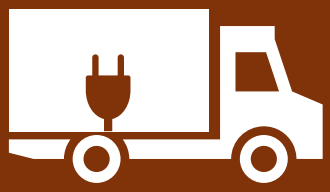

MEDIUM- AND HEAVY-DUTY COMMERCIAL AND MUNICIPAL FLEETS

MEDIUM- AND HEAVY-DUTY COMMERCIAL AND MUNICIPAL FLEETS

This chapter outlines the benefits, barriers, and pathways to medium- and heavy-duty municipal and commercial fleet electrification. This chapter's primary audience is fleet managers of local and regional fleets. While all medium- and heavy-duty vehicle classes are addressed, it does not include special considerations (e.g., charging) for long-haul trucking. Additionally, because the electric transit and school bus markets are progressing rapidly, we've dedicated a separate section of this toolkit to those vehicle types (see Transit and School Buses).

As presented in the light-duty section, taking a phased approach to electrification is recommended. Fleet managers overseeing fleets with light- and heavy-duty assets may consider reviewing the strategies here in conjunction with those presented in the light-duty section. However, despite synergies with light-duty fleet electrification, medium- and heavy-duty fleet electrification presents a distinct set of barriers, opportunities, and considerations. For instance, while a robust market for light-duty vehicles already exists, several medium- and heavy-duty vehicles are still in development and testing stages. Similarly, many light-duty EV offerings have already achieved cost and performance parity with their combustion counterparts. Parity for medium- and heavy-duty vehicles is expected to take several years.

National Leaders

- Colorado joined 14 other states and the District of Columbia in signing a Memorandum of Understanding (MOU) to advance the market for medium- and heavy-duty electric vehicles. The goal of this MOU is to ensure that 100% of all new medium- and heavy-duty truck and bus sales are zero-emission by 2050, with an interim target of 30% by 2030. The MOU signatories are working together to develop an action plan to accelerate this transition. And in 2021 the Colorado Energy Office completed a Medium- and Heavy-Duty Vehicle Study determining this transition will result in a net societal benefit ranging from $20.2 to $26.6 billion for Colorado.
- The California Air Resources Board is developing a zero-emission fleet regulation with a goal of achieving zero emission fleets by 2045 where feasible, focusing first on drayage applications and last mile delivery.
- California Hybrid and Zero-Emission Truck and Bus Voucher Program (HVIP) vouchers offer point of sale discounts for clean trucks and buses, and connects buyers and sellers through a first-come-first served incentive model. This same model was adopted by New York with the New York Truck Voucher Incentive Program.

Who to Involve in Medium and Heavy-Duty Vehicle Electrification Planning

- Fleet managers
- Fleet vehicle users
- Fleet mechanics
- Leadership and decision makers
- Facilities managers
- IT personnel

Key Takeaways

- Fleet managers are moving toward electrification as technology becomes available and tested.
- Electrifying medium- and heavy-duty vehicles will offer significant emissions benefits, which will be increasingly important as emissions requirements become more stringent.
- National, state, and regional programs are emerging and evolving to support medium- and heavy-duty fleet electrification; early adopters will benefit from incentives and subsidies.
- Some medium and heavy-duty vehicles have emerged on the market and several more models and technologies are expected to come online in the next five years.
- Cost-effectively electrifying medium- and heavy-duty fleets will require advanced planning and early coordination with Xcel Energy to ensure sufficient electric capacity.

Typical Barriers

- Medium- and heavy-duty assets have a low turnover rate.
- Fleet managers are often risk-averse, preferring to wait for technology to become more established.
- Many medium- and heavy-duty vehicle types are just now becoming available.
- Some vehicle types have achieved or exceed parity in some categories, such as operating costs, environmental impact, and safety; other vehicle types are not expected to reach parity in categories such as initial cost and fueling time for many years.
- Fleet mechanics may require training and/or may lack adequate facility space to perform maintenance in house.
- Facilities may lack adequate space and/or electric capacity to support the charging infrastructure required to charge vehicles.
- Cost-effectively charging medium- and heavy-duty fleets will require careful planning and coordination with Xcel Energy. Fleet managers may even consider "charging as a service."

VEHICLES

Vehicle availability is currently one of the greatest barriers to electrification of medium- and heavy-duty vehicles. Still, even today there are many viable options for fleet managers to consider, with many more expected to come on the market over the next several years. Some of the key players in medium- and heavy-duty vehicle electrification include Daimler, Peterbilt, Tesla, Volvo, BYD, Ford, Rivan, Lion Electric, Chanje, GreenPower Motor Company, Mercedes-Benz, US Hybrid, and Workhorse. The Colorado Energy Office compiled a list of current medium- and heavy-duty models announced to date as an appendix of a 2021 study. Some of these players are manufacturing complete vehicles ready for purchase, while other manufacturers are developing structural components and platforms to support vehicle upfitting.

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Replacement Rates

While passenger cars are typically replaced every 10 years or every 100,000 miles, truck replacement rates are more variable and, in many cases, the average vehicle's lifespan is more than 30 years. This highlights the importance of strategic electrification in this sector, as each replacement decision can have several decades of impact. Trucks that drive more miles per year are expected to have shorter battery lives, thus necessitating faster turnover rates. However, trucks and other heavy-duty equipment that operates fewer miles per year may have longer turnover rates, so are better candidates for preliminary electrification.

Medium- and Heavy-Duty Vehicle Definitions

Medium- and heavy-duty vehicles are commonly classified by gross vehicle weight rating (GVWR). GVWR combines the weight of a truck plus its payload capacity, weight of the fuel and weight of the driver. The table below summarizes the weight ratings commonly associated with classes 3-8, according to Federal Highway Administration (FHWA) standards. Class 2b, heavy pickup trucks, are included under EPA emissions standards.

Class	GVWR (lbs)	Vehicle Types	Vehicle Examples
2b	10,000	Heavy-duty pickup trucks	Tesla Cybertruck; Rivian Amazon Delivery Van
3	14,000	Small delivery trucks	Mercedes-Benz eSprinter
4	16,000	Box trucks, walk-in trucks, city delivery trucks	Ford E-450 Box Truck
5	19,500	Delivery trucks, bucket trucks, cherry pickers	Chanje v8100
6	26,000	Beverage trucks, rack trucks, school buses	Lion Electric LION6; BYD 6F
7	33,000	Street sweepers, garbage trucks, transit buses, furniture trucks, small semis	Freightliner eM2 Truck
8+	>33,000	Cement trucks, dump trucks, fire trucks, fuel trucks, semi-trucks	Tesla Semi; Daimler e-Cascadia; Peterbilt 520 EV

Key Considerations and Market Trends

The market for electric medium- and heavy-duty trucks is emerging, with several models available across vehicle classes 2b-8 and several more anticipated to come on the market in the next 1-5 years. The table below summarizes the market status for three truck types.

Vehicle Category	Classes	Key Considerations	Market Trends
Heavy-Duty Pickup Trucks	2b	Usually driven for a limited number of miles, which is ideal for electrification. Many of these vehicles are sold as bare chassis and outfitted by a third party to serve as utility vehicles, tow trucks and more. Electrification potential depends on application. This category dominates truck sales volume. On-board energy storage could be used to support auxiliary functions, such as powering tools and lifts, potentially replacing job site generators. Because many Class 2b trucks are owned by individuals or small commercial fleets, electrifying this subsector may require more tailored strategies.	Many electric trucks in this class have been announced and are typically variations of their existing light-duty counterparts
Vocational Vehicles	3-8	Drive cycles with frequent stops are a good opportunity for regenerative braking and to limit pollution from idling, during deliveries, through electrification. Electrifying delivery trucks (Class 3) can improve local air quality and health in more densely populated areas.	Class 3 vehicles are one of the most developed medium- and heavy-duty vehicle markets and are one of the most rapidly growing markets. According to a 2021 Colorado study, Class 3 sales have grown by a factor of 15.6 since 1990 compared to only 2.9 for all medium- and heavy-duty trucks.
Tractors	5-8	Trip length varies widely from less than 100 miles to more than 500 miles. Class 8 dominates energy consumption.	Several models are already available, primarily sold for drayage applications. Trucks capable of traveling 100-500 miles are anticipated to come on the market within the next 1-5 years.

Garbage Trucks

With over 50,000 garbage trucks collecting trash in the United States, these class 7/8 vehicles represent a significant opportunity to electrify our fleets. Garbage trucks travel at low speeds, tend to travel short distances, and stop frequently - making them good candidates for early electrification. It is estimated that diesel garbage trucks require approximately $5,000 in annual maintenance, primarily associated with frequent braking. Regenerative braking available through electric models is good for enhancing vehicle range and reducing brake wear and tear. Lion Electric claims its Lion8 e-truck could reduce maintenance costs for garbage trucks by 80. Lion Electric, Peterbilt, Mack, and BYD all have electric garbage trucks on the market.

CHARGING

While smaller trucks may be able to utilize Level 2 chargers, the large battery sizes and duty cycles of some trucks will necessitate investment in more powerful chargers. Additionally, meeting the charging demand of multiple electric vehicles will likely require installation of multiple chargers, which can result in very high demand. The table below summarizes approximate electricity demand by vehicle class.

Vehicle Class	Charger Type	Charging Demand
2b-3	Level 2 Charger	6 kW
4-5	Level 3 Charger	15-70 kW
6-7	Transit Chargers	60-200 kW
8+	Megachargers (planned)	1,600 kW+

Cost-effectively electrifying medium- and heavy-duty fleet vehicles will require early planning and coordination with Xcel Energy. Fleet managers will need to coordinate with Xcel Energy to understand the capacity of electrical infrastructure at desired charging sites and any potential upgrades necessary to meet charging demand, and explore rate options to keep charging costs low. Utility upgrades can range from $5,000 for secondary distribution upgrades to $9 million for substation upgrades. Fleet managers may also consider leveraging solar options and explore charging services to keep charging costs low.

PHASED STRATEGIES

With the market for vehicles and EV infrastructure evolving so rapidly, taking a phased approach can help fleet managers leverage incentives offered to early adopters, as well as give them time to learn and explore which technologies will be the best long-term fit.

Phase 1: Laying the Groundwork → **Phase 2: Piloting Vehicles** → **Phase 3: Full Fleet Electrification**

Phase 1: Groundwork

Preliminary research and evaluation are important first steps to help guide your community's fleet electrification process. Evaluate your fleet to better understand which vehicles might be eligible for replacement soon, and which vehicles would be good candidates for piloting electrification. Review your procurement process to remove any barriers to fleet electrification and prioritize future EV purchases. Explore options for siting charging stations in coordination with Xcel Energy. Leverage peer learning opportunities and available incentives to support your pilot electrification efforts and accelerate full fleet electrification.

Refresh Procurement Guidelines

Review your procurement guidelines to remove any barriers that may prevent EV purchases (e.g., exclusive bid lists, "like for like" requirements) and consider requiring staff to justify the purchase of a non-EV option. You can also include a requirement that fuel consumption and greenhouse gas (GHG) emissions be considered economic factors when making vehicle purchases, rather than only considering the upfront cost of the vehicle. This will enable procurement processes to capture all benefits of EVs and consider them a part of the decision criteria.

Examples:

- The City of Charlotte adopted a strategy to strongly discourage the purchase of new ICE vehicles, using a multi-tiered procurement approval process that offers the ability to appeal - to move to the next fuel tier with approvals from multiple departments and a special panel. The tiers begin with zero emissions vehicles and descend to alternative fuels, hybrid fuels, gasoline, and finally diesel.
- The City of Seattle's 2019 Green Fleet Action Plan set a target that 100% of all new/replacement vehicles will be chosen from green vehicle standard using the City's GHG+ Total Cost of Ownership (TCO) with cost of carbon calculator to determine best purchase. The plan includes a strategy to begin purchasing EVs for all heavy-duty trucks in 2019.

Define Pilot Vehicle Criteria

Identify a few vehicles you think would be ideal to pilot with an electric vehicle; define how (drive cycle) and how much (duty cycle) the vehicles are used. This information can be collected through telematics or other fleet tracking data and will help you decide which vehicle(s) you can electrify today based on TCO, costs savings, and model availability. This exercise will also help inform where and what type of charging would best serve your pilot vehicle(s).

Identify Potential Pilot Charging Sites

Using the drive and duty cycle data, identify potential locations for EV charging stations. Based on your need, you may select locations that are on-route, at the origin/destination, incorporated into a depot, shared with another entity, or some combination of those options.

You'll also want to consider electrical infrastructure capacity at these sites. Medium- and heavy-duty fleet vehicles may require a larger energy demand compared to light-duty options, so you will need to work closely with Xcel Energy to understand electrical infrastructure requirements and determine if upgrades would be necessary to support charging. With this information, you will be able to narrow down your list to locations that meet the needs of the vehicle and minimize costs from electrical infrastructure upgrades.

Example:

- The Portland, Oregon-based Meals on Wheels People--which provides meals for seniors in the Portland metropolitan area—electrified their transport refrigeration units (TRUs) and installed electrified parking spaces at their loading docks so vehicles can be recharged in the middle of the day when they are being restocked for afternoon deliveries.

Peer Learning

Reach out to peer communities or organizations that have electrified similar fleet vehicles, for information that can help inform decision-making. Be sure to ask about:

- Vehicle performance, especially in local extreme weather conditions
- What type of charging they are using (e.g., on-route, centralized depot)
- Actual fuel and maintenance costs
- Successes and lessons learned from early adopters can help streamline your transition.

Engage Xcel Energy

Be sure to engage Xcel Energy as early as possible to avoid pitfalls like higher-than-expected infrastructure or fuel costs, and to understand available support through Xcel Energy. As soon as you are considering electrifying your medium- and heavy-duty fleet vehicles, set up a preliminary meeting with your Xcel Energy representative to discuss potential scale of cost for infrastructure upgrades to serve the load and available electric rates and programs.

As you go through the planning process, Xcel Energy will be an important partner. Over time it will be important to discuss with them:

- The number of vehicles you anticipate charging and the timeframe for your vehicle purchases
- Amount of power (kWh) vehicles will require for charging
- Time(s) of day vehicles will likely charge
- Site(s) where vehicles will be charged
- Strategies and technology to manage charging to avoid peak demand

Track Available Incentives

Monitor grants, rebates, and other financial incentives for EVs or EV charging infrastructure, to help inform purchasing decisions and reduce financial obstacles. Maintaining an updated list of actively running group-buy and other purchasing programs in areas in or near your community will help you keep up to date on new purchasing programs as they become available and will help fleet operators take advantage of opportunities before they expire. For more information about resources that may be available in your area see the Funding section.

Phase 2: Piloting Electrification

Once you've evaluated the opportunities for electrification in your fleet, policies, and sites, select one or a few vehicles to electrify. This can serve as a pilot project to inform future electrification efforts. Use this phase to research vehicle type(s) and charging infrastructure for your pilot vehicle(s), purchase your equipment, and orient your employees. Pilot vehicles can be "low hanging fruit" - vehicles that are very well suited for electrification and ready for replacement. Pilot vehicles can also be used to demonstrate the value of electrifying ahead of typical replacement schedules, or even to test the electrification of medium- and heavy-duty vehicles as well as vehicles with special uses such as police vehicles.

Purchase Suitable Technology for Pilot

Using the groundwork completed in Phase 1, review available options for the pilot vehicle(s), charging infrastructure, and networking technology. Considerations when choosing pilot technologies include:

- **Vehicle Availability**: Medium- and heavy-duty EV options continue to grow. Explore the U.S. Department of Energy Alternative Fuel and Advanced Vehicle Search to find and compare EV options by vehicle type and other criteria.
- **Upfitting Needs**: You may need to customize your vehicle to your needs (e.g., adding ramps, storage, cab guard, ladder racks, cranes, shelving). When choosing your upfit provider make sure they are comfortable working with an EV; identify any additional costs that may arise.
- **Total Cost of Ownership**: While EVs typically require higher upfront costs, the lower operating and fuel costs and financial incentives can help achieve cost savings over time. Estimate and compare total cost of ownership for pilot EV options, as well as an ICE alternative.
- **Warranties**: Battery warranties are often separate from the vehicle. so be sure to ask what the warranties include and if there is an option to purchase an extended warranty if desired.
- **Maintenance Support**: Ask if the vehicle manufacturer has a dedicated local support team for maintenance, or if they offer training for your maintenance staff.
- **Vehicle Range and Charging Options**: Be sure the EV's battery range is consistent with the trip types required for the vehicle. If the vehicle needs to run all day, consider options for on-route, DC Fast (Level 3) Charging.
- **Networking Compatibility**: The purpose of a pilot project is to inform future decision-making. By setting up networked charging stations, you will be able to better understand the energy use and costs from your pilot and how optimize charging based on time-of-use rates. Make sure your selected charging station equipment and network solutions provider interface well to form a cohesive charging system.

Municipal Refuse Fleet Electrification Pilot

Xcel Energy developed the Municipal Refuse Fleet Electrification Pilot as part of the Transportation Electrification Plan (TEP) in Colorado to provide extended test drive demonstrations at no cost (except for electricity usage).

Example:

- Pacific Gas and Electric Company (PG&E) is piloting the first all-electric utility vehicle to conduct routing on emergency overhead line work. The vehicle was upfitted with an aerial device and other customizations to be able to meet the company's needs.

Install Chargers

Focus on installation of chargers as soon as the vehicles have been ordered. It can take time to procure chargers and make upgrades to facilities to support chargers. Contractors will want to know the specifications of your chargers so they can provide appropriate electrical service to the chargers.

Employee Training

Introduce staff to the vehicle(s) and provide basic EV training that includes:

- **Appropriate Trip Type**: Based on the battery range of the pilot EV, provide guidance on the length of trips that are most appropriate.
- **Charging Instructions**: Provide hands-on training on how to use the charging station and the charging schedule based on rate structure.
- **Basic Vehicle Operation**: Show staff how to use the vehicle, highlighting similarities and differences to ICE model.
- **Benefits**: Share why your organization prioritized this purchase, such as air quality benefits, carbon reduction goals, cost savings, or leading by example. Highlight any expected driving benefits, including reduced engine heat, vibrations, emissions, noise, and braking.

Provide an ongoing channel for staff members to give feedback about their experiences and offer suggestions for other vehicles that might be a good fit for EV conversion.

Example:

- Mack Trucks, an American truck manufacturing company, opened a training facility to provide education and training on the recently released all-electric garbage truck - to Mack employees, owner-operators, fleet customers, technicians, salespeople, and aftermarket personnel.

Evaluate Pilot Results

After six months to a year (this could vary based on how frequently the vehicle is used), gather the findings from your pilot project to inform future purchases. Key takeaways should include:

- **True Operational Costs**: Compare the estimated fuel, maintenance, and networking costs with what you experienced to fine-tune your TOC estimates for future purposes.
- **Charging Optimization Opportunities**: Determine if any adjustments need to be made to where you are charging; work with Xcel Energy to optimize your charging patterns and rates - to minimize costs.
- **Employee Feedback**: Host listening sessions with your drivers and maintenance staff to understand what did and didn't work - to inform future purchases.

Example:

- After the pilot phase of its first all-electric garbage truck in 2020 exceeded expectations, the New York City Department of Sanitation has plans to order an additional seven trucks and is trialing an all-electric street sweeper.

Phase 3: Full Electrification

Use the information you collected in Phase 1 and lessons learned in Phase 2 to plan for electrifying a larger portion of your fleet. Similar to electrifying your light-duty fleet, a full- or partial-electrification plan may include developing a comprehensive vehicle replacement plan and a charging infrastructure plan. Given the potential for extremely high electricity demands if multiple chargers are sited in one location, site planning, design, and construction are paramount for expanding your medium- and heavy-duty electrification efforts.

Develop a Full Vehicle Replacement Plan

Developing a full vehicle replacement plan will require your organization to build on work completed in Phases 1 and 2. Complete a full analysis of drive cycles, duty cycles, and special operational considerations, including typical daily range and dwell time. For larger fleets, telematics for vehicle tracking may be helpful, or even necessary, to adequately analyze your fleet for electrification potential. This analysis can help identify vehicles most suitable for electrification, inform necessary battery sizes and other vehicle features, and preliminarily inform charging siting considerations. Telematics can help identify opportunities to optimize your routes and schedules as well as understand which could be modified to better suit electric options.

Once your analysis is complete, conduct research to identify potential electric alternatives. Consider what qualities need to be on par with traditional vehicles. For instance, many electric vocational vehicles (e.g., delivery vans) have already achieved or exceeded operational cost, safety, and environmental parity, but have not achieved daily range or fueling-time parity. Based on vehicle suitability, replacement cycles, technology availability, and parity, identify vehicles suitable for electrification in the short-, medium-, and long-term. You can use the results of this analysis to set interim and long-term fleet electrification goals.

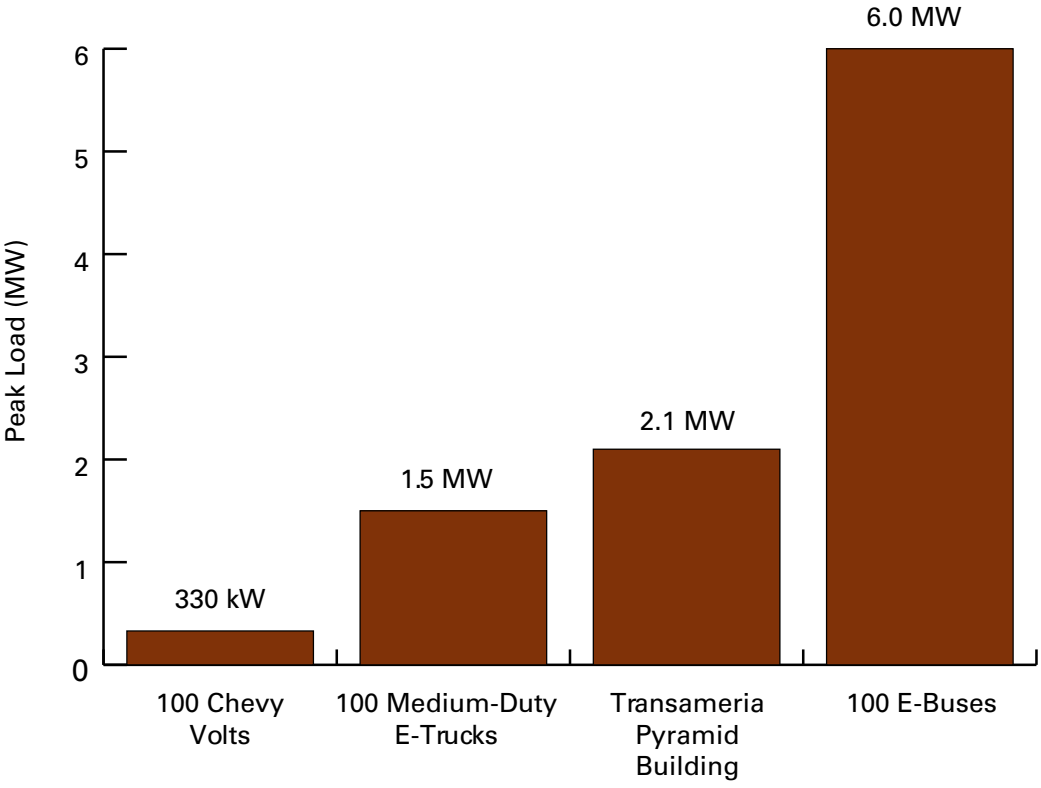
Example:

- The Sacramento Municipal Utility District (SMUD) has established criteria, key performance indicators, and software to evaluate fleet utilization and inform their fleet electrification plan. To address vehicle needs that weren't available from the original equipment manufacturer (OEM) market, SMUD began working with Zeus Electric Chassis which manufactures custom, all-electric Class 4, 5, and 6 work trucks.

Develop a Charging Infrastructure Plan

As you identify vehicles to replace with electric alternatives, use the results of your analysis to develop a charging infrastructure plan. Identify potential locations to site charging infrastructure, either at facilities, on-route, or at an off-site locations. Then, determine what type of charging levels you might need to support drive cycles and duty cycles. For example, you may decide to install DC Fast Charging at the loading facility for delivery vehicles to recharge midday while they are loaded.

Fleet charging loads will depend on vehicle types, duty cycles, vehicle miles traveled (VMT), locations and numbers of vehicles, and other considerations. Coordinate with Xcel Energy early in your planning process to discuss charging considerations, such as whether identified sites have sufficient electric capacity or need upgrades, what charging rate structures are available, and whether there are additional incentives available to bring down upfront costs of infrastructure. You may also consider installing onsite renewable energy to offset some of the new electricity demands. One report stated that a fleet of 56 buses would require approximately 11 MWh/day and a fleet of 542 could require 109 MWh/day (Black and Veatch, 2019). Another source shares sample peak loads for different electrification scenarios, showing that 100 medium-duty e-trucks could yield a peak demand of 1.5 MW.



Peak loads for various EV fleets without mitigating grid impacts, based on 2020 ACEE White Paper by Steven Nadel and Eric Junga

Electricity is more costly to generate and deliver at certain times of day, especially during the hottest and coldest months of the year. Fleet managers can often cut charging costs in half by managing the times their vehicles charge. The general practice of reducing costs by controlling charging is known as "managed charging."

Managed charging can be achieved by staff (who manually connect vehicles to chargers at times when energy is less costly) or by computer-controlled systems. The manual practice becomes labor-intensive and complex as the fleets grow. Manually-managed charging may lead to costly errors (e.g., a single vehicle plugged in 15 minutes earlier than scheduled could add thousands of extra dollars to the month's energy bill). Computer-controlled systems can precisely control the timing of vehicle charging. With these systems, vehicles are plugged in at the end of the day, but the computer system prevents power from flowing to the vehicle until the time when energy costs are the lowest. The computer system can also limit the amount of power being consumed at any one time, reducing the need for costly investments in utility service upgrades. Involve your IT department early in the charging infrastructure planning process to better understand your ability to automate charging equipment. You may also consider exploring "charging as a service" – a service dedicated to ensuring vehicles are charged at the proper locations, as scheduled, to avoid unwanted demand spikes and ensure full batteries when needed.

Finally, your charging plan should include financial considerations – how will your organization pay for the chargers and the additional electricity? Which chargers will be purchased and installed first? See the Funding section to begin identifying funding resources to support your vehicle replacement and charging infrastructure plans. What incentives are available to reduce the cost of charging infrastructure.

Example:

- After determining that Level 2 charging was sufficient for short-haul delivery and distribution, Frito-Lay installed 10 Level 2 charging stations—including load-monitoring equipment and charging monitoring software—at a distribution center in 2010. The project was a success; since then Frito-Lay has invested $6 million in EV infrastructure in more than 25 locations and has plans to continue expansion.

Implement Vehicle Replacement and Charging Infrastructure Plans

Significant lead time is needed for any necessary facility upgrades to support chargers, so you should start planning for site upgrades as soon as you have completed your vehicle replacement and charging infrastructure plans. Site plans can be further refined once you have completed your initial vehicle and charger procurements. An electrical engineer will need to be engaged to draw up plans for charging infrastructure at the site and provide quotes for the work. These plans should be submitted to Xcel Energy or the electric utility serving the site. If the initial conversation with Xcel Energy indicates that significant upgrades will be needed to provide energy to your fleet, Xcel Energy will not be able to design those upgrades until they receive the plans from the engineer. This means a minimum of several months' work must be done before Xcel Energy can begin its work. The Xcel Energy design process can take several months as well. If Xcel Energy initially indicates that only minimal site upgrades will be needed, it is likely that Xcel Energy will only need to review and approve the engineer's drawings. By including Xcel Energy early in you will not only be able to address potential concerns with energizing your charger but you can incorporate any Xcel Energy programs that may be available to support your vehicle purchase and charger installation.

Key decisions will need to be made before plans can be drawn up. Will the EV fleet expand in the future? If so, does it make more sense to oversize the electrical infrastructure now, so it does not need to be upgraded later? Where, exactly, will charging stations be located? Where will conduit run? Where will a new transformer be located? Use your vehicle replacement and charging infrastructure plans and work with an electrical engineering firm to answer these questions.

During the charging infrastructure installation process, reach out to vehicle providers to understand the lead time for purchased vehicles - to align with your charging infrastructure plans. This lead time varies widely depending on whether you are purchasing vehicles directly from an OEM or working with a custom-vehicle manufacturer.

Share Your Leadership

Just as you were learning from others in Phase 1, others can learn from your successes and lessons learned. Participate in peer networks and other sharing opportunities - to inspire other fleet managers in the region and continue learning about new innovations that could enhance your fleet electrification efforts.

Example:

- The North American Council for Freight Efficiency (NACFE) and RMI organized the Run on Less-Electric (RoL-E) electric truck technology demonstration event in 2021. The three-week demonstration showcased electric trucks in everyday operation from 13 company fleets across the U.S. and Canada.