



Shared Charging Sites: Accelerating the ZEV Market and Delivering Public Benefits

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A New Business Model to Scale Charging Availability

With the public and private sectors working in tandem to decarbonize freight transportation nationwide and achieve the high-impact emissions reductions necessary for meaningful climate action, charging infrastructure must be widely available and built out rapidly to ensure fleets can successfully operate their newly adopted battery-electric trucks (BETs). Ambitious new ventures in charging infrastructure development are securing the resources and expertise to deliver infrastructure to fleets, assist utilities, support government coordination, and make possible compliance with regulations directed at increasing the number of BETs on American roads. With dedicated procurement of equipment at scale—and creative engineering capabilities that are catalyzing innovative deployment strategies, effective site configurations, efficient system architectures, and advances in new software and energy management solutions—charging site developers can drastically cut down lead times for deploying high-capacity sites.

These sites are engines for enabling the rapid development and scaled-up rates of charging asset availability, which governments must have in supply to reach emissions-reduction targets. In addition, these sites bring clean jobs, improved public health, and local tax benefits to disadvantaged communities, which have been disproportionately affected by transportation-driven greenhouse gas emissions and boxed out of the clean transportation revolution. Today, there are billions of combined dollars in federal, state, utility, and local funding programs in place to support these projects.

**SHARED
CHARGING SITES**
are open to more
than one fleet.

CALSTART

This paper answers the most common questions about a type of charging site that is in demand but which needs more recognition from government: “shared” charging sites, also called “shared multi-fleet depots.” As the name indicates, these sites are open to more than one fleet, made available by a third party. This type of deployment, which involves a specific configuration mixed with a business model tailored to actual fleet needs, lets fleets use chargers without having to build out their own infrastructure or acquire chargers before they acquire vehicles. By using shared charging sites, fleets know what to expect from a charger, rather than risk using “public” stops that may not cater to their needs. Shared sites allow fleets to use assets without owning them in a controlled, predictable, and secure setting.

Understanding this model is important, because it could be more aggressively supported as a pathway through which fleets support decarbonization—on shorter timelines and with less capital outlay than other methods. This means that as these sites proliferate, adoption of new vehicles could be rapidly scaled up. However, the immense public-sector investments in charging infrastructure are not being directed toward these types of sites quick enough, or in many cases, at all. Terminological confusion and pre-existing notions of how charging infrastructure works, largely from the light-duty vehicle space, have clouded much of the discussion of this business model and what it enables for technology adoption pathways. This paper also highlights how this model promises to be one of the most efficient and best uses of government funding support.

What are shared charging sites?

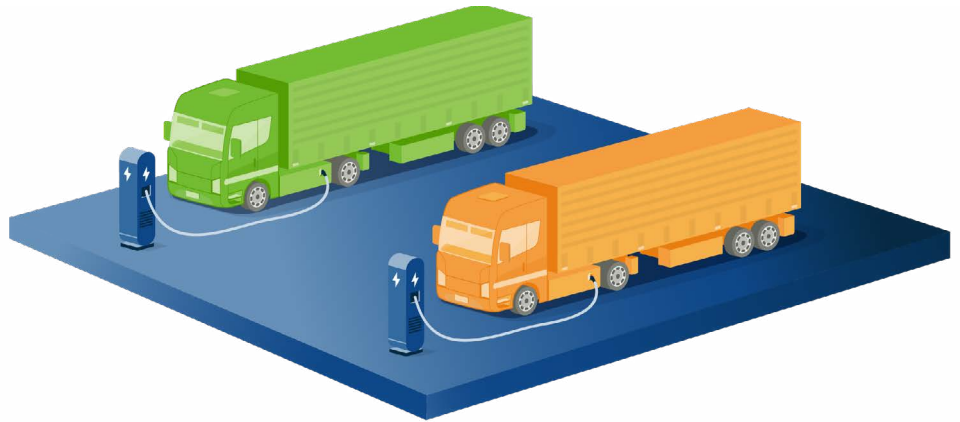
Shared charging sites, or shared multi-fleet depots, are made available to more than one fleet through an arrangement with the third-party site owner and operator. These sites are offsite and outside of a private, single-user, dedicated depot, and fleets are guaranteed access through refueling arrangements similar to those existing in the trucking industry. In addition, these sites:

- Include amenities assisting fleets in learning how to charge.
- Demonstrate trackable performance and serve industry.
- Yield clear public benefits.

What are different types of shared charging sites?

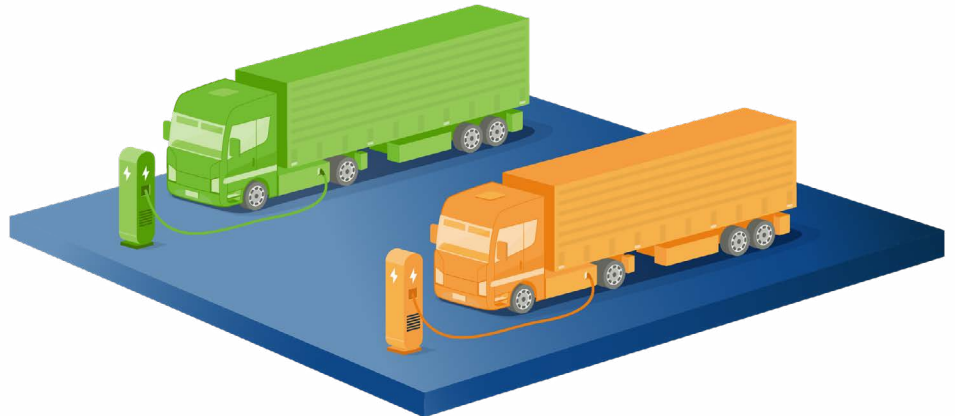
1

A third-party site (blue) offers scheduled access to any charger on the site to be used by fleets (green, orange).



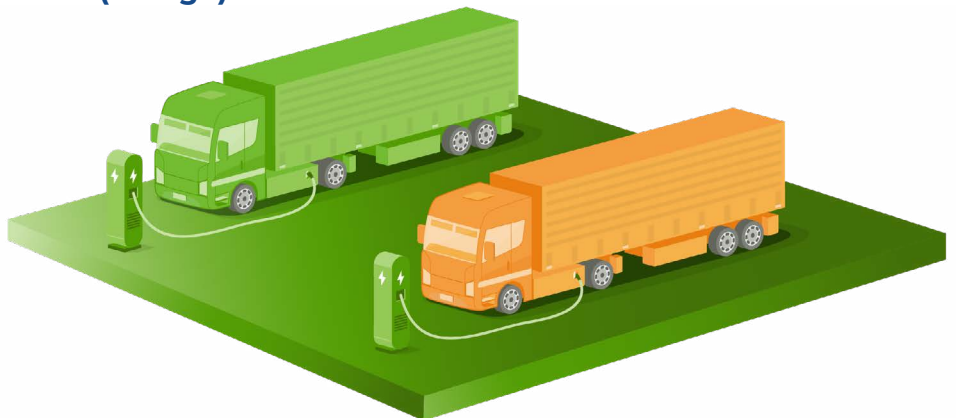
2

A third-party owned/operated site (blue) offers specific chargers for two fleets (green, orange).



3

A fleet (green) allows a third party to operate a charger for another fleet (orange) on its owned site.



How do shared sites differ from private depots?

Private-depot locations are likely the go-to conception of a site when implementers think of charging sites and how they work. In this model, when a fleet elects to convert their depot, they work to have a dedicated charging facility on their property. The site is dedicated to their trucks and not available to other operators.

Private-depot sites have rapidly become a clear target for public funding support to defray costs of converting to BETs, on the assumption that fleets wanting to decarbonize will likely need their own dedicated access to infrastructure. The public dollars support a clear fleet-transition commitment and regulatory compliance outcome. But this configuration will not support much, if not most, of the aggregate charging-asset use needed to support the transition to clean fuels. This critical point is missed by most government programs: The public interest is served not only or primarily by deploying more chargers, but by making it possible for chargers to be used and working to drive up charger utilization. Since the configuration of these private-depot sites does not allow any other fleet to use them, the public benefit of charger use is only scaled when the funding support also scales.¹

The sections below point to some of the problems in thinking that the clean fuel transition will occur only through fleets electrifying their private-depot sites. It is clear other types of charging arrangements may be necessary, specifically sites where infrastructure is owned and operated by a third party and able to be used by multiple fleets. Lack of understanding of how these third-party sites are built and operated, as well as how public funds can be used to build and grow charger utilization at them, may be the most urgent problem facing implementers.

Why are light-duty charging sites and gas stations false analogies for truck charging sites?

Due to their current market saturation for refueling, another model that unfortunately has immense currency is based off the gas station—specifically, gas stations for light-duty vehicles. A charging site in this model would consist of stations that can be pulled up to any time and where charging is provided on a first-come, first-serve basis. This gas-station model has been immensely popular when designing light-duty electric vehicle (EV) charging stations and is generally baked into federal notions of what government-supported sites should look like for those vehicles. The rationale is simple and based on end-user familiarity: Light-duty vehicle operators know how to use gas stations, so serving EVs should mean swapping gas pumps for chargers.

However, the realities of trucking make this gas-station model for a site extremely ill-suited to the demands of moving goods. Trucking sites have few resemblances to light-duty refueling stations. Critically, analogizing from the gas-station model has led to immense lack of interest in how refueling sites actually serve trucks—including how, where, and under what conditions users refuel—and how a network of sites can be built out.

¹According to forthcoming analyses by CALSTART, depot charging may make up only half of charging sites, if charging deployments are made at a pace to reach the climate goals set for the sector and which does not overbuild infrastructure for this transition.

Implementers applying this analogy to trucking seem to assume these types of sites would be dropped into high-trafficked areas, and drivers would flock to them. But to serve the trucking sector effectively, support compliance with regulation, and fulfill public obligations to vigorously support zero-emission transitions, the complex logistics sector requires more than building out a minimum viable network of this site model.

The supposed benefit of this implausible gas-station concept for BETs—the assumed “access” afforded by such a site to users—would not live up to expectations. In reality, any and every end user would compete for time and space to charge, and conflicts between user expectations and the circulation through a site could occur daily. This is the case with light-duty charging sites built according to this model, and queuing is already a problem. Analogizing truck charging to these sites would import this charge-point disorder into the freight industry. If forced upon site developers, the results would be predictably bad: With no clarity on whether chargers are available, companies would avoid using sites altogether, and fleets with valuable cargo may think twice about using a site. The most likely scenario is that sites built according to the gas-station model would turn into rest stops. While serving a critical function for operator downtime, rest stops are not the main refueling centers needed to move goods.

Why would fleets consider charging at a third-party location or “sharing” a site?

Fleets find it both time-intensive and capital-intensive to build their own dedicated charging facilities. Furthermore, they may not have access to owned facilities to build the required charging for longer, over-the-road trucking routes.

To build private charging infrastructure, a fleet must:

- Engage in facility upgrade planning and development with a variety of entities such as their utility and landlord.
- Build and operate charging facilities, led by a dedicated development team with experience in development, permitting, utility coordination, sophisticated grid-edge energy management, and delivery.
- Have dedicated maintenance and operations staff focused on keeping the equipment running and the site secure.

Fleets often do not own their facilities.

To upgrade a facility, a carrier usually needs to own land or have at least a 10-year lease and the ability to work with the landlord on permanent facility upgrades. The need for fleets to constantly optimize supply chains along with changes in manufacturing and demand for goods makes 2- to 3-year leases common in the industry. For example, warehouses are commonly leased under 5-year terms.²

²Some major omni-channel shippers and retailers, for example, [own less than 5 percent](#) of the footprint they operate.

Critically, to get a return on investment, landlords commonly desire a long-term lease, and not every landlord desires the installation of charging infrastructure. Relying on the alignment between tenants and landlords in every instance of fleet transition, even apart from the question of whether it places undue burden on fleets, makes scalability extremely unpredictable. To assume all fleets in the trucking sector will have to thread this needle could arguably constitute an immense risk to the entire clean vehicle movement. This makes third-party solutions even more critical to public goals. Shared charging removes landlord and leasing constraints from the equation and allows a carrier and owner-operator to access charging when they want and to shift their routes easily if the facility location changes. By contrast to private depots, this model could offer genuinely scalable solutions.

Facilities come with energy constraints.

Installing charging at a facility means a fleet needs a distribution circuit with sufficient power-hosting capacity. Unfortunately, the nation's distribution grid is constrained—and upgrades are both expensive and time consuming.³ In some cases, locations cannot be upgraded in a reasonable timeframe. Offsite charging at a capacity-rich location that a third-party provider located and built out, in close coordination with the utility, allows a fleet to use it as soon as new BETs are delivered. Providers can also work with non-capacity-rich sites to find creative solutions with onsite generation or microgrids to enable charging.

Site security is paramount.

Security for BETs, cargo, and charging equipment, which with expensive grid upgrades can [cost more than \\$1 million](#) and must have reliable uptime, is crucial to protect these valuable assets. For truck security, driver safety, and charging reliability, having depots shared with a specific set of fleets under controlled access conditions is crucial.

Why is “sharing” more advantageous than uncontrolled access, and why do fleets need controlled access to sites?

The usage and needs of medium- and heavy-duty freight vehicles are unique and different from passenger-vehicle needs, where the gas-station model of unrestricted, uncontrolled, and unmonitored access to chargers may be less impactful. In contrast to light-duty vehicles, working trucks that deliver freight need:

- 1. A guaranteed** spot to charge at the end of a duty cycle to be ready for the next.
- 2. The ability to schedule** mid-route charges rather than show up at a depot and wait.

It is not efficient for a vehicle operator to drive to a site without knowing if there will be a queue, then wait 1–2 hours. In passenger travel, this situation may occur less frequently given the vehicles' smaller batteries and the higher chance of a shorter queue time, but to a fleet, this delay would be fatal for their business.

³This reality is not just true of the United States, but [globally](#).

In addition, small fleets or owner-operators who adopt BETs may not have a depot to charge in; their only option for recharging would be subject to the conflicts arising from uncontrolled circulation at a site.

Since freight businesses run on thin margins, guaranteeing charging allows fleets to stay on schedule. These baseline guarantees also make possible certain optimizations that cannot happen with unpredictable circulation of trucks at a charging site.

Guaranteed access is a key feature of a shared multi-fleet depot. Third parties offering charging solutions for commercial fleets to manage access and rationalize the circulation at the site removes significant risk. Controlled access is not restricted access; it is rationalization to avoid charge-point disorder and the imposition of direct and significant technology-integration penalties for fleets.

How does the shared-site model help scale fleet electrification? Why should it merit funding support alongside the private-depot model?

Bringing recharging infrastructure into a depot is difficult for fleets for the reasons mentioned above, but also because this approach does not scale. The charging loads served by this infrastructure require significant coordination, often exceeding the budgets, time, and resource intensity needed for an overnight, passenger-car charging station. At the same time, forcing fleets out of their existing operations only to sites with uncontrolled access and uncertain refueling availability is not enough to ensure fleets meet their own sustainability targets, address their own needs for efficient operations, or meet regulatory compliance pathways, especially as BET adoption accelerates in the freight sector.

Thinking each fleet will “figure it out for themselves” does not address the problem of scale, nor does the logic of “if you build it, they will come.” Implementers must take a more active and informed approach to how buildout will happen, becoming deeply involved with solutions that guide infrastructure development.

Fortunately, industry understands that the concept of sharing is key to scale technology integration. It has precedent in other sectors where focus on aggregating demand for scarce infrastructure and seeking to develop economies of scale are drivers of facilitating technology adoption. Historically, making use of shared infrastructure in the utility and transportation sectors has accelerated adoption of new technologies and benefited both industry and consumers. In the 1990s, [wireless cellular providers](#) began divesting their existing communications infrastructure to newly formed companies that then consolidated multiple carriers onto shared towers. This movement toward a shared asset reduced capital expenditures for the carriers, allowing them to invest in their networks and customers as well as reduce the number of underutilized towers.⁴

Similarly, because shared charging sites are designed to meet the most critical needs for fleets without many of the challenges they would encounter in their own depots or at uncontrolled sites, it promises to be the quickest to high-asset utilization, which in turn frees up more capital for new sites to be built.

⁴Meanwhile, it is acknowledged that certain failed visions for infrastructure integration (such as [early intelligent-transportation ventures in the 1990s](#)) often involved indifference to the affordances provided by sharing infrastructure.

In other words, shared multi-use sites may have the most potential to scale infrastructure availability quickly, serving the public need for rapid spread of widespread charging. Government implementers need to be allowed the discretion to fund these types of sites for the larger growth of a zero-emission freight network.⁵

How do shared charging sites serve the public good?

Shared charging sites:

- Enable air quality improvements by helping fleets rapidly electrify.
- Allow economies of scale for charging services for both utilities and fleets.
- Can uniquely serve owner-operators who cannot find charging.
- Facilitate freight movement that provides an essential service to the public.

Shared charging at controlled sites deployed by a dedicated and experienced developer fills out the middle ground between private depots and uncontrolled charge points. It gives fleets in an entire area a new refueling option, allowing them to consider accelerating their BET transition plans. It also fosters public-private partnerships at the grid-edge around the provision of new and diverse energy services. Public investments in such shared infrastructure for decarbonization [are common in rail and port contexts](#) and clearly deliver a public good in a similar manner: Shared multi-use infrastructure makes roads into electric highways, and public investment in these sites could also be said to invest in a value-added service for the roadway. In other words, public dollars ensure not only regulatory compliance pathways for individual fleets can be met but that infrastructure services delivered by the surface transportation network enhance regional innovation and competitiveness.

Is shared charging considered private charging or public charging?

Shared charging is the middle ground between public and private charging. If implementers wish to incorporate this language into other definitions (i.e., “private” charging or “public” charging), this does not change the benefits of the model, which is efficient and has a demonstrable public good. Implementers should consider the following:

- Fleets, utilities, and government implementers are all currently considering shared charging as a legitimate, distinct, and clear model.
- This model has precedent in telecom infrastructure investment and in current areas of the transportation system that are widely understood to deliver many public benefits, such as rail facilities and port facilities. There are multiple ways to define “publicness” (not all of which are relevant).
- Industry finds the most useful way to distinguish charging service offerings based on whether they offer controlled or uncontrolled access—with much risk attached to uncontrolled access.

⁵See the [National Zero-Emission Freight Corridor Network Strategy](#) for more information. Shared infrastructure is a key component of CALSTART’s [Phasing in U.S. Charging Infrastructure](#) vision and roadmap.

See the above sections for more on the clear public benefits of charging, and why increasing the public stake in this shared-site model with public funding support is urgently needed.

How might shared charging be defined in authorizing legislation?

Given all the benefits of shared charging noted above, it is important for implementers to make a space for shared charging in federal, state, and regional/local contexts. This means legislators must:

- Recognize shared charging as a viable charging solution.
- Incentivize shared charging and make it eligible for medium- and heavy-duty infrastructure-focused funding.
- Ensure that measures to comply with emissions regulations include participation in a shared charging location as a potential pathway for compliance—rather than burden fleets with the difficult and confusing facility upgrade process and the challenge of owning and operating more infrastructure for every vehicle they purchase.

Shared charging can therefore be defined in legislation as: “A charging site that is open to more than one fleet.”

Are shared charging sites eligible under any existing programs or definitions?

A few programs recognize the benefit of shared sites and have set precedent for inclusion in funding programs.

Infrastructure Investment and Jobs Act (IIJA)

At the federal level, shared heavy-duty charging sites are eligible under the National Electric Vehicle Infrastructure Formula Program, as well as a number of other Federal Highway Formula Funding programs such as the Congestion Mitigation and Air Quality Improvement Program, Carbon Reduction Program, and more. This eligibility was codified under the definition of eligible projects in the Infrastructure Investment and Jobs Act (IIJA) under [PUBLIC LAW 117-58—NOV. 15, 2021 135 STAT. 1423](#): “funds made available under this paragraph in this Act shall be for projects directly related to the charging of a vehicle and only for electric vehicle charging infrastructure that is open to the general public or to authorized commercial motor vehicle operators from more than one company.”

California Senate Bill (SB) 671 Guidance

A “shared depot” model is noted in the [SB 671 Clean Freight Corridor Efficiency Assessment](#) authored by the California Transportation Commission:

“As multiple fleets and independent owner-operators will be able to use a shared depot facility, these sites could be considered publicly accessible. A significant portion of medium-duty and heavy-duty trucks may rely on the shared depot model to serve as a central fueling hub, or hub-and-spoke model, and may also rely on opportunity charging infrastructure along their routes.

“Contracting with a third-party fueling provider can sometimes be more cost effective for fleets than developing their own zero-emission depot. If fleets can save money on infrastructure, it will allow them to invest more in zero-emission trucks.”

California Energy Commission EnergIIZE Program

The [California Energy Commission’s EnergIIZE program](#) recognizes shared charging as eligible and defines it as infrastructure “intended for shared use by two or more MD/HD fleets.”

California Low Carbon Fuel Standard (LCFS) Program

[California’s LCFS program](#) defines a “shared” station as a “station that is open to multiple fleets.”

Con Edison PowerReady Medium & Heavy-Duty Vehicle Program

[Con Edison’s program](#) to convert vehicles to electric in New York City and Westchester County defines shared sites as “stations open to multiple fleets.”

Washington Clean Fuels Standard

[Washington State’s Clean Fuels Program rule](#) outlines that “shared MHD-FCI charging site means a non-public charging site for electric vehicles with a gross vehicle weight rating of 8,501 pounds or more that can be accessed by at least two MHD fleets under different ownership and control. Site security controls are permitted provided there are no obstacles impeding authorized fleet vehicles from accessing the site.”

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About CALSTART

A mission-driven industry organization focused on transportation decarbonization and clean air for all, CALSTART has offices in California, Colorado, Florida, Michigan, New York, and Europe. CALSTART is uniquely positioned to build the national clean transportation industry by working closely with its 285 member companies and building on the lessons learned from the major programs it manages for the State of California. CALSTART manages more than \$500 million in vehicle incentive and technical assistance programs in the United States and is leading a global effort to build the zero-emission commercial vehicle market.

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