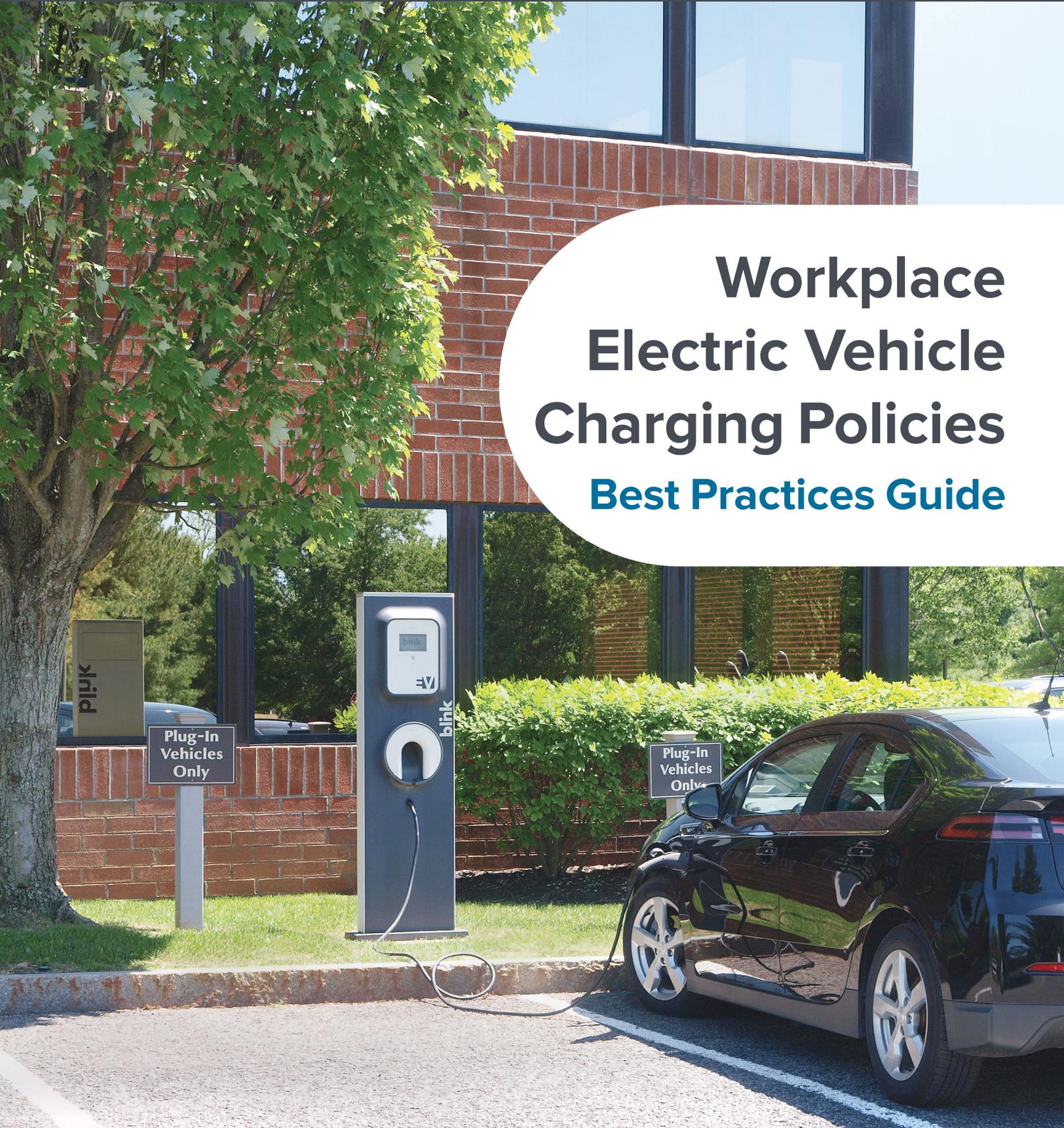




ChargeNY

Workplace Electric Vehicle Charging Policies Best Practices Guide



NYSERDA's Promise to New Yorkers:

NYSERDA provides resources, expertise, and objective information so New Yorkers can make confident, informed energy decisions.

Mission Statement:

Advance innovative energy solutions in ways that improve New York's economy and environment.

Vision Statement:

Serve as a catalyst – advancing energy innovation, technology, and investment; transforming New York's economy; and empowering people to choose clean and efficient energy as part of their everyday lives.

Workplace Electric Vehicle Charging Policies

Best Practices Guide

Prepared for:

New York State Energy Research and Development Authority

Albany, NY

Prepared by:

Energetics Incorporated

Clinton, NY

Notice

This report was prepared by Energetics Incorporated in the course of performing work contracted for and sponsored by the New York State Energy Research and Development Authority (hereafter “NYSERDA”). The opinions expressed in this report do not necessarily reflect those of NYSERDA or the State of New York, and reference to any specific product, service, process, or method does not constitute an implied or expressed recommendation or endorsement of it. Further, NYSERDA, the State of New York, and the contractor make no warranties or representations, expressed or implied, as to the fitness for particular purpose or merchantability of any product, apparatus, or service, or the usefulness, completeness, or accuracy of any processes, methods, or other information contained, described, disclosed, or referred to in this report. NYSERDA, the State of New York, and the contractor make no representation that the use of any product, apparatus, process, method, or other information will not infringe privately owned rights and will assume no liability for any loss, injury, or damage resulting from, or occurring in connection with, the use of information contained, described, disclosed, or referred to in this report.

NYSERDA makes every effort to provide accurate information about copyright owners and related matters in the reports we publish. Contractors are responsible for determining and satisfying copyright or other use restrictions regarding the content of reports that they write, in compliance with NYSERDA’s policies and federal law. If you are the copyright owner and believe a NYSERDA report has not properly attributed your work to you or has used it without permission, please email print @nyserda.ny.gov.

Acknowledgments

A variety of personnel from a number of organizations were interviewed to gather information on the current state of workplace changing, specific policy topics, and lessons learned through experience with EVSE installation and operation at the workplace. These organizations ranged from small, local offices employing a few people, to large company headquarters employing many hundreds. A variety of questions were asked including number of EVSE, level of use, usage fees, EV usage, policy details, and lessons learned. Organizations that provided valuable feedback through survey responses or information include:

3M	Monolith Solar	San Diego Gas & Electric
Bronx Zoo	NYPA	SAS
City of Rochester	NYSERDA	Schluter
Concurrent Design	Quantum Engineering	Taitem Engineering
IBM	Raytheon	Time Warner Cable
Marriott Hotels	Rosenblum	University of Wisconsin-Madison
Mercy Medical	RXR Real Estate	Vanderbilt Financial Group



Table of Contents

Notice	iv
Acknowledgments	v
1. Introduction	1
2. Policy Aspects	2
2.1 Safety	2
2.2 User Registration	2
2.3 Charging Fees	2
2.4 Charging Station Access and Parking Priority	3
3 Best Practices and Charging Etiquette	4
3.1 EV Driver Communication Network	4
3.2 Networked Stations	4
3.3 Charging Sharing Etiquette	4
Appendix A: SAS Charging Station Workplace Policy	6
Appendix B: University of Wisconsin Madison Charging Station Workplace Policy	7

Cover Photo: New York State Energy Research and Development Authority's (NYSERDA) charging stations located in Albany, NY.

Photo by Jennifer Pritchard Munyan courtesy of NYSERDA



Photo courtesy of General Electric

General Electric Employee charging stations located in Schenectady, NY.

1. Introduction

Electric vehicles (EVs) are a relatively new part of the transportation system. Their capability to “refuel” while parked at workplace charging stations creates the need for policies when charging stations are provided for employees at workplace locations. At many workplaces with charging stations, the number of EVs approaches or exceeds the number of available charging stations, which can create competition for charging station parking spots. To facilitate smooth integration of EVs and charging stations at workplace parking, company policy and universally acceptable practices should be established.

Policies must account for both EVs and conventional vehicles to address common issues and successfully incorporate EV charging into the current parking system. Organizations should avoid over-incentivizing the use of EVs at their facility because EVs will likely be a small portion of all employee vehicles and conventional vehicle

operators should not be unnecessarily inconvenienced. A well-balanced approach will reduce the need for policy enforcement.

Many organizations do not have formal policies to address potential charging station parking space conflicts due to the limited number of EVs. However, as more employees purchase EVs or the organization adds EVs to its fleet, the potential for conflicts arise. This potential is even greater when the stations are also available to visitors because this use can be random and less predictable. In general, EV drivers are usually willing to work together to address the needs of other EV drivers, especially if they are encouraged to do so.

Workplace charging stations offer many benefits to employers. They visibly demonstrate an organization’s commitment to sustainable energy and complement other environmentally friendly initiatives. They also provide points toward LEED certification and could count toward emission reduction and fossil fuels mitigation

policies because EV use reduces greenhouse gas emissions. EV charging stations can also attract and retain desirable employees. EV drivers are typically tech-savvy and highly educated, qualities many employers seek in prospective employees.

However, improperly managed charging stations could create unnecessary problems. Poorly designed policies could inconvenience EV drivers, negating their intended benefit. For example, having to move EVs in the middle of the workday to free up charging stations can disrupt employees' work. Moving from a charging space close to the building in the middle of the day to park in a more remote part of the parking lot can be a disincentive for employees to follow the rules or even charge at all. If non-EV drivers view EV charging as too great an incentive for a select group of employees (providing free fuel and preferential parking spaces), the EV charging stations might lead to disgruntled employees. Organizations have found that properly communicating the business' reasoning for installing the charging stations and distributing information about the societal benefits of EVs helps increase EV awareness and reduce parking conflicts with non-EV drivers.

2. Policy Aspects

Charging station policies can cover a range of topics but each organization's policy should be tailored to suit their parking situation and corporate mission. Employers may not need to include all of these aspects in their policies, depending on their circumstances. Appendix A and Appendix B provide two examples of workplace charging station policies that have been formally adopted.

2.1 Safety

Employee safety should be the highest concern addressed by the policy and emphasized as a priority to all EV charging station users. Although the charging station has many built-in safety factors to minimize the potential for electrical injury, tripping hazards and other cord management issues can be problematic. Stress the importance of not routing the cord where it could be a hazard to others and encourage users to coil the cord onto the station when completing the charge. Any visible damage to the charging station or cord should be reported immediately and the organization should have a procedure for notifying employees and restricting the use of the station until repairs are completed.

2.2 User Registration

Some organizations register charging station users to monitor the number of EV drivers sharing the infrastructure, whereas others purchase independently networked stations to gather data. This information can



Photo by Jennifer Pritchard Munyan courtesy of NYSERDA

SUNY Poly College of Nanoscale Science and Engineering in Albany, NY.

help site managers assess the overall system use and the number of independent users to evaluate the success of the installed EV charging station and when additional units may be needed. User registrations may also include a liability clause to help mitigate responsibility in the event of personal injury or property damage due to user negligence. Incorporating the charging station policy into existing employee policies or handbook requires EV drivers and all employees to comply with the established clauses for using the charging stations, which is especially important if there are enforceable consequences for any violations.

2.3 Charging Fees

Many locations offer free charging, as the cost of electricity is no more than a couple of dollars per vehicle per day for most EV models. Choosing to offer free charging can enable employers to use lower cost, non-networked charging stations if they want. This option can reduce the administrative burden of operating charging stations and offer an added incentive for employees to buy EVs.

Offering free charging may come with some drawbacks as well. It could cause employee discontent if some employees feel the organization is providing free "fuel" to EV drivers but is not providing gasoline to employees that drive conventional vehicles. For employers with unionized employees, offering a perk for a select set of employees (EV drivers) may run counter to union

contracts. Free workplace charging encourages EV drivers to charge at work instead of at home, creating higher utilization rates. This strategy can help promote EV use among employees but can also limit station availability by encouraging people to use the stations who don't necessarily need the charge. Workplace charging stations make EVs more feasible for a greater number of people, but this purpose can be negated if EV drivers monopolize this asset unnecessarily. Therefore, additional policy provisions may be necessary if free charging stations experience heavy use.

Employers can also choose to charge employees for the electricity they use. Some employers set charging station fees at a rate slightly more than the cost of electricity. This option offers some return on investment and provides reasonably priced charging, while also encouraging EV drivers to charge at home (where electricity is cheaper) when possible. Having employees pay for charging eliminates some of the potential obstacles posed by offering free charging, such as "free fuel" complaints by employees or challenges with union contracts.

Fee structures based on electricity consumed or the duration of charging require station monitoring. Many charging stations have this capability but charge a subscription fee to enable the station to connect via cellular network to a management system where monitoring and payments are handled. The cost for this networked capability can be as much or more than the cost of the electricity consumed by EVs during their charging sessions. For organizations that wish to avoid this added cost, fixed fees can be assessed to EV drivers

that would either have an assigned parking space at a charging station, or a sticker that allows them to park at any available charging station. The U.S. Department of Energy's (DOE) Workplace Charging Challenge, a national initiative that encourages employers to promote EVs and provide workplace EV charging for employees, tracks whether member organizations charge a fee for employees to use their workplace charging stations. The distribution of Workplace Charging Challenge organizations that charge a fee for station use is shown in Figure 1.¹

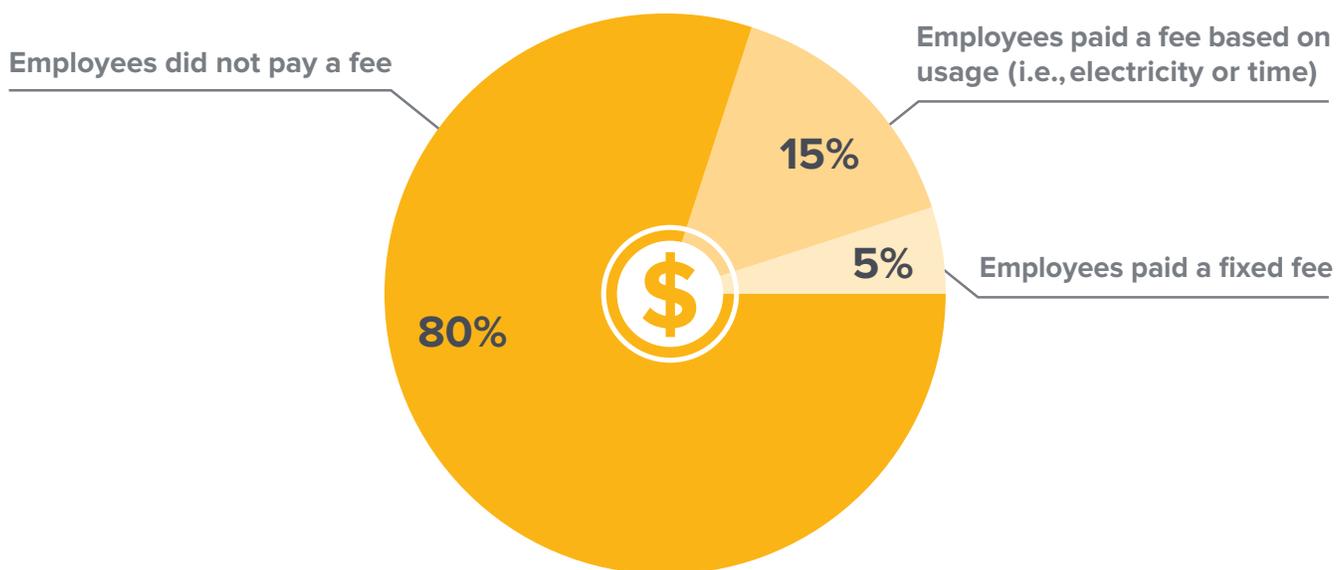
2.4 Charging Station Access and Parking Priority

Most workplaces with charging stations allow unrestricted and unlimited charging station access during and after business hours. Station owners that allow non-employee EV drivers to use their charging station typically place the charger in an easily accessible location that can be accessed 24 hours a day, 7 days a week.

EVs that already have full charges can sometimes block other EVs that need a charge if they are not encouraged to move. To encourage EV drivers to only use charging stations when actively charging, employers can require that EVs parked in charging station spaces be actively charging, establish charging time limits, or increase fees for longer charging times. These restrictions should be clearly outlined in the policy and displayed on signs near the charging station (Figure 2). In addition, the company should have a mechanism for enforcing these restrictions and set consequences for violations.

Figure 1. U.S DOE Workplace Charging Challenge Usage Fee Information

Source: 2015. US Department of Energy Workplace Charging Challenge



¹ 2015. US Department of Energy Workplace Charging Challenge. Workplace Charging Challenge. http://energy.gov/sites/prod/files/2014/11/19/progress_report_final.pdf, used with permission.

Figure 2. Sample Signage Restricting Parking at EV Charging Stations (Courtesy of MUTCD)



A related issue arises when a battery electric vehicle (BEV) driver requires a charge to get home but no charger is available. Plug-in hybrid electric vehicles (PHEV) use charging stations to maximize their electric miles, but could be occupying a space that is needed by a BEV. Because PHEVs can drive on gasoline if necessary, it is good practice to have a charging policy or procedure that will accommodate those cars needing to charge. This option may be accomplished by reserving a certain portion of the charging stations for BEVs or having a PHEV driver move out of a charging space when it is needed by a BEV. When station utilization is high, requiring payment for charging may also discourage those drivers that do not need a charge from using the limited charging resources.

3 Best Practices and Charging Etiquette

The most effective workplace EV charging policies consist of enforceable rules for EV drivers about how to use workplace charging stations. Policies about where to park must also apply to all employees, not just EV drivers. Beyond simply instituting policies, effective employers can create an environment that encourages drivers to use charging station best practices and limit charging conflicts. Best practices and behavioral norms may be incorporated into the charging station policies or it may be enough to simply encourage their use without a formal charging policy, especially while charging demand is low.

3.1 EV Driver Communication Network

An established communication link between EV drivers that use the workplace charging station can be extremely

helpful in streamlining the use of the stations or avoiding conflicts. Individual organizations often have their own communication network based on systems or programs already in place for other group messages. This network may include an interoffice email group, shared contact list, calendar-based reservation systems, or a social media group. For stations that provide charging station access to visitors, information for visitors to communicate with regular users should be visibly posted at the station or known by the receptionist, so the visiting EV driver can ask others for space to charge during their short stay. This communication network is especially helpful for new EV drivers that want to start charging at work and must coordinate with the current charging station users.

3.2 Networked Stations

Digitally networked stations can help an organization determine overall system usage as well as identify shortcomings and potential solutions for the charging system. Level of use, time of use, vehicle type, duration of use, and energy factors are just some of the parameters that can be monitored and evaluated. However, networked stations are more costly to install and also require a monthly service fee. Many organizations view the features and associated costs as necessary; thus networked stations make up the majority of newly installed chargers.

3.3 Charging Sharing Etiquette

When EVs exceed the available charging station capacity, drivers can share the resource by moving vehicles when charging is completed. For Level 2 charging stations, this scenario is common at the workplace and does not hamper an EV's range because the majority of commuting EVs will be fully charged after four hours.

Limiting the amount of time an EV can charge at work, requiring that cars only charge either before or after lunch, or requiring EVs to vacate the parking space once fully charged can be established in the charging policy, but establishing charging schedules among EV drivers (e.g., who charges in the morning while others wait until the afternoon) should be discussed among the employees based on their schedules so they are not rushing to be the first one there in the morning to access a charger. Based on data from the U.S. DOE Workplace Charging Challenge, many organizations have fewer chargers than EVs (as shown in Figure 3) and require charge sharing.

One major complaint of EV drivers that must move their cars during the workday is the disruption and inconvenience it causes, especially if they have to park far away in the parking lot at midday when they move their EV. The charging station cord is typically long enough to reach any port location on all different EVs, so a charging station placed between two parking spaces could be used by both of those vehicles. Therefore, including stand-by EV charging spaces, empty parking spaces for EVs that are not currently charging, in the infrastructure design is a good practice when feasible. However, even more reserved spaces for EVs in high priority locations can increase resentment by non-EV drivers so this strategy is best when the chargers can be placed in parking spaces that are convenient, but not too high-profile.

If a charging station can be accessed by more than one EV, a situation may arise in which an EV driver needs to remove the cord from a fully charged vehicle to use

Figure 4. Take Charge and Go placards

Courtesy of Take Charge and Go

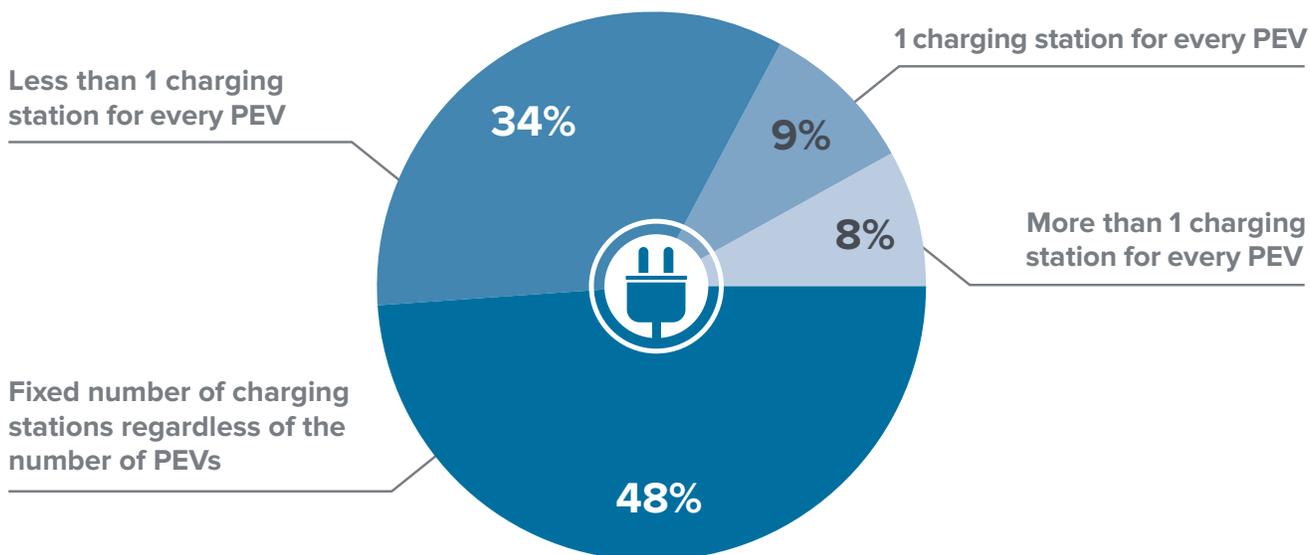


in their own. To avoid conflicts, acceptable etiquette should be established among EV drivers regarding the appropriate situation and method to unplug another EV. Typically, it is only appropriate to unplug another EV once it has been fully charged. If the other EV is not fully charged, an EV driver can park beside the charging vehicle and leave their charging port open as a sign that they would like to be plugged in once the other vehicle is finished. An additional form of notification to that driver may be necessary as well so they know someone else is waiting. Drivers should also be encouraged to leave their charging ports unlocked during charging so that other users may unplug them when finished.

A product called Take Charge and Go EV Charging Hanger has simplified charging etiquette more by mimicking a “do not disturb” sign for EVs. These placards have a green, “ok to unplug” side as well as a red, “do not unplug.” These placards are shown in Figure 4.²

Figure 3. DOE Workplace Charging Challenge Charger Quantity Information

Source: 2015. US Department of Energy Workplace Charging Challenge



² Introducing the Take Charge and Go EV Charging Indicator Hanger, www.takechargeandgo.com/2015/02/14/hangers/

Appendix A: SAS Charging Station Workplace Policy



SAS Electric Vehicle Supply Equipment Use Policy and Guidelines³

SAS Electric Vehicle Supply Equipment (“EVSE”) — commonly known as charging stations, and associated Eco-Commuter/Electric Vehicle parking spaces are available on a first come, first serve basis for all SAS employees and visitors with plug-in electric vehicles (“EV”) in accordance with the following Use Policy and Guidelines. There is no fee for the vehicle charge.

USE POLICY

All employee vehicles that are parked on campus must be registered in the Vehicle Registration System and display a SAS-issued car tag before they can use SAS EVSE. Qualifying vehicles are issued special Eco-Commuter car tags which come with additional parking benefits.

Employees parking in the EVSE Eco-Commuter spaces must limit charging times to no more than 4 hours per day. Employees may also use these spaces for no more than 4 hours to wait for available EVSE. Combined waiting and charging times may exceed 4 hours.

By using SAS EVSE, the EV owner consents for their vehicle to be unplugged when the EVSE indicates their vehicle is fully charged. This will better enable vehicles parked adjacent to existing EVSE the opportunity to charge. Authorized SAS personnel may disconnect your vehicle at any time.

GUIDELINES

Do not count on the availability of SAS EVSE as a primary justification in your decision to purchase plug-in electric vehicles. Your purchase decision should be based on your ability to charge at home and convenience of publicly available EVSE.

Do not use SAS EVSE if your commute can be accomplished by charging at home.

SAS encourages EV owners who park in spaces adjacent to EVSE to open charge-port covers as a means to let other EV owners know it is ok to plug in your vehicle when they are done.

When your charge is complete, move your vehicle so other employees can use EVSE.

Charging cords and EVSE status indicators have matching identification numbers to better identify fully charged EV and minimize confusion when moving charging cords.

Neatly replace the charging cords when finished. Cords left on the ground are safety hazards.

SAS created a report that summarizes registered plug-in EV owners by building. This report may be used by the SAS EV community for constructive collaboration about sharing campus EVSE. (Bldg. locations on report are updated regularly)

Helpful information about SAS EVSE infrastructure and plug-in electric vehicles can be found on the SAS Green Initiative Site.

Contact Security and Safety at x16400 for EV parking questions and for assistance with charging station safety instructions.

³ SAS. SAS Electric Vehicle Supply Equipment Use Policy and Guidelines. Accessed July 27, 2015 from https://www.sas.com/content/dam/SAS/en_us/doc/other/evse-policy.pdf, used with permission.

Appendix B: University of Wisconsin Madison Charging Station Workplace Policy



Electric Vehicle Charging Station Use Policy⁴

DEFINITION & PURPOSE

This policy defines the valid use of electrical charging stations by faculty, staff, students and visitors in campus garages operated by Transportation Services.

POLICY

- Vehicle must be in paid status during the hours of enforcement. No fee for using the charging station outside the hours of enforcement.
 1. Display an annual base lot, business alternate, carpool, afternoon, night, UW disabled or department limited permit.
 2. Display a flex permit and be in paid status.
 3. Pay on exit at the gate or pay stations located in the facility.
 4. Pay on exit with a department issued validation.
- Vehicle must be actively charging when parked in the charging station stall.
- Vehicle is limited to four hours parking in the charging station stall between 6 AM and Midnight.
- Charging of electric vehicles is limited to charging station stalls only.

RESTRICTIONS

- Electric vehicle charging station stalls may be closed for special event parking, maintenance and construction. The stalls will be reserved for football, basketball and other large events.
- Parking in electrical charging station stalls is restricted to vehicles plugged in for charging.
- The maximum time limit for parking in the electric vehicle stall is 4 hours.
- The University assumes no responsibility or liability for damage to vehicles using the electrical charging stations.
- Customers may not use electrical outlets in parking facilities for vehicle charging except those designated for use by electric vehicles.

RELATED REFERENCES

- Lot Times and After Hours Enforcement Policy
- Annual Base Lot Policy
- Department Permit Policy
- Flex Permit Policy
- Afternoon Permit Policy
- Night Permit Policy
- UW Disabled Permit Policy

⁴ University of Wisconsin. Electric Vehicle Charging Station Use Policy. Accessed July 27, 2015 from <http://transportation.wisc.edu/files/14EVCharging.pdf>, used with permission.

New York State Energy Research and Development Authority (NYSERDA), a public benefit corporation, offers objective information and analysis, innovative programs, technical expertise, and support to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce reliance on fossil fuels. NYSERDA professionals work to protect the environment and create clean energy jobs. NYSERDA has been developing partnerships to advance innovative energy solutions in New York State since 1975. To learn more about NYSERDA's programs, visit nyserdera.ny.gov or follow us on Twitter, Facebook, YouTube, or Instagram.

To learn more about NYSERDA's programs and funding opportunities, visit nyserdera.ny.gov or follow us on Twitter, Facebook, YouTube, or Instagram.



NYSERDA

**New York State
Energy Research and
Development Authority**

17 Columbia Circle
Albany, NY 12203-6399

toll free: 866-NYSERDA
local: 518-862-1090
fax: 518-862-1091

info@nyserda.ny.gov
nyserda.ny.gov