

Literature Review Summary: Electric Vehicle Supply Equipment Signage Guidance



Prepared by:
Energetics Incorporated

Prepared for:
New York State Energy Research
and Development Authority

October 2013

Table of Contents

Overview.....	1
General Service Signs	1
Regulatory Signs	2
Trailblazing (Special) Signs.....	4
Other Considerations	5

NOTICE: This report was prepared by Energetics Incorporated (hereafter “contractor”) 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.

Overview

Electric vehicle supply equipment (EVSE) are not yet mainstream installations like gas refilling stations, and are usually placed close to power sources to minimize costs. As a result, plug-in electric vehicle (PEV) owners can have difficulty locating EVSE to charge their vehicles. When EVSE is placed at prime parking spots to advertise a “green image” or to attract usage rather than close to a power source, an internal combustion engine (ICE) vehicle may use this convenient parking space not knowing that it is reserved for PEV charging; PEV advocates call this being “ICEd”. To ensure PEV drivers can easily navigate to EVSE parking spots and are not “ICEd” when they arrive, state and local governments are finding ways to add effective signage.

The Federal Highway Administration (FHWA) regulates the nation’s design and usage of traffic control devices using the Manual on Uniform Traffic Control Devices (MUTCD)ⁱ. EVSE signs are traffic control devices and are therefore under the regulatory authority of the FHWA through the MUTCD. The MUTCD contains the minimum standards for use that each entity looking to install signage on any street and highway open to the public must follow.

There are three different types of signage applicable to EVSE: General Service or Guidance Signs, Regulatory or Enforceable Signs, and Special or Information/Trailblazer Signs. Each of these serves a different unique purpose.

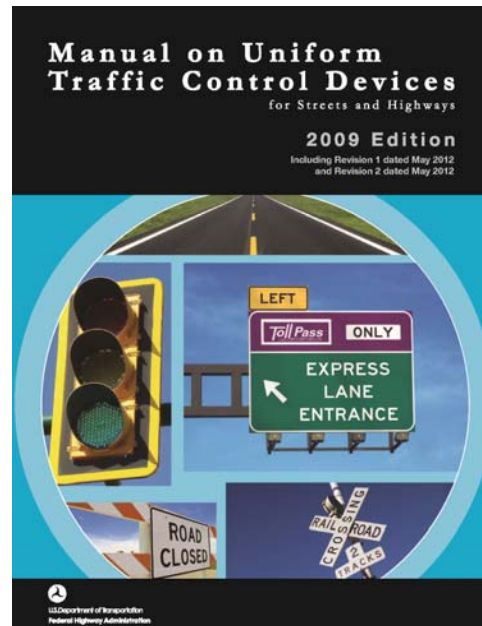


Figure 1: Federal Highway Administration's Manual on Uniform Traffic Control Devicesⁱ

General Service Signs

General Service signs are intended to provide general guidance to the charging station and should be installed at a suitable distance in advance of the turn-off or intersecting roadway, or at the charging station. The color format for general service signs for users on public streets is as follows:

- Background: Blue
- Letters, Symbols, Arrows, and Borders: White

The current revision of the MUTCD has approved the EVSE signage shown in Figure 2. The standard size for the Electric Vehicle Charging sign (D9-11b) is 24 inches wide by 24 inches high (24" x 24") on a conventional road, 30" x 30" on a freeway or expressway, and 12" x 12" at a parking facility. For the Electric Vehicle Charging plaque (D9-11bP) the standard size is 24" x 18" on a conventional road, 30" x 24" on a freeway or expressway, and 16" x 12" at a parking facility.



D9-11b
Electric Vehicle
Charging



D9-11bP
Electric Vehicle
Charging

Figure 2: MUTCD approved General Service signs and plaques for EVSEI



Figure 3: California Supplemental EVSE General Service sign

California’s MUTCD 2012 Editionⁱⁱ included an additional General Service sign for EVSE (G66-21) as shown in Figure 3, which uses the standard sizes of 24” x 24” on a conventional road, 30” x 30” on a freeway or expressway, and 12” x 12” at a parking facility. Figure 4 shows the Advance Turn (M5 series) and Directional Arrow (M6 series) auxiliary signs that can be used with the EVSE General Service signs.

The images below are examples of General Service Signs in use, including pole-mounted and mounted on a parking garage wall.ⁱⁱⁱ



Figure 4: General Service signs for EVSEⁱⁱⁱ

Regulatory Signs

Regulatory Signs are required for enforcing what vehicles park in EVSE parking spots, as well as the time duration that PEVs are permitted to park and/or charge at public charging stations. Currently, no regulatory signs have been standardized for electric vehicle charging purposes in the federal MUTCD or individual state MUTCDs. However, signs have been developed for testing in Michigan, Oregon, and Washington (see Figure 5). Regulatory Signs can be further broken down into two categories. Green/white regulatory parking signs are considered *permissive* signs and are intended to provide motorists with the allowable time and days to park. Red/black/white regulatory parking signs are *prohibitive* and are intended to advise motorists of an action that shall not be taken.



Figure 5: Regulatory signs developed for testing in Michigan, Oregon, and Washingtonⁱⁱⁱ

To be enforceable, Regulatory signs should be no smaller than 12” x 18” and placed immediately adjacent to the EVSE at a height of 7 feet as prescribed in Part 2, Chapter 2A.18 of the federal MUTCD. The first two signs in Figure 5 would allow for the parking of a PEV without being plugged in (could be used as a “wait to charge” spot next to the charging station), whereas the third sign requires the PEV to be plugged in and charging. The second sign in Figure 5 is patterned after the standard sign that reserves parking for persons with disabilities. The last example in Figure 5 is a permissive sign that could be used to designate the number of hours and days a PEV is permitted to stay connected to the charger. In June 2013, the FHWA released recommendations for MUTCD compliant EVSE signage to be used until the next Notice of Proposed Amendment to the MUTCD. These signs are presented in Figure 6 below.



Figure 6: MUTCD Temporary Recommended Regulatory Signage

The MUTCD approved signage only includes word legends, due to the lack of a symbol which can effectively convey regulations associated with EVSE and parking facilities. Symbols that have not been adopted in the MUTCD cannot be used outside of official tested applications.^{iv} To be in compliance with MUTCD standards, permissive signs may be used in combination with a prohibitive sign, as long as they are installed below or to the right of the prohibitive sign. The installer must have approval from the roadway section owner to install a sign on a roadway. The FHWA must be contacted for requests regarding usage and experimentation with standardized signs. Figure 7 shows a sample regulatory sign, used by the City of Santa Rosa, CA.^v



Figure 8: Example of Regulatory Signage Stack^v



Figure 7: PEV Parking Stall with Recommended Symbol on Pavement^{vi}

Parking spot stencils are not enforceable, but painting an EVSE symbol on the parking surface can help to clearly identify EVSE spots more visibly as shown in Figure 8.^{vi} Contact FHWA for more information, as well as stencil availability and guidelines.

If appropriate language is adopted in the municipal code, local authorities or property owners may be permitted to remove an unauthorized vehicle from an EVSE parking spot. Ready, Set, Charge California! noted the California Vehicle Code Section where the process for posting and notification is described, and provides recommended ordinance language to authorize the enforcement of Regulatory EVSE signs in “A Guide to EV-Ready Communities”.^{vii}

Trailblazing (Special) Signs

Trailblazing (Special) Signs are used at the EVSE or host facility to provide additional information for drivers and visitors (green program description, funding source, tourism or economic development info, sponsorship, etc.) These do not follow MUTCD design standards and are not intended to be enforceable. As a result, they may include other logos, shapes, and colors as part of the signage theme at the site. Special signs must not be prominent, and should be placed to the side or below the regulatory signs. Examples of Special Signs are pictured in Figure 9

below.^{viii}

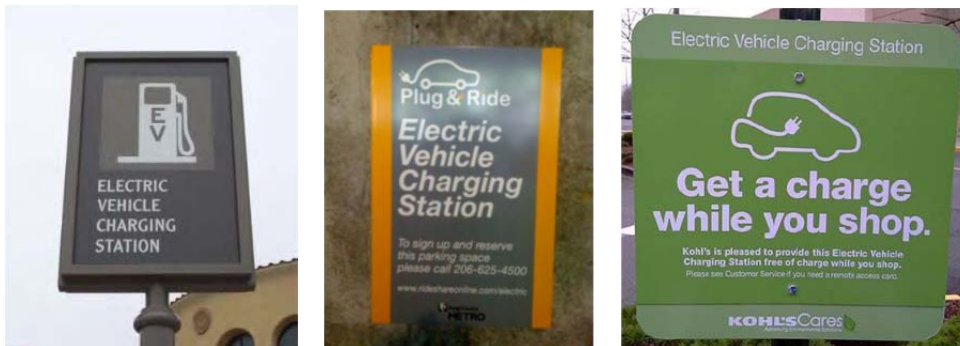


Figure 9: Examples of Trailblazing (Special) Signageⁱⁱⁱ

Other Considerations

While not aesthetically pleasing, stacking multiple signs allows for higher enforceability. Figure 10 shows a sample sign stack.^{ix} It is also important to consider that adding more signs could just add to “sign clutter” at intersections.

The general public may not recognize EVSE locations that only have friendly green or blue “EV Parking” or “EV Parking Only” signs. If the signage is blue in color, it can be mistaken for an ADA-accessible location. Green signs are often mistaken for short-term parking signs. Including a Regulatory sign is recommended.

Signs in private parking facilities for public use are not required to meet MUTCD standards, but owners and operators are encouraged to do so. Signs with different shapes, colors, and messages than those listed in the MUTCD may be posted in private facilities, but cannot be legally enforceable. State and local agencies are allowed to create their own custom word message signs if there are none available.



Figure 10: Sample sign stack^{ix}

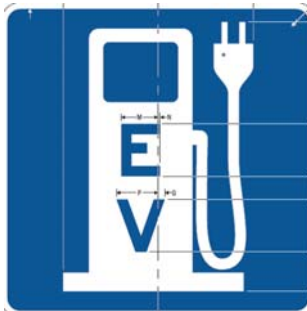


Figure 11: Interim-approved EVSE signage D9-11b^v

To introduce new signage, an entity can submit an inquiry to the FHWA to experiment with a new design (see Section 1A.10 of the MUTCD)ⁱ. The FHWA gave interim approval through this inquiry process to the California signage D9-11b in Figure 11. This is intended to replace the original EVSE symbol (see **Error! Reference source not found.**), as it provides clearer indication of the electrical aspect of EVSE. California’s version of D9-11b has been received favorably by the EV community and is widely preferred over FHWA MUTCD’s version of D9-11b.

There is debate on the effectiveness of “hybrid signs”, as pictured in Figure 12. ECOtality has found that combining the symbol and regulatory sign provides an efficient, cost effective, and aesthetically pleasing appearance to the charging station. Plug In America noted in the Clean Cities Signage Webinar in October 2012: “Cramming a lot of info onto one sign will run you into a serious lack of MUTCD standards compliance”.^{viii}

As EVSE deployment accelerates, MUTCD approved signs will increase in both quantity and clarity.



Figure 12: ECOtality’s sample “hybrid” sign^{viii}

ⁱ Federal Highway Administration. Manual on Uniform Traffic Control Devices. 2009 Edition with Revision Numbers 1 and 2 incorporated, dated May 2012. U.S. Department of Transportation.

http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htm.

ⁱⁱ California Department of Transportation. California MUTCD 2012.

www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/ca_mutcd2012.htm.

ⁱⁱⁱ Plug In America. 2012. Hawaii EV Ready Guidebook for Commercial Electric Vehicle Charging Station Installations. May.

http://images.pluginamerica.org/Hawaii_EV_Ready_Guidebook_for_Commercial_Charging_Stations_Rev_A.pdf.

^{iv} FHWA Memorandum – Regulatory Signs for EV Charging and Parking Facilities. June 2013.

<http://mutcd.fhwa.dot.gov/resources/policy/rsevcpfmemo/index.htm>

^v General Services Department. 2011. Sonoma County Electric Vehicle Charging Station Program and Installation Guidelines. County of Sonoma. July. www.sonoma-county.org/prmd/docs/misc/ev_prog_guidelines.pdf.

^{vi} EV Project. 2012. Lessons Learned – EVSE Signage. April 20.

www.theevproject.com/downloads/documents/Signage%20Initial%20Issue%204-20-2012.pdf.

^{vii} Ready, Set, Charge, California!. 2011. A Guide to EV-Ready Communities. November.

www.baclimate.org/images/stories/actionareas/ev/guidelines/readysetcharge_evguidelines.pdf.

^{viii} Clean Cities. 2012. Electric Vehicle Fall 2012 Quarterly Discussion Webinar. U.S. Department of Energy. October 11. www1.eere.energy.gov/cleancities/toolbox/webinar_electric_vehicle_fall_2012.html.

^{ix} Puget Sound Regional Council and Washington Department of Commerce. 2010. Electric Vehicle Infrastructure: A Guide for Local Governments in Washington State. July.

www.psrc.org/assets/4325/EVI_full_report.pdf.