

**Guidance for Federal Agency
Implementation of
Workplace Charging
Pursuant to the
Fixing America's Surface
Transportation Act:
Level 1 Charging Receptacles**

**Office of Federal Sustainability
Council on Environmental Quality
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1. Introduction

Fixing America's Surface Transportation Act (FAST Act)¹ authorizes the General Services Administration (GSA) and other Federal agencies to install, operate and maintain plug-in electric vehicle (PEV) charging stations for privately owned PEVs in parking areas used by Federal employees and authorized users, and requires the collection of fees to recover these costs. The provision of PEV charging stations at the workplace can reduce greenhouse gas (GHG) emissions by encouraging the displacement of commuters' petroleum fuel with lower-emission electricity.² Executive Order 13693 section 7(f) instructs the Federal government to consider the development of policies to promote sustainable commuting and work related travel practices including workplace vehicle charging for Federal employees, where consistent with agency authority and Federal appropriations law.³

This initial guidance, developed by the Council on Environmental Quality (CEQ) in consultation with the Office of Science and Technology Policy, supports the implementation of Executive Order 13693 by outlining how agencies can provide workplace charging opportunities under the FAST Act and provides an approach for a uniform fee for the use of existing and new alternating current (AC) Level 1 charging receptacles, commonly known as wall outlets, for the purposes of seeking reimbursement under the FAST Act. This guidance applies to Federal buildings not under the jurisdiction, custody, or control of the GSA; GSA-issued guidance is forthcoming.

This guidance serves to support Federal agency policy decision on the provision of Level 1 charging receptacles. Additional technical assistance and informational resources on assessing employee interest in workplace charging and workplace charging installation and management are available through the U.S. Department of Energy (DOE) Workplace Charging Challenge.⁴

Note: The FAST Act also authorizes the provision of hard-wired electric vehicle supply equipment (EVSE) with cordsets including AC Level 1 EVSE, AC Level 2 EVSE, or direct current (DC) fast charging EVSE for privately owned PEVs, and CEQ will address the use of these technologies for workplace charging in subsequent guidance. The definitions of particular types of charging and PEVs in this and subsequent guidance does not preclude other emerging technologies (e.g., wireless charging) from future consideration in the context of the FAST Act authorizations for Federal workplace charging.

2. Background

Level 1 charging receptacles – the subject of this guidance – can provide electrical energy by alternating current (AC) to the PEV batter by using a Level 1 cordset that comes standard with most commercially-

¹ Fixing America's Surface Transportation Act § 1413(c), 42 U.S.C. 6364 (2015).

² Employers participating in the U.S. Department of Energy Workplace Charging Challenge reported a combined savings of 1.7 million gallons of gasoline and 17 million pounds of GHG emissions annually. Workplace Charging Challenge Mid-Program Review: Employees Plug In, December 2015, available at http://www.energy.gov/sites/prod/files/2015/12/f27/105313-5400-BR-0-EERE%20Charging%20Challenge-FINAL_0.pdf.

³ Executive Order 13693, Planning for Federal Sustainability in the Next Decade, available at <https://www.whitehouse.gov/the-press-office/2015/03/19/executive-order-planning-federal-sustainability-next-decade>.

⁴ Information on the U.S. Department of Energy Workplace Charging Challenge may be found at <http://www.energy.gov/eere/vehicles/ev-everywhere-workplace-charging-challenge>.

available PEVs. On one end, the Level 1 cordset has a standard NEMA 5-15P, three-prong household plug that can be inserted into a Level 1 charging receptacle. On the other end, a SAE Standard J1772 connector plugs into the PEV to deliver electricity to the vehicle's onboard charger and the equipment communicates with the PEV to ensure that the plug is securely connected to the vehicle before supplying a safe flow of electricity. The vehicle's onboard charging equipment then converts the electricity to the direct current needed to charge the PEV's batteries.

The amount of electricity likely to be received by an authorized user's PEV for daily commuting to and from the workplace through a Level 1 charging receptacle is small at 4 kilowatt hours per day (Table 1). Research shows that PEV owners with access to workplace charging often charge at their home and use workplace charging to "top off" their PEV battery to replace the electricity used during the daily commute to work.⁵ The amount of electricity that may be delivered to the vehicle during workplace charging is limited by the basic physics of the electrical circuit involved—at 110 volts on a 15-ampere circuit, for example, no more than 13.2 kilowatt hours can be delivered in an 8-hour period, regardless of the capacity or state of discharge of the PEV's battery. This is less electricity than a half-dozen 100-watt light bulbs would use, if left on for an entire 24 hour day. In recognition of these realities, this guidance is designed to provide a simple, and inexpensive mechanism, as described in section 5 (a), to provide for the amounts of electricity likely to be involved in the use of Level 1 charging receptacles pursuant to the FAST Act.

3. Planning and Reporting

(a) As described in the Implementing Instructions for Executive Order 13693, Federal agencies should include, as appropriate, planning for workplace charging in the Multimodal Access Plan (MAP) submitted as an appendix to the annual Strategic Sustainability Performance Plan (SSPP).

(b) As part of the annual submission in the Federal Automotive Statistical Tool (FAST), Federal agency Chief Sustainability Officers should coordinate with Federal agency fleet managers to report annually on implementation of workplace charging. Reporting will begin with the December 2016 reporting cycle for FY 2016 data, and include the number and type of charging equipment installed at sites with active workplace charging programs, the cost of the hardware and installation, and the fee assessed to authorized users of the charging equipment.

4. Definitions

(a) *Authorized User*: An individual authorized by a Federal agency to use its parking area. This includes agency employees, as well as its contractors, subcontractors, and visitors.

(b) *Alternating Current (AC) Level 1*: AC Level 1 as defined in SAE Standard J1772.

(c) *Level 1 Charging Receptacle*: A 110/120 volt electrical connection that provides electricity used for charging a PEV without a permanently connected cordset or networked fee or usage data collection device (which may require additional hardware costs and service fees over the cost of the electricity provided).

⁵ Department of Energy, Idaho National Laboratory, 2014, "Charging and Driving Behavior of Nissan Leaf Drivers in The EV Project with Access to Workplace Charging," available at <http://avt.inel.gov/pdf/EVProj/WorkplaceChargingandDriving-Leaf.pdf>.



Level 1 charging receptacles are available for use by U.S. Senate employees (U.S. DOE Photo)



Level 1 cordsets typically come standard with most commercially-available PEVs (GM Photo)

(d) *Level 1 Cordset*: UL listed PEV accessory equipment that has on one end, a standard NEMA 5-15P, three-prong household plug that can be inserted into a Level 1 charging receptacle and on the other end, a SAE Standard J1772 connector that plugs into a PEV.

(e) *Parking Area*: Any federally owned or leased building, structure or surface lot for vehicles, including light-duty vehicles, motorcycles, and bicycles.

(f) *Plug-in Electric Vehicle (PEV)*: a vehicle that (a) draws motive power from a battery; (b) can be recharged from an external source of electricity for motive power.

(g) *Privately Owned PEVs*: PEVs not owned or leased by a Federal agency, including PEVs that are owned or leased by authorized users.

5. Principles for Determining Reimbursement for Workplace Charging

(a) While this section identifies a uniform approach to reimbursement for the use of Level 1 charging receptacles to support compliance with the FAST Act while encouraging implementation of Executive Order 13693, it is ultimately the responsibility of each implementing Agency to ensure that reimbursement is recovered where required by the FAST Act or other applicable law.

(b) Federal agencies should assess fees for workplace charging at a given parking area that are uniform for each type of charging, so that authorized users who select a particular type of charging equipment pay the same fee, regardless of which charging unit is used.

(c) The fees charged to an authorized user have a component that relates to the cost of the electricity provided and a component that relates to hardware, construction, installation, and maintenance costs.

(d) The component of the fee that relates to the cost of electricity should be based on the national average for commercial electricity rates for the preceding calendar year, as reported by the U.S. DOE Energy Information Administration (EIA).⁶ Agencies may use the state, local or observed electricity rate of the charging equipment host facility. Agencies should use renewable energy where feasible and cost effective.

(e) In accordance with the FAST Act, in determining the component of the fee that relates to hardware, construction, and installation costs, Federal agencies are not required to include the costs of installing or constructing any charging equipment:

- (1) installed or constructed on or before December 4, 2015.
- (2) installed or constructed primarily for use by Federal agency fleet vehicles.
- (3) installed or constructed pursuant to appropriations for the purpose of installing or constructing charging equipment.

(f) For charging equipment and installation costs other than those described in subsection (e), agencies should include the cost of installing and constructing Level 1 charging receptacle into the fee charged to authorized users, based on an expected 10-year lifetime for the charging equipment⁷.

(g) Agencies that choose to carry out the authorities in the FAST Act through a contract with a vendor should consider these principles and the guidance below, as appropriate, in developing terms and conditions with the vendor.

(h) In accordance with the statutory authority under the FAST Act, fees collected shall be deposited monthly in the Treasury to the credit of the respective agency's appropriations account for the operations of the building where the Level 1 charging receptacle is located and available for obligation without further appropriation during the fiscal year collected and the fiscal year following the fiscal year collected.

6. Guidance for Level 1 Charging Receptacles

(a) Introduction. As noted above, the amount of electricity involved in a PEV's use of a Level 1 charging receptacle is small, and workplace charging is anticipated to be used to "top off" PEV batteries, replacing the electricity used during the daily commute to work.⁸ With respect to the equipment necessary for Level 1 charging receptacles, such equipment typically consists of a 110/120 volt receptacle and associated wiring, with the authorized user providing the Level 1 cordset used to connect the receptacle to the vehicle. Cost estimations show that when no unusual construction such as trenching or boring is needed and the Level 1 charging receptacles are installed on existing walls, fencing or other suitable structures, and when amortized over a 10-year period, the Level 1 charging receptacle and associated wiring is a minimal expense. It is possible for agencies to require trenching or boring when installing new Level 1 charging receptacles and this scenario is included in Table 1 as Scenario 3 and the cost associated is dealt with separately in subsection (b)(2), below.

⁶ This information is reported in Table 5.3 of the EIA *Electric Power Monthly*, online at http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_03.

⁷ U.S. Department of Energy, November 2015, *Costs Associated with Non-Residential Electric Vehicle Supply Equipment*, available at http://www.afdc.energy.gov/uploads/publication/evse_cost_report_2015.pdf.

⁸ Agencies that provide charging services for electric motorcycles and bicycles may establish a lower fee to reflect the lower consumption of electricity and may contact the Office of Federal Sustainability for consultation on setting the fee.

Table 1: Estimated Costs for Level 1 Charging Receptacle Scenarios

Level 1 Charging Receptacle Scenario		Installation Cost per Receptacle *	Hardware Cost per Receptacle*	Electricity Cost per Receptacle per Day**	Total Biweekly fee per Employee per Receptacle ***
1	Existing commercial grade 15 or 20 amp receptacle	\$0	\$0	\$0.424	\$4.24
2	New wall-mounted commercial grade 15 or 20 amp receptacle and dedicated circuit; assumes no unusual installation construction such as trenching or boring needed	\$300-1,000	\$5	\$0.424	\$6.76
3	New commercial grade 15 or 20 amp receptacle and dedicated circuit requiring installation construction such as trenching or boring; assumes no major electrical upgrades needed	\$1,000-3,000	\$5	\$0.424	\$11.95

* U.S. Department of Energy, November 2015, Costs Associated with Non-Residential Electric Vehicle Supply Equipment, available at http://www.afdc.energy.gov/uploads/publication/evse_cost_report_2015.pdf.

** Average one-way commute (12 miles, 2009 National Highway Transportation Survey, nhts.ornl.gov), Average PEV efficiency (3 miles per kilowatt hour, U.S. Department of Energy, 2014 PEV Models, www.fueleconomy.gov), Average commercial customer electricity price (10.59 cents per kilowatt hour, Energy Information Administration, 2015, available at www.eia.gov/electricity/monthly/epm_table_grapher.cfm).

*** Sum of electricity cost per day (times 10 working days per biweekly period) plus average installation and hardware costs, amortized over 10 years, to be paid by the authorized user charging a privately owned PEV per charging receptacle.

(b) **Reimbursement.** CEQ anticipates that most Federal agencies will use Level 1 charging receptacle scenarios 1 and 2. Recognizing the modest costs of electricity and associated electrical infrastructure involved with Level 1 charging receptacles, this guidance provides an approach for a reimbursement policy in accordance with the FAST Act for Level 1 charging receptacles, as follows:

(1) Agencies should assess authorized users who charge their PEV batteries at Level 1 charging receptacles a flat fee for the privilege of doing so. To provide uniformity in setting this fee across the government, agencies should use national averages for commercial electricity rates, one-way commuting distances, and PEV efficiencies. Based on the relative use of the Scenarios 1 and 2 by the employers that are part of the U.S. DOE Workplace Charging Challenge, a flat biweekly fee of \$6.00 or daily fee of \$0.60 is suggested for this use.⁹ CEQ may adjust this suggested fee in future guidance based on data provided by agencies.

⁹ This flat fee was arrived at with the following assumptions:

- Average one-way commute (12 miles, 2009 National Highway Transportation Survey, nhts.ornl.gov).
- Average PEV efficiency (3 miles per kilowatt hour, Department of Energy, 2014 PEV Models, www.fueleconomy.gov)
- Average commercial customer electricity price (10.59 cents per kilowatt hour, Energy Information Administration, 2015, www.eia.gov/electricity/monthly/epm_table_grapher.cfm).
- Current estimated commercial use of Level 1 Charging Receptacle Scenarios: (1) 30%, (2) 70% (U.S. Department of Energy Workplace Charging Challenge, 2015).

(2) Agencies that implement Scenario 3 have the option of working with the U.S. DOE Workplace Charging Challenge to calculate a flat fee for authorized users of those Level 1 charging receptacles.

(3) Agencies should implement a mechanism of labels or other markings that indicate that an employee or authorized user has a PEV and is reimbursing the agency for the use of a Level 1 charging receptacle at specified parking locations.

(4) Parking spots with access to a Level 1 charging receptacle should be identified in a sufficient manner to denote service for PEVs. At sites owned by the Federal Government, these spots should be clearly marked with charging station signage, consistent with the recommendations published by the U.S. DOE Alternative Fuels Data Center,¹⁰ to ensure that authorized users are aware of the charging opportunity. If a large percentage of parking spots in a parking area are capable of providing Level 1 charging receptacles in accordance with this guidance, an agency may decide that it is not necessary to reserve or have preference for PEVs in such parking spots.

(c) Facilities safety and management. Federal employees, agencies, and Federal parking area owners and managers should ensure a safe and successful workplace charging experience by consulting best practices for the safety and management of Level 1 charging receptacles published by the U.S. DOE Workplace Charging Challenge.¹¹

¹⁰ U.S. Department of Energy, Alternative Fuels Data Center. "Signage for Plug-In Electric Vehicle Charging Stations." http://www.afdc.energy.gov/fuels/electricity_charging_station_signage.html#station (accessed February 4, 2016).

¹¹ U.S. Department of Energy, Workplace Charging Challenge. "Workplace Charging Safety and Management Policies for Level 1 Charging Receptacles." <http://energy.gov/eere/vehicles/workplace-charging-safety-and-management-policy-ac-level-1-charging-receptacles> (accessed June 2016).