

# SACRAMENTO STREAMLINE

**City Permit Counter**  
300 Richards Blvd. 3rd Floor  
Hours M–F:  
9am–12pm / 1–4pm



## City of Sacramento Guide to Electrical Vehicle Supply Equipment (EVSE) Permits for Residential

Do you own an Electric Vehicle, or are you considering buying one? Depending on your charging needs, building permits may be required if work needs to be performed in your home to upgrade or replace your electrical panel, outlets, or to add a second meter. Please contact SMUD for possible additional requirements.

### Definitions:

- A **hybrid** is a vehicle that has an internal combustion engine as well as an electric motor and battery to increase gas mileage and decrease tail pipe emissions.
- A **Plug-In Hybrid Electric Vehicle (PHEV)** is a hybrid with a larger battery pack that produces superior gas mileage and reduced emissions comparable to a hybrid, and has the capability to be plugged-in to charge the battery for increased efficiency.
- An **Electric Vehicle (EV)** or **Battery Electric Vehicle (BEV)** is 100% electric and has zero tail pipe emissions with no internal combustion engine.
- A **Plug-in Electric Vehicle (PEV)** refers to all vehicles that have a battery on board that can be charged/plugged-in to an electrical outlet, such as PHEVs, Extended-Range Electric Vehicles (EREVs), BEVs and EVs.
- **Electric Vehicle Supply Equipment (EVSE)**, or charging station, is your connection to the grid or charge connector for your **Plug-in Electric Vehicle (PEV)**

### Is my home ready?

Depending on the charging requirements that your vehicle needs, your home electrical panel may need to be upgraded or replaced to accommodate the Electrical Vehicle Supply Equipment (EVSE) recommended for your vehicle.

There are two levels of electric vehicle (EV) charging systems for single family residence (one- and two- family dwellings) installations:

**Level 1 charging:** (120 VAC, 15/20 A), this is the standard electrical outlet found in most homes. This charging level can take 8-15 hours to fully charge a vehicle, depending on how drained the battery is.

**Level 2 charging:** (240 VAC, 40A or larger), many newer homes use this type of an outlet for a clothes dryer. This level of charging can take 4-6 hours to fully charge a vehicle, depending on how drained the battery is.

To find where public and existing electric vehicle charging stations are currently located, view the Google map here: <http://www.evchargermaps.com/>

Or the U.S. Department of Energy Alternative Fuels & Advance Vehicles Data Center:  
<http://www.afdc.energy.gov/afdc/locator/stations/>

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## SMUD Billing Rates and Rebates

An optional discounted electric rate is available for PEVs, and is separate from standard residential electric rates. This option is for residential customers who own or lease licensed passenger electrical vehicles or PEVs, and take electric service under the optional Residential Time-of-Use Electrical Vehicle Rate (RTEV). To qualify for the RTEV rate, a separate meter/sub-meter must be installed. The City requires a building permit for a separate meter/sub-meter in addition to any additional infrastructure required by SMUD such as a conduit or a service box.

For more information about Electric Vehicles and Rebates, visit SMUD's website at:  
<http://www.smud.org/en/community-environment/evs/Pages/index.aspx>

## Do I need a building permit?

Depending on the current configuration of your home electrical service, and if a new electrical panel, sub-meter or outlet are needed to accommodate your vehicles charging needs, a building permit may be required. If your home already has the appropriate outlet (either 120VAC or 240VAC) and you already have or do not need a separate SMUD meter/sub-meter, a building permit is not required.

A building permit is required for all new installations and modifications of electrical panels, meters and electrical outlets. Before a permit can be issued, an electrical plan review, and sometimes a mechanical plan review (depending if a manufacturer's installation guidelines require mechanical ventilation), must be approved. Permits may be obtained over-the-counter for EV charging system installations.

## Permit fees

Fees are based on a valuation of construction materials and labor. For example a Level 2 EVSE installation, can range from \$153–\$358 in building permit fees based on an estimated construction valuation of \$1,000–\$4,000.

Additional information about City of Sacramento building fees can be found here: <http://www.cityofsacramento.org/dsd/reference/fees/index.cfm>

## Steps to Getting an EVSE Permit:

	Once you decide to purchase an Electric Vehicle...
Sign up for RTEV Rate and System Design	1. Confirm with your auto dealership what charging equipment your vehicle needs (Level 1 or 2 charging) and the installation requirements.
	2. Have a qualified electrical contractor (QEC) do an electricity panel capacity and load check. This information will need to be submitted to the City to obtain a building permit.
	<b>*Please check with SMUD for any additional requirements.</b>
	3. Contact SMUD at <a href="mailto:pev@smud.org">pev@smud.org</a> or <b>1-888-742-SMUD (7683)</b> to gain pre-approval for special Residential Time-of-Use Electrical Vehicle (RTEV) rates,* which requires the installation of a new sub-meter, and to see if a site assessment of transformer and service capacity to the home is needed.
	<b>*To qualify, you must use a QEC and have SMUD install a meter/submeter.</b>
	Obtaining a Building Permit – City Review
Submit for City Building Permit	4. If the scope of work requires a building permit, submit a complete building application including fees, electrical plans, and mechanical plan if needed, for all new charging equipment to be installed. <b>Applications</b> can be submitted with the City of Sacramento at the public counter at 300 Richards Blvd., 3 <sup>rd</sup> Floor <sup>1</sup> .
	5. Obtain a city issued permit and complete installation work.
	6. Schedule and complete a building inspection.
	Once you have finished the building permit...
Interconnection & Preferred Rates	7. If needed, contact SMUD for electrical service upgrades and to install a meter/sub-meter for the Residential Time-of-Use Electrical Vehicle (RTEV) rate.
	8. SMUD installs sub-meter and establishes a separate billing account for the charging station.
	9. Plug-in your vehicle and charge.

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### (Footnotes)

<sup>1</sup> Please verify hours for over-the-counter plan check online at [www.cityofsacramento.org/dsd](http://www.cityofsacramento.org/dsd)

**Submission Checklist for Electric Vehicle Supply Equipment (EVSE) Installations**  
Article 625 – 2010 California Energy Commission

**Submittal Requirements:**

1. One-line diagram; showing:
  - Location(s) of new and existing meter/sub meter and charge controller.
  - Wire sizing and routing.
2. Provide manufacturer installation details and specifications for the electrical supply charging unit.
3. Provide information from the manufacturer indicating whether or not ventilation is required, label plans accordingly and provide mechanical ventilation if required.
4. Complete the Electrical Load Calculation Worksheet (Form CDD-0213) and provide load calculation of electrical service – include the electrical load required to charge the vehicle at 125%.
5. Note the voltage (120V or 240V) and ampacities of the vehicle charger.
6. All supply equipment shall be listed or labeled.

**General Requirements:**

1. Coupling means of electric vehicle supply equipment shall be stored or located at a height of not less than 18" and not more than 48" above the floor level.
2. Electric vehicle supply equipment rated 125 volt, 15 or 20 amp may be cord and plug connected. All other EV supply equipment shall be permanently connected and fastened in place.
3. If both 120v and 240v circuits are desired to be monitored by the electric vehicle meter, a meter with distribution will be required.

**Note:** To qualify for SMUD's Residential Time-of-Use Electric Vehicle Rate all electrical loads fed from the meter must be dedicated to an electric vehicle charging use only.

## Electrical Load Calculation Worksheet N.E.C. 220.82

**THIS SHALL BE ON THE JOB SITE AT ALL TIMES**

**SUBMIT TWO COPIES**

Permit # \_\_\_\_\_ Date: \_\_\_\_\_  
Contractor/Owner: \_\_\_\_\_  
Job Address: \_\_\_\_\_ Total SF \_\_\_\_\_  
Phone # \_\_\_\_\_ Email: \_\_\_\_\_

Number	Item	Watts	Air Conditioning Example (not heat pump)
	Sq. Ft. @ 3 Watts per Sq. Ft - 220.12		<p>Compressor      20 amps Fan                <u>5 amps</u> Unit Total Load = 25 amps x 240V Elec. Furnace @ N.P.R. = 6000 watts x 65% = 3900 watts Use 6000 watts since it is larger</p> <p>~~~~~</p> <p><b>Heat Pump Example</b></p> <p>Compressor      20 amps Fan                <u>5 amps</u> Unit Total Load = 25 amps x 240V = 6000 watts Aux. Heat Strip = 6000 watts x 65% = 3900 watts Total Heat Pump Load = 9900 watts</p> <p><b>Heat Pump Note:</b> When doing load calculations where heat pumps are installed, the load for most heat pumps that are equipped with auxiliary heat strips will be larger under the demand for heat. For purposes of load calculations only, on heat pump compressor and fans use 65% of auxiliary heat load to show total heat pump load.</p>
	20 Amp. Appliance circuits @ 1500 watts each - 220.52(A)		
	Range (Nameplate Rating = N.P.R.)		
	Oven (N.P.R.)		
	Cooking Units (N.P.R.)		
	Water Heater (N.P.R.)		
	Dishwasher (N.P.R.)		
	Disposal (N.P.R.)		
	Washer [(1500 watts min. N.E.C. 220.52(B))]		
	Dryer [(5000 watts min. or N.P.R. if larger) N.E.C. 220.54]		
	Motors (N.P.R.)		
	Other (N.P.R.)		
	Other (N.P.R.)		
Air Conditioning Equipment Air Conditioning [cooling @ (N.P.R. x 100%)] =		Subtotal = _____ (Loss 1 <sup>st</sup> 10KW – 10,000 @ 100% = 10,000 Watts)	
Electrical Heating @ (N.P.R. x 65% =		Remainder @ 40% _____ @ 40% _____ Watts	
NOTE: Use the largest load - Heat or Cool =		Total Air Cond. and/or heat pump load = _____ Watts	
Heat pump (compressor & fans) x 100% =		Total Service Load = _____ Watts	
Aux. Heat strips (or elect. furnace) x 65% =		Total Service Load _____ Watts ÷ 240V = _____ Amps	
Total Heat Pump Load =		Service Size _____	
NOTE: Amps x Circuit Voltage = Watts			