

# 1. INTRODUCTION

The introduction of electric vehicles (EVs) in Northern California brings a challenging set of planning, regulatory, and cost issues. Because EVs require a unique infrastructure—including specialized charging equipment and adequate electric service—most users, as well as infrastructure installers and PG&E staff, are not familiar with charging basics. This guide provides the necessary information all users, installers, and PG&E need to better handle the task of installing the appropriate equipment for residential and fleet EV customers.

The guide’s introduction defines key terms and responsibilities, and gives other sources of information. Chapter 2 discusses the safety codes governing EV charging equipment, electrical requirements, equipment options, and PG&E rates for EVs. Chapter 3 details the electrical and building code requirements that apply to all installers and users of electric vehicle supply equipment (EVSE). The remaining chapters discuss the special needs of the different classes of EV users: homeowners (including multifamily residences), fleet facilities, and public access and commercial charging facilities.

For fleet users, the Energy Policy Act of 1992 (EPAct) requires fuel providers to include alternative fuel vehicles (AFVs) in their replacement vehicle purchases beginning in 1996. PG&E has opted to use EVs to meet part of this requirement. EPAct also sets guidelines for federal, state, local, and private fleets to include AFVs when purchasing replacement vehicles, and many of these organizations also plan to buy EVs. As a result, the installation of EVSE has become an important issue to many fleet managers today.

For residential customers, infrastructure issues are less complex in terms of siting, equipment selection, and load management. In addition, EV manufacturers provide ample information and assistance concerning EVSE placement and installation. However, municipalities in PG&E’s service territory treat metering issues differently. This guide addresses the practices in a few cities and provides names of relevant code officials.

## **A. EV Infrastructure Essentials**

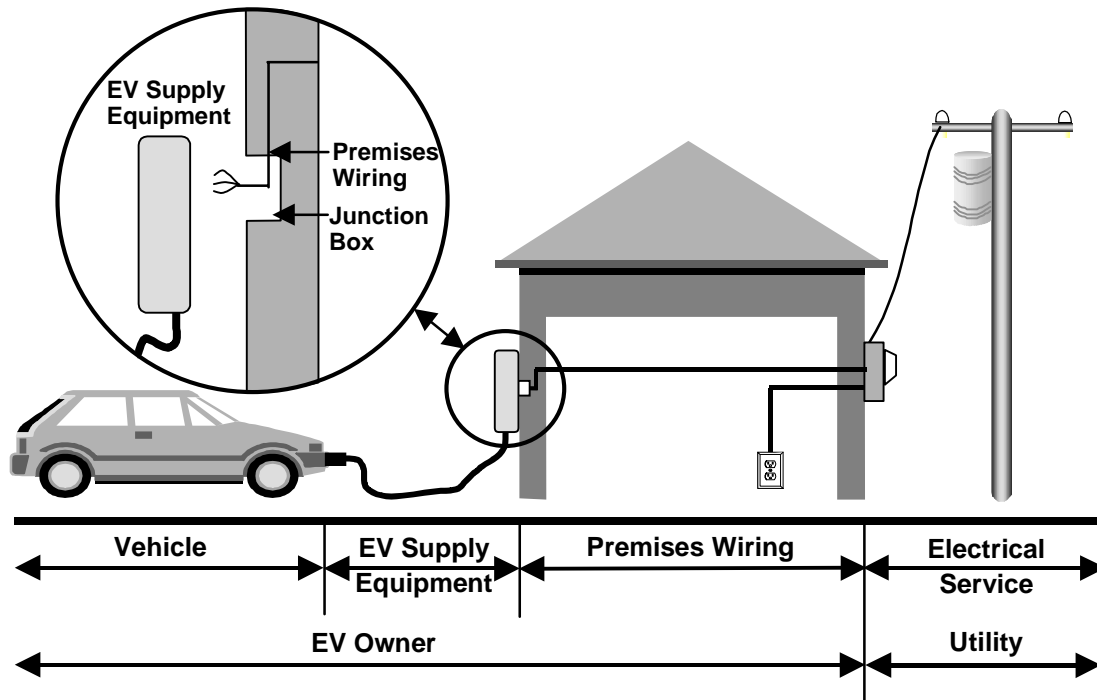
EV infrastructure is comprised of the following components:

- EVSE, including a charger, cable, and connector
- Premises wiring that runs from the customer meter to the EVSE
- Electrical service, including PG&E power lines and the customer meter

PG&E provides installation advice and assistance (call PG&E’s Clean Air Transportation Hotline at 800-684-4648) but the EV owner is ultimately responsible for the installation and operation of the EVSE, as well as for any upgrades or improvements to the premises wiring. EV owners must obtain the appropriate building permits and ensure that a qualified licensed contractor or electrician performs the installation. EV dealerships offer assistance in finding contractors for these installa-

tion services. The following figure illustrates a typical residential charging set-up and the responsibilities of each component.

**Figure 1: Typical Residential EV Charging Infrastructure**



PG&E owns, installs, and maintains the electric service to the customer meter, in addition to providing electricity. For residences, PG&E offers special EV time-of-use (TOU) rates that provide incentives to charge EVs off-peak. To take advantage of some of the special rates, the EV owner may want install a second meter for the EVSE circuit (see Chapter 2E, *PG&E EV Rates*, for more information).

**B. Information Resources**

These guidelines should not be considered the sole source of information related to installing EVSE and charging equipment. EV and EVSE manufacturers and dealers are the best sources of information on the infrastructure needs and regulatory requirements particular to their equipment. They can also provide information on ordinances in local jurisdictions, which may impose additional requirements.

Any EV infrastructure installer should follow guidelines provided by manufacturers of the EV, the charging equipment, and the EV battery. In almost all cases, EV infrastructure installation requires permits and inspection by local building or electrical code officials. Installations should always be performed by licensed contractors.