Are you thinking about installing plug-in electric vehicle charging stations at your company? Workplace charging offers many benefits to employers, employees and the broader community. This guide provides steps to implement a workplace charging program and a list of additional resources.

**Step 1: Research Options and Develop a Plan**

- Review key resources on workplace charging (WPC), including *Best Practices for Workplace Charging* and *Amping Up California Workplaces: 20 Case Studies on Plug-in Electric Vehicle Charging at Work*. (See Figure 1a and Additional Resources.)

- Survey your employees to determine their current and future interest in purchasing plug-in electric vehicles (PEVs) and charging at work. This will help you determine how much and what kind of WPC is best suited for your workplace. Questions could include employees’ daily commute distance, whether they currently own or are considering buying a PEV and their willingness to pay for charging. A sample survey can be found in *Best Practices for Workplace Charging*. (See Additional Resources.)

- If you lease the office building or parking lot, talk to your landlord or other facility managers to obtain permission to install charging.

- Evaluate electrical connections to determine whether system upgrades will be needed.

- Create a budget that includes the equipment purchase, installation and operating costs.

- Contact your local electric utility to discuss available rate options, including any special PEV rates.

- Explore any available incentives or tax credits.

- Plan for future growth.

- Create an advisory or user group to help verify that practices and policies are on target and to act as a sounding board when considering changes.
  - Take advantage of any parking area construction to add capacity for future workplace charging.
  - Install oversized conduit for future expansion.
Step 2: Choose a System

- There are three basic levels of charging. Each differs by charging rate and therefore the amount of time it takes to “fill up” a PEV’s batteries, as shown in Table 1.

<table>
<thead>
<tr>
<th>Type of Charging</th>
<th>Power Levels (Installed circuit rating)</th>
<th>Miles of Range per Hour of Charging*</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Level 1</td>
<td>110/120VAC at 15 or 20 Amps</td>
<td>~4-6 miles/hr.</td>
</tr>
<tr>
<td>AC Level 2</td>
<td>3.3 kW (low) 208/240VAC at 30 Amps</td>
<td>8-12 miles/hr.</td>
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<tr>
<td></td>
<td>6.6 kW (medium) 208/240VAC at 40 Amps</td>
<td>16-24 miles/hr.</td>
</tr>
<tr>
<td></td>
<td>9.6 kW (high) 208/240VAC at 50 Amps</td>
<td>24-36 miles/hr.</td>
</tr>
<tr>
<td></td>
<td>19.2 kW (highest) 208/240VAC at 100 Amps</td>
<td>&gt; 60 miles/hr.</td>
</tr>
<tr>
<td>DC Fast Charging</td>
<td>200-500VDC at up to 200 Amps</td>
<td>Generally up to 80% charge in less than 30 minutes</td>
</tr>
</tbody>
</table>

* Refer to vehicle specifications for exact ratings.

- Charging stations are known formally as electric vehicle supply equipment (EVSE). There are many makes and models to choose from. Which station or combination of stations is right for your workplace will depend on how far your employees travel to work (and therefore how much charging they need), whether you intend to charge a fee for use, and other features you might want such as network access, management and reporting. Refer to the Additional Resources list below for details.

What Level of Charging is Best?

Employers may wish to install a variety of charging levels based on how far employees drive, whether they rely on the workplace as their primary charging venue and how long they park. For example, an employee who drives 20 miles roundtrip may find Level 1 sufficient, while an employee who drives 60 miles roundtrip but lives in an apartment building without home charging may benefit from Level 2 or even DC Fast Charging.

According to the U.S. Department of Transportation, 51 percent of employees travel less than 10 miles to work, as shown in Figure 1. For these people and many more, PEVs are ideal for daily driving. For employees with longer commutes, WPC can make battery-electric vehicles a more viable and attractive choice. For those with plug-in hybrid vehicles, which operate on gasoline and electricity, charging at work means getting more electric miles.

Figure 2. One-way distance traveled by the average commuter from home to work on a typical day.
Aggregated data cover activities for the month prior to the survey.
Step 3: Create and Follow an Installation Checklist

- Conduct a site assessment to determine the charging site(s).
- Check compliance with the Americans with Disabilities Act (See Additional Resources for Universal Charging Access Guidelines).
- Estimate the electrical load.
- Coordinate with your local utility.
- Contact equipment suppliers.
- Hire prime contractor and verify subcontractor credentials.
- Have contractor pull all necessary construction permits.
- Install charging equipment.
- Activate system.

Cost Considerations

- Installation costs will vary depending upon power requirements, siting considerations, the choice of equipment and availability of WPC incentives.
- Operational costs include the electricity, demand charges, charging network costs and transaction fees.

Step 4: Establish and Follow WPC Policies and Procedures

- Establish clear internal policies and procedures in order to manage your WPC program effectively.
- As outlined in Best Practices for Workplace Charging, issues to consider include:
  - Payment options
    - Free charging
    - Hourly fee ($/hr)
    - Electricity usage charge ($/kWh)
  - Tax implications
    - Research any tax implications of offering charging as an employee benefit (See Additional Resources)
  - Access priorities
    - Employee-only vs. public use
    - Fleet vehicles vs. employee vehicles vs. public vehicles
    - Dedicated charger vs. charger shared by multiple employees
  - System optimization
    - Manage use among multiple employees
      - Determine maximum charging time per vehicle
      - Install signage to indicate PEV parking only, time limits, etc.
    - Establish schedules to avoid charging during critical peak load times
    - Evaluate usage data and make adjustments if needed
    - Integrate PEV charging with the building electricity load

Step 5: Evaluate and Monitor Program

- Evaluate your WPC program, employee response, system use, etc.
- Review data to make adjustments and plan next phase.
Additional Resources

• Advanced Energy, Project Insights: Real-World Charging Behavior at the Workplace (2013)
  http://www.advancedenergy.org/transportation/resources/PEVUsageStudyIR_WorkplaceCharging.pdf?_cldee=bWFyeUBicmF6ZWx

• California Governor’s Office of Planning and Research, Plug-In Electric Vehicles: Universal Charging Access Guidelines and Best Practices (2013)
  http://opr.ca.gov/docs/PEV_Access_Guidelines.pdf

  http://www.pevcollaborative.org/workplace-charging

  www.pevcollaborative.org/workplace-charging

  www.pevcollaborative.org/workplace-charging


• California Plug-In Electric Vehicle Collaborative, Why Employers Should Install Workplace Charging (2013)
  www.pevcollaborative.org/workplace-charging

• CALSTART, Best Practices for Workplace Charging (2013)
  http://www.calstart.org/Libraries/Publications/Best_Practices_for_Workplace_Charging.sflb.ashx

• Electric vehicle supply equipment (charger) listings
  http://www.pluginamerica.org/accessories
  http://www.pluginrecharge.com/p/electric-vehicle-supply-equipment-evse.html
  http://www.aqmd.gov/tao/Demonstration/ElectricHybrid/SoCalEV_Ready_Program.htm

• Internal Revenue Service fringe benefit information

• PEV Resource Center, Resources for Businesses
  http://www.driveclean.ca.gov/pev/Resources_For_Businesses.php

• UC Davis Institute of Transportation Studies, Charging for Charging: The Paradox of Free Charging and Its Detrimental Effect on the Use of Electric Vehicles (2013)
  http://www.its.ucdavis.edu/?page_id=10063&pub_id=1919

• U.S. Department of Energy workplace charging resources
  http://www1.eere.energy.gov/vehiclesandfuels/electric_vehicles/resources.html