

November 2013

California Energy Commission

DOCKETED

14-IEP-1B

TN 72558

AUG 05 2014

AMPING UP CALIFORNIA WORKPLACES:



**20 case
studies on
plug-in
electric vehicle
charging
at work**



CALIFORNIA
PLUG-IN ELECTRIC VEHICLE
COLLABORATIVE

This report was developed by the California Plug-In Electric Vehicle Collaborative, a multi-stakeholder partnership working to ensure a strong and enduring transition to a plug-in electric vehicle marketplace. Members played guiding and consulting roles in developing this report, although individual organizations may not formally endorse every aspect or recommendation.

The PEV Collaborative would like to thank Dan Bowermaster of the Electric Power Research Institute and Jasna Tomic of CALSTART for their leadership role as co-chairs of the Workplace Charging Working Group. The report was developed by the Working Group co-chairs, volunteers of the Working Group, Collaborative staff and our contractors, The Better World Group, Inc., Clean Fuel Connection, Inc., J Knapp Communications, and Winter Graphics. Special thanks to the companies that provided case studies and to Josh Boone, lead PEV Collaborative staff for his contributions to all Working Group activities.

California Plug-In Electric Vehicle Collaborative

Carla Peterman, 2013-2014 Chairman
California Plug-In Electric Vehicle Collaborative

Christine Kehoe, Executive Director
California Plug-In Electric Vehicle Collaborative

AeroVironment <i>Robert Barrosa</i>	ChargePoint <i>Richard Lowenthal</i>	Nissan North America, Inc. <i>Tracy Woodard</i>
American Lung Association in California <i>Bonnie Holmes - Gen</i>	Clean Fuel Connection, Inc. <i>Enid Joffe</i>	Northern Sonoma County Air Pollution Control District <i>Barbara Lee</i>
Bay Area Air Quality Management District <i>Jack Broadbent</i>	Daimler <i>John Tillman</i>	NRG Energy <i>Terry O'Day</i>
BMW Group <i>Frank Breust</i>	ECOTALITY <i>Colin Read</i>	Office of Governor Edmund G. Brown Jr. <i>Cliff Rechtschaffen</i>
California Air Resources Board <i>Mary Nichols</i>	Electric Power Research Institute <i>Dan Bowermaster</i>	Pacific Gas and Electric Company <i>Steve Malnight</i>
California Center for Sustainable Energy <i>Len Hering, RADM, USN (ret)</i>	Ford Motor Company <i>Cynthia Williams</i>	Plug In America <i>Dan Davids</i>
California Electric Transportation Coalition <i>Eileen Tutt</i>	General Motors <i>Robert Babik</i>	Sacramento Municipal Utility District <i>Elisabeth Brinton</i>
California Energy Commission <i>Janea Scott</i>	Greenlots <i>Ron Mahabir</i>	San Diego Gas & Electric <i>Greg Haddow</i>
California Public Utilities Commission <i>Carla Peterman</i>	Honda Motor Company <i>Elmer Hardy</i>	South Coast Air Quality Management District <i>Barry Wallerstein</i>
California State Assembly <i>Bonnie Lowenthal</i>	Institute of Transportation Studies, UC Davis <i>Tom Turrentine</i>	Southern California Edison <i>Caroline Choi</i>
California State Assembly <i>Nancy Skinner</i>	International Council on Clean Transportation <i>Alan Lloyd</i>	Tesla Motors, Inc. <i>Diarmuid O'Connell</i>
California State Senate <i>Jerry Hill</i>	Kia Motors America <i>Steve Kosowski</i>	Toyota North America <i>Toshio Yoshidome</i>
California State Senate <i>Alex Padilla</i>	Los Angeles Department of Water and Power <i>Marvin Moon</i>	Union of Concerned Scientists <i>Adrienne Alvord</i>
CALSTART <i>John Boesel</i>	Natural Resources Defense Council <i>Roland Hwang</i>	
Center for Energy Efficiency and Renewable Technologies <i>John Shears</i>		

Table of Contents

Introduction	2
What is Workplace Charging?.....	2
Purpose of this Report	4
How to Use this Report	4
Workplace Charging Snapshot	5
Case Studies	10
Small Workplaces.....	10
Mission Motors.....	10
Pat's Garage.....	12
Medium Workplaces.....	14
ChargePoint	14
Evernote	16
Pomona College.....	18
Sierra Nevada Brewing Company	20
Star One Credit Union	22
Straus Family Creamery	24
Westridge School for Girls.....	26
Large Workplaces	28
20th Century Fox.....	28
California Environmental Protection Agency (Cal/EPA)	30
California State University Los Angeles (CSULA).....	32
Cisco Systems.....	34
General Motors.....	36
Google.....	38
Los Angeles Department of Water and Power (LADWP)	40
NetApp, Inc.....	42
San Diego Gas & Electric (SDG&E).....	44
SAP Labs, LLC	46
Warner Bros. Entertainment, Inc.	48
Findings and Conclusion	50
Appendix A	51
Appendix B	59
Endnotes	60

Introduction

In March 2012, Governor Edmund G. Brown Jr., issued Executive Order B-16-2012 to accelerate the market for zero-emission vehicles (ZEVs) in California by setting a goal of 1.5 million ZEVs on the state's roadways by 2025. The Executive Order defined ZEVs to include hydrogen fuel cell vehicles and plug-in electric vehicles (PEVs). PEVs include both plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs). **Currently, California's market share of U.S. PEV sales is nearly 30 to 40 percent¹; from 2011 through mid-2013, more than 45,500 PEVs were sold across the state.²**

PEV market growth has spurred the need for more charging stations throughout local communities. Most PEV drivers charge their vehicles at home. The workplace is a strategic location to install charging stations because employees' vehicles are parked there for extended periods every day.

The California Plug-In Electric Vehicle Collaborative (PEV Collaborative), which has been actively engaged in helping grow the market for PEVs, believes that workplace charging fills a critical gap in PEV infrastructure needs. Bridging this gap will help spur employee purchases of PEVs, extend electric miles driven, build range confidence, create a workplace showroom for PEVs where other employees can see the vehicles in use, allow employers to utilize PEVs for fleet vehicles, and attract, and retain employees already driving PEVs or wanting to invest in this technology.

What is workplace charging?

The term "workplace charging" refers to PEV charging that is provided at or near the driver's place of employment. It provides PEV drivers convenient and reliable refueling away from home and the reassurance employees may need in order to commute roundtrip in their PEVs without the fear of running out of electricity. Although the range of today's PEVs is sufficient for most commutes – the average one-way commute for Americans is about 12 miles³ – some commutes are longer. Sometimes people need their cars for work or personal errands during the day. Workplace charging provides extra flexibility that enhances the utility of PEVs, thereby demonstrating to drivers that PEVs can work for them in their daily lives.

Workplace charging also can be a market enabler. For employees who do not have dedicated charging at home, workplace charging can be a key factor in their decision to purchase a PEV. Some businesses offer workplace charging that provides access not only to employees but also to the public and PEV fleets.

PEV Charging Equipment Basics

There are many different suppliers of PEV charging stations (also called electric vehicle supply equipment, or EVSE [See Appendix B]), and the stations have varying functionality. The three available charging levels correspond with the rate at which the battery is replenished. They are described below and in Table 1.



AC Level 1: Plugs into a standard 110/120-volt alternating current (VAC) three-prong wall outlet with no other connection needed. AC Level 1 charging is usually accomplished using a portable "cordset" that is provided with the vehicle or by a permanently installed charging station. Plug-in hybrid electric vehicles (PHEVs) tend to

have smaller batteries than all-electric or battery-electric vehicles (BEVs) and can often adequately recharge in a reasonable time with an AC Level 1 cordset. If possible, a dedicated circuit is recommended to avoid overloading breakers in the electrical panel. Since cars are often parked at work for eight hours a day, Level 1 is often sufficient for workplace charging.



AC Level 2: Uses 240VAC current and is typically used for PEVs with larger batteries, such as BEVs, and in cases where PHEVs may be parked for a short period (generally three hours or less) and need to charge quickly. An AC Level 2 charging station should be installed on a dedicated circuit by a qualified electrician. It can also be plugged into a 240VAC outlet when equipped with an appropriate plug connection.

DC Fast Charging: Uses a commercial-grade 440VAC or 480VAC device that uses direct current (DC) to charge a PEV to approximately 80 percent in under 30 minutes, assuming a 24 kWh battery.

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

* Refer to vehicle specifications for exact ratings.

Table 1. Charging levels for workplace applications.
Source: Plug-in Electric Vehicle Charging Infrastructure Guidelines for Multi-unit Dwellings, California Plug-In Electric Vehicle Collaborative (2013).

Introduction (continued)

Purpose of this Report

This report presents information collected from the PEV Collaborative's spring 2013 statewide survey (Appendix A) of 79 public and private employers located in California. Some of those surveyed also have offices in other locations throughout the United States.

Information gleaned from the survey data provides a snapshot of workplace charging in California and the different solutions employers have deployed. The report features 20 case studies of workplaces that have already installed charging and highlights their successes and challenges.

In addition to this report, the PEV Collaborative has developed three brief guides to help employers and employees considering workplace charging. The three guides are titled: *Why Employers Should Install Workplace Charging for Plug-in Electric Vehicles*, *Employers' Guide to Installing Workplace Charging for Plug-in Vehicles* and *How Can I Get Charging at My Workplace?* Additionally, PEV Collaborative member CALSTART has published *Best Practices for Workplace Charging*⁴, which offers practical step-by-step guidance to organizations seeking to install workplace charging. See Appendix B for additional workplace charging resources.

How to Use this Report

The case studies are organized by workplace size – small workplaces are classified as those that have fewer than 100 employees; medium workplaces have 1,000 or fewer employees; and large workplaces have more than 1,000 employees. The report is designed so that the reader can find the workplaces that best match his or her own circumstances and use those particular case studies to help determine how best to deploy workplace charging at his or her company.

Workplace Charging Snapshot

In Spring 2013, 79 individual organizations responded to the PEV Collaborative's workplace charging survey, which targeted employers located within California.

Members of the PEV Collaborative had provided contacts for organizations that had installed or were considering installing workplace charging. In addition, PEV Collaborative members, themselves, were asked to complete the online survey. Survey invitations were emailed to approximately 150 people. The outstanding response (over 50 percent) is indicative of the high level of interest in this subject and the willingness of the leading organizations to tell their story.

The largest number of responses (40) came from private businesses. Twenty-two governmental agencies, eight educational institutions, five utilities and four non-governmental organizations also completed the online survey. Eighty percent of the respondents were located in Northern California, most in Silicon Valley. Less than 20 percent were in Southern California. Although it is unclear why most of the responses came from Northern California, a reasonable guess is that it was due to the large number of Silicon Valley companies who have installed charging.

The organizations that responded ranged in size from two employees to more than 100,000, but most respondents were on the smaller end; approximately one-half employed fewer than 500.

Nine of the 79 respondents did not have workplace charging at the time of the survey, but most of the respondents were planning installations. Four were in the process of deciding on locations and products. Two organizations were working to adopt internal policies before implementing workplace charging. One respondent did not

need workplace charging because all of its employees took transit to work, and another organization did not elaborate. One respondent did not answer the question.

The 70 organizations that indicated they have workplace charging listed almost 1,500 charging stations. The breakdown by charging level is shown in Table 2. About 28 percent of the organizations provided more than one level of charging. The vast majority of stations were located in California. Only three companies referenced charging stations at their worksites located outside of California.

Level 1	Combination Level 1 and Level 2	Level 2	DC Fast Charging	Total
390	131	946	8	1475
26%	9%	64%	1%	100%

Table 2. Number of charging stations installed, by level.⁵

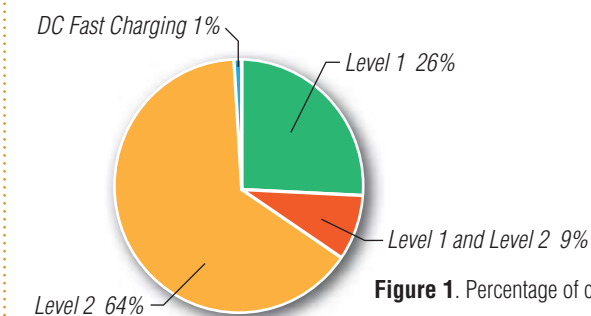


Figure 1. Percentage of charging stations installed by level.

The organizations surveyed installed a variety of charging stations, as shown in Table 3. Seventeen respondents had more than one type of charging station.

Level 1 Only	Combination Level 1 and Level 2	Level 2 Only	DC Fast Charging Only	Two or More Types of Chargers
3	16	35	0	17

Table 3. Types of charging station installed by organization.

Workplace Charging Snapshot (continued)

The number of charging stations that each organization installed varied greatly, as shown in Figure 2. Most organizations installed a few units, but some installed many. For example, Google has installed more than 470 charging stations at its Mountain View headquarters, putting the Internet giant solidly in the lead, based on the survey results. Most organizations (87 percent) reported that installing charging stations did, in fact, encourage more employees to purchase PEVs and some indicated that additional charging installations were planned.

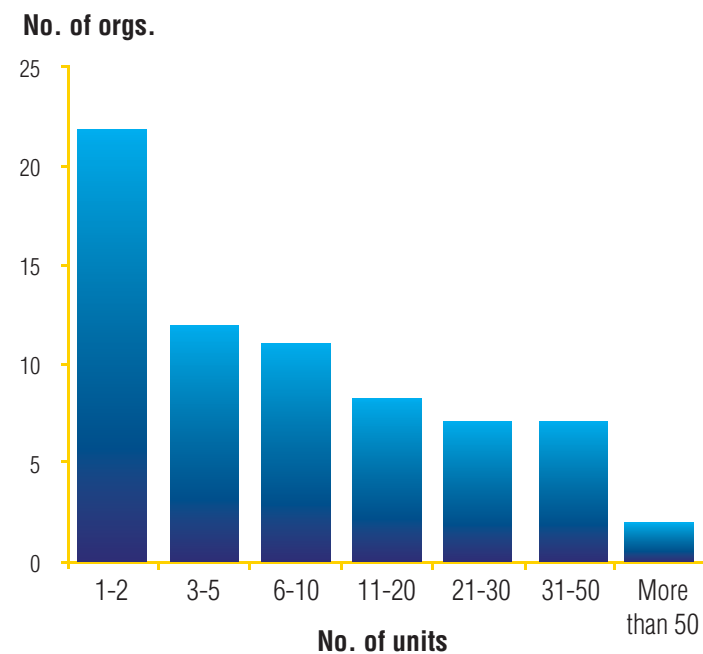


Figure 2. Number of charging stations installed by organization.

The survey asked organizations to select their motivation for installing workplace charging. Respondents were permitted to pick as many responses as applicable and most listed multiple reasons. Survey respondents overwhelmingly listed “being green” as the top reason for installing charging, followed by requests from employees. “Other” reasons included receiving grant funding, following a corporate mission/initiative, providing charging for visitors and encouraging people to purchase PEVs. Table 4 lists the number of times each reason was stated.

Reasons for Installing Charging	No. of Times Stated
Being green	65
Requests from employees	37
Requests from senior management	27
GHG reductions	27
Buy-in from senior management	24
Other	23
Employee retention	18
Employee attraction	17
Cost of equipment	13
Internal policy	12
Equipment utilization	9
Cost of installation	6
Equity in terms of employee benefits	3
Liability	1

Table 4. Reasons for installing charging.

Companies also were asked to identify the challenges they faced in installing charging. Respondents were permitted to pick as many responses as applicable and most listed multiple reasons. The top challenges to installing workplace charging were the cost of installation and the cost of equipment. “Other” challenges included availability of electricity, permitting/installation issues, maintenance, operations decisions (e.g., location of charging stations, wireless or landline equipment communication, billing), and managing demand. Table 5 lists the number of times each reason was stated.

Top Challenges to Installing Workplace Charging	No. of Times Stated
Cost of installation	58
Cost of equipment	43
Other	29
Equipment utilization	15
Equity in terms of employee benefits	15
Internal policy	12
Liability	8
Buy-in from senior management	2

Table 5. Top challenges to installing workplace charging.

The total cost per installation and the total cost to the organization varied widely depending upon the type of equipment. Cost ranged from \$1,500 to \$30,000. Many respondents commented that the cost varied based on the level of charging and specific site conditions. As seen in the reported “challenges” (Table 5), installation cost remains a major concern to many organizations. Many companies received grants to install their charging stations so their cost was considerably lower than the actual retail cost. It was difficult to calculate average costs because various organizations interpreted the survey question differently. However, the most frequent response to the question of cost was a range of \$3,000 to \$5,000 per unit, which is in line with other estimates.⁶

More than one-third of the workplaces received some type of grant support to purchase the charging stations and/or for installation. Two-thirds of workplaces covered their portion of the costs in their operating budget. A small percentage of organizations relied on third-party ownership or financing.

Two-thirds of workplaces currently provide free charging to employees, as shown in Figure 3. For others, employees pay a fee based either on energy consumption or time, depending upon the level of charging. Of those workplaces that charge a fee, six charge per kilowatt-hour, with \$0.10 per kWh a common rate. Sixteen charge an hourly rate, which ranges from \$0.45 to \$4 per hour (valet). The most common fee is \$1 per hour.

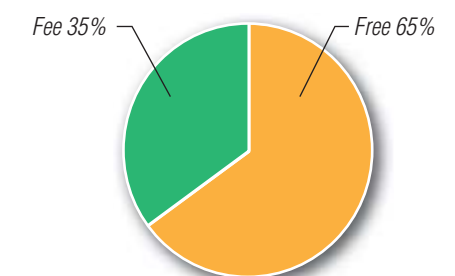


Figure 3. Free vs. fee-based charging

As shown in Table 6 and Figure 4, only 3 percent of respondents believed DC Fast Charging-only was sufficient, while the majority felt Level 2 alone, or some combination of Level 1, Level 2 and DC Fast Charging was needed to make a workplace charging program successful.

Level 1	Level 2	DC Fast Charging	Combination of Levels	Total
8%	58%	3%	31%	100%

Table 6. Level of charging needed.

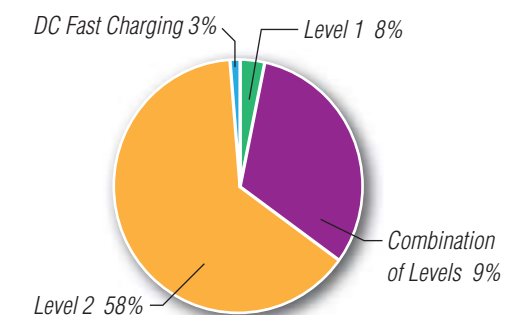


Figure 4. Level of charging needed.

Case Studies

The following 20 case studies represent a sampling of workplace charging scenarios in California and for some companies, outside of California. They are divided into three categories by size based on the number of employees.

Small Workplaces

Mission Motors
Pat's Garage

Medium Workplaces

ChargePoint
Evernote
Pomona College
Sierra Nevada Brewing Company
Star One Credit Union
Straus Family Creamery
Westridge School for Girls

Large Workplaces

20th Century Fox
California Environmental Protection Agency (Cal/EPA)
California State University Los Angeles (CSULA)
Cisco Systems
General Motors
Google
Los Angeles Department of Water and Power (LADWP)
NetApp, Inc.
San Diego Gas & Electric (SDG&E)
SAP Labs, LLC
Warner Bros. Entertainment, Inc.



Mission Motor Company



Mission Motors is a Tier-1 supplier of optimized electric powertrain components, offering energy storage, drive systems and software intelligence for automotive, power sports and heavy equipment applications.

www.ridemission.com



CHARGING SNAPSHOT

No. of employees: **25**

No. of charging stations and types:
Level 1 - several outlets are available
Level 2 - 1

No. of employees driving PEVs: **3**

No. of times charging stations are used per day:
2

CHARGING STORY



Workplace charging setting

Mission Motors is headquartered in San Francisco and leases its facility. The company installed a Clipper Creek Level 2 charger in its on-site employee parking lot to support a battery electric vehicle in the company fleet and its employees with PEVs. The availability of the charger significantly improved the company's experience with its fleet vehicle and influenced several employees to purchase PEVs.



Decision-making process

Mission Motors was motivated to install workplace charging for several reasons. Because the company develops technology to advance electric and hybrid vehicles, it saw workplace charging as a way to further its "green" objectives and to reduce greenhouse gas emissions. The company received requests from employees and management to install charging. This was a way to attract and retain employees and provide equity in terms of an employee benefit.

The company has surveyed its employees to determine how many might purchase PEVs in the future, and it believes that providing workplace charging will encourage more to seriously consider this option in the future. The company thinks that Level 2 charging is needed at workplaces to support employee-driven PEVs.



Charging implementation and management

The charging station is available to employees and visitors. Because there are only three PEVs that use the charging station, no limits are placed on the use of the charger. Employees using the charger coordinate times to plug in each vehicle to ensure that everyone gets a full charge by the end of the day.



Charging costs

The total cost for the charging station and installation was \$3,755. The company covered these costs in its operating budget. The company has the capability of adding additional chargers in the future.

Charging is free for employees and visitors.



Employee benefits

Mission Motors does not offer any company-sponsored incentives for employees to purchase PEVs. The company provides free charging to employees.



Workplace charging challenges

The top challenge associated with workplace charging is installation and equipment costs.

Contact information

Karl Johnson

Head of Sustainability
(415) 666-2000
karl@ridemission.com

“Install it, and they will come. For me, the availability of the Level 2 charger at work directly played into my purchase of a battery electric vehicle.”

Thomas Smith, Mission Motors Electrical Engineer



Pat's Garage/Green Gears

Opened in 1986, **Pat's Garage** specializes in Honda, Acura, Subaru and hybrid vehicle repair and maintenance. Green Gears was founded in 2007 by Pat's owner to convert hybrids to plug-in hybrids for individual customers and fleet managers in the San Francisco Bay Area. Green Gears has performed 70 percent of the roughly 1,000 Prius plug-in conversions in the United States.

www.patsgarage.com
www.greengears.net



CHARGING SNAPSHOT

No. of employees: **7**

No. of charging stations and types:
Level 1 - 1
Level 2 - 1

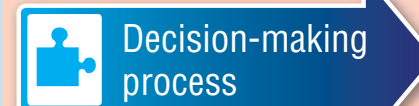
No. of employees driving PEVs: **1**

No. of times charging stations are used per day:
1

CHARGING STORY



Pat's Garage leases its San Francisco facility and its employees park their vehicles on the street. The charging station is mounted on the wall of the building and is accessible from the street.



Several elements factored into installation of workplace charging at Pat's Garage. Because the company works with advanced vehicle technologies like hybrids and PEV conversions, Pat's wanted to be "green" and encourage the growth of plug-in technology. It also received requests from employees and senior management to install a charger. Additionally, Pat's Garage received a grant from the ChargePoint America program (funded by the U.S. Department of Energy) to cover the charging station equipment cost so the company was motivated to install the charger because of this incentive.

The company has surveyed its employees to determine how many might purchase PEVs in the future. It believes the availability of workplace charging will encourage more employees to drive PEVs. Pat's Garage believes employees need both Level 1 and Level 2 charging.



Employees, visitors and members of the general public can use the Level 2 charging station. There are no limits placed on the use of this charging station because it typically is used only once per day.



With the offset of grant funding for the equipment from the ChargePoint America program, the company paid \$1,110 to install the charging station, which was funded through its operating budget. The charging station installation has the capability to add chargers in the future.

All PEV drivers pay \$0.34 per kWh via personal credit card to charge.



Pat's Garage does not offer any company-sponsored incentives for employees to purchase PEVs.



The costs of the equipment and installation are the top challenges to installing workplace charging.

Contact information

Patrick Cadam

Owner

(415) 647-4500

pat@patsgarage.com

“The majority of all plug-in vehicle charging will take place in the home or at the workplace. By installing a charging station at my workplace, I hope to encourage the growth of plug-in technologies among my employees and members of the nearby public.”

Patrick Cadam, Owner

ChargePoint, Inc.



ChargePoint is the largest online network of independently owned PEV charging stations and operates in 14 countries. The company manufactures charging stations, provides electric vehicle charging services for PEV station owners and offers online tools and mobile applications for PEV drivers.

www.chargepoint.com

CHARGING SNAPSHOT

No. of employees: **120**

No. of charging stations and types:
Level 2 - 4, each with 2 ports

No. of employees driving PEVs: **12**

No. of times charging stations are used per day:
1.5

CHARGING STORY



Headquartered in Campbell, Calif., ChargePoint leases its office building and provides an on-site parking lot for employees. The parking lot has four dual ChargePoint Level 2 charging stations. There is no company-owned fleet.

Decision-making process

ChargePoint installed workplace charging to meet employee requests and because the company believes workplace charging will help attract and retain employees. Senior management also supported the installation of workplace charging.

The company has not surveyed its employees to determine their interest in purchasing PEVs in the future; however, it has observed that providing workplace charging encourages more people to purchase PEVs. When it installs more chargers, there are always more vehicles to use them. The company believes Level 2 charging is needed to make workplace charging successful.

Charging implementation and management

The charging stations are available to employees, visitors and the general public. No limits are placed on the chargers. Charging is managed by the drivers, who text each other when they need to communicate about charging station use.

Charging costs

The average installation cost per charging port was \$6,000. The total cost per charging port to ChargePoint was \$10,000. The company covered these capital costs in its operating budget. The charging station network was constructed to allow additional charging stations to be added in the future.

All PEV drivers pay \$0.25 per kWh to charge, using their own credit card.

Employee benefits

ChargePoint does not provide any company-sponsored incentives for employees to purchase PEVs.

Workplace charging challenges

The top challenges are the installation costs and a resistant landlord.

Contact information

Tony Canova

Chief Financial Officer

408-841-4500

tony.canova@chargepoint.com

“To make workplace charging successful, companies need to budget for growth of at least 100 percent per year. We started with just two ports and every time we install more, more cars come.”

Richard Lowenthal, Founder and Chief Technical Officer



Evernote

Evernote is a privately-held company that builds innovative mobile, desktop and tablet apps that help both individuals and companies work smarter and be more productive.

www.evernote.com



CHARGING SNAPSHOT

No. of employees: **250**

No. of charging stations and types:
Level 2 - 10
DC Fast Charger - 1

No. of employees driving PEVs: **46**

No. of times charging stations are used per day:
46

CHARGING STORY



Headquartered in Redwood City, Calif., Evernote leases its building and provides an on-site parking garage for its employees, where the 11 charging stations are located. There is no company-owned PEV fleet.

“The motivation behind Evernote’s robust workplace charging program is unique: to increase employee productivity. By gaining access to HOV lanes in their PEVs, some of our employees have cut their commute in half. In our mind, a shorter commute means a happier, more productive workforce.”

Maeanna Glenn, Special Projects Manager

Decision-making process

Evernote was primarily motivated to install workplace charging because PEVs with the Clean Air Vehicle Decal can use the carpool lane with a single occupant, enabling employees to get to work quicker, thereby increasing productivity.

The company has not surveyed its employees to determine their interest in purchasing PEVs in the future, but it feels that offering workplace charging will encourage more employees to purchase PEVs. In fact, demand has been so high that the company has plans to install eight more Level 2 chargers in the coming months. Evernote believes that employees need more Level 2 chargers in order to continue the success of its workplace charging program.

Charging implementation and management

The charging stations are available to employees, visitors and the general public.

No limits are placed on the chargers. Evernote’s Special Projects Manager oversees use of the charging stations through a shared charging calendar and a Google Group for employee participants. Each participant has a designated time each day to use one of the chargers.

Charging costs

The average installation cost per charging station was \$2,445 for the Level 2 chargers and \$22,025 for the DC Fast Charger. With the offset of grant funding from The EV Project (funded by the U.S. Department of Energy), the total cost to Evernote for both the Level 2 chargers and the DC Fast Charger was approximately \$10,000. The company covered the additional capital costs through its operating budget. The charging station network has future expansion capabilities.

Charging is free for employees. All other PEV drivers pay \$1 to \$2 per hour to charge depending upon the Blink account the driver uses.

Employee benefits

Evernote offers employees a subsidy of \$250 per month toward any PEV that qualifies for the HOV sticker, and the company pays for the charging. The company has negotiated a deal with Nissan for a special lease rate for the LEAF that matches the monthly subsidy.

Workplace charging challenges

The top challenges are the installation and equipment costs. Cost would have been an issue for Evernote if it had not been able to use grant funding.

Contact information

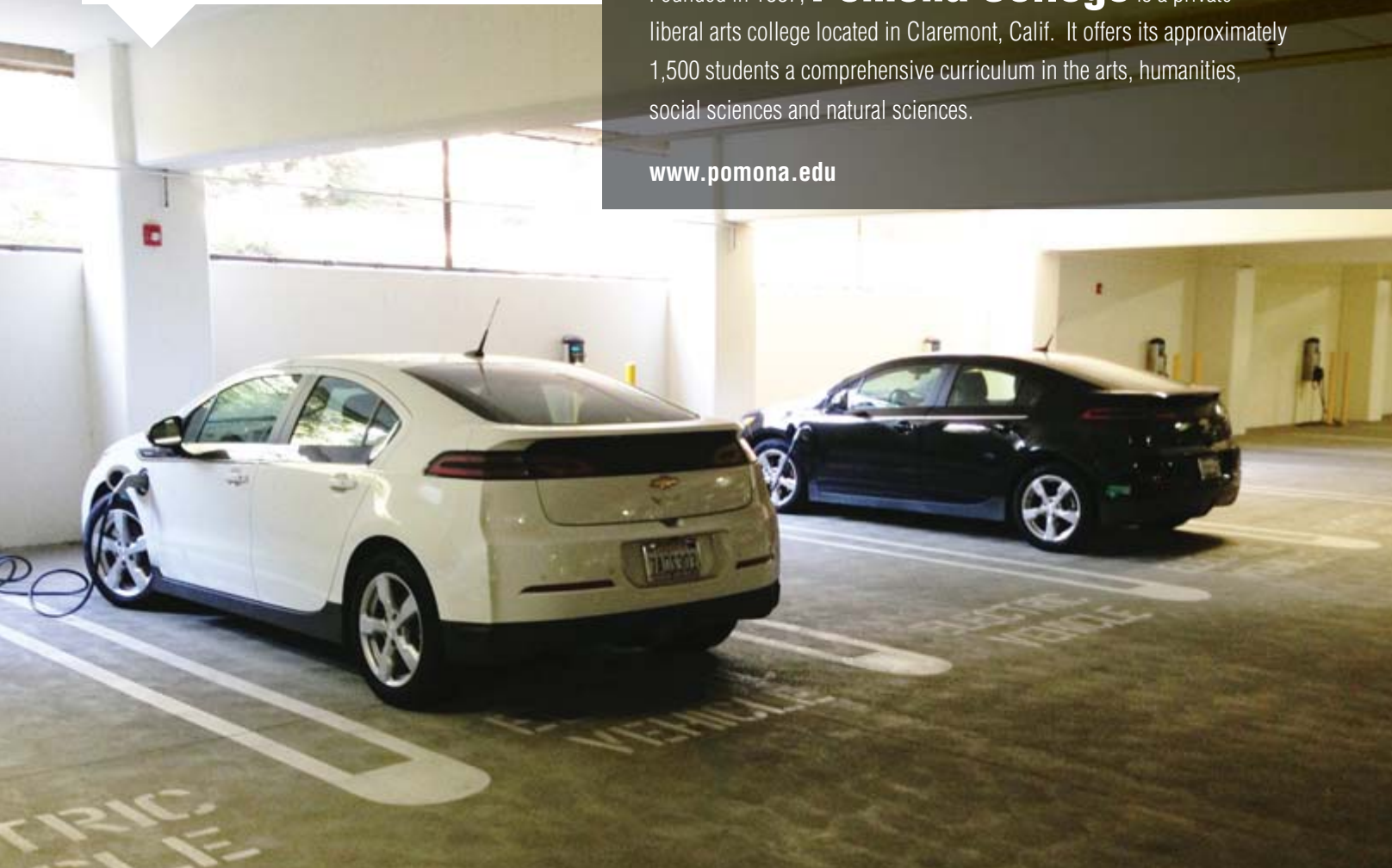
Maeanna Glenn
Special Projects Manager
mglenn@evernote.com



Pomona College

Founded in 1887, **Pomona College** is a private liberal arts college located in Claremont, Calif. It offers its approximately 1,500 students a comprehensive curriculum in the arts, humanities, social sciences and natural sciences.

www.pomona.edu



CHARGING SNAPSHOT

No. of employees: **735**

No. of charging stations and types:
Level 2 - 6

No. of employees driving PEVs: **4**

No. of times charging stations are used per day:
2

CHARGING STORY



Pomona College's charging stations are located in the South Campus Parking Structure, which is owned by the college. The college offers on-site parking lots, on-site parking garages and street parking for its employees. The college does not have any PEVs in its on-road fleet, although it does have 55 plug-in electric carts.

“Two of our staff members purchased their electric vehicles within the last 12 months, and being able to charge while at work was a factor in their purchase decision because they both have long commutes.”

Ginny Routhe, Assistant Director of Sustainability

Decision-making process

Furthering the college's vision for a greener campus, it installed six charging stations while constructing the campus' newest parking structure in 2011. The chargers were one of many sustainability features in the new garage. The college also had support from senior management to install workplace charging.

Pomona College has not surveyed its employees to determine how many might purchase PEVs in the future; however, it thinks that workplace charging will encourage more employees to purchase them. The college believes employees need Level 2 charging.

Charging implementation and management

The charging stations are available to employees, visitors and members of the general public. No limits are placed on the use of the chargers, and no issues have arisen surrounding charger sharing. Drivers are sent a text message on their cell phones when charging is complete.

Charging costs

The cost per charging station to Pomona College was approximately \$6,000, excluding installation. The college covered these capital costs in its capital projects budget with the construction of the new parking structure. The charging station network was constructed to allow more chargers to be added.

Faculty and staff pay approximately \$0.15 per kWh to charge. Others pay \$1.25 per hour to charge. All PEV drivers pay using their own credit card through the ChargePoint network.

Employee benefits

Pomona College does not provide any school-sponsored incentives for employees to purchase PEVs, although it does provide charging for faculty and staff at a discounted rate.

Workplace charging challenges

Equipment costs, equipment utilization and consistent system functionality are viewed as the top challenges.

Contact Information

Ginny Routhe

Assistant Director of Sustainability
(909) 607-5000
ginny.routhe@pomona.edu



Sierra Nevada Brewing Co.

Founded in 1980, **Sierra Nevada Brewing Co.** is one of America's premier craft breweries. Headquartered in Chico, Calif., the privately held company produces nearly 1 million barrels of beer annually.

www.sierranevada.com/brewery/about-us/sustainability



CHARGING SNAPSHOT

No. of employees: **400**

No. of charging stations and types:
Level 2 - 2

No. of employees driving PEVs: **1**

No. of times charging stations are used per day:
One to two times per week

CHARGING STORY



At its company-owned headquarters, Sierra Nevada has two Level 2 charging stations, which were installed in 2009. The chargers sat idle until the company's owner purchased a Nissan LEAF in 2011. The chargers can be used by employees and visitors, and are used to charge Sierra Nevada's two PEV fleet vehicles.

Decision-making process

Sierra Nevada decided to install workplace charging primarily to further its sustainability goals. The company also wanted to help build PEV infrastructure in California. Additionally, the company's founder and senior management requested that chargers be installed for the benefit of employees, patrons, vendors and the general public. The company believes that Level 2 charging best meets its workplace charging needs.

However, the company does not currently believe that providing workplace charging will encourage more employees to purchase PEVs given current vehicle costs. Employees have not been surveyed to determine how many might purchase PEVs in the future.

Charging implementation and management

Because the company's founder and the two fleet vehicles are the primary users of the charging stations, no demand issues have emerged, so no limit is placed on charging.

Charging costs

The total cost per charging station installation was \$3,500. The capital costs for the chargers came from the company's operating budget.

Charging is free for employees and guests. The charging stations are tied into the company's solar installation, which is one of the largest privately owned solar arrays in the country with more than 10,500 solar panels generating roughly 2.9 million kWh per year.

Employee benefits

Sierra Nevada does not offer any company-sponsored incentives for employees to buy PEVs, but since it provides free charging, if employees were to invest in a PEV they would receive that benefit.

Workplace charging challenges

The installation and equipment costs are viewed as the top challenge. Sierra Nevada recommends that businesses poll their employees to see if there is a need for workplace charging before investing in installations.

Contact information

Cheri Chastain
Sustainability Manager
(530) 893-3520
cheri@sierranevada.com

“One of our key motivations to install the chargers, even before anyone in our company had an electric vehicle, was to help build the EV infrastructure in California.”
Cheri Chastain, Sustainability Manager



Star One Credit Union

Star One is the largest credit union in California's Silicon Valley, offering financial services to more than 90,000 members worldwide.

www.starone.org



CHARGING SNAPSHOT

No. of employees: **165**

No. of charging stations and types:
Level 2 - 1

No. of employees driving PEVs: **3**

No. of times charging stations are used per day:
2

CHARGING STORY



Star One's company-owned administration building has one Level 2 charging station located in its on-site parking lot. The charging station has two charging connectors that can reach four parking spaces. The company has no fleet vehicles.

Decision-making process

Star One's key motivation to install the charging station was to be green. The company has not surveyed its employees to determine how many might purchase PEVs in the future, but believes that workplace charging will encourage more to do so because it will decrease range anxiety. It believes that Level 2 charging is needed at the workplace.

Charging implementation and management

The charging station may only be used by employees. The company has developed procedures to manage the use of the charging station such as parking in the designated location and moving the car once it is charged. These procedures have helped ensure that employees can all share and have equal access to the charger.

Charging costs

The total cost for the charging station installation was \$5,700. The cost to the company was \$8,300. The capital cost for the charger was covered through the company's operating budget. The charging station was constructed to enable additional chargers to be added in the future.

Charging is free for employees.

Employee benefits

Star One does not offer any company-sponsored incentives for employees to buy PEVs. Employees receive free charging.

Workplace charging challenges

The top challenge to workplace charging is the cost of installation and the equipment, although Star One did not consider the cost unmanageable.

Contact information

Steve Harris

Administration Manager

(408) 543-5125

steveh@starone.org

“The cost was not that bad. The whole process was painless.” *Steve Harris, Administration Manager*



Straus Family Creamery

Founded in 1994, **Straus Family Creamery**

is a family-owned and operated business, dedicated to making the highest quality, minimally processed organic dairy products. The dairy and creamery are located in Marshall on California's North Coast. The Straus' dairy was the first certified organic dairy west of the Mississippi River and Straus Family Creamery the first 100 percent certified organic creamery in the country.

www.strausfamilycreamery.com



CHARGING SNAPSHOT

No. of employees: **100**

No. of charging stations and types:
Level 2 - 4

No. of employees driving PEVs: **2**

No. of times charging stations are used per day:
2

CHARGING STORY



Workplace
charging setting

Straus Family Creamery's warehouse and administrative office, located in Petaluma, Calif., has two charging stations. There also are two charging stations at its creamery operation in Marshall, Calif. Each location has a Magne Charge station to accommodate a first-generation Toyota RAV4 EV and a Blink station to accommodate a Nissan LEAF (and possible future vehicles). The company has two PEVs in its fleet.



Decision-making
process

Straus Family Creamery's motivation to install charging stations was two-fold: to further its sustainability efforts and to accommodate the president's company car, a Toyota RAV4 EV. When the vehicle was replaced with a Nissan LEAF, it was not turned in, but rather put to use by the COO. The company has taken additional steps to reduce its carbon footprint, including instituting a carpool program, a wastewater reuse program and the use of solar power at the office and warehouse. The charging stations are another step along this path.

The request for charging stations came from management. Company President, Albert Straus, drives a PEV, so he directed that chargers be installed. Management thinks that Level 2 stations are needed for workplace charging to be successful at its locations.



Charging
implementation
and management

No limits are placed on charging because only two vehicles use the charging stations most of the time. The charging stations can be used by employees and visitors.



Charging costs

The total cost per charging station ranged from \$1,500 to \$3,000, with installation completed by the in-house maintenance team. The charging-station network was constructed to enable additional chargers to be installed in the future.

Charging is free for both employees and visitors.



Employee
benefits

The president and COO drive company PEVs for business and local event use.



Workplace
charging
challenges

None. Straus Family Creamery eagerly awaits employees purchasing personal PEVs and would happily install the necessary additional charging stations in Petaluma.

Contact information

Isabelle Reining
Sustainability Manager
(707) 776-2887
isabelle@strausmilk.com

“Sustainability is at the core of our mission and using alternative energy and electric transportation is a natural expression of it. For our operations, we strive to create an integrated system – with the ultimate goal of becoming carbon neutral. Electric vehicle charging and electric vehicles are a big step in that direction.”

Albert Straus, President

Westridge School for Girls

Founded in 1913, Westridge School for Girls is an independent day school for college-bound girls, grades 4 through 12, with approximately 480 students. It is located in Pasadena, Calif.

www.westridge.org



CHARGING SNAPSHOT

No. of employees: **110**

No. of charging stations and types:
Level 1 - 1

No. of employees driving PEVs: **3**

No. of times charging stations are used per day:
3

CHARGING STORY



Workplace
charging setting

Westridge installed one Level 1 charger to serve two of its employees that drive PEVs. Once the charger was installed, a third employee purchased a PEV. The school owns the on-site parking lot for its employees where the charger is located, and two parking spaces are dedicated to PEV-only charging. Westridge does not have a school-owned PEV fleet.



Decision-making
process

Westridge installed workplace charging for several reasons. The charging station is one of the school's many sustainability initiatives, including the only LEED Platinum Certified building in the City of Pasadena, two solar installations, retrofits of its irrigation system and energy efficient lighting. Additionally, some employees requested charging and the school viewed this investment as a means to retain employees.

The school has surveyed its employees to determine how many might purchase PEVs in the future and two or three employees stated that they are interested in buying a PEV. Thus, the school believes that installing workplace charging will encourage more employees to invest in PEVs. Westridge thinks that employees need all three levels of charging.



Charging
implementation
and management

The charger is available to employees, visitors and members of the general public. No limits are placed on the use of the charger; however, PEV drivers are expected to share the charger. It is available on a first-come, first-served basis.



Charging costs

The charging equipment was provided free of charge by a grant funded through the U.S. Department of Energy. The school paid \$5,000 to have the unit installed. That cost was covered through the school's operating budget. It was not built to enable additional chargers to be added.

Charging is free to all PEV drivers.



Employee
benefits

Westridge does not provide any school-sponsored incentives for employees to purchase PEVs, although it does provide free charging and views this as an employee benefit. Offering this free charging benefit is one of the many reasons the Los Angeles News Group recognized Westridge as one of the top workplaces in the San Gabriel Valley for 2013.



Workplace
charging
challenges

Westridge does not believe there are any challenges to workplace charging.

Contact information

Brian Williams

Director of Facilities

(626) 799-1053 x201

bwilliams@westridge.org

“Two of our employees who drive PEVs live approximately 30 miles away, which is about the outer limit of their vehicle's electric-drive range. If we did not have workplace charging, they would either not drive their PEVs to work or wouldn't have purchased these vehicles at all.”

Brian Williams, Director of Facilities

20th Century Fox



A global producer and distributor of motion pictures and television shows, **20th Century Fox** studios in Los Angeles is a fully-integrated 50+ acre facility that provides production facilities and services for film, TV and related entertainment industries.

www.foxstudios.com
<http://gei.21cf.com/>



CHARGING SNAPSHOT

No. of employees: **3,000-6,000 (depending upon production)**

No. of charging stations and types:
Level 2 - 20

No. of employees driving PEVs: **40 - 50**

No. of times charging stations are used per day:
2 times per charger

CHARGING STORY



Workplace charging setting

Fox Studios has four charging stations in each of its four parking structures, as well as four chargers in various locations on the studio lot itself. The studio owns its production facilities and has one PEV in its fleet.



Decision-making process

Several factors motivated Fox to install workplace charging. The studio is committed to minimizing its environmental impact and making its operations more sustainable. Workplace charging helps further its energy and green initiatives. The studio's Energy Initiative Department received requests from employees for workplace charging and had support from senior management to install the chargers.

Although the studio has not surveyed its employees to see how many might purchase a PEV in the future, it believes that workplace charging will encourage more of them to purchase these vehicles. The studio feels that employees need Level 2 charging at the workplace.



Charging implementation and management

The charging stations are available on a first-come, first-served basis for employees, visitors and the studio's fleet vehicles. Vehicles parked at the charging stations must be actively charging. Once charging is complete, drivers must move their vehicles. Security staff actively monitor and enforce the active-charging rule.



Charging costs

The installation cost per charging station was \$2,500. The total cost per station to Fox was \$2,000 because of the federal electric vehicle infrastructure tax credit of 30 percent of the total cost up to \$30,000 for businesses. The studio covered these capital costs in its operating budget. The charging station network was constructed to have expansion capabilities in the future.

All PEV drivers are charged \$1 per hour, which is paid by credit card.



Employee benefits

Fox offers employees a \$4,000 incentive toward the purchase of a PEV. Additionally, Fox negotiated a deal with Blink to waive the 2013 membership fee for those employees who register for a Blink Card to use the charging stations.



Workplace charging challenges

One of the top challenges associated with workplace charging is the cost of installation, particularly when installing charging stations in areas that have no power or where acquiring power is expensive. Equity, in terms of the benefits an employer offers its employees, also is a challenge.

Contact information

Lisa Day

Director, Energy Initiative

(310) 369-8240

lisa.day@fox.com

“Our employees love having the ability to charge their PEVs at work. It takes away range anxiety and has led to even more employees driving PEVs and encouraging others to take the plunge.”

Lisa Day, Energy Initiative Director

California Environmental Protection Agency



The California Environmental Protection Agency

(Cal/EPA), based in Sacramento, Calif., was created in 1991 based in Sacramento, Calif. to restore, protect and enhance the environment, to ensure public health, environmental quality and economic vitality.

www.calepa.ca.gov



CHARGING SNAPSHOT

No. of employees: **3,000**

No. of charging stations and types:

Level 1 - 16

Level 2 - 20

No. of employees driving PEVs: **Approx. 40**

No. of times charging stations are used per day:

1½ to 2 times per day

CHARGING STORY



Workplace charging setting

Several hundred Cal/EPA employees typically park in an eight-story public parking garage operated by the City of Sacramento across the street from the Joe Serna Jr. Cal/EPA Headquarters Building. The garage has approximately 600 parking spaces, 20 of which have Level 2 charging stations and signage. Sixteen 120-volt outlets are also available at the same parking spaces. Cal/EPA has two PEVs in its fleet.



Decision-making process

Cal/EPA installed workplace charging to support the agency's mission and contribute to attaining the building's LEED Platinum certification. Cal/EPA expects that providing workplace charging will encourage more employees to drive PEVs. Some prospective PEV drivers would not be able to commute to work without the ability to charge in the parking garage.



Charging implementation and management

The charging stations are available to anyone who parks in the structure, including employees, the agency's fleet vehicles and members of the general public. About 20 PEV drivers who are not Cal/EPA employees regularly use the charging stations at the garage.

The charging stations are available on a first-come, first-served basis. The garage has more PEVs than chargers. To address this demand, PEV drivers established an

informal charger sharing protocol, including an email list so drivers can request access to charging. The City of Sacramento is considering various options to facilitate sharing. Options include signage for either a four-hour time limit or a requirement that vehicles be actively charging to park at the charging stations.



Charging costs

The original charging stations were installed more than 13 years ago, redeployed from a prior electric vehicle loan program administered by the California Air Resources Board (CARB), an agency under the umbrella of Cal/EPA. CARB also funded the more than \$100,000 in electrical infrastructure and installation costs. Two years ago, a U.S. Department of Energy/California Energy Commission grant funded replacement stations meeting the current SAE J1772 standard. The electrical charging infrastructure was designed to support additional chargers.

The City of Sacramento pays for the cost of electricity and maintenance for the 20 Level 2 charging stations out of its operating budget.



Employee benefits

The City of Sacramento provides free parking and charging to monthly PEV drivers that park in city-owned downtown garages. Cal/EPA does not provide specific incentives to employees. California consumers that lease/purchase eligible PEVs can receive rebates under the Clean Vehicle Rebate Project, established by CARB.



Workplace charging challenges

The cost of the equipment and liability issues are seen as top workplace charging challenges. Additionally, Cal/EPA is only a tenant and has had difficulty negotiating previous equipment upgrades. Thus, expanding the charging infrastructure would likely be difficult.

Contact information

Mark Williams

Air Pollution Specialist

(916) 327-5610

mwilliam@arb.ca.gov

“I'm proud that our employees are helping to lead the transition to zero- and near-zero-emission cars. The benefits to our environment and California's economy will be significant.”

Matt Rodriguez, Cal/EPA Secretary



Established in 1947, **CSULA** is one of the 23 campuses in the public California State University system. More than 20,000 students are enrolled.

www.calstatela.edu

CHARGING SNAPSHOT

No. of employees: **1,000**

No. of charging stations and types:
Level 2 - 2

No. of employees driving PEVs: **10**

No. of times charging stations are used per day:
8

CHARGING STORY



CSULA installed two Level 2 charging stations in one of the school-owned on-site parking lots. The university does not have any PEVs in its fleet.

Decision-making process

CSULA installed charging stations for two reasons. First, the university vigorously promotes alternative forms of transportation and green technologies so the charging stations help advance the school's green initiatives. Additionally, the cost of the equipment was paid for, in part, by a U.S. Department of Energy grant, so the reduced cost of the charging stations made installing workplace charging more attractive.

Although the university has not surveyed its employees to see how many might purchase a PEV in the future, it has seen first-hand how workplace charging has encouraged them to do so. Once CSULA installed the charging stations, more employees bought these vehicles and began using the chargers. The university believes Level 2 charging is needed at the workplace.

Charging implementation and management

The charging stations are available to employees and the members of the general public. Charging time is limited to three hours, which is managed by the university's Parking & Transportation Services staff. The drivers communicate with each other to enable others to charge during the workday.

Charging costs

A grant by the U.S. Department of Energy covered the cost of the charging equipment. CSULA paid \$5,000 per charging station for installation, which was covered through the university's operating budget. The charging station system was constructed to enable future charging expansion.

Charging is free to all PEV drivers.

Employee benefits

CSULA does not provide any university-sponsored incentives for employees to purchase PEVs, although it does provide free charging.

Workplace charging challenges

The cost of installation, the equipment and permits are seen as the top workplace challenges.

Contact information

David Blekhman

Professor, College of Engineering, Computer Science and Technology
(323) 343-4569
blekhman@calstatela.edu

“I really appreciate the additional charging stations installed on campus. I am very happy to be an owner of a plug-in electric vehicle.”

Robert Salerno, CSULA Building Service Engineer

Cisco

Cisco Systems

Cisco (NASDAQ: CSCO) is the worldwide leader in IT that helps companies seize the opportunities of tomorrow by proving that amazing things can happen when you connect the previously unconnected.

<http://thenetwork.cisco.com>



CHARGING SNAPSHOT

No. of employees: **70,000**

No. of charging stations and types:
Level 2 - 130

No. of employees driving PEVs: **450**

No. of times charging stations are used per day:
5 times per station per day

CHARGING STORY



Workplace charging setting

In addition to having charging stations at its headquarters in San

Jose, Cisco has charging stations at several of its campus locations, including: Research Triangle Park, NC; Boxborough, Mass.; Lawrenceville, Ga.; Amsterdam, Netherlands; Feltham, England; Reading, England, and Lysaker, Norway. Cisco owns all of the facilities where the chargers are located. Cisco does not have a company fleet. It has both on-site parking lots and on-site parking garages for its employees.



Decision-making process

The company decided to install workplace charging to help with employee attraction, retention and satisfaction. Both senior management and employees asked for charging stations. Additionally, Cisco has a long track record of environmental initiatives. The company views supporting PEV adoption as part of its sustainability strategy and as a way to reduce its indirect emissions related to employee commuting.

Cisco has conducted a number of surveys at its various locations to determine the number of employees who are currently driving PEVs or planning to purchase or lease one in the future. The survey results indicate that providing workplace charging will encourage more of Cisco's employees to drive PEVs.



Charging implementation and management

The charging stations are available to employees and visitors. There are no limits placed on the chargers. Employees are expected to manage the process themselves and move their vehicles in a timely manner. Any issues that arise are handled by the company's security team, which asks people to move their cars when there are vehicles waiting to charge.



Charging costs

The average cost per charging station was \$15,000, including installation. The company covered these capital costs in its operating budget. Cisco's charging station network was built to enable additional chargers in the future.

Charging is free for employees and visitors.



Employee benefits

Cisco does not offer any company-sponsored incentives for employees specifically to purchase PEVs; however, the company's employee discount program offers discounts for vehicles, including PEVs. The company also is providing a pilot program in its European region to include PEV options on employee automobile lease plans. Additionally, the company offers free charging to employees and visitors.



Workplace charging challenges

The top challenges associated with workplace charging are cost of installation, liability and equity issues in terms of the benefits a company offers its employees.

Contact information

Ali Ahmed

Senior Manager, Workplace Resources

(330) 523-2021

aliahme@cisco.com

“Providing PEV charging is just one way that Cisco looks to reduce the environmental impact of our operations. In 2012, Cisco directly contributed to saving more than 4,000 gallons of fuel and \$11,000 in fuel costs, and close to 24,000 pounds of carbon dioxide equivalent in GHG emissions as a result of people using our charging stations.”

Ali Ahmed, Senior Manager, Workplace Resources



General Motors

General Motors (GM) is one of the world's largest automotive companies with operations in 120 countries. GM, its subsidiaries and joint venture entities, sell vehicles under the Chevrolet, Cadillac, Baojun, Buick, GMC, Holden, Isuzu, Jiefang, Opel, Vauxhall and Wuling brands.

www.gm.com

CHARGING STORY



Workplace charging setting

GM has installed 383 Level 1 and Level 2 workplace charging stations (including 76 that are connected to a solar array) for employee use at 30 GM campuses in the United States. It also has installed more than 400 "private" chargers for executives and fleet testing. There are 26 charging stations in California at six GM sites: Palo Alto (1), Thousand Oaks (4), Torrance (17), North Hollywood (2), Glendale (1) and Santa Fe Springs (1). The majority of chargers are located in Michigan: Detroit (33), Warren (121), Milford (22), Hamtramck (10), and Pontiac (32). There are 146 chargers at 18 assembly plants in the United States, including at Bowling Green, Ky., Toledo, Ohio, Lordstown, Ohio, Arlington, Va., and White Marsh, Md. Additionally, there are three charging stations in Ardsley, NY.

The company provides both on-site parking lots and on-site garages for employee parking.

CHARGING SNAPSHOT

No. of employees: **80,000 (U.S.)**

No. of charging stations and types:

Level 1 – 139 for employees

Level 2 - 244 for employees; 400 for executives/fleet/testing

DC Fast Charger - various for fleet/testing

No. of employees driving PEVs: **Approx. 250**

No. of times charging stations are used per day:
On average, each station is used once per day



Decision-making process

GM decided to install workplace charging to further its "green" initiatives and to play a role in promoting PEVs. Additionally, employees requested charging and senior management supported workplace charging.

The company believes that workplace charging will encourage more employees to purchase PEVs. In fact, GM notes that Volt purchases in particular seem to be gaining traction as employees see these vehicles plugged in at work and plan for their next car purchase. Workplace charging engages many employees who were not otherwise familiar with PEVs and makes them much more aware of this technology.

GM believes that Level 1 charging is an effective workplace charging solution for employees.



Charging implementation and management

Workplace charging stations are available to all employees and visitors. There are no limits placed on the use of the chargers because the company does not believe it is practical to ask employees to share chargers or move their vehicles during the day. GM's plan is to provide enough chargers to accommodate any employee with a PEV. This insight is leading the company to install more Level 1 chargers than it had originally planned.



Charging costs

The average installation cost per charging station varied widely since GM offers a range of charging options:

- 120V charging = \$1,000 per modified outlet
- Non-solar, 240V charging = \$10,000 per station
- Solar PV canopy, 240V charging = \$300,000 for 8 chargers

GM paid for the costs of the chargers out of its respective departmental operating budgets and there were a few limited, early grants from various agencies, including the U.S. Department of Energy. Where possible, the charging network was built to accommodate the addition of future chargers.

Charging is free to employees and visitors.



Employee benefits

GM does not provide any company-sponsored incentives for employees to purchase PEVs. It offers free charging to employees with PEVs.



Workplace charging challenges

The cost of the equipment and installation are the top challenges.

Contact information

Britta Gross

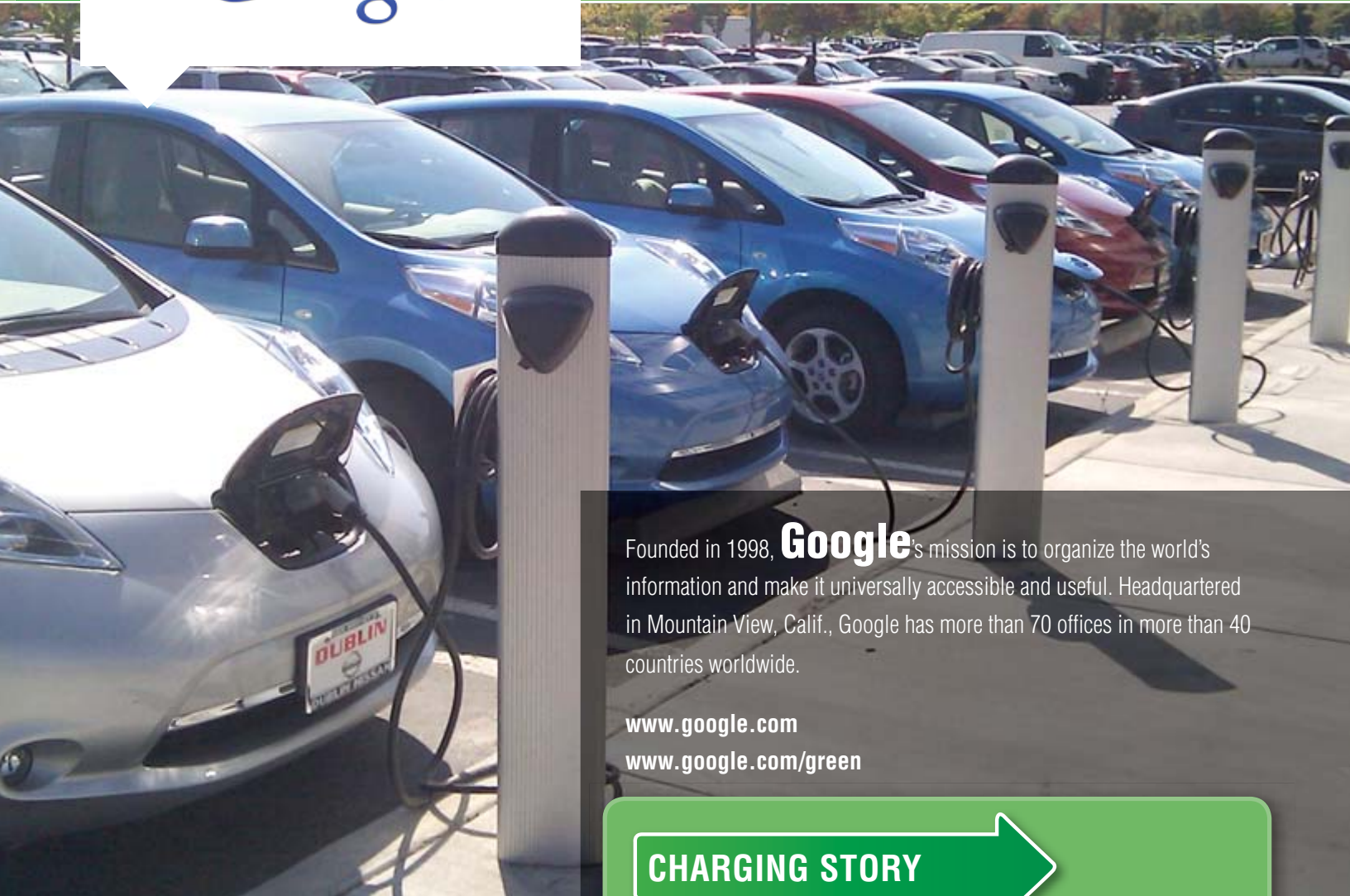
Director, Advanced Vehicle
Commercialization Policy

(586) 596-0382

britta.gross@gm.com

“GM wanted to do its part in promoting the adoption of plug-in vehicles, starting with our own employees. Each charge spot has turned every parking lot into a virtual showroom for our plug-in vehicles – employees are asking lots of questions and it's driving plug-in vehicle sales.”

Britta Gross, Director of Advanced Vehicle Commercialization Policy



Founded in 1998, **Google**'s mission is to organize the world's information and make it universally accessible and useful. Headquartered in Mountain View, Calif., Google has more than 70 offices in more than 40 countries worldwide.

www.google.com
www.google.com/green

CHARGING STORY



Workplace
charging setting

As part of Google's long-standing commitment to sustainable business practices, including clean transportation initiatives, the company has set a goal to install chargers at 5 percent of its parking spaces. To date, the company has more than 180 Level 1 and more than 470 Level 2 charging stations at its Mountain View campus, with plans to expand. Ten additional Google locations have deployed more than 50 Level 2 charging stations across those sites, also with plans to expand. Google both owns and leases its buildings, and has on-site parking lots, on-site parking garages and street parking for its employees.

CHARGING SNAPSHOT

No. of employees: **17,000 (headquarters)**

No. of charging stations and types:

Level 1 - 180+

Level 2 - 470+

No. of employees driving PEVs: **500+**

No. of times charging stations are used per day:

2 times per charging station per day



Decision-making
process

Google's workplace charging is part of the campus' broader green transportation system aimed at reducing greenhouse gases from employee commuting and company operations. The company wants to enable employees with long commutes or without home charging to drive PEVs. Google views workplace charging as a valuable employee recruiting and retention benefit.

Early in the development of its workplace charging program, Google saw clear signals that charging was needed and decided to provide charging at 5 percent of its parking spaces. Those signals included the forecasted needs of the company's carsharing fleet of 50+ PEVs and the high number of employee and senior management requests for charging. Some were already driving PEVs and others were on waiting lists to purchase them.

Google's experience has been that access to workplace charging encourages more employees to purchase PEVs. The company believes that employees need Level 2 charging to make Google's workplace charging program successful.



Charging
implementation
and management

Access controls via the charging station network limit use of the charging stations to employees, visitors and Google's fleet vehicles. The company is mitigating the challenge of charging station oversubscription by increasing its outreach to PEV drivers and encouraging them to create and use email lists for their individual buildings to self-manage the stations. It is enhancing access to charging stations by promoting cord-sharing.



Charging costs

Google's workplace charging program has a capital budget for equipment procurement and installation, and an operations budget for ongoing expenses such as network subscription fees. The charging station network was designed to enable future charging expansion.

Charging is free for both employees and visitors as a way to encourage more people to drive PEVs.



Employee
benefits

Google does not offer any company-sponsored incentives for employees to purchase PEVs; however, it provides free charging. Additionally, Google's workplace charging supports its 50+ PEV GFleet program, a carsharing service that enables employees to use fleet PEVs during the day, helping to minimize the company's environmental impact.



Workplace
charging
challenges

The top challenge associated with workplace charging is cost of installation and the equipment.

Contact information

Workplace Charging Team

workplace-charging-requests@google.com

“At Google, we believe that PEVs are game-changers in the effort to reduce the carbon footprint of transportation, improve air quality, and increase the adoption of intermittent renewable energy sources, so we offer free workplace charging to support our corporate carsharing program and encourage Googlers to buy their own plug-ins.”

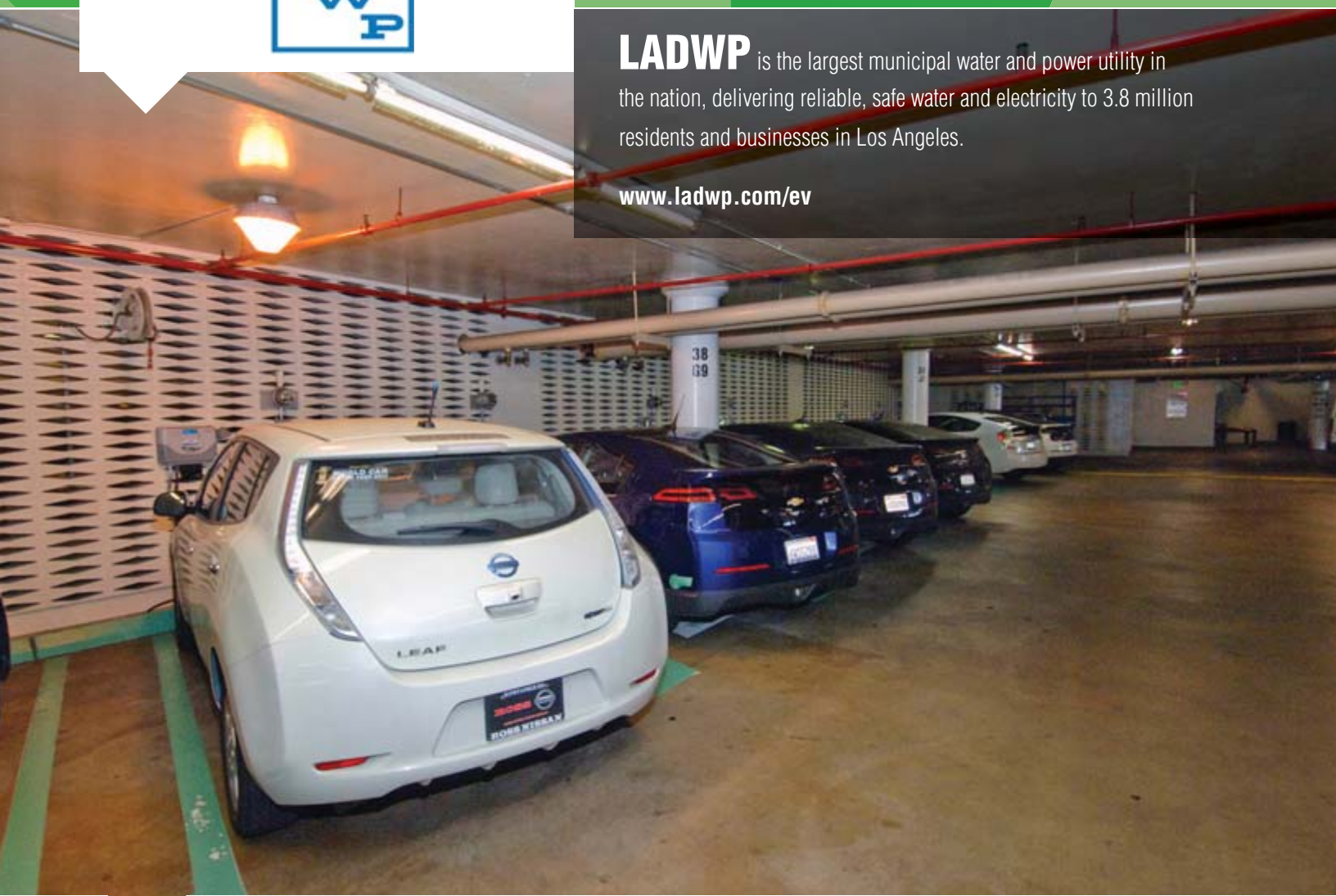
Rolf Schreiber, Technical Program Manager



Los Angeles Department of Water and Power

LADWP is the largest municipal water and power utility in the nation, delivering reliable, safe water and electricity to 3.8 million residents and businesses in Los Angeles.

www.ladwp.com/ev



CHARGING SNAPSHOT

No. of employees: **3,200 at main office building, 9,400 total**

No. of charging stations and types: **Level 2 - 12 (will add 64 soon)**
DC Fast Charger - 0 (will install 1 soon)

No. of employees driving PEVs: **Approximately 18 at main office building**

No. of times charging stations are used per day: **2 times per day per charger**

CHARGING STORY



Workplace charging setting

At its main office building, LADWP currently provides 12 Level 2 charging stations for employees and visitors to share. The utility owns the building where the charging stations are installed. The utility is installing 64 additional charging stations for employees at its main office building and 60 chargers for its own fleet of PEVs. LADWP also is installing 50 chargers at three additional LADWP buildings and other work sites.



Decision-making process

LADWP installed workplace charging for many reasons. Employees and senior management requested workplace charging. Management also saw workplace charging as a means to attract and retain employees. LADWP is committed to sustainability and views providing workplace charging to employees and visitors as a way to encourage reductions in fossil fuel dependence and greenhouse gas emissions. The utility believes that providing workplace charging will encourage more employees to drive PEVs. Additionally, LADWP's workplace charging helps the utility comply with the South Coast Air Quality Management District's Rule 2202, designed to reduce mobile source emissions generated from employee commutes. Most of LADWP's employees drive to work.

As evidenced by its recent investment in additional Level 2 chargers, LADWP believes that this type of charging is needed to accommodate the needs of its employees.



Charging implementation and management

Since LADWP currently has more PEV drivers than chargers, its parking enforcement office manages the use of charging stations by handing out placards to employees and visitors at the parking entry kiosk. The placard asks drivers to move their vehicles after four hours or standard parking rates for the garage will apply. This has been a successful strategy to accommodate the high demand. Additionally, the utility limits the number of hours that visitors may park in the lot. The chargers are full primarily in the morning and early afternoon.



Charging costs

The typical installation cost was \$4,000 per charging station. However, grant funding has brought down the total cost per station to \$2,000. Funding comes from the utility's operating budget and grants.

Charging is free for employees and visitors since LADWP's motivations are to benefit employees and visitors and to encourage PEV adoption.



Employee benefits

LADWP does not offer any PEV purchase incentives for employees, but it does offer free charging to PEV drivers.



Workplace charging challenges

LADWP sees the top challenges to workplace charging as the installation cost and parking availability. Past installations were mostly retrofits; the utility made use of electrical infrastructure left behind by the first generation of PEVs a decade ago. Now, however, the utility is installing new chargers and new electrical infrastructure, so the cost is higher. Additionally, limited parking in the company lot creates competition for dedicated spaces for PEV charging.

Contact information

Marvin Moon
Director of Engineering and EV Program Manager
(213) 367-1716
marvin.moon@ladwp.com

“Workplace charging is a substantial incentive to purchase a plug-in electric vehicle.”

Scott Briasco, Manager of Fleet Environmental Compliance & Electric Transportation



NetApp, Inc.



Headquartered in Sunnyvale, Calif., **NetApp** creates storage systems and software that help customers around the world store, manage, protect and retain data.

www.netapp.com

CHARGING STORY



Workplace charging setting

In April 2013, NetApp installed 31 Level 2 charging stations in the parking lots and garages located throughout its campus, with two parking spaces per charger to maximize utilization. This extensive deployment was a result of the rapid growth in employee PEV drivers over the last two years. Before the Level 2 chargers were installed, there were only a handful of PEV drivers, so they were allowed to use the 120-volt plugs the company had placed in some of their garages to charge their vehicles. However, as PEV drivers began to crowd out the company's small electric maintenance vehicles, it became clear to NetApp that a more sustainable solution was needed.

CHARGING SNAPSHOT

No. of employees: **3,840**

No. of charging stations and types:

Level 1 - 12

Level 2 - 31

No. of employees driving PEVs: **110**

No. of times charging stations are used per day:

43



Decision-making process

Requests from employees and senior management motivated NetApp to install workplace charging. Additionally, the company views workplace charging as a way to retain employees.

The company surveyed its employees prior to installing the Level 2 charging stations to gauge interest and found a significant number of employees owned a PEV or intended to purchase a PEV within the next two years. The number of PEV drivers increases by one or two each week, and if demand continues to grow, the company anticipates installing more chargers later in the year. NetApp thinks that employees need Level 2 charging to make workplace charging successful.



Charging implementation and management

The charging stations are available to employees and the company's fleet. Only employees who register their vehicle with NetApp and sign a liability waiver may use the chargers. The company relies on its network of employee PEV drivers to resolve any issues around sharing chargers, although no issues have arisen.



Charging costs

The average cost per charging station was approximately \$3,600, not including installation. The company covered the capital costs through its operating budget. The charging station network was constructed to have the capability of adding additional chargers in the future.

Employees pay the average utility rate for the campus (currently \$0.14/kWh), plus a usage fee of approximately \$0.41 per charge.



Employee benefits

NetApp does not offer any company-sponsored incentives for employees to purchase PEVs. However, some vehicle manufacturers that have a commercial relationship with the company have offered discounts to NetApp's employees.



Workplace charging challenges

The top challenges are the cost of the equipment and equity issues in terms of the benefits an employer offers its employees.

Contact information

Kris Wafler-Herrera

WPR Site Services Manager

(408) 822-6000

kris.wafler@netapp.com

“Our advice to employers considering workplace charging is to install more than enough chargers to meet your current needs. Once the chargers are in place, the number of employees with PEVs will grow significantly, as it did at NetApp.”

Brian Glazebrook, Senior Global Sustainability Manager



SDG&E is a regulated public utility that provides energy service to 3.4 million people through 1.4 million electric meters and 860,000 natural gas meters in San Diego and southern Orange counties. Its service area spans 4,100 square miles.

www.sdge.com/ev

CHARGING SNAPSHOT

No. of employees: **5,000**

No. of charging stations and types:

Level 1 - 11

Level 2 - 31

DC Fast Charger - 1

No. of employees driving PEVs: **More than 45**

No. of times charging stations are used per day:

1 time per two days and increasing

CHARGING STORY



Workplace charging setting

SDG&E has 43 plug-in electric vehicle (PEV) charging stations installed at approximately six company locations. The equipment serves employee-owned PEVs and SDG&E's fleet of 27 PEVs. The utility both owns and leases the buildings where the charging stations are located. SDG&E was the first of two utilities in the nation to sign the U.S. Department of Energy Workplace Charging Challenge to expand workplace charging.



Decision-making process

SDG&E's motivation to install workplace charging included:

- To increase employee and general public awareness of PEVs and in turn encourage more to purchase PEVs.
- To demonstrate leadership to customers on how to provide low-cost workplace charging to attract and retain employees.
- Senior management's commitment to workplace charging for employees.

After analyzing its employee workplace charging patterns, SDG&E found that employees typically park at work all day and do not need their cars charged fully. Future charging expansion plans will primarily involve Level 1 charging because it is the lowest cost to install and has the lowest impact to the utility grid. Level 1 charging provides 3 to 5 miles of range per charging hour and is sufficient for most employees. Given the average commute of 25 miles for most of SDG&E's PEV-driving employees, they complete their charging needs by mid-day using Level 1 charging.

Typical employee PEV driver profile:

- Begins the day with a full charge
- Drives 12 miles or less from home
- Needs approximately 4 kWh to "top off"

By using price signals (e.g., making Level 1 and off-peak charging cheaper than Level 2 or on-peak charging), SDG&E has seen a shift to almost 90 percent using Level 1 charging. By using Level 1 charging, SDG&E avoided a \$6,000 product upgrade.



Charging implementation and management

Charging stations are only available to company employees and its fleet vehicles. There are no time limits placed on the use of the chargers. Access to the charging stations is managed by the drivers themselves.

Rarely do multiple drivers need to use the same chargers at once, but when such situations arise, drivers place cards on their vehicle dashboards that display the time of day when a charging session is expected to end. The card also displays the driver's cell phone number so someone waiting to use the charging station can call to coordinate use of the equipment.



Charging costs

Average costs:

- Installation cost per charging station = \$5,000
- Cost per station to SDG&E = \$9,000

SDG&E designed its charging station network to accommodate additional charging stations in the future. The funding for the charging stations comes from SDG&E's facilities capital budget.

Average cost to employees:

- Summer - \$0.27/kWh for on-peak and \$0.16/kWh for off-peak charging
- Winter - \$0.17/kWh
- DC fast charger - \$4 per session

Employees pay for charging and are billed internally through the company.



Employee benefits

SDG&E does not offer company-sponsored purchase incentives for employees to buy PEVs, but it considers workplace charging a significant benefit. The utility has partnered with car manufacturers to offer employee discounts.



Workplace charging challenges

Top challenges:

- Cost of installation
- Cost of charging equipment

Additional challenges:

- Equipment utilization
- Equity in terms of the benefits a company offers employees

Charging revenues derived from the prices employees are willing to pay are not sufficient to cover the initial cost or operation of workplace charging. For SDG&E, centrally controlled Level 1 charging with a fee structure that reflects time-of-use cost for off-peak and on-peak charging is a cost-effective solution with minimal impact on the grid.

Contact information

Gregory W. Haddow

Clean Transportation Manager

(858) 650-4188

ghaddow@semprautilities.com

“SDG&E was one of the first two utilities in the county to sign a partnership with the U.S. Department of Energy committing to serve as a leader in the workplace charging arena.”

Gregory Haddow,
Manager of Clean Transportation



SAP Labs, LLC



Headquartered in Palo Alto, Calif., **SAP Labs** researches, designs and delivers leading-edge software applications, and is the first SAP Lab established outside of SAP's global headquarters in Germany. SAP is the world's third-largest software manufacturer with locations in more than 130 countries.

www.sap.com

CHARGING SNAPSHOT

No. of employees: **1,500**

No. of charging stations and types:
Level 1 - 1
Level 2 - 14

No. of employees driving PEVs: **35**

No. of times charging stations are used per day:
2 times per day per charger

CHARGING STORY



Workplace charging setting

SAP Labs leases nine buildings at its Palo Alto campus.

Chargers are installed in its on-site employee parking lots. Eleven of these chargers are for employee charging. Three of the chargers are dedicated for technology demonstrations, including a reservation system and wireless charging. SAP Labs has one PEV in its fleet that is used to shuttle employees around its campus.

“SAP Labs is developing software to improve electric vehicle charging infrastructure, so we also want to be a leader in this area by offering charging to our own employees. Plus, with the rapid growth of PEV adoption, we know that workplace charging will be needed to attract employees in the future.”

Geoff Ryder, Sustainability Principal



Decision-making process

SAP Labs installed workplace charging as a result of its commitment to sustainability and to reducing GHG emissions. Employees and senior management requested that charging stations be installed, and the company views workplace charging as a way to attract and retain employees.

The company surveyed its employees in 2010 and found that more than 200 were interested in purchasing PEVs. SAP Labs believes that providing workplace charging will encourage more employees to purchase these vehicles in the future. The company believes employees need Level 2 charging to make workplace charging successful.



Charging implementation and management

The charging stations are available to employees, visitors and SAP's fleet vehicles. Charging is limited to half-day use, which is self-enforced by the PEV drivers.



Charging costs

The installation cost per charging station was approximately \$5,000. SAP pays about \$100 per year to operate each charging station, plus the cost of electricity (the City of Palo Alto Utilities' rate is approximately \$0.13 per kWh). The company covered the charging station costs through its operating budget. The charging station network was not built to have future expansion capabilities.

Charging is free for employees and visitors.



Employee benefits

Car companies have offered SAP Labs employees discounted lease and purchase programs. Additionally, charging is free for employees.



Workplace charging challenges

Challenges include the costs of installation and equipment. Another challenge is the equity issue in terms of the benefits that an employer offers its employees.

Contact information

Raquel Fanucchi

Head of Palo Alto Campus

(650) 849-2810

r.fanucchi@sap.com

Warner Bros. Entertainment

WARNER BROS. ENTERTAINMENT, INC.

Warner Bros. is a global leader in the creation, production, distribution, licensing and marketing of all forms of creative content and their related businesses. Located in Burbank, Calif., the studio lot covers 142 acres and features 35 soundstages and a number of backlot outdoor sets.

www.warnerbros.com

CHARGING SNAPSHOT

No. of employees: **4,300**

No. of charging stations and types:
Level 2 - 5

No. of employees driving PEVs: **45**

No. of times charging stations are used per day:
1.5 times per day per charger, on average

CHARGING STORY



Warner Bros. owns its studio facilities and offers on-site parking for its employees. In 2012, the studio installed five Level 2 charging stations in two of its parking structures to support studio employees who drive PEVs. The studio does not have any PEVs in its fleet.

Decision-making process

Warner Bros. installed workplace charging for several reasons. Employees driving PEVs and employees considering PEVs expressed interest in workplace charging stations. Senior management supported these employee requests. Additionally, Warner Bros. has a number of initiatives to promote energy efficiency, strategic growth and sustainability, and deploying charging stations helps advance these objectives.

Although the studio has not surveyed its employees to see how many might make a future PEV purchase, it believes that workplace charging could provide a safety net for those considering a PEV but are concerned about range. Studio executives feel that employees need Level 2 charging.

Charging implementation and management

In January 2013, employees who expressed interest in workplace charging were invited to join a pilot program so the studio could learn more about charging behavior,

challenges and the potential need for scalability. As of July 1, 2013, 45 employees have joined the program.

The studio developed a PEV charging policy, which includes a four-hour time limit and the use of chargers to “top off” only. The studio worked with an outside vendor to create a sign-up system and to establish customer service and usage reporting processes.

Charging costs

The total cost per charging station installation was \$3,500. The capital costs for the chargers came from the company’s operating budget.

The installation cost per charging station varied for each location due to factors such as power availability and transformer capacity, but ranged from \$2,000 to \$10,000. The cost of each charging station was \$5,000. The studio covered the installation and equipment costs through its operating budget. The charging station network was constructed to have future expansion capabilities.

Charging is currently free for employees.

Employee benefits

Warner Bros. does not offer any studio-sponsored incentives for employees to purchase PEVs but does offer free charging for employees who drive them.

Workplace charging challenges

One challenge is the installation and equipment cost. Another is scheduling the use of the chargers so that all employees driving PEVs can have access.

Contact information

Chris Owens

Director, Office Services/Parking Department

(818) 954-7275

chris.owens@warnerbros.com

“Warner Bros.’ charging pilot program is intended to provide convenient workplace access and supporting technology for our employees who drive PEVs.”

Jon Gilbert, President, Worldwide Studio Facilities, Warner Bros. Entertainment

Findings and Conclusions

These case studies, together with the data from the PEV Collaborative's 2013 workplace charging survey, illustrate how workplace charging enables PEV drivers to commute to and from work with range confidence. Many of the case studies show that the availability of workplace charging factored into employees' decisions to purchase a PEV and that most employers believe providing workplace charging will encourage more to do so.

California businesses and organizations primarily are installing workplace charging to showcase their environmental commitment. Additionally, employee and/or management requests to install charging are key motivating factors. More than half of employers believe that Level 2 charging is needed to make a workplace charging program successful.

Respondents provided a wide range of workplace charging cost information, based on a variety of factors. The most frequent response was that the cost to the employer ranged from \$3,000 to \$5,000 per unit, not including installation. In more than one-third of the surveys, employers mentioned receiving federal, state or regional grants to offset their expenses. Thus, approximately two-thirds of the workplaces surveyed likely invested their own resources to install charging. This finding is encouraging because it demonstrates that a majority of workplaces were willing to pay for workplace charging even without external incentives.

To date, these early adopters of workplace charging overwhelmingly cited installation costs as the biggest obstacle. This finding supports the need for new construction to include electrical capacity for PEV charging to avoid costly infrastructure retrofits. More than half the respondents also cited equipment costs as a challenge. As the market has grown, charging equipment costs are coming down.

A minimal investment in a charging station at the workplace can help "green" a company, help improve air quality by reducing smog-forming and greenhouse gas emissions, attract and retain employees, and grow the number of PEVs in the marketplace.

Appendix A

CALIFORNIA PLUG-IN ELECTRIC VEHICLE COLLABORATIVE

PURPOSE

This Survey is a project of the California Plug-In Electric Vehicle Collaborative (PEV Collaborative) Workplace Charging Working Group. The purpose of this Workplace Charging Survey is to identify and document Plug-In Electric Vehicle (PEV) charging infrastructure primarily at California workplaces. For the purposes of this survey, workplace charging is focused on offering employees access to electric vehicle charging stations while at work.

To help expand workplace charging throughout the country, we would like your feedback about workplace charging at your organization. Your responses to this brief survey will help other employers interested in workplace charging by providing valuable information as to the costs, challenges and benefits of workplace charging, which will be compiled into a workplace charging case studies report.

If there are others within your organization who may be better suited to complete this survey, please forward the survey to the most appropriate people.

NARRATIVE OVERVIEW AND BACKGROUND OF YOUR ORGANIZATION

*** 1. WHAT IS THE NAME OF YOUR ORGANIZATION?**

*** 2. WHAT IS THE MISSION OF YOUR ORGANIZATION?**

*** 3. WHAT IS THE TYPE OF YOUR ORGANIZATION?**

☐ PUBLIC

☐ PRIVATE

☐ NGO/NON-PROFIT

☐ PUBLIC-PRIVATE PARTNERSHIP

☐ Other (please specify)

*** 4. HOW MANY PEOPLE ARE EMPLOYED AT YOUR WORKPLACE?**

*** 5. WHAT IS THE NUMBER OF EMPLOYEES THAT DRIVE TO WORK?**

CHARGING INFRASTRUCTURE & DECISION MAKING

CALIFORNIA PLUG-IN ELECTRIC VEHICLE COLLABORATIVE

*1. DO YOU CURRENTLY HAVE CHARGING AVAILABLE AT YOUR WORKPLACE?

- ☐ YES
☐ NO

2. IF YES, WHERE ARE THE CHARGERS LOCATED THAT YOU WILL BE REFERENCING IN THIS SURVEY?

- ☐ IN CALIFORNIA
☐ OUTSIDE OF CALIFORNIA
☐ BOTH

3. IF YOU HAVE CHARGERS LOCATED OUTSIDE OF CA THAT YOU WILL BE REFERENCING IN YOUR SURVEY ANSWERS, PLEASE PROVIDE THE CITY, STATE AND ZIP CODE WHERE THEY ARE LOCATED.

4. IF YOU DO NOT HAVE WORKPLACE CHARGING, DID YOUR ORGANIZATION CONSIDER WORKPLACE CHARGING AND DECIDE AGAINST IT?

- ☐ YES
☐ NO

5. IF YOUR ORGANIZATION CONSIDERED INSTALLING CHARGING BUT DECIDED AGAINST IT, WHAT WERE THE REASONS WHY?

6. IF YOU CURRENTLY HAVE CHARGING, BRIEFLY DESCRIBE YOUR WORKPLACE CHARGING PROJECT IN 5-10 SENTENCES.

CALIFORNIA PLUG-IN ELECTRIC VEHICLE COLLABORATIVE

7. WHAT WERE THE KEY MOTIVATIONS AND BENEFITS TO INSTALLING WORKPLACE CHARGING?

- ☐ BEING GREEN
☐ REQUESTS FROM EMPLOYEES
☐ REQUESTS FROM SENIOR MANAGEMENT
☐ EMPLOYEE ATTRACTION
☐ EMPLOYEE RETENTION
☐ COST OF INSTALLATION
☐ COST OF EQUIPMENT
☐ EQUIPMENT UTILIZATION
☐ INTERNAL POLICY
☐ LIABILITY
☐ BUY-IN FROM SENIOR MANAGEMENT
☐ EQUITY IN TERMS OF EMPLOYEE BENEFITS
☐ GHG REDUCTION GOALS
☐ Other (please specify)

8. WHAT ARE THE TOP CHALLENGES TO INSTALLING WORKPLACE CHARGING? (choose all that apply)

- ☐ COST OF INSTALLATION
☐ COST OF EQUIPMENT
☐ EQUIPMENT UTILIZATION
☐ INTERNAL POLICY
☐ LIABILITY
☐ BUY-IN FROM SENIOR MANAGEMENT
☐ EQUITY IN TERMS OF EMPLOYEE BENEFITS

Other (please specify)

9. WHAT IS THE NUMBER OF EMPLOYEES THAT DRIVE PLUG-IN ELECTRIC VEHICLES [E.G. BATTERY ELECTRIC VEHICLES (BEVs), PLUG-IN HYBRID ELECTRIC VEHICLES (PHEVs)]?

CALIFORNIA PLUG-IN ELECTRIC VEHICLE COLLABORATIVE

10. HAVE YOU SURVEYED EMPLOYEES TO DETERMINE HOW MANY MIGHT PURCHASE PEVs IN THE FUTURE?

☐ YES

☐ NO

IF YES (please specify)

11. DO YOU BELIEVE PROVIDING WORKPLACE CHARGING WILL ENCOURAGE MORE EMPLOYEES TO PURCHASE PEVs?

☐ YES

☐ NO

PLEASE EXPLAIN

12. ON AVERAGE WHAT IS THE NUMBER OF EMPLOYEES THAT USE THE CHARGING STATION(S) PER DAY?

13. ON AVERAGE HOW MANY TIMES ARE THE CHARGING STATION(S) USED PER DAY?

14. DO YOU OFFER YOUR EMPLOYEES FINANCIAL OR OTHER INCENTIVES TO PURCHASE PEVs? BRIEFLY DESCRIBE.

15. HOW MANY CHARGING STATION(S) ARE INSTALLED AT YOUR WORKPLACE?

LEVEL 1

LEVEL 2

DC FAST CHARGER

16. IS YOUR CURRENT CHARGING NETWORK CONSTRUCTED FOR SCALABILITY (I.E. DO YOU HAVE THE ABILITY TO ADD ADDITIONAL CHARGING STATIONS)?

☐ YES

☐ NO

CALIFORNIA PLUG-IN ELECTRIC VEHICLE COLLABORATIVE

17. ARE THERE ANY ISSUES AROUND EMPLOYEES SHARING CHARGERS? IF SO, HOW ARE THEY BEING RESOLVED?

18. DO YOU OWN OR LEASE THE BUILDING?

☐ OWN

☐ LEASE

19. DO YOU HAVE PEVs IN YOUR FLEET?

☐ YES

☐ NO

☐ DON'T HAVE A FLEET

20. WHAT KIND OF PARKING SPACES DOES YOUR ORGANIZATION OFFER?

☐ ON-SITE PARKING LOT

☐ OFF-SITE PARKING

☐ ON-SITE GARAGE PARKING

☐ STREET PARKING

Other (please specify)

21. WHAT IS THE TOTAL COST PER INSTALLATION?

22. WHAT IS THE TOTAL COST TO YOUR ORGANIZATION PER CHARGING STATION?

23. WITH RESPECT TO CHARGING STATION USE, ARE THE CHARGING STATION(S) AVAILABLE TO VISITORS, THE GENERAL PUBLIC, AND/OR YOUR FLEET (IF YOU HAVE ONE)?

Choose all that apply

☐ VISITORS

☐ GENERAL PUBLIC

☐ FLEET

☐ DON'T KNOW

CALIFORNIA PLUG-IN ELECTRIC VEHICLE COLLABORATIVE

24. HOW ARE YOU COVERING THE CAPITAL COST OF THE CHARGING STATIONS?

☐ OPERATING BUDGET
 ☐ GRANTS
 ☐ THIRD PARTY OWNERSHIP OR FINANCING

Other (please specify)

25. HAVE YOU DONE A RETURN ON INVESTMENT (ROI) ANALYSIS ON THE CHARGING STATION(S)?

☐ YES
 ☐ NO

IF YES, WHAT DID THE ROI SHOW? (please specify)

26. ARE YOU PLACING ANY LIMITS ON USE OF CHARGERS

☐ YES
 ☐ NO

IF YES, PLEASE DESCRIBE

27. HOW ARE YOU TAKING UTILITY COSTS INTO ACCOUNT?

☐ LIMITING EMPLOYEES TO OFF-PEAK USAGE
 ☐ USING 110V CHARGING

Other (please specify)

28. HOW DOES YOUR ORGANIZATION CURRENTLY MANAGE USE OF THE CHARGING STATIONS?

29. HOW DOES YOUR YOUR ORGANIZATION PROVIDE PEV CHARGING?

☐ FREE
 ☐ AT COST

30. IF YOU CHARGE EMPLOYEES, HOW MUCH DO YOU CHARGE?

CALIFORNIA PLUG-IN ELECTRIC VEHICLE COLLABORATIVE

31. HOW DO EMPLOYEES PAY?

☐ PAYROLL DEDUCTION
 ☐ CREDIT CARD

Other (please specify)

32. IN YOUR OPINION, WHAT LEVEL OF CHARGING DO EMPLOYEES NEED?

☐ LEVEL 1 (110 VOLT)
 ☐ LEVEL 2 (220 VOLT)
 ☐ DC FAST CHARGING

33. DID YOU USE SMART CHARGERS WITH REPORTING OR PAYMENT SOFTWARE?

☐ YES
 ☐ NO

POINT OF CONTACT INFORMATION AND ADDITIONAL INFORMATION

* 1. PROVIDE THE CONTACT INFORMATION FOR THE PERSON WHO COMPLETED THE SURVEY

NAME

TITLE

PHONE NUMBER

EMAIL ADDRESS

* 2. PROVIDE THE BEST POINT OF CONTACT FOR WORKPLACE CHARGING FOR YOUR ORGANIZATION

NAME

TITLE

PHONE NUMBER

EMAIL ADDRESS

MAILING ADDRESS

3. PROVIDE YOUR ORGANIZTION'S WEBSITE ADDRESS AND ANY ADDITIONAL INFORMATION THAT YOU WOULD LIKE TO INCLUDE.

Appendix B

Workplace Charging Resources

- California Plug-In Electric Vehicle Collaborative, *Why Employers Should Install Workplace Charging* (2013)
www.pevcollaborative.org/workplace-charging
- California Plug-In Electric Vehicle Collaborative, *Employers' Guide to Workplace Charging* (2013)
www.pevcollaborative.org/workplace-charging
- California Plug-In Electric Vehicle Collaborative, *How Can I Get Charging at My Workplace?* (2013)
www.pevcollaborative.org/workplace-charging
- California Plug-In Electric Vehicle Collaborative, *Workplace Charging: Why and How?* (2012)
http://www.pevcollaborative.org/sites/all/themes/pev/files/Comm_guide7_122308.pdf
- California Plug-In Electric Vehicle Collaborative, *Amping Up California Workplaces: 20 Case Studies on Plug-in Electric Vehicle Charging at Work* (2013)
<http://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
- Advanced Energy, *Project Insights: Real-World Charging Behavior at the Workplace* (2013)
http://www.advancedenergy.org/transportation/resources/PEVUsageStudyIR_WorkplaceCharging.pdf?_cldee=bWFyeUBicmF6ZWx
- California Center for Sustainable Energy, *California Plug-in Electric Vehicle Driver Survey Results* (2013)
http://energycenter.org/sites/default/files/docs/nav/transportation/cvrp/survey-results/California_Plug-in_Electric_Vehicle_Driver_Survey_Results-May_2013.pdf
- 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
- Minnesota Pollution Control Agency, *Charging While You Work - A Guide for Expanding Electric Vehicle Infrastructure at the Workplace* (2012), <http://www.workplacecharging.com/uploads/Charging-while-you-work-guide-8.5-11.pdf>
- San Diego Gas & Electric, Key points to know when considering workplace charging
<http://www.sdge.com/clean-energy/business/employers-and-property-owners>
- Southern California Edison, *Workplace: Employee Electric Vehicle Charging*
https://www.sce.com/wps/wcm/connect/552cf7ec-e2da-4c34-becd-2c3e9fea1193/PEV_Business_EmployeeVehicleCharging.pdf?MOD=AJPERES
- U.S. Department of Energy Workplace Charging Resources,
http://www1.eere.energy.gov/vehiclesandfuels/electric_vehicles/resources.html
- Electric vehicle supply equipment (charger) listings
<http://www.pluginamerica.org/accessories>
<http://www.pluginrecharge.com/p/electric-vehicle-supply-equipment-evse.html>
<http://goelectricdrive.com/index.php/find-an-ev-charger>
http://www.aqmd.gov/tao/Demonstration/ElectricHybrid/SoCalEV_Ready_Program.htm
- PEV Resource Center, Resources for Businesses
http://www.driveclean.ca.gov/pev/Resources_For_Businesses.php

CALIFORNIA PLUG-IN ELECTRIC VEHICLE COLLABORATIVE

4. PLEASE PROVIDE 3-5 INTERESTING FACTS OR PROGRAMS THAT YOUR ORGANIZATION UTILIZES RELATED TO PEVS AND/OR GREEN INITIATIVES.

5. WHAT TYPE OF INFORMATION WOULD BE USEFUL TO PROVIDE TO OTHER EMPLOYERS CONSIDERING WORKPLACE CHARGING?

PLEASE PROVIDE 2-3 HIGH RESOLUTION JPEG OR EPS IMAGES FOR INCLUSION IN THE CASE STUDIES BOOKLET. THESE IMAGES CAN BE EMAILED TO SAM EMMERSEN AT SAM@BETTERWORLDGROUP.COM. WE ARE LOOKING FOR THE FOLLOWING TYPES OF IMAGES.

1 - AN IMAGE THAT READERS WILL QUICKLY BE ABLE TO IDENTIFY YOUR ORGANIZATION (E.G. AERIAL IMAGES OF HQs, STREET IMAGE OF COMPANY SIGN, ETC.)

2 - AN IMAGE SHOWING CHARGING STATIONS OR PEV STATIONS IN USE.

Endnotes

¹ Governor's Interagency Working Group on Zero-Emission Vehicles, *2013 ZEV Action Plan - A Roadmap Toward 1.5 Million Zero-Emission Vehicles on California Roadways by 2025* (2013), 3, accessed August 20, 2013

[http://opr.ca.gov/docs/Governor's_Office_ZEV_Action_Plan_\(02-13\).pdf](http://opr.ca.gov/docs/Governor's_Office_ZEV_Action_Plan_(02-13).pdf)

² California Plug-In Electric Vehicle Collaborative PEV Sales Dashboard, accessed August 20, 2013

<http://www.pevcollaborative.org/>

³ U.S. Department of Transportation, Federal Highway Administration, *2009 National Household Travel Survey - Summary of Travel Trends, 48*, accessed August 20, 2013

<http://nhts.ornl.gov/2009/pub/stt.pdf>

⁴ CALSTART, *Best Practices for Workplace Charging* (2013), accessed August 20, 2013

http://www.calstart.org/Libraries/Publications/Best_Practices_for_Workplace_Charging.sflb.ashx

⁵ Charging station types were self-reported. Combination Level 1 and Level 2 units were counted as a single unit, but combination Level 2 units were counted as two units.

⁶ Mary Brazell and Enid Joffe, *Infrastructure Matters, Lessons Learned from the EV Demonstration Programs of the 1990s*, PowerPoint presentation of results of study for Detroit Edison, March 10, 2011.



CALIFORNIA
PLUG-IN ELECTRIC VEHICLE
COLLABORATIVE

www.pevcollaborative.org