CALIFORNIA ENERGY COMMISSION

CALIFORNIA NATURAL RESOURCES AGENCY

California Energy Commission

Clean Transportation Program

FINAL PROJECT REPORT

Electric Vehicle Chargers at California State Parks

Prepared for: California Energy Commission

Prepared by: Adopt a Charger

Adopt a Charger

January 2022 | CEC-600-2022-031

California Energy Commission

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ACKNOWLEDGEMENTS

The author wishes to acknowledge the following individuals and organizations who participated in the development of the Adopt a Charger Project to install electric vehicle chargers at California State Parks and/or provided information for this report:

Sam Allsop, Ted Novack, and the amazing staff of the California State Parks

National Park Service Climate Leadership in Parks Program

Los Angeles Department of Water and Power

Electric Power Research Institute

The Kashia Band of Pomo Indians

Monterey Bay Unified Air Pollution Control District

National Park Service

South Coast Air Quality Management District

Tesla Motors

Sacramento Municipal Utility District

Google

Southern California Edison

Aaron Sims and the staff of Sustainable Electric Solutions

Thoma Electric

Clipper Creek

All of the electric vehicle drivers who have charged at the California State Parks, checked in on the PlugShare web application, and provided feedback on the process.

PREFACE

Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007) created the Clean Transportation Program. The statute authorizes the California Energy Commission (CEC) to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. Assembly Bill 8 (Perea, Chapter 401, Statutes of 2013) reauthorizes the Clean Transportation Program through January 1, 2024, and specifies that the CEC allocate up to $20 million per year (or up to 20 percent of each fiscal year's funds) in funding for hydrogen station development until at least 100 stations are operational.

The Clean Transportation Program has an annual budget of about $100 million and provides financial support for projects that:

- Reduce California's use and dependence on petroleum transportation fuels and increase the use of alternative and renewable fuels and advanced vehicle technologies.
- Produce sustainable alternative and renewable low-carbon fuels in California.
- Expand alternative fueling infrastructure and fueling stations.
- Improve the efficiency, performance and market viability of alternative light-, medium-, and heavy-duty vehicle technologies.
- Retrofit medium- and heavy-duty on-road and nonroad vehicle fleets to alternative technologies or fuel use.
- Expand the alternative fueling infrastructure available to existing fleets, public transit, and transportation corridors.
- Establish workforce-training programs and conduct public outreach on the benefits of alternative transportation fuels and vehicle technologies.

To be eligible for funding under the Clean Transportation Program, a project must be consistent with the CEC's annual Clean Transportation Program Investment Plan Update. The CEC issued PON-13-606 to fund electric vehicle charging infrastructure in several categories that will support the growth of electric vehicles as a conventional method of transportation and adoption of plug-in electric vehicles over a wide range of California's population and socio-economic classes. In response to PON-13-606, the recipient submitted an application which was proposed for funding in the CEC's notice of proposed awards April 4, 2014 and the agreement was executed as ARV-14-014 on August 12, 2014.

ABSTRACT

In partnership with the California States Parks, Adopt a Charger is installing electric vehicle charging at a variety on popular destination locations including urban parks, rural parks, and disadvantaged communities across the state. The project allows Adopt a Charger to gain insights into the unique needs of each site type, including lessons learned with American with Disabilities Act compliance, and best practices for future locations. The project installed a total of 62 chargers at 18 California State Parks including Will Rogers State Historic Park, Kenneth Hahn State Recreation Area and Hearst Castle to name a few.

Through this project, Adopt a Charger found high utilization for chargers even in rural areas and American with Disabilities Act regulations affected initial project locations. Adopt a Charger encourages site hosts to offer Level 2 charging as an amenity and recommends the CEC to consider popular destination locations as the CEC continues to assess the need for public chargers.

Keywords: electric vehicle, plug-in electric vehicle, electric vehicle charging

Please use the following citation for this report:

Adams, Kathryn. Adopt a Charger. 2022. *Electric Vehicle Chargers at California State Parks*. California Energy Commission. Publication Number: CEC-600-2022-031.

TABLE OF CONTENTS

LIST OF FIGURES

Page

LIST OF TABLES

Page

EXECUTIVE SUMMARY

This project will create the framework to expand California's network of charging stations creating a template for expanding to other parks. The CEC grant funding opportunity provides value feedback to adequately address siting, American with Disabilities Act compliance, and best practices for future locations. Adopt a Charger installed electric vehicle charging at a variety of different locations including urban parks, rural parks, disadvantaged communities across the state to gain insight into the unique needs of each scenario.

The project is deploying electric vehicle chargers at the following locations:

- Will Rogers State Historic Park
- Kenneth Hahn State Recreation Area
- Fort Ross State Historic Park
- Old Town San Diego State Historic Park
- Los Angeles State Historic Park
- Hearst Castle
- Heilbron Mansion/Northern Buttes District Headquarters
- Baldwin Hills Scenic Overlook
- California Railroad Museum
- Sea Cliff State Beach
- Natural Bridges State Beach
- Inland Empire District office
- Henry W. Coe State Park
- Granite Bay State Park
- Chino Hills State Park

The goal of this project is to install and maintain at least 50, up to 61 electric vehicle chargers. The project installed a total of 62 chargers at 18 California State Parks.

Through this project, Adopt a Charger found high utilization for chargers even in rural areas and American with Disabilities Act regulations affected initial project locations. Adopt a Charger encourages site hosts to offer Level 2 charging as an amenity and recommends the CEC to consider popular destination locations as the CEC continues to assess the need for public chargers.

CHAPTER 1: Introduction

Background

For nearly twenty years, California has been both the policy leader and the hottest market with respect to plug-in vehicles (PEVs) - both "pure" electric vehicles (EVs) and plug-in hybrid vehicles. Former Governor Brown's 2013 Zero Emission Vehicle Action Plan set the aggressive goal of 1.5 million zero-emission vehicles on the road in California, and in 2018 expanded on that goal with plans for 5 million cars by 2030. By far, the biggest factor in determining the success of electric vehicles is the market itself.

Vehicles are always an emotional purchase, driven in part by the cars themselves (is it cool, fast, fun?), but just as much by the fueling infrastructure. To that end, the principle barrier to more widespread use of electric vehicles in California is volume and location of public charging. Today's PEV drivers typically refuel their vehicles at home, but chargers are also starting to be installed in multiple urban venues and workplaces, in part to accommodate multi-family dwelling residents and/or those who can't otherwise charge at home.

These locations serve a visible psychological purpose toward increasing PEV sales; the range anxiety of those considering a PEV purchase is assuaged by the idea that charging is "everywhere". But what urban charging cannot do is substantially increase actual EV miles travelled by PEVs.

Most PEVs are fully charged upon departing from home, so their greatest charging need is not the urban charger a few miles from home, but the "destination charger" located at the midpoint of a day's round-trip. This is especially true for plug-in hybrid vehicles, whose EV range of ~10-40 miles could automatically be doubled or more by appropriately placed public charging- an idea long championed by California Air Resources Board's Dan Sperling. Budget-constrained State parks are especially attractive for this approach; they are highly desirable destinations among both current PEV drivers and those who share similar values and could become PEV drivers. But they are among the hardest to "commercialize", which is why other EV service equipment providers avoid them, and why state funding is necessary to complete these projects.

To address both the need and the challenges, Adopt a Charger is leveraging relationships with significant PEV stakeholders in California, to provide match support for the CEC grant toward the installation of EV charging at 12 parks. The visibility of EV chargers at State Parks had a positive impact on visitation, boosting the economic benefit of increased park attendance, raised awareness of PEV inspiring future PEV sales, and increased the EV miles traveled by current PEV owners.

Goals and Objectives of the Project

The goal of this project is to install and maintain at least 50, up to 61 electric vehicle chargers. This goal supports both the "Cool Parks" Initiative and the State Parks' Road Map. The

installed chargers are posted to the PlugShare[1] website to collect data for analysis to inform the public on electric vehicle chargers.

The project installed a total of 62 chargers at 18 California State Parks.

Project Partners

Adopt a Charger

Adopt a Charger is a nonprofit organization that promotes the adoption of electric vehicles by installing electric vehicle charging stations at popular destination locations including National Parks, State parks, museums, and universities. Adopt a Charger has a mission to accelerate the widespread adoption of plug-in electric vehicles through the proliferation of public, fee-free electric vehicle chargers which are "adopted" by sponsors. These sponsors, corporations, organizations and individuals donate funds used to install and maintain electric vehicle chargers.

California Department of Parks & Recreation

California State Parks provide for the health, inspiration and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high quality outdoor recreation.

Installation of electric vehicle chargers at State Parks is part of the "Cool Parks" initiative that responds to the pressing challenges of climate change and seeks to educate park visitors and motivate the broader public to be part of the solution. By providing destination charging at these popular locations, this enables emission free trips to the park and exposing the public to plug-in electric vehicles.

Los Angeles Department of Water and Power

The Los Angeles Department of Water and Power (LADWP), the largest municipal water and power utility in the nation, was established more than 100 years ago to deliver reliable, safe water and electricity to 4 million residents and businesses in Los Angeles.

LADWP has their "Charge Up LA!" program that offers residential and commercial customers rebates to help deploy electric vehicle charging infrastructure at homes, businesses, including workplaces, multi-unit dwellings, and public parking lots.

Sustainable Electric Solutions

Formed in October 2015, Sustainable Electric Solutions, Inc. is a California contractor offering services in solar energy, efficient lighting, and electric vehicle charging. Sustainable Electric Solutions was a contractor for Adopt a Charger for this project and installed chargers at Will Roger State Historic Park, Los Angeles State Historic Park, Kenneth Hahn State Recreation Area, Fort Ross State Historic Park, Old Town San Diego State Historic Park, Sea Cliff, Baldwin Hills State Park, Heilbron Mansion, California Railroad Museum, and Chino Hills State Park.

[1] PlugShare homepage https://www.plugshare.com

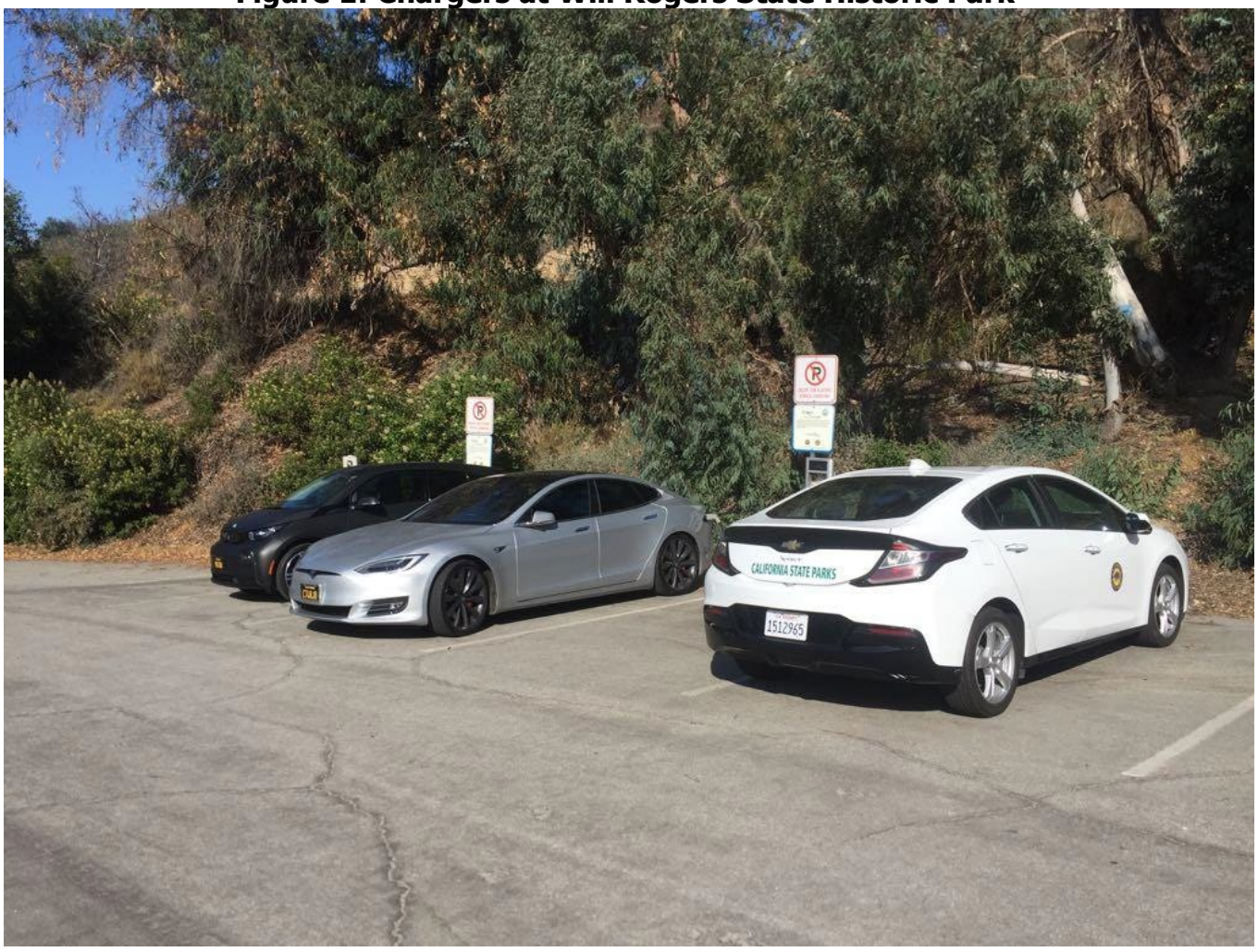
CHAPTER 2:
Project Locations

Will Rogers State Historic Park

Will Rogers State Historic Park is located at 1501 Will Rogers State Park Road, Pacific Palisades, California 90272.

In January 2016, two Eaton Level 2 electric vehicle supply equipment (EVSEs) donated by Google, were installed with sponsorship from the LADWP and the South Coast Air Quality Management District. The chargers at Will Rogers State Historic Park are shown in Figure 1.

Figure 1: Chargers at Will Rogers State Historic Park



EVSE Utilization at Will Rogers

Usage through January 2015 to April 2018 was 6,702 kilowatt-hours (kWh), and April 2018 to February 2018 was 7,952 kWh. The EV chargers were used more in the last year than the prior 3 years combined. Estimated total cost of electricity $1,139.34 for 29 months of operation. If we had used networked EVSE at this location the cost of networking and maintenance would have been $2,880 to try to recoup the $1,139 of electricity. To break even

on operating costs, we would have to charge EV drivers $0.54/kWh and hope that there was no reduction in the usage. This points to how difficult it is to commercialize charging especially at the State Parks. More important to parks are parking. At Will Rogers State Historic Park visitors "poach" parking spots to avoid paying the daily parking fee of $12. If we can encourage visitors to park in the lot, we can increase parking revenue. The average visit is ~2.5 hours. Assuming each driver charged to full while connected and drew 16.5 kWh – that would equate to 406 charging sessions, and $4,874 in parking revenue recouped by the chargers being in place. Table 1 shows the utilization statistics at Will Rogers State Historic Park.

Table 1: Utilization at Will Rogers State Historic Park

Total Energy Delivered (3-year period)	14,654 kWh
Estimated Number of Charging Sessions	406 sessions
Estimated Electricity Cost (at $0.17/kWh)	$2,930.80
Electric Vehicle Miles Traveled	43,100 miles
Gallons of Gasoline Avoided	1,166 gallons
Metric Tons of Carbon Dioxide Equivalent Avoided	10.4 metric tons

Source: Adopt a Charger

Will Rogers has already outgrown the two EVSEs. There are future plans to replace the existing Eaton chargers with dual head power sharing Clipper Creek solution. This will happen outside of the CEC grant.

This location had 36 positive check-ins on PlugShare and one negative because when LADWP installed the statistical meter, they did not turn the breaker back on, and the EV chargers were without power for a couple days. No other maintenance issues. Table 2 shows EV driver comments at Will Rogers State Historic Park.[2]

Table 2: EV Driver Comments at Will Rogers State Historic Park

"Awesome Chargers!"
"Free Juice!"
"$12 to park, but charging is free."
"Support the parks and be nice to the rangers and thank God for people like Will and Betty Rogers!"

Source: Adopt a Charger

Kenneth Hahn State Recreation Area

The Kenneth Hahn State Recreation Area is located at 4100 S. La Cienega Boulevard, Los Angeles, California 90056. Craig Sapp, district superintendent for the Angeles District of California State Parks, requested The Kenneth Hahn State Recreation Area due to visitor requests to have EV charging.

In July 2016, four Clipper Creek Level 2 EVSEs were installed with sponsorship from Southern California Edison and South Coast Air Quality Management District.

[2] Will Rogers State Historic Park PlugShare webpage https://www.plugshare.com/location/79545

At the Kenneth Hahn State Recreation Area, the project was able to appropriate the parking space next to existing American with Disabilities Act spaces during a remodel at the KHRSA visitor center. American with Disabilities Act accommodations for EV charging have proven difficult in the park setting, and many of the originally selected sites for the project could not move forward because it would have required leveling and resurfacing of parking lots. Figure 2 shows the chargers at Kenneth Hahn State Recreation Area. The charging station signage is shown in Figure 3.

Figure 2: Chargers at Kenneth Hahn State Recreation Area

Source: Adopt a Charger

Figure 3: Signage at Kenneth Hahn State Recreation Area

Source: Adopt a Charger

EVSE Utilization at Kenneth Hahn

Usage statistics for the Kenneth Hahn State Recreation Area are shown in Table 3 below.

Table 3: Utilization at Kenneth Hahn State Recreation Area

Total Energy Delivered (20 months)	14,370 kWh
Estimated Number of Charging Sessions	870 sessions
Estimated Electricity Cost (at $0.17/kWh)	$2,443.00
Electric Vehicle Miles Traveled	42,265 miles
Gallons of gasoline avoided	1,135 pounds
Metric Tons of Carbon Dioxide Equivalent Avoided	10.1 metric tons

Source: Adopt a Charger

This location had 41 positive check-ins on PlugShare and one negative. The negative check-in was to report a charger that had faulted due to a tripped breaker. EV driver comments at Kenneth Hahn State Recreation Area are shown in Table 4.[3]

Table 4: EV Driver Comments at Kenneth Hahn State Recreation Area

"Great area for free charging."
"Whoa, this place is beautiful!"
"Getting my hike on!"
"Time for a charge and a hike!"
"A great place for a free charge and a lovely hike"
"Great place for the fam!!! Charge and have some recreation time!!"
"All chargers working!!"
"Free charge!"
"Great way to bring kids to the park and charge vehicle."
"Awesome hidden gem here in southwest LA!"

Source: Adopt a Charger

Fort Ross State Historic Park

Fort Ross State Historic Park is located at 19005 Coast Highway, Jenner, California 95450. The Kashia Band of Pomo Indians requested this location. The EV chargers at Fort Ross enable the Tribe to travel emission free from the Stewart's Point Rancheria to Santa Rosa.

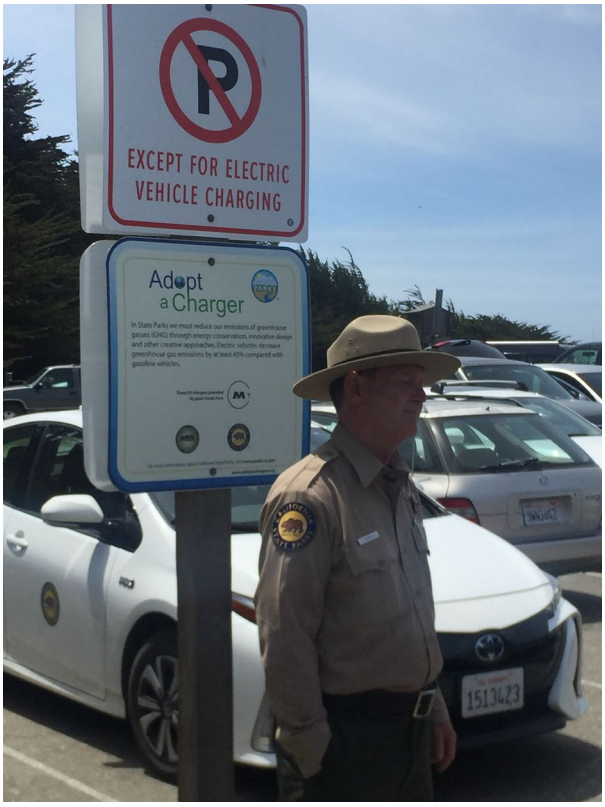
In May 2017, two Clipper Creek Level 2 EVSEs were installed with sponsorship from the Kashia Band of Pomo Indians. Figure 4 shows the chargers at Fort Ross State Historic Park in Figure 4. The charging station signage is shown in Figure 5.

[3] Kenneth Hahn State Recreation Area PlugShare webpage https://www.plugshare.com/location/91613

Figure 4: Chargers at Fort Ross State Historic Park

Source: Adopt a Charger

Figure 5: Signage at Fort Ross State Historic Park



Source: Adopt a Charger

EVSE Utilization at Fort Ross

Usage statistics for the Fort Ross State Recreation Area are shown in Table 5 below.

Table 5: Utilization at Fort Ross State Historic Park

Total Energy Delivered (2-year period)	3,316 kWh
Estimated Number of Charging Sessions	190 sessions
Estimated Electricity Cost (at $0.17/kWh)	$563.72
Electric Vehicle Miles Traveled	5733 miles
Gallons of gas equivalent	264 gallons
Metric Tons of Carbon Dioxide Equivalent Avoided	2.3 metric tons

Source: Adopt a Charger

This location had 18 positive check-ins on PlugShare. Checking-in at this location may be difficult as there is no cell phone service at this location. Adopt a Charger collaborated with the CEC and California Department of Parks and Recreation to create a video to promote the 10-year anniversary of the Clean Transportation Program.

At the time these chargers were installed the nearest EV charger was 25 miles away. The Fort Ross EV chargers have opened up the Sonoma Coast to EV tourism, and served as a catalyst for more charging in the area. Since installation, 2 local wineries have installed EV charging and 2 hotels in the vicinity are currently installing EV charging for their guests. EV driver comments at Fort Ross State Historic Park are shown in Table 6.[4]

Table 6: EV Driver Comments at Fort Ross State Historic Park

"Plugged in while we visited the park. Gained 64 miles."
"19 miles/hour"
"Charged a few hours ago, but you know, no cell reception over there."
"Thank you, State Parks!"
"No good cell phone coverage here, so this note is a day late. Very interesting tour of Fort Ross."
"Free charging, no card needed."

Source: Adopt a Charger

Old Town San Diego State Historic Park

Old Town San Diego State Historic Park is located at 4002 Wallace Street, San Diego, California 92110.

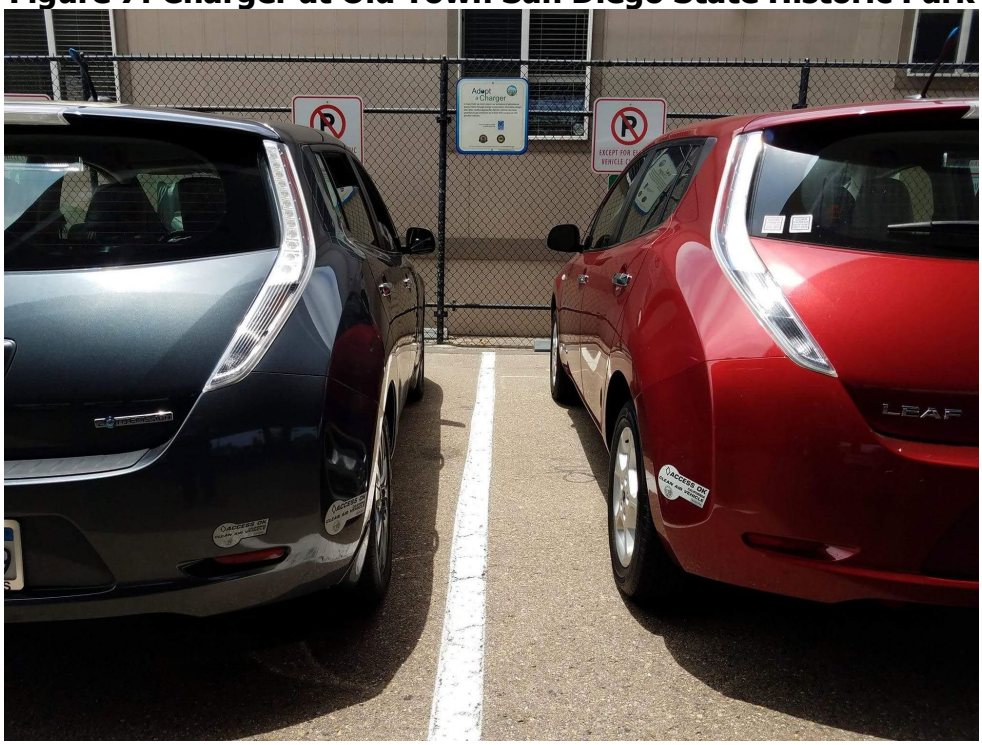
In October 2016, four Clipper Creek Level 2 EVSEs and four Level 1 (120 volt) plugs were installed with sponsorship from the South Coast Air Quality Management District. Staff at the Old Town San Diego State Historic Park requires a 4-hour parking limit between hours of operation. There is no access when the park is closed. This location has requested two more chargers for fleet and employee use. The chargers at Old Town San Diego State Historic Park is shown in Figures 6 and 7.

[4] Fort Ross State Historic Park PlugShare webpage https://www.plugshare.com/location/91071

Figure 6: Charger at Old Town San Diego State Historic Park

Source: Adopt a Charger

Figure 7: Charger at Old Town San Diego State Historic Park



Source: Adopt a Charger

EVSE Utilization at Old Town San Diego

Utilization from October 2016 to February 2019 was 29,411 kWh. Working to formulate a transition plan to allow for paid charging, to enable extended hours. San Diego Gas & Electric have been contacted about expanding this location and maintenance under Assembly Bill 1083. The utilization statistics at Old Town San Diego State Historic Park are shown in Table 7.

Table 7: Utilization at Old Town San Diego State Historic Park

Total Energy Delivered (28 months)	29,411 kWh
Estimated Number of Charging Sessions	5,700 sessions
Estimated Electricity Cost (at $0.19/kWh)	$5,588.09.00
Electric Vehicle Miles Traveled	86,503 miles
Gallons of gasoline equivalent	2,340 gallons
Metric Tons of Carbon Dioxide Equivalent Avoided	20.8 metric tons

Source: Adopt a Charger

This location had 48 check-ins on PlugShare. There were four complaints about the hours of operation. EV driver comments at Old Town San Diego State Historic Park are shown in Table 8.[5]

Table 8: EV Driver Comments at Old Town San Diego State Historic Park

"Thanks for these chargers!"
"Recently one of the chargers showed a fault but was reset."

Source: Adopt a Charger

Los Angeles State Historic Park

The Los Angeles State Historic Park is located at 1245 N. Spring Street, Los Angeles, California 90012. Adopt a Charger applied for LADWP's "Charge Up L.A.!" rebate program, which provided $5,000 per charger, as match funding towards the project.

In October 2017, four Level 2 EVSEs including service adjustment to the main panel at the Los Angeles sector office. This location is for fleet, employee, volunteer and business visitor use only. This site is not open to the public and is not listed on PlugShare. There were a number of requests received for public charging. Adopt a Charger is working with California Department of Parks and Recreation and LADWP on the best solution given the use case and available power. Started Scope of Work for public charging. The chargers at Los Angeles State Historic Park are shown in Figure 8.

[5] Old Town San Diego Historic Park PlugShare webpage https://www.plugshare.com/location/98553

Figure 8: Chargers at Los Angeles State Historic Park

Source: Adopt a Charger, LADWP

EVSE Utilization at Los Angeles State Historic Park

Usage statistics for the Los Angeles State Historic Park are shown in Table 9 below.

Table 9: Utilization at Los Angeles State Historic Park

Total Energy Delivered (17-month period)	4706 kWh
Number of fleet vehicles	3
Estimated Electricity Cost (at $0.17/kWh)	$800.02
Electric Vehicle Miles Traveled	13,841 miles
Gallons of gasoline avoided	374 gallons
Metric Tons of Carbon Dioxide Equivalent Avoided	3.3 metric tons

Source: Adopt a Charger

A press release by LADWP announced the new EV chargers installed at the Los Angeles area State Parks. Craig Sap, Angeles District Superintendent for California State Parks, stated, "California State Parks is proud to be a part of this important effort to encourage drivers to go green, which is critical to preserving our natural resources while allowing visitors to fully experience the beauty of our parks. The Angeles District currently has about 15 EV chargers

throughout our parks in Southern California and we're committed to adding another 10 chargers within the next eight to 10 months."[6]

Hearst Castle

Hearst Castle is located at 750 Hearst Castle Road, San Simeon, California 93452.

In May 2017, fourteen Level 2 EVSEs were installed. A ribbon cutting was planned to coincide with the solar panel array on October 8, 2018. The chargers at Hearst Castle are shown in Figure 9.

Figure 9: Chargers at Hearst Castle

Source: Adopt a Charger

EVSE Utilization at Hearst Castle

Usage statistics for the Hearst Castle shown in the table below. At this time Hearst Castle is still generating more energy from solar than it needs to cover the visitor center and EV chargers. Not all visitors take the tour. The utilization statistics at Hearst Castle are shown in Table 10.

[6] Los Angeles Department of Water and Power, 'New Electric Vehicle Chargers Installed at Los Angeles Area State Parks' http://www.ladwpnews.com/new-electric-vehicle-chargers-installed-at-los-angeles-area-state-parks/

Table 10: Utilization at Hearst Castle

Total Energy Delivered (Oct 2018 – Feb. 2019)	8,855 kWh
Estimated Number of Charging Sessions	447 sessions
Estimated Electricity Cost (solar generation)	$0.00
Electric Vehicle Miles Traveled	26,044 miles
Gallons of gasoline avoided	705 gallons
Metric Tons of Carbon Dioxide Equivalent Avoided	6.3 metric tons

Source: Adopt a Charger

This location had 35 positive check-ins on PlugShare. The Hearst Castle electrician installed a sub meter to track usage of the EV chargers. Staff from Hearst Castle commented that these chargers opened up the entire San Luis Obispo area to plug-in electric vehicles. EV driver comments at Hearst Castle are shown in Table 11.[7]

Table 11: EV Driver Comments at Hearst Castle

"They had every kind of charge plug available."
"Great set up."
"Used the Tesla Destination Charger."
"It worked as advertised."
"Good Parking – Free Charge!"
"Nice surprise, didn't see this since I usually just use the SuperCharger."
"Covered solar parking with lots of chargers. Awesome!"
"Partially covered by large solar roof panels everywhere. Clean energy here!"
"Great spot. Glad I checked it out. Useful in its remoteness. It runs off 7kW though."
"Charging on Sunshine!"
"Thanks CA State Parks for free charging! Coastal air and Tesla tailgating at its finest. Greetings from AZ. Awesome stop and tour of the castle."

Source: Adopt a Charger

Heilbron Mansion/Northern Buttes District Headquarters

The Heilbron Mansion is located at 704 O Street, Sacramento, California, 95814.

In September 2017, two Level 2 EVSEs were installed. New signage was designed and was applied as a decal on the EVSE's face. For this historic location, it was better to be understated and not use the 2-foot by 2-foot signs. After the install, the chargers had to be moved due to remodel at Heilbron Mansion. The chargers were moved in March 2018 to a new location, the Northern Buttes District Headquarters located at 400 Glen Drive, Oroville, California 95966. The chargers at Heilbron Mansion are shown in Figures 10 and 11.

[7] Hearst Castle PlugShare webpage https://www.plugshare.com/location/121584

Figure 10: Chargers at Heilbron Mansion

Source: Adopt a Charger

Figure 11: Chargers with Signage at Heilbron Mansion

Source: Adopt a Charger

EVSE Utilization at Heilbron Mansion/Northern Buttes District Headquarters

Usage statistics for the Heilbron Mansion/Northern Buttes District Headquarters are shown in Table 12 below.

Table 12: Utilization at Heilbron Mansion/Northern Buttes District Headquarters

Total Energy Delivered (6 months)	650 kWh
Number of fleet vehicles using chargers	3 cars
Estimated Electricity Cost (at $0.17/kWh)	$110.50
Electric Vehicle Miles Traveled	1,912 miles
Gallons of gasoline avoided	51.7 gallons
Metric Tons of Carbon Dioxide Equivalent Avoided	.46 metric tons

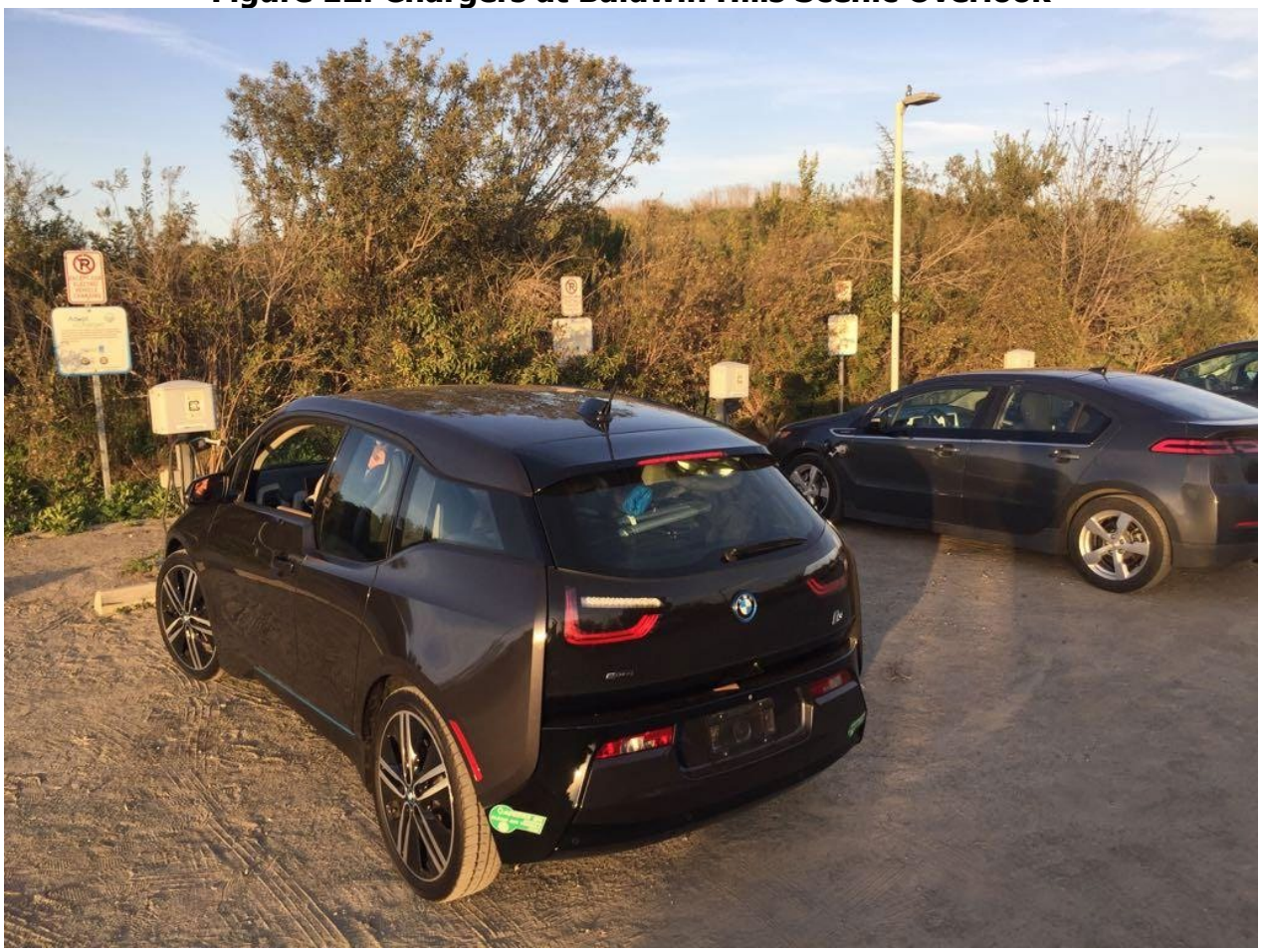
Source: Adopt a Charger

Baldwin Hills Scenic Overlook

Baldwin Hills Scenic Overlook is located at 6300 Hetzler Road, Culver City, California 90232.

In August 2017, one Clipper Creek Level 2 EVSEs was installed at the Baldwin Hills Scenic Overlook. This location had three existing publicly accessible EV chargers. Two of the chargers were replaced and an additional EV charger was installed at the Baldwin Hills Scenic Overlook Administration Office. The chargers at Baldwin Hills Scenic Overlook are shown in Figure 12. The charging station signage is shown in Figure 13.

Figure 12: Chargers at Baldwin Hills Scenic Overlook



Source: Adopt a Charger

Figure 13: Signage at Baldwin Hills Scenic Overlook

Source: Adopt a Charger

EVSE Utilization at Baldwin Hills Scenic Overlook

Usage statistics for the Baldwin Hills Scenic Overlook are shown in Table 13. EV driver comments at Baldwin Hills Scenic Overlook are shown in Table 14.[8]

Table 13: Utilization at Baldwin Hills Scenic Overlook

Total Energy Delivered (2-year period)	10,287 kWh
Estimated Number of Charging Sessions	780 sessions
Estimated Electricity Cost (at $0.17/kWh)	$1,748.79
Electric Vehicle Miles Traveled	30,256 miles
Gallons of Gas avoided	819 gallons
Metric Tons of Carbon Dioxide Equivalent Avoided	7.3 metric tons

Source: Adopt a Charger

[8] Baldwin Hills Scenic Overlook PlugShare webpage https://www.plugshare.com/location/46135

Table 14: EV Driver Comments at BHSO

Go up the road to the parking lot. 3 Clipper Creek stations that each also have a wall outlet. Cables are pretty long! You still have to pay $6 for parking.
Fortunately, I have an annual State Park pass, so don't have to pay for parking. Charging is free.

Source: Adopt a Charger

California Railroad Museum

The California Railroad Museum is located at 125 I Street, Sacramento, California 95814.

In March 2018, four Level 2 EVSEs were installed for employees, fleet, and volunteer usage. Adopt a Charger applied for rebates under the Sacramento Municipal Utility District's Workplace Charging Program which offers a $1.500 incentive for each Level 2 (240 volt) hardwired wall or pedestal mounted electric vehicle charger port. The charger at California Railroad Museum is shown in Figure 14.

Figure 14: Charger at California Railroad Museum

Source: Adopt a Charger

EVSE Utilization at California Railroad Museum

Usage statistics for the California Railroad Museum are shown in Table 15 below.

Table 15: Utilization at California Railroad Museum

Total Energy Delivered (as of June 13, 2018)	932 kWh
Estimated Number of Charging Sessions	sessions
Estimated Electricity Cost (at $0.17/kWh)	$177.08
Electric Vehicle Miles Traveled	2,741 miles
Gallons of gasoline avoided	74.2 gallons
Metric Tons of Carbon Dioxide Equivalent Avoided	.66 metric tons

Source: Adopt a Charger

Sea Cliff State Beach

Sea Cliff State Beach is located at State Park Drive, Aptos, California 95003.

In December 2018, we broke ground on the install of six Level 2 EV charging stations which were completed February 2019. No utilization data is available at this time. The chargers at Sea Cliff State Beach are shown in Figure 15.

Figure 15: Chargers at Sea Cliff State Beach

Source: Adopt a Charger

EV driver comments at Sea Cliff State Beach are shown in Table 16.[9]

Table 16: EV Driver Comments at Sea Cliff

Pulling 9.5kW from 2 stations.
Very nice!

Source: Adopt a Charger

Natural Bridges State Beach

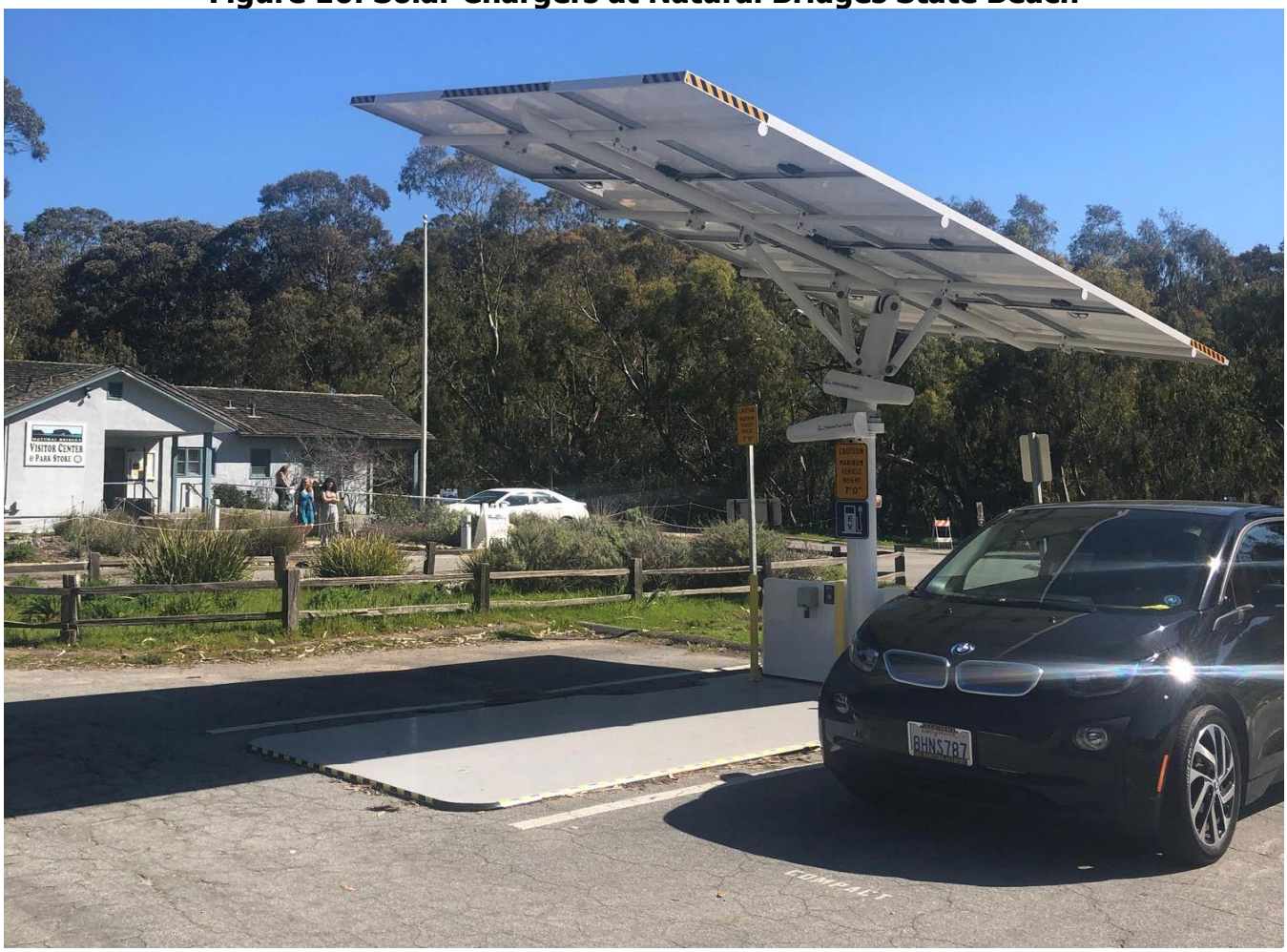
The Natural Bridges State Beach is located at 2531 West Cliff Drive, Santa Cruz, California, 95060.

[9] Sea Cliff State Beach PlugShare webpage https://www.plugshare.com/location/173365

Parks ordered Envision Solar's EV ARC solar chargers for this location. They became operational on June 25, 2018.

The EV ARCs saved Adopt a Charger significant deployment time and funding. Invented and manufactured in California, the EV ARC fits inside a parking space and does not reduce available parking in any way. The EV ARC requires no trenching, foundations or installation work of any kind, can be deployed in minutes and can be moved to a new location with ease. The EV ARCs allow EVs to run completely on sunshine helping Adopt a Charger reach larger climate action plan and carbon-emission reduction goals, while contributing to Envision Solar's resiliency and disaster preparedness plans. The product's energy storage allows use by first responders during grid outages. The chargers at National Bridges State Beach are shown in Figure 16.

Figure 16: Solar Chargers at Natural Bridges State Beach



Source: Adopt a Charger

EVSE Utilization at Natural Bridges State Beach

Usage statistics for the Natural Bridges State Beach are shown in Table 17 below.

Table 17: Utilization at Natural Bridges State Beach

Total Energy Delivered (9-month period)	653 kWh
Estimated Number of Charging Sessions	98 sessions
Estimated Electricity Cost (at $0.00/kWh)	$0.00
Electric Vehicle Miles Traveled	1,921 miles
Gallons of gasoline avoided	52 gallons
Metric Tons of Carbon Dioxide Equivalent Avoided	.462 metric tons

Source: Adopt a Charger

Inland Empire District Office

The Inland Empire District Office is located at 17801 Lake Perris Drive, Perris, California 92571-8400.

In April 2017, four Level 2 EVSEs were installed and completed as match funding for the project by California Department of Parks and Recreation. The chargers at Inland Empire District Office are shown in Figure 17.

Figure 17: Chargers at Inland Empire District Office

Source: Adopt a Charger

EVSE Utilization at Inland Empire District Office

Usage statistics for the Inland Empire District Office are shown in Table 18 below.

Table 18: Utilization at Inland Empire District Office

Total Energy Delivered (22-month period)	11,518 kWh
Number of fleet vehicles charging	3
Estimated Electricity Cost (at $0.17/kWh)	$1958
Electric Vehicle Miles Traveled	33,878 miles
Gallons of gasoline avoided	917 gallons
Metric Tons of Carbon Dioxide Equivalent Avoided	8.1 metric tons

Source: Adopt a Charger

Henry W. Coe State Park

Henry W. Coe State Park is located at 9100 E. Dunne Avenue, Morgan Hill, California 95037. In June 2018, one Envision Solar EV ARC was deployed at this location, but it is currently offline.

Ocotillo Wells State Vehicular Recreation Area

Ocotillo Wells SVRA is located at 5172 CA-78, Borrego Springs, CA 92004. They received on Envision Solar ARC system in May 2018 that includes one Level 2 charger as match for the project by California Department of Parks and Recreation. The chargers at Ocotillo Wells are shown in Figure 18.

Figure 18: Chargers at Ocotillo Wells

Source: Adopt a Charger

EVSE Utilization at Ocotillo Wells

Table 19 shows the utilization at Ocotillo Wells State Vehicular Recreation Area.

Table 19: Utilization at Ocotillo Wells

Total Energy Delivered (9-month period)	762 kWh
Estimated Number of Fleet Vehicles charging	2
Estimated Electricity Cost (solar generation)	$0.00
Electric Vehicle Miles Traveled	2241 miles
Gallons of gasoline avoided	61 pounds
Metric Tons of Carbon Dioxide Equivalent Avoided	.439 metric tons

Source: Adopt a Charger

Oceano Dunes State Vehicular Recreation Area

In May 2018, California Department of Parks and Recreation provided an Envision Solar Arc with one level 2 EV charging station at the parks Ranger Station located at 928 Pacific Blvd., Oceano CA 93445. The solar EV chargers at Oceano Dunes are shown in Figure 19.

Figure 19: Solar EV Charger at Oceano Dunes

Source: Adopt a Charger

EVSE Utilization at Oceano Dunes

The utilization statictics at Oceano Dunes Ranger Station are shown in Table 20.

Table 20: Utilization at Oceano Dunes Ranger Station

Total Energy Delivered (9-month period)	502 kWh
Number of fleet vehicles charging	1
Estimated Electricity Cost (solar generation)	$0.00
Electric Vehicle Miles Traveled	1476 miles
Gallons of gasoline avoided	40
Metric Tons of Carbon Dioxide Equivalent Avoided	.355 metric tons

Source: Adopt a Charger

California State Parks Bay Area District Office

The California State Parks Bay Area District Office, located at 845 Casa Grande Road, Petaluma, CA 94954 received on Envision Solar ARC system in May 2018 that includes two level 2 chargers as match for the project by California Department of Parks and Recreation. The chargers at the California State Parks Bay Area District Office are shown in Figure 20.

Figure 20: Chargers at Bay Area District Office

Source: Adopt a Charger

EVSE Utilization at Bay Area District Office

The utilization statistics at the Bay Area District Office are shown in Table 21.

Table 21: Utilization at Bay Area District Office

Total Energy Delivered (9-month period)	1094 kWh
Number of fleet vehicles	2
Estimated Electricity Cost (solar generation)	$0.00
Electric Vehicle Miles Traveled	3,218 miles
Gallons of gasoline avoided	87 gallons
Metric Tons of Carbon Dioxide Equivalent Avoided	.774 metric tons

Source: Adopt a Charger

Granite Bay State Park

Granite Bay State Park is located at 2530 Douglas Blvd #110, Roseville, California 95661.

In June 2018, one Envision Solar EV ARC, with two Level 2 chargers, was deployed at this location. The EV ARC charger is shown at the Granite Bay State Park is shown in Figure 21.

Figure 21: EV ARC at Granite Bay State Park

Source: Adopt a Charger

EVSE Utilization at Granite Bay State Park

Usage statistics for the Granite Bay State Park are shown in Table 22 below.

Table 22: Utilization at Granite Bay State Park

Total Energy Delivered (9-month period)	672 kWh
Estimated Number of Charging Sessions	101 sessions
Estimated Electricity Cost (solar)	$0.00
Electric Vehicle Miles Traveled	1,976 miles
Gallons of gasoline avoided	54
Metric Tons of Carbon Dioxide Equivalent Avoided	.475 metric tons

Source: Adopt a Charger

Chino Hills State Park

The Chino Hills State Park is located at 4721 Sapphire Road, Chino Hills, California 91709.

In January 2019, we broke ground on the install of two Clipper Creek Level 2 EVSEs and completed the project in March 2019. No utilization data is available at this time. The chargers at Chino Hills State Park are shown in Figure 22.

Figure 22: Chargers at Chino Hills

Source: Adopt a Charger

CHAPTER 3:
Results and Recommendations

Major Findings

Major findings from this project include:

- Charging stations received relatively high utilization even in rural areas.
- Networking fees would have increased expense tenfold, made the user experience cumbersome, and decreased utilization, reducing electric vehicle miles traveled and greenhouse gas reduction.
- The new American with Disabilities Act regulations regarding EV charging stations made many of the initial locations impossible to execute and required additional site visits to identify suitable locations.
- The installation of these EV chargers had a profound effect on the greening of the California State Parks fleet.

Recommendations

Recommendations learned from the project include:

- Encourage site hosts to offer Level 2 EV charging as an amenity to maximize awareness of PEV, increase electric vehicle miles traveled, and increase greenhouse gas reduction.
- These EV chargers proved to be an important opportunity for outreach and education to a receptive audience.
- Maintain flexibility in approach to charging infrastructure. The needs of urban parks, rural parks, and beach locations all varied greatly. In all cases, the number one consideration was the effect of the parking and the revenue that it generates for the parks.

As the CEC continues to assess the need for public chargers, Adopt a Charger encourages the CEC to consider popular destination locations. Rarely does a PEV driver require a charge at the local drug store, but it is necessary when traveling 30-40 miles to visit a National Park, California State Park, museum, or university. Because visitors often spend 2-4 hours at these locations, Level 2 charging would be appropriate with supplemental 120-volt outlets to accommodate overflow and provide charging opportunities for employees. Most of the California State Parks are strategically located along interstate freeways, which make them the perfect stopping point between major metropolitan areas.

Adopt a Charger would also like to suggest that the CEC consider alternative approaches to charging infrastructure. The majority of prior funding was applied to EV service providers that require a network subscription or pay-per-use models. According to a recent study "Are Taxpayer and Private Dollars Creating Effective Electric Vehicle Infrastructure?" by Tom Saxton, Vice President of Plug in America, the number of cars plugged in dropped by almost 60 percent when there was a fee involved. The competing EV service equipment providers only added to this dilemma. Even if a driver does have one network's card, what happens when you encounter one of the other company's chargers? The concern is that these parking spots will not be used: drivers frustrated by access issues, businesses frustrated because

parking is valuable real estate, and animosity created among EV critics who constantly see prime parking spots sitting empty.

The best way to introduce the public to plug in vehicles is to see these cars charging in the "wild", and the best salespeople are the owners themselves. When seeing a LEAF or a Volt driving down the road, most people don't realize that they run on electricity. The connection is made when someone sees the cars plugged in and can engage in conversation with the owner about the experience. In the early adoption phase of plug-in vehicles, we need to do everything we can to encourage the use of public charging. The educational opportunity is outside of the auto dealership, and outreach efforts are not effective if the chargers are underutilized. Connecting with actual drivers is the most effective way to engage the public in a conversation about electric vehicles, and it is further encouraged by providing free or sponsored charging.

GLOSSARY

CALIFORNIA ENERGY COMMISSION (CEC)—The state agency established by the Warren-Alquist State Energy Resources Conservation and Development Act in 1974 (Public Resources Code, Sections 25000 et seq.) responsible for energy policy. The CEC's five major areas of responsibilities are:

1. Forecasting future statewide energy needs.
2. Licensing power plants sufficient to meet those needs.
3. Promoting energy conservation and efficiency measures.
4. Developing renewable and alternative energy resources, including providing assistance to develop clean transportation fuels.
5. Planning for and directing state response to energy emergencies.

Funding for the CEC's activities comes from the Energy Resources Program Account, Federal Petroleum Violation Escrow Account, and other sources.

ELECTRIC VEHICLE (EV)—A broad category that includes all vehicles that are fully powered by electricity or an electric motor.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE)—Infrastructure designed to supply power to EVs. EVSE can charge a wide variety of EVs, including BEVs and PHEVs.

KILOWATT-HOUR (kWh)—The most commonly used unit of measure telling the amount of electricity consumed over time, means one kilowatt of electricity supplied for one hour. In 1989, a typical California household consumed 534 kWh in an average month.

LOS ANGELES DEPARTMENT OF WATER AND POWER (LADWP)—An electric municipal utility serving the greater Los Angeles, California, region.

PLUG-IN ELECTRIC VEHICLE (PEV)—A general term for any car that runs at least partially on battery power and is recharged from the electricity grid. There are two different types of PEVs to choose from—pure battery electric and plug-in hybrid vehicles.