



**CALIFORNIA
ENERGY COMMISSION**



California Energy Commission
Clean Transportation Program

FINAL PROJECT REPORT

City of Coronado Electric Vehicle Tourism Supply Equipment Deployment Project

Prepared for: California Energy Commission

Prepared by: OpConnect, LLC for City of Coronado



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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 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-13-035 on July 7, 2015.

ABSTRACT

This final report documents the activities, accomplishments and what was learned during the completion of our project ARV-13-056. Six electric vehicle charging stations were installed at two separate locations, Coronado Municipal Golf Course and Coronado Cays Park. Two dual port chargers and one single port charger, supplied by OpConnect, were installed at each location by Saturn Electric. Permitting for this project was completed within three months of the project start and installation of the units was completed in April 2015.

These units were announced in a press release in October 2015. In addition to standard news media contacts, this press release was also sent to the San Diego area electric vehicle car dealers. For additional outreach and communications, OpConnect has visited many San Diego area electric vehicle car delvers to provide them with OpConnect welcome packets. These packets include an OpConnect card and instructions on how to locate charging stations with the web portal and mobile application and how to access the stations.

Electric vehicle drivers can access the chargers by either using a major credit card, or if they are registered OpConnect members, they can use their OpConnect card, the mobile application, or the chargers' touchscreen to provide their membership credentials. During an initial six-month evaluation period following installation, forty-seven charging sessions were done using these chargers, with a majority (forty sessions) of these being done at the Coronado Cays Park location.

Early evaluation of the financial results show that these chargers are on their way to becoming cash neutral or positive, especially if additional revenue from advertising operations can be realized in the future. This project was successful due to strong support and cooperation from the City of Coronado to streamline and accelerate the permitting and installation process and this should be noted as an important component in future projects.

Keywords: Electric vehicle supply equipment, plug-in electric vehicle, Coronado, charging station

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EXECUTIVE SUMMARY

The City of Coronado is a year-round destination for visitors from around the region. Most visitors make it across the bridge to Coronado by car. A growing number of visitors are driving plug-in electric vehicles (PEV) to Coronado. Currently there are not nearly enough PEV charging stations to serve the existing need, which hinders the growth of longer trips, due to PEV drivers lacking range confidence. With a need to serve existing and future PEV charging demands, its destination island-peninsula geography is an ideal location to deploy public charging infrastructures to service one of the state's tourism epicenters.

With the project's proposed charging stations, these PEV drivers can shop and play for an extended period of time while their vehicle charges at a nearby station. The Energy Commission's investment in this PEV infrastructure project will help increase PEV adoption, reduce greenhouse gas emissions, support and create jobs, and continue to showcase California as a leader in advanced transportation.

The goals of this project are:

- Demonstrate a viable, self-sustaining business model that has the potential to reduce the costs of expanding California's statewide charging network.
- Deploy public chargers in strategic locations to address range anxiety and help accelerate mass PEV adoption.
- Spur state and local investment and job opportunities.
- Demonstrate an open standard protocol electric vehicle service equipment technology.
- Continue to meet the City's greenhouse gas reduction goals.
- Add to the City's tourism industry.

The process that was followed to realize these goals was:

- Identify installation sites that will be
 - Popular tourist destinations
 - Have site owners that are cooperative
 - Have available parking spaces to dedicate to electric vehicle parking to minimize icing issues
- Complete necessary design work and obtain required permits
- Agree upon a business model between the City of Coronado and the electric vehicle service equipment network operator, OpConnect
- Install the electric vehicle service equipment
- Monitor electric vehicle service equipment usage.

The results to date are not very heavy usage of the installed chargers but based on the non-network (credit card) users, the stations appear to be being used by visitors.

CHAPTER 1:

Project Purpose and Approach

Project Purpose

The City of Coronado is a year-round destination for visitors from around the region. Most visitors make it across the bridge to Coronado by car. A growing number of visitors are driving PEV to Coronado. Currently there are not nearly enough PEV charging stations to serve the existing need, which hinders the growth of longer trips, due to PEV drivers lacking range confidence. With a need to serve existing and future PEV charging demands, its destination island-peninsula geography is an ideal location to deploy public charging infrastructures to service one of the state's tourism epicenters.

With the project's proposed charging stations, these PEV drivers can shop and play for an extended period of time while their vehicle charges at a nearby station. The Energy Commission's investment in this PEV infrastructure project will help increase PEV adoption, reduce greenhouse gas emissions, support and create jobs, and continue to showcase California as a leader in advanced transportation.

Project Approach

Project Goals

The goals of this project are:

- Demonstrate a viable, self-sustaining business model that has the potential to reduce the costs of expanding California's statewide charging network.
- Deploy public chargers in strategic locations to address range anxiety and help accelerate mass PEV adoption.
- Spur state and local investment and job opportunities.
- Demonstrate an open standard protocol electric vehicle service equipment (EVSE) technology.
- Continue to meet the City's greenhouse gas reduction goals.
- Add to the City's tourism industry.

Project Objectives

The objectives of this project are:

- Install EVSE charging stations at two locations within City of Coronado.
- Observe and measure PEV usage and penetration during the project's duration and share that information with project partners and the State of California.
- Integrate "PEV tourism" into the city's tourism and visitor marketing efforts.

CHAPTER 2:

Project Purpose

The following activities were accomplished in this project:

- Survey the two installation sites for the electric vehicle (EV) chargers: Coronado Public Golf Course and Coronado Cays Park. These surveys determined the installation locations for three (3) chargers at each location. At each location, two chargers were dual port pedestal units installed to serve standard parking spaces and one charger was a single port pedestal unit installed to serve a handicap parking space.
- Obtain the required installation permits. This task included preparation of installation diagrams and other data required by the permitting agency.
- Establish electrical service with the local utility (San Diego Gas & Electric) for the chargers, which were to be separately metered from the general property's meter at each location.
- Deliver six (6) EV chargers for the two locations. A total of ten (10) parking spaces are served by these 6 chargers.
- Install and commission into service the six (6) EV chargers. Installation and commissioning of the chargers was completed in April 2015. The six (6) chargers were updated to add cord management system to minimize tripping hazards from cables on the ground in November 2015.

Figures 1 and 2 are photos of installed chargers at the two locations:

Figure 1: OpConnect EV Chargers Installed at Coronado Golf Course



Source: OpConnect.

Figure 2: OpConnect EV Chargers Installed at Coronado Cays Park



Source: OpConnect.

- Operate and gather operational data from the installed chargers. The chargers were operated from April 2015 through October 2015 to gather data on their usage. The OpConnect EV charging network includes back office functionality that records each charging session done with these chargers. EV drivers can access the chargers by either using a major credit card, or if they are registered OpConnect members, they can use their OpConnect card, the mobile application, or the chargers' touchscreen to provide their membership credentials. Some of the things that we wanted to study during the six-month evaluation period were:
 - Whether users would be OpConnect network members or credit card users
 - Would there be any regular or high frequency users at each location
 - Would one location be utilized more than the other
 - Would there be use of the charger dedicated for handicap parking.

Forty-Seven charging sessions have been conducted on these chargers during the six-month initial evaluation period following installation, with a majority (forty) of these being done at the Coronado Cays Park location. Relative to our study topics, we learned the following:

- 57 percent of the charging done during this evaluation period was done with credit card usage. This is about 3 times the norm relative to the rest of OpConnect network chargers, but this high credit card usage can be attributed to the fact that OpConnect is a relatively new network in this area and these are the first OpConnect chargers in the City of Coronado. The high credit card usage also indicates that offering drivers a charger with a credit card reader gave the non-network users the convenience of being able to access the chargers
- There were no high frequency users at the Coronado Golf Course location, which is an indication that installation at this location is probably supporting the project goals of providing charging for visitors to support EV tourism. There was one high frequency user at the Coronado Cays location (who accounted for 55 percent of all of the charging done at this location). This could be an individual who works or lives in or around this location. However, the remainder of the charging at this location was also be different or unknown (credit card) users, which indicates that installation at this location is also supporting the project's goals.
- The Cays location was used much more than the Golf course location, an indication that EV charging was in higher need at this location.
- There were no charging sessions on the chargers dedicated for handicap parking during the study period.

- Perform outreach and media communications to inform the public about the EV chargers. OpConnect visited some San Diego area EV car dealerships to provide them with OpConnect welcome packets. These packets include an OpConnect card and instructions on how to locate charging stations with the web portal and mobile application and how to access the stations. Coordination was also done with Plug Share, the most widely used EV charger locating smartphone application in the United States, to ensure that the chargers were included in their locator maps to help EV drivers locate them. These units were announced in a press release (Appendix A). In addition to standard news media contacts, this press release was also sent to EV related news outlets and San Diego area EV car dealers.

Coordination has also recently begun with Car2Go, the operator of an all-electric car-sharing fleet in the San Diego area. The purpose of this coordination is to establish business processes to allow Car2Go users to access these chargers on a Car2Go account.

The City of Coronado has also included a map showing the EV charger locations on their public web page.

- Provide monthly reporting to the CEC.
- Conduct an on-site critical review meeting with the CEC. This meeting was conducted on June 18, 2015 at the Coronado City Hall and was attended by Sharon Purewal from the CEC, Bill Cecil from the City of Coronado, Tim Dudek from Saturn Electric and Dexter Turner from OpConnect. Installation drawings for the two install locations were reviewed, and then the meeting participants visited both sites to review the installed chargers, signage, parking space marking, etc.

CHAPTER 3:

Project Assessment

The objective of installing and operating EV chargers at the two locations in the City of Coronado has been met and was done so in a very efficient manner. The City, through their representative Bill Cecil, was supportive of this project and worked to quickly provide necessary documentation, approvals, etc. to facilitate the permitting and installation process and this was a key element in completing the installation and commissioning in April 2015. One fact that was learned from this project, and which will be a useful consideration for the timeline of future projects, is that the scheduling of any inspections that are required by the local utility should be taken into account. These inspections must be scheduled 30-45 days prior.

The successful installation of these EV chargers has helped support jobs at the installer Saturn Electric. These chargers will also help the City of Coronado realize its goal of continual reduction in greenhouse gases. Charging sessions conducted during the initial 6-month observation period of the stations have resulted in the reduction of an estimated 220 pounds of greenhouse gases.

Since one goal was to demonstrate a viable, self-sustaining business model for the operation of public EV charging infrastructure we must examine the financial results of this project. To encourage the early use of the installed EV chargers, the usage rate was set to \$1.50/hour of charging time. It should be noted that this is 25-50 percent below the minimal usage rate for paid public charging infrastructure in the area.

During this early period in the lifetime of the chargers, they are not yet operating at a break-even or cash positive rate. This is not unusual for new EV chargers. OpConnect feels that a business relationship with Car2Go will increase the utilization of the chargers and as more PlugShare users post their usage of the chargers, utilization and revenue will increase over time. The inclusion of future advertising revenue generated by the chargers' touchscreens will also help realize the long-term goal of EV chargers which are cash positive. These early results also point to the need to do additional outreach to tourism agencies in the Los Angeles area – an effort that will be addressed in the future.

Observation of the EV chargers during the 6-month study period has also shown that internal combustion engine drivers park in spaces designated for EV parking and charging, an issue that should be addressed at the Coronado Golf Course. Observation of vehicles with internal combustion engines parking in the spaces for these chargers has demonstrated that there are some drivers of internal combustion engine vehicles that do not respect the posted signage. This is part of a wider discussion on a state-wide level where various remediations, including fines, are under consideration.

CHAPTER 4:

Conclusions

EV charging infrastructure is a necessary component of the long-term viability of electric vehicles. Public support for this charging infrastructure is key in these early years of the rollout of the vehicles because as the financial data presented in the Project Assessment show, during the early period of the operation of the chargers there is not sufficient revenue from the operation of the chargers to entice private entities to invest in the infrastructure. Public funding such as this project provides the “kick start” of the upfront investment in the equipment which will help make the equipment economically viable in the long term, especially if additional revenue sources such as advertising are realized.

This project has also demonstrated the importance of strong support from local public agencies in successful EV charging infrastructure projects. Support to expedite the supply of technical data, streamline permitting approvals and minimize approvals and associated paperwork make the installation process more efficient and economical and minimize the timeline from the initial project vision to operating infrastructure. This is evidenced by the quick installation of the equipment in this project and the fact that the project was completed within budget.

Projects such as this, which have the goal of increasing tourism by EV drivers, can be improved with more consideration of where the potential tourist will come from, and increased coordination with tourism agencies in these areas. Partnerships with the tourism destinations (such as the golf course for example) to offer benefits such as discounts on activities at these destinations for EV users making use of the charging infrastructure will also help make projects like this more successful.

One thing that we would have done differently in this project is to bring in a third or even a fourth installation location to support tourism in Coronado. These additional locations would most likely be private parking structures in the retail and restaurant area in downtown Coronado. This is an area highly trafficked by visitors and we have learned that there could be high demand for public charging stations in this area.

Another thing that we would do differently in future projects is to begin the outreach to get EV drivers signed up as OpConnect members (working with local auto dealerships for example) earlier. This would result in the percentage of member users being higher initially and enable us to gather more data about high frequency users earlier.

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 Energy Commission'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.

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.

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.

APPENDIX A:

Press Release

Figure A-1 is an OpConnect Press Release by Dexter Turner announcing the completion of PEV charging stations in Coronado.

Figure A-1: OpConnect Press Release

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FOR IMMEDIATE RELEASE

OpConnect and Saturn Electric add Charging Stations in Coronado to Support EV Tourism

The City of Coronado and installation partners OpConnect and Saturn Electric have completed the installation of six OpConnect Mark II electric vehicle chargers at Coronado Cays Park and the Coronado Municipal Golf Course. This installation was funded by the California Energy Commission through a \$123,100 grant for the deployment of EV charging infrastructure.

The City of Coronado is a year-round destination for visitors from the region and around the world and a growing number of visitors are driving electric vehicles to Coronado. With an exceptional need to serve existing and future electrical vehicles charging demands, its destination island-peninsula geography, and strong environmental beach ethos, Coronado was an ideal location to deploy public charging infrastructures to service one of the state's tourism epicenters. The OpConnect Mark II chargers feature 15" touchscreen displays, a surveillance camera and a card reader standard on all units. To support users and guests from outside the Coronado area, these chargers allow drivers to pay with major credit cards and do not require membership in any charging network or a call to a support phone number for non-network members.

About OpConnect (www.opconnect.com):

OpConnect, LLC is a leader in electric vehicle charging stations and charging station management software technology. The OpConnect Electric Vehicle Charging System® includes Level 2 chargers, back office systems for charger management and a web site and mobile application for driver management of their accounts. OpConnect currently has hundreds of charging ports, both OpConnect stations and other manufacturers' chargers, under management with its charger management back office systems.

About Saturn Electric (www.saturnelectric.com):

Saturn Electric has installed numerous commercial and residential electrical installations in the City and County of San Diego. Saturn Electric has also installed hundreds of level 2 commercial and residential and DC Fast chargers throughout southern California. The company is a member of NECA (National Electrical Contractors Association) EVSE Development Committee, member of the SPX National Advisory Board and of the San Diego Regional Infrastructure (REVI) Working Group.

Source: OpConnect.