



**CALIFORNIA
ENERGY COMMISSION**



**CALIFORNIA
NATURAL
RESOURCES
AGENCY**

California Energy Commission
Clean Transportation Program

FINAL PROJECT REPORT

PLUG-IN SAN DIEGO FINAL REPORT

Prepared for: California Energy Commission

Prepared by: San Diego Association of Governments



January 2022 | CEC-600-2022-038

California Energy Commission

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ACKNOWLEDGEMENTS

The San Diego Association of Governments (SANDAG) acknowledges the Center for Sustainable Energy for its partnership on this Contract. SANDAG also acknowledges Regional Energy Working Group Chair Chris Orlando, Councilmember, City of San Marcos, for his support for Plug-in San Diego (Plug-In SD) and the advancement of zero-emission vehicles.

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PREFACE

Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007) created the Clean Transportation Program. The statute authorizes the 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-14-603 to provide funding opportunities for plug-in electric vehicles and fuel cell electric vehicles. In response to PON-14-603, the recipient submitted an application which was proposed for funding in the CEC's notice of proposed awards November 17, 2014 and the agreement was executed as ARV-14-036 on June 30, 2015.

ABSTRACT

The San Diego region has been planning for plug-in electric vehicles for many years and aspires to further the growth of plug-in electric vehicles and electric vehicle infrastructure to support the state's goals for greenhouse gas reduction and zero-emission vehicle deployment. This document serves as the Final Report by the San Diego Association of Governments pursuant to its Agreement ARV-14-036 with the California Energy Commission under solicitation PON-14-603 for regional plug-in electric vehicle readiness plan implementation.

The project comprised five primary tasks: streamline permitting and inspection processes, improve the electric vehicle charging station installation process, assist in siting electric vehicle charging station, provide technical assistance through the electric vehicle expert, and conduct plug-in electric vehicle awareness activities targeted at dealerships and workplaces. Project methods were to utilize the Center for Sustainable Energy to assist in Plug-in San Diego resource development, trainings, and outreach; and to develop an on-demand regional technical assistance program for potential electric vehicle charging station hosts called the electric vehicle Expert.

Results include development of best practices and correction sheets to streamline the permitting and inspection process for electric vehicle charging station; creation of an installation check-list to provide guidance for electric vehicle charging station installers; distribution of an online training module for new car dealerships; successful engagement with electric vehicle stakeholders through trainings, meetings, and presentations; and technical assistance provided to over 70 potential electric vehicle charging station hosts through the electric vehicle Expert.

The Plug-in San Diego project was well received and should be continued in order to prepare the region for increased deployment of plug-in electric vehicle and electric vehicle charging station. Project recommendations are to improve effectiveness of future outreach with tailored marketing; increase the reach of the electric vehicle Expert program by expanding outreach, enhancing resource documents that address documented electric vehicle charging station barriers, and continue to promote and prepare potential site hosts for electric vehicle charging station incentive opportunities; and complete infrastructure mapping and analysis to guide future planning and investment.

Keywords: San Diego Association of Governments (SANDAG), Center for Sustainable Energy (CSE), plug-in electric vehicle (PEV), zero-emission vehicle (ZEV), electric vehicle charging station (EVCS)

Please use the following citation for this report:

Wood, Allison, Jeff Hoyos, Anna Lowe. (San Diego Association of Governments). 2022. *Plug-in San Diego Final Report*. California Energy Commission. Publication Number: CEC-600-2022-038.

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EXECUTIVE SUMMARY

The San Diego region has been preparing for the deployment of plug-in electric vehicles for many years. With transportation accounting for nearly half of all greenhouse gas emissions at both a statewide and regional level, plug-in electric vehicle will play an important role in reducing these emissions. With this aim, the San Diego Association of Governments prepared the San Diego Regional plug-in electric vehicle Readiness Plan to identify barriers to the installation of electric vehicle charging station and make recommendations on how best to address these barriers. The Readiness Plan was developed through close coordination with the San Diego Regional Electric Vehicle Infrastructure working group made up of public agencies, electric vehicle charging station providers, and other key stakeholders. The Readiness Plan provided the guidance for this project, Plug-in San Diego

The goal of Plug-in San Diego is to implement recommendations made by the Readiness Plan, streamline permitting, improve the electric vehicle charging station installation process, and assist in siting electric vehicle charging station, while increasing awareness of electric vehicle charging station and plug-in electric vehicle in general. The project consisted of five main tasks to accomplish this goal:

1. Develop a best practices report, series of correction sheets, and website language for local jurisdictions in the San Diego region to improve the permitting and inspection process for electric vehicle charging station, hold sub regional trainings to distribute the, and provide technical assistance to individual jurisdictions.
2. Create regionally consistent guidance for the process of electric vehicle charging station at workplaces, public sites, and multi-unit dwellings through a best practices report and installation checklist.
3. Engage and inform plug-in electric vehicle stakeholders on multi-unit dwellings -specific resources and offer technical assistance on the electric vehicle charging station siting process to multi-unit dwellings.
4. Establish the electric vehicle expert and provide direct technical assistance on electric vehicle charging station permitting and inspection, installation, and siting to local governments, contractors, potential site hosts, and other electric vehicle stakeholders; document electric vehicle Expert inquiries; prepare frequently asked questions frequently asked questions; and evaluate effectiveness of the electric vehicle Expert service through a survey.
5. Provide presentations and training to plug-in electric vehicle dealerships and workplaces; coordinate with the San Diego Association of Governments iCommute program to engage with employers in the region; develop updated educational materials for dealerships on plug-in electric vehicle and electric vehicle charging station; and document awareness activities in summary reports.

San Diego Association of Governments, in partnership with the Center for Sustainable Energy, successfully implemented the project tasks and achieved the following results:

1. Conducted five sub regional local government trainings with approximately 70 attendees in total. Attendees included building officials, building inspectors, engineers, planners, development technicians, plans examiners, and transportation managers.

2. Provided electric vehicle expert responses to 77 inquiries. The majority of inquiries came from multi-unit dwellings and workplaces followed by local governments and other public agencies. Ninety-three percent of electric vehicle expert survey respondents rated the quality of the technical assistance they received as excellent.
3. Reached over 93 percent (58 out of 62) of dealerships selling plug-in electric vehicle in the San Diego region, representing 13 different automakers, and provided information on plug-in electric vehicle incentives and access to online training modules for salespersons.
4. Engaged with over 300 individuals across 82 employers through seminars, events, and webinars focused on plug-in electric vehicle benefits and workplace policies to support plug-in electric vehicle and electric vehicle charging station.

The resources developed and technical assistance provided through Plug-in San Diego were well received by local governments, property owners, and other electric vehicle stakeholders. Fortunately, San Diego Association of Governments and Center for Sustainable Energy are able to continue these services through a new award from the CEC. The work done under Plug-in San Diego to date will be built upon and refined during the project's continuation.

Through Plug-in San Diego, the electric vehicle expert service demonstrated the ability to fill an important gap for stakeholders interested in moving forward with electric vehicle charging. The continued growth of plug-in electric vehicle will continue to fuel the demand for more electric vehicle charging station in public settings, workplaces, and multi-unit dwellings. Factors such as physical layout, technology specifications and capabilities, property owner rights and obligations, third-party operations, procurement requirements, and others continue to create a challenging, and often confusing, situation for electric vehicle charging station hosts to navigate. Without active and responsive technical assistance, potential electric vehicle charging station hosts would continue to move slowly without fully understanding the various requirements of designing, selecting, installing, and operating electric vehicle charging station.

Direct experience with plug-in electric vehicle awareness activities in the San Diego region continues to show that the general awareness of plug-in electric vehicle, and particularly of electric vehicle charging station, remains low. For example, during engagement electric vehicle charging station permitting with local governments, San Diego Association of Governments and Center for Sustainable Energy discovered a need for general education on plug-in electric vehicle and electric vehicle charging station technology and availability in addition to the details of permitting and inspection requirements. For plug-in electric vehicle awareness efforts to successfully lead to adoption there is a need for multiple touches and ongoing engagement. Past awareness efforts have successfully raised the level of awareness of plug-in electric vehicle in many workplaces and multi-unit dwellings, but ongoing efforts are still needed to transform that awareness into real interest and consideration of plug-in electric vehicle and electric vehicle charging station.

With the growing plug-in electric vehicle market, the need for electric vehicle expert services is expected to increase. According to the California Statewide Plug-in Electric Vehicle Infrastructure Assessment, the San Diego region will need between 9,000-15,000 workplace charging ports and 1,800-4,200 public charging ports by 2020. This region should also expect 100,000-150,000 plug-in electric vehicle by 2025 to meet the statewide goals. State goals for renewable energy and zero net energy buildings will add more complexity to the electric

vehicle charging landscape, as will the adoption of plug-in electric vehicle into government fleets, transit agencies, and transportation network carriers. The increase in number of available vehicles makes and models will also influence plug-in electric vehicle adoption and demand for charging installations.

Further planning and analysis will help inform charging deployment in the region but will not reduce the need for one-on-one technical assistance for local jurisdictions, property owners, and other potential electric vehicle charging station site hosts. Technical assistance must continue to grow and adapt to new challenges to meet these larger scale market needs.

CHAPTER 1:

Project Purpose and Approach

Purpose of Plug-In SD

The purpose Plug-In SD was to implement the Readiness Plan by addressing barriers identified in the Readiness Plan related to permitting and inspection, installation, and PEV awareness. SANDAG recognizes the important role PEVs play in reducing greenhouse gas emissions in the region and has been planning for the deployment of PEVs for many years. SANDAG launched Plug-in SD to offer resources and technical assistance to its member agencies (including 18 cities and the County of San Diego), public agencies, property owners, and dealerships in order to support increased PEV sales and EV Charging Station installations in the San Diego region.

General Barriers

The Readiness Plan, adopted by the SANDAG Board of Directors on January 24, 2014, identified a number of barriers to the installation of EVCS and made recommendations on how to address these barriers. Through Plug-in SD, this project provided a coordinated regional effort to implement the recommendations. As PEV adoption has continued to grow in the region, the ability of municipalities to accommodate PEVs has not expanded as quickly. Many municipalities are limited in staff time and technical expertise to address challenges related to EVCS on their own.

Goals of Plug-in SD

The goal of Plug-in SD is to implement recommendations made by the Readiness Plan, to streamline permitting, improve the EVCS installation process, and assist in siting EVCS, while increasing awareness of EVCS and PEVs in general.

Objectives of Plug-in SD

The objectives of Plug-in SD are to:

- Streamline the EVCS permitting and inspection process through training and technical assistance to municipal staff.
- Provide new resources to educate municipal staff, contractors, and end users on the installation process.
- Establish a regional electric vehicle expert (EV Expert) who can provide direct technical assistance on EVCS deployment in all the above areas.
- Increase awareness of PEVs by providing new car dealers with informational materials and through direct workplace promotion of PEVs and EVCS.

Approach to Achieve Project Purpose

The approach to achieve the goal and objectives of Plug-in SD included developing EVCS resources, offering no-cost technical assistance, and engaging in outreach activities. Plug-in SD resources included best practices reports, correction sheets, and checklists on permitting, inspection, and installation of EVCS. These resources were developed in a way to allow local jurisdictions to customize the documents to their own needs.

A key component of Plug-in SD included the establishment of a regional technical expert to assist local government staff with a variety of EVCS challenges (e.g., permitting and inspection, installations, siting, etc.), train local government staff on best practices and tools (e.g., checklists and correction sheets) available to overcome those challenges, and respond to inquiries from other potential EVCS hosts. This regional technical expert (the "EV Expert") provided subject matter expertise on EVCS permitting, installation, and siting and offered technical assistance and training at no cost to local governments and other stakeholders. Local government staff and other potential EVCS hosts were able to schedule in-person consultations or access the EV Expert remotely via phone and e-mail to address permitting, inspection, installation, and siting needs.

The use of checklists and correction sheets coupled with providing municipal staff with access to a subject matter expert has been successful in advancing other clean energy technologies (e.g., energy efficiency, solar photovoltaic, etc.) in the region. This model builds public and private sector institutional knowledge on the nuances associated with the deployment of new technologies, while limiting the burden on end-users (in this case, potential EVCS hosts).

In addition to the resources and technical assistance, Plug-in SD included outreach-related tasks in order to expand general knowledge about PEVs and EVCS. Outreach activities were focused on two key areas, dealerships and workplaces. Recognizing workplaces as a critical piece for a robust EV charging network, Plug-in SD provided information to employers on PEV-friendly policies and benefits of offering EVCS to employees and/or the general public. Dealerships are often a key conduit of information to potential PEV buyers and it is important for sales staff to be informed about incentives for PEVs and able to answer questions about PEV performance and EV charging available in the region. Plug-in SD created an online training module for dealership staff to quickly learn answers to frequent questions about PEVs and EV charging in the San Diego region.

CHAPTER 2:

Project Activities Performed and Results

Project Activities Performed

Plug-in SD included several components with the overall aim to provide resources, targeted technical assistance, and outreach on EVCS to a variety of stakeholders. This included a particular focus on local jurisdictions, multi-unit dwellings (MUDs) building owners, employers, and dealerships.

Permitting and Inspection Process

Through Plug-in SD, SANDAG and CSE developed guidance and resources for local jurisdictions in the San Diego region to improve the permitting and inspection process for EVCS. In order to promote the availability of the resources and offer further technical assistance, five sub regional workshops were held for local governments throughout the region. During the term of this project, in October 2015, Governor Brown signed into law Assembly Bill 1236 (Chiu, 2015), which requires cities and counties to adopt an ordinance to streamline and expedite the permitting processes for EVCS projects (residential and commercial) by September 2017. In adopting the ordinance, local governments are required to:

- Adopt a checklist of all requirements to be eligible for expedited review
- Publish the checklist and EVCS permitting documentation on the web
- Allow for electronic submittal of EVCS permit application and authorize electronic signature

Resources available through Plug-in SD were created to support local jurisdictions in meeting AB 1236 requirements.

Permitting and Inspection Resource Development

Plug-in SD resources on permitting and inspection of EVCS include a Best Practices Report, Correction Sheets, and website text. Each of these resources is further described below.

Permitting and Inspection Best Practices Report

The Permitting and Inspection Best Practices Report was completed early in the project in order to help inform future resources. The Report includes:

- An overview of common barriers to EVCS installations including permit application delays and inspection corrections identified in the Readiness Plan
- A catalogue of existing permit processes and compliance requirements for EVCS among building departments in the San Diego region
- EVCS permitting and inspection best practices that assist local building departments in preparing for the anticipated increase in EVCS permits

The Best Practices identified in the report were derived from those currently in place throughout San Diego region local governments, the Readiness Plan and the Governor's Office of Planning and Research ZEV in California: Community Readiness Guidebook (ZEV Guidebook). These best practices include:

- Clear and regionally consistent website information
- EVCS permitting guide

- EVCS-specific and fillable permit application
- Permit fee incentives
- Plan review and inspection corrections lists
- Online permitting and inspection services

Permitting and Inspection Corrections Sheets

The San Diego Chapter of the International Code Council and other local jurisdiction staff provided key input into the development of EVCS Permitting and Inspection Correction Sheets. The correction sheets are for use by permit reviewers and inspectors to expedite the overall plan check and inspection process. The sheets cover three installation types (residential, non-residential, and MUDS), identify common corrections, and provide solutions to addressing these corrections. Local jurisdictions were able to customize the correction sheets for their specific processes with assistance from the EV Expert.

Website Language Guide

The Plug-in SD website language guide offers guidance on providing clear information on jurisdiction websites in order to save valuable staff time, implement a low-cost way to increase applicant understanding, and reduce application or installation errors. The guide describes both a strategy for organization of web content related to EVCS as well as text that can be customized for each jurisdiction. The availability of the website guide was highlighted to jurisdiction staff during the sub-regional workshops.

EVCS Permitting and Inspection Sub-Regional Workshops

SANDAG and CSE conducted five sub regional on-site trainings for local government staff in the San Diego region. The trainings provided local government staff guidance on improving the permitting and inspection process to ensure EVCS installers, contractors, and end users can receive timely and accurate approvals for EVCS installations. Through the training sessions, Plug-in SD was able to engage and educate approximately 70 attendees in total. The attendees included building officials, building inspectors (electrical, structural, combination and construction), engineers (electrical, fire protection and mechanical), planners, development technicians, plans examiners, conservation and transportation managers. There was representation from ten of the 19 jurisdictions in the San Diego region at the training workshops. An individual from EsGil Corporation¹, who provides on-site staffing to the Building Divisions in a handful of cities within San Diego County, was in attendance at the Central San Diego workshop as well. The general attendance numbers were proportional to the size of the jurisdictions with greater representation from larger jurisdictions. Training sessions were held at the following locations and dates listed below:

- North County Inland Workshop –City of Escondido- May 17, 2016
- Central San Diego Workshop –City of San Diego-May 19, 2016
- North County Coastal Workshop –City of Carlsbad-May 24, 2016
- South Bay Workshop –City of Chula Vista -May 26, 2016
- East County Workshop –City of El Cajon-June 2, 2016

¹ [EsGil Corporation Website](http://www.esgil.com/) http://www.esgil.com/

Because not all jurisdictions were able to attend a workshop, CSE met individually with the remaining cities to ensure that all 19 jurisdictions received training and information on Plug-in SD resources. The workshops and individual city meetings helped to refine the correction sheets and identify areas for future training and/or resources for local jurisdictions related to EVCS. Some of these areas included training for dealers who sell PEVs on the requirements of installing charging at home, information on on-street parking, and guidance on accessibility requirements. In general, the staff appreciated diagrams and photos of installations to better understand how code requirements apply to certain situations.

Installation Process

Through Plug-in SD, SANDAG and CSE developed guidance and resources for EVCS installers, local government staff, and contractors in order to offer regionally consistent guidance and better understanding of the process for installing EVCS at workplaces, public sites, and MUDs.

Development and Distribution of EVCS Installation Guidance

Plug-in SD resources on the installation of EVCS include a Best Practices Report and Checklists. Each of these resources is further described below.

Installation Best Practices Report

SANDAG and CSE completed the Installation Best Practices Report early in the project timeline in order to inform the development of the installation checklists. The report includes:

- A review of codes and standards relating to EVCS installations
- An overview of common installation challenges in different scenarios
- Best practices to assist local building departments and electrical contractors to prepare for the anticipated increase of EVCS installations

EVCS installation best practices presented in the report derive from those currently in place through San Diego region local governments, the Readiness Plan, and the Governor's Office of Planning and Research ZEV Guidebook. These best practices include:

- Standardization of EVCS building codes and installation requirements
- Training for electrical contractors
- EVCS installation guides and checklists
- EVCS encouragement programs

Installation Checklists

The installation checklists are for use by contractors and local government staff to ensure installations of EVCS are done safely, consistently, and in compliance with relevant codes. The checklists cover three installation types (residential, non-residential, and MUDs), and cover the following topics: submittal requirements, pre-installation work, equipment and scheduling, and installation. Local jurisdictions are able to customize the checklists for their specific processes with assistance from the EV Expert and make them available on their websites as a resource for the public.

EVCS Siting

SANDAG and CSE worked to engage and inform PEV stakeholders on MUD-specific resources, and to encourage potential MUDs EVCS hosts to utilize the technical assistance on the EVCS siting process available from the EV Expert.

Promotion of EV Expert Technical Assistance and Resources for EVCS Siting at MUD's

Plug-in SD outreach and informational materials specifically targeting the MUD community included a set of PowerPoint slides and a sell sheet describing the EV Expert services available to MUDs. SANDAG and CSE distributed the flyer to stakeholders via email and in-person at community events, including EV Day. The PowerPoint slides were used as reference materials for MUD-specific EV Expert inquiries and for presentations to MUD stakeholder groups, including the San Diego County Apartment Association and City of San Diego Community Planners Committee.

Plug-in SD successfully engaged potential EVCS hosts at MUD's through close coordination with San Diego Gas & Electric (SDG&E)². As customers contacted SDG&E regarding the Power Your Drive program, SDG&E would put some customers that were not eligible for the program in contact with the EV Expert in order to offer information on other EVCS solutions for the MUD property.

Technical Assistance from EV Expert

Through the development of an EV Expert, SANDAG and CSE provided direct technical assistance on EVCS permitting and inspection, installation, and siting to local government staff, contractors, potential EVCS hosts, and other stakeholders.

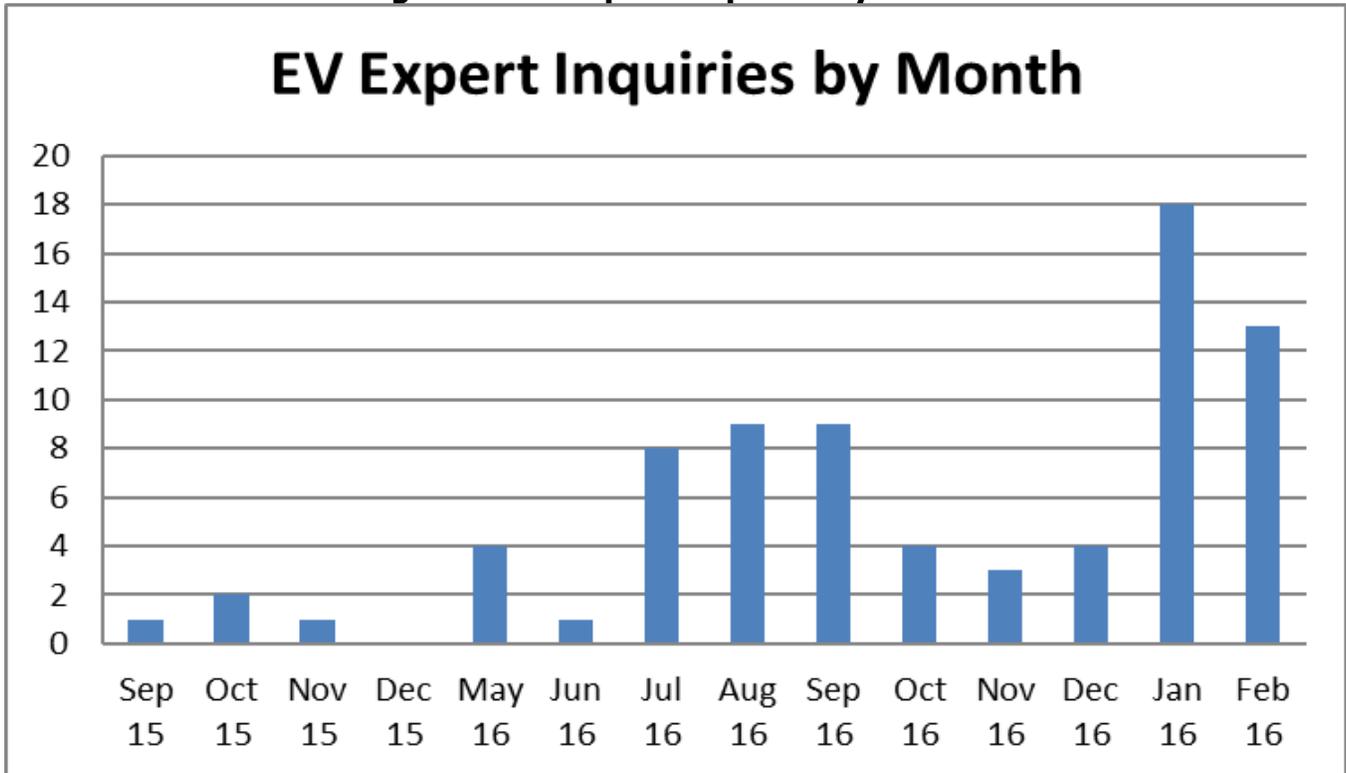
EV Expert Promotion and Standard Operating Procedure

Through Plug-in SD, SANDAG and CSE developed an EV Expert promotion plan and Standard Operating Procedure to disseminate the EV Expert services and respond appropriately to EV Expert inquiries. Plug-in SD conducted outreach through web and email blasts, attendance at meetings and events, referrals from other programs related to energy efficiency, and coordination with SDG&E Power Your Drive Program.

In addition to web blasts and word of mouth, Plug-in SD was able to leverage existing SANDAG and CSE programs as channels to disseminate EV Expert Services. Furthermore, coordination with San Diego Gas and Electric (SDG&E's) Power Your Drive allowed interested parties who did not meet the utility's' Power Your Drive Program requirements to be referred to the Plug-in SD EV Expert. Figure 1 shows the number of EV Expert inquiries received by month.

² [San Diego Gas and Electric Website](https://www.sdge.com/) <https://www.sdge.com/>

Figure 1: EV Expert Inquiries by Month



With an increased demand for EV Expert assistance, CSE developed an EV Expert Standard Operating Procedure to streamline inquiry response times. The EV Expert Standard Operating Procedure for inquiries was comprised of four stages outlined below:

- Stage One – Inquiry, allowed EV Expert staff to understand the inquiry needs, ensured that EV Expert services met the inquiry needs, and analyzed the level of response needed.
- Stage Two- Categorization placed each inquiry into either basic, intermediate or complex categories based on the amount of effort required for the inquiry. If the inquiry was “very basic” then Plug-in SD staff were able to use existing resources to answer inquiries. EV Expert staff was then assigned inquiries.
- Stage Three – Research and Response Development, varied widely in the amount of research and types of responses required. As the project progressed, early research and resource identification was leveraged to expedite the delivery of new responses.
- Stage Four – Delivery and Wrap Up delivered responses to the inquiring party and followed up with an EV Expert services survey.

The Plug-in SD EV Expert Response Documents included a compilation of Plug-in SD resources and recommendations of best practices to support EVCS deployment, including siting and installation, pricing, and employee/resident use policies. EV Expert responses ranged from simple emails to fully customized reports, with templates created for different types of responses. Table 1 shows the number of inquiries received and the level of complexity associated with the inquiry.

Table 1: EV Expert Levels of Inquiries

Level of Inquiry	Count
Initial Interest; no follow-through	17
Basic	33
Intermediate	10
Complex	1
Active	10
Intermediate/Complex	2
Complex/Active	2
Intermediate/Active	2
Total	77

Source: Source: Plug-In SD

Remote and In-Person EV Expert Consultations

The EV Expert provided technical assistance through remote and in-person consultations. SANDAG and CSE promoted the availability and technical assistance of the EV Expert through direct communications with local governments (including the workshops described above), contractors, potential EVCS hosts, and other stakeholders. Furthermore, EV Expert services provided remote access to the EV Expert via email and phone (during published hours) and responded to inquiries within one business day.

Most inquires covered multiple topics, ranging from code requirements to information on funding programs to selecting equipment. One common topic was incentives as budget is often a limiting factor for interested site hosts to move forward with installing charging at their locations.

Many inquiries involved questions about charging station brands, specifications, and network options. The EV Expert served as an unbiased third party and was able to develop a list of major brands and vendors to help inquiring parties navigate their options.

The EV Expert received additional questions related to selecting the best sites for charging at publicly owned sites within a jurisdiction as well as the physical siting of chargers in a parking lot, for both municipal and privately owned sites. Questions related to the requirements of the California Green Building Standards Code for new construction came up in the discussion about the number of spaces that should be dedicated to charging. EV charging space accessibility requirements was another topic that the EV Expert provided information on. In addition to code requirements, questions about policies such as price and time limits for charging were frequently asked. The Plug-in SD EV Expert also received inquiries from PEV owners living in mobile home communities experiencing issues with charging and accessing the appropriate utility rates.

As the program progressed, frequently asked questions frequently asked questions were posted online and available during in-person consultations. Plug-in SD also generated monthly reports of all EV Expert consultations and kept a log so that past inquiries could be referenced for future inquiries similar in nature.

The EV Expert Summary Report provides a description of the EV Expert process, outreach methods, inquiries and tracking, common topics and responses, and a conclusion and next steps.

Survey of EV Expert Effectiveness

SANDAG and CSE conducted a survey to evaluate the effectiveness of the EV Expert in providing technical assistance that addressed barriers faced with regard to EVCS permitting and inspection processes, installation, and siting. Although the number of surveys returned does not represent a complete sample of the EV Expert consultations provided through Plug-in SD, the survey responses provide an overall snapshot of the effectiveness of the technical assistance service.

Beginning in August 2016, EV Expert staff emailed out the Effectiveness Survey as follow-up to inquirers. The EV Expert Log served as a tracking mechanism to note when the survey was emailed to inquirers following receipt of EV Expert technical assistance. Out of 27 effectiveness surveys sent to inquirers as of February 28, 2017, 14 responses to the survey have been received. Responses to the survey were described in the EV Expert Effectiveness Report and Summarized in Project Results 2.2 below.

PEV Awareness

In order to expand PEV awareness in the region, SANDAG and CSE engaged in presentations and training with PEV dealership and employer channels. Outreach included information on PEV features, benefits of the vehicles, available incentives, utility rates, and regional planning in support of EVCS.

Dealership Education and Outreach

Originally, SANDAG and CSE planned to develop an updated informational brochure for PEV new car dealerships. However, after an informal survey of local dealerships, CSE discovered that most dealerships preferred some sort of training for sales staff. SANDAG and CSE decided to change the approach and create an online training module rather than printed collateral. To further ready the San Diego region for PEVs, dealership awareness activities served to ensure the new car dealerships selling PEVs have a current understanding of PEV incentives and PEV charging characteristics, including availability of charging in the region.

SANDAG and CSE leveraged feedback from previous efforts to create an updated sell sheet and interactive web modules, highlighting PEV benefits and resources. CSE then distributed sell sheets, flash drives preloaded with the web modules and informational materials to dealers through individual visits and coordination with San Diego County New Car Dealers Association.

The Plug-in SD Dealership Awareness Summary Report includes the number of physical sell sheets distributed, metrics on web resources highlighted in materials, and recommendations for future outreach efforts to dealerships.

Workplace Seminars

Plug-in SD sought to provide education on PEVs to consumers through workplace seminars and to facilitate an increase in employers adopting PEV-friendly policies, including installation of EVCS. SANDAG and CSE targeted employers based on the need for workplace charging to extend the range of PEVs and to fill a gap in charging infrastructure needs for individuals who may not have access to charging at home.

Through Plug-in SD, SANDAG and CSE conducted eight presentations to employers, employees, and the general public in the San Diego region. The presentation formats included lunch and learns, coordinated webinars and networking events in conjunction with iCommute³ efforts, and public outreach events in San Diego County. Attendance at the presentations included employees from the County of San Diego, Port of San Diego employees, Port of San Diego tenants (a group of 20 employers), and employees of Alexandria Properties (a group of 5 employers). Additionally, Plug-in SD used a booth format at three public facing events. Topics covered at the presentations included available technologies, the benefits of PEVs, parking management, and options for PEV charging policies and management. Plug-in SD received positive feedback from the workplace presentations.

Project Results

Support for Local Jurisdictions

Plug-in SD conducted five sub regional on-site trainings for local government staff in the San Diego region. The trainings provided local government staff guidance on improving the permitting and inspection process to ensure EVCS installers, contractors, and end users can receive timely and accurate approvals for EVCS installations. Through the training sessions, Plug-in SD was able to engage and educate approximately 70 attendees in total. The attendees included building officials, building inspectors (electrical, structural, combination and construction), engineers (electrical, fire protection and mechanical), planners, development technicians, plans examiners, conservation and transportation managers.

At the completion of the trainings, surveys were distributed to identify future training needs and assess the value of the workshops. Most respondents found the trainings very helpful in equipping local governments with the tools to meet Assembly Bill 1236⁴ requirements and saw value in utilizing Plug-in SD resources to minimize staff time and improve consistency. Follow-up emails were sent to all registrants and attendees with all of the resources covered during the training and access to the PowerPoint slides that included active links and additional notes supporting information covered throughout.

Following the trainings, SANDAG and CSE met with staff from seven cities that were unable to attend a sub-regional training. The individual city meetings were valuable to both the city staff and Plug-in SD; city staff was able to have their individual questions answered and provide more thoughtful comments on the Plug-in SD resources available and future needs to support local jurisdictions with EV charging.

EV Expert Inquiries

Through Plug-in SD, EV Expert staff provided responses to 77 inquiries, that is shown in Table 2 below, as of February 28, 2017, on EVCS permitting and inspection, installation, and/or siting with local government staff, contractors, and/or potential EVCS hosts. The majority of inquiries came from MUDs and workplaces. Local governments and public agencies followed. The following table shows the number of inquiries coming from each category. EV Expert then offered recommendations during consultations based on the Plug-in SD permitting, inspection, and installation resources, and additional resources on MUDs EVCS installations.

³ [Commute Sandbag Website](https://www.icommutesd.com/) <https://www.icommutesd.com/>

⁴ [California Legislative Website](https://leginfo.ca.gov) <https://leginfo.ca.gov>

Table 2: Types of EV Expert Inquiries

Type of Inquiry	Count
MUDs	19
Local Government	9
Other Public Agency	5
Single Family	9
Workplace	13
WP and SF	2
Commercial/Retail	12
WP/Commercial/Retail	6
Other	2
Total	77

Source: Source: Plug-In SD

EV Expert Survey

Plug-in SD’s EV Expert provided information and resources to a multitude of properties to help them move forward in installing EV charging. Table 3 displays the type of facility or property the inquirer represented.

Table 3: Survey Responses – Facility Type Represented

Effectiveness Survey Respondents	Count
Public agency	4
Workplace	3
Multifamily residential community	2
Commercial/retail	1
Other *	4
Total	14

Source: Source: Plug-In SD

Ninety-three percent of survey respondents (13 out of 14) rated the quality of the technical assistance they received as excellent. The same number of survey respondents indicated that they learned ‘A lot’ about EV charging resources and that they would recommend the EV Expert to colleagues and other industry peers. As shown in Table 4, many respondents felt confident to proceed with their EV charging installation after the experience with Plug-in SD’s EV Expert. The one negative response included comments that were not directed towards the EV Expert service, but rather directed towards SDG&E and the utility provider’s investment in charging at multi-family communities rather than public charging.

Table 4: Survey Responses – Confidence to Proceed

Value	Percent	Count
Yes	57.1 percent	8
No	7.1 percent	1
Unsure	7.1 percent	1
Other* - Write In	28.6 percent	4
Total	100 percent	14

Source: Source: Plug-In SD

Survey respondents were asked to write in responses pertaining to what additional resources would help them move forward with EV charging. This question was not a required survey question, but the majority of respondents asked for information on incentives available to cover both for purchase of equipment as well as installation. Suggestions for additional support following the EV Expert consultation highlighted the desire for a site walk after understanding costs. The Table 5 captures the noted topics and resources.

Table 5: Survey Responses – Additional Resources

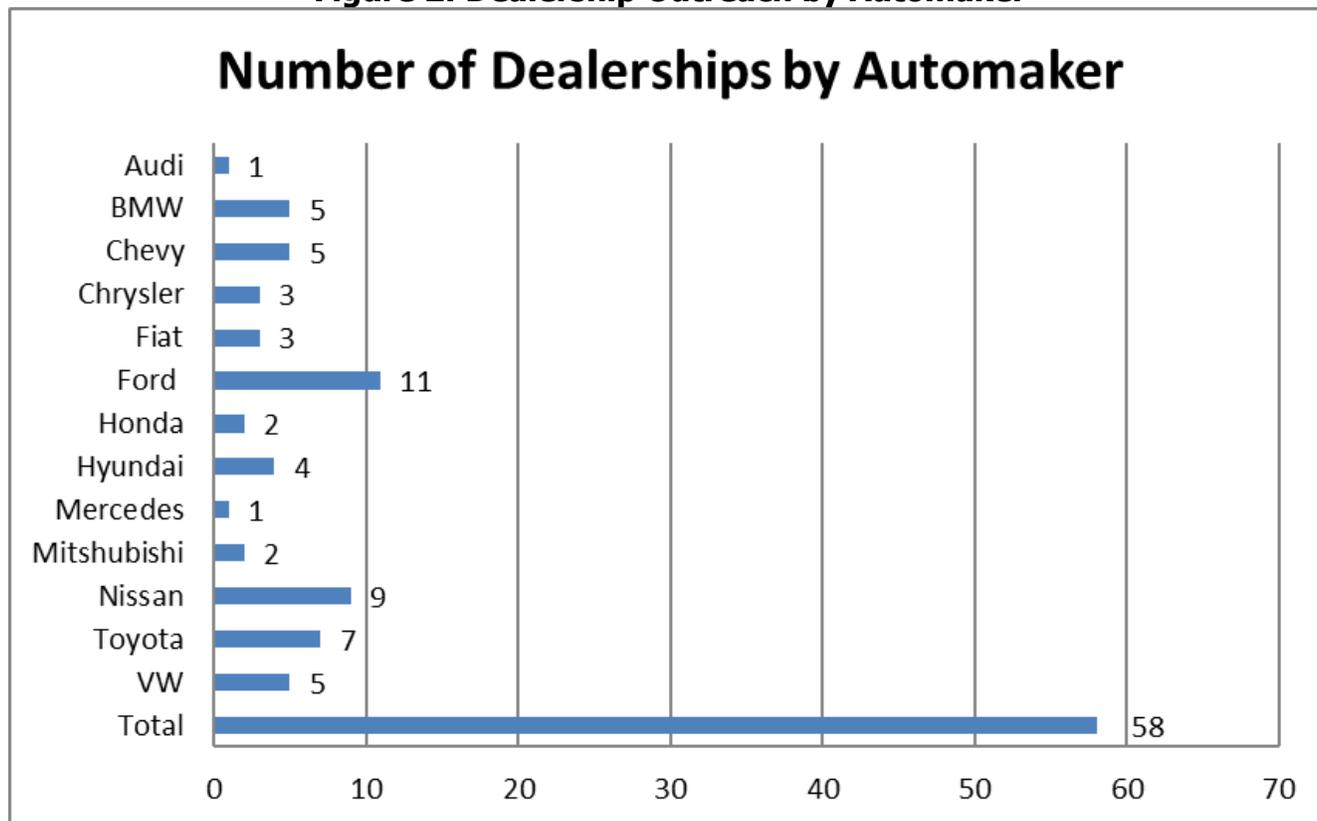
Additional Resources Survey Respondents Noted	Count
Funding (Rebates, grants, incentives)	5
Pricing policy	4
Vendor information	4
Recommendations on monitoring/service plans	1
Site walk to identify charger locations	2
Comparison table of various charging tools (consistent units of measurement such as defining amps)	1

Source: Source: Plug-In SD

Dealership Outreach

At the basic level, Plug-in SD staff reached over 93 percent or 58 of the 62 dealerships selling PEVs in the San Diego region. The dealerships represent 13 different automakers as shown in the Figure 2.

Figure 2: Dealership Outreach by Automaker



Source: Plug-In SD

In reaching those dealerships through Plug-in SD, staff was able to:

- Confirm or raise awareness of PEV incentives with each dealership;
- Raise awareness of the importance of PEV incentives (financial and non-financial) with each dealership; and
- Provide access to online training modules aimed at educating the least informed salespersons.

Most dealership managers mentioned that any resources are helpful, particularly for the customer, and that information coming from a third party has value when provided to customers. Despite this information, there was very low apparent follow through and use of the eLearning modules based on analytics for the webpage that hosted the modules. As of February 12, 2017, there were 28 unique eLearning page visits and average visitation was just over four minutes. It is possible that some dealerships, as they indicated was their intention, showed the eLearning modules during regular staff meetings / training sessions and that the total numbers of viewers of the eLearning modules is somewhat higher.

Workplace Outreach

Overall, the Plug-in SD workplace seminars and events reached 82 employers and over 300 individuals informing them on PEVs. Through this effort SANDAG and CSE identified a need for on-going outreach and marketing to raise awareness of PEV benefits and accelerate PEV adoption.

CHAPTER 3:

Advancements in Science and Technology

Plug-in SD Role in Helping End-users Adopt New Technology

With the growing PEV market, the need for EV Expert services is expected to increase. According to the California Statewide Plug-in EV Infrastructure Assessment, the San Diego region will need between 9,000-15,000 workplace charging ports and 1,800-4,200 public charging ports by 2020⁵. This region should also expect 100,000-150,000 PEVs by 2025 to meet the statewide goals. State goals for renewable energy and zero net energy buildings will add more complexity to the EV charging landscape, as will the adoption of EVs into government fleets, transit agencies, and transportation network carriers. The increase in number of available vehicles makes and models will also influence EV adoption and demand for charging installations.

Further planning and analysis will help inform charging deployment in the region but will not reduce the need for one-on-one technical assistance for local jurisdictions, property owners, and other potential EVCS site hosts. Technical assistance must continue to grow and adapt to new challenges to meet these larger scale market needs.

CHAPTER 4:

Project Successes and Observations

Measuring Success of the Project

The goal of Plug-in SD was to implement the recommendations made by the Readiness Plan, to streamline permitting, improve the EVCS installation process, and assist in siting EVCS, while increasing awareness of EVCS and PEVs in general. The resources developed and technical assistance provided through Plug-in SD allowed the project to achieve this goal.

Achievement of Plug-in SD Project Goals

Table 6 describes project achievements as they relate to the project goal as described in the Agreement.

Table 6: SANDAG ARV-14-036 Agreement Project Goal

1.	GOAL: The goal of this Agreement is to implement recommendations made by the Readiness Plan, to streamline permitting, improve the EVCS installation process, and assist in siting EVCS, while increasing awareness of EVCS and PEVs in general.	100 percent
	EXPLANATION: Through the resources developed, trainings held, and technical assistance provided, Plug-in SD achieved the goal of this agreement. Further, due to the success of the EV Expert component, Plug-in SD will continue to offer this service, as well as new PEV readiness resources, through a subsequent agreement with the Energy Commission.	

Source: Source: Plug-In SD

Achievement of Plug-in SD Project Objectives

Table 7 describes project achievements as they relate to the project objectives as described in the Agreement.

Table 7: SANDAG ARV-14-036 Agreement Project Objectives

1.	OBJECTIVE: Streamline the EVCS permitting and inspection process through training and technical assistance to municipal staff.	100 percent
	EXPLANATION: Resources developed for permitting and inspection of EVCS included a best practices report, correction sheets, and website language guide. All 19 jurisdictions in the San Diego region received training on the Plug-in SD resources through sub-regional trainings and in-person meetings. With the requirements of AB 1236, by September 2017, all jurisdictions will have adopted a streamlined permitting process for EVCS. In the San Diego region, jurisdictions are able to use Plug-in SD deliverables to fulfill these requirements.	
2.	OBJECTIVE: Provide new resources to educate municipal staff, contractors, and end users on the installation process.	100 percent
	EXPLANATION: Through Plug-in SD, an installation best practices report and checklist were developed and provided to municipal staff, contractors, and end users. These resources were distributed through sub-regional workshops, in-person meetings with jurisdiction staff, and in response to EV Expert inquiries.	
3.	OBJECTIVE: Establish a regional EV expert who can provide direct technical assistance on EVCS deployment in all the above areas. The effectiveness of this approach will be evaluated through surveys of municipal staff by the Recipient and documented as part of project reporting by the Recipient.	100 percent
	EXPLANATION: SANDAG and CSE established the EV Expert as an on-demand technical resource managed by staff at CSE. The EV Expert had a dedicated email address and phone line, responded to inquiries promptly, and documented interactions through monthly progress reports. EV Expert provided responses to 77 inquiries, as of February 28, 2017, on EVCS permitting and inspection, installation, and/or siting with local government staff, contractors, and/or potential EVCS hosts. An EV Expert Effectiveness Report summarizes the results of surveys of EV Expert inquirers. Based on the positive feedback and value seen in the EV Expert, SANDAG and CSE plan to continue the service through a subsequent Energy Commission agreement.	
4.	OBJECTIVE: Increase awareness of PEVs by providing new car dealers with informational materials and through direct workplace promotion of PEVs and EVCS.	100 percent
	EXPLANATION: Through Plug-in SD, a web-based training module was developed for dealerships that sell EVs. The training module covers key questions related to PEVs and EVCS. Plug-in SD staff reached over 93 percent or 58 of the 62 dealerships selling PEVs in the San Diego region. As of February 12, 2017, there were 28 unique eLearning page visits and average visitation was just over four minutes. Workplace seminars and events reached 82 employers and over 300 individuals informing them on PEVs.	

Source: Source: Plug-In SD

Project Observations

EVCS Permitting and Inspection

Plug-in SD's work with local jurisdictions highlighted the need for continued engagement on several topics to answer further questions about PEVs and EVCS, adapt Plug-in SD resources

to city-usable formats, and support Assembly Bill 1236 implementation. Cities suggested a few additional resources that could be valuable in their understanding of PEV permitting. Example site plans or templates that cities can provide to applicants could help installers with consistent submittals across the region. Diagrams and layouts illustrating accessibility scenarios would help plans examiners better visualize the requirements. More pictures of different installations that highlight common corrections could help inspectors, especially those who have not seen many installations.

Cities expressed that load calculations are often a problem for homeowners to complete. More examples of load calculations would be beneficial to homeowners as well as for more complex commercial and multifamily installs. More information is needed especially for larger projects that use new adaptive load management technology. Cities need guidance on how these technologies work and can be permitted within existing load calculation requirements as these load management technologies allow greater load than normally would be allowed.

Following through to adoption

Consistent engagement with cities is necessary to ensure that the resources provided are beneficial and can assist in streamlining processes as envisioned by the Plug-in SD project and Assembly Bill 1236. The smaller cities generally wait to take action until they have seen what the bigger cities in the region have done. This is both practical given the resources that smaller cities have as well as useful for regional consistency. Plug-in SD can serve as a conduit to share what the larger jurisdictions have done with the smaller ones. The model ordinance language that California Building Officials prepared was shared with all of the cities in the San Diego region by Plug-in SD as an additional resource.

Both the workshops and individual meetings were valuable learning opportunities for general education on EVCS permitting and installation issues. Plug-in SD gained valuable feedback directly from the appropriate local government staff. Additionally, these meetings allowed for relationship building and catalysts for cities to meet goals of their Climate Action Plans and sustainability metrics. The individual meetings reiterated needs expressed in the sub-regional workshops for additional tools such as example site plans, installation scenarios, and load calculation templates.

Meeting individually with the cities who could not attend the sub-regional workshops provided significant value. Not only was it easier to get the right people at the table, but this method also allowed for more staff overall to attend when Plug-in SD could participate in pre-existing city staff meetings. The meetings allowed for opportunities to receive direct feedback on areas where additional work is needed to accelerate adoption of EVs and infrastructure. This feedback was received at workshops as well, but the in-person meetings allowed more organic conversation and open dialogue on areas such as legislation and technology advancements.

Staff was very interested in learning about the new technology and asked questions outside the basics of charging. It was clear that city staff did not have the resources or impetus to address these issues without the help from Plug-in SD. In-person meetings rather than workshops allowed for more personal technical assistance and discussions on awareness and market trends and the positive environmental impacts of cleaner vehicles while highlighting the need for infrastructure to support these vehicles.

In future work, Plug-in SD staff can ideally serve as an extension of staff to the cities, which will be beneficial in driving regional consistency of permitting and inspection processes of

EVCS installations and support implementation of best practices to ensure all local stakeholders are ready for the growing numbers of PEVs.

EV Expert

Although the EV Expert was effective at addressing many different types of questions, there were certain barriers to EVCS installations that the EV Expert could not fully resolve. These barriers are outlined below with suggestions on how they could be addressed.

Expensive Installations

The cost of installation was a barrier for many situations. Many inquiries came through SDG&E's Power Your Drive because they exceeded SDG&E's budget cap, and inquirers were only interested in EV charging when it came highly subsidized. The EV Expert provided information on current and expected incentives, but with a limited number of incentives available, price remains a major barrier. To address this barrier the EV Expert can focus on how to make installations cost effective and demonstrate a return on investment based on fees for charging or show that the investment is relatively small compared to the benefits it provides. If future funding programs do become available EV Expert staff can use the EV Expert tracking log to notify potential hosts. As the market matures, more site hosts should be willing to install EVCS without incentive funding, but they would still need technical support to do so.

Electrical Issues

The next step after the EV Expert response for most inquirers was to obtain a full electrical evaluation. The available power capacity on site can often drive the ultimate size of a charging system. The EV Expert did not perform extensive load calculations for site hosts but encouraged inquirers to use a licensed electrical contractor. After a facility has a licensed electrician go through an electrical evaluation to perform load calculations and determine electrical capacity, the EV Expert can offer more information on hardware solutions and management practices to make the most of the available capacity or planned upgrades. National and even statewide resources do not include utility-specific best practices. The EV Expert can continue to provide value by putting these broader resources into the context of the local utility environment including applicable tariffs, grid management goals, integration with renewables, and other topics.

Mobile Home Parks

One unexpected area of interest was from mobile home parks. Most mobile home parks are on a single utility meter and use non-utility sub-meters. Due to this metering arrangement, mobile home park residents may have trouble installing a level 2 charging station and do not have access to time-of-use rates. Inquiries were referred to a Public Utility Commission approved pilot program that offers upgrades to individual metering, but this program was fully subscribed. Plug-in SD could encourage the inclusion of mobile home parks in future EV charging programs.

Planning and Deployment Goals

Other issues brought to the EV Expert's attention included a lack of clearly defined regional planning goals past 2020 and 2025. Local cities expressed interest in better understanding their EV charging deployment and installation goals to meet sustainability goals for the city, fill the existing gaps in charging, and accommodate the increasing numbers of vehicles expected in the market.

CHAPTER 5:

Project Conclusions and Recommendations

Project Conclusions

The resources developed and technical assistance provided through Plug-in SD were well received by local governments, property owners, SDG&E, and other EV stakeholders. Fortunately, SANDAG and CSE are able to continue these services through a new award from the CEC. The work done under Plug-in SD to date will be built upon and refined during the project's continuation.

EV Expert

EV Expert consultations have served as the only unbiased, no cost technical resource to San Diego region stakeholders looking to move forward with EV charging while also augmenting existing programs, such as SDG&E's Power Your Drive. Through Plug-in SD, the EV Expert service has demonstrated the ability to fill an important gap for stakeholders interested in moving forward with EV charging. The continued growth of EVs will continue to fuel the demand for more EVCS in public settings, workplaces, and MUDs. Factors such as physical layout, technology specifications and capabilities, property owner rights and obligations, third-party operations, procurement requirements, and others continue to create a challenging, and often confusing, situation for EVCS hosts to navigate. Without active and responsive technical assistance, potential EVCS hosts would continue to move slowly without fully understanding the various requirements of designing, selecting, installing and operating EVCS.

The proliferation of EV charging programs (EVgo⁶ REV⁷, Power Your Drive), EV Service Providers, EVCS technology, general resources, and guides has created an environment in which potential EVCS hosts must conduct significant research and dedicate considerable time to making determinations on how best to move forward for their specific situation. Recognizing that no two situations are exactly the same, the EV Expert can assist a potential host in evaluating layout, physical infrastructure, stakeholder needs/wants, culture, and other individual considerations. As an unbiased, unaffiliated resource, EV Expert provides timely information, analyses and recommendations specific to stakeholders' particular needs, helping to speed EV charging market development.

PEV Awareness

Direct experience with PEV awareness activities in the San Diego region continues to show that the general awareness of PEVs, and particularly of EVCS, remains low. For example, during engagement on EVCS permitting with local governments, SANDAG and CSE discovered a need for general education on PEV and EVCS technology and availability in addition to the details of permitting and inspection requirements. This low level of awareness is particularly prevalent in underserved communities. Underserved communities are vital in moving the PEV market and adoption of electric cars beyond first adopters and into the mainstream. The continued growth of PEVs will fuel the demand for more EV charging in public settings, workplaces, and MUDs. Thus, through the continuation of Plug-in SD, SANDAG and CSE will

⁶ [EVgo Website](https://www.evgo.com/) <https://www.evgo.com/>

⁷ [REV For Life Website](https://www.revgroup.com/) <https://www.revgroup.com/>

focus on awareness and education to MUDs, local government, fleet managers, facility managers, and workplaces with targeted efforts for disadvantaged communities.

In order to achieve state goals for PEV adoption, awareness efforts need to lead to interest, consideration, and ultimately adoption of PEVs and EVCS. For PEV awareness efforts to successfully lead to adoption there is a need for multiple touches and ongoing engagement. Past awareness efforts have successfully raised the level of awareness of PEVs in many workplaces and MUDs, but ongoing efforts are still needed to transform that awareness into real interest and consideration of PEVs and EVCS.

Project Recommendations

SANDAG and CSE will jointly implement the continuation of Plug-in SD and the EV Expert will be a primary focus for the future. The recommendations below will be used to inform the next phase of the project.

Outreach and Engagement

To improve effectiveness of future outreach, Plug-in SD can expand on existing outreach methods and evaluate which groups to better tailor marketing efforts towards. For instance, Plug-in SD could extend services to other trade associations, utilize local governments as a conduit to the community, coordinate with other programs targeting the MUD community, or make better use of social media.

While referrals from SDG&E provided leads on interested workplaces, many of these referrals chose not to move forward with charging because the infrastructure was not being subsidized. SDG&E provided presentations as a major part of Power Your Drive's lead generation and outreach effort reducing the need for Plug-in SD to conduct an initial seminar or additional presentations to workplaces. In the future, Plug-in SD and SDG&E can better coordinate on general outreach and communications. Plug-in SD can build upon past iCommute coordination in hosting additional events to reach other workplaces and businesses on a more regular basis.

Positioning EV Expert Service for Future Success

With more than 70 inquiries completed, the EV Expert Program has been a key enabler of regional EVCS deployment. More work is needed to expand the reach of the EV Expert to support even greater deployment of EVs and infrastructure for the region. Plug-in SD can continue to work with local jurisdictions interested in expanding infrastructure at both their own facilities and throughout the community to ensure that the region can support PEV growth. The EV Expert can focus on implementing solutions to the limitations discussed during inquiries as well as taking the steps outlined below to be well positioned to meet future needs.

Expanding Outreach

The EV Expert was not actively promoted during the early stages of the Plug-in SD program because a Standard Operating Procedure for handling these inquiries had not been established. With more sustained outreach and promotion, the future EV Expert service could reach more people and the existing Standard Operating Procedure can be improved through the lessons learned from the EV Expert consultations that occurred. Some referrals came from consumers participating in the Clean Vehicle Rebate Project, and these will continue, and sometimes lead to engagement with the property managers or workplaces of the consumer.

The use of partnerships was an important source of referrals, including the SANDAG iCommute program and SDG&E's Power your Drive Program. These partnerships should be continued and

strengthened to extend the reach of the EV Expert. The EV Expert has also begun to build a partnership with the San Diego County Apartment, including placing an article in their newsletter and participating in the San Diego County Apartment Education Expo. The EV Expert could be further promoted to San Diego County Apartment members as well as other organizations such as the International Facilities Managers Association, Chambers of Commerce and other relevant trade groups.

Solving More Problems

Expanded outreach should be matched with the capability to provide quick and effective service. This can be accomplished through enhanced resources. Sections of EV Expert Response Documents are often leveraged across multiple responses. As common questions become clear, the answers could be formatted into stand-alone best practice documents. These documents could be promoted to potential site hosts with similar circumstances with one-on-one EV expert assistance still available to answer site-specific questions.

The website frequently asked questions should continue to be updated with more information and resources, along with improved filter options to allow visitors a better opportunity to “self-service” their EV charging resource needs. Continued EV Expert service also presents the opportunity to dig deeper into certain subjects, such as best practices for integration of EV charging with renewables, or load management strategies for larger scale workplace charging.

Incentive Programs

Incentive programs play an important role in encouraging EVCS installations and were a frequent topic for EV Expert inquiries. SDG&E’s Power Your Drive Program and other proposed programs help to meet some of the increased demand for EV charging, however, these programs are continually changing. As the Power Your Drive Program enters its installation phase, the NRG settlement for make-readies (installation of all electrical infrastructure up to a make-ready stub that the charging equipment would connect to) is coming to an end. New utility programs are being proposed at the same time the Volkswagen Clean Air Settlement will be making an unprecedented new investment in charging infrastructure. Equitable distribution of charging infrastructure in the region is integral in ensuring that EV charging is accessible to communities of all income levels. Additional investment of infrastructure in low-income areas is needed and incentives will increase accessibility to clean vehicles and EV charging. The EV Expert can stay up to speed on the status of all incentive programs, connect potential site hosts to the most relevant programs, and equip them with the information to move forward with EVCS installation.

Regional Planning and Analysis

Through Plug-in SD, SANDAG and CSE found a need for more robust planning for EV infrastructure needs. Local jurisdictions asked for how they can plan and identify key locations for EVCS in their community and prepare for future infrastructure funding opportunities, particularly for disadvantaged communities. SANDAG will also be planning for an incentive program to provide rebates for EVCS installations and more robust mapping could inform that program.

In the continuation of Plug-in SD, effort will be put toward an infrastructure mapping and needs assessment, investment and incentives analysis, and disadvantaged communities’ assessment. These assessments and analysis would be used by SANDAG, local jurisdictions, and potential private organizations to guide EVCS planning and investment

GLOSSARY

CENTER FOR SUSTAINABLE ENERGY (CSE)— We are committed to creating strategies, advising on policies and administering programs with the goal of maximizing renewable energy adoption and distributed energy resources to help drive the decarbonization of transportation and the built environment in an economically affordable way.⁸

ELECTRIC VEHICLE CHARGING STATION (EVCS)— An electric vehicle charging station, also called EV charging station, electric recharging point, charging point, charge point, electronic charging station (ECS), and electric vehicle supply equipment (EVSE), is an element in an infrastructure that supplies electric energy for the recharging of plug-in electric vehicles— including electric cars, neighborhood electric vehicles and plug-in hybrids.⁹

ELECTRIC VEHICLE EXPERT (EV Expert)— believes that electric vehicles are the future and this site's aim is to provide all the information you need if you're looking to buy or are simply curious. We are an independent site looking to provide honest and realistic figures to ensure you have all the knowledge to make the decision that's right for you.¹⁰

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

MULTI-UNIT DWELLING (MUDS)—(also known as multi-dwelling unit or MDU) is a classification of housing where multiple separate housing units for residential inhabitants are contained within one building or several buildings within one complex. Units can be next to each other (side-by-side units) or stacked on top of each other (top and bottom units). A common form is an apartment building. Many intentional communities incorporate multifamily residences, such as in cohousing projects.¹¹

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.

PLUG-IN SAN DIEGO (Plug-in SD)— In July 2015, SANDAG launched Plug-in SD through a two-year California Energy Commission (CEC) grant. Plug-in SD implemented recommendations from the Electric Vehicle (EV) Readiness Plan through a combination of resource development, training, technical assistance through an EV Expert, and outreach.¹²

SAN DIEGO ASSOCIATION OF GOVERNMENTS (SANDAG)— This public agency serves as the forum for regional decision-making. SANDAG builds consensus; makes strategic plans; obtains and allocates resources; plans, engineers, and builds public transportation, and provides information on a broad range of topics pertinent to the region's quality of life.¹³

SAN DIEGO REGIONAL ELECTRIC VEHICLE READINESS PLAN (Readiness Plan)— identifies barriers to the deployment of PEV charging infrastructure and includes recommendations and

⁸ [Center for Sustainable Energy Website](https://energycenter.org) <https://energycenter.org>

⁹ [Wikipedia EVCS definition](https://en.wikipedia.org/wiki/Charging_station) https://en.wikipedia.org/wiki/Charging_station

¹⁰ [Electric vehicle expert definition](https://www.electricvehicleexpert.com/) <https://www.electricvehicleexpert.com/>

¹¹ [Wikipedia MUD definition](https://en.wikipedia.org/wiki/Multi-family_residential) https://en.wikipedia.org/wiki/Multi-family_residential

¹² [Plug-In SD](https://www.sandag.org/) <https://www.sandag.org/>

¹³ [San Diego Association of Government Website](https://www.sandag.org/index.asp?fuseaction=about.home) <https://www.sandag.org/index.asp?fuseaction=about.home>

resources for overcoming those barriers. This Plan is designed for local government officials, such as planners and building staff, as a resource to assist them in helping their local governments prepare for a growing PEV market.¹⁴

SAN DIEGO GAS AND ELECTRIC (SDG&E's)— has released a comprehensive sustainability strategy with specific, actionable commitments in the areas of environmental stewardship, clean transportation, grid modernization, community engagement and other company operations to help California achieve its clean energy ambition.¹⁵

ZERO-EMMISSION VEHICLE (ZEV)— Vehicles that produce no emissions from the on-board source of power (e.g., an electric vehicle)

¹⁴ [San Diego Regional Electric Vehicle Readiness Plan Document](https://energycenter.org/sites/default/files/docs/nav/programs/pev-planning/san-diego/7-DRAFT%20-%20SD%20PEV%20Plan.pdf)

<https://energycenter.org/sites/default/files/docs/nav/programs/pev-planning/san-diego/7-DRAFT%20-%20SD%20PEV%20Plan.pdf>

¹⁵ [San Diego Gas and Electric Website](https://www.sdge.com/) <https://www.sdge.com/>