CALIFORNIA ENERGY COMMISSION

California Energy Commission

Clean Transportation Program

FINAL PROJECT REPORT

Valley Takes Charge! Zero-Emission Vehicle Awareness Programs in the San Joaquin Valley

Prepared for: California Energy Commission

Prepared by: San Joaquin Valley Air Pollution Control District

San Joaquin Valley AIR POLLUTION CONTROL DISTRICT

Gavin Newsom, Governor

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Kevin Wood
Colette Kincaid
Primary Authors

San Joaquin Valley Air Pollution Control District
1990 E. Gettysburg Avenue
Fresno, California 93726
559-230-5816
San Joaquin Valley Air Pollution Control District Website
https://www.valleyair.org/Home.htm

Agreement Number: ARV-14-039

Donald Coe
Project Manager

Elizabeth John
Office Manager
ADVANCED FUELS AND VEHICLE TECHNOLOGIES OFFICE

Kevin Barker
Deputy Director
FUELS AND TRANSPORTATION

Drew Bohan
Executive Director

PREFACE

Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007) created the Clean Transportation Program, formerly known as the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP). 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 solicitation PON-14-603 entitled Zero-Emission Vehicle Readiness under the Clean Transportation Program on September 9, 2014. This first-come first-served grant solicitation was an offer to support new and existing planning efforts 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 Energy Commission's notice of proposed awards January 16, 2015, and the agreement was executed as ARV-14-039 on August 10, 2015.

ABSTRACT

The Energy Commission-funded project, Implementation of Zero-Emission Vehicle Awareness and Training Programs in the San Joaquin Valley, known as Valley Takes Charge! addressed the barriers to greater deployment of electric vehicle infrastructure in the San Joaquin Valley Region. This project was administered by the San Joaquin Valley Air Pollution Control District and conducted by the Center for Sustainable Energy. The project performed a survey on existing permitting processes, developed materials and offered trainings for permitting officials to streamline their processes in compliance with state legislation the. Valley Takes Charge! program also offered training for electrical installers to prepare them for increasing electric vehicle infrastructure deployment in the valley. In addition, the project included education for key decision-makers on the region's progress on electric vehicle deployment and the continued efforts needed to achieve widespread transportation electrification in the valley. Taken together, these actions addressed some key barriers to electric vehicle infrastructure deployment in the valley. Additional effort could further address remaining barriers and issues to accelerate the deployment of electric vehicles and charging infrastructure.

Keywords: Zero-Emission Vehicle readiness, EV permitting, training, Assembly Bill 1236, electric vehicle charging stations, EV awareness

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EXECUTIVE SUMMARY

The San Joaquin Valley Air Pollution Control District recognizes the adoption of electric vehicles as a key to addressing the region's air quality challenges. The district previously collaborated with the Center for Sustainable Energy to produce the San Joaquin Valley Plug-in Electric Vehicle Readiness Plan (May 2014) and Charging Roadmap: Siting Optimal Locations for Public Charging Stations in the San Joaquin Valley (May 2014). The plans analyzed the readiness of the region to adopt electric vehicles, identified key barriers and the best locations for electric vehicle infrastructure.

In order to implement the recommendations of the plan, The San Joaquin Valley Air Pollution Control District and Center for Sustainable Energy began this project, titled Implementation of Zero-Emission Vehicle Awareness and Training Programs in the San Joaquin Valley, in June 2016, under a grant from the Energy Commission. The Valley Takes Charge! project sought to address barriers such as the need for streamlined permitting processes, lack of education for electrical installers and low awareness among local decision-makers.

Project Survey and Toolkit Development

The project began with a survey of permitting agencies in the region to pinpoint the precise nature of the challenges and then designed toolkits with best practices for specific permitting challenges. The survey found that most building officials felt they had a good handle on electric vehicle permitting, however, the subject had not been a focus for many cities.

The survey revealed that permitting and inspection staff in the region hold a general enthusiasm for electric vehicles and understand their importance for air quality in the region. However, jurisdictions in the air district's boundaries have not prioritized the development of specialized processes or resources for electric vehicle chargers, likely because of the low numbers of applications received for electric vehicle infrastructure. Most jurisdictions felt electric vehicle infrastructure was served by existing permitting processes and did not present any challenges outside of some cases such as accessibility. Although many cities were aware of upcoming deadlines for streamlined permitting compliance under California Assembly Bill 1236, the deadlines for small cities were more than a year away at the time of the survey. Toolkit materials were developed to help cities reach Assembly Bill 1236 compliance.

The Valley Takes Charge! project created three main resources to help streamline permitting and installation of electric vehicle charging stations. The resources were the Checklist for Residential and Nonresidential Permit Application, the Plan Review and Permit Correction Sheet and the Installation Guidance Checklist. Taken together, these resources were meant to help cities work through a full project life cycle from project initiation, permit application and permit processing to installation and inspection. Versions were made to address both residential and nonresidential installations. The toolkits were distributed in trainings with agency permitting staff throughout the region. The project also distributed additional materials developed by California Building Officials.

Training and Permitting

The Valley Takes Charge! project launched a series of regional workshops to train public agency staff on the materials. The project team conducted five trainings with approximately 50 total attendees. These workshops faced attendance challenges due to low interest and competing priorities among permitting and inspection staff in the region. In order to drive attendance, the project team submitted the training for International Code Council continuing education credit and added slides on zero net energy topics. The trainings were promoted through International Code Council groups, email marketing and direct outreach to cities. Project staff also hand-delivered materials to several jurisdictions in the region.

The project also provided a hotline to be used by permitting officials for questions about the permitting and inspection process. This hotline was announced during trainings and further marketed through email. Through the hotline, Valley Takes Charge! project staff learned of permitting challenges that installers were facing in the Fresno area. The project team engaged with installers and city staff, identified the primary sources of permitting delays and provided guidance and best practice examples from other cities to address the delays.

The Valley Takes Charge! project also sought to engage electrical installers in the region, because developing a network of informed contractors is essential for increased electric vehicle infrastructure deployment in the valley. Since improper installations were identified as the primary source of delays by permitting officials, training contractors on proper installation procedures was another strategy supporting streamlined deployment.

Community Outreach

The Valley Takes Charge! project team focused on community colleges and regional occupational program classes with students who were just starting to explore becoming an electrician. These courses have a built-in attendance and could help train future generations of electricians working in the Valley on electric vehicle infrastructure. In the end, six presentations were made to 120 students. However, there remains a need to address the knowledge gaps of working contractors. Future efforts may build upon initial outreach from the Valley Takes Charge! project staff to the Joint Apprenticeship and Training Committee.

Lastly, the project team sought to increase awareness of electric vehicles and electric vehicle infrastructure in the region. Since other programs are doing consumer-focused outreach in the region, the Valley Takes Charge! project focused on outreach to elected officials and other decision-makers who can help address the barriers to greater EV deployment in the region.

The project staff organized four ride-and-drive events in conjunction with other regional meetings in Delano, Fresno, Merced and Modesto. These events gave key decision-makers the opportunity to appreciate the benefits of driving electric and provided a way to inform them about the need to support and increase the region’s electric vehicle adoption.

Project staff sought many other opportunities to provide information on electric vehicle efforts in the valley in a variety of formats, including presentations at Council of Governments meetings, participation in public workshops with the San Joaquin Valley EV Partnership and the Clean Transportation Center, and participation in National Drive Electric Week events. These

activities offered chances to share information and resources to drive electric vehicle infrastructure deployment in the valley, while also engaging with stakeholders to hear about conditions on the ground.

Throughout the project, the region achieved a large increase in electric vehicle deployment, driven in part by the availability of longer range and affordable electric vehicle options. With electric vehicle market growth, the valley is experiencing greater need for certain electric vehicle readiness efforts. Continued distribution of resources and toolkits created through the Valley Takes Charge! project would address permitting challenges that are now emerging. More trainings for electricians could ensure a knowledgeable workforce to meet the growing demand for electric vehicle infrastructure. Finally, continued marketing, outreach and education efforts will help the region achieve greater transportation electrification and address its air quality goals.

CHAPTER 1:
Project Background

San Joaquin Valley Air Pollution Control District oversees an eight-county region spanning almost 27,500 square miles within the California's Central Valley (see Figure 1 below). At its northern end the San Joaquin Valley borders the southern end of the Sacramento Valley, and to the west, south and east San Joaquin Valley extends to the edges of the valley floor. The region is the state's top agricultural producing region and is home to more than three million residents. This area also faces major air quality challenges. Over the past seven years the district has led and sustained varied efforts to improve air quality within the district's boundaries by removing barriers to the adoption of light-duty plug-in electric vehicles (PEVs) and encouraging their widespread use.

Figure 1: San Joaquin Valley Air Pollution Control District Territory

Source: San Joaquin Valley Air Pollution Control District

Specifically, San Joaquin Valley Air Pollution Control District designed and offered the Drive Clean in the San Joaquin and Charge Up! Electric Vehicle Charger Incentive Program. Together these programs have offered incentives to eligible applicants to make the transition to PEVs and to purchase and install electric vehicle charging stations, commonly referred to as electric vehicles supply equipment (EVSE). To support Charge Up!, the district collaborated with the Center for Sustainable Energy to produce both the San Joaquin Valley Plug-in Electric Vehicle Readiness Plan (May 2014) and Charging Roadmap: Siting Optimal Locations for Public Charging Stations in the San Joaquin Valley (May 2014). The latter provided a roadmap for public charging locations throughout the region, while the former analyzed the overall readiness of the region to adopt electric vehicles (EVs) and identified key barriers that needed to be addressed. Key needs identified in the readiness plan included:

- Knowledge of EVs (decision makers and public).
- Regional planning for public EV charger siting.
- EVs in government fleets.
- EV charger permitting and inspection.
- Public agency EV charger installations.
- Commercial and workplace charging.
- Zoning and parking rules.
- Building codes.
- Training and education for municipal staff and electrical contractors.

With a 2015 Energy Commission grant, San Joaquin Valley Air Pollution Control District and the Center for Sustainable Energy began this project, *Implementation of Zero-Emission Vehicle Awareness and Training Programs in the San Joaquin Valley*, in June 2016. The project specifically set out to address the lack of decision-maker awareness of EVs and to provide permitting agency staff and local installers' greater knowledge of EV charging.

The first step the team took was to name and brand this effort *Valley Takes Charge!* (Figure 2 below) to create consistency with San Joaquin Valley Air Pollution Control District's other efforts in this space.

Figure 2: *Valley Takes Charge!* Logo

Source: Center for Sustainable Energy

Education and Training for Permitting Agency Staff

In 2015 and 2016 there was a small but growing number of PEVs in the San Joaquin Valley. Local permitting and building code staff's lack of knowledge of PEVs resulted in extensive delays in permit processing, which presented an obstacle to installing EV charging stations. As well, permitting requirements varied across the region, with few standards in some parts of the region, lack of online permitting, and inconsistent permitting fees, all of which confuse those attempting to go through with permitting and installing EV chargers.

To address the permitting challenges this project intended to survey permitting agencies in the region to pinpoint the precise nature of the challenges, and then design toolkits of permitting best practices addressing the precise permitting challenges. The toolkits were to be distributed in trainings with agency permitting staff throughout the region.

Education and Training for EV Charger Installers

While not drastically different than other more common site electrical work, the installation of EV chargers can be improved by educating installers (generally electrical contractors) on both permitting and installation best practices. Few electric vehicle infrastructure training programs were available in the region in 2015; two that were available were through Joint Apprenticeship and Training Committees and International Brotherhood of Electrical Workers offices. The training attendance was poor in 2016, partly because Joint Apprenticeship and Training Committees and International Brotherhood of Electrical Workers have minimal resources to conduct outreach on the availability and benefits of these training programs. Because of low attendance rates, these trainings are infrequent and not readily available throughout the geographically vast San Joaquin Valley region. Additionally, the currently established trainings do not incorporate any permitting and inspection best practices.

San Joaquin Valley Air Pollution Control District and Center for Sustainable Energy intended to use this project to develop curriculum covering permitting and inspection best practices for installers, to augment existing trainings in the region. As well, the district and Center for Sustainable Energy intended to extend trainings to various parts of the region.

Increased EV Awareness for Decision-Makers

According to the *San Joaquin Valley PEV Readiness Plan* there is limited public understanding and awareness of the many facets of purchasing and using PEVs, from available incentives and total cost of ownership to vehicle capabilities. In particular, the Plan noted that outreach to local elected officials is a high priority.

Gaps that exist include a lack of policy design or planning for PEVs among many jurisdictions in the valley, a surface understanding of PEVs and a relative uncertainty among local governments and senior policymakers on how to support a growing PEV market. Addressing these gaps will allow the development of PEV-friendly policies and encourage the adoption of PEVs.

CHAPTER 2:
Survey of Permitting and Inspection Process

While the 2014 Readiness Plan for the region identified permitting and inspection as a barrier, the project team sought to review and document existing permitting and inspection processes in the San Joaquin Valley as a first step to the project. Review was accomplished through a survey administered in 2016 to assess the knowledge level about EV chargers among permitting and inspection staff in the region. The survey's findings and accompanying report were used to inform the development of new resources and educational materials for local governments with the end goal of improving their permitting and inspection processes. Information gathered by survey also informed materials developed for contractors and consumers who engage in the permitting, installation and inspection of EV chargers.

Survey Approach

Survey Participation

The project team evaluated the status of permitting and inspection processes in the region through a convenience sample survey. The survey was distributed by email with multiple follow-ups made by phone and email. Identifiable permitting and inspection staff, city managers, PEV coordinating council participants and development services department staff (planning, building, public works, engineering, etc.) received the survey with requests to forward to an appropriate contact. The first response was received on August 22, 2016, and the last response on October 5, 2016. 87 permit and city staff contacts and 55 city managers received targeted mailings. The project received 23 responses of which eight were complete for all sections. San Joaquin Valley Air Pollution Control District also distributed a general URL to allow others not included in the targeted mailing to participate. This mail campaign yielded four complete responses (a 2.8 percent response rate) in addition to the initial survey distribution.

Survey administrators paid special attention to achieving adequate representation from the northern, central and southern regions of the air district. They also made extra outreach calls to larger cities to ensure their representation in the data. These large municipalities were more likely to have already processed EV charger permits and established EV charger best practices in compliance with an earlier Assembly Bill 1236 deadline. After multiple contacts, Visalia was the only city with a population greater than 90,000 residents that did not participate in the survey. The survey received balanced participation from each of the three regions with one-third from the north, one-third from mid-valley and one-third from the south (see Appendix for map).

Reliability of Results

Though this survey produced useful information regarding the experiences and sentiments inspection and personnel staff that participated directly in the project, the results cannot be generalized. This survey does not attempt to represent the larger population of local

government staff in the San Joaquin Valley region or beyond. This report only describes the thoughts and experiences of those permitting and inspection staff who engaged directly with the project team.

General Survey Findings

Attitudes and Sentiments

The survey revealed that permitting and inspection staff in the region hold a general enthusiasm for PEVs. They generally believe in the technology and its promise for cleaner air, but that conviction is tempered by years of low demand for EV charger permits and inspections. Although a majority of survey respondents (77.5 percent) agreed or strongly agreed that "electric vehicles are important to the valley's goal of reducing carbon emissions and cleaner air," more than half of the survey respondents (57 percent) reported receiving no EV charger permits during a typical month. The jurisdiction with the largest number of permit applications received, including both commercial and residential units, reported only three per month.

Responses show that expectations for future numbers of installations are low, with one-third to one-half expecting zero installations and 90 percent expecting less than ten of any given type. In part, this may be due to a general lack of awareness among consumers regarding the increasing value of clean transportation incentives now available and the absence of dealerships in sharing rebate information with customers on the showroom floor. PEV consumer surveys show nearly one-third of individuals say they are not familiar with what rebates and tax credits are available.

Center for Sustainable Energy investigated the possibility that staff pessimism was due to inaccurate counts of EV charger permits and inspections due to municipalities being unable to accurately track EV chargers in their record-keeping systems. This hypothesis was disproven as a relatively high number, 66 percent of total responses, reported that their city could track the number of EV charger installations. During follow-up workshops, permitting and inspection staff said that they could recall by memory in most cases but would simply query electrical permit records if necessary.

Assembly Bill 1236 Compliance

Generally, jurisdictions in the air district's boundaries have not prioritized the development of specialized processes or resources for EV chargers, likely because of the low numbers of applications received for EV chargers. Approximately 66 percent of survey respondents said they did not have a dedicated process for dealing with EV charger permits. If the permitting and inspection process itself is an obstacle to EV adoption, this "chicken before the egg" scenario would be considered a market barrier. Assembly Bill 1236, however, is forcing the issue, although compliance is slow to come. The survey found that 26.7 percent were working on developing Assembly Bill 1236 compliant processes, while only two respondents (6.7 percent) already had new processes in place.

A review of survey results showed that cities that have neither begun nor finished developing EV charger measures were overwhelmingly small municipalities. This was expected as

municipalities with populations less than 200,000 were not required to be in compliance until September 2017, although several city staff members seemed to be unaware of the deadline at time of the survey.

Permitting Process

Electronic Resources and Submittal

For many respondents, questions concerning EV charger permitting were largely academic. The majority of jurisdictions that participated in the survey processed no permits or only a single permit in the month preceding the survey. Twelve survey participants were able to provide feedback on the EV charger permitting processes. The survey aimed to identify the ease with which applicants could access permitting information and apply. Specifically, the *Valley Takes Charge!* project team was interested in learning whether EV charger permitting information was typically available online and how prevalent electronic permit submittal, a requirement under Assembly Bill 1236, was in the valley.

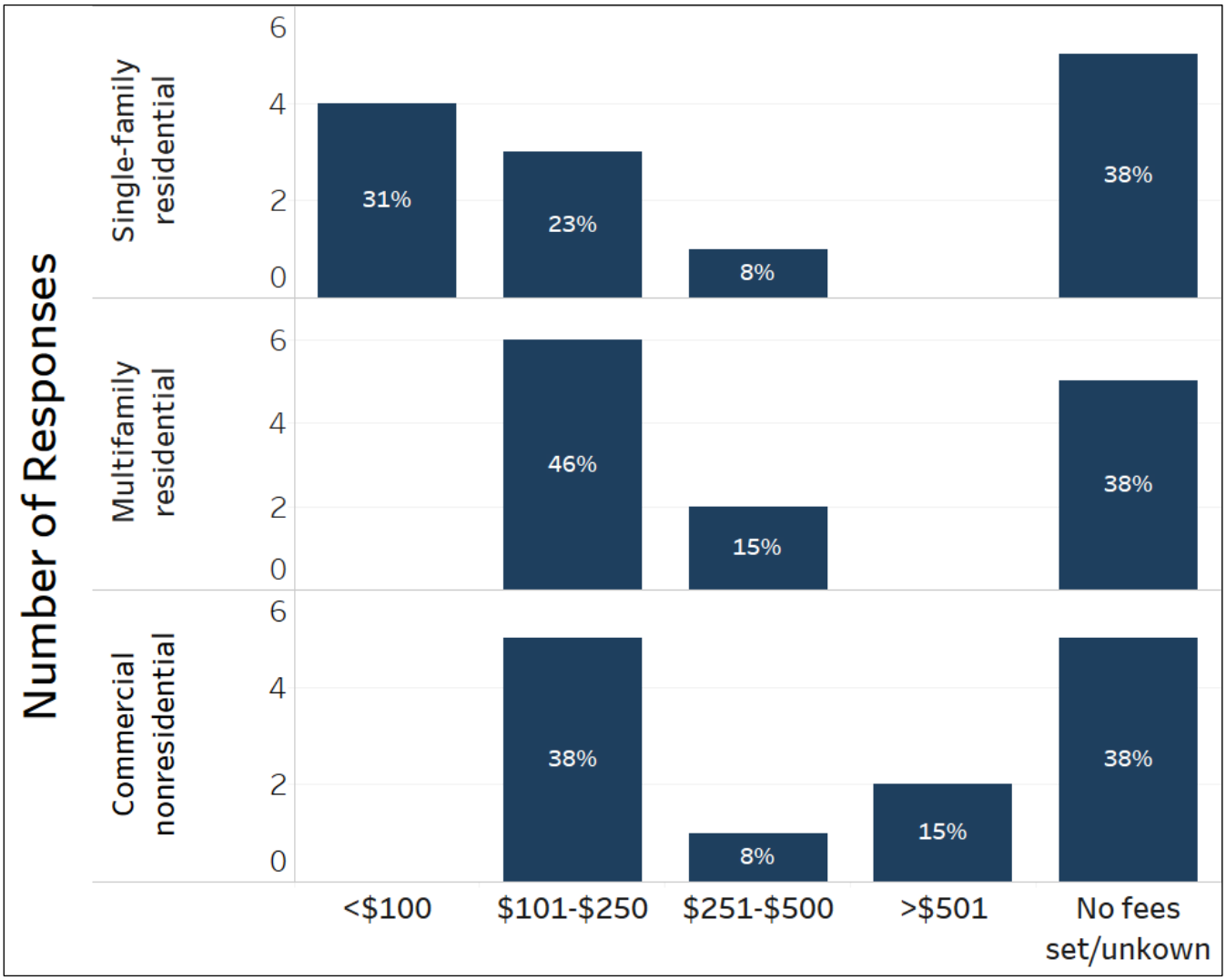
Electronic submittal removes the need for in-person visits and reduces the time required for applicants. Among the twelve survey respondents that provided feedback on EV charger permitting, about half noted that their jurisdiction accepts online, email or fax submittals for permits. Less than 50 percent of jurisdictions met the Assembly Bill 1236 "electronic submission requirement" meaning that they do not accept permit applications by fax, email or an online form.

Half of the respondents also indicated that general permitting information is available to the public on their jurisdictions' webpages. However, half of these survey participants indicated that EV charger-specific guidance was either not available or that they were unaware if it was available. Only 17 percent of responding jurisdictions have EV charger-specific permitting information online.

Permit Fees

Three survey questions asked about the average cost of permit fees. For these three questions, thirteen respondents provided information on these fees. Four percent have fees less than $100; 13 percent have fees less than $250 and 46 percent reported having no set fee. These amounts are low compared to the state average. According to the *EV Project's Lessons Learned* report, for example, average fees in San Diego, Los Angeles and San Francisco respectively are $215, $85 and $150. Though a permit fee represents a cost to the consumer there is no indication that a $100 charge on top of the value of a new or used vehicle and charging station creates a significant barrier to market growth or an impediment in the permitting process. Figure 3 shows the average costs for a single-family residential, multifamily residential and commercial nonresidential EVSE permit (permitting and inspection).

Figure 3: Average Costs for EVSE Permit (Permitting and Inspection)



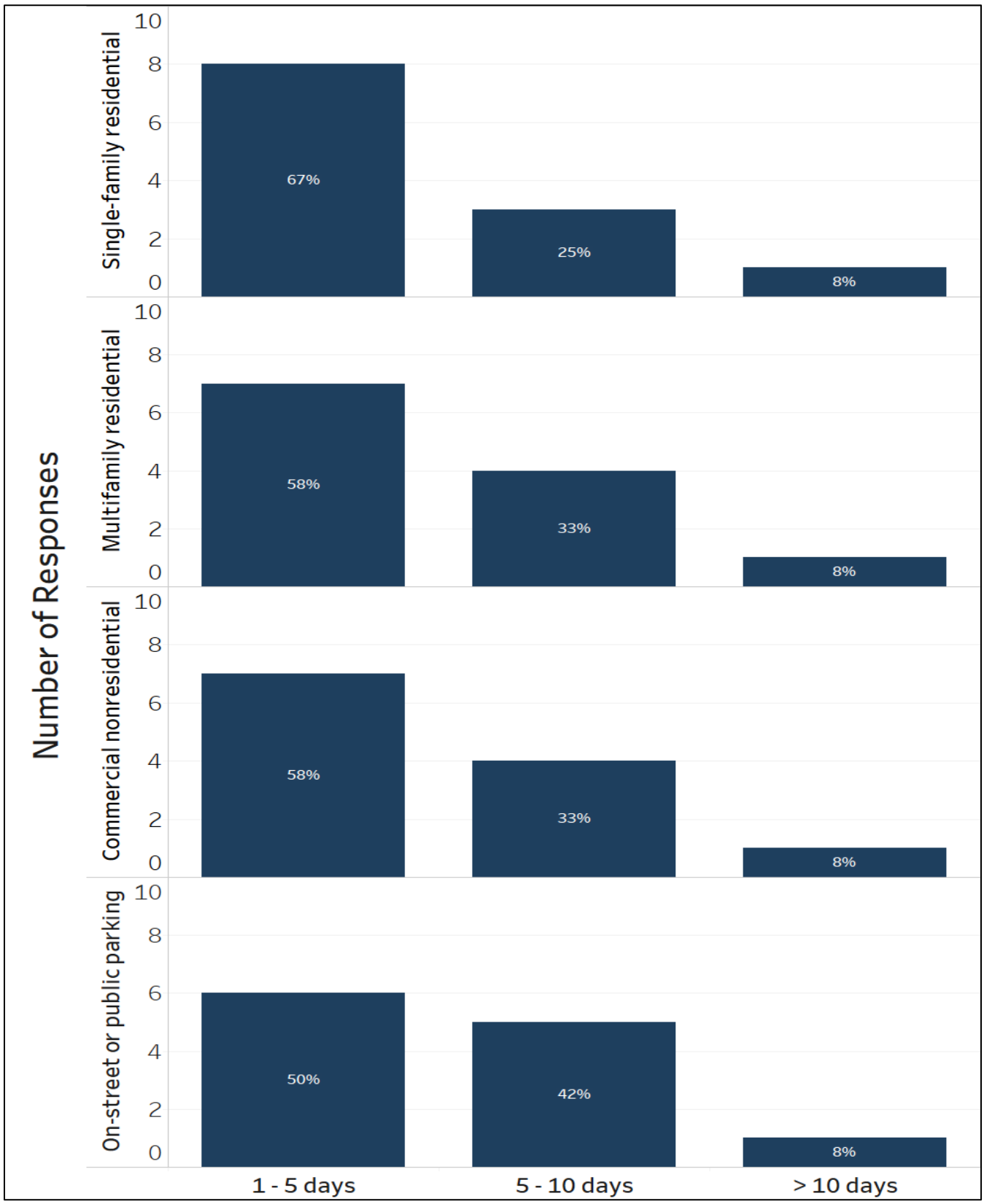
Source: Center for Sustainable Energy

Time to Process Applications

The survey asked jurisdictions to report the number of business days it typically takes to approve a permit application for single-family, multifamily residential, commercial nonresidential and on-street or public parking EV charger installations. The results from twelve respondents were generally positive in that the majority of applicants have their permits processed in one to five days.

Single-family applications were more likely to be processed in one to five days than other categories. On-street or public parking was reported as requiring the longest time for the permit application process. This is likely due to additional tasks (trenching, for example), triggering other permit requirements as well as other requirements such as right-of-way easements. Figure 4 shows the average permit approval times in business days.

Figure 4: EVSE Permit Application Approval Time (Business Days)



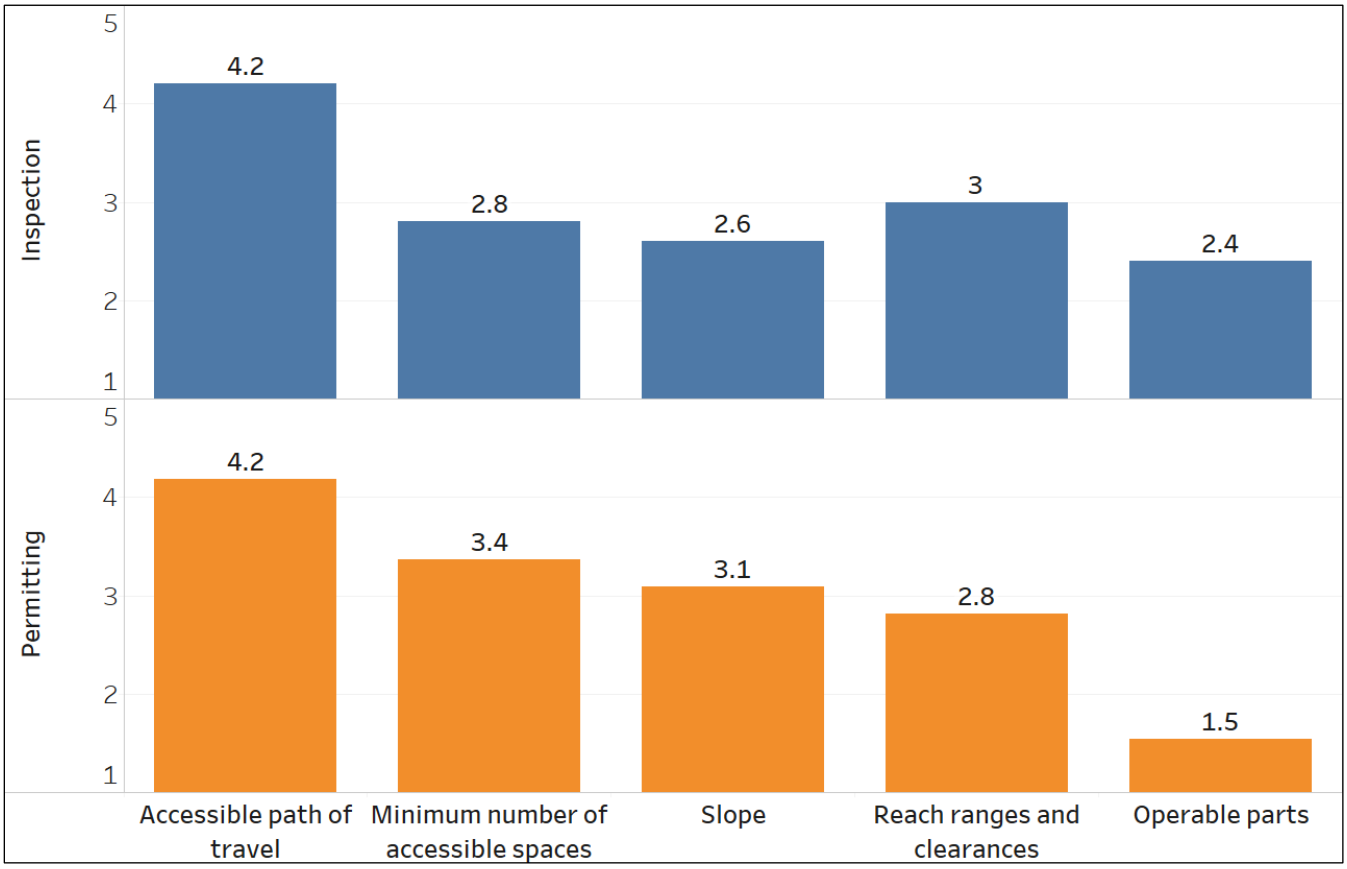
Source: Center for Sustainable Energy

Impact of Additional Reviews on EV Charger Permits

All jurisdictions that participated in the survey required a building or electrical permit for any type of EV charger installation with some requiring additional reviews. The survey asked what types of activities generally trigger the need for additional reviews. The activities that respondents identified included trenching, cutting and replacing concrete, accessibility compliance and zoning or parking requirements for multifamily, nonresidential and on-street public parking. Among respondents, 87.5 percent required a planning or zoning entitlement permit for nonresidential EV chargers.

Accessibility requirements generate a number of compliance challenges for EV charger installations. The survey asked staff who work in the planning and permitting division and the building and inspection division which aspects of accessibility requirements where most challenging. According to respondents, the most vexing aspects for developers are generally related to path of travel, number of accessible spaces and slope. Figure 5 shows accessibility compliance challenges for EVSE installations.

Figure 5: Rank of Accessibility Compliance Challenges for EVSE Installations



Source: Center for Sustainable Energy

California Green Building Standards Code Considerations

The survey also asked about the California Green Building Standards Code that includes both mandatory and voluntary measures to ensure residential and commercial new construction projects are ready for EV infrastructure. Cities can adopt the voluntary measures in California Green Building Standards Code beyond the mandatory requirements for their local jurisdictions. From the survey respondents, no city reported adopting EV readiness requirements beyond what is mandated in the California Green Building Standards Code. Two-thirds of cities in the survey were certain that they had not and one-third were unsure if any requirements above the mandatory were adopted. Though no survey respondents reported enacting additional requirements, at the time of the survey the unincorporated community of Mountain House required complete charging circuits in all new houses. This requirement was included as part of the community master plan as a transportation management measure for air quality.

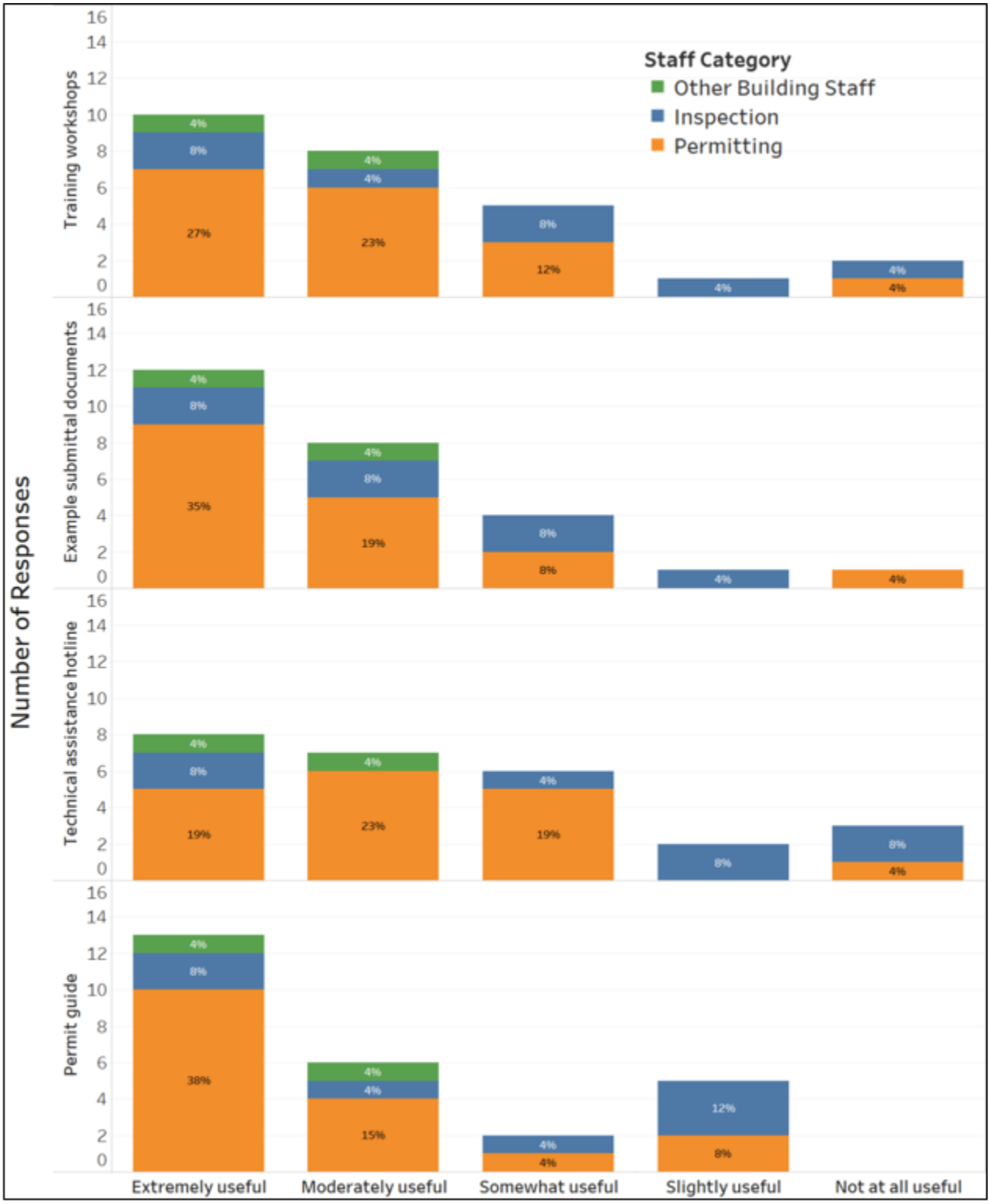
Feedback on Proposed Permitting Resources

Receiving stakeholder input on the development and design of resources was an important consideration. As part of the survey, permitting and inspection staff were asked whether different proposed resources would be helpful in the course of their work. All the tools and resources mentioned in the survey (Figure 4) were generally regarded as "extremely" or "moderately" useful. During workshops, additional resources were recommended for development. Between the survey and follow-up workshops, noted resources included permit guidance, training workshops, a technical assistance hotline and example submittal documents.

Though all resources were confirmed as being valuable efforts for the *Valley Takes Charge!* project team to undertake, respondents prioritized resources that would educate permit office customers. Along these lines, respondents rated the fillable application as the most useful resource.

Training workshops were not ranked as highly as other resources. However, in follow-up workshops International Code Council chapters encouraged the idea of Center for Sustainable Energy staff returning to give additional presentations to members on best practices and new resources. Most importantly, in these conversations International Code Council members encouraged efforts that would educate and train developers, installers, electricians and other permit office customers. Figure 6 shows the usefulness of resources in streamlining and expediting the EVSE permitting process.

Figure 6: Usefulness of Project Resources



Source: Center for Sustainable Energy

Inspections

Eight survey participants provided complete responses to the section on inspection processes for EV chargers. One survey participant who identified as "Other Building Staff" provided a partial response to the questions involving inspection.

In the month prior to taking the survey, respondents inspected fewer than 10 EV charger installations across all permit types. All identified a consistently low volume of permit applications for EV chargers, typically one every four months but never more than two a month. During follow-up workshops, several inspectors reported that they were aware of increasing demand for multifamily residential and commercial nonresidential EV charger inspections in the Bay Area and would expect some of that trend to spread to their jurisdictions.

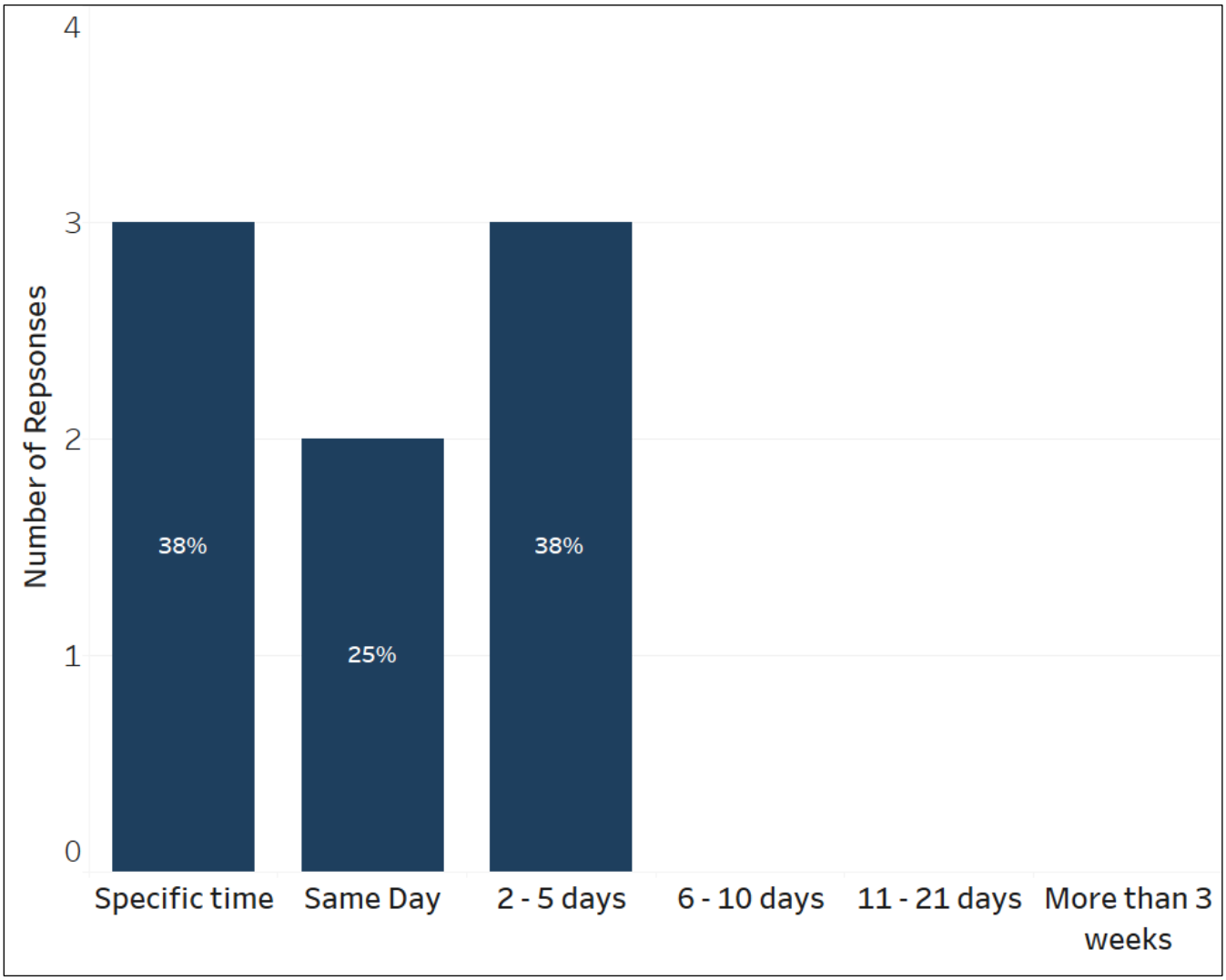
Inspection Processes and Resources

With regards to the work of inspecting EV chargers, most cities do not have a specific inspection checklist for EV charger installations but have considered developing one. Only a small number of inspection staff indicated that their jurisdiction had taken any action regarding EV charger resources or processes. A survey respondent from the City of Selma, however, answered that the city's general electrical inspection list does include EV charger installations. A survey respondent from Madera County reported that their jurisdiction has an existing dedicated process for the permitting and installation of EV charger.

Scheduling of EVSE Inspections

Another important question was whether inspection scheduling was negatively impacting installations. For example, the survey asked inspection and other building department staff about the typical time window given to site owners or contractors to schedule final onsite inspections. According to survey results, inspectors generally provide a three to four-hour window of time for the final inspection. Permit applicants, contractors and site owners have a variety of options to request and schedule an inspection. Generally, the options include online, email, fax, in person, mail and by phone with the phone option being the most selected answer. Figure 7 shows the number of business days following request for inspection.

Figure 7: Number of Business Days Following Request for Inspection



Source: Center for Sustainable Energy

EV Charger Inspection Complexity

Commonly cited issues that arise when inspecting EV charger installations include grounding problems, access to verify the conductor size, conduit size and disconnect rating and the lack of appropriate conduit protection. Single-family residential projects are routine and fast, older homes with undersized panels notwithstanding. On average, a residential EV charger installation requires one to three inspections, typically including rough and final inspections.

Nonresidential EV charger installations are more complex and require more inspections. They involve additional zoning and planning reviews that incorporate accessibility requirements. The number of inspections needed for a nonresidential EV charger installation is typically dependent upon the location of the installation, the position of conduits running to the equipment, the number of stations being installed, contractor knowledge of accessibility, the location's accessibility for inspection and the availability of a qualified contractor do the installation. At the San Joaquin Valley International Code Council meeting, staff reiterated that most often an inspection is issued a correction because the contractor did not perform the

installation correctly. Installers either did not follow code or the site conditions varied significantly from the conditions shown on the permit application (i.e., if the permit request showed 200-ampere service and only a 100-ampere service was found on site).

Accessibility and the need to comply with requirements set by the Americans with Disabilities Act is also a major inspection concern. Survey respondents selected accessible path of travel and the minimum number of accessible spaces as the two most challenging accessibility aspects of EV charger installations. Building staff also reported that reach ranges and clearances are, to a degree, also challenging aspects.

Findings and Recommendations

Perception of the Market

Communities within the boundaries of the San Joaquin Valley Air Pollution Control District received a limited number of EV charger permit applications in any given month. High expectations were set when EVs first became commercially available, but despite gains in market share, the number of EVs on the road and EV charger installations completed remained small. In addition, a lack of education about EV charger incentives has tempered permitting and inspection staff expectations for future growth, according to the survey and follow-up workshops.

New Resources for Permitting and Inspection Staff

Despite the pessimistic view expressed found by survey, the majority of permitting and inspection staff polled in the survey and spoken to in person recognized and appreciated the need to improve EV charger permitting and inspection processes. They also identified specific resources for the *Valley Takes Charge!* project to produce. These included permit guides for installers, checklists compliant with Assembly Bill 1236, and sample submittal documents. Survey responses indicated that the *Valley Takes Charge!* project services would be most beneficial for small cities that largely had not yet achieved Assembly Bill 1236 compliance at the time of the survey.

A More Robust Electric Vehicle Marketplace

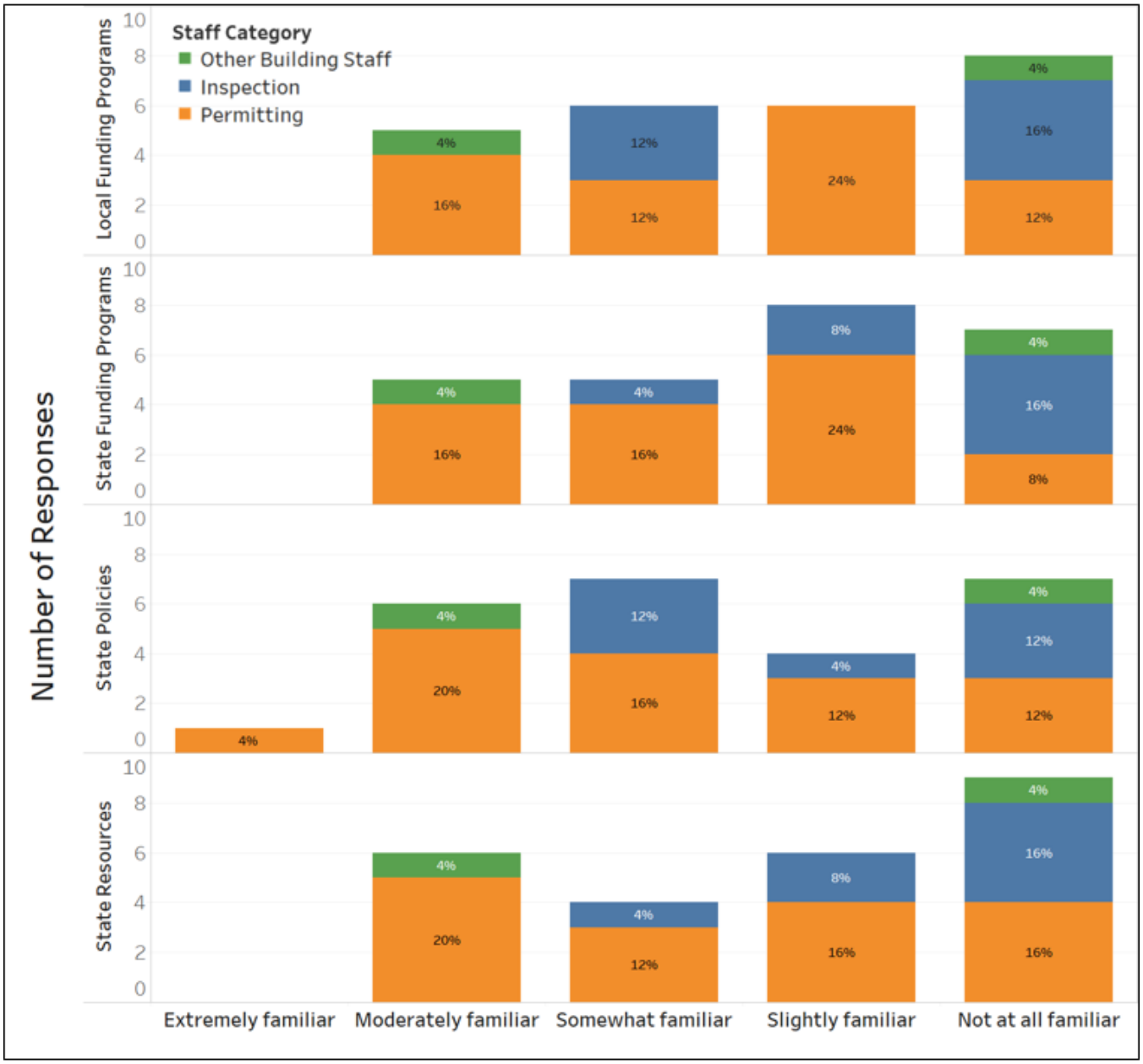
The survey found that few respondents have used or were aware of guidance documents such as the *San Joaquin Valley Plug-in Electric Vehicle Readiness Plan*. Of those that were familiar with the plan, one-third indicated that their jurisdictions have plans to implement its recommendations and best practices. This indicated a real need to market the Plan and *Valley Takes Charge!* project resources to ensure they have a positive impact.

Working with Municipal Staff and Other Stakeholders

Giving permitting and inspection staff better tools to do their jobs is only part of the solution to more efficient permitting and inspecting processes. Educating EV charger installers, property owners and managers makes permitting and inspection easier by ensuring that installation sites are properly outfitted and that contactors submit accurate plans and perform correct installations. The *Valley Takes Charge!* project team developed an EV charger installer curriculum based on feedback from the survey and workshops.

A lack of awareness about the benefits of electric vehicles, the availability of incentives and the resources supporting EVSE installation contributed to delays in market growth in the region at the time of survey. The *Valley Takes Charge!* project team worked with all of the stakeholders involved in the permitting, inspection and installation of EV chargers to reduce market barriers and increase goodwill for the technology, which is essential for the San Joaquin Valley to meet its clean air goals. Figure 8 shows the survey results regarding familiarity of clean transportation initiatives.

Figure 8: Familiarity of Clean Transportation Initiatives by Staff Category



Source: Center for Sustainable Energy

CHAPTER 3:
Training and Resources

Based on the findings of the survey and engagement with stakeholders in the valley, the project team sought to develop resources and trainings that would support improved permitting and inspection processes and installation procedures.

Just prior to the start 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 EVSE projects by September 2017. In adopting the ordinance, local governments were required to:

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

Resources created through the *Valley Takes Charge!* project were designed to support local jurisdictions in meeting Assembly Bill 1236 requirements.

Resource Toolkits

The *Valley Takes Charge!* project team created three main resources for to help streamline permitting and installation of EVSE. Taken together, these resources were intended to help cities work through a full project life cycle from project initiation, permit application, permit processing, installation and inspection.

This toolkit is intended for use by city and county staff for review of EVSE installations. The applicant for an EVSE installation must first obtain a building permit and complete the forms listed in the checklists. The installation checklist provides detailed information on phases from planning for EVSEs to execution and inspection. The resources were as follows:

Checklist for Residential and Nonresidential Permit Application

The checklists are one page reference sheets to ensure proper EVSE installation. Submittal and documentation requirements are also clearly listed in the checklists. Required by Assembly Bill 1236, this checklist is a guide for permit applicants. These checklists were provided in an editable format so they could be used or modified for individual jurisdictions as seen fit for their specific use. Under Assembly Bill 1236, local governments should post a checklist on their appropriate website.

Plan Review and Permit Correction Sheet

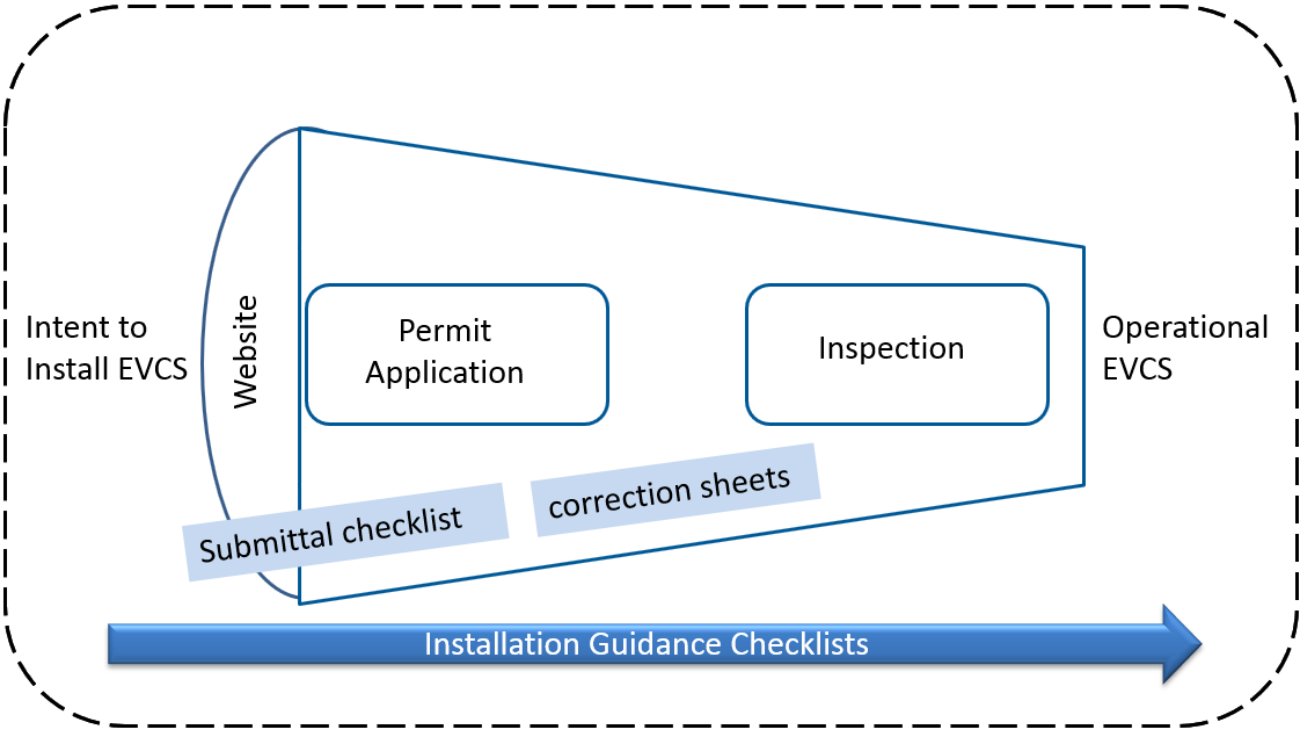
The correction sheets provide code references and detailed guidance for both residential and nonresidential EVSE installations. These correction sheets may be used alongside the permit application checklists listed above. The correction sheets allow staff to quickly review submittals and make the necessary corrections.

Installation Guidance Checklist

The installation checklists are comprehensive documents intended for use by installers, developers, and electrical contractors. The checklists include step-by-step guidance from pre-installation work to coordination with the local utility and jurisdiction

Figure 9 below illustrates how these resources can be used through the full project life cycle. When someone has an intent to install an EVSE, they can visit their local government's website and find the submittal checklist outlining the permitting requirements of EVSE. They might have found the installation guide checklist as part of their initial research into installation EVSE, or their installer may have received training on it. Once a permit application has been made, the corrections sheets can be used in reviewing the permitting application as well as the final inspection.

Figure 9: EVSE installation Process Using Resources



Source: Center for Sustainable Energy

During the course of the toolkit development, California Building Officials) released their own toolkit of materials for Assembly Bill 1236 compliance. The California Building Officials toolkits contained very similar checklists as both were based on the guidance in the Governor's Office of Planning and Research's zero-emission vehicle Community readiness guidebook. The California Building Officials toolkits provided sample ordinance language for both administrative and technical ordinances. They also provided sample timelines for ordinance option in order to meet Assembly Bill 1236 compliance deadlines.

Permitting and Inspection Training

Based on the feedback received in the scoping workshops, the project team was concerned that there was not high demand for more training. Permitting and inspection staff have many different types of projects that they must review and electric vehicle charging was not among their top concerns. In order to drive attendance, CSE submitted the training for International Code Council continuing education credit and added slides on Zero Net Energy (ZNE) topics.

The workshops focused on the impact of EVs on building energy use and shared best practices with the goal of driving regional consistency in EVSE installations. Additionally, the workshops reviewed state policy recommendations and goals and discussed the implications of upcoming, commercially available vehicle gird integration technologies and utility programs.

The following learning objectives were developed to meet International Code Council continuing education requirements:

- Zero net energy building standards for new construction and major renovations,
- Automatic load management system considerations,
- Methods of utilizing load management systems to avoid the need for service panel upgrades
- Correct use of inverters to use electric vehicles as a back-up power source (NEC Ch. 7, 700- 702),
- General knowledge of available switch devices,
- Understanding of California Green Building Standards Code impact on local ordinances for load management services,
- Available mechanical switch options,
- Service load calculations (National Electrical Code article 220, 220.82, 220.83).

Permitting and inspection training results

As shown below in Table 1, the project team conducted five trainings with approximately 50 total attendees. The sixth planned training in Hanford was canceled after the city staff decided they could attend the Visalia training instead.

Table 1: Permitting and Inspection Trainings

Region	Location	Date	Attendees
Middle	Kingsburg, California (International Code Council meeting)	May 16, 2017	20 or More
	Hanford, California	July 20,2017	2-3 (Opted to cancel and attend Visalia)
South	Visalia, California	July 19, 2017	12
	Bakersfield, California (County of Kern)	December 20, 2017	4
North	Modesto, California	September 19, 2017	2
	Webinar	October 12, 2017	8

Source: Center for Sustainable Energy

The trainings were organized by establishing a host city and then inviting other jurisdictions in the region. The trainings were marketed using the same email lists used to send the survey. Unfortunately in the case of Modesto and Kern County, other cities in the region did not attend, so those trainings only served a single jurisdiction. Through recruitment for the workshops, some building officials reviewed the resources and said that they could provide the resources to their staff without needing to send anyone offsite for a training. Additionally, project staff visited permitting counters at other cities in the region and drop off materials. Jurisdictions reached in this way included Arvin, Delano, Lemoore, Madera (City and County), McFarland, Shafter, Tulare (City), and Wasco.

The Chief Building Official in one city was at the counter and received the materials. When asked if there were other resources or assistance he could use with EV permitting, he gestured to the large stack on plans on the counter, and said that he did not have enough staff to review all of the permit applications he currently had, let alone think about how to further streamline the permitting of EVSE, which he had rarely seen in his city.

This general attitude was widespread among workshop attendees and others who were contacted in the course of the work. Even when they were personally excited about EV infrastructure, they did not see an immediate demand for permit streamlining. When asked about what additional help was needed to streamline permitting, most jurisdictions thought simply having more staff available, both at the permit counter or as inspectors would do more to improve permitting times than additional resources. Permitting staff also identified utility service upgrades or other interconnection issues as primary sources of delays.

Permitting Hotline

The project also provided a permitting hotline to be used by permitting officials for questions about the permitting process. This hotline was announced during trainings and further marketed through email. The hotline got limited use through the project period. A few jurisdictions inquired about funds available to support city installations of EVSE. The most detailed consultation was regarding accessibility requirements for EV charging and parking counts. Resources were provided including Division of State Architect guidance and examples from other cities.

In later 2018, project staff engaged with staff in the cities of Fresno and Clovis to discuss permitting issues that had been brought up by installers participating in the California Electric Vehicle Infrastructure Project program. Public charging installations in the city of Fresno were experiencing substantial delays in receiving permits. Through multiple calls with installers and city staff, the project team sought to identify the primary sources of permitting delays. It appears that the primary issue was in parking site plan review. The electrical contractors installing EVSE were not including fully dimensioned site plans in their initial submittals. Electrical contractors did not seem prepared to offer the kinds of detailed site plans that the City was seeking, including information like circulation, tree coverage, and drainage issues. The details required were typical of a new development, as opposed to a simple retrofit which is how the installers had approached it. After going through at least one round of revisions, the contractors realized that they did not have the in-house capability to produce plans meeting the city requirement. The need to hire a civil engineer added to the cost of the overall

project and added additional delays. The contractors reported that they did not experience these same delays in other jurisdictions.

The project team confirmed that the neighboring City of Clovis did not require the same level of site plan detail for traffic and circulation, but would require detailed plans when EVSE were likely to impede pedestrian or traffic flow (for example, if charging cords routed across sidewalks). This information, plus examples from other jurisdictions were provided to the City of Fresno to inform their approach.

Installation training

The San Joaquin Valley PEV Readiness Plan noted the need to train more electrical contractors in the region to be ready for installing EVSE. With the growing number of PEVs in the valley, there are increasing opportunities for qualified and properly trained electrical contractors to install EVSE at residential and nonresidential sites. Developing a network of informed contractors will be essential for increased EVSE deployment in the valley. Improper installations were also identified as primary sources of delays by permitting officials, so training contractors on proper installation procedures was another strategy supporting streamlined deployment.

The project sought to expand on electric vehicle infrastructure training programs available in the valley through Joint Apprenticeship and Training Committees and International Brotherhood of Electrical Workers local offices. These trainings, especially the Electric Vehicle Infrastructure Training Program had not been well attended to date. Because of low attendance rates, these trainings are infrequent and not readily available throughout the geographically vast San Joaquin Valley region.

This work hoped to compliment efforts that were already underway by the San Joaquin Valley Regional Industry Cluster of Opportunity team to train electrical contractors, expand training opportunities and increase contractor participation in trainings. Additionally, curriculum could be supplemented with more information on permitting and inspection best practices for contractors in order to facilitate more efficient EVSE installations.

The project team started conversations with Joint Apprenticeship and Training Committees and International Brotherhood of Electrical Workers staff to see if the *Valley Takes Charge!* project could provide support in conducting outreach on the availability and benefits of these training programs. However, the staff reported that no EV trainings were being planned in the immediate time frame, and that they believed most working electricians were too busy for the full eight or sixteen-hour Electric Vehicle Infrastructure Training curriculum. They thought that some sort of seminars might be of interest to electricians, but that it could be hard to get good attendance at some events.

Execution

Based on the feedback, the *Valley Takes Charge!* team decided to focus on community colleges and Regional Occupational Program classes with students who were just starting to explore an electrical career. This would help building the future generation of electricians working in the valley, and these courses had a built-in attendance. Instructors were also very

welcoming of guest speakers who could touch on new and interesting topics. The objectives of the trainings included:

- Providing context for what kinds of new work electric vehicle adoption will create for electrical installers in the valley,
- Providing a comprehensive understanding of how electric vehicle charging stations operate and the best practices for their installation,
- Introducing the *Valley Takes Charge!* Resources Toolkit and other relevant resources for students.

The objectives of the trainings were met in a PowerPoint presentation format that could be between 45 and 90 minutes in length. The presentation included an array of pictures of different types of installations with key features identified. The students also received printed copies of the installation guidance checklist created in the earlier part of the project. The presentations followed the following format:

- Introduction to the valley air district, and the *Valley Takes Charge!* program
- Overview of the electric vehicle market and its projected growth
- Electric vehicle charging basics
- Types, uses, and distribution of charging stations in the valley
- EVSE installation process
- Permitting and inspection process
- Utility coordination and metering requirements
- Physical site requirements
- Electrical requirements
- Communications/access control
- Step-by-step demonstration of the installation process
- State and local incentives for charging station installation
- The *Valley Takes Charge*! Resources Toolkit and other helpful resources for installers

The presentations were split between two staff members and included time for questions and discussions as appropriate. Table 2 below shows the trainings that were completed. Project staff was able to make effective use of time by scheduling presentations back and back and on subsequent days.

Table 2: Electric Vehicle Charging: Training for Electrical Installers

Region	Location	Date	Attendees
Middle	Institute of Technology (Clovis)	09/27/2017	25-30
	Fresno City College	09/27/2017	25-30
South	College of the Sequoias (Basic Class)	09/25/2017	35
	College of the Sequoias (Advanced Class)	09/25/2017	20
North	Merced Regional Occupational Program (Atwater)	09/26/2017	16
	Merced Regional Occupational Program (Los Banos)	09/26/2017	13

Source: Center for Sustainable Energy

Results

The *Valley Takes Charge!* project staff received generally positive feedback from students and instructors. The students were excited to discuss new technology and learn about potential career paths. Many students were not aware of electric vehicles or had not yet seen EV charging infrastructure in their area. However, most of these students were not in a position to immediately put their learnings into practice on a job site, as they still had much more training to do. Additionally, the Regional Occupational Program students were not yet committed to electrical careers, but the presentations showed them a reason to pick electrical careers, as well as the skills they would need, such as the math involved in load calculations.

Both students and instructors expressed interest in providing an additional training that would allow students to do hands on work with EVSE. This kind of training was not provided through this project but could be a future need.

After training completion, the project staff explored offering more trainings targeted at working installers. Project staff attempted to engage with Pacific Gas and Electric to see if the utility was going to sponsor any trainings associated with their infrastructure investments, but nothing appeared to be forthcoming. More training is likely still needed in the valley to address the needs of working installers.

CHAPTER 4:
Awareness

According to the *San Joaquin Valley PEV Readiness Plan* there is limited public understanding and awareness of the many facets of purchasing and using PEVs. In particular the Plan noted that outreach to local elected officials is a high priority.

Since there are other programs doing consumer focused outreach in the region, the *Valley Takes Charge!* project focused on outreach to elected officials and other decision makers that can help address the barriers to greater PEV deployment in the region.

Needs identified in the readiness plan include a lack of policy design or planning for PEVs among many jurisdictions in the valley, a limited understanding of PEVs and a relative uncertainty among local governments and senior policymakers on how to support a growing PEV market. The *Valley Takes Charge!* project awareness activities addressing these gaps will allow the development of PEV-friendly policies, and widespread deployment of EVs.

Ride and Drives

The ride and drive program under the *Valley Takes Charge!* program was designed to provide hands on experience to elected officials at events where they would already be present. Many EV education projects have concluded that getting people inside an EV is one of the most effective methods of promoting EV adoption. Once people have been in the driver's seat of an EV, they can start to understand the benefits of the vehicles and the need to support adoption. Targeted vehicle infrastructure project events were seen as the most effective use of limited resources as large consumer ride and drives are very resource intensive to produce. However, even modest ride and drives took a large amount of coordination between securing a spot at the venue and on the agenda for a presentation, finding local dealers to supply vehicles and staff, and working through site logistics like parking, insurance, and finding suitable driving routes that would give a realistic impression of the vehicle's capabilities.

Table 3 below shows the completed events.

Table 3: Vehicle Infrastructure Project Ride and Drives

Location	Date	Host	Activity
Modesto, California	12/08/2017	California Partnership for the San Joaquin Valley	Presentation and ride and drive
Merced, California	12/21/2017	Merced Council of Governments	Table and ride and drive.
Fresno, California	01/25/2018	Fresno Council of Governments	Presentation and ride and drive
Delano, California	01/29/2018	Kern County Association of Cities Meeting	Center for Sustainable Energy vehicles and presentation

Source: Center for Sustainable Energy

Participants gave positive feedback on the ride and drive experiences and the presentations. Having EVs at the events gave more credibility to the presentations, which made the point the

valley will have to continue to provide resources to make sure it is ready for future growth in the EV market.

During the Modesto event Paul Van Konyenburg, a California Transportation Commissioner, mentioned the importance of PEV adoption and charging infrastructure in the valley. Several attendees commented and asked questions about electric vehicles and charging infrastructure as a follow up. Having the EVs there for attendees to drive firsthand added to the conversation.

Although the results were positive from these events, there were difficulties in putting on events. One of the most challenging aspects was just finding the right forum to reach elected officials. There were a limited number of meetings that would have room for both a presentation and ride and drives. With evening meetings with no break in the middle, the vehicles could only be driven for a limited period before the meeting. A few potential hosts were unable to guarantee a spot on the agenda until the week before a meeting, which made it impossible to confirm logistics with staff traveling from outside the valley, as well as to coordinate with dealers to provide vehicles and to meet insurance requirements.

Project staff intended to showcase a variety of vehicles at the event, including both plug-in hybrids and all-electric vehicles. However, the distance from some dealers meant that some shorter range EVs couldn't be used for a ride and drive and make it back to the dealer on one charge. Dealer participation was also hard to get due to limited audiences at the events. Dealers want people who are ready to buy. Individual dealers did not see the potential for fleet purchases. Thanks to generous incentives for public fleets from the *Clean Vehicle Rebate Project* (CVRP) and the San Joaquin Valley Air Pollution Control District, many public agencies have been purchasing PEVs; however, this did not help project staff make the case that there was more the city should be doing to promote electric vehicles when they already had PEVs in their fleets.

Pictures of Events

Figure 10 shows participants of the California Partnership for the San Joaquin Valley, and Figure 11 shows vehicle display at Kern County Association of Cities meeting.

Figure 10: California Partnership for the San Joaquin Valley Participants

Source: Center for Sustainable Energy

Figure 11: Vehicle Display at Kern County Association of Cities Meeting

Source: Center for Sustainable Energy

Other Awareness Events

Project staff sought many opportunities to give information on electric vehicle efforts in the valley in a variety of formats. At all events, a *Valley Takes Charge!* project factsheet was distributed. The Table 4 below shows events where the project was the primary topic for the presentation and the reason for participation. This did not include other outreach events where project materials were used but were tangential to the other planned outreach.

Table 4: Seminars/Trainings/Events

Location	Date	Event	Attendees
Bakersfield, California	September 18, 2018	National Drive Electric Week	Number of attendees unknown, 15 conversations with people who came to the booth to talk.
Webinar	November 8, 2017	"Procuring EVSE"	60
Bakersfield, California	September 16, 2017	National Drive Electric Week	Number of attendees unknown, 20 conversations with people who came to the booth to talk.
Stockton, California	August 3, 2017	San Joaquin Valley Council of Governments Board Meeting	15
Bakersfield, California	June 15, 2017	Kern Council of Governments Meeting	20
Bakersfield, California	February, 2017	EV Partnership	55
Fresno, California	October 25, 2016	Clean Transportation Summit	70

Source: Center for Sustainable Energy

Every activity tried to raise awareness on the importance of PEVS in the valley and provide actionable information on how to support EV infrastructure deployment.

Council of Governments meetings followed a standard presentation format, touching on the following topics:

- Why EVs? Why the *Valley Takes Charge!* project?
- State Policy Context
- Progress in the valley – rebate statistics
- Project activities
    - Resources
    - Trainings
- Incentives
- Questions and Answers

Council of Governments members were very receptive to the presentations, especially hearing that the valley was seeing greater EV adoption, but still needed to do lots of work to achieve state goals. A separate item on the Kern Council of Governments agenda was a presentation on an annual quality of life survey, and Kern County residents listed air quality as one of their top concerns, so the board members may have been more receptive to hearing about how EVs are crucial to reducing air pollution locally.

The procurement webinar focused on strategies and best practices for procuring EV charging stations as well as vehicles. Often fleet procurement processes have been designed with the assumption that a retiring vehicle should receive a like replacement. Procuring EVs can take some changes to internal processes, as well going out to bid on a new class of vehicles. Cooperative purchasing through groups like SourceWell (formerly National Joint Powers

Alliance), and the California Department of General Services contract can help reduce the burden of writing new bid specifications.

The Clean Transportation Summit and San Joaquin Valley EV Partnership event included panels with more focused discussion of charging infrastructure. The *Valley Takes Charge!* project staff was able to present the resources being developed through the project to audiences eager to learn about EV infrastructure. The events also provided an opportunity to hear from other industry participants on what challenges they see with infrastructure deployment in the Valley.

The National Drive Electric Week events are consumer focused festivals with many different booths and vehicles on display. The booth staffs were able to engage with both current and perspective EV drivers. Staff heard from Valley residents about conditions on the ground and challenges they face as EV drivers. Some of these challenges include key locations needing public charging stations, such as over the Tejon pass or heading into Sequoia National Park. Some current drivers mentioned that charging equipment has not always been maintained or was not working. Overall most current EV drivers felt proud to be doing their part for the region's air quality by driving EVs and were excited that public agencies were continuing to support more deployment of EV infrastructure.

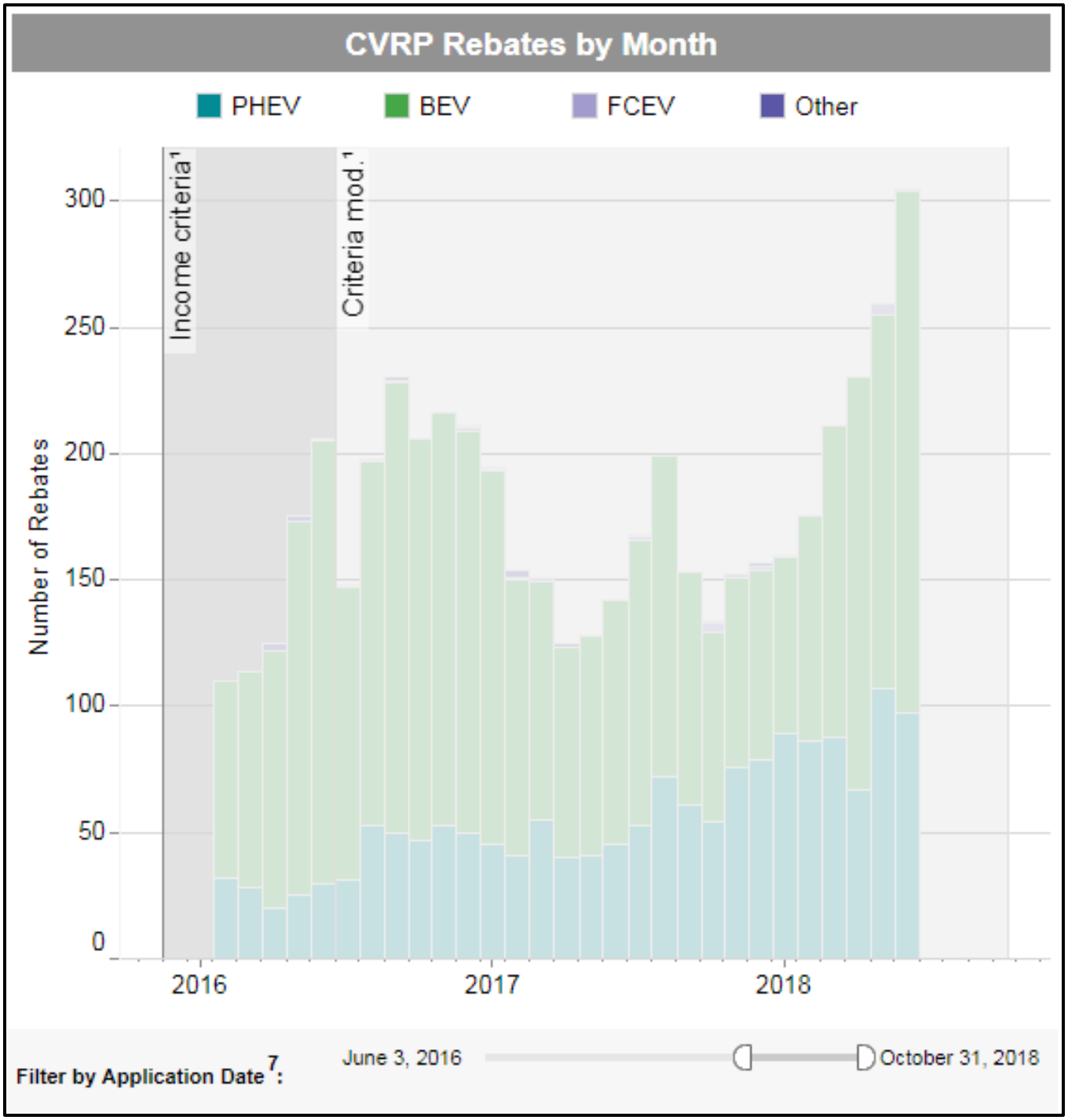
CHAPTER 5:
Conclusions and Future Actions

There have been some positive market developments during the project that have both been partially influenced by the project and in turn affected the project. The accelerating growth of the valley's PEV market may make the case for continued support in resources, trainings, and outreach.

PEV Market Growth

Most importantly during the project, PEV sales, as evidenced by CVRP rebates, soared as the market in the region took off. From March 2010 (beginning of the CVRP) through May 2016 (start of the project) CVRP rebates in the region totaled 3,723 (1,052 plug-in hybrid electric vehicle Plug-in hybrid electric vehicle, 2,671 battery electric vehicles) (Center for Sustainable Energy 2019). While rebates from June 2016 through October 2018 (latest full reporting period available as of writing of this report) totaled 5,139 (1,627 plug-in hybrid electric vehicle, 3,512 battery electric vehicles). This represents a 357 percent increase in rebates issued. Because of income limits that make the rebate unavailable to applicants with a certain higher income, this may underrepresent the market in the later period (as income limits were first imposed in March 2016). This drastic increase was most heavily focused with the first quarter of 2017 and the third quarter of 2018, as shown in Figure 12.

Figure 12: CVRP San Joaquin Valley Rebate Statistics June 2016 to October 2018



Source: Center for Sustainable Energy

Such significant PEV market demand changes in the region may have been a response to both PEV availability (for example, long-range Chevrolet Bolt was first available in the region in 2017) and EV charging availability (for example, charging network EVgo completed Highway 99 corridor charging through the region in 2017). Regardless of the exact cause, the increased demand has led to increased investment in EV charging in the region. In turn the increased investment has led to increased pressure on local agency permitting and inspection processes and staff.

Regional EV Charging Investment

In early through mid 2017 Electrify America solicited proposals within California (five percent of total submissions came from the San Joaquin Valley region) to inform their Cycle-1 investment in EV infrastructure. Certain Valley stakeholders that were engaging with *Valley Takes Charge!* (through both permitting and awareness activities) at the time submitted proposals to Electrify America. These stakeholders also used CVRP statistics to show that the valley had higher PEV growth rates than some of the state's larger metro areas, and as a result, Fresno was designated a metro area for *Electrify America* Cycle-1 investment. This resulted in an Electrify America investment commitment in both Community Charging and High-Speed Highway Network; that investment continues to be built out through 2019. This turned out to be the only Electrify America investment in the valley region in Cycle-1 as shown in Figure 13.

Figure 13: *Electrify America* Cycle-1 Investment Map

Source: Electrify America

In addition to Electrify America investment in EV charging, the Energy Commission's California Electric Vehicle Infrastructure Project launched an EV charging incentive project in Fresno (Fresno County Incentive Project) in December 2017. That project focuses on Level 2 EV charging incentives for all property types, except single-family residential. To date over $800,000 of California Electric Vehicle Infrastructure Project incentive funds for 211 Level 2 EV chargers at 36 sites have been reserved or issued in Fresno County.

Results of Market Changes and Project Efforts

One result of the increased EV charging investment is a greater number of permit applications, particularly focused within Fresno County. This increased pressure has resulted in some late 2018 *Valley Takes Charge!* requests for assistance and support for EV charging permitting, as previously untested processes and staff have become strained under an increased volume. A key conclusion is that market status (low versus high demand market, for example) has a direct impact on the attention and time local agency permitting staff are willing and able to dedicate to improvement of permitting and inspection processes for EV charging. As the valley market has only just begun to reach EV charging demand levels sufficient to spur local agency interest, efforts at widespread distribution of the resources and toolkits created through *Valley Takes Charge!* should be continued.

A second result has been the emergence of certain electrical contractors focusing on EV charging as a real business opportunity. For example, in late 2018 and early 2019, Turn-Key Construction and Solar Incorporated and Green Commuter both created teams specifically focused on EV charging projects in Fresno County. While neither benefited directly from 2017 *Valley Takes Charge!* contractor trainings, they have since sought out support navigating local agency permitting and inspection processes and are using resources and toolkits developed through the project. Here too sufficient market demand (and investment) was necessary to create sufficient installer interest in EV charging as a business opportunity warranting specialized training and knowledge.

While the team conducted four successful ride and drive and vehicle presentation events to raise awareness with decision makers in the valley, a key take away from this effort is that both automakers and new car dealerships must be fully supportive of efforts within a region to create a high degree of access to PEVs. It may not be common knowledge, but in the valley in 2017 and 2018 not every dealership was authorized to sell PEVs even if PEVs were available from the nameplate the dealership is franchised to sell. This results in new car purchasers traveling long distances to see and try EVs. As well, it results in challenges amongst dealerships in supporting PEV ride and drive events, as the location of a ride and drive event may be within the territory of dealership that does not sell PEVs. The only way to support a ride and drive event requires participation of a competing dealership from a different territory, a significant obstacle for some dealerships and automaker dealer networks.

Recommended Future Actions

With the EV market now beginning to accelerate, the valley is entering a period of even greater need for certain types of EV readiness implementation efforts. First, as noted earlier, distribution of the resources and toolkits created through the *Valley Takes Charge!* project should be continued to now receptive local agencies and local installers. One proven way to continue that distribution would be through EV ombudsman (EV infrastructure technical assistance) services. Such services made available to local agencies, installers and property owners could help to smooth the pain points increased demand and activity have revealed,

Second, the regional micro-siting analysis created as part of the regional PEV readiness plan is now five years old and could be updated. The EV charging investment seen in 2016 through 2019 could be captured in updated analysis, and remaining gaps identified for future

investment. As well, newer modeling techniques may result in a different optimal micro-siting plan, given the greater availability of data (for example, PEV sales, EV charging usage, etc.) than in 2014, as well as increased deployment of infrastructure, which filled maps of the gaps identified in the original analysis.

GLOSSARY

CLEAN VEHICLE REBATE PROJECT (CVRP) - CVRP is intended to encourage and accelerate zero-emission vehicle deployment and technology innovation by providing grants to eligible vehicles.

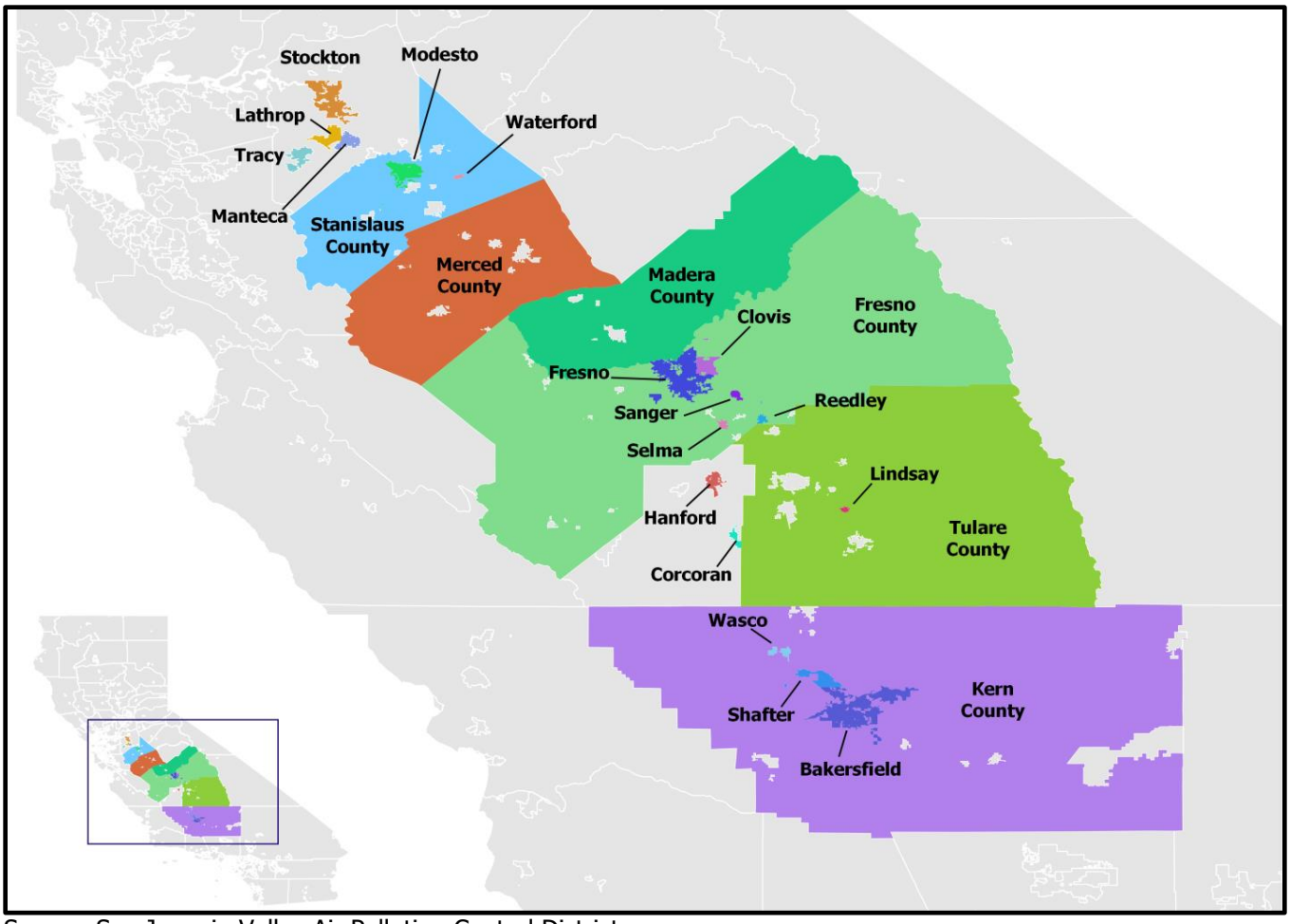
ELECTRIC VEHICLES (EV) – A broad category that includes all vehicles that are fully powered by electricity or an electric motor.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE) - Infrastructure designed to supply power to EVs. EVSE can charge a wide variety of EVs including battery electric vehicles and plug-in hybrid electric vehicles.

PLUG-IN ELECTRIC VEHICLE (PEV) - is 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:
Map of 2016 Survey Responses

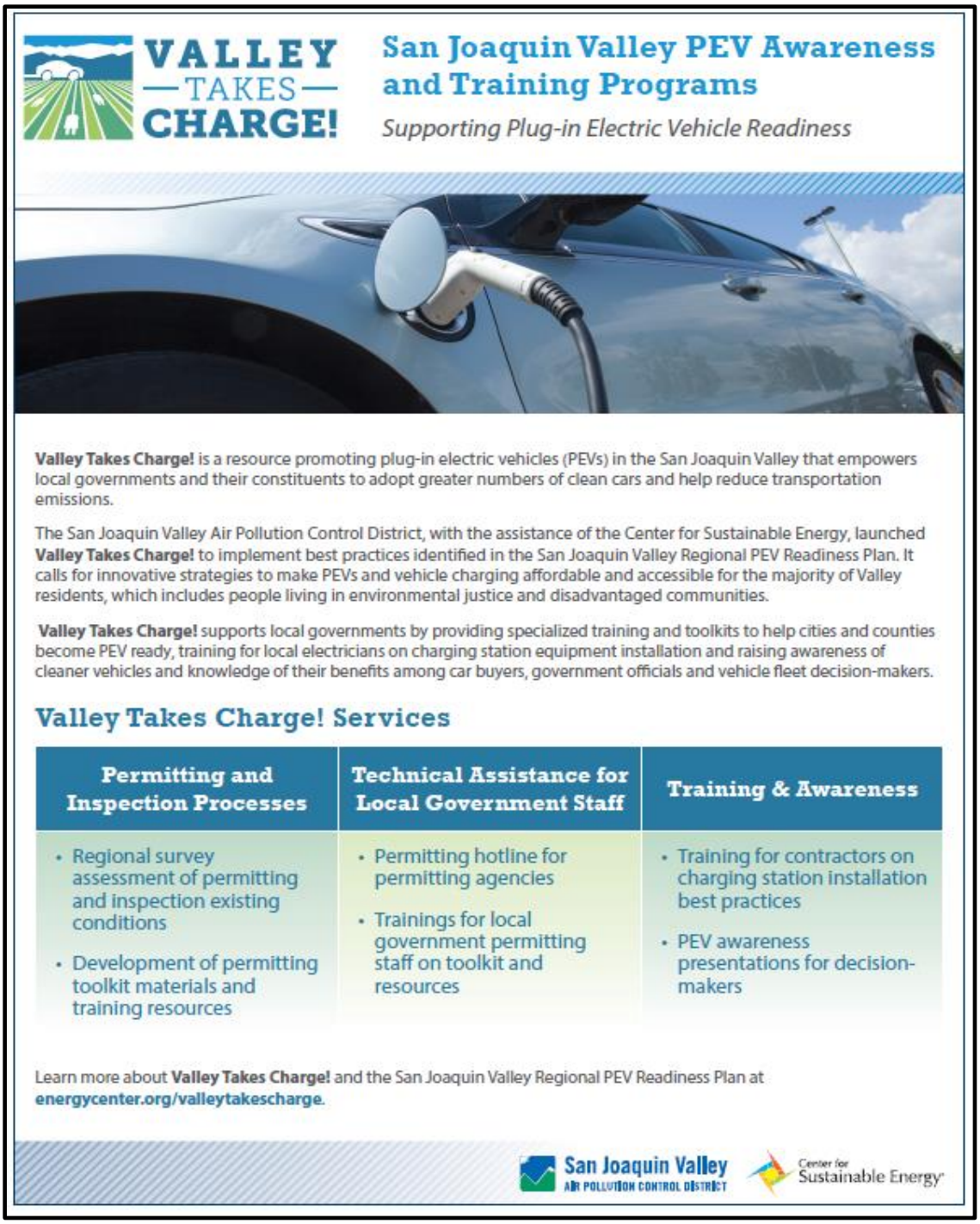
Figure A-1: Survey Response Map



Source: San Joaquin Valley Air Pollution Control District

APPENDIX B:
Outreach Materials

Figure B-1: Valley Takes Charge! Factsheet



VALLEY —TAKES— CHARGE!

San Joaquin Valley PEV Awareness and Training Programs

Supporting Plug-in Electric Vehicle Readiness

Valley Takes Charge! is a resource promoting plug-in electric vehicles (PEVs) in the San Joaquin Valley that empowers local governments and their constituents to adopt greater numbers of clean cars and help reduce transportation emissions.

The San Joaquin Valley Air Pollution Control District, with the assistance of the Center for Sustainable Energy, launched **Valley Takes Charge!** to implement best practices identified in the San Joaquin Valley Regional PEV Readiness Plan. It calls for innovative strategies to make PEVs and vehicle charging affordable and accessible for the majority of Valley residents, which includes people living in environmental justice and disadvantaged communities.

Valley Takes Charge! supports local governments by providing specialized training and toolkits to help cities and counties become PEV ready, training for local electricians on charging station equipment installation and raising awareness of cleaner vehicles and knowledge of their benefits among car buyers, government officials and vehicle fleet decision-makers.

Valley Takes Charge! Services

Permitting and Inspection Processes	Technical Assistance for Local Government Staff	Training & Awareness
• Regional survey assessment of permitting and inspection existing conditions • Development of permitting toolkit materials and training resources	• Permitting hotline for permitting agencies • Trainings for local government permitting staff on toolkit and resources	• Training for contractors on charging station installation best practices • PEV awareness presentations for decision-makers

Learn more about **Valley Takes Charge!** and the San Joaquin Valley Regional PEV Readiness Plan at **energycenter.org/valleytakescharge**.

San Joaquin Valley Air Pollution Control District

Center for Sustainable Energy

Source: San Joaquin Valley Air Pollution Control District

Figure B-2*: Valley Takes Charge!* Ride and Drive flyer

VALLEY TAKES CHARGE!

Power Up for a Plug-In Electric Vehicle Test Drive!

Fresno Council of Goverments, Policy Board Meeting

January 25, 2018, 4pm-5pm

Valley Takes Charge! is bringing plug-in electric vehicle (PEV) test drives to your next meeting. Experience the advantages of driving electric and learn about how public agencies are implementing new vehicle technologies.

After a test drive, **Valley Takes Charge!** Fleet and Facility Services staff will be available to answer questions and share best practices for PEV operations and charging. Our staff are recognized experts in clean transportation planning and facilities, project implementation, fleet services and charging infrastructure.

For more information about **Valley Takes Charge!**
and PEV readiness resources, visit
EnergyCenter.org/ValleyTakesCharge.

Valley Takes Charge! is a program of the San Joaquin Valley Air Pollution Control District and the nonprofit Center for Sustainable Energy and is funded by the California Energy Commission.

Center for Sustainable Energy

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