Charge Ready and Market Education Programs

Pilot Report

May 2016 – March 2018
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1 Executive Summary

The Charge Ready and Market Education programs were developed to support California's policies to reduce greenhouse gas (GHG) and air pollutant emissions and to help meet the state's zero-emission vehicle (ZEV) goals. The Charge Ready program deploys electric infrastructure to support light-duty electric vehicle (EV) charging at customer sites throughout Southern California Edison's (SCE's) service area. At the time of this report, SCE has deployed infrastructure to support 941 charge ports at 60 customer sites, including 462 charge ports (50%) at 36 sites located in Disadvantaged Communities (DACs),[1] significantly exceeding the Pilot's goal of placing 10% of charge ports in DACs. Additionally, the Pilot exceeded SCE's Diversified Business Enterprise 40% spending goal. The architecture and engineering firm and the general contractors selected for Charge Ready were all Diversified Business Enterprises (DBEs).

The Market Education program targets car buyers to help them gain awareness of EVs and the benefits of fueling from the grid. The Market Education program also includes SCE's advisory services, providing education and support related to electrifying fleets, EV charging, reducing GHG footprints, and other transportation electrification (TE) areas for business customers. Each program was designed in two phases, with a smaller-scope Phase 1 Pilot to prepare for a broader Phase 2. This report covers Phase 1 of each program, and demonstrates that the Pilots have achieved their objectives. Based on successfully meeting its objectives for the Pilot, SCE will request California Public Utilities Commission (CPUC) approval of the second phase of these programs. Moving forward with the broader Phase 2 is particularly important in light of the adoption by California Governor Brown of a target of 5 million EVs by 2030[2].

The Charge Ready and Market Education programs support California's GHG- and air-pollution-reduction goals by addressing the following issues resulting from insufficient EV infrastructure, especially in certain market segments.

- Range anxiety continues to be a key roadblock to expediting EV adoption. Access to charging at both home and work is a top priority for EV drivers with workplace charging serving a dual-role: 1) to advance adoption through consumer assurance on available away-from-home charging locations, and 2) to increase electric vehicle miles traveled.[3] SCE's Pilot helps to accelerate EV adoption by meeting a large portion of charging needs at long-dwell-time locations.
- The cost and complexity of deploying charging infrastructure at premises other than single-family homes is another major barrier to EV adoption.[4] For example, while customers with parking facilities may understand the benefits of offering EV charging to their tenants, they may not envision an obvious return on investment. Property owners and managers who provide parking may not have the time or motivation to gain an understanding of a new, complex, and potentially confusing market.
- Developing driver awareness of EVs and their benefits is one of the most important factors for increasing EV adoption and significantly growing the market. Not understanding EV benefits (individual, societal, and environmental) or the differences between internal combustion vehicles, battery EVs (BEVs) and plug-in hybrid EVs (PHEVs) significantly hinders EV adoption[5,6]. Federal, state, and local governments may attempt to address this issue, but only a small amount of public funding is designated to raising consumer awareness.[7] We, SCE, as a utility, together with other stakeholders, is uniquely equipped to meet the need for greater market education focused on the needs and interests of

1 DACs were identified using the California Environmental Protection Agency's (CalEPA) California Communities Environmental Health Screening Tool (CalEnviroScreen 2.0).
2 Executive Order B-48-18.
3 California Air Resources Board, "California's Advanced Clean Cars Midterm Review", January 2017, p. B64, B84-B86, available at https://www.arb.ca.gov/msprog/acc/mtr/acc_mtr_finalreport_full.pdf
4 See "California Transportation Electrification Assessment; Phase 1: Final Report," prepared by ICG International and E3, September 2014, Section 5.2, pp. 46-50, available at http://www.caletc.com/wp-content/uploads/2016/08/CalETC_TEA_Phase_1-FINAL_Updated_092014.pdf [as of October 27, 2014]. Installing charging stations at businesses involves many more factors than home charging, and also includes a more expensive setup. Commercial Level 2 charging station installation costs are an average of $2,500, compared with residential Level 2 costs of $1,300 and residential Level 1 costs of only $200. See "Electric Vehicle Supply Equipment Installed Cost Analysis: 2013 Technical Report," Electric Power Research Institute (EPRI), December 6, 2013, pp. 18, 33, abstract available at http://www.epri.com/abstracts/Pages/ProductAbstract. aspx?ProductId=000000003002000577 [as of October 27, 2014]. As with businesses, charging station installation cost at multi-unit dwellings far exceeds that of single-family residences. Id., pp. 3-5, 3-6.
5 National Renewable Energy Laboratory, "Consumer Views on Plug-in Electric Vehicles – National Benchmark Report", January 2017, p. 11, available at https://www.afdc.energy.gov/uploads/publication/consumer_views_pev_benchmark.pdf
6 International Council on Clean Transportation, "Literature review of electric vehicle consumer awareness and outreach activities", March 2017, p. 2, available at https://www.theicct.org/sites/default/files/publications/Consumer-EV-Awareness_ICCT_Working-Paper_23032017_vF.pdf
7 CEC has funded less than $5 million in consumer education on EVs since 2009 with Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP) funds, out of more than $400 million between 2009 and 2013. See California Energy Commission, DRIVE: California's Alternative & Renewable Fuel & Vehicle Technology Program, Reports, as of June 30, 2013, available at http://www.energy.ca.gov/drive/investing/reports.html [as of October 27, 2014].

customers and drivers within the SCE service territory with a population of 15 million people.

- DACs face additional socioeconomic barriers as well as a concentrated amount of air pollution, mostly caused by petroleum-powered vehicles.[8] Education and outreach will help familiarize customers with available EV incentives and rebates that make EVs more affordable, including special state incentives available to residents of DACs. Providing EV charging infrastructure plus education and outreach in these communities will help increase EV adoption and reduce harmful emissions.

1.1 Charge Ready Pilot Program Description

Charge Ready was developed to reduce barriers to EV adoption by deploying electric infrastructure to support installation of EV charging stations (EV supply equipment, or EVSE)[9] at locations where EVs are usually parked for at least four hours (i.e. long dwell-time locations). These locations provide adequate time for most EV drivers to fully recharge their vehicles with Level 1 and Level 2 charging stations.

The Pilot was open to non-residential customers in the following long dwell-time location market segments:

- Workplaces
- Multi-Unit Dwellings (MUDs), such as apartment buildings
- Fleets
- Destination centers, such as sports arenas or malls

Through Charge Ready, SCE installed and paid all costs for make-ready stubs serving EVSE, and will continue to own and maintain that infrastructure, including:

- Electric distribution infrastructure, such as transformers, service lines, and meters dedicated to EV charging equipment deployed under the program.
- Customer-side infrastructure, such as panels, step-down transformers, wiring and conduits, and stub outs, to allow for EVSE installations.

Participating customers were responsible for procuring, installing, and maintaining qualified EVSEs, including electrical energy and networking costs, but received rebates to reduce the EVSE and installation costs.

To efficiently execute the Pilot and inform stakeholders of progress achieved, SCE established an Advisory Board open to participation by industry stakeholders, and representatives of disadvantaged communities (DACs). The board provided useful input and guidance to SCE during the Pilot implementation and execution.

1.2 Objectives

The objectives of the Charge Ready Phase 1 Pilot were to inform and refine the design and cost estimates of the program, and to develop success measures for Phase 2.[10] Charge Ready objectives included evaluating:

- Processes, including: 1) qualifying charging stations (for example, availability of Level 2 charging stations with load management and demand response (DR) capabilities); 2) procuring deployment-related services (such as sourcing qualified electrical contractors); and 3) validate and refine the Charge Ready Phase 1 filing assumptions about time and costs to deploy EV charging infrastructure at participating customer sites.
- Post-deployment impacts, including analyzing load from the various market segments served by the Pilot and their installed charging stations.[11]

As this report demonstrates, the Pilot successfully achieved its objectives in accordance with the key guiding principles[12] that drove its implementation and execution.

1.3 Implementation

SCE launched the Charge Ready Pilot in May of 2016. The Pilot immediately generated significant interest, with 190 applications received within the first month. SCE stopped accepting new applications in January 2017 as all program funding was reserved for approved sites at that time.

Participating customers were able to select EVSE from different approved models. At the time of this report, there are 61 approved models offered by twelve SCE-qualified vendors, demonstrating SCE's commitment to offering a broad range of charging equipment options to participating customers.

8 California Public Utility Commission, Zero-Emission Vehicles Fast Facts, available at http://www.cpuc.ca.gov/zev/
9 An EVSE may typically include one, two, or four charge ports, with varying costs and demand (kW), SCE uses charge port (rather than EVSE) as the preferred unit to provide detailed reporting about Charge Ready.
10 Testimony In Support Of Southern California Edison Company's Charge Ready Application, Vol. 02 – Phase 1 Charge Ready And Market Education Pilot, p. 3.
11 Post-deployment impacts will be evaluated by SCE using meter interval and EVSE networking data. In addition, customer outreach and recurring surveys to Charge Ready customers will be used to identify parameters to effectively service current customers.
12 See Section 2.2.2 of this report.

SCE completed its first deployment in February 2017, in the City of Lynwood. It included six charge ports to support the City's new EV fleet.

As of the date of this report, SCE has deployed infrastructure to support 941 charge ports at 60 customer sites, including 462 charge ports (50%) at 36 sites located in DACs, significantly exceeding the Pilot's goal of placing 10% of charge ports in DACs. On March 9, 2018, SCE released unused funds reserved for completed sites and re-opened the Pilot to new applications. SCE expects to add approximately 175 additional ports with the recently released funding.

1.4 Market Education

SCE developed a Market Education campaign to generate awareness about EVs and the benefits of fueling from the grid, delivered to a broad audience of potential car buyers through a variety of complementary channels, including paid media (for example, radio) and direct messaging (such as email). SCE developed specific efforts to target customers residing in DACs, including outreach events. With limited funding, SCE's Market Education campaign successfully achieved a 15% recall rate. More information can be found in Section 3 Market Education.

SCE also launched new TE Advisory Services[13] online content in September 2017 to assist business customers in considering and planning for TE deployment through self-service online tools (for example, Charge Port Estimator), fact sheets (on topics such as managed charging through **vehicle-grid integration**).

SCE has been sharing these new TE tools and content with customers via one-on-one interactions, as well as promoting the tools in larger community and industry forums. For example, when discussing a customer's desire to install charging stations at its site, the Charge Port Estimator tool can be used to provide a helpful estimate of the number of charge ports the customer may need. Based on this conversation, the customer may submit an application to the Charge Ready Program, or the conversation may simply serve as a helpful reference point for customers who may want to install stations on their own if they do not meet the requirements of the program. Since the launch of updated web pages with content specific to Workplace Charging, Public Charging, Fleet, and MUDs, we have seen a significant increase in unique site visitors with a total count of 620 unique visitors for all four market segments' web pages (a nearly 300% increase in Q4 2017 over Q3 2017) and page views (a nearly 200% increase in Q4 2017 over Q3 2017).

Additionally, as part of TE Advisory Services, SCE launched in-person services in January 2018. More information can be found in Section 3.2 TE Advisory Services.

1.5 Conclusions

Phase 1 of the Charge Ready program successfully achieved its objectives. With infrastructure to support 941 charge ports deployed thus far, the Pilot allowed SCE to develop and improve processes to qualify a broad range of charging stations with DR capabilities from multiple vendors. It also provided real-life data about the time and costs to deploy EV charging infrastructure at participating customer sites, and helped SCE refine some of the assumptions included in its initial plans.

In addition, the Pilot confirmed customer interest in a program to deploy utility-owned infrastructure on the customer side of the meter to serve customer-owned charging equipment while maintaining market and technology neutrality, with high satisfaction expressed by participating customers.[14]

Phase 1 of the Market Education program demonstrated the need for greater public education about EVs and the benefits of fueling from the grid. The initial response to TE Advisory Services also confirmed a business customer interest for more technical assistance from a trusted energy advisor to help navigate the complexities of adopting and deploying TE technologies.

SCE plans to file an application in the second quarter of 2018 to seek approval of Phase 2, with changes based on the lessons learned documented in this report.

13 Sce.com/TE
14 Overall satisfaction of participating customers surveyed by SCE averaged 9.2 out of 10, with 100% of customers rating the program between 8 and 10.

2 Charge Ready Pilot

2.1 Pilot Design

The Charge Ready program was designed to offer customers a key solution for the electrical infrastructure necessary to support EV charging. To remove barriers to deploying EV charging, as part of the Pilot, SCE constructed the electric infrastructure needed to serve EVSE at participating customer locations, and will continue to own and maintain that infrastructure. The Pilot also offered customer participants a rebate to reduce the cost of acquiring and installing qualified EVSE. The rebates were calculated as a percentage of the EVSE base cost, as shown in the table below:

Table 2.1 Pilot Rebate Levels by Market Segment

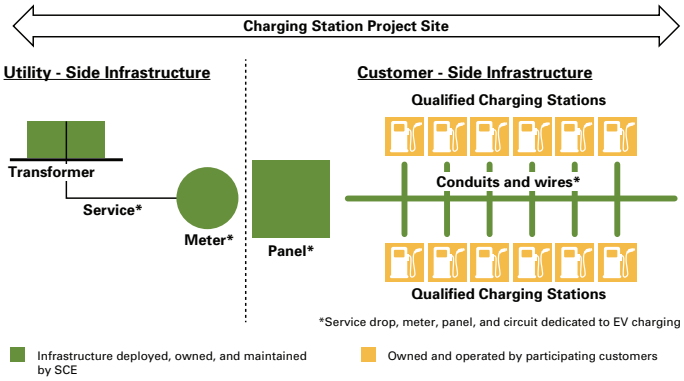
Market Segment	Rebate (% Base Cost)[15]
All segments in DACs	100%
MUDs	50%
All other segments (workplaces, fleets, and destination centers)	25%

Customer participants must procure, operate, and maintain the charging stations in accordance with the terms and conditions of the Pilot.

Customer participants established their own policies about charging station use (for example, access to charging stations and financial contributions from EV drivers). However, customers with Level 2 charging stations must participate in a Charge Ready DR Pilot.

SCE deployed electric infrastructure, on both the customer and utility sides of the electrical meter, to serve the charging stations at participating customer locations, up to and including the "make ready" stub.[16] Figure 2.1 shows a diagram of a Charge Ready Project Site.

Figure 2.1 Charge Ready Model



SCE established a clear end-to-end process and aimed to support efficient charging station deployment while minimizing disruption for participating customers. SCE established procedures to determine the number of charging stations approved at each site, and deployed supporting infrastructure based on existing and anticipated EV adoption at each participating site. The customer participants, together with SCE, approved the final site plan. To participate in SCE's program, most sites had to support a minimum of ten charge ports. A minimum of five ports was required for sites in DACs.[17] Participating customers had to procure qualifying charging stations and their installation directly from qualified suppliers for interconnection to SCE's supporting infrastructure. SCE offered a rebate for the procurement and installation of qualified charging stations, in an amount that reflected a percentage of the base cost[18] for functionalities established by SCE.

15 Charge Ready rebates, combined with other rebates or programs, cannot cover more than 100% of the charging station costs.
16 Includes customer-side and utility-side infrastructure.
17 DACs were identified using the California Environmental Protection Agency's (CalEPA) California Communities Environmental Health Screening Tool (CalEnviroScreen 2.0).
18 SCE defined the base cost as "The amount representing the best value for a Charging Station and its installation, as determined by SCE through primary or secondary market research." (Schedule CRPP). The base cost was determined by conducting an analysis for each of the charging station level categories using pricing information submitted by approved Charge Ready vendors. SCE evaluated several combinations to develop a fair comparison among single- and multiple- connector EVSEs. SCE determined a price per port for each of the qualified models and configurations, and used the lowest price per port within each EVSE category, to determine the base costs.

2.1.1 Customer and Site Eligibility

The program was open to SCE customers who met the following criteria:

Customer Eligibility

- Qualified as non-residential customers (business, government)
- Met the program's guidelines for EV adoption
- Owned, leased, or operated a long-dwell-time parking site (4+ hours)
- Provided a grant of easement from the property owner
- Delivered proof of purchase of qualified charging equipment

Site Approval

- Granted by SCE on a first-come, first-served basis that meet Pilot cost thresholds
- Required agreement from customers on the number of charging stations and their site locations (as proposed by SCE)
- Required a minimum of ten charging stations (reduced to five in DACs) in up to 4% of parking spaces (unless existing adoption demonstrated higher demand)

In addition, program participants were required to own and operate qualified charging stations for at least 10 years, pay for operating costs (such as energy, maintenance, repairs, and the EV network), and also provide non-Personally Identifiable Information (PII). Customers with Level 2 charging stations must also participate in a Charge Ready DR Pilot and any future DR program.

SCE focused its efforts on DACs, which are disproportionately affected by low EV adoption and the negative environmental impacts of gasoline- and diesel-powered vehicles. SCE managed the Pilot to ensure a minimum of 10% of all charge port installations were deployed in DACs. By March 2018, out of the 1,066 charge ports funded through the program, 50% are located in DACs. Out of the 43 sites in DACs, 27 sites have less than 10 ports per site. On average, there were 12 ports per site in DACs.[19] Appendix A shows the breakdown by market segment in DACs and non-DACs of sites with reserved funding as of March 2018.

19 In comparison, non-DAC sites have an average of 20 ports per site.

2.1.2 Pilot Objectives

The CPUC approved guiding principles for the Charge Ready Pilot.[20] These principles are listed below as a reference, and the body of this report will describe how each of these requirements was successfully met.

Table 2.2 Pilot Objectives

Pilot Objective	Pilot Summary	For more information, refer to Pilot Report Section
	Guiding Principles	
1. Support the Governor's and California state goals, including: A. Achieve installation of grid-integrated infrastructure to support 1 million ZEVs by 2020[21]. B. Accelerate the adoption of 1.5 million ZEVs by 2025[22]. C. Support clean air and climate change objectives.	The 941 charge ports deployed thus far in the Pilot provide grid-integrated infrastructure and support the acceleration and adoption of ZEVs. Based on meter data from participating customers, 214.7 metric tons (MT) of carbon dioxide equivalent (CO2e) was reduced from the charging stations installed from February 2017 through January 2018. These GHG emissions reductions are direct emissions reductions based on displacing conventional gasoline -powered vehicles with electric vehicles. The Pilot will likely further reduced GHG emissions through indirect benefits of the Pilot, such as accelerated EV adoption.	Section **2.3** Section **2.7.4**
2. Support the acceleration of a competitive EV charging market and encourage innovation, while maintaining market-neutral customer engagement.	SCE developed a Request for Information (RFI) to find and approve charging stations that meet the Pilot's requirements, reduce barriers for Pilot participants in procuring charging stations, and promote competition in the EV charging market.	Section **2.6.1**
3. Maintain customer choice.	At the time of this report, the Pilot offered 61 models from 12 vendors, maintaining customer choice and market-neutral customer engagement.	Section **2.6.1**
4. Remove barriers to deploying EV charging.	SCE constructs, owns, and maintains the electric infrastructure needed to serve EVSE at participating customer locations. The Pilot also offered customer participants a rebate to reduce the cost of acquiring and installing qualified EVSE.	Section **2.2**
5. Ensure the customer participant site infrastructure is installed and maintained in safe working order.	The Pilot required SCE employees and subcontractors installing make-ready infrastructure to follow safety requirements. For infrastructure safety, all site plans were submitted to the appropriate Authority Having Jurisdiction (AHJ) for approval and permitting. Some AHJs required approval from multiple agencies, such as Building and Safety, Electrical, and Fire Department Planning. For charging station safety, all installations were per AHJ-approved plans, and were inspected by AHJ inspectors.	Section **2.5.2**
6. Enable EV load management to support the grid in a manner that delivers benefits to all SCE customers.	SCE required DR capabilities for Level 2 charging stations and required customers selecting those charging stations to participate in a DR program.	Section **2.6.1** and Section **4**

20 D.16-01-023, p. 7.
21 Executive Order B-48-18 established a goal to put 5 million ZEVs in California by 2030.
22 Executive Order B-48-18 established a goal to install 250,000 vehicle charging stations in California by 2025.

Pilot Objective	Pilot Summary	For more information, refer to Pilot Report Section
7. Evaluate customer participant strategies that give EV drivers the opportunity to maximize fuel cost savings relative to conventional transportation fuels.	Based on initial analysis of the load profiles from the different segments, Destination Centers and Workplaces appear to be good candidates for load shifting strategies, while Destination Centers, Fleets, and Multi-Unit Dwellings are better candidates for a traditional DR strategy. Different segments are better suited to different types of events based on when they typically use electricity. However, all segments will be included when all types of events are called. DR concepts that will be tested are based on incentives. Through participation in future DR programs, our customers will have reduced fuel costs.	Section **2.7.3**
8. Manage program costs.	Establishing cost thresholds[23] for various segments to manage program costs and to fulfill demographic goals of 10% of infrastructure installed in DACs.	Section **2.11**
9. Provide representative data (by different market segments, and across DACs, load management strategies, and pricing models) to allow for meaningful evaluation and comparisons, and to inform Phase 2 and future EV policy.	As Charge Ready installations were completed, detailed analyses were conducted, to understand the utilization of EVSE and track growth in terms of the number of Charge Ready sites, charging ports, charging sessions, average connection times, average charge times, and the amount of kWh consumed. SCE will continue to analyze submitted charging data, and expects to gain significant learnings as the users mature and develop more consistent charging patterns and behavior.	Section **2.7.3**
10. Identify and incorporate best practices for future EV infrastructure deployment.	SCE identified and recorded lessons learned, issue resolutions, and recommendations for a future program phase.	Section **2.6**
11. Support SCE's company-wide Diversified Business Enterprise (DBE) spending goal of 40%.	The architecture and engineering firm and general contractors selected for Charge Ready are all DBEs.	Section **2.4**
12. Provide services in line with legislative goals (Senate Bill [SB] 535 [de León, 2013] and SB 1275 [de León, 2014]) to serve DACs and increase access to clean transportation.	SCE focused on DACs, which are disproportionately affected by low EV adoption and negative environmental impacts of gasoline- and diesel-powered vehicles. By March 2018, of the 1,066 charge ports at 70 sites funded, 50% or 535 charge ports at 43 sites are located in DACs.	Section **2.8**
13. Complement other utility clean energy programs and other non-utility programs, such as those being implemented pursuant to the Charge Ahead California Initiative established by SB 1275, which will build consumer demand for clean energy and clean vehicles.	In addition to the Charge Ready demand response Pilot, Charge Ready also complemented other clean-energy programs, such as the Clean Fuel Rewards Program in which EV drivers may be eligible to receive a $450 rebate. SCE has been promoting this alongside its promotion of Charge Ready.	Section **2.3**

23 Using costs estimated during design stage, which are used to determine if a project meets cost thresholds to move forward in the process.

Pilot Objective	Pilot Summary	For more information, refer to Pilot Report Section
	Settlement Agreement[24]	
1. Utilization for Level 1 and Level 2 EVSEs by Market Segment, including DACs.	As Charge Ready installations were completed, SCE analyzed the utilization of EVSE using SCE meter data.[25] Customers and vendors are required to submit monthly usage data for 10 years following the installation and SCE will continue to analyze charging data, and expects to gain significant learnings as the users mature and develop more consistent charging patterns and behavior.	Section **2.7.3**
2. Comparisons of different customer participant load profiles and load management strategies, including the use of price signals by customer participants to charging station users.	SCE's analysis of the load profiles from the different segments indicates that Destination Centers and Workplaces are ideal potential candidates for load shifting strategies, while Destination Centers, Fleets and MUDs are likely better candidates for traditional DR strategies. See Section 4.0 for DR load management for a description of incentives/pricing signals to promote participation. As the Charge Ready Demand Response pilot is executed throughout 2018, aggregated data on customer participation to DR events and response to price signals will be developed, compiled, shared and reported during the 2018 Transportation Electrification Advisory Board quarterly meetings.	Section **2.7.3**
3. Information about charging station costs, levels and types of preferred features, and rebate amounts reserved or paid to date.	At the time of this report, 70 customers with 1,066 charge ports have submitted their charging station procurement documents. The majority of customers selected Level 2B charge ports and dual-port connectors. A few customers purchased extra features including cable management, customized charging station wraps, and pole retractor.[26]	Section **2.6.2**
4. Conversion of EV charging hours into avoided GHGs and identification of other grid benefits and implications, as appropriate.	Based on meter data for participating customers, 214.7 metric tons (MT) of carbon dioxide equivalent (CO2e) was reduced from the charging stations installed from February 2017 through January 2018. Further GHG reductions can be attributed to the Pilot's indirect benefits, such as accelerated EV adoption. Calculation methodology for the 214.7 MT of CO2e is described in Section 2.7.4	Section **2.7.4**
5. Insights learned by SCE about the effect of the program on the EVSE and EV market.	The 941 charge ports deployed thus far in the Pilot support the acceleration and adoption of ZEVs. As an example of increased EV adoption, Mr. Kenny Tang of Cathay Bank in El Monte observed that several employees started driving EVs after the site installed charging stations with 17 ports through the Charge Ready pilot.[27, 28]	Section **3.0**

24 Application 14-10-014, Motion for Approval of Settlement Agreement, p. A-1.
25 SCE meter data aggregates energy load and does not show session data, charging duration, or connection times per port. Vendor-submitted data does show session data, for example, but is currently unreliable for reasons such as missing data due to charging station or network issues and in some cases did not match SCE meter data.
26 Based on customer-submitted final invoices.
27 Shared with permission from customer participant.
28 Based on EPRI data, the sales of EVs in year 2017 was 30 percent higher than EV sales in year 2016 in SCE territory. Additionally, the share of EV-sales-to-total-vehicle-sales increased from 3 percent in year 2016 to 4 percent in year 2017 in SCE territory. SCE has not determined exact attribution Charge Ready pilot to additional EV sales.

2.2 Pilot Operations

2.2.1 Enrollment and Deployment Status

At the time of this report, SCE has committed funds for a total of 1,066 charge ports, with 50% located in DACs. **Appendix A** shows a breakdown of the 1,066 charge ports by city and zip code. On March 9, 2018, SCE released unused funds reserved for completed projects and re-opened the Pilot to new applications. SCE expects to add approximately 175 additional ports with the recently released funding. The following two figures provide the charge port distribution by market segment and customer type for the 1,066 charge ports:

Figure 2.2 Charge Ports by Market Segments

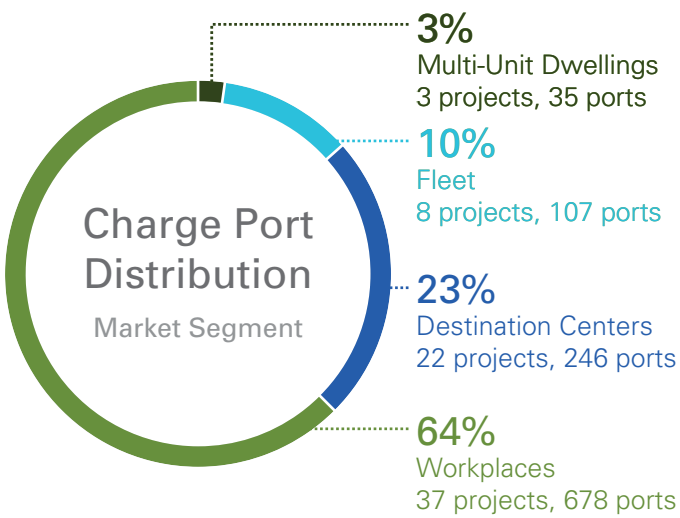
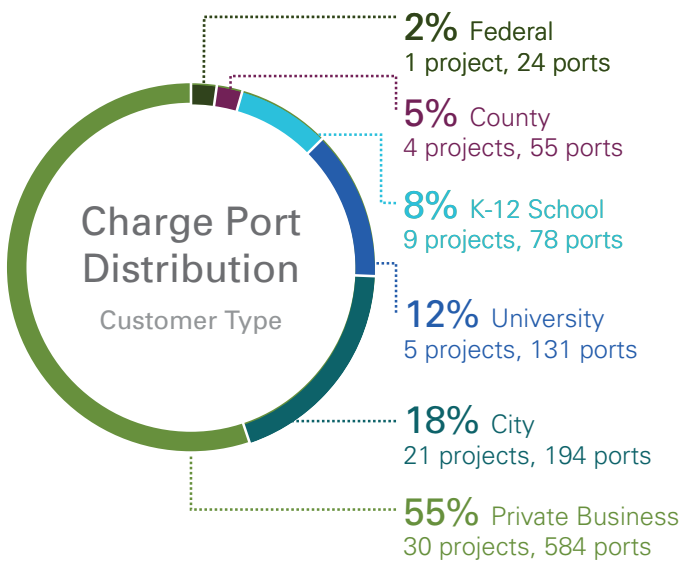


Figure 2.3 Charge Ports by Customer Type



2.2.2 Application Process

The Pilot's application process was designed to accommodate customer needs and promote customer choice. The process can be described in six stages: Engagement, Evaluation, Confirmation, Planning and Design, Construction, and Verification.

Process Overview

- **Engagement** began with a customer submitting an application indicating their interest in participating in the Pilot. This application is called **Step 1 – Notice of Intent**.
- **Evaluation** followed the application submission. SCE conducted on-site assessments to evaluate the feasibility of deploying charging stations through the Pilot.
- **Confirmation** of the customer's participation, including the customer's approval of the number of charging stations and deployment locations at each site (as proposed by SCE). SCE reserved funding (if available) upon receipt of **Step 2 – Agreement**, signed by the customer and property owner.[29]
- SCE then conducted **Planning and Design** for the approved site, while the customer participant procured qualified charging stations. At the end of the procurement period, customer participants had to provide the required proof of purchase using **Step 3 – Certification**[30]. In addition, customers who applied for charging stations for fleet EVs were also required to provide their DMV registrations, or evidence of vehicle purchase or lease.
- SCE then conducted **Construction** for the approved site. Before construction began, SCE held a pre-construction meeting with the customer participant. Once the infrastructure was completed and passed inspection, the customer participant's selected charging station vendor installed the charging stations.
- Finally, **Verification** took place, to ensure the electric infrastructure and charging systems were deployed in accordance with approved plans (using **Step 4 – Walk-Through Report** and **Step 5 – Rebate Confirmation**); SCE then issued the rebate.

Waitlist Process

SCE established a waitlist for customers that did not meet program timelines, or whose applications exceeded funding availability. Waitlisted projects can move forward in the process if other projects with reserved funding drop out of the program or if funding becomes available.

2.3 Successes

The Pilot was met with enthusiasm by the marketplace. SCE's initial outreach resulted in 334 applications totaling 2,043 charge ports. The Pilot was fully subscribed by January 2017 based on estimated costs. As described in section 2.4.1 below, evaluation of applications resulted in a smaller number of sites and associated charge ports being deployed within the available Phase 1 Pilot funding. At the time of this report, the Pilot has deployed infrastructure to support 941 charge ports with additional 62 charge ports in construction. SCE expects to deploy infrastructure to support up to 1,250 charge ports by the Pilot's completion. The infrastructure supports EV acceleration and adoption. As an example of increased EV adoption, Mr. Kenny Tang of Cathay Bank in El Monte observed that several employees started driving EVs after the site installed charging stations with 17 ports, confirmed that through their participation in the workplace segment several employees have started driving an EV that weren't doing so before the charging stations were installed.

29 Charging stations were procured by customers only after the Step 2 Agreement was signed and SCE reserved funding.
30 The Step 3 procurement and preliminary site design period began once customers executed their Step 2 agreements and funds were reserved for the customers' applications. This period allowed 30 calendar days from fund reservation, and customers were provided an additional 15 days if they submitted extension requests. SCE also offered, at its discretion, additional extensions if the customers were actively procuring charging stations. Customers who did not meet these timelines were subject to being placed onto a waitlist. SCE Account Managers encouraged customers to begin this process early to comply with the Pilot's timelines.
31 Division of State Architect provides design and construction oversight for K–12 schools, community colleges, and various other state-owned and leased facilities. See http://www.dgs.ca.gov/dsa/home.aspx

2.4 Pilot Operations Lessons Learned and Potential Improvements

2.4.1 Customer Engagement and Evaluation

SCE reviewed customer applications and conducted on-site assessments to determine the feasibility of deploying charging stations. The following table shows lessons learned and recommendations to improve the customer engagement and evaluation stage of the Pilot.

Table 2.3 Customer Engagement and Evaluation Lessons Learned and Recommendations

Program Phase	Lessons Learned	Resolution/Recommendation
Site Assessment	Program Timing: Several schools were not able to conduct the program's EV survey (to help identify existing and future EV adoption at the site) during the summer months when they were not in session. Also, the Pilot was launched in late May, and many businesses had already set their budget plans for the following year, creating a challenge for those interested in the program.	SCE will propose a five-year program which will resolve any seasonal/annual timing issues and will allow customers sufficient time to plan appropriately for participation.
Eligibility Requirement	SCE proposed deploying a maximum number of customer-site charging stations, to meet anticipated use. For some DACs, maximum use supports the minimum program requirement of five charge ports. This presents a challenge for customers who prefer dual-port stations.	In DACs, customers who were approved for a maximum of five ports but selected dual-port stations were allowed to deploy six ports. The additional port also reduced the overall cost per port for those projects.
	The 10-charge port minimum requirement was a challenge for some customers in non-DACs.	In the future phase, SCE may reduce the minimum port requirement fewer than 10 to support increased adoption across all targeted segments.
	Some customer sites were not viable in the Charge Ready program due to high costs. Customers who are willing to pay excess costs were unable to do so.	SCE will consider submitting a proposal that allows customer cost-sharing in future programs. Several customers specifically requested this option and indicated they would have moved forward, if allowed to do so. This question was often brought up by customers whose applications were rejected because they exceeded the program's cost thresholds.
Application Support	Another challenge during the Pilot was the lack of automation in processing applications. Follow-up e-mails and notifications to customers and their selected vendors were drafted and sent manually for each project. Due to the Pilot's short duration, SCE focused its spending on charging station infrastructure rather than an application processing system to support the Pilot.	SCE will evaluate automation in processing applications where appropriate.

2.4.2 Application Process

SCE assisted customers through the Pilot application process. After customers signed the Step 2 agreement and SCE reserved funding, customers submitted their Step 3 certification. The following table shows lessons learned and recommendations to improve the application process of the Pilot.

Table 2.4 Application Process Lessons Learned and Recommendations

Program Phase	Lessons Learned	Resolution/Recommendation
Step 2 - Agreement	The Pilot experienced varied and at times lengthy customer delays to execute the Step 2 Agreement. The average cycle time from site assessment completion to Step 2 Agreement completion was 72 business days.	Our solution to minimize these delays was to have a continuous dialogue between SCE Account Managers and customers. In the future phase, SCE may establish different timelines for customers in different market segments. For example, SCE may allow more time for government customers due to their specific approval processes (e.g. school board, DSA[32], or city council approval).
	Some customers withdrew from the Pilot after SCE incurred design costs for these withdrawn projects, which reduced the funding available to other customers who wanted to participate in the program.	SCE will improve the Pilot processes and future program design to minimize the design costs incurred before customers confirm their charging station procurement. For example, SCE may request proof of procurement at an earlier stage in the process. In the future phase, SCE may require a deposit from the customers and will focus on communicating termination fees and how they are applied, before customers sign their agreements, to help ensure mutual customer and SCE commitment.
Step 3 - Procurement	Customers experienced difficulty contacting the approved charging station vendors on SCE's Approved Package List.	SCE gathered and published detailed contact information for approved vendors, including direct contacts to the vendors' sales departments, which resolved the issue.
	After signing their program agreements, customers were required to provide proof of purchase of their charging stations within 30 calendar days. SCE found a majority of submissions to be incomplete or inaccurate.	SCE made changes to improve document completeness and accuracy. Customer form instructions were updated, charging station vendors were reminded of the requirements, and SCE's project management organization worked closely with customers to submit accurate documents, after which SCE experienced an improvement in the quality of customer submissions.
	Most customers require more than 30 calendar days to procure the EVSE. Customers who submitted proof of purchase averaged 44 business days. Federal, university, and municipal customers took longer than average, while business, school, and county customers were faster than average (see Appendix for additional information on market segments). Most customers requested two extensions, with some needing additional extensions. As a result, SCE experienced delays in starting construction at these customers' sites.	SCE waitlisted 8 customers who exceeded procurement deadlines, including extension deadlines. Of the 8 customers, 5 eventually moved forward and 3 were rejected. SCE may recommend different program requirements for government and institution customers to accommodate their unique internal processes., To improve construction timelines in the Pilot, SCE adapted by purchasing some materials ahead of time to reduce lead times.

32 Division of State Architect provides design and construction oversight for K–12 schools, community colleges, and various other state-owned and leased facilities. See http://www.dgs.ca.gov/dsa/home.aspx

Program Phase	Lessons Learned	Resolution/Recommendation
Step 3 - Procurement	A number of customers submitted incomplete procurement documents, which delayed deployment design completion and construction start.	For a future phase, SCE will change materials to add an in-depth requirements overview at the initial customer meeting. The procurement requirements could also be included in educational materials. Vendors could be trained and responsible for ensuring their supporting documents include the necessary elements. Additionally, a Step 3 requirements meeting, in which the Account Manager reviews all Step 3 requirements, may be added to the process.

2.4.3 Pre-Construction Process

While the customers procured the charging stations, SCE completed and presented the deployment design to the customers. Once the customers approved the design and SCE received all supporting documents required with Step 3 - Certification, SCE completed other pre-construction requirements such as applying for permits and ordering materials. The following table shows lessons learned and recommendations to improve the pre-construction stage of the Pilot.

Table 2.5 Pre-Construction Lessons Learned and Recommendations

Program Phase	Lessons Learned	Resolution/Recommendation
Requirements	Initially, SCE required a two-step process to obtain easements. First, property owners were asked to sign contingent easements that provided "blanket" easements over their entire properties. The intent of contingent easements was to move applications through the design and construction processes. Once the final design was complete and accepted by the customer participants, SCE amended the contingent easements to encompass only the charging station infrastructure locations. Several customers were resistant to executing contingent easements over their entire properties. Additionally, the contingent easements caused delays in receiving the customers' signed program agreements, due to additional time needed for customers' legal review.	In Q1 2016, as a process improvement, SCE bypassed the contingent easement and only required execution of the final easement. The final easement reflected the final charging station design and location. Requiring customers to execute final easements only resolved delays in moving applications through the design process and receiving customers' signed program agreements.
	SCE experienced delays in executing final easements. Average cycle time was 59 business days; 37% of projects took more than 59 business days, and some took up to 234 business days, causing construction delays. For some customers, more time was needed for management and legal easement document review.	While the easement process was mentioned in the Charge Ready participation package and at Account Manager meetings with customers, for the future phase, SCE will ensure customers thoroughly understand the easement process during the early application stages and will recommend customers' management and legal team review easements early in the process. SCE has begun discussing the easement with customers and providing the easement template during the first three customer touchpoints, and is asking customers to have their management and legal personnel begin reviewing the easement template at the beginning of the project.

Program Phase	Lessons Learned	Resolution/Recommendation
Site Design	Customer-requested re-designs for alternate charging station locations caused delays at a small number of sites, including some of the Pilot's highest port sites.	SCE will explore limiting or defining the number of customer re-design requests allowed, and deadlines for such requests.
Pre-Construction	The Pilot required a separate panel and separate service for the charging stations. This is more costly than using an existing panel and service line at the customer site.	For a future phase, SCE will evaluate the feasibility of using customers' existing panels and service lines. This approach would be limited to customers with existing panels that can support new charging station load.
	Program requirements in the Charge Ready Pilot did not facilitate use of planned and/or existing infrastructure at new construction sites. Capitalizing on construction already underway could reduce program costs significant but coordination and contractual obligation agreements with developers will be key.	SCE will evaluate program requirements and offerings to determine the most feasible and cost-effective way to deploy charging stations at new construction sites. These offerings may include but are not limited to rebates for sites that exceed CalGreen building code and early coordination with project developers to plan and deploy charging stations.
	Construction delays in meter panel manufacturing and delivery occurred early in the Pilot. Panels were custom-ordered specifically for each individual site; and for warranty purposes, the manufacturers had requirements to build and fully test the panels. These meter panel delays caused initial site construction delays.	SCE started ordering meter panels early in the design process to avoid construction delays. SCE also expanded the number of meter panel manufacturers to ensure all sites could be supported. The SCE team also began awarding projects earlier in the scheduling and construction coordination process to mitigate this delay. The SCE team and Charge Ready general contractors also identified alternate sources for panel procurement, reducing material lead time. For a future program phase, SCE may bulk order standardized meter panels based on grouped site requirements to eliminate construction delays.

2.4.4 Construction

By March 2018, utility- and customer-side infrastructure construction was completed for 60 projects with a total of 941 ports. Based on these projects, the overall average cycle time for infrastructure construction was 44 business days, not including charging station installation. Destination centers had an average cycle time of 54 days for infrastructure construction, workplace sites took 38 days, fleet sites 37 days, and MUD sites 43 days. The following table shows lessons learned and recommendations to improve the construction stage of the Pilot.

Table 2.6 Construction Lessons Learned and Recommendations

Program Phase	Lessons Learned	Resolution/Recommendation
Resources	The first projects were awarded to general contractors that did not have sufficient resources to support concurrent projects during that time period, which contributed to delays in SCE's ability to award construction projects.	In Q2 2017, SCE added an additional general contractor, for a total of three contractors, to support construction through the remainder of the Pilot.
Construction	SCE experienced construction delays due to a handful of customer requests for specific outage dates or construction start delays at their sites.	In a future phase, SCE will work with customers to commit to pre-scheduled outages earlier in the process.
Charging Station Installation	A charging station vendor challenged the infrastructure completed by SCE as it does not include the mounting fixture.	Standard charging station footprints could accommodate standardized make-ready infrastructure and mounting fixtures, which would lower overall costs. Pedestal-based EVSEs from different manufacturers can have slightly different dimensions (or "footprints"). In order to accommodate this, the make-ready installed by SCE is generic so that the customer can use the mounting fixtures provided by the EVSE vendor to accommodate the EVSE of their choice. This process and make-ready specifications are explained in both customer and EVSE-facing documentation. If the make-ready installed by SCE follows the template required by a specific manufacturer, then customer choice in EVSE models would be limited and predefined early in the process. The development of standard charging station footprints could accommodate standardized make-ready infrastructure and mounting fixtures, which could lower overall costs.[33]

2.4.5 Post-Construction

SCE conducted post-installation verification to confirm equipment installation and operability are consistent with approved plans. Once verified, SCE provided rebate checks to customers. The following table shows lessons learned and recommendations to improve the post-construction stage of the Pilot.

Table 2.7 Post-Construction Lessons Learned and Recommendations

Program Phase	Lessons Learned	Resolution/Recommendation
Charging Station Maintenance	Some vendors left the marketplace post-purchase. Service and maintenance may not be available for the products offered by these vendors. Charge port data and cloud services may be impacted.	During the charging station qualification process, SCE inquired about vendors' ability to service and support their products by asking about backup replacement stock and availability of service personnel. In a future phase, SCE will modify contract language to help protect customer investments.
Rebate	Delays were experienced in receiving the required final documentation from charging station vendors and customers.	SCE continually followed up with customers and their selected vendors on their missing documentation before releasing their charging station rebates. In a future phase, SCE may minimize the requirements and request documentation earlier in the process.

33 See https://www.evsolutions.com/Upload/Product/636035262081975030.pdf, page 15 for an example of a pedestal footprint.

2.4.6 MUDs

The Multi-unit Dwelling (MUD) segment represents a large and growing opportunity to reduce Southern California's GHG emissions. Most MUD tenants are renters and over 50% of renters are "rent burdened."[34] MUD tenants must rely on their landlords or Homeowners' Associations (HOAs) to provide or allow EV charging services. Based on our interactions with MUD owners during the course of the Pilot we received feedback that some are more likely to provide upgrades to the facilities that benefit most tenants as opposed to amenities like charging stations that may benefit fewer tenants.

As described in section 2.10.3 of this report, SCE conducted surveys of MUD customers that were contacted through our outreach efforts but did not participate in the program. Thirty two percent of survey respondents show that installing charging stations at their sites were of a low priority; addressing their concerns should increase their motivation for installing them.

SCE concentrated its Pilot efforts on outreach to the MUD owners. However, more traction in this segment may be possible by marketing directly to tenants and encouraging them to convey their needs to their landlords.

Finally, MUDs also had other unique challenges with charge port installation in the Charge Ready pilot.

Identified challenges are listed below:

Table 2.8 MUDs Lessons Learned and Recommendations

Lessons Learned	Resolution/Recommendation
Parking limitations were the most pervasive constraint for all MUDs. Because most spaces were already assigned to residents; it was difficult for the owners or property managers to allocate sections of parking stalls for charging station installations. While some commercial customers would have liked this option also, most went ahead with a deployment in one area of their parking lot. MUDs felt it would be especially burdensome to ask their residents to have to park on the opposite side of a large residential complex. The Pilot also required port count to not exceed 4% of the number of total parking spaces (unless EV adoption supports additional ports), which prevented MUDs with smaller parking lots from participating.	Allowing parking lots adjacent to the MUD property to be eligible for the program if they can serve those MUD residents. However, this will require increased coordination with different site hosts and may add cost and complexity to the program. SCE proposes to lower port minimum requirement as well as eliminate minimum parking lot size to address participation barriers.
For customer convenience, large MUD complexes often wanted to deploy charging stations throughout the grounds, rather than in single, defined areas. This required multiple service connections and exclusive infrastructure components resulting in high costs that exceeded Pilot thresholds.	SCE will work with site hosts to learn more about customers parking management best practices and incorporate learnings earlier in process to help address deployment location concerns.
As with all parking structures, MUDs with parking structures faced challenges in meeting current state accessibility requirements, which required more work. In some cases, AHJs required MUDs to update all parking areas to current codes.	SCE proposes to eliminate parking lot size requirements which would allow for an option of curb side charging deployment. Allowing parking lots (non-parking structure) adjacent to the MUD property to be eligible for the program if they can serve those MUD residents. However, this will require increased coordination with different site hosts and may add cost and complexity to the program.
Due to space constraints, it could be difficult to find viable locations for switchgear, transformers, and other necessary equipment for charging station deployment.	Capitalizing on construction already underway could address space constraints but coordination and contractual obligation agreements with developers will be key.

2.5 Contractors

2.5.1 Supplier Diversity

The architecture and engineering firm, as well as the general contractors selected for Charge Ready, were all Diversified Business Enterprises (DBEs). This exceeded SCE's Diversified Business Enterprise 40% spending

2.5.2 Training and Safety

SCE values safety, and ensured the utility and the customer participant site infrastructures were installed and maintained in safe working order. The Pilot required SCE employees and subcontractors installing the make-ready infrastructure to follow these safety requirements:

- All general contractors must prepare and adhere to a job-specific Job Hazard Analysis (JHA).
- All general contractors must have a dedicated safety officer or manager who regularly visits the job site.
- Safety tailboards must be held daily to discuss the work to be performed and any potential risks.

34 See: http://www.hcd.ca.gov/policy-research/plans-reports/docs/California's-Housing-Future-Main-Document-Draft.pdf "California's Housing Future: Challenges and Opportunities, Public Draft – Statewide Housing Assessment 2025", January 2017, figure 1.20, p. 15.

- All general contractors must submit a monthly safety report to SCE.
- SCE personnel must follow all site safety regulations, including wearing appropriate personal protection equipment.
- Subcontractor electricians must hold valid California C-10 licenses.
- Electricians installing the make-ready infrastructure must be EV Infrastructure Training Program (EVITP) certified.

For infrastructure safety, all site plans were submitted to their AHJs for approval and permitting. Some AHJs required multi-agency (for example, Building & Safety, Electrical, and Fire Department Planning) approval. For charging station safety, all installations were completed per AHJ-approved plans, and inspected by AHJ inspectors.

2.6 Charging Stations

2.6.1 Overview

In accordance with our testimony,[35] the Pilot installed charging stations at long-dwell-time locations. The three types of charging stations that met those needs were:

1. Level 1 charging system, without network capability.
2. Level 2 "A" charging system, with network capability integrated into the EVSE.
3. Level 2 "B" charging system, with network capability provided by an external device (such as a kiosk or gateway) shared among multiple stations.

SCE required DR capabilities for Level 2 charging stations, and customers selecting those stations are required to participate in a future DR program. SCE developed an RFI to find charging stations with these capabilities and qualify them for the Pilot to reduce customer participant barriers in procuring charging stations and to promote competition in the EV charging market. The Approved Package List (APL)[36] summarizes the vendors and EVSE models available to customers. By March 2018, the Pilot offers 61 models from twelve vendors, maintaining customer choice and market-neutral customer engagement. Appendix C provides a summary of the different charging system types. To further reduce barriers to adoption, SCE provided a rebate to reduce charge port cost and installation (the base cost, defined in Section 2.2). The base cost values at the time of this report are shown in the following table. During the Pilot, these values were updated once on December 2016 due to models that were dropped from the APL.

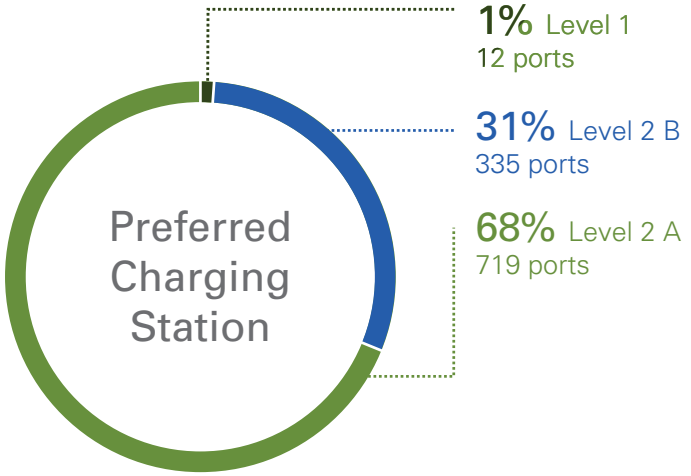
Table 2.9 Charging Stations Base Cost

Charging System Type	Base Cost ($ per port)
Level 1	$1,396
Level 2 "A"	$2,188
Level 2 "B"	$1,611

2.6.2 Customer Charging Stations

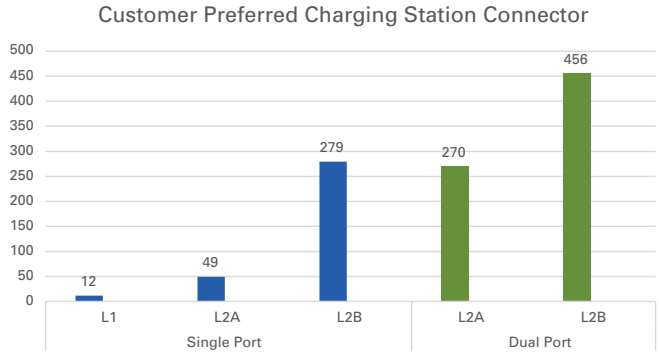
By March 2018, 70 customers with 1,066 charge ports had submitted their procurement documents for the charging stations. The following chart displays customer charging station selection.

Figure 2.4 Customer Preferred Charging Station Type



The following graph shows that more customers preferred dual-port connectors for both Level 2A and Level 2B charge ports. Installing dual port charging stations reduced infrastructure costs from construction-related work (e.g., reduced trenching and restoration).

Figure 2.5 Customer Preferred Charging Station Connector



35 Testimony In Support Of Southern California Edison Company's Charge Ready Application, Vol. 03 – Phase 1 Charge Ready And Market Education Pilot, p. 10.
36 The Pilot's Approved Package List can be found on the landing page at https://on.sce.com/chargeready.

2.6.3 Rebate

By the end of February 2018, 35 rebate payments were released.

The following table provides a summary of charging station requests and rebates.

Table 2.10 Charging Station Rebate Update

Charging Station Rebates	
Rebate amount reserved for Level 1 ports	$19,356
Rebate amount reserved for Level 2A ports	$358,993
Rebate amount reserved for Level 2B ports	$774,318
Rebate amount paid for Level 1 ports	$-
Rebate amount paid for Level 2A ports	$237,642
Rebate amount paid for Level 2B ports	$243,289

SCE reviewed the final invoices submitted by the customers for projects with paid rebates to determine the customer cost of charging station and installation after rebate. The following tables show the average customer cost per port by market segment in DAC and non-DAC sites.

Table 2.11 Average Customer Cost per Port after Rebate in non-DACs

Market Segment	Number of Sites	Total Number of Ports	Avg. Charging Station and Installation Cost/port	Average Rebate/Port	Average Cust. Cost/port after Rebate
Destination Center	6	104	$2,268.99	$435.83	$1,833.16
Fleet	1	10	$1,819.00	$489.50	$1,329.50
Multi-Unit Dwelling	1	10	$2,147.80	$979.00	$1,168.80
Workplace	5	131	$2,427.01	$439.95	$1,987.06

Table 2.12 Average Customer Cost per Port after Rebate in DACs

Market Segment	Number of Sites	Total Number of Ports	Avg. Charging Station and Installation Cost/port	Average Rebate/Port	Average Cust. Cost/port after Rebate
Destination Center	10	62	$2,371.34	$1,800.95	$570.39
Fleet	3	22	$2,488.65	$1,842.33	$646.31
Workplace	9	121	$3,879.71	$1,779.11	$2,100.60

2.6.4 Charging Stations Lessons Learned and Recommendations

Through an RFI process, the Charge Ready team identified challenges and recommends potential improvements for a future phase of the program, as described below:

- Through the Pilot, SCE tested and approved charging stations.[37] **SCE learned the importance of testing charging stations and approving the EVSE into the program.** Some EVSE did not pass evaluation, for reasons such as failing to pass the momentary outage test, failing to stop the charge session even when charging has been completed, unknown charging interruptions, missing OpenADR 2.0b or UL certifications, ventilation and other safety issues. In a future phase, SCE will explore options for testing and may continue testing EVSE directly or through a third party to be approved in the program and ensure safe, reliable charging stations.
- **Several EVSE vendors were not ready for the program upon enrolling.** Even though the RFI describes the technical requirements, some vendors submitted packages but were still in the process of receiving UL or OpenADR certification, or receiving other updates. This may have been a mistake from the vendors that delayed the RFI process and kept them "on hold" in our testing queue for a good deal of time. It also required significant back-and-forth communication to follow up on missing requirements. During Q4 2017, for the equipment still in the testing queue from previous RFI submissions, the Charge Ready team started setting firm deadlines to receive equipment, and recommends the same approach in a future program phase. The average cycle time for equipment testing was 127 days.
- **New vendors submitted responses to RFIs for equipment that was already approved for the Pilot.** SCE also required re-sellers to submit the EVSE documentation and supply the stations for testing even if the specific model was already approved. SCE implemented this requirement to understand the re-sellers' ability to service and support their products. In these cases, SCE conducted the entire RFI process, testing, and building out new pricing analyses. SCE did not originally expect re-sellers to participate in the Pilot. Instead, SCE had anticipated that only direct vendors would handle the sale of the EVSEs to customers in the Pilot. Because of this new information discovered through the Pilot, the team learned it is important to establish a procedure for accepting and approving re-sellers for pre-approved charging stations.

37 SCE stopped accepting new model submissions from new or existing vendors as of Q3 2017 because the Pilot was fully subscribed and most customers had already selected their charging stations at that time.

- **SCE encountered vendors changing model numbers during the testing process, and submitted different model numbers than originally listed in the RFI response.** This made it challenging to match models with the RFI response, manuals, pricing templates, and nameplate labels on the test equipment, making some parts of the testing process more difficult. Some information is not requested in the RFI, such as gateway model numbers, differentiation between L2A and L2B, and firmware version number, and needs to be acquired from the vendor prior to approval. This requires extensive coordination with the vendor. SCE worked closely with vendors during the tech evaluation process to get the equipment approved that would meet the tech requirements. This process helped vendors learn what it takes to deliver equipment and services. Simply rejecting the equipment that presented these issues would have been quicker, but would also mean far fewer options for customers, which could have had an impact on Pilot participation. For a future phase, SCE intends to create a supplemental document that the vendor signs and submits at the end of testing. This document would capture all the information that may have changed during testing, and also a method to c onsolidate all the emails that go back and forth between SCE and the vendor to acquire this information.

- Energy management systems, which are considered a new technology, are encouraged by vendors in their RFI introductions. **A standard procedure to test energy management systems does not exist** as these systems were just permitted under California Code after January 2017. The Pilot had to adapt at that point and develop evaluation methods to ensure safe function and approve them for Pilot customers. Such systems, in the right circumstances, can reduce the electrical infrastructure needed to serve a number of cars, as long as operating conditions permit. Also, the RFIs do not cover compliance standards, such as NEC Article 750 or UL 916, for these systems. In the Pilot, there were two vendors who submitted these systems and made it through the RFI review, and specific procedures were drafted to accommodate these vendors. For a future phase, SCE will develop a standard procedure for testing and approving energy management systems to be used in the Charge Ready program.

- Although OpenADR 2.0 and network communication were requirements for EVSE to be approved for the Charge Ready Pilot, preparation for the Charge Ready DR Pilot discovered that actual executions to meet the requirements varied by EVSE vendor. For example, at least one vendor does not support the ability for chargers to "throttle" to a lower capacity of charging, but only turn chargers off or on. Some vendor systems also do not require an e-mail address or phone number from drivers using their chargers, making it difficult to notify drivers when events are called that could impact their charging. SCE is testing whether the lack of these features on certain EVSEs will impact future DR participation in the Charge Ready DR Pilot. SCE will report its findings in the Advisory Board meetings as the Pilot progresses. Also SCE will use the findings from the Pilot to develop specifications for EVSE vendor capabilities to enable increased participation in future demand response programs. Finally SCE, through continual post-deployment analysis, will exclude vendors that cannot meet or execute the requirements of future DR programs.

2.7 Charging Station Operation

2.7.1 Rate Schedules

Customers with low load factors are more costly to serve because their utilization is volatile. Therefore, utilities must size transmission and distribution systems accordingly. Under current CPUC-approved tariffs, some of these costs are passed on to customers via demand charges, which are measured in kW. These are different from energy consumption charges, which are measured in kWh.

Charge Ready customer participants who had general service accounts located at their premises could select available EV rates with Facilities-Related Demand (FRD) charge offset options.

For Rate Schedules TOU-EV-3-B, TOU-EV-4, and TOU-EV-6, FRD charges are determined using the FRD in excess of the primary account located at the same premises (the customer of record must be the same for both accounts). If the FRD from EV charging is less than the FRD of the primary service account (within any given monthly billing period), no separate FRD charge is due for the qualifying EV account. This is also known as demand neutralization.

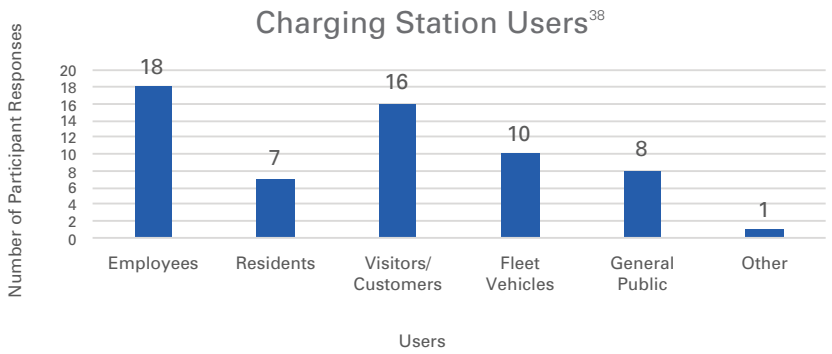
The majority of Pilot participants are selecting TOU-EV-4 due to the estimated load expected by the number of charging stations being deployed at the site. TOU-EV-3 is for customers with peak demand under 20kW. Any site with a minimum of 5 6.6kW Level 2 stations will exceed this threshold. TOU-EV-6 is for sites with over 500kW peak demand and only one of the sites is expected to exceed this threshold. Also, the demand neutralization feature of the EV-4 rate made it more attractive for customers with an existing service account at the site compared to the traditional TOU-GS rate option with full demand charges.

2.7.2 Charging Station Access and Use

As customer participants own and operate their charging stations, they determine charging station access and pricing policies.

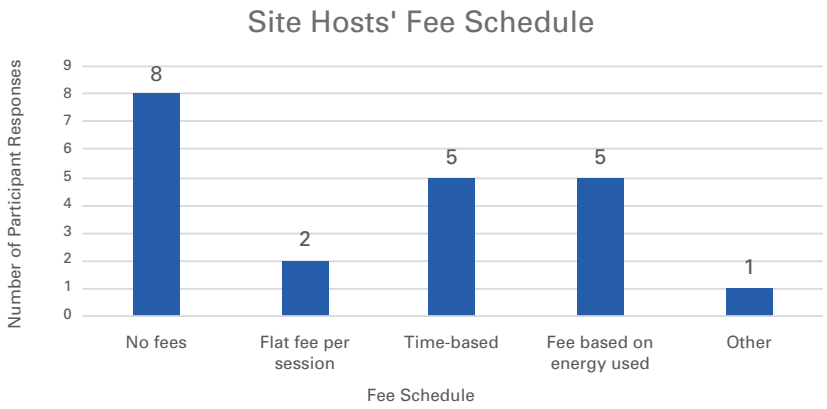
Charge Ready invited participants to complete customer satisfaction surveys to determine how the program met expectations. The survey methodology is described in Section 5. The survey asked participants questions related to charging station accessibility and how end-user fees were assessed, if any. By the end of January 2018, survey invitations were sent to 25 participants, representing 34 sites. SCE received responses from 20 participants. The following chart shows charging station accessibility at their sites.

Figure 2.6 Charging Station Users



The following chart shows charging station fee schedule set by the site hosts. The data is limited to responses made by the customers to the survey described in Section 2.9 Customer Satisfaction. SCE plans to conduct more customer surveys to learn about charging station fees, accessibility, and incremental EV adoption. SCE will report its findings in the Advisory Board meetings when available.

Figure 2.7 Site Hosts Fee Schedule



2.7.3 Charging Station Utilization and Customer Participant Load Profiles

As Charge Ready installations were completed, SCE analyzed EVSE utilization and tracked the number of Charge Ready sites, charging ports, and kWh consumed. SCE collected and analyzed meter data[39] at each Charge Ready program Pilot site. At each site, the bank of charging stations was connected to a single meter, allowing SCE to measure the aggregated load and determine its grid impact. The charts below show the average usage per port by month for each market segment from June 2017 to February 2018.[40]

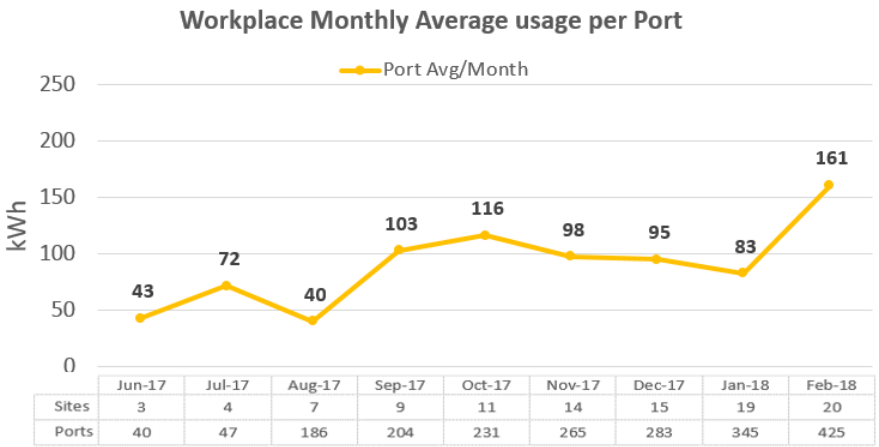
Workplaces grew from 3 sites and 40 ports in June 2017 to 20 sites and 425 ports in February 2018 and have shown fairly consistent growth in the average usage per port. Destination Centers increased from 4 sites and 24 ports in June 2017 to 21 sites and 222 ports in February 2018. Fleets increased from 2 sites and 15 ports in June 2017 to 4 sites and 32 ports in February 2018. Average usage per port has fluctuated at Fleet sites, but reached the highest usage in January and February of 2018. No Multi-Unit Dwelling sites were live until October 2017, but have grown from 1 site and 10 ports to 3 sites and 35 ports in February 2018. Instances of lower usage per port from one month to the next at Workplaces, Destination Centers and MUDs may be a result of new sites and additional ports being installed, but not being fully utilized right away. Utilization at newly installed ports should increase over time with more awareness of charging station availability.

38 "General public" are where the EVSEs are accessible by anyone, not only to residents, employees, or visitors to the site.

39 SCE meter data aggregates energy load and does not show session data, charging duration, or connection times per port. Vendor-submitted data does show session data, for example, but is currently unreliable for reasons such as missing data due to charging station or network issues and in some cases did not match SCE meter data.

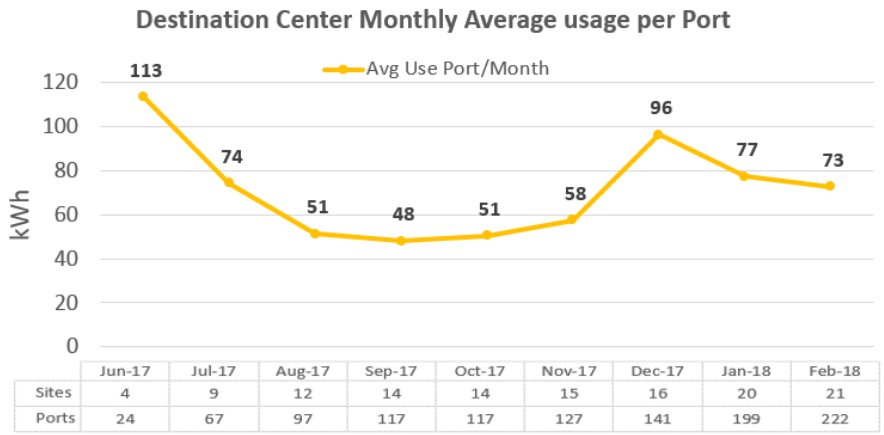
40 Charts were updated and corrected to show the monthly average usage per port rather than original charts which showed the combined totals of the average usage per port per site.

Figure 2.8 Workplaces Monthly Average Usage per Port



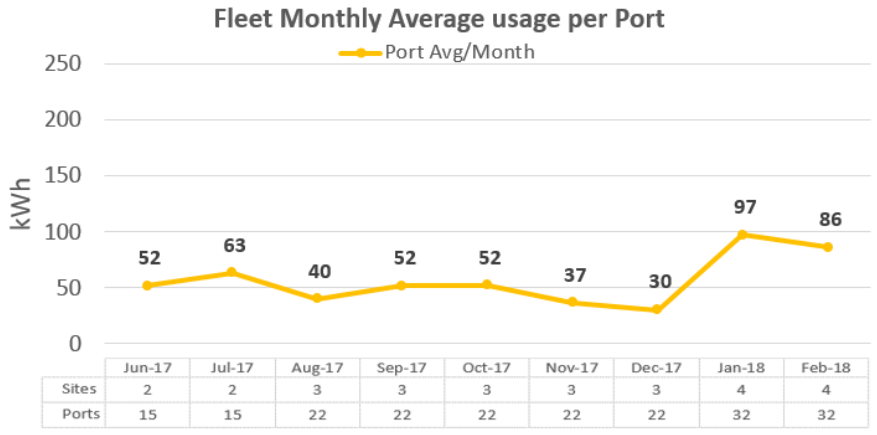
	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18
Sites	3	4	7	9	11	14	15	19	20
Ports	40	47	186	204	231	265	283	345	425

Figure 2.9 Destinations Center Monthly Average Usage per Port



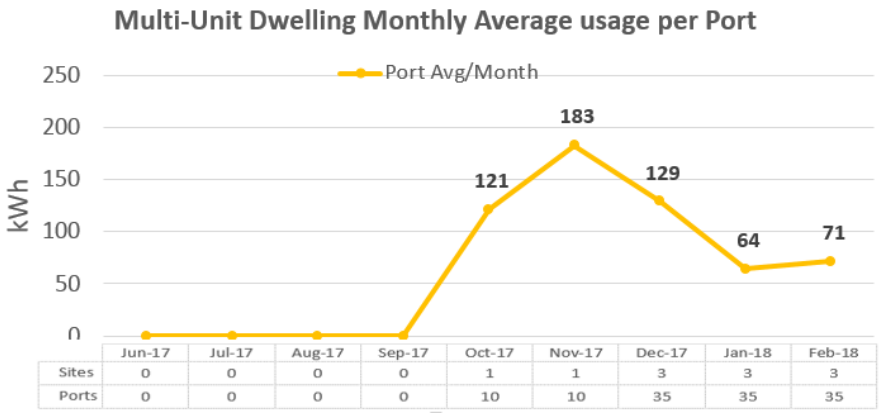
	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18
Sites	4	9	12	14	14	15	16	20	21
Ports	24	67	97	117	117	127	141	199	222

Figure 2.10 Fleets Monthly Average Usage per Port



	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18
Sites	2	2	3	3	3	3	3	4	4
Ports	15	15	22	22	22	22	22	32	32

Figure 2.11 MUDs Monthly Average Usage per Port



SCE also analyzed the charging station load profiles to design the DR Pilot. The following charts show February 2018 usage data from workplaces, destination centers, fleets, and multi-unit dwellings. Based on analysis of the load profiles, different segments are better suited to different types of events based on when they are consuming electricity. However, all segments will be included when both types of events (load shifting and load reduction) are called. Destination Centers and Workplaces may be good candidates for load shifting strategies as significant charging load exists during the time of day prior to sunrise and during solar generation ramp up, while Destination Centers, MUDs and Fleets may be the best candidates for traditional DR or load reduction strategies as significant load exists after sunset and during residential peak energy usage times in early to late evening. The Charge Ready DR Pilot (see Section 4.0) will include both traditional DR and load shifting events, but will most likely only reduce charging capacity by throttling to 50%. However, communication to customers and end users (either through the customer or the EVSE/EVSP vendor) will be utilized for all events.

Figure 2.12 Workplaces – Weekday Average Usage

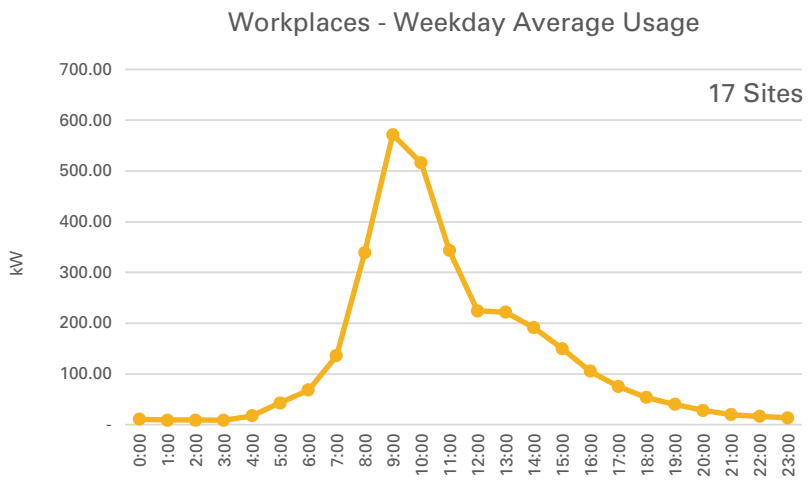


Figure 2.13 Workplaces – Weekend Average Usage

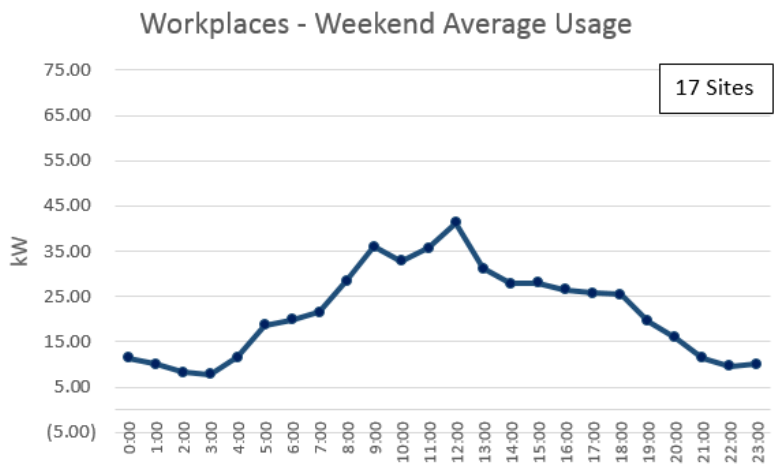


Figure 2.14 Destination Centers - Weekday Average Usage

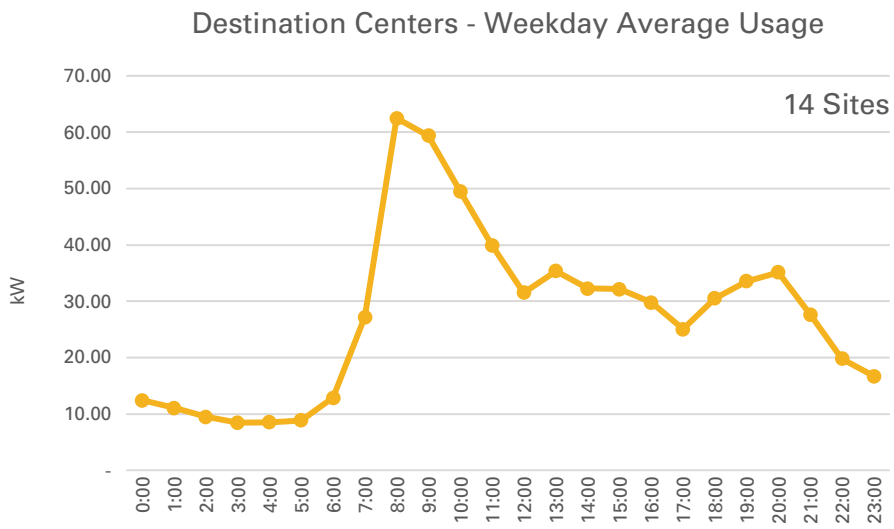


Figure 2.15 Destination Centers - Weekend Average Usage

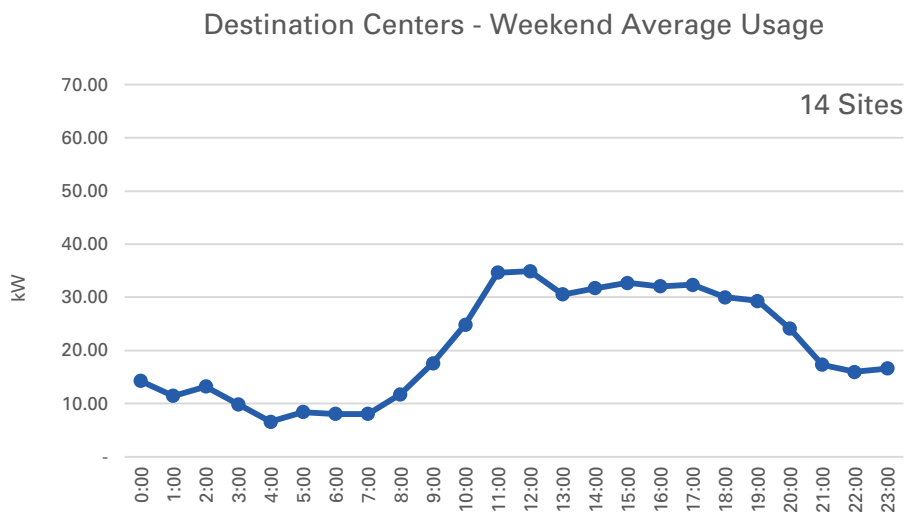


Figure 2.16 Fleets - Weekday Average Usage

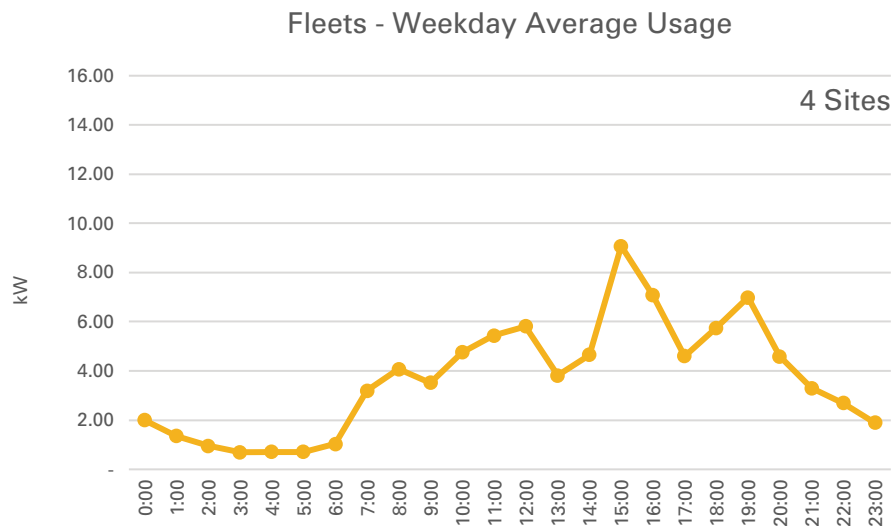


Figure 2.17 Fleets - Weekend Average Usage

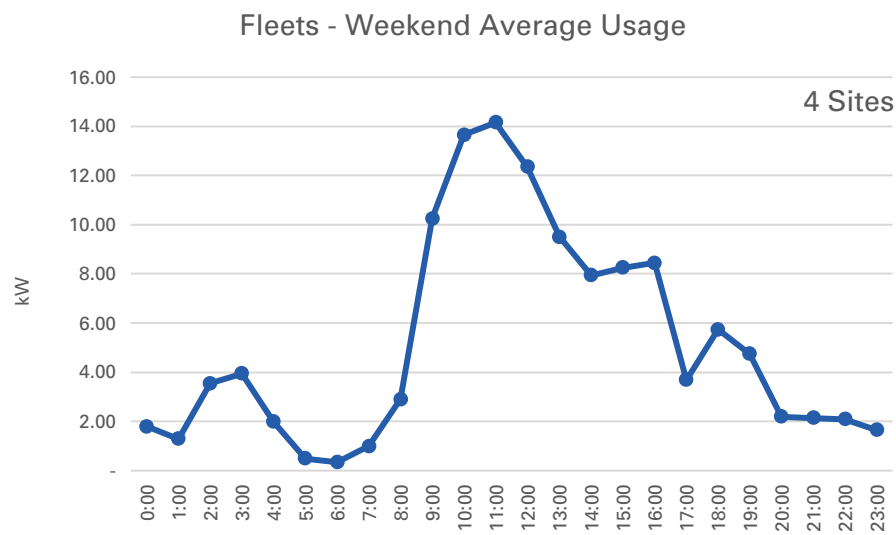


Figure 2.18 MUDs - Weekday Average Usage

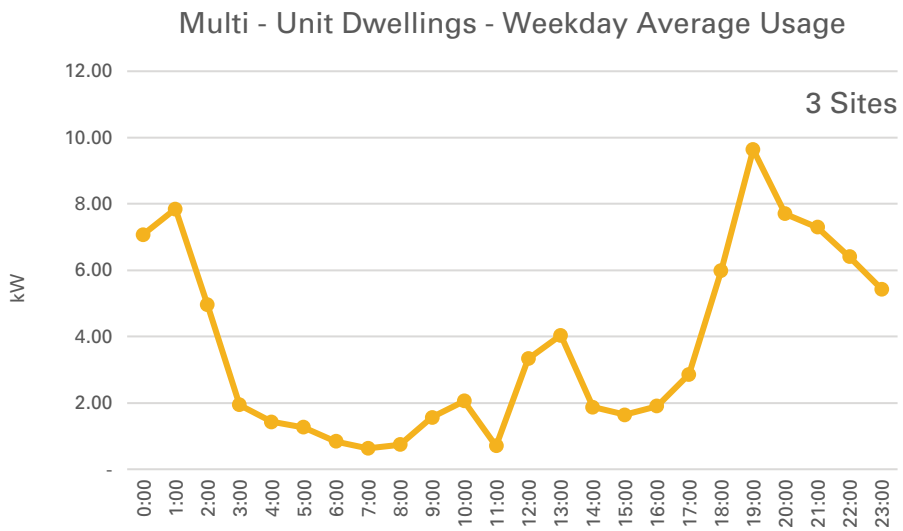
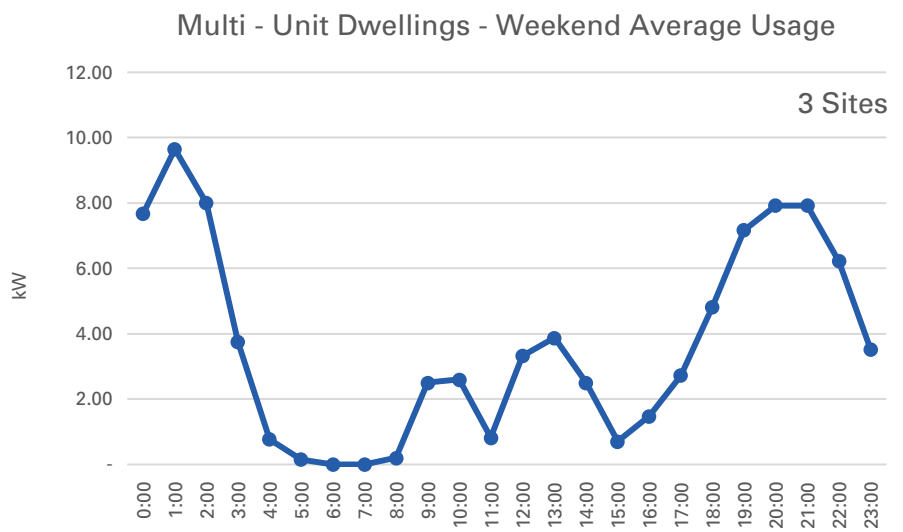


Figure 2.19 MUDs - Weekend Average Usage



The figures above indicate that, on average, workplaces experience a higher level of charging on weekday mornings and consistent level of charging during weekdays. Destination centers, on average, experience higher levels of charging in the morning with usage on weekend afternoons. Fleet sites, on average, experience higher levels of charging on weekday afternoons and during mid-day on weekends. Finally, MUDs, on average, experience similar patterns of charging with higher usage at night on weekdays and weekends. SCE will continue to analyze submitted charging data, and expects to gain significant learnings as the users mature and develop more consistent charging patterns and behaviors.

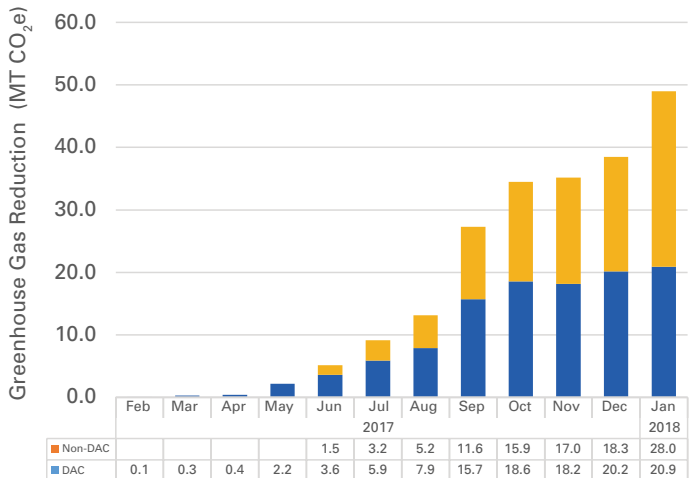
2.7.4 Avoided Greenhouse Gases

A total of 214.7 metric tons (MT) of carbon dioxide equivalent (CO_2e) was reduced from the charging stations installed from February 2017 through January 2018. For comparison, reducing 214.7 MT CO_2e emissions equates to planting over 5,500 coniferous trees in an urban setting and allowing them to grow for 10 years.[41]

These GHG emissions reductions are direct emissions reductions based on displacing conventional gasoline-powered vehicles with electric vehicles. SCE used participating customer meter data to calculate displacement of gasoline-powered vehicle miles. Actual GHG emission reductions are likely even greater than those presented in this report due to indirect benefits of the Charge Ready Pilot program. For example, the increased presence of charging stations enhances public awareness of EV technology; it also decreases range anxiety in both current EV drivers and potential EV drivers, which can encourage EV adoption and increase electric vehicle miles driven.

The following figure presents a summary of the estimated GHG emissions avoided per month attributed to the Charge Ready Pilot charging stations (based on electricity throughput) for both DAC and non-DAC sites.

Figure 2.20 Greenhouse Gas Emissions Reductions from the Pilot



	Feb	Mar	Apr	May	Jun	Jul 2017	Aug	Sep	Oct	Nov	Dec	Jan 2018
Non-DAC					1.5	3.2	5.2	11.6	15.9	17.0	18.3	28.0
DAC	0.1	0.3	0.4	2.2	3.6	5.9	7.9	15.7	18.6	18.2	20.2	20.9

Methodology: For the purposes of calculating avoided GHG emissions, SCE used the California Air Resources Board's (CARB's) Low Carbon Fuel Standard regulation guidance. SCE calculated metric tons (MT) of carbon dioxide equivalent (CO_2e) using the following equation:

$$MT\ CO_2e = (CI_{gasoline} - CI_{electricity}/EER) \times Energy\ Density \times EER \times kWh \times 10^{-6}$$

Carbon intensity (CI) is the measure of GHG emissions associated with producing and consuming a fuel throughout its lifecycle, which is measured in grams of CO_2e per megajoule (MJ). The CI of gasoline is 99.78 g CO_2e/MJ.[42] The CI of SCE electricity delivered in 2016 is 66.65 g CO_2e/MJ.[43]

The Energy Economy Ratio (EER) is a dimensionless value that represents the efficiency of a fuel as used in a powertrain as compared to a reference fuel. EERs are often a comparison of miles per gasoline gallon equivalent (mpge) between two fuels. EER for light- and medium-duty EVs is 3.4.[44]

The Energy Density of electricity is 3.6 MJ/kWh.[45] SCE collected meter data to determine the amount of electricity used each month of the Pilot program, starting in February 2017 and continuing through January 2018.

2.8 Disadvantaged Communities

SCE focused its efforts on DACs, which are disproportionately affected by low EV adoption and the negative environmental impacts of gasoline- and diesel-powered vehicles. SCE managed the Pilot to ensure a minimum of 10% of all charge port installations were accorded in DACs.

As a general rule, to participate in SCE's program, each site had to support a minimum of ten charge ports. However, in DACs, SCE reduced the minimum number of ports required to five, with a 100% rebate toward the charging station base cost.

The Pilot was a success in DACs. Of the 1,066 charge ports with reserved funding to date, 50% (535 charge ports) are located in

41 USEPA. Greenhouse Gases Equivalencies Calculator - Calculations and References. Available at: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

42 Based on CARB's Low Carbon Fuel Standard, Table 6: Carbon Intensity Lookup Table for Gasoline and Fuels that Substitute for Gasoline. CARBOB - based on the average crude oil supplied to California refineries and average California refinery efficiencies. Available at: https://www.arb.ca.gov/regact/2015/lcfs2015/lcfsfinalregorder.pdf. Accessed: February, 2018.

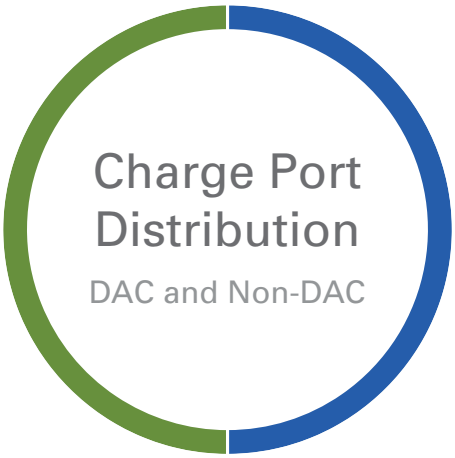
43 Based on SCE's CO2e emissions from delivered electricity in 2016. Available at: https://www.edison.com/content/dam/eix/documents/investors/corporate_responsibility/2016-eix-corporate-responsibility-and-sustainability-report.pdf. Accessed: November, 2017.

44 Based on information available in ARB's Low Carbon Fuel Standard. Available at: https://www.arb.ca.gov/regact/2015/lcfs2015/lcfsfinalregorder.pdf. Accessed: February, 2018.

45 Based on information available in ARB's Low Carbon Fuel Standard. Available at: https://www.arb.ca.gov/regact/2015/lcfs2015/lcfsfinalregorder.pdf. Accessed: February, 2018.

DACs, which greatly exceeds the Pilot's requirement to deploy 10% of charge ports in DACs.

Figure 2.21 Charge Ports in DACs and Non-DACs



50% Non-DAC
27 projects, 531 ports

50% DAC
43 projects, 535 ports

During the Pilot, SCE conducted six outreach events in DACs to support program enrollment. SCE employees who attended the events provided an estimated 1,900 customer interactions. A full list of the outreach events can be found in **Appendix D**.

2.9 Customer Satisfaction

Charge Ready invited its participants to complete customer satisfaction surveys to determine how the program met expectations. SCE uses Verint, a third-party online software to deploy these surveys. SCE sent invitations to each customer, with unique links so they could be identified in the analysis. The survey invitation was sent to customer participants approximately 10 to 12 weeks after their charging stations were installed and verified by SCE to allow customers ample time to use the charging stations. Areas of questioning included overall satisfaction levels with the Charge Ready program (1 – very dissatisfied to 10 – very satisfied) and satisfaction levels for the different areas of the program. By the end of January 2018, SCE sent survey invitations to 25 participants representing 34 sites. SCE received responses from 20 customers.
The table below shows the average satisfaction score provided by the survey respondents. The program received an average satisfaction score of 9.2. Based on feedback from these completed projects, customers are highly satisfied with the overall program and application process.

The lowest average score of 8.0 was rated for charging network pricing from SCE-approved vendors.

Table 2.13 Average Satisfaction Score per Survey Topic

Survey Topic	Average Satisfaction Score
The total time for the project was reasonable	9.1
Prices of the charging stations from SCE approved vendors	8.3
The amount of time it took to receive the rebate after the final walk-through	8.7
Cost of the charging network services	8.0
Cost of charging stations after rebate (amount paid minus the rebate)	8.4
SCE managed the process without excessive delays	9.1
Overall Satisfaction with SCE's Charge Ready program	9.2
SCE clearly explained each step of the process	9.1
SCE was easy to work with	9.4
SCE kept you well informed throughout the process	9.3
Easement process	8.9
The amount of the rebate	9.3
SCE was able to answer all questions related to Charge Ready	9.4
Final walk-through by SCE	9.3
The online enrollment including registration, online forms, dashboard, etc.	9.3
Site evaluation and presentation of Defined Plan	9.0
The information available from SCE on qualified charging stations / approved vendors	9.3
Overall Satisfaction with the charging station procurement process with the approved SCE Charge Ready vendor	9.1
SCE understood your needs and challenges	9.4
SCE always responded to your questions and requests in a timely manner	9.5
SCE always took responsibility to completely address your issues	9.5
The information available from SCE to help you learn about the program	9.4
The overview meeting with SCE Account Representative	9.6
The variety of charging station brands / models on the Approved Package List	9.6
SCE Construction (e.g., trenching, conduit, etc.)	9.4
The Parking Survey completed by your employees or residents, if applicable	10.0
Average Satisfaction Score	**9.2**

46 190 Pilot applicants were invited, including those with projects that did not move forward.

SCE plans to conduct additional customer surveys in Q3 2018 to learn about charging station fees, accessibility, and incremental EV adoption. SCE will report its findings in the Advisory Board meetings and quarterly reports when available.
In addition, SCE hosted a vendor conference for charging station vendors participating in the Pilot on February 26, 2018. The session was attended by 12 vendors. The following day, SCE hosted a customer-feedback session for Pilot customers that was attended by 20 Pilot customers.[46] The objective of both sessions was to learn about the vendors' and customers' experience in the Pilot and gather feedback for future programs. The following table summarizes the feedback received from both sessions. Feedback will be used to improve requirements and processes of future programs.

Table 2.14 Summary of Feedback Received from Pilot Approved Vendors and Customer Participants

Area of Focus	Vendor Feedback	Customer Feedback
Program Design	• Marketing was done very well • Customers liked SCE covering make-ready infrastructure costs • Easement process was long, recommends moving it up in the process • Heard concerns about customers not being able to add more ports in the future (SCE installed only the required infrastructure to support the Pilot installations, which may not support future charging station additions)	• Marketing was done very well • Easement process was long, recommends moving it up in the process • Concerns about long-term commitment and stations becoming obsolete[47] • Minimum port count was a challenge at some sites • Would be easier if SCE offered package of make-ready infrastructure options including charging stations, which would eliminate the need for customer procurement of charging stations
Base Cost and Rebate	• Some of the vendors' confused the base cost with the rebate amount • Would prefer set rebate levels vs base cost calculation • Feels that utility is "getting in their business" by requiring pricing information that is used to calculate the base cost of charging stations	• Customers who attended the session had full understanding of what base cost and rebate mean • 100% rebate for Disadvantaged Communities is great
Charging Station and RFI	• There is interest in Level 3 stations for faster charging capabilities • Recommends not re-testing stations once primary vendor is approved	• There is interest in Level 3 stations for faster charging capabilities
Site Design and Construction	• Pre-construction meeting is great • Some stub-outs[48] did not match charging station templates	• Pre-construction meeting is great • Appreciates SCE's attention to detail and customer service
General	• Time it took from application to completion is long • Recommends using API[49] for monthly data pulls versus Excel-based submissions	• Overwhelming positive feedback for all SCE employees and general contractor interaction • Application process and enrollment portal was easy • One customer noted that time to complete was long but customer do not see SCE as the reason for any delays, which occurred during customer requirement submission stage[50]

47 Some Pilot customers chose not to participate in the Pilot because of the 10-year commitment term. The concern was over the possibility of transfer of ownership of the site as well as equipment obsolescence prior to the end of the 10-year time period.

48 SCE's program RFI documents detailed the standard stub out design. The customer's selected EVSE vendor is responsible to provide and install the appropriate charging station base plate template.

49 Due to the Pilot's short duration, SCE focused its spending on charging station infrastructure rather than a processing system to support the Pilot.

50 See Section 2.4.2 and 2.4.3 of this report for lessons learned on application process and requirements cycle time.

2.10 Charge Ready Education and Outreach

2.10.1 Overview

Charge Ready education and outreach efforts were designed to promote the Pilot to SCE customers. SCE also tested marketing channels in preparation for a subsequent phase of Charge Ready, including email, website, social media, collateral, and account manager interaction. SCE developed content to communicate to potential customer participants about the Pilot, and highlighted key areas such as eligible rates, bill impact analyses, metering options, EV infrastructure, access to subject matter expert resources, and EVSE information. SCE also developed marketing materials to provide relevant program information and help customers through the application process. The Charge Ready program landing page[51] is the main resource for customers to learn about the Pilot and submit their applications. A full list of the Charge Ready marketing materials, along with their descriptions, can be found in **Appendix E.**

2.10.2 Outreach Events

SCE conducted 38 outreach events during the Pilot to support program enrollment. SCE employees who attended the events provided an estimated 6,281 customer interactions. A full list of the outreach events can be found in **Appendix D**.

2.10.3 Multi-Unit Dwelling Outreach

In Q3 2016, SCE focused some of its Charge Ready marketing efforts toward the MUD market segment. To increase MUD customer enrollment in Charge Ready, SCE developed a customer outreach and engagement plan, including:

- Direct Engagement: SCE Account Managers individually reached out to a list of MUD customers that had been screened as potential Charge Ready participants. During the Pilot, there were 147 Account Manager interactions with MUD customers.
- Targeted Marketing Collateral: SCE developed a MUD Customer Fact Sheet articulating the value proposition for MUDs to deploy EV charging, in general, and through Charge Ready, in particular. The collateral was distributed via email to 482 customers with an invitation to attend a MUD workshop.
- MUD Customer Outreach Events: SCE conducted an in-person meeting at SCE's Energy Education Center on August 30, 2016. SCE presented a program overview and organized a meet-and-greet with the program's charging station vendors. Participating MUD customers also learned about complementary financing opportunities from representatives from CARB and the California State Treasurer's office (CPCFA/CalCAP).

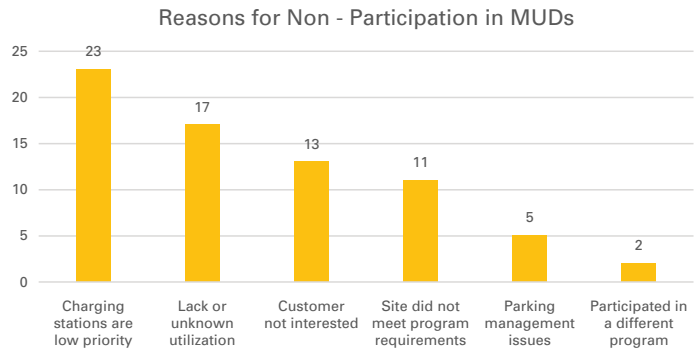
SCE also started weekly MUD Virtual Workshops in Q4 2016 to educate MUDs about the Charge Ready program and other available complementary EV programs. During the meetings, SCE shared the MUD fact sheet and other targeted marketing materials developed during Q3 2016.

SCE learned about the MUD customer segment through its marketing and outreach approach. Low customer attendance at the first two MUD Virtual Workshops changed the outreach strategy from a mass message approach to a targeted, direct engagement approach. SCE intended to reach large numbers of MUD customers through the virtual workshops, but later found direct engagement to be more effective in educating customers about the program.

SCE discontinued the weekly MUD Virtual Workshops and, instead, focused efforts on direct engagement with customers.

SCE's direct interactions (phone, email, and in-person meetings) with MUD customers revealed customers interested in charging stations and also uncovered reasons why some MUD customers were not interested in the program. For the customers interested in the program, SCE focused resources to support these customers during in the enrollment process. For customers not interested in the program, SCE gathered customer feedback to inform a future Phase 2 MUD outreach strategy. The following chart summarizes the feedback from 71 MUD customers who indicated their reasons for not participating in the program.

Figure 2.22 Reasons for MUDs Declining to Participate in Charge Ready



2.10.4 Overall Successes

Charge Ready Pilot marketing created overwhelming customer and vendor interest, gaining favorable feedback from vendors and customers as described in Section 2.9 Customer Satisfaction. In addition, the effectiveness of the multi-media marketing was proven two weeks after launch; the program had already received a total of 183 applications. SCE communicated the details of a complex, months-long project in a simple, easy-to-follow manner. Due to significant interest in the program, SCE stopped accepting new applications seven months after launch. 334 customers had submitted applications to have 2,043 EV charging stations installed on their property when SCE

51 https://on.sce.com/chargeready

stopped accepting new applications. SCE expects to add approximately 175 additional ports with the recently released funds previously reserved for completed sites.

2.10.5 Charge Ready Education and Outreach Lessons Learned and Potential Improvements

During the Pilot, SCE learned that there is no "one-size-fits-all" marketing campaign or outreach that works for all segments of the Charge Ready program. Especially with MUDs, SCE learned that much more education is required for both residents and MUD owners. SCE will take a more holistic approach in educating these customers, combining messages on safety, EVs, charging, and EVSE education.

2.11 Pilot Costs

Through the execution of the Charge Ready pilot SCE discovered several ways to manage the cost of delivering electric vehicle charging infrastructure to the customer such as:

- Executing concurrent steps to reduce overall timeline and example is obtaining SCE and GC permits in parallel
- Scheduling site inspections strategically to reduce drive time and onsite presence to reduce design costs and inspector hours that are billed to the program
- New messaging was developed to improve efforts to educate the customers and suggest installations in parking areas that have the greatest chance of qualifying on the original site visit resulting in the reduction of follow-up site visits and associated costs
- Establishing cost thresholds[52] for various segments to manage program costs and to fulfill demographic goals of 10% of infrastructure installed in DACs
  - DAC charge ports are by nature more expensive due to the 5-port minimum – allocating fixed costs amongst a smaller number of ports – initially $30,000 was allocated per port for this segment; if DAC successes continue this allocation will no longer be necessary to achieve goals in DACs.
  - Non-DAC (and DAC after 10% achieved) threshold allocated remaining capital to Non-DAC ports – threshold was set at approximately $15,000 per port

The CPUC approved SCE's proposal to establish a Charge Ready Program balancing account to recover the revenue requirements associated with up to $22 million in direct capital and O&M costs to implement Phase 1 of the Charge Ready and Market Education Programs.[53] The following table summarizes the Pilot's spend at the time of this report.

Table 2.15 Pilot Costs

Variables	Authorized/Planning Assumptions[54]	2/28/18 Inception-to-date[55]	Remaining[56]	Percentage Remaining
Capital				
Utility-Side Infrastructure Costs	$3,353,532	$1,225,388	$2,128,144	63%
Customer-Side Infrastructure Costs	$7,586,387	$8,352,551	($766,164)	-10%
Easement	$115,942	$120,425	($4,483)	-4%
Station Testing	$30,000	$60,393	($30,393)	-101%
BCD Labor	$103,500	$108,776	($5,276)	-5%
PMO Labor	$460,003	$686,212	($226,209)	-49%
Total Capital	**$11,649,364**	**$10,553,746**	**$1,095,618**	**9%**
Operations & Maintenance				
Rebate	$5,850,000	$480,931	$5,369,070	92%
BCD Labor	$51,750	$57,099	($5,349)	-10%
Transportation Electrification Advisory Services	$316,800	$265,019	$51,781	16%

52 Using estimated costs.
53 D.16-01-023, p. 59.
54 In 2014 dollars.
55 In nominal dollars.
56 In comparison to Authorized/Planning Assumptions.

Variables	Authorized/Planning Assumptions[54]	2/28/18 Inception-to-date[55]	Remaining[56]	Percentage Remaining
PMO Labor & Non-Labor	$232,340	$222,496	$9,844	4%
Charge Ready ME&O, Market Reporting, SAP	$665,000	$492,919	$172,081	26%
EV Awareness	$2,830,600	$1,701,757	$1,128,843	40%
Other O&M[57]		$832,410	($832,410)	0%
Total Operations & Maintenance	**$9,946,490**	**$4,052,631**	**$5,893,859**	**59%**
Total Program	**$21,595,854**	**$ 14,606,378**	**$6,989,476**	**32%**

2.11.1 Data Analysis and Insights

SCE's estimated budget for infrastructure (utility- and customer-side) and rebates was $16.8 million to deploy up to 1,500 charge ports. Customer-side infrastructure deployment costs were higher than estimated in SCE's testimony. The Pilot average cost per port is $13,731. The table below shows the cost breakdown.

Table 2.16 Average Cost per Port

Cost per Port	Filing Assumptions[58]	Estimated Average Cost per Port[59]
Utility-Side Infrastructure	$2,237	$2,129
Customer-Side Infrastructure	$5,058	$10,397
Rebate	$3,900	$1,206
Total	**$11,195**	**$13,731**

2.11.2 Pilot Costs – Lessons Learned and Recommendations

The average cost[60] per port in the Pilot is $13,731 recorded ($12,857 in 2014$) at an average of 15 ports installed per site based on the 1,066 charge ports in progress. Fifty-four percent of the applicants installed 5-10 ports[61] per site with an additional 11% with port counts between 11 and 15 per site. The rest of the participants installed greater than 15 ports per site. Appendix A shows a breakdown of charge port data by market segment in DACs and Non-DACs. Sites with the minimum number of ports are significantly more costly to deploy, especially if they require new transformers to serve the incremental EV load. SCE's testimony forecast average cost per port to be $11,195, assuming an average of 26 ports per site.[62] The Pilot actual average recorded costs per port were higher than forecast because SCE deployed an average of 14 ports per site. When comparing deployments with approximately 26 ports per site, the average costs per port aligned with SCE's forecast for deployments of that size. It is important to note, however, that the average rebate paid is lower than SCE's forecast (because SCE originally proposed to provide all participating customers with a rebate for 100% of base cost) and customer-side infrastructure is higher than filing assumptions. The cost drivers include:

- Site assessment and design are generally fixed costs regardless of size, making sites with fewer charge ports more expensive per port, all other factors equal.
- Non-fleet sites require ADA improvements, which can add significant costs depending on the existing site conditions.
- The cost assumptions in SCE's testimony did not account for the updated state accessibility statutes, which have necessitated more construction work at some customer sites to ensure compliance with the new requirements.
- Trenching and pavement work in public Right of Way (ROW) is significantly more expensive than installation on private property or parking areas out of ROW.

57 Includes other O&M (e.g. site assessments, design, permits, and easements on withdrawn projects).
58 SCE's testimony forecast average cost per port to be $11,195, assuming an average of 26 ports per site.
59 Based on 34 projects completed with recorded costs and 36 projects with estimated costs.
60 Includes infrastructure costs and rebate.
61 Program minimum requirement is 10 ports per site in non-DACs and 5 in DACs.
62 The 26 ports per site was a weighted average assuming different percentages of participation by different size sites.

Other infrastructure cost drivers include:

- Sites that were primary metered[63] were not approved in the program. SCE found it too costly to bring power to proposed charging station location in these sites. This would require creating a parallel line extension from upstream SCE facilities to feed the proposed charging site.

  AHJ constraints – the costs associated with municipality fee requirements or other jurisdictional constraints varied by jurisdiction, and influenced site viability. Permitting[64] can be variable if the AHJ charges based on site value rather than fixed-plan-review pricing.
- K-12 school sites requiring Division of the State Architect (DSA) inspection incur an additional $5,000 to $6,000 per site in inspection fees.
- Underground parking garages presented challenges, such as non-level grades, space constraints, and height restrictions, to serve power primarily due to AHJ requirements that required significant civil work to bring sites into compliance.
- Parking structures and sites that may accommodate surface-mounted conduits represent significant savings since there is minimal site restoration work following installation.
  - However, older parking structures present difficulties with current ADA code and may be too costly.
- Site conditions and construction complexity – in some cases, SCE found site conditions added significant costs. Examples included:
  - Older buildings with parking lots that would require large investment to conform to AHJ requirements, such as ADA and state accessibility statutes.
  - Poor customer parking lot conditions required restoring the entire parking lot.
  - Proximity – longer distances from charging station sites to existing transformers increased trenching and boring costs.

2.12 Pilot Summary

Charge Ready Phase 1 successfully met its objectives. SCE deployed infrastructure to support 941 charge port to date, half of this total in DACs, and expects to deploy infrastructure to support approximately 1,250 charge ports by the Pilot's completion. SCE also developed and improved processes to qualify a wide range of charging stations and vendors. The Pilot produced real-life data on the time and costs to deploy EV charging infrastructure.

SCE discovered that MUDs are interested in participating in the Pilot and also identified barriers for this segment, such as lack of assignable parking space and expensive parking upgrade requirements triggered by EVSE installations.

SCE was also able to meet its objective of deploying DR-compatible EVSEs and is using these devices to develop an effective DR program for this market through the execution of the Charge Ready DR pilot. This pilot is currently underway and is necessary for SCE to study charging patterns and develop an effective DR program.

The Pilot proved customers are interested in utility-owned EV charging infrastructure with the expected deployment of approximately 1,250 charge ports by the end of the Pilot. Customers also provided their satisfaction with the program (an average customer satisfaction rating of 9.2 (1 – very dissatisfied to 10 – very satisfied) as described in Section 2.9 Customer Satisfaction).

The Market Education program revealed that enhanced public EV education is necessary to help customers understand program benefits. SCE also discovered that business customers need additional assistance from their trusted energy advisors.

SCE plans to file an application for Phase 2 approval. In that phase, SCE will propose changes based on lessons learned during Phase 1.

63 The infrastructure and equipment behind a customer's primary metering cabinet is customer-owned. SCE does not serve new load from a customer-owned transformer. This did not exclude a primary-metered customer from participating if their site had another viable SCE power source that was within the program budget.

64 Permitting fees in the Pilot ranges from $0.00 to $10,673.55.

3 Market Education

3.1 Overview

Separately from its education and outreach efforts to support enrollment in the Charge Ready Pilot, SCE also communicated about EVs and the benefits of fueling from the grid to a broad audience, through a variety of complementary channels. These channels include:

- Paid Media: Digital banners, video ads, Search Engine Marketing (SEM), paid social media, radio (local booth sponsorship at EV-related events).
- Direct Messaging: Direct mail or email to targeted customer populations.
- Other channels: bill onserts, messaging on SCE.com, and organic social media.
- Co-Marketing: Charge Ready has been leveraging other clean-energy programs outside of Charge Ready, such as the Clean Fuel Rewards Program which EV owners may be eligible to receive a $450 dollar rebate.
- Local Media: SCE also leverages the resources of its Corporate Communications group to gain local and domestic media coverage.

Customers exposed to these channels are directed to relevant information on the updated SCE.com EV website, which includes content in English, Spanish, Korean, Chinese, and Vietnamese. SCE tracked customer site interactions using web traffic and click through rates as shown on and Table 3.2 below to improve and optimize the experience. SCE tested three messages: 1) Cost Savings, 2) Environmental, and 3) Range Anxiety. All three messages had the same click-through rates, which would indicate an interest in all three topics among our customer base. Additionally, click through rate was consistent across ethnicities (English, Spanish, and Chinese). While the digital ads and radio sponsorships concluded at the end of Q2 2017, SCE continued marketing activities including paid social media to support market education efforts, as well as sponsorship and participation in several National Drive Electric Week events. As a result of these efforts, SCE observed increased web traffic.

Table 3.1 Electric Vehicle Awareness Website Metrics

EV Awareness	Q4 2017
Electric Vehicle Overview Page on SCE.com[65]	
Unique Visitor Count	7,986
Repeat Visitor Count	2,851
Page Views	11,526
Bounce Rate[66]	41.46%
Multi-page Visits	6,674
Electric Vehicle Campaign Landing Page on SCE.com[67]	
Unique Visitor Count	8,518
Repeat Visitor Count	743
Page Views	10,944
Bounce Rate	87.08%
Multi-page Visits	1,277

Additionally, through a 12-month digital and radio campaign launched in July 2016, SCE delivered more than 65 million digital and 6,000 radio spots, and observed monthly increases in website page views. Customer engagement in online ads was in line with industry benchmarks, with video ads performing above benchmarks for completion rates. The following table provides metrics around the digital campaign, from July 2016 – June 2017.

Table 3.2 Digital Campaign Metrics

Channel	Impressions	Clicks	CTR[68]	VCR[69]
Display Ads	23,187,350	10,436	0.04%	
Mobile Ads	30,646,251	63,080	0.10%	
Video Ads	9,955,511	6,975	0.10%	80.79%
SEM	1,448,875	9,963	0.71%	

The following table includes metrics capturing traffic for key campaign pages within the site.

65 https://www.sce.com/wps/portal/home/residential/electric-cars/ This page provides an overview of the EV-related content for residential customers on the website, and includes links to Pilots (Submeter, Charge Ready) and EV content for businesses. Customers can navigate to this site without a vanity URL.
66 Bounce rate is the percentage of single page visits.
67 https://www.sce.com/wps/portal/home/residential/electric-cars/EV-Assessment-Campaign-Page/ This page was visible only by clicking through on digital and social media ads, or by using a vanity URL provided in radio ads.
68 Click-through rate. The utility benchmark for CTR is 0.13%.
69 Video completion rate. The utility benchmark for VCR is 57.3%.

For SCE's Market Education efforts, customer awareness of EV benefits and messaging were tracked using SCE's Customer Attitude Tracking (CAT) survey, a quarterly phone survey designed to assess and track customer attitudes toward relevant marketing issues and marketing campaigns. This survey was conducted by an independent marketing research firm, contacting 450 randomly-selected SCE households. SCE collected baseline data in Q2 2016. For EV awareness, customers were asked to recall messaging about the benefits of EVs and preparing to buy or lease an EV, as well as SCE's role in supporting and advancing electric transportation. Quarterly measures of awareness were compared to the baseline to determine lift,[70] as well as the impact of the media mix on awareness levels. The following table summarizes the CAT Survey's quarterly data. Respondents were asked, "In the past three months, do you recall seeing, hearing, or reading any ads about SCE and the benefits of electric vehicles?" The results continued to show levels of EV awareness close to the baseline.

Table 3.3 Customer Attitude Tracking Survey Metrics

Response	Baseline	Q4 2016	Q1 2017	Q2 2017	Q3 2017	Q4 2017
Total Respondents	1,354	450	450	450	600	600
Yes	189 14%	58 13%	57 13%	54 12%	92 15%	92 15%
No	1,147 85%	383 85%	384 85%	378 84%	489 82%	476 79%
No Response	18 1%	9 2%	8 2%	18 4%	19 3%	32 5%

3.2 TE Advisory Services

SCE created TE Advisory Services (TEAS) to provide business customers with a dedicated "one-stop shop" for specialized education, awareness, and support on such issues as federal, state, and local incentives, vehicle and charging equipment financing opportunities, vehicle types, and charging installation programs.

TE Advisory Services includes:

Updated web content on SCE.com business section, which includes information on:

- Vehicle types
- Charging Infrastructure
- SCE's EV Rates
- Information specific to MUDs, Fleets, Workplaces, and Public sites
- Links to additional tools, resources and fact sheets
- Calls to action to reach out to SCE for more information and support (Account Manager or 800#)

Self-service online tools to assist customers:

- The Charge Port Estimator, which estimates the number of charge ports customers may need at their sites
- A Rate Analysis Tool, based on customers' numbers of estimated charge ports and segment types
- A customer self-administered EV survey for workplaces and MUDs

Fact Sheets: Customer-facing PDFs covering the following TE topics, including links to additional resources:

- Transportation Electrification Overview
- Fleet Conversion
- MUDs
- Vehicle to Grid Integration
- Planning for Charging Infrastructure
- Understanding GHG Emissions from Transportation
- Overview of Fleet Segments and available EV alternatives

70 Improvement in response.

In addition to the above, TE Advisory Services launched in-person services for approximately 25 business customers in Q1 2018. Services included the following

- An initial fleet assessment (including GHG savings calculations) to help customers evaluate business cases for converting fleets of vehicles to TE technology
- Infrastructure Assessments to assist customers in evaluating a potential deployment of charging equipment

Customers selected were those who had shown a commitment to sustainability, potential for a larger scale conversion/ deployment, and had participated in multiple discussions with their Account Managers to confirm their interest in TE. A combination of government entities and commercial businesses were selected to include a representative mix of customers. SCE is tracking web traffic and has established the following baselines presented in the table below to compare against as more outreach is conducted.

Table 3.4 TEAS web traffic

Q4 2017: Baseline

Metric	Workplace	Public	Fleet	MUD
Unique Visitor Count	292	121	138	69
Page Views	507	188	281	162
Multi-Page	346	143	165	111

3.3 Market Education Lessons Learned and Recommendations

The EV Market Education and Outreach effort was designed to raise awareness and provide education on the benefits of EVs and fueling from the grid. The campaign was not developed as an enrollment campaign. The campaign was developed to establish a baseline for awareness and to learn about effective marketing strategies to inform the future phase of the program.

The EV awareness campaign cost $1.5 million, and was in the market for 12 months.

This limited spending and time in the market was not enough to build momentum for large gains in awareness. SCE maintained awareness levels at or around 14%; however, to increase awareness, a larger media spend level should be implemented over a longer duration.

Future media campaigns would also benefit from additional channels to enable a broader reach, such as out-of-home (billboards), television, or print.

4 Demand Response Pilot

4.1 Demand Response Pilot Overview

SCE required all customer participants with Level 2 charging stations to participate in future DR programs designed in connection with the Program and approved by the Commission.[71] SCE also required all Level 2 charging stations to be DR-capable (i.e., capable of receiving and executing real-time instructions to throttle, and/or modify the end-user pricing of EV charging load) and encouraged those charging stations to include additional load management features (e.g., EV charging sequencing or sharing). All Level 2 charging stations qualified for the Pilot have DR communication capabilities built directly into the charging station (Type A) or communication through a gateway device to the charging station (Type B). The different types of charging stations installed as part of the Pilot have gone through rigorous testing by SCE's ATO, and the communication capabilities will be tested further during the Charge Ready DR Pilot[72] that will launch in Q2 2018.

To participate in the Charge Ready Pilot, customers must, at their own expense, procure, own, install, operate, and maintain the charging stations in working order at their originally-installed locations for the entire 10-year term of participation, in accordance with Schedule CRPP. Based on charging station procurement documents submitted by customers during the Step 3 process, some customers chose to pay for maintenance packages and extended warranty coverage from the EVSE suppliers.

With the rapid increase of renewable energy sources in California, an imbalance of load-to-energy is emerging. To mitigate the impacts of this "duck curve,"[73] SCE's Charge Ready DR Pilot events will attempt to shift load to periods of high solar generation during spring and winter months, and decrease load during steep ramping periods that occur in late afternoons and evenings during summer months. In addition, SCE has proposed new time-of-use (TOU) rates that better align with the needs of the electric grid, with on-peak time periods beginning in the evening hours when solar generation is decreasing and typical net customer electricity use is highest. These new TOU rates also shift off-peak time periods to morning and afternoon hours when solar generation is maximized. Although the DR Charge Ready Pilot will begin before these new TOU rates are in place, the program was designed in consideration of these potential new rates in an effort to limit the need for future major program modifications.

4.2 Pricing Model Overview

All Level 2 Charge Ready customers will participate in a DR Pilot beginning in the spring of 2018. Customers will be incented based on participating in two different types of test events:

1. Load Shift events, in which customers receive a discounted rate for charging during a time of high solar generation and potential negative prices by shifting charging from early morning to midday.
2. Traditional DR events, in which customers receive incentives for consuming less electricity during peak times, or during periods of steep ramping of electricity demand.

The Charge Ready DR Pilot plans to test both incentives and controls to influence charging behavior of EV drivers. A more detailed description can be found in SCE's Charge Ready DR Advice letter.[74]

71 Schedule CRPP.
72 See http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/64403AD51EE6896F882580AC000B520F/$FILE/A1701XXX-SCE%202018-2022%20DR%20Testimony%20Vol%202%20Chap.%203-13.pdf "SOUTHERN CALIFORNIA EDISON COMPANY'S (U 338-E) TESTIMONY IN SUPPORT OF ITS APPLICATION FOR APPROVAL OF ITS 2018 – 2022 DEMAND RESPONSE PROGRAMS: VOLUME 2 – SCE'S 2018 – 2022 PROPOSED DEMAND RESPONSE PROGRAMS BY CATEGORY", 1/17/2017, p 45-55.
73 https://www.caiso.com/Documents/FlexibleResourcesHelpRenewables_FastFacts.pdf
74 Advice Letter 3773-E, "Southern California Edison Company's Charge Ready Demand Response Pilot Plan, Pursuant to Decisions 16-01-023 and 17-12-003".

5 Appendices

Appendix A. Pilot Customer Participants

Table 5.1 Summary by Market Segment in Disadvantaged Communities

Disadvantaged Communities

Segment	# of Ports	# of Applications
Destination Center	80	12
Fleet	28	4
Multi-Unit Dwelling	12	1
Workplace	415	26
Grand Total	**535**	**43**

Table 5.2 Summary by Market Segment in Non-Disadvantaged Communities

Non-Disadvantaged Communities

Segment	# of Ports	# of Applications
Destination Center	166	10
Fleet	79	4
Multi-Unit Dwelling	23	2
Workplace	263	11
Grand Total	**531**	**27**

Table 5.3 Summary by City of Installation in Disadvantaged Communities

Disadvantaged Communities

City of Installation	# of Ports	# of Applications
Barstow	6	1
Carson	13	2
Chino	7	1
El Monte	39	4
Fontana	21	3
Hanford	16	2
Hawthorne	80	1
Irwindale	30	2
Loma Linda	5	1
Los Angeles	10	1
Lynwood	14	2
Maywood	9	1
Montclair	6	1
Norwalk	12	1
Ontario	35	6
Orange	20	1
Porterville	6	1
Rancho Cucamonga	18	1
Rosemead	67	2
S El Monte	10	1
Santa Ana	16	1
Santa Fe Spgs	12	1
South Gate	20	2
Torrance	24	1
Visalia	6	1
West Covina	9	1
Whittier	24	1
Grand Total	**535**	**43**

Table 5.4 Summary by City of Installation in Non-Disadvantaged Communities

Non-Disadvantaged Communities

City of Installation	# of Ports	# of Applications
Alhambra	14	1
Aliso Viejo	10	1
Camarillo	19	1
Fountain Vly	73	1
Fullerton	33	2
Hermosa Beach	10	1
Inglewood	32	1
Irvine	68	2
Lancaster	12	1
Long Beach	51	3
Malibu	24	1
Monrovia	13	1
Ontario	22	2
Orange	20	1
Palm Desert	38	2
Palmdale	12	1
Rllng Hls Est	10	1
Santa Barbara	10	1
Santa Monica	44	2
Thousand Oaks	16	1
Grand Total	**531**	**27**

Table 5.5 Summary by Zip code in Disadvantaged Communities

Disadvantaged Communities

Zip Code of Installation	# of Ports	# of Applications
90022	10	1
90250	80	1
90262	14	2
90270	9	1
90280	20	2
90502	24	1
90601	24	1
90650	12	1
90670	12	1
90745	8	1
90746	5	1
91706	30	2
91710	7	1
91730	18	1
91731	25	2
91732	14	2
91733	10	1
91761	13	2
91762	6	1
91763	6	1
91764	16	3
91770	67	2
91790	9	1
92311	6	1
92335	14	2
92337	7	1
92354	5	1
92707	16	1
92868	20	1
93230	16	2
93257	6	1
93292	6	1
Grand Total	**535**	**43**

Table 5.6 Summary by Zip code in Non-Disadvantaged Communities

Non-Disadvantaged Communities

Zip Code of Installation	# of Ports	# of Applications
90254	10	1
90265	24	1
90274	10	1
90303	32	1
90401	31	1
90405	13	1
90802	27	2
90822	24	1
91016	13	1
91320	16	1
91764	22	2
91803	14	1
92260	38	2
92606	18	1
92656	10	1
92697	50	1
92708	73	1
92831	23	1
92832	10	1
92868	20	1
93012	19	1
93108	10	1
93534	12	1
93550	12	1
Grand Total	**531**	**27**

Table 5.7 Multi-Unit Dwelling Summary by City of Installation

Multi-Unit Dwelling

City of Installation	Number of Charge Ready Ports	Number of Charge Ready Applications	Disadvantaged Community	Property Type
Rolling Hills Estates	10	1	No	Condominiums
Santa Fe Springs	12	1	Yes	Apartments
Santa Monica	13	1	No	Apartments
Total	**35**	**3**		

Appendix B. Pilot Operational Metrics

Table 5.8 Pilot Cycle Times[75]

Pilot Cycle Times	
Average customer "end-to-end" cycle time, by segment	337[76]
Minimum customer "end-to-end" cycle time, by segment	211[77]
Maximum customer "end-to-end" cycle time, by segment	432[78]
Average time for Application Received to Initial Qualification	37
Average time for Initial Qualification to Site Assessment Completion	43
Average time for Site Assessment Completion to Program Agreement Complete	72
Average time to complete base map	9
Average time to complete preliminary design	35
Average time from Preliminary Design Sent to customer to Preliminary Design Approved	11
Average time to complete T&D final design	17
Average time for Final Design Received to Permit Requested	9
Average time for Permit Requested to Permit Approved	36
Average time for Permit Approved to Ready to Break Ground	27
Average time from Ready to Break Ground to Final Inspection Completed	66
Average time from Final Inspection Completed to Rebate Check Issued	45

75 Business Days.
76 Based on 35 projects with rebate paid.
77 Based on 35 projects with rebate paid.
78 Based on 35 projects with rebate paid.

Table 5.9 Pilot Applications

	Planning Assumptions	Inception-to-Date Actual	Percentage to Planning Assumptions
Total number of applications received	58 projects, 1,500 charge ports	334 projects, 2,043 charge ports	576%, 136%
Percentage of total applications received for Disadvantaged Communities	N/A	47%	N/A
Percentage of applications received for Destination Centers	N/A	24%	N/A
Percentage of applications received for Workplaces	N/A	65%	N/A
Percentage of applications received for Fleet	N/A	5%	N/A
Percentage of applications received for MUDs	N/A	6%	N/A
Percentage of charging stations requested for Disadvantaged Communities	10%	38%	377%
Percentage of charging stations requested for Destination Centers	N/A	27%	N/A
Percentage of charging stations requested for Workplaces	N/A	59%	N/A
Percentage of charging stations requested for Fleet	N/A	8%	N/A
Percentage of charging stations requested for MUDs	N/A	6%	N/A
Number of approved and confirmed projects (Step 2 Agreement signed)	58 projects, 1,500 charge ports	70 projects, 1,066 charge ports	121%, 71%
Number of approved and confirmed projects for Disadvantaged Communities (Step 2 Agreement signed)	N/A	43 projects, 535 charge ports	N/A
Number of approved and confirmed projects for Destination Centers (Step 2 Agreement signed)	N/A	22 projects, 246 charge ports	N/A
Number of approved and confirmed projects for Workplaces (Step 2 Agreement signed)	N/A	37 projects, 678 charge ports	N/A
Number of approved and confirmed projects for Fleet (Step 2 Agreement signed)	N/A	8 projects, 107 charge ports	N/A
Number of approved and confirmed projects for MUDs (Step 2 Agreement signed)	N/A	3 projects, 35 charge ports	N/A
Number of applicants rejected	N/A	94 projects, 392 requested charge ports	N/A
Percentage of applicants rejected for Disadvantaged Communities	N/A	40%	N/A
Percentage of applicants rejected for Destination Centers	N/A	23%	N/A
Percentage of applicants rejected for Workplaces	N/A	69%	N/A

	Planning Assumptions	Inception-to-Date Actual	Percentage to Planning Assumptions
Percentage of applicants rejected for Fleets	N/A	0%	N/A
Percentage of applicants rejected for MUDs	N/A	7%	N/A
Number of applicants withdrawn	N/A	143 projects, 630 charge ports	N/A
Percentage of applicants withdrawn for Disadvantaged Communities	N/A	46%	N/A
Percentage of applicants withdrawn for Destination Centers	N/A	19%	N/A
Percentage of applicants withdrawn for Workplaces	N/A	69%	N/A
Percentage of applicants withdrawn for Fleets	N/A	6%	N/A
Percentage of applicants withdrawn for MUDs	N/A	7%	N/A
Number of applicants withdrawn after signing Step 2 - Agreement	N/A	11	N/A
Number of applicants withdrawn after signing Step 2 – Agreement for Disadvantaged Communities	N/A	5	N/A
Number of applicants withdrawn after signing Step 2 – Agreement for Destination Centers	N/A	4	N/A
Number of applicants withdrawn after signing Step 2 – Agreement for Workplaces	N/A	7	N/A
Number of applicants withdrawn after signing Step 2 – Agreement for Fleets	N/A	0	N/A
Number of applicants withdrawn after signing Step 2 – Agreement for MUDs	N/A	0	N/A
Total number of charge ports installed	N/A	578	N/A
Total number of charge ports installed for Disadvantaged Communities	N/A	247	N/A
Total number of charge ports installed for Destination Centers	N/A	191	N/A
Total number of charge ports installed for Workplaces	N/A	320	N/A
Total number of charge ports installed for Fleets	N/A	32	N/A
Total number of charge ports installed for MUDs	N/A	35	N/A
Average number of charge ports installed per site	N/A	14	N/A
Average number of charge ports installed per site for Disadvantaged Communities	N/A	10	N/A

	Planning Assumptions	Inception-to-Date Actual	Percentage to Planning Assumptions
Average number of charge ports installed per site for Destination Centers	N/A	11	N/A
Average number of charge ports installed per site for Workplaces	N/A	20	N/A
Average number of charge ports installed per site for Fleets	N/A	8	N/A
Average number of charge ports installed per site for MUDs	N/A	12	N/A
Total number of completed projects	58 projects, 1,500 charge ports	41 projects, 578 charge ports	N/A
Percentage of completed projects for Disadvantaged Communities	N/A	61%	N/A
Percentage of completed projects for Destination Centers	N/A	44%	N/A
Percentage of completed projects for Workplaces	N/A	39%	N/A
Percentage of completed projects for Fleets	N/A	10%	N/A
Percentage of completed projects for MUDs	N/A	7%	N/A

Table 5.10 Customer Participant Request

	Planning Assumptions	Inception-to-Date Actual
Average number of total parking spaces per site	N/A	621 parking spaces/site
Average number of total parking spaces per site for Disadvantaged Communities	N/A	377 parking spaces/site
Average number of total parking spaces per site for Destination Centers	N/A	931 parking spaces/site
Average number of total parking spaces per site for Workplaces	N/A	523 parking spaces/site
Average number of total parking spaces per site for Fleets	N/A	404 parking spaces/site
Average number of total parking spaces per site for MUDs	N/A	636 parking spaces/site
Percentage of total number of parking spaces located in parking structures	N/A	12%
Total number of parking spaces located in parking structures for Disadvantaged Communities	N/A	1,660
Total number of parking spaces located in parking structures for Destination Centers	N/A	7,560
Total number of parking spaces located in parking structures for Workplaces	N/A	23,332
Total number of parking spaces located in parking structures for Fleets	N/A	1,882

	Planning Assumptions	Inception-to-Date Actual
Total number of parking spaces located in parking structures for MUDs	N/A	2,978
Average fleet size[79]	N/A	6 (Fleet Segment Only) 4 (All Segments)
Percentage of applications received with charging systems already installed at the site	N/A	15%
Average number of charging systems already installed at the site	N/A	10
Average number of charge ports requested per site	26	7.6
Average number of charge ports requested per site for Disadvantaged Communities	N/A	8.3
Average number of charge ports requested per site for Destination Centers	N/A	9.2
Average number of charge ports requested per site for Workplaces	N/A	9.8
Average number of charge ports requested per site for Fleet	N/A	13.1
Average number of charge ports requested per site for MUDs	N/A	8

Table 5.11 Average EVSE Procurement Period

Organization	Average Business Days
Business	36
K-12 School	54
University	62
City	50
County	15
Federal	69

Table 5.12 Charging Station Procurement Submission Issues

Issue	No. of Projects
Missing delivery date	30 projects, 497 charge ports
Incorrect vendor name	4 projects, 118 charge ports
Missing equipment and installation cost breakdown	4 projects, 100 charge ports
Missing model #	5 projects, 138 charge ports
Missing fleet documentation	4 projects, 71 charge ports
Quote signed after expiration date / missing signature / missing quote	14 projects, 166 charge ports
Missing installer information / missing installation cost	8 projects, 111 charge ports

79 Applicants from all segment categories may indicate the number of fleet vehicles at their site (All Segments). Applicants in the fleet category intend to use the new charging station for their EV fleet (Fleet Segment Only).

Appendix C. Charging Stations and Rebate

Table 5.13 Number of Approved Charging System Models

Charging System Type	Total Number of Approved Models
Level 1	4
Level 2 "A"	17
Level 2 "B"	41
Total	**62**

Table 5.14 EVSE Model Summary

Average number of ports per EVSE	1.4
Average number of circuits per EVSE	1.3
Average number of ports per circuit	1.1
Number of wall EVSE units	18
Number of pedestal units	31
Number of both wall and pedestal units	13

Table 5.15 Charging Station Request and Rebate

Charging Station Requests & Rebates[80]	
Number of Level 1 charge ports requested[81]	13
Number of Level 2 charge ports requested[82]	1,053
Number of total charge ports approved	1,066
Average Number of Level 1 charge ports approved per Level 1 site	6.5
Average Number of Level 2 charge ports approved per Level 2 site	15.3
Number of Level 1 EVSE bought	12
Average number of ports per Level 1 EVSE	1.0
Number of Level 2A EVSE bought	184
Average number of ports per Level 2A EVSE	1.7
Number of Level 2B EVSE bought	512
Average number of ports per Level 2B EVSE	1.4
Number of Level 1 EVSE installed	12
Number of Level 2A EVSE installed	135
Number of Level 2B EVSE installed	219
Rebate amount reserved for Level 1 ports	$19,356
Rebate amount reserved for Level 2A ports	$358,993
Rebate amount reserved for Level 2B ports	$774,318
Rebate amount paid for Level 1 ports	$-
Rebate amount paid for Level 2A ports	$237,642
Rebate amount paid for Level 2B ports	$243,289

80 Data as of February 2018.
81 In the Step 2 Agreement, the applicant indicates the requested number of Level 1 EVSE to be approved and installed under the Program. The number of installed Level 1 EVSE must match the number of Level 1 EVSE requested in Step 2 Agreement.
82 In the Step 2 Agreement, the applicant indicates the requested number of Level 2 EVSE to be approved and installed under the Program. The number of installed Level 2 EVSE must match the number of Level 2 EVSE requested in Step 2 Agreement.

Appendix D. Outreach Events

Table 5.16 Outreach Events

Event Date	Event Name	Outreach Type	Location	Estimated Customer Interactions
4/2/2016	Formula E – ePrix	Market Education & TE Advisory Services	Long Beach	300
5/18/2016	Charge Ready Pilot Kick-Off	Charge Ready Education & Outreach	Irwindale	300
5/26/2016	AT&T/PEVC Ride and Drive	Market Education & TE Advisory Services	El Segundo	84
5/31/2016	Uptown Whittier Association Meeting	Disadvantaged Community Outreach	Whittier	1
6/10/2016	California Association of Community Managers, Inc. (CACM) CEO Business Forum	Charge Ready Education & Outreach	San Diego	100
6/16/2016	CBS Eye on the Environment Event	Charge Ready Education & Outreach	Studio City	100
6/23/2016	Faith-Based Business Summit	Charge Ready Education & Outreach	Los Angeles	75
6/29/2016	CA Higher Ed Summit	Charge Ready Education & Outreach	Fullerton	50
7/2016	Connecting Women to Power Business Conference	Disadvantaged Community Outreach	Carson	5
7/29/2016	Environmental Justice Advisory Group meeting at AQMD	Charge Ready Collaboration Efforts with Complementary EV Programs	SCAQMD Headquarters - Diamond Bar	15
8/4/2016	Filipino American Chamber of Commerce of Orange County	Charge Ready Education & Outreach	Anaheim	100
8/24/2016	EV Virtual Summit	Charge Ready Education & Outreach	Webex	75
8/30/2016	SCE MUD Workshop	Charge Ready Education & Outreach	Irwindale/Skype	20
9/10/2016	National Drive Electric Week - SCAQMD/Diamond Bar	Market Education & Charge Ready	SCAQMD/Diamond Bar	80
9/11/2016	National Drive Electric Week - Los Angeles	Market Education & Charge Ready	Los Angeles	118
6/2/16 & 6/29/16	CA Hotel & Lodging Association	Disadvantaged Community Outreach	Multiple cities	17
9/16-9/17/2016	AltCar Expo	Market Education & Charge Ready	Santa Monica	142
9/21/2016	Apartment Association of Greater Los Angeles (AAGLA) [12-2pm]	Charge Ready Education & Outreach	AAGLA Headquarters - 621 South Westmoreland Avenue, Los Angeles, CA 90005	45
9/28/2016	Apartment Association of Orange County - Reverse Trade Show (20 MUD Property Managers)	Charge Ready Education & Outreach	Costa Mesa	45
10/6/2016	League of Cities	Charge Ready Education & Outreach	Long Beach	50
10/25/2016	County of Ventura	Charge Ready Education & Outreach	Westminster	25
11/4/2016	Optima presentation	Charge Ready Education & Outreach	Torrance	2
11/8/2016	Charge Ready Weekly MUD Virtual Workshop (collaboration with CalCAP)	Charge Ready Education & Outreach	Rosemead	0

Event Date	Event Name	Outreach Type	Location	Estimated Customer Interactions
11/15/2016	Charge Ready Weekly MUD Virtual Workshop (collaboration with CalCAP)	Charge Ready Education & Outreach	Rosemead	0
12/2/2016	Consumer Advisory Panel Brainstorming Session (hosted by SCE)	Charge Ready Education & Outreach	Rosemead	50
12/13/2016	SCAG EV Charging Stations and Multi-Family Housing: Overcoming the Obstacles	Charge Ready Education & Outreach	Los Angeles	20
2/24/2017	San Joaquin Valley EV Partnership - Workplace Charging Workshop	Charge Ready Education & Outreach	Bakersfield	50
2/24/2017	San Joaquin Valley EV Partnership - Workplace Charging Workshop	Disadvantaged Community Outreach	Bakersfield	50
3/1/2017	Local Government Kickoff Workshop	Charge Ready Education & Outreach	Downey	200
3/9/2017	Apartment Association of Orange County Trade Show	Disadvantaged Community Outreach	Costa Mesa Orange County	1200
3/17/2017	California Association of Community Managers Trade Show (for Property	Disadvantaged Community Outreach	Anaheim	625
4/22/2017	Earth Day Festival	Charge Ready and Market Education	City of Lynwood	600
9/10/2017	National Drive Electric Week	Market Education	South Pasadena	70
9/15-16/2017	AltCar Expo	Market Education	Santa Monica	350
9/16/2017	National Drive Electric Week	Market Education	Los Angeles	267
9/16/2017	National Drive Electric Week	Market Education	Gardena	150
9/16/2017	National Drive Electric Week	Market Education	Tehachapi	50
9/26/2017	Transportation Electrification	Market Education	Rosemead	850
			Total Estimated Customer Interactions	**6,281**

Appendix E. Charge Ready Marketing Materials

Table 5.17 Charge Ready Marketing Materials

Marketing Materials	Description
Charge Ready Landing Page	Website SCE.com Landing Page - Provides resources that enable customers and EVSE vendors to learn more about Charge Ready
Charge Ready Enrollment Portal[83]	Website - A seamless interface that allows customers to apply for participation in the Pilot and provide the required information throughout the enrollment and deployment process
Frequently Asked Questions[84]	Website - Addresses many of the most common questions and concerns customers may have when considering the Pilot
Participation Package	Collateral (Interactive PDF) - An intuitive document designed to walk interested customers through the Pilot process from start to finish

83 https://chargeready.sce.com
84 https://www.sce.com/wps/portal/home/business/electric-cars/Charge-Ready/Charge-Ready-Supports

Marketing Materials	Description
Pilot Fact Sheet	Collateral - A high-level overview of the Pilot that should give customers an idea of what to expect
Demand Charges Overview	Collateral - Provides definitions of demand charges and solutions for customers to mitigate demand charges, such as load management and SCE's available rates
Electric Vehicle Supply Equipment Vendor Fact Sheet	Collateral - Provides information to prospective vendors to apply for qualification as a Charge Ready charging station vendor
Pilot Email Invitations	Promotional Emails - Sent directly to customers to spark interest and drive traffic to landing page; message is crafted specifically for four segments: MUDs, workplaces, fleet, and destination centers
Customer Video	Video Vignette - Quick and easy way for people to learn more about the Pilot
Charge Ready Twitter Page	Social Media - Provides followers the latest news and developments from within the Charge Ready Program

Appendix F. Media Outreach and Published Articles

SCE, City of Ontario Partner in 'Charge Ready' Program
EEI Delivering the Future, October 2017

California utilities plot ways to prep grid for coming EV boom
Utility Dive, August 22, 2017

California buses are going electric, and that's good for our environment
Los Angeles Daily News, August 4, 2017 (This opinion piece by President Ron Nichols, which prominently mentions Charge Ready, also ran in the Los Angeles Daily Breeze, Long Beach Press-Telegram, the San Bernardino Sun, San Gabriel Valley Tribune, the Inland Valley Daily Bulletin, Pasadena Star-News, Whittier Daily News, and Redlands Daily Facts.)

Santa Monica Poised To Approve Contract Adding 29 Electric Vehicle Charging Stations. (LOOKOUT)
Santa Monica Lookout, July 27, 2017

Charging stations for electric vehicles nearly open
Porterville Record - Friday, June 23, 2017

Charging station goes online in Lynwood on Earth Day
KPCC-FM, April 21, 2017

SCE brings EV charging stations to Lynwood
KFI-AM, April 21, 2017

SCE President Ron Nichols talks about electrifying transportation on Earth Day
Chung T'ien Television, May 3

Edison installs first electric-car charging stations in low-income community
San Gabriel Valley Tribune, February 16, 2017. This article is also provided by the **Pasadena (CA) Star-News** and the **Long Beach (CA) Press-Telegram**.

SoCal Edison to install 1,500 electric-car charging sites; what's your electric utility doing?
Green Car Reports, June 1, 2016

How Southern California Edison might help you charge your electric car at work
L.A. Daily News/Long Beach Press-Telegram/San Gabriel Valley Tribune/Pasadena Star, May 25, 2016

Southern California Edison plugging into electric-vehicle charging market
L.A. Daily News/Long Beach Press-Telegram/San Gabriel Valley Tribune/Pasadena Star, May 14, 2016

SCE to add electric vehicle charging stations
KNBC-TV, May 16, 2016

So Cal Edison looking to install 1,500 new electric vehicle charging stations
KNX News Radio, May 16, 2016

Plugging EVs: Program by SoCal Edison will add 1,500 charging stations
Los Angeles Business Journal, March 27, 2016

CA EV Infrastructure: Platform for innovation or simple utility service?
SmartGridNews, April 25, 2016

EV charging pilot takes off in Southern California
Green Transit News, May 16, 2016

SCE Launches Charge Ready Electric Vehicle Charging Pilot Program
The Street, May 24, 2016

SCE launching $22M Charge Ready EV charging pilot
Green Car Congress, May 17, 2016

SDG&E kicks off $52.5 million EV charger installation and customer education pilot
Utility Dive, May 23, 2016

Electric vehicle charging station pilot
World Journal, May 19, 2016

SCE Ramps Up Electric Vehicle Charging Program
socalTECH, May 17, 2016

SCE Launches Charge Ready Electric Vehicle Charging Pilot Program
Electric Cars Report, May 17, 2016

Southern California Edison to start electric car charging pilot program
Korea Herald Biz, May 17, 2016

SCE Launches Charge Ready Electric Vehicle Charging Pilot Program
Transmission & Distribution World, May 18, 2016

SCE electric vehicle charging facilities expansion plan
Korea Daily, May 19, 2016

SCE encourages participation in charging station pilot program
Singtao Daily, May 17, 2016

Plugging EVs: Program by SoCal Edison will add 1,500 charging stations.
Los Angeles Business Journal, March 27, 2016

You Know Electric Cars Are Poised to Take Off When the Koch Brothers Plan the Technology's Demise
Huffington Post, February 26, 2016

So Cal Edison gets green light to install 1,500 charging stations
CBS2, Jan. 15, 2016

So Cal Edison to Install Charging Stations
KCAL9, Jan. 15, 2016

Edison to install 1,500 electric vehicle charging stations
KNBC-TV, Jan 22, 2016

Edison will be installing 1,500 Charging Stations
KABC-TV, Jan. 15, 2016

State regulators approve electric vehicle charging station pilot program
Los Angeles Times, Jan. 15, 2016

Editorial: The right way to charge electric cars
Los Angeles Times, Jan. 27, 2016

EV drivers get more spark from Edison
L.A. Daily News/Long Beach Press-Telegram/San Gabriel Valley Tribune/Pasadena Star, Jan. 20, 2016

Southern California Edison to install 1,500 charging station
Orange County Register, March 29, 2016

Commentary: We'll all pay to charge others' electric cars
Orange County Register, Feb. 4, 2016

Utility to roll out more electric vehicle charging stations
San Jose Mercury News, Jan. 20, 2016

Electric vehicle charging stations will be installed around the area by Southern California Edison
KNX Radio, Jan. 15, 2016

SCE is getting ready to roll out a $22 million pilot program for EV charging stations
KPCC Radio, Jan. 20, 2016

Southern California pilot program to install 1,500 car charging stations
KPCC Website, Jan. 15, 2016

Edison to Install 1,500 Charging Stations
Los Angeles Business Journal, Jan. 15, 2016

Tesla's Cheaper Model 3 Could Strain Charging Infrastructure
MIT Technology Review, March 29, 2016

California Invites Power Utilities into the Car-Charging Market
Bloomberg, May 5, 2016

SCE Electric Car Initiative
KCOY-TV, Jan. 15, 2016

So Cal Edison will install 1,500 new charging stations for electric vehicles
KESQ-TV, Jan. 15, 2016

So Cal Edison says it will help to pay for the installation of 1,500 new electric car chargers
KFI Radio, Jan. 15, 2016

SCE receives green light from state regulators to begin vehicle charging pilot project
KCEP-FM, Las Vegas, Jan. 15, 2016

SoCal Edison to Add 1,500 new stations for a pilot project to install 1,500 EV charging stations
KFSN-TV, Fresno

Today CPUC gave SCE Green Light to Install As Many As 1,500 Charging Stations
KCRW Radio, Jan 22, 2016

$22 Million EV Charging Pilot Launched In Southern California
CleanTechnica, Jan. 27, 2016

Gov't Regulators To Break Out Subsidy For EV Charging Stations
Daily Caller, Jan. 19, 2016

Two California Utilities Get Creative with EV Charging
Energy Efficient Markets, Feb. 1, 2016

Southern California Utilities to Deploy 5,000 EV Chargers in First-of-Their Kind Pilots
Green Tech Media, Feb. 1, 2016

How Utilities Are Planning Electric-Vehicle Infrastructure in California and Beyond
Green Tech Media, Feb. 25, 2016

To Lead Nation in EVs, California Should Encourage Charging Station Competition
GovTech, April 27, 2016

You Know Electric Cars Are Poised to Take Off When the Koch Brothers Plan the Technology's Demise
Huffington Post, Feb. 26, 2016

Proposal to Charge Electric Cars in Southern California Gets the Green Light
NRDC Switchboard, Jan. 14, 2016

Electric Charging Station Coming Your Way
Los Alamitos-Seal Beach Patch, Jan. 14, 2016

California Regulators Approve Pilot EV Charging Program for Southern California Edison
Renewable Energy World, Jan. 15, 2016

Proposal to Charge Electric Cars in Southern California Gets the Green Light
NRDC, Jan. 14, 2016

Utility to roll out more electric vehicle charging stations
San Jose Mercury News, Jan. 20, 2016

California legislature not happy with PG&E EV proposal
SmartGridNews, April 21, 2016

California regulators approve SCE pilot to build 1,500 EV charging stations
Utility Dive, Jan. 19, 2016

California Regulators Approve Pilot EV Charging Program for Southern California Edison
Renewable Energy World, Jan. 19, 2016

SCE Inside Edison/Newsroom Stories

Hyundai Employees Can Now Charge Their EVs at Work
September 22, 2017

Charge Ready: Ontario Gets Charged Up in Time for National Drive Electric Week
September 11, 2017

Southern California Cities Plug Into Charge Ready EV Program
March 29, 2017

SCE Charge Ready Among Electric Vehicle Programs Recognized by White House
July 21, 2016

SCE launches Charge Ready Electric Vehicle Charging Pilot Program
May 16, 2016

State Commission Ruling Allows Electric Utilities to Invest in Electric Car Charging
January 22, 2015

Appendix G. Rejected and Withdrawn Applications

Figure 5.1 Withdrawn Application Reasons

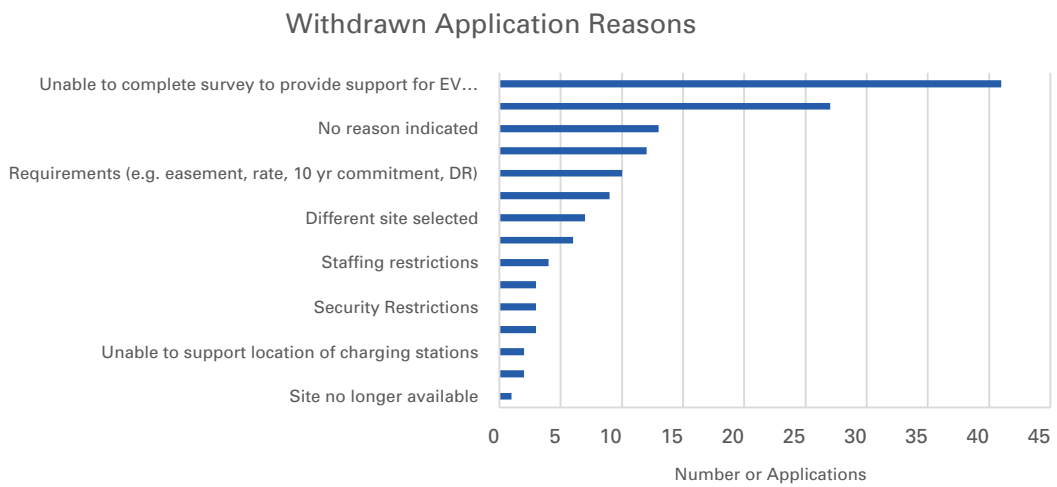


Figure 5.2 Rejected Application Reasons