



Drive EV

Incentive Program: Final Evaluation Report

April 2019

Prepared for
Sonoma Clean Power

Prepared by
Center for Sustainable Energy

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Recommended citation: Orose, Jamie; Pallonetti, Nicholas; and Russell, Nicholas (2019), “Drive EV Incentive Program: Final Evaluation Report,” Center for Sustainable Energy, San Diego CA, April 2019.

With thanks to Laura Parsons, Ryan Bodanyi, Maura Eisele and others at the Center for Sustainable Energy for their support and guidance in designing and conducting this evaluation.

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I. Executive Summary

Background

Sonoma Clean Power (SCP)—the self-funded, public electricity provider serving the counties of Sonoma and Mendocino in Northern California—invests in local energy programs/projects that are designed to be practical, affordable and inclusive in order to reduce greenhouse gas (GHG) emissions and accelerate the adoption of clean technologies. To this end, SCP created the Drive EV program to increase awareness of electric vehicles (EVs), reduce the cost of owning and operating EVs and eliminate impediments to EV adoption. The Center for Sustainable Energy (CSE) was contracted by SCP to administer and evaluate the program in each of its three iterations: 2016, 2017 and 2018. This report summarizes Drive EV (third iteration) evaluation activities and offers recommendations to inform future programs.

Program Design

Drive EV lowered the cost of acquiring EVs by offering SCP customers incentive certificates redeemable for discounts on eligible new and used EVs at the time of purchase at participating dealers. The standard incentive amount for new EVs was \$2,000, with low-income customers enrolled in either the California Alternate Rates for Energy (CARE) or Family Electric Rate Assistance (FERA) programs eligible to receive \$4,000. The standard incentive amount for used EVs was \$1,000, with CARE/FERA participants eligible to receive \$2,000. SCP negotiated partnerships with five original equipment manufacturers (OEMs) and local dealers to provide additional discounts. SCP also co-promoted a free EV charger incentive program.

Program Outcomes

In total, the 2018 Drive EV program received 1,586 applications, with 1,375 certificates being approved. Overall, 485 participants (35%) redeemed their certificates for eligible EVs. CARE/FERA participants made up 15% of the overall certificates issued for the program (208); 22% of those certificates were redeemed. Over half (53%) of incentivized vehicles were purchased (vs. leased) and 93% were new (vs. used) vehicles. The most commonly incentivized vehicles were the Chevrolet Bolt, Nissan LEAF, Chevrolet Volt and Kia Niro, constituting 86% of incentivized vehicles.

Evaluation Objectives and Methods

To evaluate impacts of the Drive EV program, CSE and SCP developed the following objectives.

1. Measure the short-term impact of the Drive EV program on EV awareness, adoption and utilization in Sonoma and Mendocino counties.
2. Measure the short-term impact of the Drive EV program on GHG emissions and gasoline usage in Sonoma and Mendocino counties.
3. Assess the satisfaction of program stakeholders and the short-term impact of the program on the SCP brand.

Program evaluation methods included an analysis of application data, a survey of certificate recipients, partner dealer interviews, emissions reduction estimations and analysis of SCP-provided data related to service rate enrollment, marketing activities and participation in a co-promoted free charger incentive.

Evaluation Results

Key findings include the following.

- Of the certificates issued, 35% were redeemed for the acquisition of an eligible EV, a decrease of 7 percentage points from Drive EverGreen 2.0. This was likely influenced by non-participating dealership deals and the impact of the Tesla Model 3.
- Sonoma County residents received 94% of certificates issued, with 77% of certificates concentrated in six cities (Santa Rosa, Petaluma, Sebastopol, Sonoma, Rohnert Park and Windsor).
- CARE/FERA respondents were more likely to rate saving money as a motivating factor for adopting an EV and more likely to rate cost and EV ownership concerns as barriers to EV adoption.
- CARE/FERA participants were significantly less likely to own their homes or live in detached homes. They were also significantly more likely to identify as female and had lower average education and income levels.
- Certificate non-redeemers were significantly older and more likely to identify as Hispanic or Latino.
- Certificate redeemers rated reduced environmental impacts and increased energy independence as their most important motivators for adopting EVs.
- Certificate non-redeemers rated range anxiety and vehicle price as their most significant barriers.
- Almost one-third (31%) of certificate non-redeemers indicated they purchased a vehicle without using a Drive EV incentive, 82% of them reported purchasing an EV, 29% of which were Teslas.
- The three most common reasons for not redeeming certificates were the EV they wanted was not included in the program (23%), the program ended (22%), and they acquired an EV at a non-participating dealership (20%).
- Certificate redeemers rated the incentives they received as very important to their decisions to acquire EVs; 77% stated they would have not adopted an EV without the program.
- Approximately 354 EVs were added to Sonoma and Mendocino county roads because of the program.
- Nearly nine out of 10 certificate redeemers (87%) replaced or planned to replace a vehicle with their newly acquired EV. Around half (54%) stated they replaced or will replace a gasoline-fueled vehicle, with another 18% replacing a conventional hybrid or diesel vehicle. Nearly all (95%) respondents stated they would use their EV as their primary vehicle.
- Over one-quarter (28%) of replaced vehicles were EVs.
- The average certificate redeemer who acquired a new EV received \$9,624 worth of discounts; those who opted for a used vehicle averaged \$3,109 in discounts.

- Discounts varied significantly by available EV, and models with higher average cost savings were not the most highly incentivized vehicles in the program.
- Lessees received higher discounts than those who purchased their EVs, most likely due to lessors' ability to claim the federal EV tax credit. Despite this, more than half of certificate redeemers purchased their EVs instead of leasing.
- Certificate redeemers ranked charging at home overnight as the most common form of EV charging, with 38% of respondents self-reporting increases in their electric bills.
- Forty percent of certificate recipients indicated that prior to participating in Drive EV, they did not know enough about EVs to make a decision about getting one.
- The Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool estimates that incentivized vehicles will reduce GHG emissions by 4,040 metric tons of CO₂ equivalent over the next three years. Based on assumptions made in the estimation of GHG reductions, sensitivity testing conducted presents a range of GHG reductions between 2,357 and 5,652 metric tons of CO₂ equivalent.
- GHG emission reduction estimates indicate an average of 8.33 metric tons of savings per vehicle incentivized, 0.28 metric tons of savings per \$100 of total program expenditure and 0.39 metric tons of savings per \$100 of SCP incentive dollars spent.
- The AFLEET Tool estimated a displacement of 8,017 barrels (approx. 336,714 U.S. gallons)¹ of petroleum over the next three years. This equates to approximately 0.55 barrels (approximately 23 U.S. gallons) per \$100 of total program expenditure, 0.78 barrels (approximately 33 U.S. gallons) per \$100 of SCP incentive dollars spent and 16.53 barrels (approx. 694 U.S. gallons) per incentivized vehicle.
- Almost three-quarters (72%) of certificate redeemers took advantage of the free EV charger incentive program.
- The most commonly identified ways in which certificate recipients first heard about the program were SCP mailers (34%), word of mouth (20%), newspaper articles (8%) and SCP's website (7%).
- Overall, 15% of certificate recipients indicated they applied in previous years of the program. Of this group, 42% stated they purchased/leased an EV in previous years. A total of 18 survey respondents indicated that they purchased/leased an EV in multiple program iterations.
- Certificate redeemers identified increased community engagement (18%) and wider dealership selection (10%) as their most common recommendations for program improvement. Certificate non-redeemers identified more vehicle options (18%) and wider dealership selection (17%) as their most common recommendations for program improvement.

¹ 1 barrel = 42 U.S. gallons per the US Energy Information Administration. Energy Units and Calculators Explained. https://www.eia.gov/energyexplained/index.cfm?page=about_energy_units. Accessed 3/4/2019.

Recommendations

While SCP does not plan to offer future iterations of the Drive EV program, the following recommendations, which are further detailed at the end of this report, are meant to help inform other entities that are considering offering similar programs. These recommendations include the following.

1. Consider smaller-scale EV rebate program to allow for continued participation
2. Consider new ways to spur dealership participation in a wider geographic region
3. Expand model availability and used vehicle options
4. Continue to assist dealers in program participation
5. Improve upon existing tools for customer verification and dealer certificate reimbursement
6. Review and consider customer responses to other programs that respondents would like SCP to offer in the future
7. Consider marketing and outreach strategies that target a broader audience
8. Promote average cost savings and vehicle ranges in promotional materials to overcome common barriers
9. Consider a more comprehensive analysis of the full three-year cycle of the Drive EV program
10. Examine possible reasons for low participation rates from customers in Mendocino County
11. Collect redeemers' energy consumption data to analyze impacts on utility bills and the grid
12. Consider additional methods for assessing direct and spillover program effects
13. Use caution when comparing GHG reduction estimates to other programs due to the variability in factors that impact savings (e.g., grid mix, consumer demographics)

Additional details about the program, its outcomes and findings and recommendations are provided in this report to inform SCP's future efforts to promote clean vehicles through the Drive EV program.

II. Program Description

Drive EV Overview

Sonoma Clean Power (SCP) is the self-funded, public electricity provider serving the counties of Sonoma and Mendocino in Northern California. SCP provides consumers with the option of using cleaner electricity (45% renewable electricity, 87% carbon-free²) at competitive rates from renewable energy sources such as solar, wind and geothermal. In addition, SCP is invested in delivering services that enhance quality of life through competitive pricing, improved air quality, and energy efficiency. By changing the way residents source energy, SCP is able to deliver customer programs that make a difference in everyone's life.

SCP views transportation electrification as critical to the reduction of GHG emissions in Sonoma and Mendocino counties and has set a goal to get 10,000 EVs on Sonoma and Mendocino county roads by 2020. Thanks in part to previous iterations of the Drive EV program, which has incentivized 773 EVs,³ 7,072 EVs were registered in Sonoma and Mendocino counties as of 1/1/2018.⁴ Despite this progress, 83% of all registered vehicles were conventional gasoline-fueled vehicles,⁵ and according to a 2015 GHG inventory of Sonoma County, 59% of GHG emissions originate from on-road transportation, up six percentage points since 2010.⁶ To address this, SCP implemented the third iteration of the Drive EV program to facilitate consumer adoption of EVs with the following objectives.

- Increase awareness of EVs
- Reduce the cost of owning and operating EVs
- Eliminate impediments to EV adoption

With a budget of approximately \$1.5 million, SCP significantly lowered the cost of acquiring EVs by offering its customers incentives for eligible models. The standard incentive amount was \$2,000; low-income customers enrolled in either the California Alternate Rates for Energy (CARE) or Family Electric Rate Assistance (FERA) programs were eligible to receive \$4,000. SCP customers applied on SCP's website for a certificate that they would then present at participating dealerships for a point-of-sale discount on the cost of an EV. SCP also negotiated partnerships with five OEMs and five local dealers to provide additional discounts on new eligible EVs. Four OEM partners also offered used EVs. The standard incentive amount for used EVs was \$1,000, with CARE/FERA participants eligible to receive \$2,000, with dealers offering additional discounts.

² Sonoma Clean Power. SCP's 2017 Power Sources. <https://sonomacleanpower.org/power-sources>. Accessed 2/4/2019.

³ Sonoma Clean Power: Drive EV Program Results. <https://sonomacleanpower.org/drive-ev-program-results>. Accessed 2/5/2019.

⁴ State of California Department of Motor Vehicles. California Motor Vehicle Fuel Types by County. https://www.dmv.ca.gov/portal/dmv/detail/pubs/media_center/statistics. Accessed 2/5/2019.

⁵ Ibid.

⁶ Regional Climate Protection Authority. Greenhouse Gases. <http://rcpa.ca.gov/data-and-reports/sonoma-county-greenhouse-gas-inventory/>. Accessed 2/4/2019.

The program accepted applications from August 1, 2018, through November 16, 2018. In addition to the vehicle incentives, SCP co-promoted a free EV charger incentive program that provided a Level 2 home charger to customers. By acquiring an EV and a home charger that uses electricity from SCP, certificate redeemers could significantly lower their transportation-related emissions.

The program has been implemented twice before: in late 2016 and late 2017. Over the years, changes have been made to the program design including increasing model availability, adjusting incentive amounts and investing in systems upgrades for process improvement. Based on lessons learned from the second round, several changes were made to the design of the Drive EV program.

The following changes in program design were made for the third iteration of Drive EV.

- Lengthening the program timeline to 15 weeks
- Increasing the CARE/FERA incentive amount for new EVs by \$500
- Increasing the number of vehicle style options, including a minivan option
- Increasing the number of dealerships offering used EV options
- No longer cross-promoting the EverGreen service rate (100% local, renewable energy plan offered by SCP)

III. Evaluation Plan

Evaluation Objectives and Questions

The evaluation of Drive EV was guided by the following evaluation objectives and questions designed in collaboration with SCP.

OBJECTIVE 1: Measure the short-term impact of the Drive EV program on EV awareness, adoption and utilization in Sonoma and Mendocino counties.

Evaluation Questions

- How did the program impact EV adoption in Sonoma and Mendocino counties?
- How important were the incentives offered in participants' decision/ability to adopt an EV?
- What average vehicle cost savings did certificate redeemers receive?
- When and how are certificate redeemers charging their EVs?
- What are redeemers' self-reported changes in gas and electrical costs?
- How many program participants took advantage of the free charger incentive program?
- How many participants were repeat applicants from previous programs?
- What program design changes were made and what impact did they have on program participation?

OBJECTIVE 2: Measure the short-term impact of the Drive EV program on GHG emissions and gasoline usage in Sonoma and Mendocino counties.

Evaluation Questions

- How many vehicles were replaced because of the program, and what percentage of these replaced vehicles were conventional gasoline vehicles?
- What factors motivated participants to replace gas vehicles?
- What percentage of replaced vehicles were EVs?
- What were the estimated reductions in GHG emissions and gasoline usage that are attributable to the Drive EV program?

OBJECTIVE 3: Assess the satisfaction of program stakeholders and the short-term impact of the program on the SCP brand.

Evaluation Questions

- Did the Drive EV program raise awareness of SCP and EVs in Sonoma and Mendocino counties?
- What types of marketing and EV education activities were effective in raising awareness of the Drive EV program and the benefits of driving an EV?
- What lessons were learned from the administration of Drive EV, and how can they inform similar EV rebate programs in the future?

Methodology

The evaluation team used a mixed-methods approach, collecting quantitative and qualitative data, with an emphasis on quantitative data. The following section details the data sources used, collection methods and analysis procedures.

Definitions

To ensure accurate interpretation of results, see Table 1 for a list of common terms used for differing program participant populations in this report.

Table 1. List of program participant terms and definitions

Term	Definition
Applicants	Individuals who applied for Drive EV incentive certificates
Certificate recipients	Individuals who were approved for Drive EV incentive certificates, regardless of whether they acquired EVs
Certificate redeemers	Individuals who received Drive EV incentive certificates and redeemed them for the acquisition of program-eligible EVs
Certificate non-redeemers	Individuals who received Drive EV incentive certificates, but did not redeem them for the acquisition of program-eligible EVs

Application Data

Data from the Drive EV application were used to address multiple evaluation questions. Application data used in this evaluation include the following.

- Applicant account information, service address and contact information
- Date of application
- Applicant CARE/FERA status
- Certificate redemption status (denied, unredeemed, redeemed)
- EV purchase/lease date
- EV model acquired
- New/used status
- EV purchase/lease status
- Lease terms (length of lease and approved mileage) if applicable
- Amount of incentives and discounts

These data sets were used for calculating program totals, determining representativeness of survey data and conducting emissions calculations and cross-program analysis. Through the process of cleaning these data, it was discovered that some customers' CARE/FERA status were incorrectly identified at the time of application and were issued incorrect certificates as a result.⁷ CARE/FERA indicators for these

⁷ CARE/FERA status error was due to incorrect customer statuses logged in SCP's account verification tool. A total of 36 records were impacted. Twenty-nine applicants were enrolled in CARE/FERA but identified as non-CARE/FERA and issued a non-CARE/FERA-level certificate. Seven records were not enrolled in CARE/FERA but were identified as CARE/FERA and issued a CARE/FERA-level certificate. All but one of these seven had been enrolled in CARE/FERA within the year prior to Drive EV. Five of the 36 impacted applicants redeemed their certificates for EVs.

participants were updated to reflect their actual status at the time of application for the purpose of this evaluation.

Survey Data

The Drive EV program closed on November 16, 2018. Participating dealers were given until December 7, 2018, to submit all relevant documentation for reimbursement. After this administration period, the survey was distributed via email to certificate recipients, with certificate redeemers receiving a different version than non-redeemers. Survey results were collected between December 13, 2018, and January 17, 2019. A total of 1,368 potential respondents were invited to participate.⁸ Reminder emails were sent each week during the window to non-respondents (total of four). As an incentive for participation, respondents were given the option to enter a drawing for one of 10 \$30 Amazon gift cards. The survey collected 619 responses. Eleven responses were collected from participants with incorrect CARE/FERA statuses at time of application. These responses were removed from the analysis because they did not participate in the program as intended and may have provided different responses if they had received the correct certificate. Overall, the survey received a 44% response rate (608 responses). Out of the 608 survey respondents, 66 were CARE/FERA participants (22 certificate redeemers/44 certificate non-redeemers).

Table 2. Summary of survey invitations and responses

Population	Number of Invitations Sent	Number of Responses Received	Response Rate
Certificate redeemers	485	281	58%
Certificate non-redeemers	883	327	37%
Total	1,368	608	44%

Table 3 shows the topics explored with each survey audience. A copy of the survey instrument can be found in Appendix B.

⁸ Program issued 1,375 certificates. Five certificate recipient applications were still pending resolution at the time of survey launch and were not invited. Two duplicate certificate recipients, who applied twice with the same name and PG&E account number were only invited to the survey once.

Table 3. Summary of survey topics by audience

Survey Topic	Certificate Redeemers	Certificate Non-Redeemers
Motivations/enablers of adoption	X	X ⁹
Barriers to EV adoption		X
Importance of incentives in the decision/ability to adopt an EV	X	
Counterfactuals (vehicle purchase decisions in the absence of the Drive EV program)	X	X
Household vehicle composition	X	X
EV usage (e.g., miles driven, rideshare)	X	
Self-reported fuel and energy cost savings	X	
Effectiveness of outreach and marketing	X	X
Initial awareness of EVs and SCP	X	X
Participant satisfaction and feedback	X	X
Participant demographics	X	X
Reasons participants from previous program iterations chose to participate again	X	X

Survey analysis was completed using both STATA and R statistical software packages and consisted of three primary steps.

1. Cleaning and preparation of data for analysis

Survey data went through a multistep quality control procedure to ensure data were exported correctly, accurately coded and cleaned and checked for duplicates. Relevant application data were appended to survey results using a unique applicant ID. Quantitative survey questions were reviewed for accuracy and validity.

2. Determining representativeness of survey data

Survey data were examined to determine the extent to which survey respondents were representative of certificate recipients. These findings were used to determine if survey responses should be adjusted using survey weights to ensure results accurately represent the program population sampled. The dimensions examined were the proportion of redeemed and unredeemed certificates, CARE/FERA rate eligibility and geographic distribution measured at the city and ZIP code levels. The analysis included a series of Pearson's chi-square tests to assess whether the distributions of these characteristics were independent of whether the individual took the survey.¹⁰

Chi-square test results showed that certificate redeemers were overrepresented in the survey population (46%) when compared to the total program population (36%). While this difference was statistically significant, redemption status triggered very different lines of questioning in the survey that

⁹ Topic was only explored with certificate non-redeemers who specifically stated they acquired an EV outside of the Drive EV program.

¹⁰ 36 records identified as having CARE/FERA discrepancies were removed from the program population sample and survey records to conduct chi-square testing.

were not applicable to both audiences, making it inappropriate to weight the entire survey based on this status. No other statistically significant differences were found between survey respondents and the total program population. Table 4 shows the p-values¹¹ obtained from the Pearson's chi-square tests conducted to compare the respondent sample to the approved certificate population.

Table 4. Survey sample vs. total program population

Dimension	P-value
Certificate redemption status	0.000
CARE/FERA status	0.133
City	1.000
ZIP code	1.000

To further address representativeness, redeemed survey respondents were compared against the population of all redeemed program participants. The dimensions examined were: vehicles purchased v. leased, vehicle model, CARE/FERA rate eligibility and geographic distribution measured at the city and ZIP code levels. Findings showed no statistically significant differences between these populations.

Table 5. Redeemed survey responses vs. redeemed program population

Dimension	P-value
Purchase vs lease	0.694
Vehicle model	0.998
CARE/FERA	0.527
City	1.000
ZIP code	1.000

A lack of significant differences was found between survey respondents and the program population sampled, and the survey received a high response rate for both redeemers and non-redeemers. The existing evidence suggests survey respondents are representative of the overall program participants, and the survey data can be used without adjusting results through post-survey weights.

3. Descriptive statistics and significance testing

Descriptive statistics (e.g., frequencies, means) were calculated for all survey questions. Results were split into two sets of subgroups: redeemers vs. non-redeemers and CARE/FERA customers vs. non-CARE/FERA customers. Where relevant to the evaluation questions, differences between these subgroups were tested for statistical significance.¹²

¹¹ The authors use a 95% confidence interval to determine statistical significance. Thus, in chi-square and t-tests, a p-value less than 0.05 indicates statistically significant association.

¹² Survey questions that produced categorical variables (e.g., yes/no) were tested using Pearson's chi-square tests to determine differences in response frequency. Likert scale questions with linear response options (e.g., options ranging from "not at all important" to "extremely important") were treated as continuous variables and were tested using two-sample t-testing that assumed unequal variance.

GHG Emission and Petroleum Use Estimates

GHG emission reductions and petroleum displacement attributable to the Drive EV program were estimated using the Alternative Fuel Life-Cycle Environmental and Economic Transportation (AFLEET) Tool 2018,¹³ based on inputs and assumptions derived from application and survey data.

The AFLEET Tool produces annualized well-to-wheels estimates of GHG emissions and petroleum use for a specified fleet of vehicles. Well-to-wheels estimates include emissions and petroleum use from both on-road vehicle operation and upstream activities (e.g., fuel extraction and production). To estimate reductions attributable to the program, two fleets of vehicles were analyzed: 1) the fleet of vehicles incentivized by the program (adopted fleet) and 2) the fleet of vehicles that *would have been* on the road had the program not existed (alternate fleet). The differences between the two fleets equal the estimated total annual GHG emission reductions and petroleum displacement. This analysis included the following steps.

1. Assigning an adopted fleet and alternate fleet vehicle profile to each survey respondent who redeemed their certificate
2. Calculating annual GHG emission and petroleum use estimates of each fleet using the AFLEET Tool
3. Scaling up the totals for each fleet to represent all certificate redeemers¹⁴
4. Subtracting adopted fleet totals from alternate fleet totals
5. Multiplying difference in annual estimates to represent total savings over the three-year program life¹⁵ of the adopted fleet

The assigned vehicle profiles that were input to the AFLEET Tool specified customer electric generation mix based on SCP service option, vehicle fuel type and annual fuel usage determined by EPA fuel economy and PHEV utility factor (i.e., percentage of miles driven in electric mode) estimates¹⁶ and self-reported vehicle miles traveled (VMT). Table 6 specifies how vehicle characteristics were assigned for the adopted and alternate fleets.

¹³ The AFLEET Tool was developed by Argonne National Laboratory for the Department of Energy's Clean Cities Program. Based on assumptions input by the user, it produces estimates of petroleum use, greenhouse gas emissions and tailpipe air pollutant emissions for a fleet of vehicles. The tool uses data from Argonne's Greenhouse gases, Regulated Emissions and Energy use in Transportation (GREET) fuel-cycle model and the Environmental Protection Agency's Motor Vehicle Emission Simulator (MOVES).

¹⁴ Because not all participants responded to the survey, totals had to be scaled up to represent the entire certificate redeemer population. To do this, emission estimates were multiplied by the inverse of the survey response rate for each combination of new/used, technology type (BEV/PHEV) and SCP service rate (CleanStart/EverGreen).

¹⁵ The program life of the adopted fleet is associated with a 36-month lease, which characterizes the vehicle adoptions of nearly half of certificate redeemers. After this period, assumptions made on vehicle use and grid make-up become less reliable. This method also aligns closely to the methodology used by the California Air Resources Board that quantifies 2.5-year emission reduction estimates for similar EV rebate programs based on program ownership requirements as outlined in the proposed Fiscal Year 2018-19 Funding Plan. https://www.arb.ca.gov/msprog/aqip/fundplan/proposed_1819_funding_plan.pdf. Accessed 3/1/19.

¹⁶ Fuel economy and utility factor estimates were derived from EPA Fuel Economy data provided at <https://www.fueleconomy.gov>. Accessed 2/28/19.

Table 6. Sources used to determine vehicle characteristics used in fleet profiles

Vehicle Characteristic	Adopted Fleet Source	Alternate Fleet Source
Annual VMT	Response to survey question 30 (Appendix B)	
Fuel economy	Application data	Responses to survey questions 17, 20, 22 and 24 (Appendix B)
Fuel type		
Utility factor		

The alternate fleet vehicle profiles were derived from responses to survey questions that asked respondents to indicate the type of vehicle they would be using had the Drive EV program not existed. Each certificate redeemer was assigned an alternate fleet fuel economy value as delineated in Table 7. Respondents who indicated they would have purchased/leased the same vehicle they obtained through Drive EV had the program not existed were assigned EPA estimated fuel economy and PHEV utility factor values for the model specified in the application data. Respondents who indicated they would have purchased a different electric or hybrid vehicle had the program not existed were assigned average fuel economy and PHEV utility factor values based on EPA estimates of models of the indicated fuel type for model year 2018 or 2019.¹⁷ Respondents who would have purchased a nonhybrid gasoline-fueled vehicle were assigned the California-sales-weighted average of EPA fuel economy values for the top 30 selling MY 2018 gasoline models.¹⁸ Respondents who would have continued using a vehicle they already owned without the program were assigned an average fuel economy based on EPA estimates of the indicated technology type, body style and model year of that vehicle.

Table 7. Alternate fleet fuel economy assignments by survey response

Response Selected	Fuel Economy Assignment
Purchased/leased the same all-battery EV I got through Drive EV	Varied by respondent; based on vehicle purchased/leased through Drive EV
Purchased/leased a different all-battery EV	30 kWh/100 mi
Purchased/leased a plug-in hybrid EV	Electric mode (47%): 43 kWh/100 mi Gasoline mode (53%): 33 mpg
Purchased/leased a conventional hybrid	36 mpg
Purchased/leased a nonhybrid gasoline-fueled vehicle	29 mpg
Continued using a vehicle I already owned	Varied by respondent; based on technology type, body style and model year specified in survey question 22 or 24 (Appendix B)
Other	Varied by respondent, not included in the GHG calculations (n=11)

¹⁷ As a conservatism, the more fuel efficient of the two model years was used.

¹⁸ Williams, Brett; Pallonetti, Nicholas. Exploratory Estimation of Greenhouse-Gas Emission Reductions from California's Clean Vehicle Rebate Project. Presented at 98th Annual TRB meeting, 2019.

https://cleanvehiclerebate.org/sites/default/files/attachments/CVRP%20GHGs_TRB%202019-01-17.pdf. Accessed 3/7/2019.

The cost of achieving GHG emission reductions and petroleum displacement was then calculated using two cost metrics.

- **Cost Metric #1:** Per \$100 of Drive EV incentive dollars spent (\$1,026,000)
- **Cost Metric #2:** Per \$100 of total program funds allocated, including incentive dollars, marketing/outreach, program administration costs and consultation (\$1,445,000)

The GHG emissions reduced and petroleum displaced per \$100 dollars spent over the program life of the adopted fleet was calculated as follows.

Equation 1. Calculation used to determine cost of GHG reductions and petroleum displacement

$$\frac{\text{Estimated annual GHG emission reductions or petroleum displacement} * 3 \text{ years}}{\text{Cost metric} / \$100^{19}}$$

Several assumptions were made to estimate GHG emission reductions and petroleum displacement. These assumptions are summarized in Table 8, along with the sensitivity tests performed for each assumption.

Table 8. Summary of assumptions used to estimate GHG reductions and petroleum displacement as well as sensitivity testing performed

Assumption	Sensitivity Test Performed
Fuel economy values assigned to the alternate fleet accurately reflect the fuel economy that would have been achieved in the program's absence	±10% fuel economy per vehicle in the alternate fleet
Survey responses accurately reflect all certificate redeemers	±10% total GHG emissions for alternate fleet
Survey respondents provide accurate estimates of the number of miles they will be driving their incentivized EVs, <i>and</i> their mileage would be the same had the program not existed	±10% annual VMT per vehicle in the adopted and alternate fleet
EPA utility factor values accurately reflect the electric mode operation of PHEVs (including BMW i3 REX)	±10pp utility factor per vehicle
Unspecified portion (13%) of the SCP CleanStart Electricity Portfolio is properly represented by the modified ²⁰ California grid mix (33.9% renewable, 48.6% natural gas, 4.3% coal, 9.4% nuclear power, 2.9% biomass, 0.8% residual oil)	Adjust unspecified portion of electricity portfolio to 100% renewable energy and to 100% coal

¹⁹ Cost metric #1 = \$10,260 (\$1,026,000/\$100); Cost metric #2 = \$14,450 (\$1,445,000/\$100).

²⁰ EPA eGRID2016 CAMX grid (<https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid>) modified as described in the California Air Resources Board's CA-GREET 2.0 Supplemental Document and Tables of Changes. <https://www.arb.ca.gov/fuels/lcfs/ca-greet/CA-GREET2-suppdoc-060415.pdf>. Accessed 3/1/2019.

Additional Information Sources

Additional data used for this evaluation was obtained from several sources.

1. **Dealership interviews:** Qualitative interviews were conducted with representatives from four of the five participating dealerships. Phone interviews were conducted between December 3, 2018, and January 16, 2019, focusing on the dealership experience administering the program and feedback for program improvement. Each interview was conducted by a CSE research analyst, while another analyst took notes (no recordings were made). See Appendix D for the interview protocol used in these interviews. Notes taken during the interviews were reviewed and characterized into main themes.
2. **Data collected from previous program iterations:** Survey and program data from Drive EverGreen 1.0 and 2.0 were used to compare with Drive EV.
3. **Free EV charger incentive program data:** These data facilitated the analysis of redeemers who concurrently took advantage of SCP's free EV charger incentive program. Certificate redeemers were matched across programs using PG&E account numbers, as well as internal SCP tracking numbers.
4. **SCP customer service plan enrollment data:** SCP customers are enrolled in either CleanStart service (87% carbon-free) or EverGreen service (100% local and renewable). This enrollment data was used to apply energy grid mixes to the GHG emissions estimates for certificate redeemers.
5. **Marketing and outreach data:** SCP provided data and analytics on their various marketing and outreach activities used to promote the program. Data were analyzed in relation to the program applications received.

IV. Results

How did the program impact EV adoption in Sonoma and Mendocino counties?

Program Participation Overall and by CARE/FERA Status

In total, 1,586 Drive EV applications were received, 1,375²¹ certificates were approved and 485 (35%) certificates were redeemed for the purchase or lease of an eligible EV. In addition, 211 applications were denied either because applicants were ineligible, did not complete their application or were otherwise cancelled.

Over half (53%) of incentivized vehicles were purchased, and 93% were new vehicles. In total, 32 used EVs were incentivized through the program. Survey respondents (n=17) who purchased a used vehicle mentioned price as the most common motivating factor for acquiring a used EV over a new one. Out of 97 non-redeemers who purchased another vehicle outside of the program, 82% reported purchasing an EV.

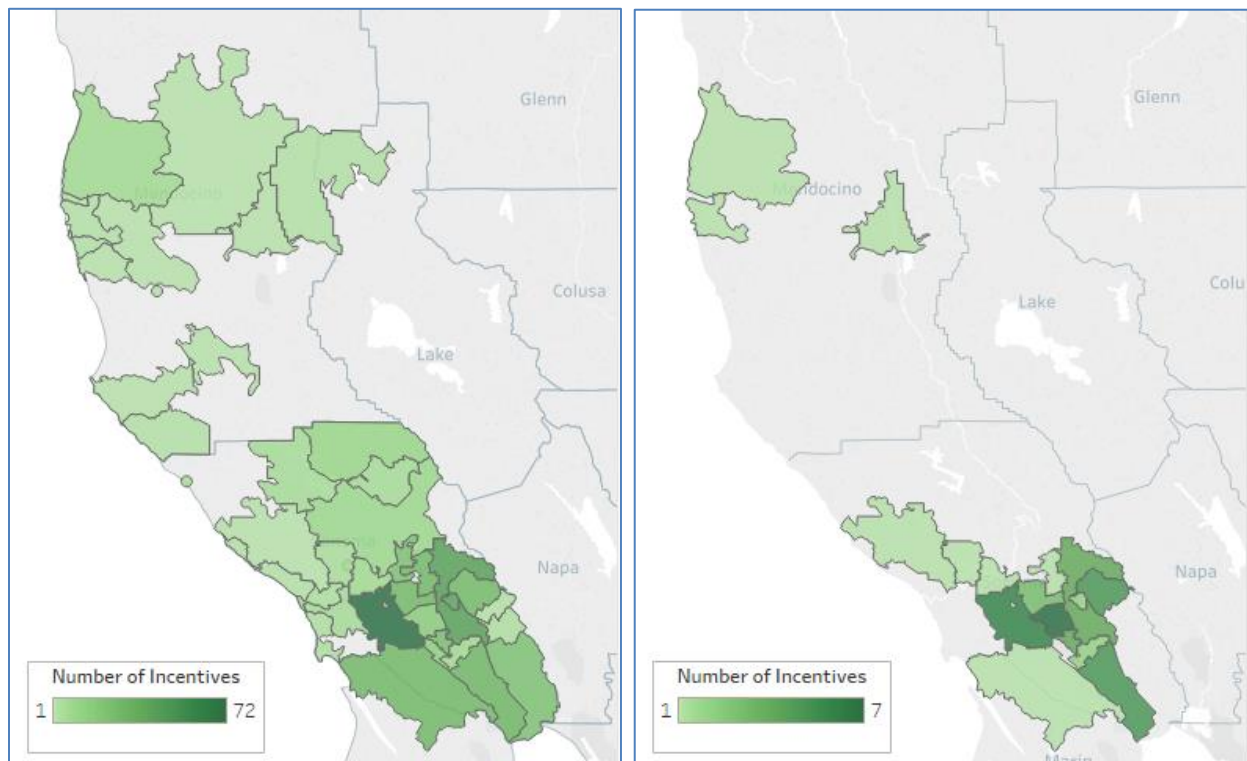
Sonoma County residents received 94% of the certificates issued, with 77% of the certificates concentrated in six cities (Santa Rosa, Petaluma, Sebastopol, Sonoma, Rohnert Park and Windsor). The other 6% of certificates were issued to Mendocino County residents. CARE/FERA program participants follow a similar trend, with 77% concentrated in the same cities.

Overall, CARE/FERA program participants made up 15% of the overall certificates issued for the program (208 out of 1,375). Almost One quarter (22%) of CARE/FERA participants redeemed their certificates. Nine percent (46) of the incentivized vehicles went to CARE/FERA participants.

The following maps show the distribution of redeemed certificates overall, as well as by CARE/FERA status.

²¹ There were 1,373 unique program participants. Two people received multiple certificates.

Figure 1. Distribution of redeemed certificates by ZIP code (overall, left, and CARE/FERA, right)

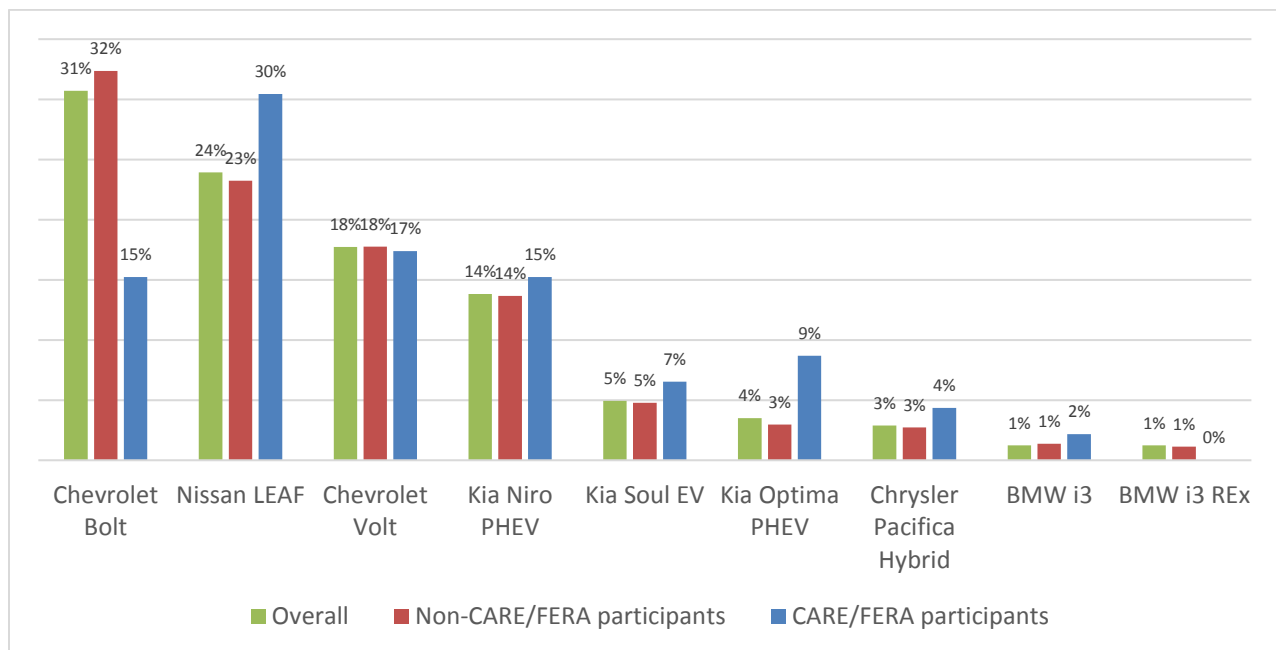


The most commonly incentivized EVs were the Chevrolet Bolt (149), Nissan LEAF (116), Chevrolet Volt (86) and Kia Niro PHEV (67); together they constituted 86% of vehicles incentivized. The Nissan LEAF (14), Chevrolet Volt (8), Kia Niro PHEV (7) and Chevrolet Bolt (7) were the most popular EVs acquired by CARE/FERA participants.

Table 9: Number of EV models incentivized

Vehicle	Vehicles Incentivized
Chevrolet Bolt	149
Nissan LEAF	116
Chevrolet Volt	86
Kia Niro PHEV	67
Kia Soul EV	24
Kia Optima PHEV	17
Chrysler Pacifica Hybrid	14
BMW i3	6
BMW i3 Rex	6
Total	485

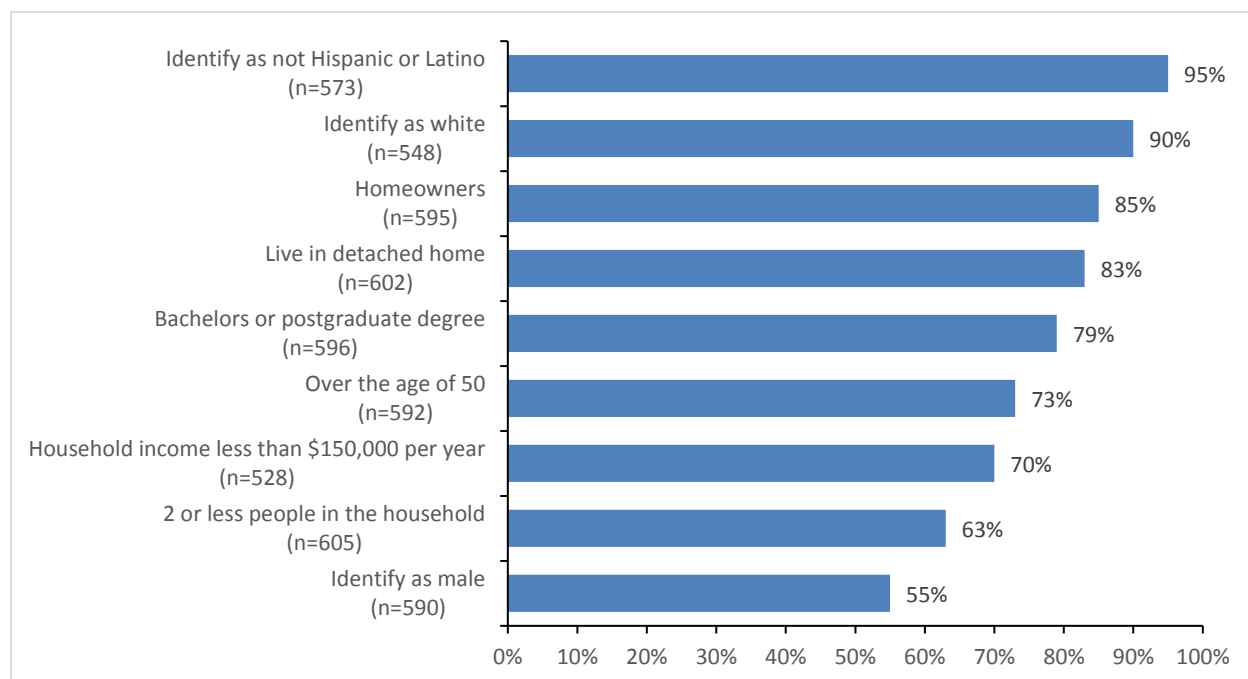
Figure 2: Percent of EV models incentivized overall and by CARE/FERA status



Program Participant Demographics

The majority of certificate recipients own their homes (85%) and live in detached houses (83%). The average age range of certificate recipients was 50-59 years old, with 73% over the age of 50. The average household size was 2.5 people and average household income was between \$100,000-\$150,000, with 70% of certificate recipients reporting household incomes of less than \$150,000 per year. Lastly, 90% of respondents identified as white, and 79% reported having a bachelor's or postgraduate degree. Figure 3 shows the demographic breakdowns for all survey responses.

Figure 3. Majority demographic indicators of survey respondents



To provide context on how much Drive EV program participants represent the overall Sonoma and Mendocino county population, CSE compared their demographic data to census data collected from the American Community Survey. Drive EV participants were more likely to identify as white (90% v. 81%) and less likely to identify as Latino/a or Hispanic (5% v. 26%), as compared with the overall population. Furthermore, Drive EV participants had higher household income and education levels than the overall population. Almost one-third (30%) of respondents said their household income was over \$150,000 per year, as compared with 16% of the overall population; respondents are also more likely to hold a bachelor's or postgraduate degree (79% v. 33%). Lastly, the Drive EV program population skewed older, with 73% over the age of 50, compared to 40% of the overall population.²² Please note this comparison is to the total population of Sonoma and Mendocino counties and a more appropriate comparison would be to the new car-buying population, however, these data are unavailable. The new car-buying population tends to be wealthier and more highly educated than the general population.

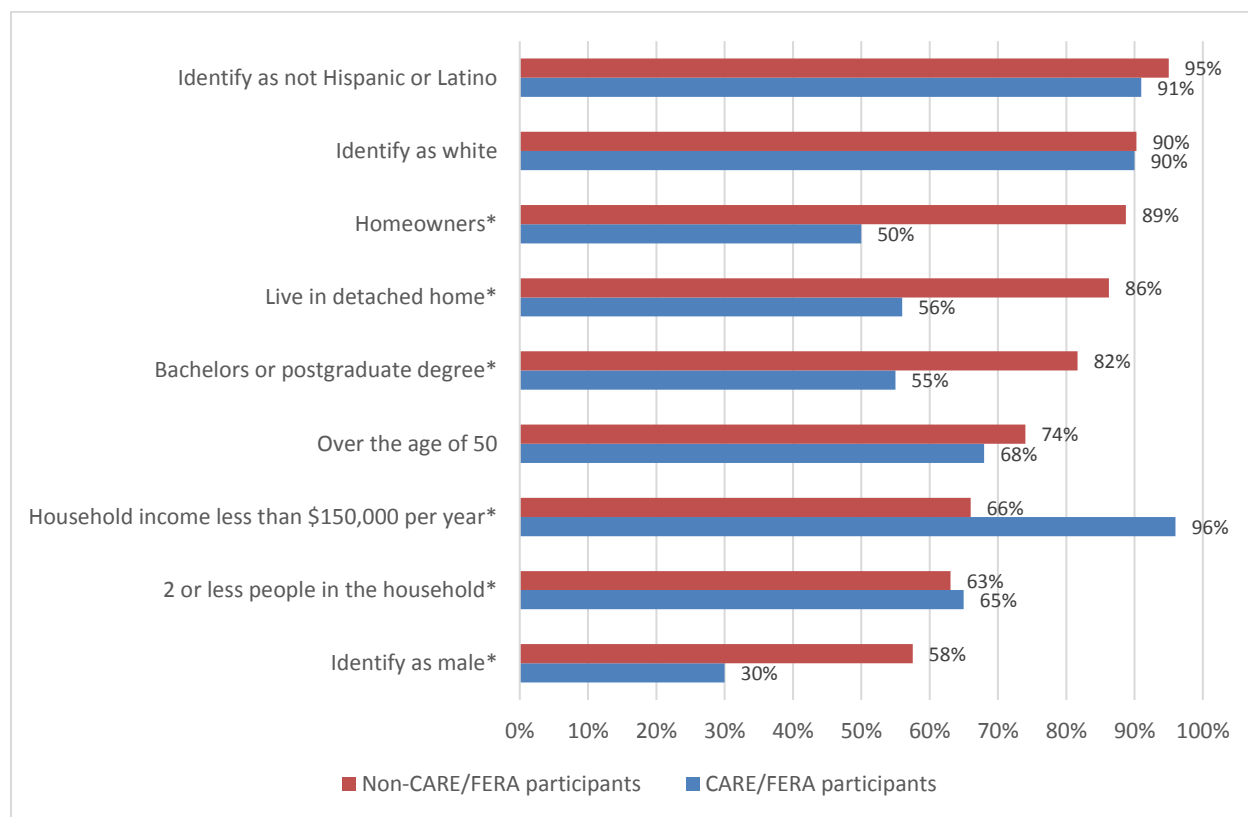
Certificate redeemers and non-redeemers were not significantly different in terms of race, gender, income, education level, household size or homeownership. Certificate non-redeemers were significantly older ($p=0.02$) and more likely to identify as Hispanic or Latino ($p=0.01$). However, a vast majority of both groups identified as not Hispanic or Latino.

More significant differences exist between CARE/FERA and non-CARE/FERA participants. CARE/FERA participants were less likely to own their homes and more likely to live in attached homes or apartments. They were more likely than non-CARE/FERA participants to identify as female. Finally, they

²² American Community Survey. Population, housing and demographic estimates (Tables S0101, S1501, S1901, S2501, DP05). <https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>. Accessed 2/28/2019.

had significantly lower levels of income and education. On average, CARE/FERA participants reported household income in the range of \$50,000–\$75,000, as compared to \$125,000–\$150,000 for non-CARE/FERA participants ($p=0.00$). Figure 4 shows the demographic differences between CARE/FERA and non-CARE/FERA participants.

Figure 4. Demographic and housing differences by CARE/FERA status

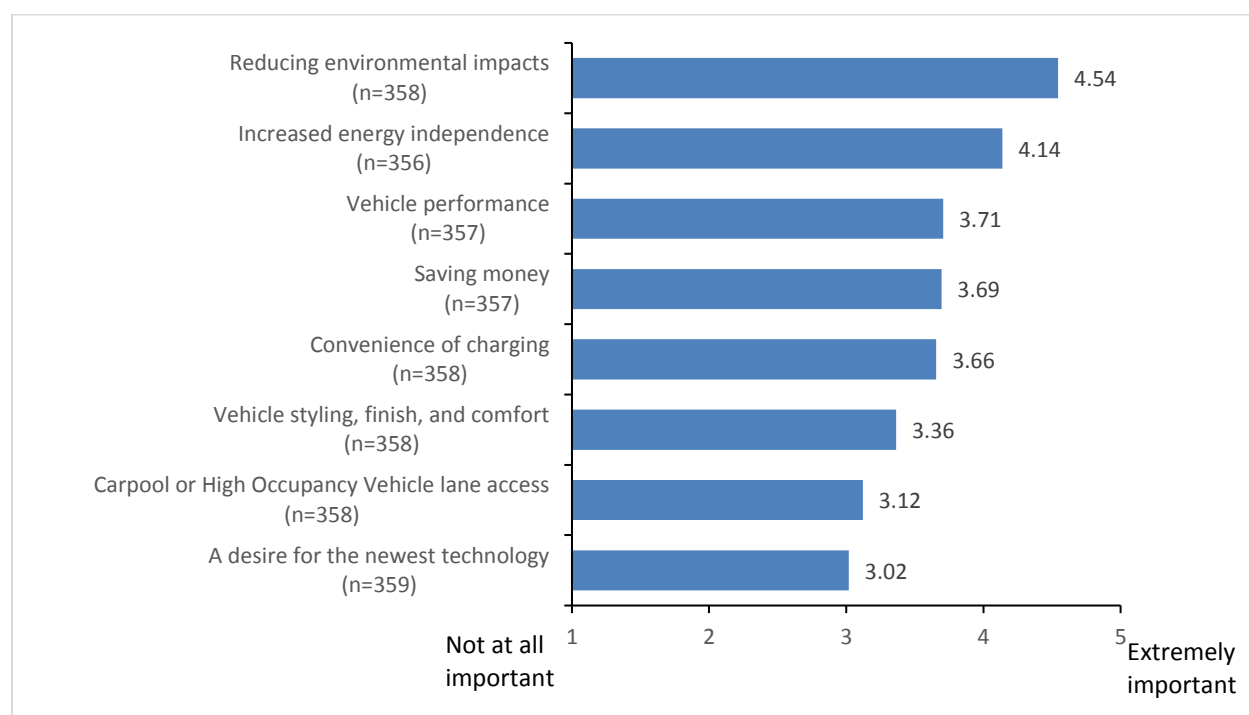


* Indicates statistical significance (p-value less than 0.05)

EV Adoption Motivators

Certificate redeemers, and those non-redeemers who said they acquired an EV outside the Drive EV program, were asked to rate the importance of several factors in their decision to adopt their EV. Reducing environmental impacts had the highest average importance of all the listed motivations, as shown in Figure 5. Increased energy independence was also highly rated. Rated as slightly less important were vehicle performance and saving money. These factors present an opportunity to design further educational materials focusing on these specific benefits of EV ownership that may attract a wider consumer base who value more traditional factors in their vehicle purchasing decisions.

Figure 5. Rated importance of motivations for adoption among respondents who adopted an EV



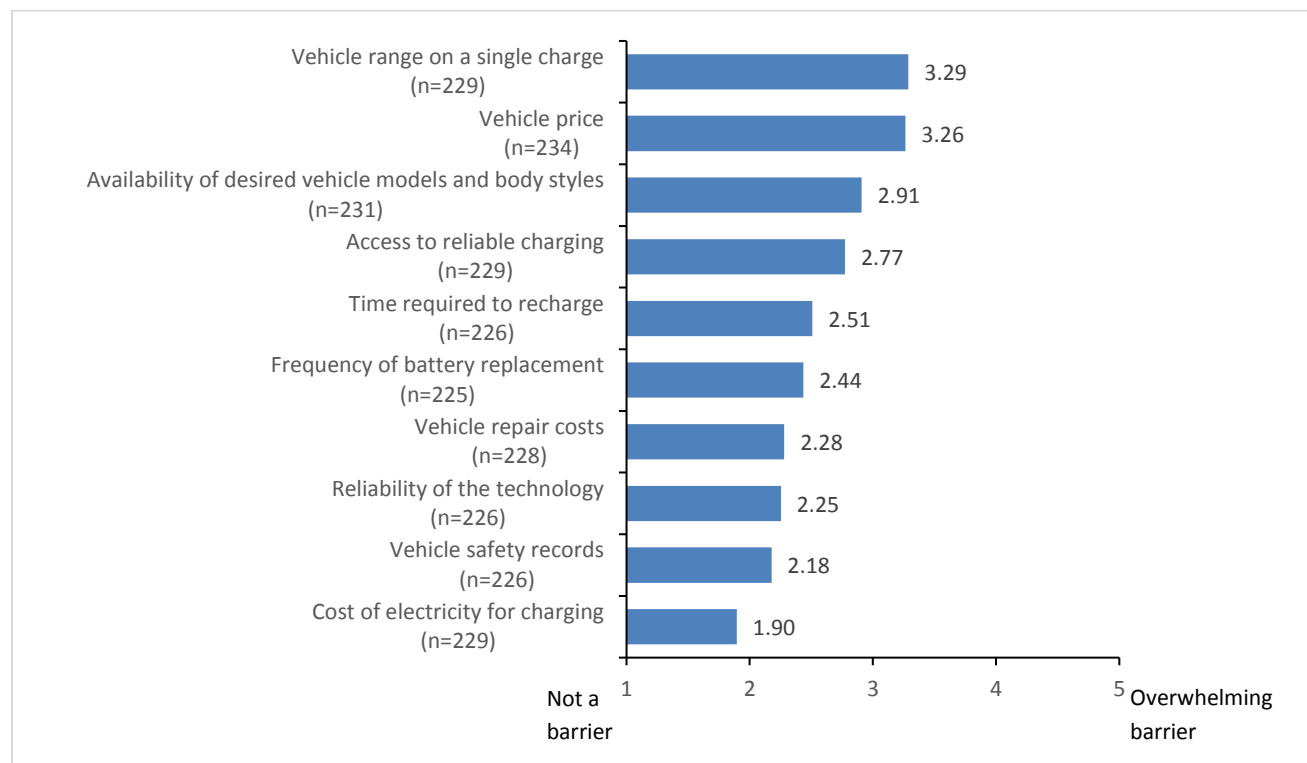
Certificate redeemers valued reducing environmental impacts significantly higher than non-redeemers who acquired EVs outside of the Drive EV program ($p=0.00$). These non-redeemers placed more value than certificate redeemers in vehicle-specific metrics such as vehicle performance ($p=0.01$), styling/finish/comfort ($p=0.01$) and a desire for the newest technology ($p=0.01$).

CARE/FERA participants were more likely to rate saving money as a motivating factor when compared with non-CARE/FERA participants.

Barriers to Adoption for Non-Redeemers

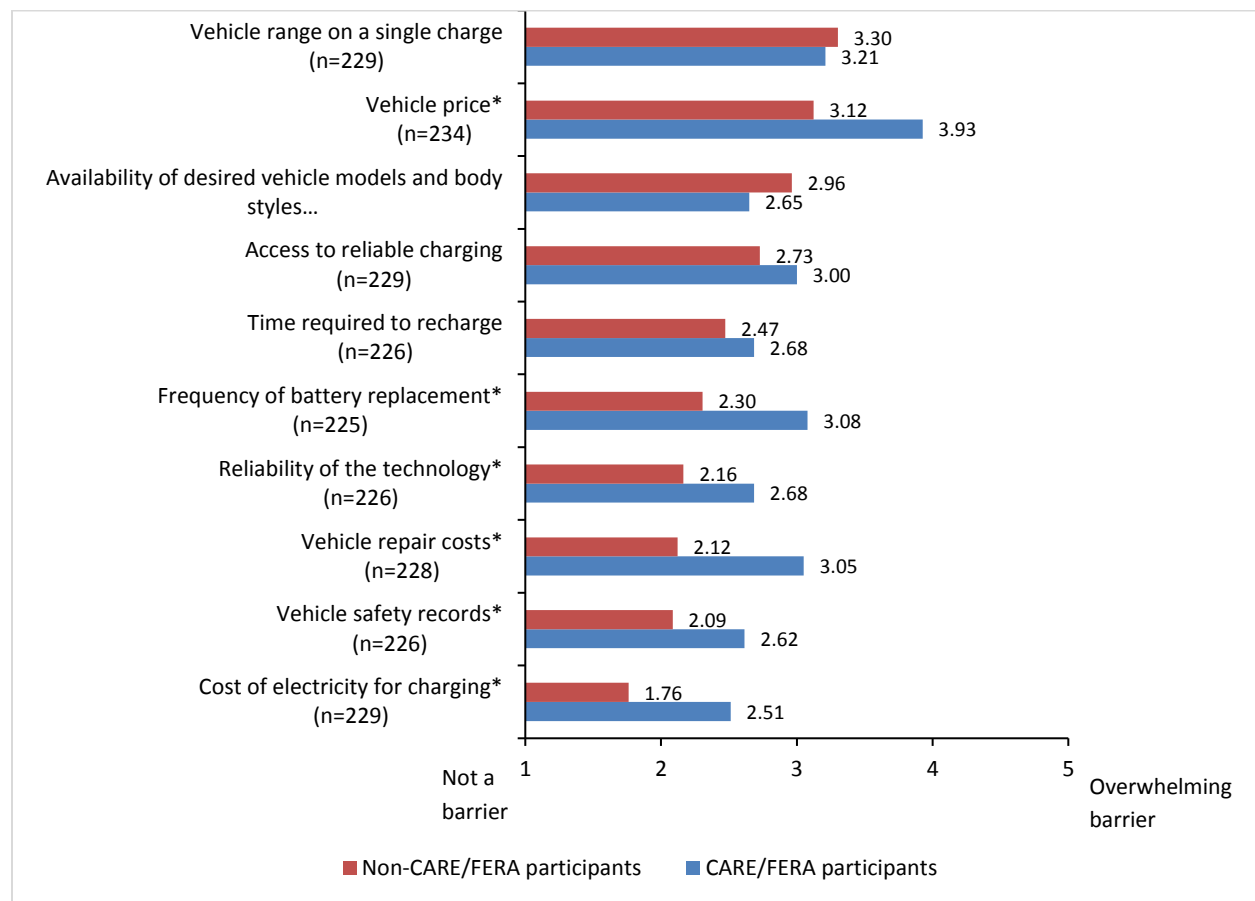
Non-redeemers who had not already purchased an EV and had no plans to purchase one in the near future were asked to rate the significance of common barriers to EV adoption. The most common barriers to adoption they identified were range anxiety, price and model availability.

Figure 6. Rated importance of selected barriers to adoption among non-redeemers



CARE/FERA participants rated barriers related to cost—such as vehicle price ($p=0.00$) and electricity costs ($p=0.00$)—and the reliability of EV technology ($p=0.00$) as significantly higher than non-CARE/FERA participants. In addition, they rated EV ownership concerns—such as battery replacement frequency ($p=0.00$) and repair costs ($p=0.00$)—higher than non-CARE/FERA participants.

Figure 7. Differences in barriers to adoption by CARE/FERA status



Reasons Why Certificate Non-Redeemers Did Not Acquire an EV

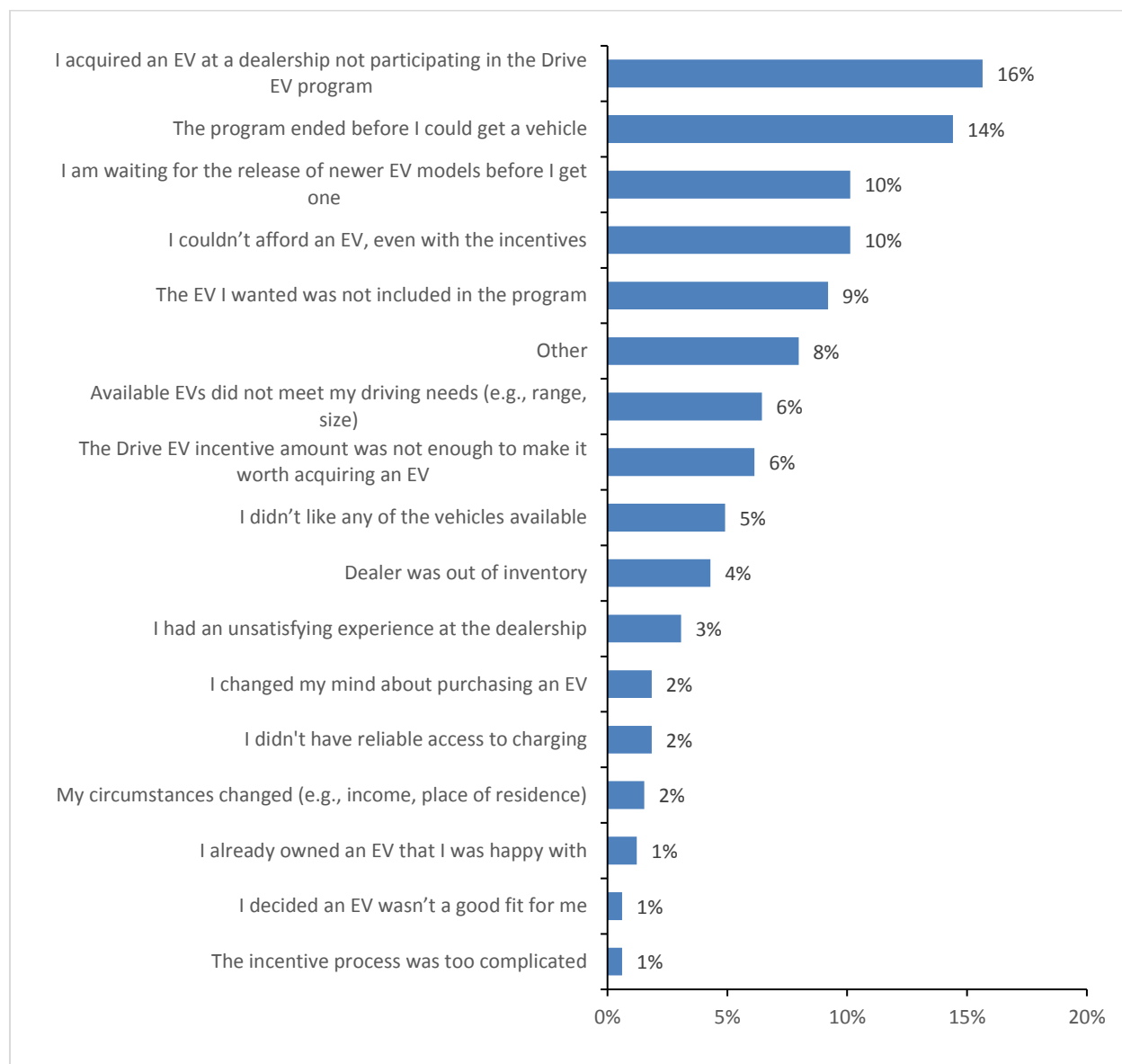
Survey respondents who did not redeem their certificates were asked to select the reasons they chose not to redeem. Respondents could choose multiple responses and provide open feedback on their reasons for not redeeming their certificates.

Following are the five most common reasons cited for not redeeming certificates.

- The EV they wanted was not included in the program (23%)
- The program ending before they could get a vehicle (22%)
- They acquired an EV from a non-participating dealership (20%)
- They were waiting for the release of a newer EV model (19%)
- They could not afford an EV even with the incentives (17%)

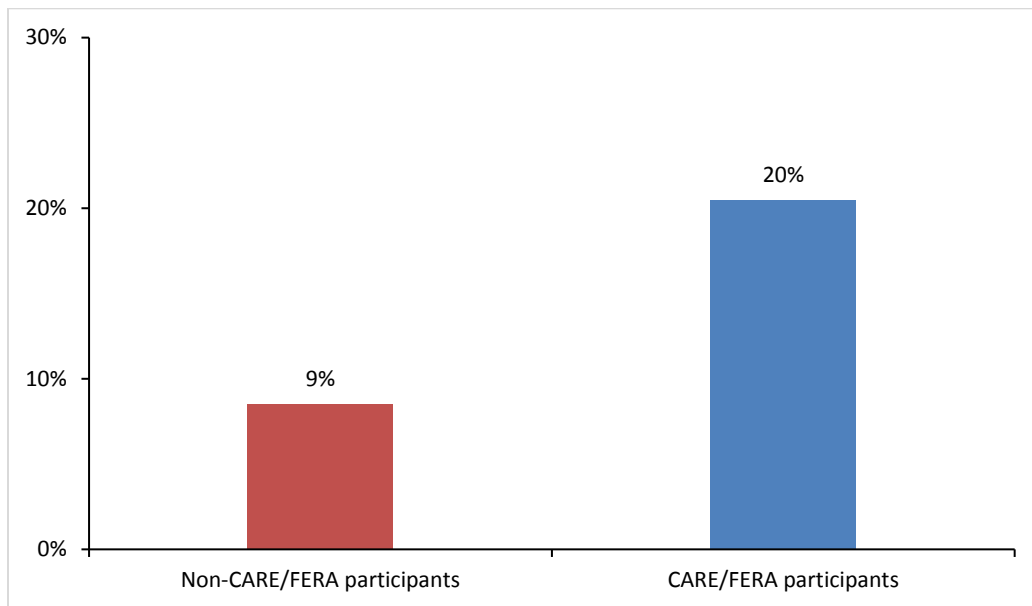
Based on their responses to this question, non-redeemers were then asked to select the PRIMARY reason they did not redeem their certificate. Figure 8 shows the primary reasons for non-redemption.

Figure 8. Primary reasons for not redeeming an approved certificate (n=326)



Non-redeemers cited the main reasons they did not redeem their certificate as acquiring an EV at a non-participating dealership (16%) and the program ending before they could redeem their certificate (14%). CARE/FERA respondents were more likely to cite high costs, even with the incentives, as their main reason for not adopting an EV.

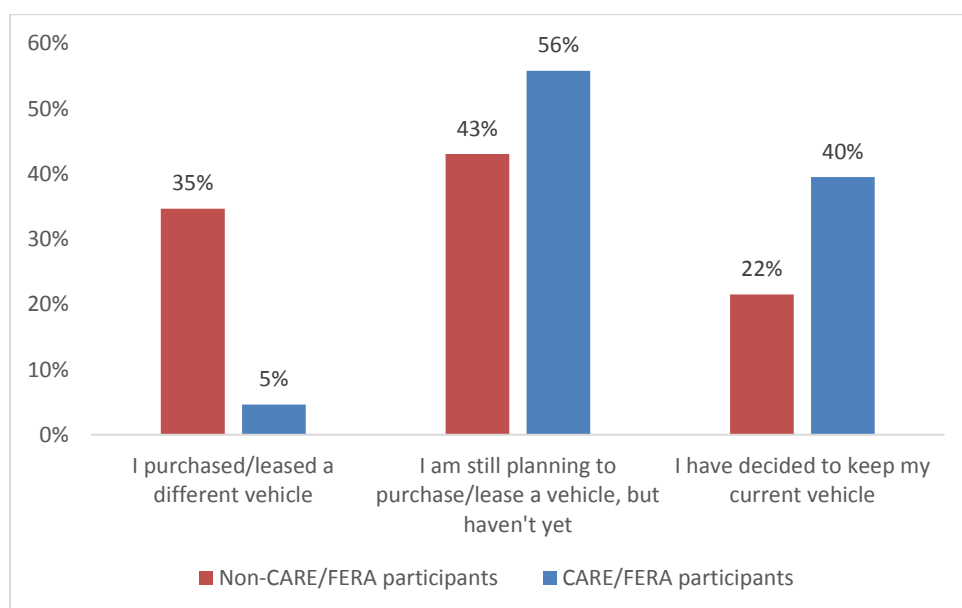
Figure 9. Percent of respondents who stated they could not afford an EV, even with the incentives, by CARE/FERA status.



Vehicle Purchasing Decisions of Certificate Non-Redeemers

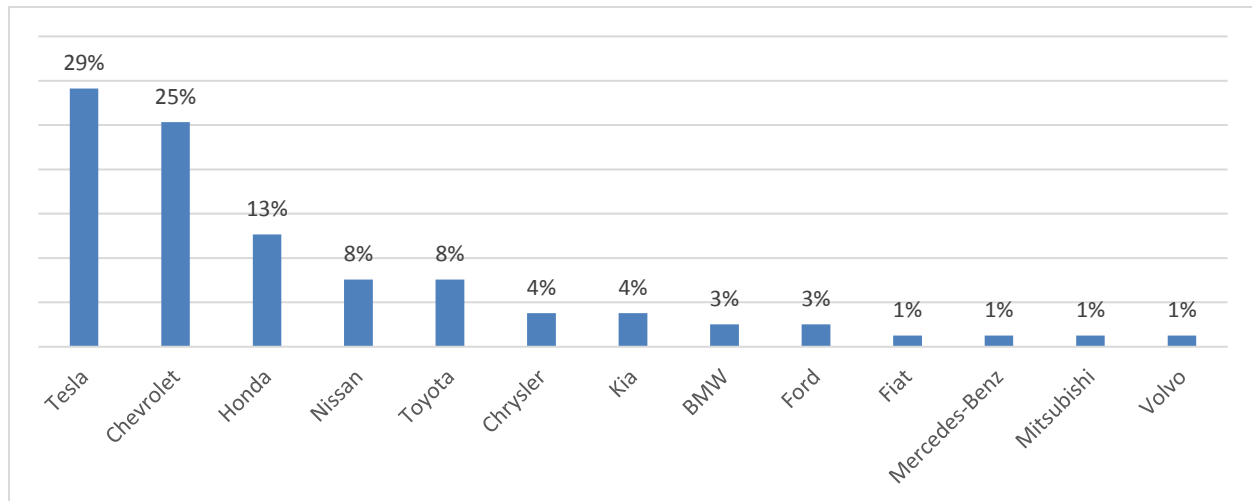
Overall, 31% of certificate non-redeemers purchased or leased a different vehicle, and 45% still have plans to purchase a vehicle. CARE/FERA participants were significantly more likely to still be shopping for a vehicle or to have decided to keep their current one ($p=0.00$).

Figure 10: Vehicle shopping plans of certificate non-redeemers by CARE/FERA status (n=317)



A large majority (82%) of certificate non-redeemers who purchased or leased another vehicle ended up acquiring an EV. Over half (57%) of them were from vehicle manufacturers not included in Drive EV, including 29% from Tesla.

Figure 11: EV brands acquired by certificate non-redeemers (n=79)



The most common reasons certificate non-redeemers who still acquired an EV stated for not using their Drive EV incentive certificate to purchase an EV were the following.

- The model they wanted was not available in the program (39%)
- They got a better deal at a non-participating dealership (35%)
- Other (20%)
- The dealer was out of inventory, or they had a bad experience (17%)

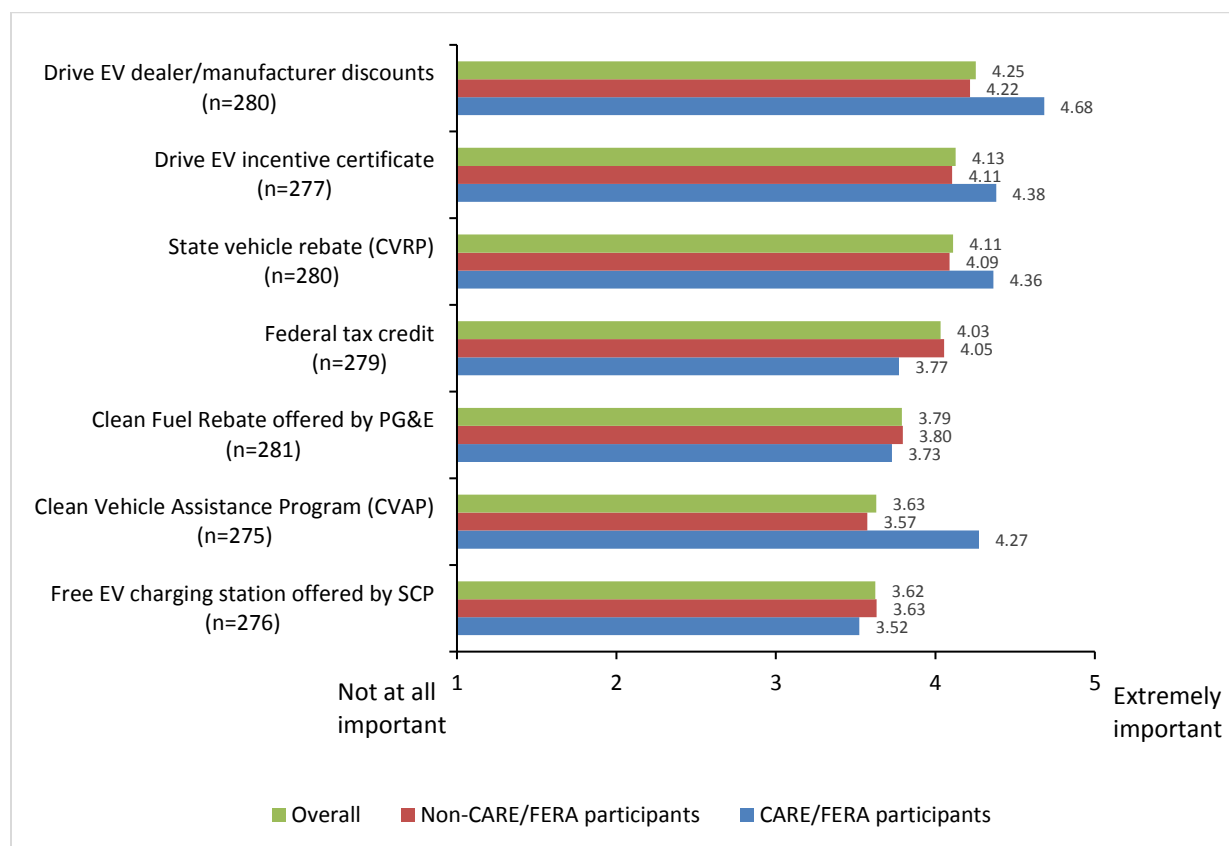
For those still planning to purchase or lease a vehicle, 85% reported they still plan to purchase an EV. For those who decided to keep their current car, 83% kept a conventional gasoline or hybrid vehicle.

How important were the incentives offered in participants' decision/ability to adopt an EV?

Redeemers were asked to rate the importance of the Drive EV program, as well as other incentives co-promoted by SCP, in making it possible for them to adopt. Responses were on a five-point scale, with one indicating “not at all important” and five indicating “extremely important.” When these respondent ratings were averaged, the dealer/manufacturer discounts (4.25) and the Drive EV incentive certificate (4.13) were the highest-rated incentives, followed by the Clean Vehicle Rebate Project (4.11) and federal tax credits (4.03). The Clean Fuel Rebate (3.79), Clean Vehicle Assistance Program (3.63) and free EV charging station (3.62) were rated as relatively less important.

CARE/FERA participants did value incentives slightly higher than non-CARE/FERA participants in most cases. See Figure 12 for details on rebate importance by CARE/FERA status.

Figure 12: Importance of rebates in decision to adopt an EV overall and by CARE/FERA status

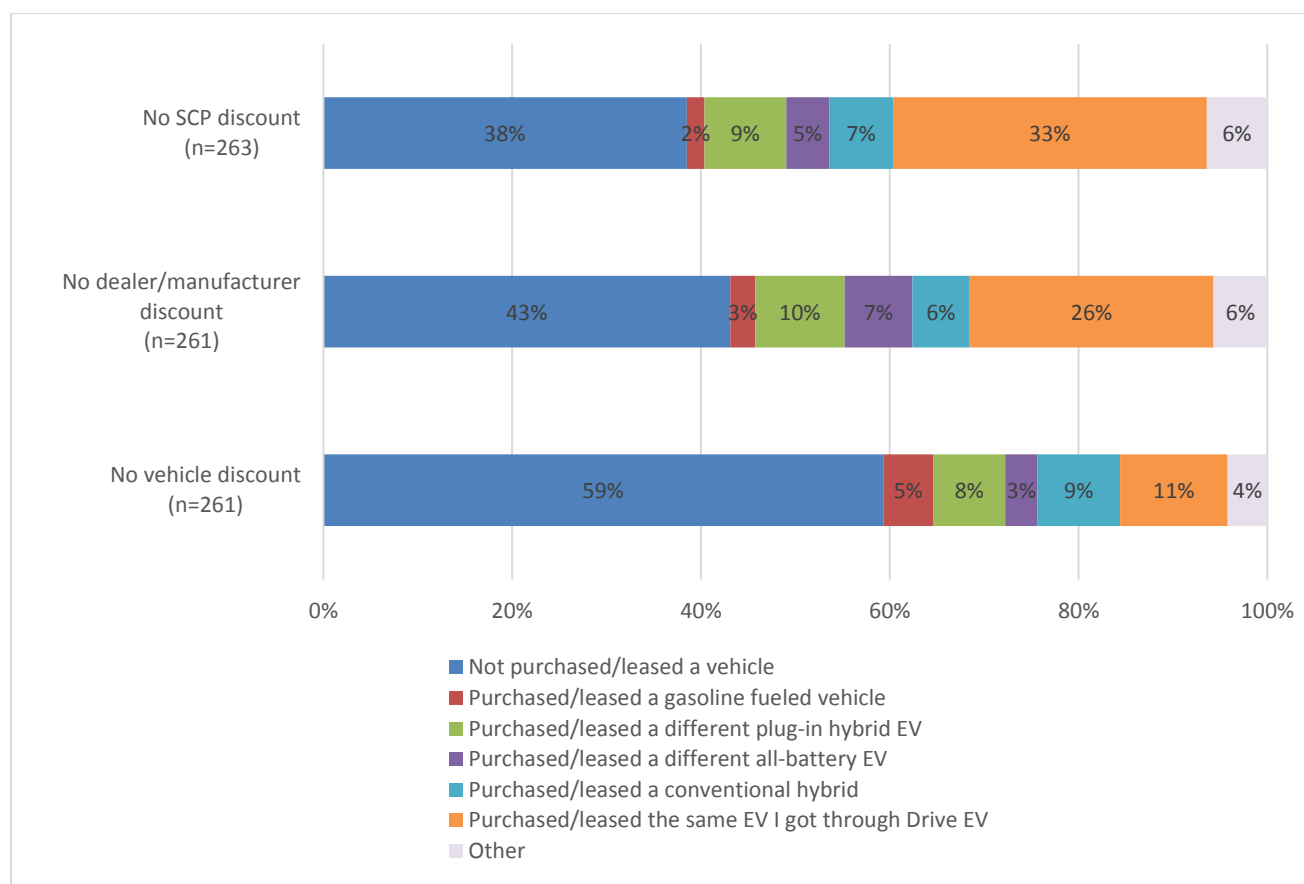


In the context of incentive programs, “free-ridership” can be defined as program participation among consumers who would have adopted the technology even if the incentive did not exist. Free-ridership in these types of programs is often unavoidable, and certain levels can even be acceptable, depending on the goals of the program. To measure the impact of free-ridership, redeemers were asked a series of counterfactual questions to gauge what they would have done if the Drive EV program did not exist. A

majority (73%) of redeemers reported they would have not adopted an EV if the Drive EV incentives (Both SCP and dealer/manufacturer discounts) were not available, with 14% stating they would have acquired a more conventional vehicle type (hybrid or gas vehicle). Applied to the number of incentivized vehicles (485), this suggests that approximately 354 EVs were added to Sonoma and Mendocino county roads by the program. Almost one-quarter (22%) of redeemers said they would have purchased an EV without the program and can therefore be considered free-riders. Among CARE/FERA respondents, 95% reported they would have not adopted an EV without the program, compared to 71% of non-CARE/FERA respondents.

Overall, 59% of redeemers said they wouldn't have purchased any vehicle at all without the SCP and dealer/manufacturer discounts. Of this group, 75% replaced a conventional gasoline, hybrid or diesel vehicle.

Figure 13. What participants would have done without the incentives



These results indicate an increase in free-ridership between Drive Evergreen 2.0 (17%) and Drive EV (22%). Evidence exists that this increase was caused by a high percentage of previous EV adopters participating in Drive EV. As noted elsewhere in this report in more detail, participants often replaced an EV with their redeemed vehicle or already had at least one non-gasoline fueled vehicle in their house. This suggests a proportion of program participants already adopted or were comfortable with EV technology, making them less likely to rely on incentives.

What average vehicle cost savings did certificate redeemers receive?

Upfront Vehicle Cost Savings

According to analysis of program data and documentation, redeemers experienced significant vehicle cost savings—an average of \$9,624 for those who acquired a new EV.

Figure 14. Average new vehicle prices after applicable discounts for certificate redeemers (n=453)



Average vehicle cost savings varied greatly by model. The most highly discounted new EVs in the program were the Kia Soul EV, BMW i3 and i3 Rex and Nissan LEAF. However, total cost savings did not equate directly to number of EVs incentivized, except in the case of the Nissan LEAF. Conversely, the Chevrolet Bolt significantly outperformed these heavily discounted models and had the second lowest average discount. The Chevrolet Bolt has maintained its popularity year-over-year in Drive EV as well as overall EV sales when compared to other models offered through Drive EV.²³ This is most likely due to the popular body style and increased battery range of the Chevrolet Bolt.

²³ <https://insideevs.com/monthly-plug-in-sales-scorecard/>. Accessed 4/10/2019.

Figure 15. Average total discount on new EVs (n=453)

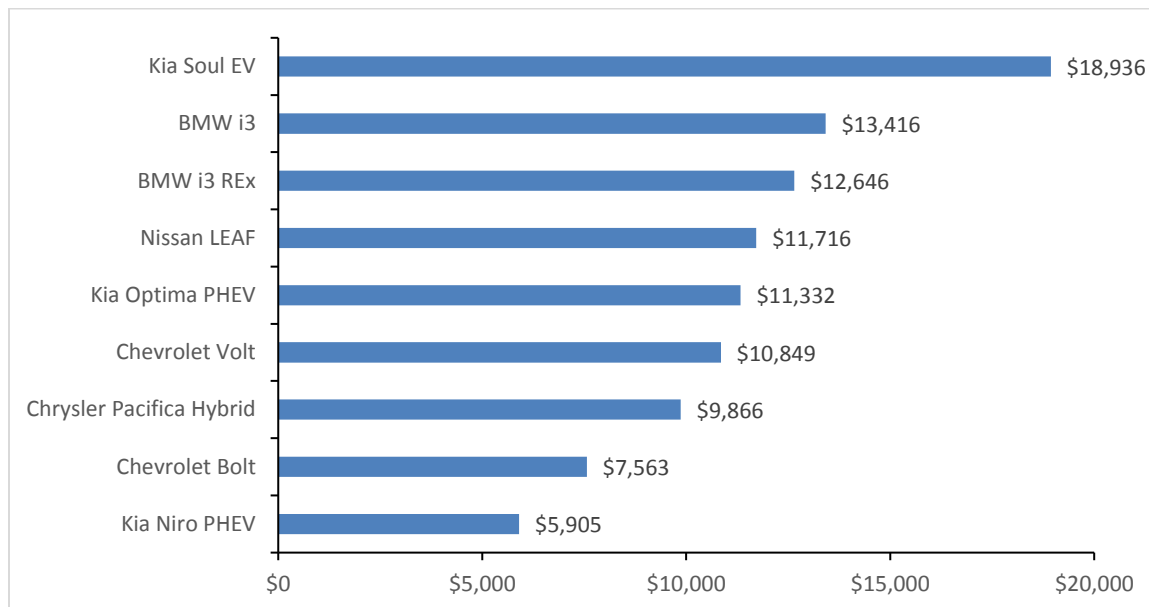


Table 10. Number of incentivized new EVs in relation to applied incentive discounts

Eligible EVs	EVs Incentivized	Avg. Starting Price	Avg. Dealer Discount	Avg. Manufacturer Discount	Avg. SCP Discount	Avg. Final Sale Price
Chevrolet Bolt	149	\$41,617	\$4,019	\$1,451	\$2,094	\$34,053
Nissan LEAF	96	\$35,900	\$2,122	\$7,386	\$2,208	\$24,184
Chevrolet Volt	80	\$38,234	\$4,000	\$4,698	\$2,150	\$27,385
Kia Niro PHEV	67	\$32,428	\$1,270	\$2,426	\$2,209	\$26,523
Kia Soul EV	21	\$36,397	\$1,884	\$14,767	\$2,286	\$17,461
Kia Optima PHEV	17	\$37,695	\$1,899	\$6,844	\$2,588	\$26,363
Chrysler Pacifica Hybrid	14	\$47,546	\$3,563	\$4,018	\$2,286	\$37,679
BMW i3 REX	6	\$54,337	\$2,563	\$8,083	\$2,000	\$41,691
BMW i3	3	\$51,345	\$4,083	\$6,667	\$2,667	\$37,929
Total	453	\$38,476	\$2,996	\$4,448	\$2,181	\$28,851

Total vehicle savings were higher based on whether the redeemer purchased or leased the vehicle. Lessees received significantly higher discounts (over \$6,100 more on average). The increased manufacturer discounts for leased vehicles were most likely due to the ability of the lessor to claim the federal EV tax credit and pass those savings onto the customer. Despite higher incentive amounts for leases, over half (53%) of certificate redeemers chose to purchase their EVs, compared to just 33% during Drive Evergreen 2.0. Based on the number of EVs being replaced, and the number of repeat participants, this increase in purchases may be due to an evolving market in Sonoma and Mendocino counties where EV adopters are more trusting of the technology and have already experienced it,

making them more likely to purchase their second EV. Over one-third (37%) of certificate redeemers reported owning at least one other non-gasoline fueled vehicle.

Used EVs incentivized saw an average cost savings of \$3,109 per vehicle. CARE/FERA participants acquired only six of the 32 used vehicles incentivized despite lower vehicle prices. According to dealership interviews conducted, used vehicles were typically only encouraged if buyers did not qualify for financing options being offered for a new EV; in addition, customers were limited to the availability of used models on the lot. Overall, used EVs made up 7% of the total vehicles incentivized and 14% of the models offering a used option. More analysis and research are needed to determine the best methods for designing and maximizing a used EV incentive.

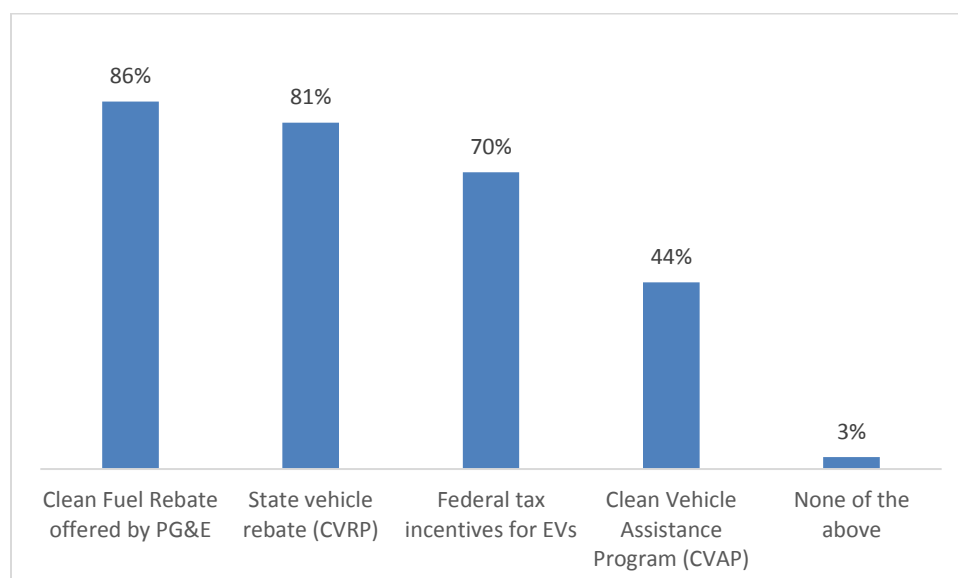
Table 11. Number of incentivized used EVs in relation to applied incentive discounts

Eligible EVs	EVs Incentivized	Avg. Starting Price	Avg. Dealer Discount	Avg. Manufacturer Discount	Avg. SCP Discount	Avg. Final Sale Price
Nissan LEAF	20	\$13,404	\$1,500	\$185	\$1,200	\$10,519
Chevrolet Volt	6	\$18,461	\$1,375	\$0	\$1,333	\$15,752
BMW i3	3	\$26,229	\$3,148	\$0	\$1,000	\$22,081
Kia Soul EV	3	\$23,026	\$3,365	\$0	\$1,000	\$18,662
Total	32	\$16,456	\$1,806	\$116	\$1,188	\$13,347

Redeemers Who Stacked Incentives

In addition to the average discounts quantified above, many certificate redeemers reported they have applied, or intend to apply, for additional incentives that were co-promoted on SCP's website, and that would provide additional savings post EV purchase. Over 80% of redeemers stated they applied, or intend to apply, for California's Clean Vehicle Rebate Project and PG&E's Clean Fuel Rebate.

Figure 16: Redeemers who will take advantage of other EV incentives

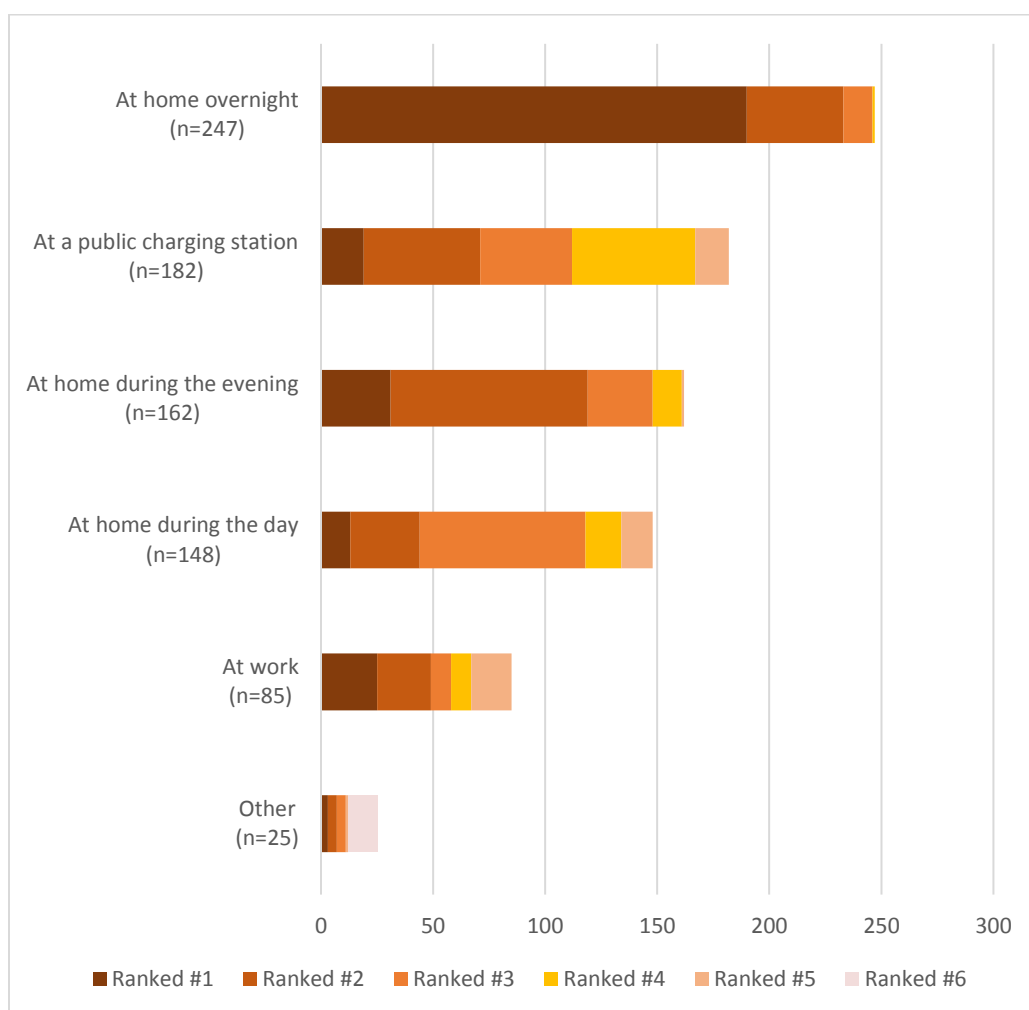


When and how are certificate redeemers charging their EVs? What are their self-reported changes in electrical costs?

While this evaluation stops short of a full cost-benefit analysis due to the amount of time and data access needed to conduct a thorough analysis, survey respondents were asked to self-report gasoline savings and changes to their electric bills as a result of charging their vehicles.

To examine these results, respondents were surveyed about their EV charging behaviors. A majority of redeemers (73%) stated they had access to a charging station at home. In addition, redeemers were asked to rank charging methods by the frequency at which they use them. Results indicate the most common method for charging EVs is overnight at home.

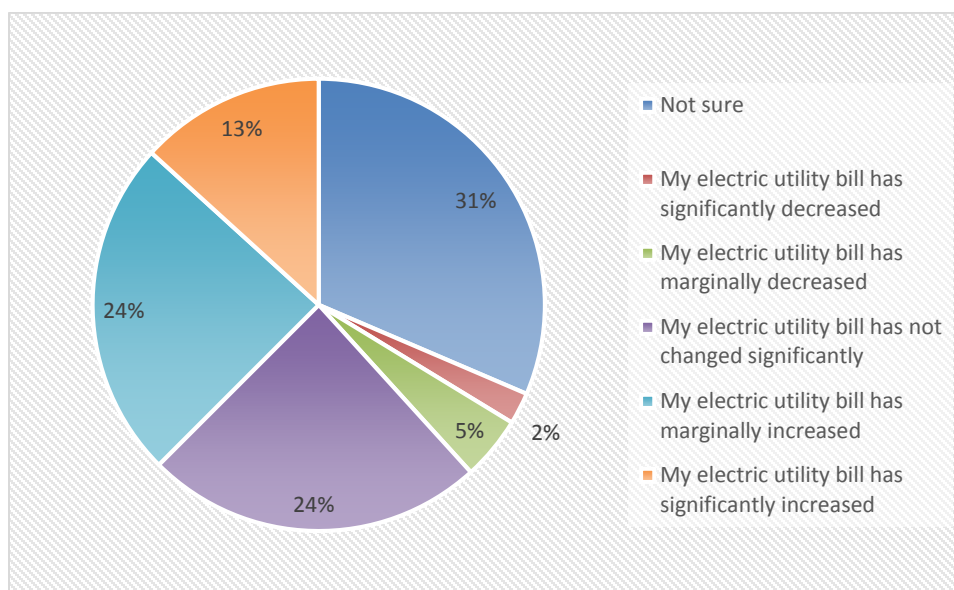
Figure 17. Most frequently used charging methods by redeemers



Redeemers also were asked to report if they have noticed any changes in their electric utility bill. To assure respondents received at least one bill since acquiring their EV, results for this question were limited to those who had at least 35 days elapse between the purchase of their EV and the day they took

the survey. Of this subpopulation, respondents had owned their EV for an average of 91 days. Overall, 38% stated they had seen a marginal or significant increase in their electric utility bill.

Figure 18. Self-reported change in electric utility bill (n=264)



More analysis is needed to determine actual impact of the change in electric costs for customers that consider longer billing periods, time-of-use and peak season rates, weather factors and solar and home charger installations. In addition, these data do not consider how redeemers perceive the additional cost and whether these costs are acceptable based on the environmental trade-offs. At least preliminarily, respondents are perceiving increases.

How many program participants took advantage of the free EV charger incentive program?

In addition to the Drive EV program, SCP co-promoted a separate incentive for a free home EV charger. Some 72% of redeemers took advantage of this offer. These findings represent certificate redeemers who applied for a free charger on or before January 17, 2019. Since the Free EV charger program is ongoing, this finding does not include those who may have applied after January 17, 2019.

How many repeat customers were there from previous program years?

Fifteen percent of survey respondents (91) indicated they had participated in previous years of Drive EV. Of these 91 respondents, 42% stated they purchased/leased an EV in previous years. A total of 18 survey respondents indicated that they purchased/leased an EV in multiple years.

What program design changes were made and what impact did they have on program participation?

Program Changes for Drive EV

Based on the results and lessons learned from previous program iterations, as well as program realities, several changes were implemented for Drive EV. Changes in program design for the third iteration of the Drive EV program included the following.

- Officially lengthening the program timeline to 15 weeks
- Increasing the CARE/FERA incentive amount for new EVs by \$500
- Increasing the number of vehicle options, including a minivan option
- Increasing the number of dealerships offering used EV options
- No longer cross-promoting the EverGreen service rate

See Appendix A for details on how the Drive EV program has evolved since its launch in 2016.

In addition to these program design changes, there is evidence that external factors, such as the release of the Tesla Model 3, impacted program results. While the scope of this analysis does not include a full analysis of the impacts of program design changes over the years, we did compare certain key findings from each previous iteration with those of Drive EV to examine differences.

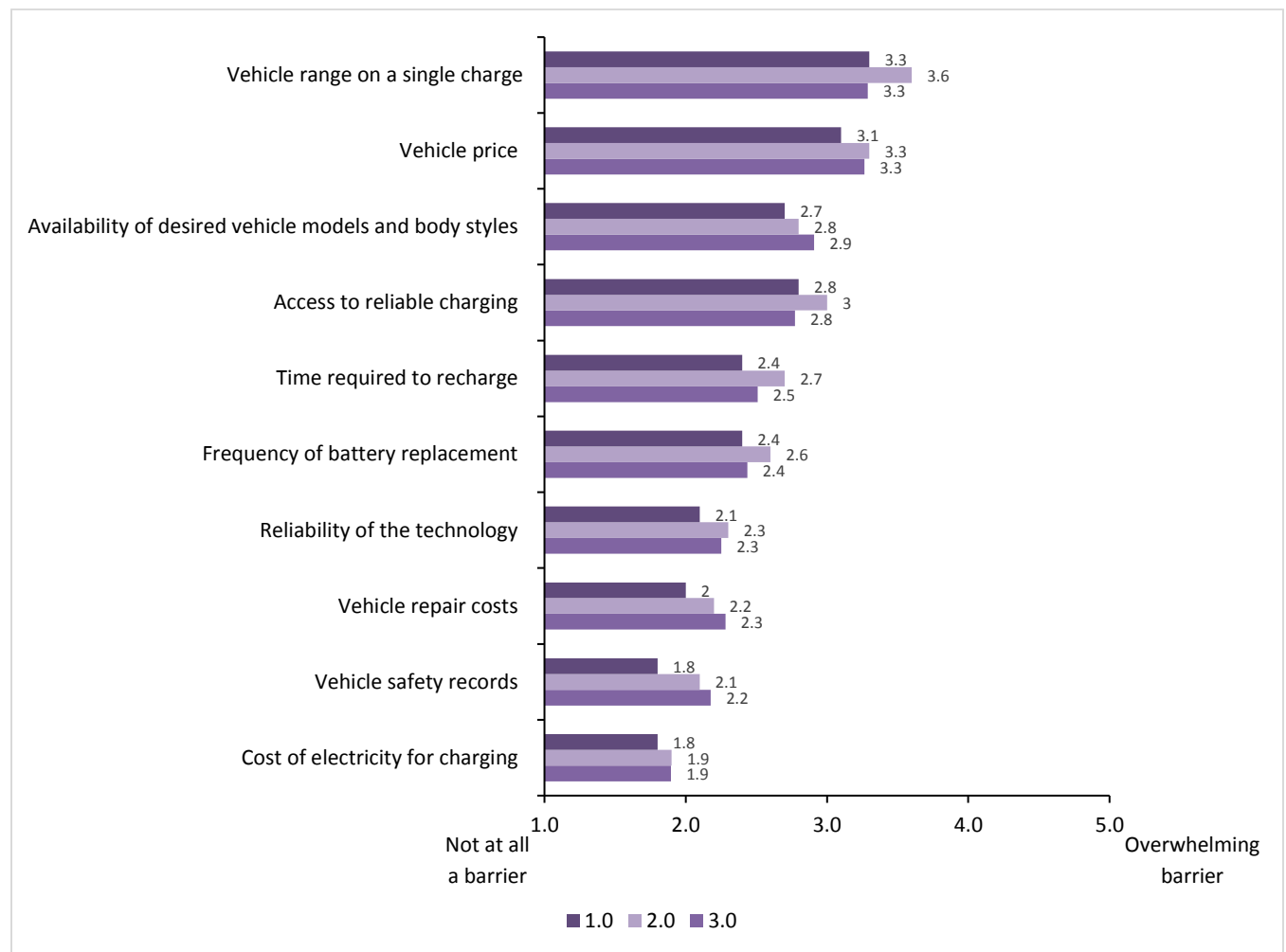
Results showed the certificate redemption rate went down 7 percentage points and represents the lowest rate in the program. Over half (57%) of non-redeemers who purchased an EV acquired one that was not available in the program (most notably Tesla and Honda). This suggests a “Tesla effect” caused by the release of the Model 3 as well as the growing popularity of other in-eligible brands like Honda. Increased incentive amounts for CARE/FERA seems to have increased participation rates from income-qualifying participants. The increased availability of used EVs also seems to correlate with the number of used EVs being incentivized.

Table 12: Differences in key metrics from year-to-year

Metric	Drive EverGreen 1.0	Drive EverGreen 2.0	Drive EV
Redemption rate	37%	42%	35%
Model availability concerns by non-redeemers	27%	9%	13%
Income less than \$150,000	70%	72%	70%
Number/Percent of incentivized EVs that were used	n/a	20/4%	32/7%

Vehicle range and price remained the most common barriers to adoption between program cycles, however vehicle range was found to be slightly less of a barrier in Drive EV (3.29) than during the previous year (3.59). The availability of desired models rising slightly above the access to charging for Drive EV.

Figure 19. Analysis of barriers to adoption from three iterations of Drive EV

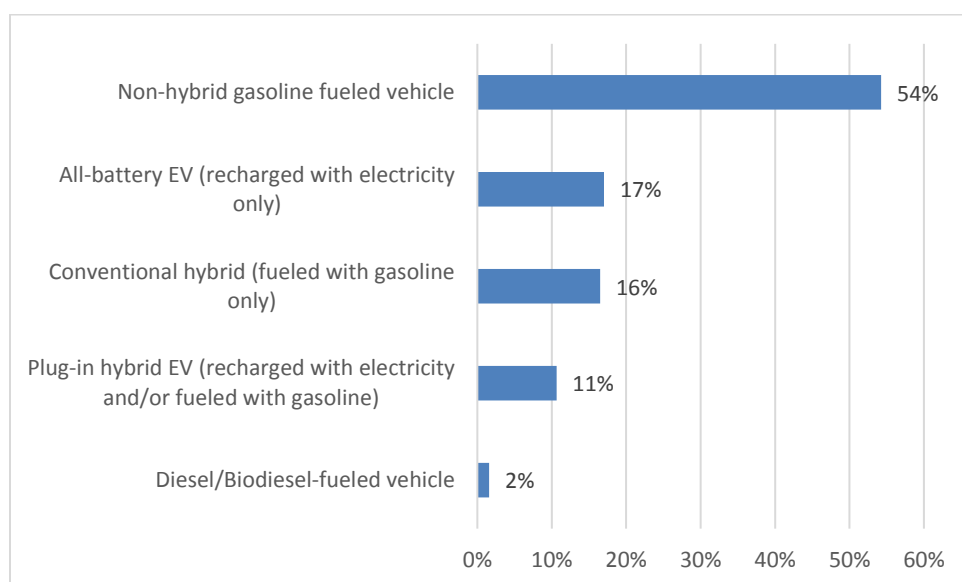


How many vehicles were replaced because of the program, and what percentage of these replaced vehicles were conventional gasoline vehicles? What percentage of replaced vehicles were EVs? What factors motivated participants to replace gas vehicles?

Vehicle Replacement, Household Vehicle Composition and Future Vehicle Acquisitions

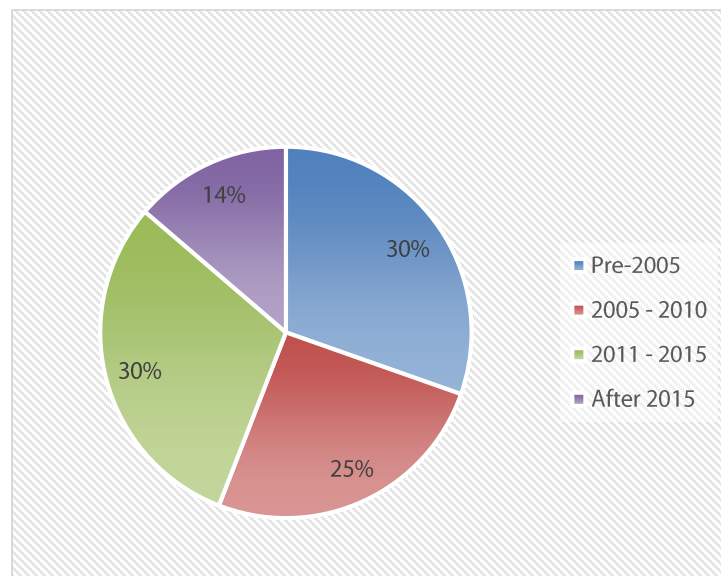
Survey respondents who redeemed incentives were asked whether their incentivized EV replaced, or will replace, another household vehicle. Nearly nine out of 10 respondents (87%) were replacing a vehicle with their new EV, over half of which (54%) were conventional gasoline vehicles. An additional 18% were replacing diesel or conventional hybrid vehicles, while 28% were replacing EVs. Nearly all (95%) redeemers stated they will use their newly incentivized EV as their primary vehicle.

Figure 20: Vehicle tech types of replaced vehicles (n=188)



Respondents who replaced a gasoline, hybrid, or diesel vehicle indicated the most influential factor that led them to acquire an EV was the better range available in new EV models (57%). Nearly half (47%) also indicated it was just time to replace their vehicle. Replaced vehicle model years varied, with 56% of replaced vehicles manufactured in model year 2010 or earlier.

Figure 21: Model years of replaced vehicles (n=204)



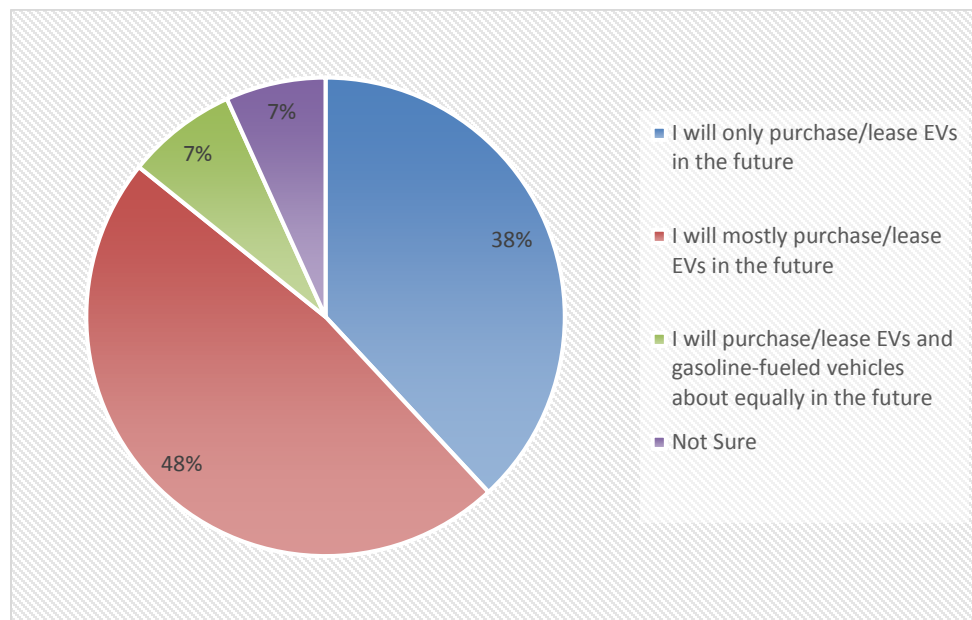
To gather more detail about EV adopter driving habits, we asked a series of questions related to household vehicle composition. On average, redeemers have nearly two (1.7) vehicles in their household in addition to their new EV; approximately 1.5 of these vehicles are conventional gasoline vehicles. Over one-third (37%) of certificate redeemers reported owning at least one other non-gasoline fueled vehicle. To better determine the uses of these gasoline vehicles, respondents were asked to indicate the tasks for which they used them. The most common responses included the following.

- Running errands (47%)
- Commuting to work (45%)
- Taking long trips (43%)
- Other (21%)

Open-ended analysis of “Other” responses reaffirmed the use of these vehicles for long trips as well as hauling heavy loads for recreational or work purposes.

Redeemers also were asked to forecast their future vehicle acquisition plans. Results show 86% of respondents plan to only or mostly purchase EVs in the future. These findings, as well as results indicating that 72% of redeemers also received a free EV charger, are positive indicators that certificate redeemers are likely to continue their EV purchasing behavior in the future.

Figure 22. Future vehicle purchasing plans among certificate redeemers (n=281)



What were the estimated reductions in GHG emissions and gasoline usage that are attributable to the Drive EV program?

Vehicle Miles Traveled (VMT) for EV Adopters

Survey respondents were asked, “On average, about how many miles do you think you will be driving your EV?” with open response fields for a typical workday and a typical nonwork day. Assuming a 52-week year and five-day workweeks, BEV and PHEV adopters plan to drive their EVs an average of 12,279 miles and 11,723 miles, respectively.

GHG Emission Reductions as a Result of the Program

The total reduction in GHG emissions attributable to the program is estimated to be between 2,357 and 5,652 metric tons of CO₂-equivalent (CO₂e) over the three-year program life of the adopted fleet. This range considers sensitivity tests on assumptions made to facilitate the emission estimates.

Table 13 summarizes the GHG reduction estimates. With the baseline assumptions applied, the AFLEET Tool calculated a reduction of 4,040 metric tons of CO₂e over the three-year program life of the adopted fleet (see methods section for explanation of how program life is determined)—equivalent to a per vehicle reduction of approximately 8 metric tons of CO₂e.

These savings rates are characterized by (among other assumptions that may change over time) EV charging on SCP’s atypically clean power mix, and it is possible that program participants will either move out of SCP service territory or choose to opt out of SCP service, thus realistically limiting projection of these savings rates further than three years into the future. If such vehicles were to continue to be driven under similar circumstances throughout their useful life, they would add to greater emissions savings. For example, IHS Markit research cited by Automotive News in 2016 indicated U.S. drivers keep a new vehicle for 79.3 months on average, and the average age of a modern vehicle is 11.6 years.²⁴ This represents a twofold to fourfold increase in lifespan over program life.

Non-CARE/FERA participants reduced more GHGs in total and per total program expenditure, as they made up a larger proportion of the program. Due to the larger incentive amounts, emission reductions from CARE/FERA participants were more expensive than non-CARE/FERA participants on a per SCP incentive dollar basis, though CARE/FERA participants provided larger per-vehicle reductions. This difference may be due to CARE/FERA participants being more likely to replace older vehicles and/or to not purchase or lease new vehicles had the incentive program not existed.

²⁴ <https://www.autonews.com/article/20161122/RETAIL05/161129973/average-age-of-vehicles-on-road-hits-11-6-years>. Accessed 4/10/2019.

Table 13. Total GHG reductions over three-year program life of the adopted fleet: overall and by CARE/FERA status

Participant type	Total GHG Reductions	Cost of GHG Reductions per Total Program Expenditure	Cost of GHG Reductions per SCP Incentive Dollars	GHG Reductions per Vehicle
Entire Program	4,040 metric tons of CO ₂ e	0.28 metric tons of CO ₂ e per \$100	0.39 metric tons of CO ₂ e per \$100	8.33 metric tons of CO ₂ e
CARE/FERA	440 metric tons of CO ₂ e	0.03 metric tons of CO ₂ e per \$100	0.26 metric tons of CO ₂ e per \$100	9.56 metric tons of CO ₂ e
Non-CARE/FERA	3,600 metric tons of CO ₂ e	0.25 metric tons of CO ₂ e per \$100	0.42 metric tons of CO ₂ e per \$100	8.20 metric tons of CO ₂ e

Petroleum Displacement as a Result of the Program

Table 14 summarizes estimated petroleum displacement attributable to the program. The AFLEET Tool calculated a displacement of 8,017 barrels of petroleum over the program life of the adopted fleet. This equates to approximately 0.78 barrels saved for every \$100 in incentive funding and 17 barrels per incentivized vehicle over a three-year program life, though additional savings are likely to occur further into the vehicle's useful life.

Similar to GHG reductions, non-CARE/FERA participants displaced more petroleum in total and per total program expenditure due to their larger proportion of program participation. CARE/FERA participants displaced less petroleum per SCP incentive dollar and more petroleum per vehicle.

Table 14. Total petroleum displacement over three-year program life of the adopted fleet: overall and by CARE/FERA status

Participant Type	Total Petroleum Displacement	Cost of Petroleum Displacement per Total Program Expenditure	Cost of Petroleum Displacement per SCP Incentive Dollars	Petroleum Displacement per Vehicle
Entire Program	8,017 barrels	0.55 barrels per \$100	0.78 barrels per \$100	16.53 barrels
CARE/FERA	874 barrels	0.06 barrels per \$100	0.52 barrels per \$100	19.00 barrels
Non-CARE/FERA	7,143 barrels	0.49 barrels per \$100	0.83 barrels per \$100	16.27 barrels

Emission Reductions Originating in Sonoma and Mendocino Counties

Survey respondents who redeemed a certificate were asked to estimate the percentage of their total EV driving they will be doing within Sonoma or Mendocino counties. Respondents stated an average of 80% of their driving will be within these counties. Although the impacts of GHG emissions are not locally contained, Sonoma and Mendocino will be able to show leadership in locally originated emission reductions.

Impact of Sensitivity Testing on GHG Reduction Estimates

Table 15 summarizes the results from sensitivity testing conducted on the assumptions made for the emission calculations. A 10% shift in the fuel economy of alternate fleet vehicles had the greatest impact on the emission reduction estimate. The high fuel economy scenario of the alternate fleet would decrease the GHG reduction estimate by 11%, while the low scenario would increase the estimate by 13%. A 10% shift in the alternate fleet emissions had the second largest impact on this estimate, resulting in $\pm 12\%$ shifts in the reduction estimate. A 10% shift in assumed VMT had the third largest impact on this estimate, resulting in an increase of 8% and a decrease of 10% in the high and low scenarios. The sum of effects from the sensitivity tests have an overall impact (positive or negative) of up to 41.7% on the GHG reduction estimate. Many of the same assumptions also impact petroleum use and are likely to similarly affect that estimate. Therefore, it is advised to represent reductions as an estimate or a range rather than an exact total.

Table 15. Summary of sensitivity testing

Assumption	Sensitivity Test Performed	Percentage Decrease in GHG Reduction Estimate	Percentage Increase in GHG Reduction Estimate
Fuel economy values assigned for the alternate fleet accurately reflect the fuel economy that would have been achieved in the program's absence	$\pm 10\%$ fuel economy per vehicle in the alternate fleet	-11%	+13%
Survey responses accurately reflect all certificate redeemers	$\pm 10\%$ total GHG emissions for alternate fleet	-12%	+12%
Survey respondents provide accurate estimates of the number of miles they will be driving their incentivized EVs <i>and</i> their mileage would be the same had the program not existed	$\pm 10\%$ annual VMT per vehicle in the adopted and alternate fleet	-10%	+10%
EPA utility factor values accurately reflect the electric mode operation of PHEVs (including BMW i3 REX)	$\pm 10\text{pp}$ utility factor per vehicle	-2%	+2%
Unspecified portion (13%) of the SCP CleanStart Electricity Portfolio is properly represented by the modified ²⁵ California grid mix (33.9% renewable, 48.6% natural gas, 4.3% coal, 9.4% nuclear power, 2.9% biomass, 0.8% residual oil)	Adjust unspecified portion of electricity portfolio to 100% renewable energy and to 100% coal	-7%	+3%
Sum of variability achieved by sensitivity tests²⁶		-41.7%	+39.9%
GHG reduction estimates with sensitivity testing adjustments		2,357 metric tons of CO_{2e}	5,652 metric tons of CO_{2e}

²⁵ EPA eGRID2016 CAMX grid (<https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid>) modified as described in the California Air Resources Board's CA-GREET 2.0 Supplemental Document and Tables of Changes. <https://www.arb.ca.gov/fuels/lcfs/ca-greet/CA-GREET2-suppdoc-060415.pdf>. Accessed 3/1/2019.

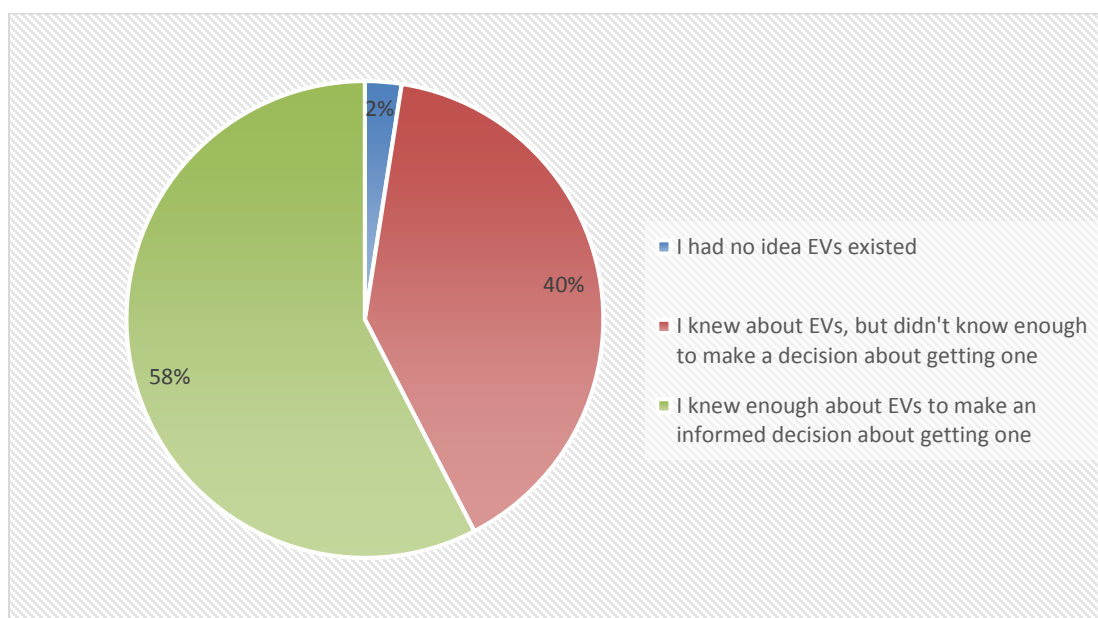
²⁶ Note that a simple sum of variability achieved by individual effects oversimplifies their combination and does not reflect their combination in a single sensitivity test, but can help to bound expectations about the possible range of estimates.

Did the Drive EV program raise awareness of SCP and EVs in Sonoma and Mendocino counties?

Impact of Program on EV Awareness

All survey respondents were asked to describe their awareness of EVs before participating in Drive EV. Results show certificate recipients were fairly familiar with EVs prior to the program. Some 58% of respondents stated they knew enough about EVs to make an informed decision about getting one before the Drive EV program. Conversely, 40% of certificate recipients stated they knew about EVs, but not enough to make an informed decision. Among redeemers, 43% stated they did not know enough about EVs to make a decision, indicating participation in the program may have motivated some certificate redeemers to build their awareness of the technology as they decided to acquire an EV. CARE/FERA program participants were significantly less likely ($p=0.02$) to report they knew enough to make a purchasing decision on an EV.

Figure 23. Certificate recipient knowledge of EVs before Drive EV (n=606)



Impact of Drive EV on the SCP Brand

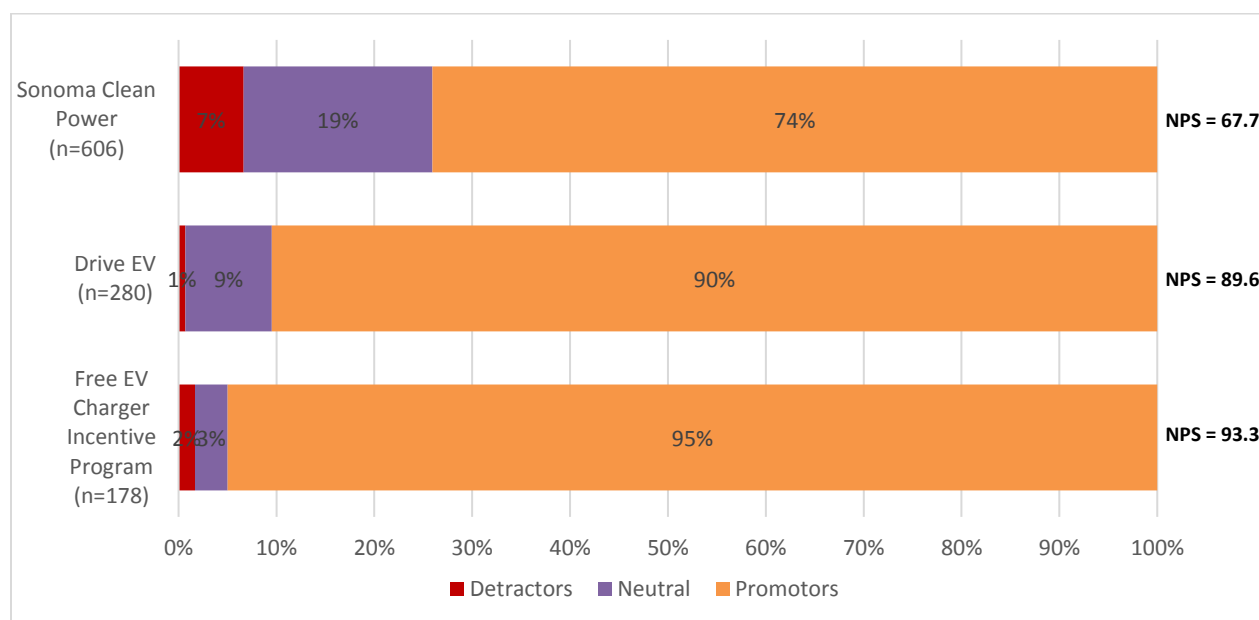
A self-reported 12% of certificate recipients said they were not SCP customers when they learned about the Drive EV program, indicating that the program did recruit customers to opt-in to SCP. CARE/FERA respondents (22%) were significantly more likely to report they were not SCP customers when they learned about Drive EV ($p=0.01$).

To measure impacts of this program on the SCP and Drive EV brand, the evaluation team asked a series of net promoter score (NPS) questions to survey respondents. The NPS system was created by Fred

Reichheld and a team at Bain and Company²⁷ and has become a common way to gauge customer satisfaction and loyalty to a particular brand. The NPS system works by asking respondents the likelihood they would recommend a particular program to a friend. The question is measured on a 10-point scale and responses are organized into promoters (9 or above), neutral (7-8) or detractors (6 or below). The net promoter score is then calculated by subtracting the percent of detractors from the percent of promoters. Net promoter scores are often used by companies for benchmarking, and there is no official consensus as to what makes up a good NPS. However, according to the Temkin Group consumer benchmark survey, the average NPS scores for utility companies was 27.²⁸

Survey respondents were asked NPS questions for SCP, the Drive EV program and the free EV charger incentive program. All respondents rated SCP, redeemers rated Drive EV, and only those who indicated they had applied or enrolled were asked to rate the free EV charger incentive program. NPS scores reveal high levels of satisfaction with all aspects of these programs. In particular, Drive EV received an NPS of 89.6.

Figure 24. Net promoter analysis



²⁷ <http://www.netpromotersystem.com/about/why-net-promoter.aspx>. Accessed 3/1/2019.

²⁸ <https://temkingroup.com/product/net-promoter-score-benchmark-study-2016/>. Accessed 3/1/2019.

What types of marketing and EV education activities were effective in raising awareness of the Drive EV program and the benefits of driving an EV?

Marketing and Outreach Activity

SCP conducted extensive marketing and outreach activities during Drive EV. Marketing and outreach strategies included the following.

- Targeted email campaigns to SCP and CSE contact lists
- Direct mailers
- Radio, Pandora and TV advertisements
- Print and online advertising
- Targeted billboards, banners and other outdoor advertisements
- Facebook advertising and sponsored posts
- Community events
- News articles and press releases
- Targeted letters to CARE/FERA customers, residents in the Northern Sonoma County Air Pollution Control District (NoSoCoAir) and Burbank Housing residents

TV and radio ads, as well as online advertising, ran throughout the course of the program. Billboards were displayed on Highway 101 in two-week increments (one per month between August and October). Ads were run on Facebook and Facebook Audience Network²⁹ throughout the program and targeted adults (primarily ages 25-64) with interests in politics, sustainability, EVs/hybrids and local news. Facebook ads also targeted Hispanic audiences (ages 25-54) with interest in family, soccer, soap operas and Spanish television. Email campaigns, print advertising and direct mail occurred at set intervals during the project. Table 16 shows the extent of marketing activities.

²⁹ Facebook Audience Network is a tool that allows advertisers to share their ads to customers who are using mobile sites or apps other than Facebook.

Table 16. Summary of marketing and outreach activities

Activity	Number of Campaigns	Estimated People Reached	Link Clicks	Total Impressions	Circulation Total
Email blasts	9	2,577	411		
Direct mail campaign	1	190,000			
Direct mail campaign to CARE/FERA customers (including NoSoCoAir and Burbank Housing residents)	1	51,000			
Pandora ads	1	Unknown		470,588	
Radio ads (English and Spanish)	3	Unknown			
TV ads	4	Unknown		645,000	
Print ads	49	Unknown			864,000
Online digital ads	2	Unknown		667,000	
Billboards and outdoor advertisements	3	Unknown			
Facebook advertising	25	207,614	991		
Community events	20	Unknown			

Marketing and Outreach Effect on Certificate Applications

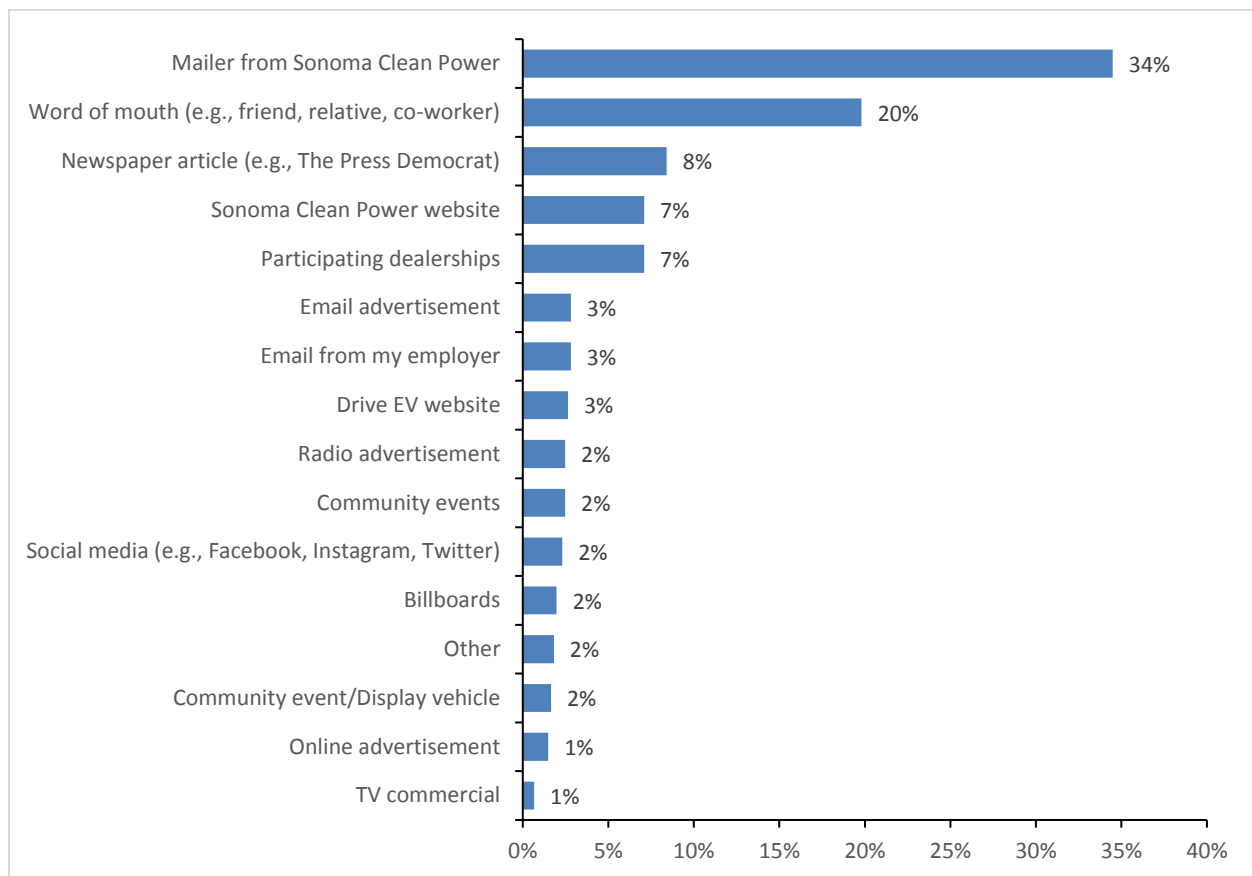
Survey respondents were asked how they heard about the Drive EV program, with the option to select multiple responses. Survey piping logic was then used to determine how recipients *first* learned about the program.

A majority of survey respondents (n=606) were exposed to the program via the following methods.

- Direct mailers from Sonoma Clean Power (53%)
- Word of mouth (28%)
- Sonoma Clean Power Website (26%)
- Newspaper articles (19%)
- Drive EV website (18%)
- Participating dealerships (16%)
- Email advertising (12%)

The ways in which survey respondents were *first* introduced to the program are very similar. The following chart shows how survey respondents first heard of the program.

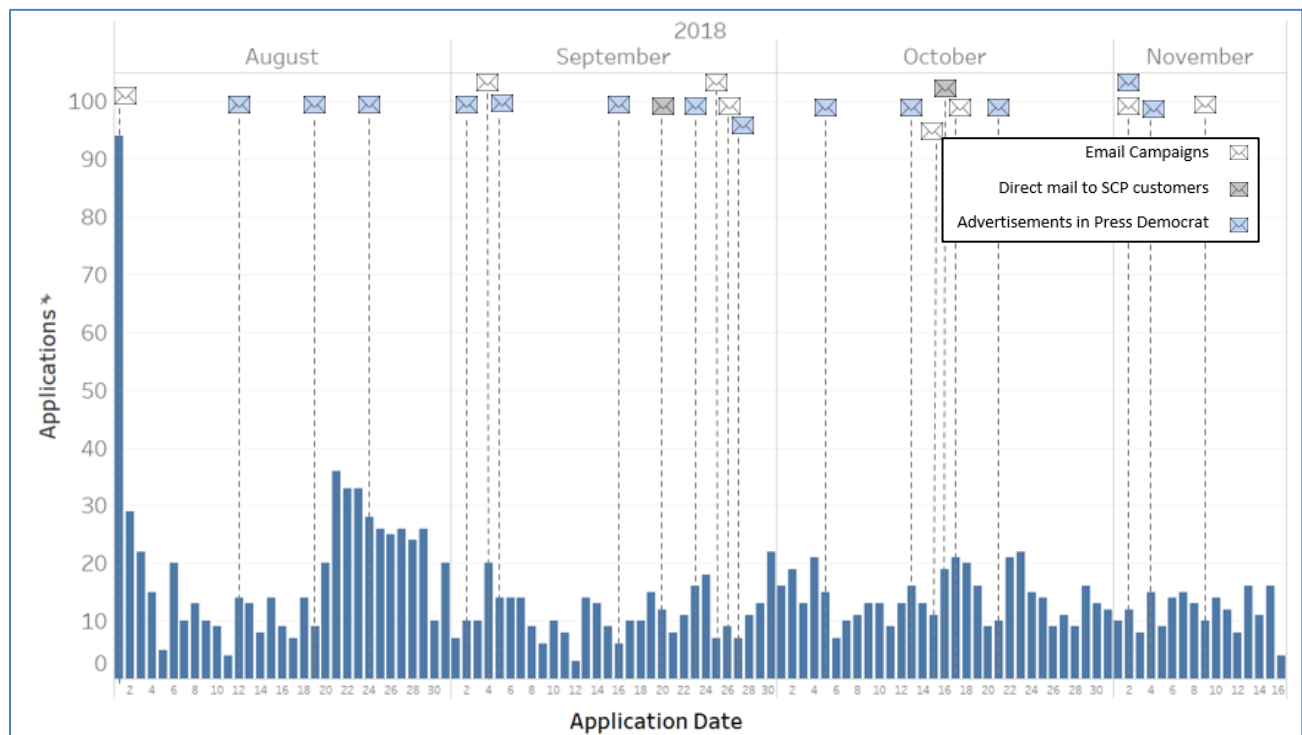
Figure 25: How certificate recipients first learned of the Drive EV 3.0 program (n=606)



Survey responses, coupled with relatively low click-through rates of email and social media campaigns, indicate targeted mail and print campaigns were more effective at building program awareness. Community events were not identified as a common way that participants learned about the program. This finding, coupled with open-ended suggestions to increase community outreach and engagement indicate that more effective community engagement may spur more program participation (see Participant Satisfaction and Program Recommendations section below).

Data on specific advertising dates was only available for direct mailers, email campaigns and newspaper advertisements. Figure 26 shows the impact of these activities on program applications. Findings show early email campaigns and The Press Democrat advertisements were effective in driving applications in the first month. However, Figure 26 does not consider how other marketing and outreach activities that did not have specific advertising dates may have also influenced application volume.

Figure 26. Certificate applications and marketing efforts



Impact of Educational Materials on Consumer Awareness and Knowledge of EVs

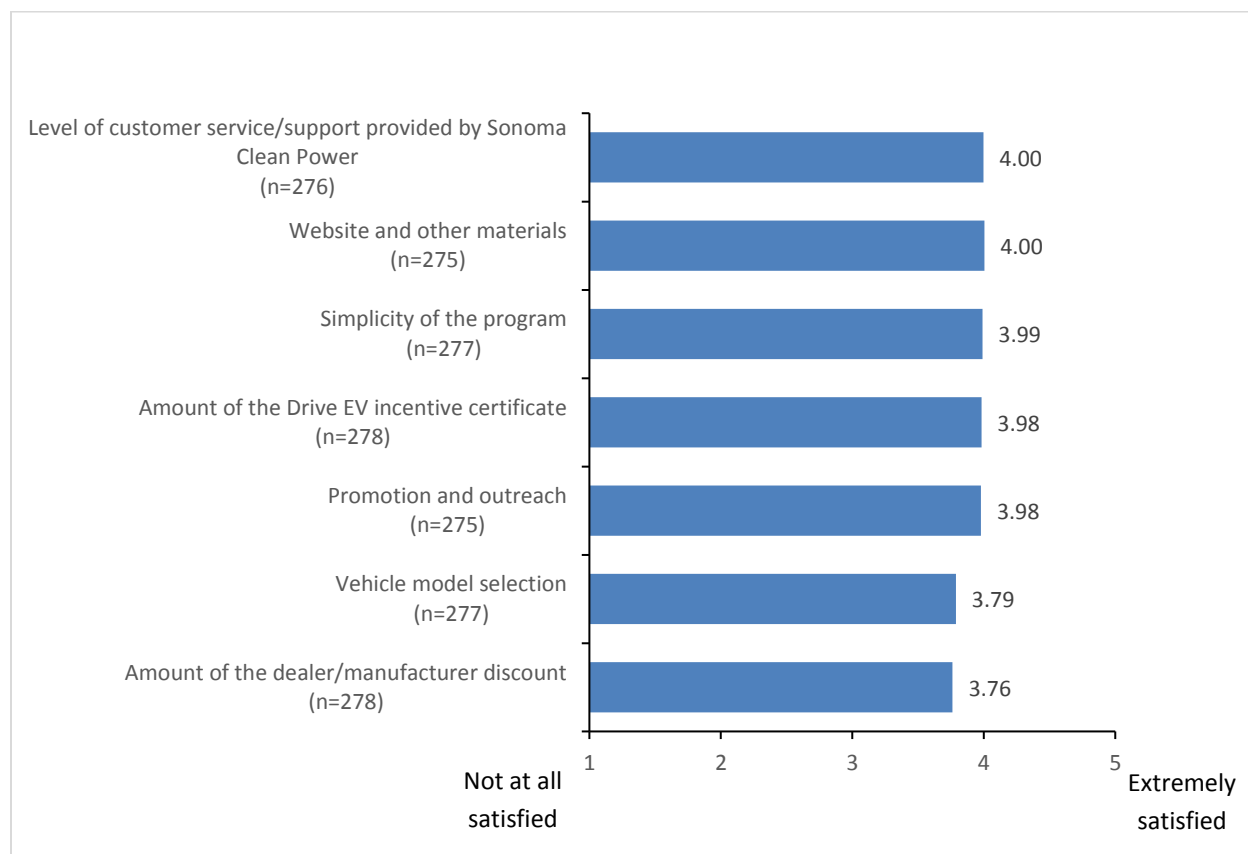
After the first iteration of this program, SCP created the Electric Vehicle Buyer's Guide to assist prospective program participants in learning about EVs. In Drive EV, 49% of program participants stated they reviewed this guide during their EV search. Of the participants who reviewed the guide, 71% stated the guide helped them understand the benefits of EV ownership.

What lessons were learned from the administration of Drive EV, and how can they inform similar EV rebate programs in the future?

Participant Satisfaction and Program Recommendations

Certificate redeemers were asked to rate their level of satisfaction with various aspects of program design on a five-point scale (not at all satisfied to extremely satisfied). On average, respondents were very satisfied with all aspects of the program, but marginally less so with the vehicle model selection and amount of the dealer or manufacturer discount.

Figure 27. Certificate redeemer satisfaction with various features of the Drive EV program



In an open-ended question, survey respondents provided feedback on Drive EV and made suggestions for improving the program. Responses were coded and categorized into themes. Common themes were then identified for both certificate redeemers and non-redeemers. Certificate redeemers (n=88) cited increased community engagement through outreach and education (18%) and wider dealership selection (10%) as the most common areas for program improvement. Following are other common themes identified by certificate redeemers.

- More vehicle options (7%)
- Confusion in certificate process (6%)

A higher percentage of certificate non-redeemers (n=141) identified more vehicle options (18%) and wider dealership selection (17%) as the most common areas for program improvement. Other common themes identified by certificate non-redeemers were as follows.

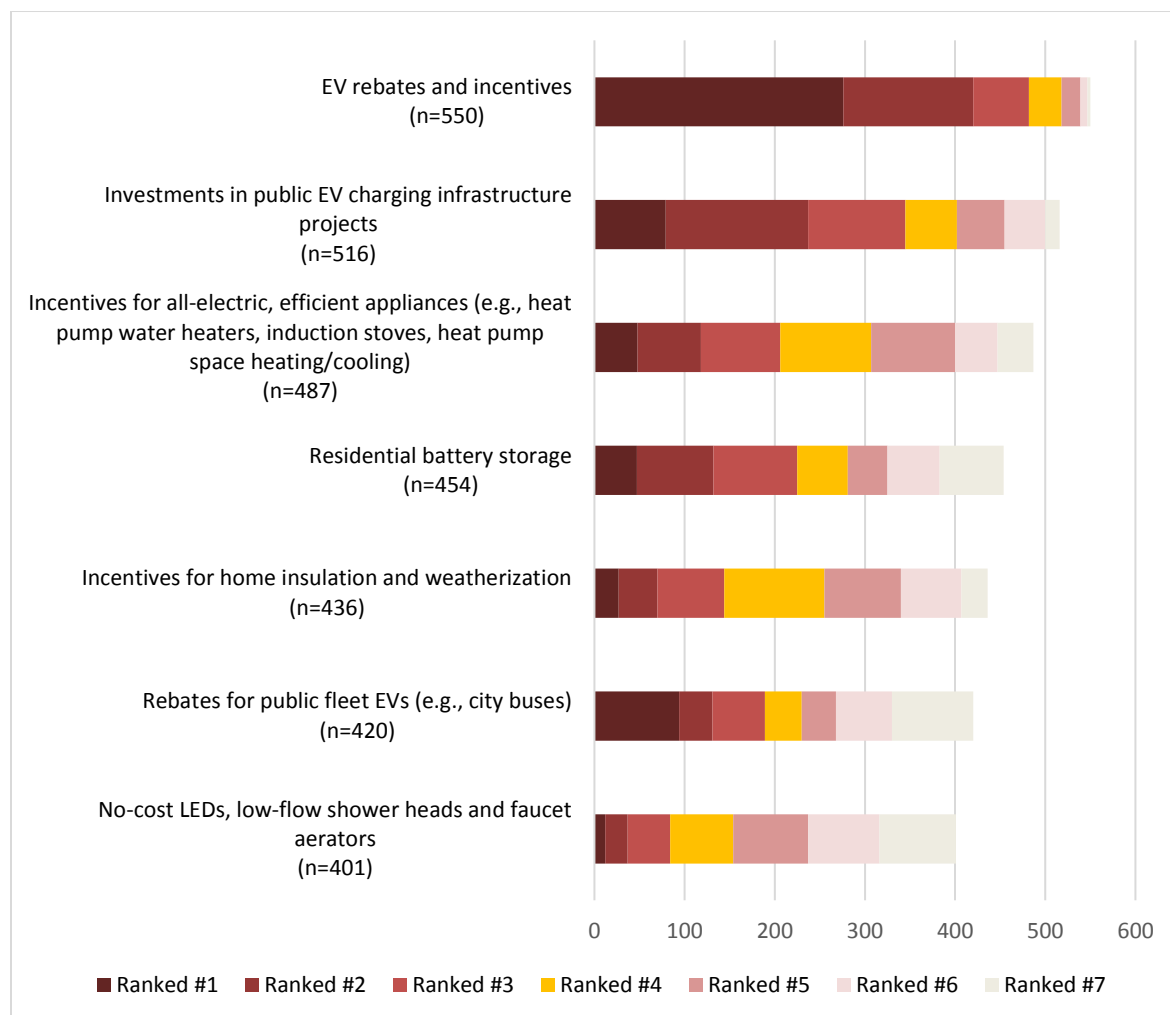
- Increase the length of the program (7%)
- More outreach and education (5%)

While not specifically a program recommendation, a large portion of the respondents used this question to share their satisfaction with the program (36) and suggest SCP invest in public charging infrastructure projects (29), which SCP has indicated it will initiate in fiscal year 2019-2020.

Recommendations for Future SCP Programs

Survey respondents were asked to rank possible clean energy programs they would like to see SCP offer in the future. The most highly ranked program choice selected was continuing EV rebates and incentives, followed by investment in EV infrastructure.

Figure 28. Most commonly suggested future programs Drive EV certificate recipients would like SCP to offer in the future



Participating Dealership Impact

To determine the impacts of the Drive EV program on participating dealerships, CSE conducted interviews with representatives from four of the five participating dealerships. Interviews were conducted with sales managers who oversaw the Drive EV program at their dealership and were not involved in the day-to-day selling of vehicles. Interview questions were meant to gather perspectives on the impact of the program on the dealership, effectiveness of training and support, effectiveness of marketing activities, availability of manufacture and dealer discounts, future plans for promoting EVs and recommendations for improving the dealership and customer experience.

Most dealership staff reported satisfaction with the increase in sales they attained through the program. The most common logistical hurdles dealers faced were related to the certificate claiming processing and issues with the online claim submission portal. Dealerships interviewed stated the dealership portal was helpful in tracking claim status and required documentation needed to submit for reimbursement.

However, they also stated the portal did not save them the hoped-for time in prepping and uploading documents. In addition, the system sometimes prohibited them from claiming a certificate if another dealer previously claimed it but did not complete the sale. This difficulty was compounded if the issue occurred on the weekend, because certificate claim issues could only be rectified on weekdays.

All of the dealers indicated SCP's marketing and outreach was effective and most of the dealers reported that customers highly valued the third-party validation from SCP, which they viewed as a trusted entity that legitimized the deal they were being offered. Most interviewees did not participate in the trainings personally but reported that their staff were largely satisfied with the training and support provided and felt SCP was responsive to their needs. Some interviewees indicated the trainings were not as applicable since their staff was already trained. Following are key recommendations suggested by dealer interviewees for program improvement.

- Streamline the procedure for claiming certificates (e.g., transition to digital documents)
- Fix technical issues with the portal
- Notify dealers earlier about the launch of the program to allow enough time to receive adequate inventory

Two of the four dealerships stated they offered manufacturer and dealer discounts to non-SCP customers who were shopping for EVs. One of the dealers explained that they would offer the discounts to non-SCP customers if they asked for it. All of the dealers also stated they had little to no control over the manufacturer discount and to whom it was offered.

Finally, all of the dealers interviewed mentioned they have the desire to promote EVs in the future as the Drive EV program ends. Some of the dealers expressed that they lack any concrete plans for promoting EVs or that they are unsure of what the EV market will bring in the future without the program.

Program Staff Input

CSE program staff who administered Drive EV provided comments and feedback on program design and operations. In general, staff indicated the new Salesforce platform for application submittal and processing helped speed up processing times and facilitated easier processing of data for evaluation and analysis. Issues in the SCP customer verification tool led to incorrect CARE/FERA indicators and increased times when the tool was not available.

V. Recommendations

While SCP does not plan to offer future iterations of the Drive EV program, the following section includes recommendations for similar programs that may be introduced by other entities. Recommendations are based in the evaluation results and grouped by program element.

Program Design

- 1. Consider continuing to offer an EV rebate program.** Increases in free-ridership, decreases in participation rates and other evidence—such as the replacement rate of EVs and household compositions of EVs—seem to suggest the program is slowing down or attracting higher rates of people who have already converted to EVs. However, noted by the high percentage of non-participating EVs being adopted, evidence of non-participating dealerships offering discounts coinciding with this program, and overwhelming support from survey respondents to continue this program, it may indicate there is value to still offering it. In addition, dealership participants indicated that despite their efforts to sell EVs, they do not expect the same type of sales numbers in the absence of this program. Perhaps consider limiting participation to people who have not participated in the past or offering smaller incentives that may continue to help spur EV adoption.
- 2. Consider new ways to spur dealership participation in a wider geographic region.** As noted, 95% of Drive EV certificates were issued to residents of Sonoma County and concentrated in six cities. In addition, 30% of certificate non-redeemers still made an EV purchase, largely from non-participating OEMs. Some 56% of those EVs were not available in the program (most notably Tesla and Honda). Despite SCP's efforts to engage all EV dealers in their service territory through a competitive RFP process, the Drive EV program dealer partners were centralized to one geographic area. Considering these factors, increasing the number and geographic diversity of participating dealers (e.g., one dealer per OEM, per county) may facilitate program participation among a larger and more diverse population and allow SCP to take credit for those vehicles. Through their recruitment efforts, SCP reported many dealers faced structural barriers to participating such as the inability to stock EVs or the lack of infrastructure to charge and maintain them. Identifying creative ways to help dealers overcome these barriers may increase their participation.
- 3. Expand model availability and used vehicle options.** Increases in model availability were found to be key to the success of Drive EV, however, there seems to be a notable effect of other popular models not being available (most notably Tesla and Honda). Continuing to expand the list of eligible vehicle models will further expand the program's appeal to a broader audience. We also saw a noticeable increase in used EVs being incentivized during Drive EV. This is most likely due to an increase in the number of dealerships offering used EVs and providing additional discounts on top of the SCP used vehicle incentives. If OEMs have used options available on lease returns or other unwind vehicles, they should be encouraged to include them in the program.

Dealership Collaboration

1. **Continue to assist dealers in program preparation.** Drive EV results indicate dealer inventory issues were not as much of a concern as in previous iterations. Four out of five dealer partners were participants from previous years, suggesting this, coupled with SCP's early program support, allowed them to scale up for the program. While less of an issue, dealers did report scrambling for inventory at times.

Program Administration

1. **Improve upon existing tools for customer verification and dealer certificate reimbursement.** Dealerships interviewed stated that the dealership portal was helpful in tracking claim status and required documentation needed to submit for reimbursement. However, they also stated the portal did not save them the hoped-for time in prepping and uploading documents. In addition, the system sometimes prohibited them from claiming a certificate if another dealer previously claimed it but did not complete the sale. This difficulty was compounded if the issue occurred on the weekend, because certificate claim issues could only be rectified on weekdays. Upgrades to CSE's processing system were well received and allowed for faster processing of applications and issuing of certificates. Issues were found in using the account verification tool, including some mislabeling of CARE/FERA statuses. Consider using alternative low-income qualifiers than CARE/FERA enrollment as those are opt-in programs and may exclude low-income customers. Overall tools were received well, but minor tweaks may increase effectiveness.
2. **Review and consider customer responses to other programs that respondents would like SCP to offer in the future.** In addition to continuing to offer incentives for EVs, customers also ranked EV infrastructure investment, incentives for electric appliances and residential battery storage incentives as items they would like SCP to invest in for future programs.

Outreach and Education

1. **Consider marketing and outreach strategies that target a broader audience.** Drive EV attracted an older, more educated audience to the program, hence the effectiveness of print and mail campaigns to attract program participants. The demographic profile of Drive EV participants mirrors similar incentive programs, indicating the program is attracting participants that have a proclivity toward EV adoption. While these strategies proved successful, SCP should consider the idea of enhancing their marketing strategy to expand the diffusion of EV technology to a younger, more representative audience that may not be early adopters of new technology.
2. **Promote average cost savings and vehicle ranges in promotional materials to overcome common barriers.** Through all iterations of Drive EV, vehicle range and price have remained common barriers to participants not redeeming their incentives. Incorporating information about average vehicle cost savings and battery range, as well as promoting transparency through the SCP program dashboard, would allow consumers to make more informed projections of their potential savings. Using cost savings specific to the Drive EV program also may mitigate frustration over perceived savings from other programs, specifically the federal tax credit that rarely equals the \$7,500 total possible.

Evaluation

- 1. Consider a more comprehensive analysis of the full three-year cycle of the Drive EV program.** After three years of offering this program, and incorporating improvements and lessons learned into program design, SCP now has the opportunity to quantify the impacts of the overall program and take a deep dive into the full program in order to identify the key elements of success that can serve as a benchmark for future programs.
- 2. Examine possible reasons for low participation rates from customers in Mendocino County.** As noted, the majority of program participants were concentrated in specific cities in Sonoma County. Drive EV continued this trend from previous program iterations. Potential dealer accessibility issues have been identified as one possible cause of this, but a more extensive qualitative assessment of Mendocino County customers may identify barriers to EV adoption.
- 3. Collect certificate redeemers' energy consumption data to analyze impacts to utility bills and the grid.** While this evaluation explored redeemers' perspectives on energy costs, analysis of actual consumption and cost data would better inform the program's impact on customer utility bills and the electrical grid. To assess this, SCP or future implementers could collect energy consumption data from participants before and after acquisition of a rebated vehicle. These consumption patterns and information about the vehicle would enable evaluators to estimate the impact of adding specific vehicle models to a household's electricity bill compared to equivalent gasoline costs.
- 4. Consider additional methods for assessing direct and spillover program effects.** Evidence collected via surveys and interviews suggests some market spillover effects (e.g., nonparticipating dealers offering competitive discounts) took place as a result of Drive EV that may impact overall EV sales in Sonoma and Mendocino counties. However, the true impact of the program on wider sales is difficult to assess due to the presence of numerous conflating factors, including changes to statewide clean vehicle incentive programs like the CVRP; variations in the cost of fuel; the release of new, highly anticipated models; and changes in vehicle supply at local dealerships. Though factors like these make it difficult to identify direct effects of the program, several approaches could be taken to understand impacts and spillover effects. For example, acquiring vehicle registration data from a provider such as IHS Markit would enable evaluators to track vehicle registration volume, market share and distribution of clean vehicles in the areas. It would be difficult to claim causation from a specific program, but it might be instructive for context.
- 5. Use caution when comparing GHG reduction estimates to other programs due to the variability in factors that impact savings.** Though this report has outlined the cost of the program with respect to emission reductions, additional evaluation of cost-effectiveness could be conducted by comparing emission reductions per dollar spent with other SCP programs. While useful for calculating overall impact, care should be taken in interpreting similarities and differences in emission reductions per dollar spent compared to programs administered in other areas, which can have very different electricity generation portfolios, socio-economic and consumer choice patterns and consumer preferences for various vehicle features.

Appendix A: Drive EV Program Design Changes Over the Years

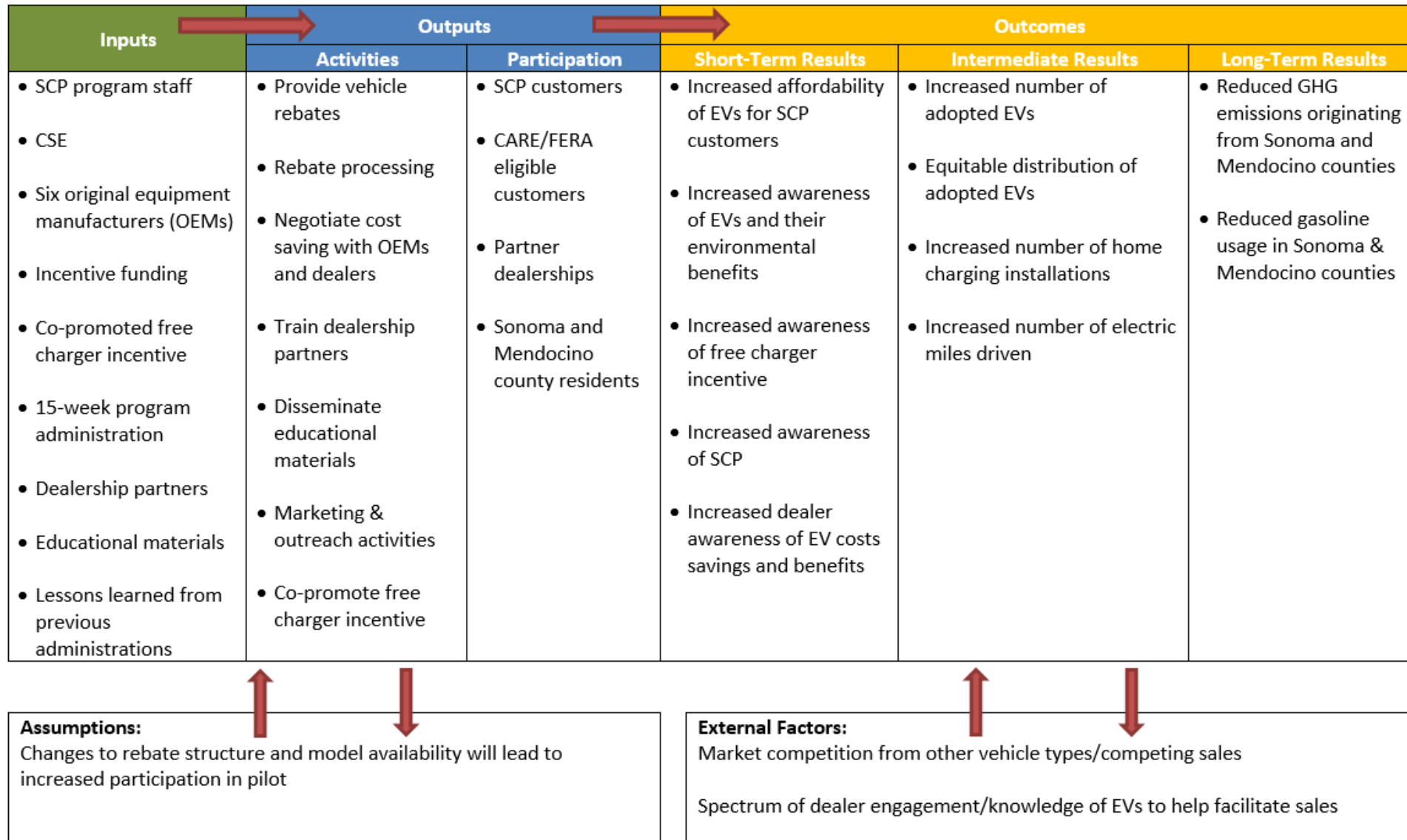
Program Elements	Drive EV 1.0 pilot	Drive EV 2.0	Drive EV 3.0
Time frame	10/27/2016 – 1/5/2017	8/8/2017 – 11/30/2017 ³⁰	8/1/2018 – 11/16/2018
Time of delivery	Point of sale	Point of sale	Point of sale
Incentive value levels	New EVs: -\$2,500 for non-CARE/FERA customers -\$5,000 for CARE/FERA customers Used EVs: -\$1,100 -Reserved for low-income consumers	New EVs: -\$2,000 for non-CARE/FERA customers -\$3,500 for CARE/FERA customers Used EVs: -\$1,000 for non-CARE/FERA customers -\$2,000 for CARE/FERA customers	New EVs: -\$2,000 for non-CARE/FERA customers -\$4,000 for CARE/FERA customers Used EVs: ³¹ -\$1,000 for non-CARE/FERA customers -\$2,000 for CARE/FERA customers
Incentive limits	Two certificates per person	One certificate per person, two per account	One certificate per person, two per account
Eligibility criteria	SCP customers in Sonoma County	SCP customers in Sonoma & Mendocino counties	SCP customers in Sonoma & Mendocino counties
EV manufacturer/dealer partnerships	-Two OEMs -One dealership participant per OEM -One model available per OEM	-Eight OEMs -One dealership participant per OEM -One to five models available per OEM -Three dealerships offering used EVs	-Five OEMs -One dealership participant per OEM -One to three models available per OEM -Four dealerships offering used EVs
Dealership responsibilities	-Submit vouchers and receive reimbursement -Participate in various marketing events	-Submit vouchers and receive reimbursement -Participate in various marketing events -Participate in dealer trainings	-Submit vouchers and receive reimbursement -Participate in various marketing events -Participate in dealer trainings
Complementary incentives and programs offered	-Manufacturer and dealer discounts -Co-promotion of free EV charging equipment (not offered concurrently) -Co-promotion of EverGreen service	-Manufacturer and dealer discounts -Co-promotion of free EV charging equipment -Co-promotion of EverGreen service	-Manufacturer and dealer discounts -Co-promotion of free EV charging equipment -Co-promotion of the Clean Vehicle Assistance Program -Co-promotion of the Go Green! program
Education and outreach	-Email and Social media marketing campaigns	-EV Buyer's Guide -Targeted email campaigns and direct mailers -Radio, TV, print and online ads -Targeted billboards/outdoor ads/banners -Social media ads -Community events	-EV Buyer's Guide -Targeted email campaigns and direct mailers -Radio, TV, print and online ads -Targeted billboards/outdoor ads/banners -Social media ads and sponsored posts -Community events and presentations with display cars from participating dealers -News articles and press release -Targeted letters to CARE/FERA customers, NSCAPCD ³² and Burbank Housing residents

³⁰ Incentive period was extended four weeks due to California wildfires.

³¹ Used EVs offered at four participating dealerships (BMW, Nissan, Kia and Chevrolet)

³² Northern Sonoma County Air Pollution Control District

Appendix B: Program Logic Model



Appendix C: Survey Instrument

Drive EV Survey

Survey Introduction (Non-Redeemers)

Welcome to the Sonoma Clean Power (SCP) Drive EV Survey! Regardless of whether or not you redeemed your Drive EV certificate, we'd like to learn more about your experience deciding whether to get an EV.

Your participation is voluntary, however your input will help SCP improve clean energy programs for its customers, so we encourage you to take 5–10 minutes and try to answer all the questions. If you complete the survey, you will have the option to enter a drawing to win one of ten \$30 Amazon.com gift cards.

Your identity will remain confidential and all reported results will be anonymous. Your survey link is personalized and cannot be shared with others.

If you have questions about this research project or if you experience technical difficulties, you may contact the Center for Sustainable Energy at 858-429-5158 or jamie.rose@energycenter.org.

Survey Introduction (Redeemers)

Welcome to the Sonoma Clean Power (SCP) Drive EV Survey! You were invited to participate in this survey because you redeemed an SCP Drive EV Incentive Certificate for an electric vehicle (EV) purchase or lease. We'd like to learn more about your experience deciding about an EV.

Your participation is voluntary, however your input will help SCP improve clean energy programs for its customers, so we encourage you to take 10 minutes and try to answer all the questions. If you complete the survey, you will have the option to enter a drawing to win one of ten \$30 Amazon.com gift cards.

Your identity will remain confidential and all reported results will be anonymous. Your link is personalized and cannot be shared with others.

If you have questions about this research project or if you experience technical difficulties, you may contact the Center for Sustainable Energy at 858-429-5158 or jamie.rose@energycenter.org.

Vehicle Adoption Decisions

Logic: Section is hidden unless certificate status is “unredeemed”.

1. You received a Sonoma Clean Power Incentive Certificate for an EV through the Drive EV program but never redeemed it. Why not? (Select all that apply.)

- ☐ I acquired an EV at a dealership not participating in the Drive EV program
- ☐ I already owned an EV that I was happy with
- ☐ The program ended before I could get a vehicle
- ☐ The incentive process was too complicated
- ☐ I couldn't afford an EV, even with the incentives
- ☐ The Drive EV incentive amount was not enough to make it worth acquiring an EV
- ☐ I didn't like any of the vehicles available
- ☐ I am waiting for the release of newer EV models before I get one
- ☐ Available EVs did not meet my driving needs (e.g., range, size)
- ☐ The EV I wanted was not included in the program
- ☐ I didn't have reliable access to charging
- ☐ I decided an EV wasn't a good fit for me
- ☐ My circumstances changed (e.g., income, place of residence)
- ☐ I changed my mind about purchasing an EV
- ☐ Dealer was out of inventory
- ☐ I had an unsatisfying experience at the dealership
- ☐ Other

Logic: question hidden unless response to q.1 = “Other”

Please specify what other reason you had for not redeeming your certificate.

2. What was the primary reason you did not redeem your certificate?

Responses auto-populate from selected items on q.1

3. What are your current vehicle shopping plans?

- ☐ I purchased/leased a different vehicle
- ☐ I am still planning to purchase/lease a vehicle, but haven't yet
- ☐ I have decided to keep my current vehicle
- ☐ I don't currently have a car and have no plan to purchase/lease one

Logic: question hidden unless response to q.3 = "I purchased/leased a different vehicle."

4. What type of vehicle did you purchase/lease?

- ☐ Non-hybrid gasoline fueled vehicle
- ☐ Conventional hybrid (fueled with gasoline only)
- ☐ Plug-in hybrid EV (recharged with electricity and/or fueled with gasoline)
- ☐ All-battery EV (recharged with electricity only)
- ☐ Hydrogen fuel-cell vehicle
- ☐ Diesel/Biodiesel-fueled vehicle
- ☐ Other alternative fuel-powered vehicle

Logic: question 5-6 hidden unless response to q.4 = "Plug-in hybrid EV (recharged with electricity and/or fueled with gasoline)" or "All-battery EV (recharged with electricity only)"

5. What led you to acquire an EV without redeeming your Drive EV certificate? (Select all that apply.)

- ☐ I got a better deal at a non-participating dealership
- ☐ I had a bad experience at a participating dealership
- ☐ The participating dealership was out of inventory
- ☐ Other, please specify:

6. Please select the brand of EV you decided to acquire.

- ☐ Audi
- ☐ BMW
- ☐ Cadillac
- ☐ Chevrolet
- ☐ Chrysler
- ☐ Fiat
- ☐ Ford
- ☐ Honda
- ☐ Hyundai
- ☐ Jaguar
- ☐ Karma
- ☐ Kia
- ☐ Mercedes-Benz
- ☐ Mini

- ☐ Mitsubishi
- ☐ Nissan
- ☐ Porsche
- ☐ smart
- ☐ Tesla
- ☐ Toyota
- ☐ Volkswagen
- ☐ Volvo

Logic: question hidden unless response to q.3 = "I am still planning to purchase/lease a vehicle, but haven't yet"

7. What type of vehicle are you most likely to purchase/lease?

- ☐ Non-hybrid gasoline fueled vehicle
- ☐ Conventional hybrid (fueled with gasoline only)
- ☐ Plug-in hybrid EV (recharged with electricity and/or fueled with gasoline)
- ☐ All-battery EV (recharged with electricity only)
- ☐ Hydrogen fuel-cell vehicle
- ☐ Diesel/Biodiesel-fueled vehicle
- ☐ Other alternative fuel-powered vehicle

Logic: question hidden unless response to q.3 = "I have decided to keep my current vehicle"

8. What type of vehicle did you decide to keep?

- ☐ Non-hybrid gasoline fueled vehicle
- ☐ Conventional hybrid (fueled with gasoline only)
- ☐ Plug-in hybrid EV (recharged with electricity and/or fueled with gasoline)
- ☐ All-battery EV (recharged with electricity only)
- ☐ Hydrogen fuel-cell vehicle
- ☐ Diesel/Biodiesel-fueled vehicle
- ☐ Other alternative fuel-powered vehicle

EV Adoption

Logic: question hidden unless certificate status is “redeemed” OR

response to *q.4* = “Plug-in hybrid EV (recharged with electricity and/or fueled with gasoline)” or “All-battery EV (recharged with electricity only)”

9. How important were the following factors in your decision to purchase/lease an EV?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
Saving money	()	()	()	()	()
Reducing environmental impacts	()	()	()	()	()
Carpool or High Occupancy Vehicle (HOV) lane access	()	()	()	()	()
Increased energy independence	()	()	()	()	()
Convenience of charging	()	()	()	()	()
Vehicle performance	()	()	()	()	()
Vehicle styling, finish, and comfort	()	()	()	()	()
A desire for the newest technology	()	()	()	()	()

Logic: questions 10-11 hidden unless certificate status is “redeemed”

10. How important were each of the following in making it possible for you to adopt an EV?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important

State vehicle rebate (CVRP)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean Vehicle Assistance Program (CVAP)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Federal tax credit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean Fuel Rebate offered by PG&E	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drive EV incentive certificate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drive EV dealer/manufacturer discounts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Free EV charging station offered by SCP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. Which of the following best describes the vehicles you plan to purchase/lease in the future?

- ☐ I will only purchase/lease EVs in the future
- ☐ I will mostly purchase/lease EVs in the future
- ☐ I will purchase/lease EVs and gasoline-fueled vehicles about equally in the future
- ☐ I will mostly purchase/lease gasoline-fueled vehicles in the future
- ☐ I will only purchase/lease gasoline-fueled vehicles in the future
- ☐ I'm not sure

12. Have you applied for a Drive EV certificate in previous years? (The program was formerly named Drive EverGreen.)

- ☐ Yes
- ☐ No
- ☐ I'm not sure

Logic: question 13-14 hidden unless response to q.12 is "Yes"

13. Did you redeem your Drive EV certificate for an EV in previous years?

☐ Yes

☐ No

14. What motivated you to participate in the Drive EV program again?

Logic: question hidden unless certificate status is “unredeemed” AND

response to q.7 = “Plug-in hybrid EV (recharged with electricity and/or fueled with gasoline)” or “All-battery EV (recharged with electricity only)”

15. How important are the following factors when you are considering whether to purchase/lease an EV?

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
Saving money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reducing environmental impacts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Carpool or High Occupancy Vehicle (HOV) lane access	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased energy independence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Convenience of charging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vehicle styling, finish, and comfort	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A desire for the newest technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Logic: question hidden unless response to *q.3* = “I have decided to keep my current vehicle” or “I don’t currently have a car and have no plan to purchase/lease one.” or “I am still planning to purchase/lease a vehicle, but haven’t yet”

OR

response to *q.4* = “Gasoline-fueled vehicle” or “Conventional hybrid (fueled with gasoline only)” or “Diesel/Biodiesel-fueled vehicle” or “Other alternative fuel-powered vehicle”

16. To what extent is each of the following a barrier to purchasing or leasing an EV for you?

	Not at all a barrier	A minor barrier	A moderate barrier	A major barrier	An overwhelming barrier
Vehicle price	()	()	()	()	()
Cost of electricity for charging	()	()	()	()	()
Vehicle range on a single charge	()	()	()	()	()
Frequency of battery replacement	()	()	()	()	()
Time required to recharge	()	()	()	()	()
Access to reliable charging	()	()	()	()	()
Reliability of the technology	()	()	()	()	()
Vehicle repair costs	()	()	()	()	()
Vehicle safety records	()	()	()	()	()
Availability of desired vehicle models and body styles	()	()	()	()	()

If you have experienced any other major barriers to purchasing or leasing an EV, please describe them in the box below:

[Open-ended text box]

Incentive Effect

Logic: Section hidden unless certificate status is “redeemed”

Logic: Instructions hidden unless respondent acquired a New EV.

As a reminder, through the Drive EV program, you:

- Redeemed an incentive certificate from SCP for **\$[xxxx]** off the purchase/lease of a **[New/Used] [Make/Model]** and
- Received a dealer/manufacturer discount of **\$[xxxx]**.

In the following questions, please consider **the Drive EV incentive certificate from SCP and dealer/manufacturer discounts** separately.

Logic: Instructions and q.17 hidden unless respondent acquired a Used EV.

As a reminder, through the Drive EV program, you:

- Redeemed an incentive certificate from SCP for **\$[xxxx]** off the purchase/lease of a **[New/Used] [Make/Model]**

17. If the Drive EV incentive certificate from SCP had NOT been available, what would you have done?

- () Purchased/leased the same EV I got through Drive EV
- () Purchased/leased a different vehicle: all-battery EV
- () Purchased/leased a different vehicle: plug-in hybrid EV
- () Purchased/leased a different vehicle: conventional hybrid
- () Purchased/leased a different vehicle: non-hybrid gasoline fueled vehicle
- () Not purchased/leased a vehicle
- () Other, please specify: _____ *

Logic: Question 18-20 hidden unless respondent acquired a New EV.

18. If the Drive EV incentive certificate from SCP had NOT been available, but the dealer/manufacturer discounts were, what would you have done?

- () Purchased/leased the same EV I got through Drive EV
- () Purchased/leased a different vehicle: all-battery EV
- () Purchased/leased a different vehicle: plug-in hybrid EV
- () Purchased/leased a different vehicle: conventional hybrid
- () Purchased/leased a different vehicle: non-hybrid gasoline fueled vehicle

- ☐ Not purchased/leased a vehicle
- ☐ Other, please specify: _____ *

19. If the dealer/manufacturer discounts had NOT been available, but the Drive EV incentive certificate from SCP was, what would you have done?

- ☐ Purchased/leased the same EV I got through Drive EV
- ☐ Purchased/leased a different vehicle: all-battery EV
- ☐ Purchased/leased a different vehicle: plug-in hybrid EV
- ☐ Purchased/leased a different vehicle: conventional hybrid
- ☐ Purchased/leased a different vehicle: non-hybrid gasoline fueled vehicle
- ☐ Not purchased/leased a vehicle
- ☐ Other, please specify: _____ *

20. If neither the dealer/manufacturer discounts nor the Drive EV incentive certificate from SCP had been available, what would you have done?

- ☐ Purchased/leased the same EV I got through Drive EV
- ☐ Purchased/leased a different vehicle: all-battery EV
- ☐ Purchased/leased a different vehicle: plug-in hybrid EV
- ☐ Purchased/leased a different vehicle: conventional hybrid
- ☐ Purchased/leased a different vehicle: non-hybrid gasoline fueled vehicle
- ☐ Not purchased/leased a vehicle
- ☐ Other, please specify: _____ *

Household Vehicle Composition

Logic: Section hidden unless certificate status is "redeemed"

21. Which of the following best describes your EV purchase or lease?

- ☐ It replaced, or will replace, another household vehicle
- ☐ It is an additional vehicle to my household
- ☐ It is the first vehicle acquired by my household

Logic: Q.22-23 hidden unless response to q.21 is "It replaced, or will replace, another household vehicle"

22. Please describe the vehicle you replaced (or will replace) with your EV.

Technology Type

- ☐ Non-hybrid gasoline fueled vehicle
- ☐ Conventional hybrid (fueled with gasoline only)
- ☐ Plug-in hybrid EV (recharged with electricity and/or fueled with gasoline)
- ☐ All-battery EV (recharged with electricity only)
- ☐ Hydrogen fuel-cell vehicle
- ☐ Diesel/Biodiesel-fueled vehicle
- ☐ Other alternative fuel-powered vehicle

Vehicle Type

- ☐ Compact car



- ☐ Midsize car



- ☐ Fullsize car



- ☐ Small/midsize SUV



- ☐ Fullsize SUV



- ☐ Pickup truck



- ☐ Minivan



- ☐ Motorcycle



Model Year

- ☐ MY 2019
- ☐ MY 2018
- ☐ MY 2017
- ☐ MY 2016
- ☐ MY 2015
- ☐ MY 2014
- ☐ MY 2013
- ☐ MY 2012
- ☐ MY 2011
- ☐ MY 2010
- ☐ MY 2009
- ☐ MY 2008
- ☐ MY 2007
- ☐ MY 2006
- ☐ MY 2005
- ☐ MY 2004
- ☐ MY 2003
- ☐ MY 2002
- ☐ MY 2001
- ☐ MY 2000
- ☐ MY 1999 or earlier

23. What did you do, or are you planning to do, with your old vehicle?

- ☐ I traded it in to the dealership when I purchased/leased my incentivized EV
- ☐ I sold it, or will sell it, privately to a new owner
- ☐ I donated, or will donate, the vehicle
- ☐ I gave, or will give, the vehicle to someone I know
- ☐ I scrapped, or will scrap, the vehicle
- ☐ I damaged/totaled my old vehicle in a car accident
- ☐ I lost my old vehicle in the Northern California wildfires

☐ I haven't decided yet

☐ Other, please specify: _____ *

Logic: Question hidden unless response to q.21 is "It is an additional vehicle to my household"

24. Please describe the vehicle that you would have been driving had you not added your [model] to your household?

Technology Type

☐ Non-hybrid gasoline fueled vehicle

☐ Conventional hybrid (fueled with gasoline only)

☐ Plug-in hybrid EV (recharged with electricity and/or fueled with gasoline)

☐ All-battery EV (recharged with electricity only)

☐ Hydrogen fuel-cell vehicle

☐ Diesel/Biodiesel-fueled vehicle

☐ Other alternative fuel-powered vehicle

Vehicle Type

☐ Compact car



☐ Midsize car



☐ Fullsize car



☐ Small/midsize SUV



☐ Fullsize SUV



☐ Pickup truck



☐ Minivan



☐ Motorcycle



Model Year

☐ MY 2019

☐ MY 2018

☐ MY 2017

☐ MY 2016

☐ MY 2015

☐ MY 2014

☐ MY 2013

☐ MY 2012

☐ MY 2011

☐ MY 2010

☐ MY 2009

☐ MY 2008

☐ MY 2007

☐ MY 2006

☐ MY 2005

☐ MY 2004

☐ MY 2003

☐ MY 2002

☐ MY 2001

☐ MY 2000

☐ MY 1999 or earlier

Logic: question hidden response to q.21 is "It replaced, or will replace, another household vehicle" AND q.22 *Technology Type* for replaced vehicle is "Gasoline-fueled vehicle" or "Conventional hybrid (fueled with gasoline only)" or "Diesel/Biodiesel-fueled vehicle" or "Other alternative fuel-powered vehicle"

25. Which of the factors below were influential in your decision to replace your old vehicle with an EV at this time? (Select all that apply.)

- ☐ My lease was up and I was in the market for a car
- ☐ It was just time to replace my car
- ☐ New EV models have better range than previous EVs
- ☐ New EV models became available in different body styles (e.g., minivans, SUVs)
- ☐ I already have an EV and wanted to continue replacing gasoline-fueled vehicles in my household
- ☐ Other, please specify:

Logic: Question hidden unless response to *q.21* is "It replaced, or will replace, another household vehicle" or "It is an additional vehicle to my household"

26. Not including your newly acquired EV, how many vehicles do you currently have in your household?

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4 or more

Logic: Question hidden unless response to *q.26* is "1" or "2" or "3" or "4 or more"

27. How many of these vehicles in your household are gasoline-fueled? (not including plug-in hybrid EVs)

- ☐ 0
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4 or more

Logic: Q. 28-29 hidden unless response to *q.27* is "1" or "2" or "3" or "4 or more"

28. Will your newly acquired EV serve as your primary vehicle?

- ☐ Yes
- ☐ No

29. What tasks do you primarily use your gasoline-fueled vehicle/s for? (Select all that apply.)

☐ Taking long trips

☐ Running errands

☐ Commuting to work or school

☐ Other, please specify: _____

30. On average, about how many miles do you think you will be driving your EV?

On a typical workday: _____

On a typical non-work day: _____

31. About what percentage of your total miles driven will be in your EV?

0% _____ [slider] _____ 100%

32. About what percentage of your EV driving miles will be within Sonoma or Mendocino counties?

0% _____ [slider] _____ 100%

Logic: Question hidden unless respondent acquired a Used EV.

33. What led you to purchase a used EV as opposed to a new one?

EV Charging and Usage

Logic: Section hidden unless certificate status is "redeemed"

34. Do you have easy access to any of the following EV charging options?

	Yes	No	Not sure
Electrical outlet at home			
Charging station at home			
Electrical outlet at work			
Charging station at work			
Charging station near home or work			

35. Please rank the following EV charging methods in order of how frequently you use them.

Drag items from the left to the right starting with the most frequently used. If you do not use a method, leave it in the left-hand column	
At home during the day	
At home during the evening	
At home overnight	
At work	
At a public charging station	
Other	

If you selected **Other**, please specify here:

[Optional text box]

36. Since acquiring your EV, which of the following best describes the changes you have noticed in your electric utility bill?

- ☐ My electric utility bill has significantly decreased
- ☐ My electric utility bill has marginally decreased
- ☐ My electric utility bill has not changed significantly
- ☐ My electric utility bill has marginally increased
- ☐ My electric utility bill has significantly increased
- ☐ I am not sure

Logic: Question hidden unless response to q.21 is "It replaced, or will replace, another household vehicle" AND q.22 *Technology Type* for replaced vehicle is "Gasoline-fueled vehicle" or "Conventional hybrid (fueled with gasoline only)" or "Diesel/Biodiesel-fueled vehicle" or "Other alternative fuel-powered vehicle"

37. Approximately how much money did you spend per week on fueling the vehicle you replaced?

38. Do you drive for, or plan to drive for any rideshare companies (e.g., Uber, Lyft) with your new EV?

- ☐ Yes
- ☐ No

Logic: questions 39 hidden unless response to q.38 = "Yes"

39. Which of the following rideshare companies do you drive for, or are planning to drive for? (Select all that apply.)

☐ Uber

☐ Lyft

☐ Other, please specify: _____

Program Awareness and Impressions

40. How did you hear about Sonoma Clean Power's Drive EV program? (Select all that apply.)

☐ Sonoma Clean Power website

☐ Drive EV website

☐ Mailer from Sonoma Clean Power

☐ Word of mouth (e.g., friend, relative, co-worker)

☐ Community event/Display vehicle

☐ Participating dealerships

☐ Social media (e.g., Facebook, Instagram, Twitter)

☐ TV commercial

☐ Radio advertisement

☐ Email advertisement

☐ Online advertisement

☐ Email from my employer

☐ Billboards

☐ Community events

☐ Newspaper article (e.g., The Press Democrat)

☐ Other

Logic: questions 42 hidden unless response to q.41 = "Other"

Please specify the other way in which you heard about the Drive EV program.

41. In which way did you FIRST hear of the Drive EV program?

Responses will auto-populate based on selections made on q.31

42. Which of the following best describes your awareness of EVs before learning about the Drive EV program?

- ☐ I had no idea EVs existed.
- ☐ I knew about EVs, but didn't know enough to make a decision about getting one.
- ☐ I knew enough about EVs to make an informed decision about getting one.

43. Were you already a customer of Sonoma Clean Power when you learned about the Drive EV program?

- ☐ Yes
- ☐ No

44. On a scale of 0-10, how likely are you to recommend Sonoma Clean Power to a friend?

0	1	2	3	4	5	6	7	8	9	10
Not at all likely					Extremely likely					

Logic: Questions 45-50 hidden unless certificate status is "redeemed"

45. On a scale of 0-10, how likely are you to recommend Drive EV to a friend?

0	1	2	3	4	5	6	7	8	9	10
Not at all likely					Extremely likely					

46. Are you familiar with Sonoma Clean Power's free EV charging equipment incentive program?

- ☐ No, I am not familiar with the free EV charging equipment incentive program
- ☐ Yes, and I have already ordered a charger
- ☐ Yes, and I plan to order a charger
- ☐ Yes, but I have no intention of ordering a charger

Logic: question hidden unless response to q.46 = "Yes, but I have no intention of ordering a charger" or "Yes, and I have already ordered a charger" or "Yes, and I plan to order a charger"

47. Did you hear about the free EV charging equipment incentive program through your participation in Drive EV?

- ☐ Yes
- ☐ No, I heard about it elsewhere

Logic: question hidden unless response to q.46 = "Yes, and I have already ordered a charger"

48. On a scale of 0-10, how likely are you to recommend the free EV charging equipment incentive program to a friend?

0	1	2	3	4	5	6	7	8	9	10
Not at all likely									Extremely likely	

49. Please select the additional EV incentive programs that you have applied for, or are planning to apply for? (Select all that apply.)

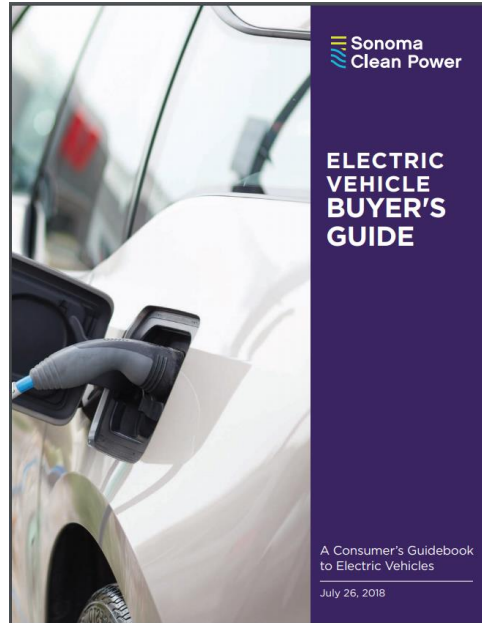
- ☐ State vehicle rebate (CVRP)
- ☐ Clean Vehicle Assistance Program (CVAP)
- ☐ Federal tax incentives for EVs
- ☐ Clean Fuel Rebate offered by PG&E
- ☐ None of the above

50. How satisfied were you with each of the following aspects of the Drive EV program?

	Not at all satisfied	Slightly satisfied	Moderately satisfied	Very satisfied	Extremely satisfied
Promotion and outreach	()	()	()	()	()
Website and other materials	()	()	()	()	()
Simplicity of the program	()	()	()	()	()
Amount of the Drive EV incentive certificate	()	()	()	()	()
Amount of the dealer/manufacturer discount	()	()	()	()	()
Level of customer service/support provided by Sonoma Clean Power	()	()	()	()	()
Vehicle model selection	()	()	()	()	()

51. Did you review SCPs Electric Vehicle Buyer's Guide while you were searching for an EV?

- ☐ Yes
- ☐ No
- ☐ Not sure



Logic: question hidden unless response to q.51 = "Yes"

52. Please rate your level of agreement with the following statement: The Electric Vehicle Buyer's Guide taught me about the benefits of owning an EV.

- ☐ Strongly disagree
- ☐ Disagree
- ☐ Neither agree nor disagree
- ☐ Agree
- ☐ Strongly agree

Demographics and Household

In this final section we will be asking some questions about you and your household so we can learn more about the characteristics of Drive EV program participants in Sonoma and Mendocino counties. This information will remain confidential.

53. Do you own or rent your residence?*

- ☐ Rent

- ☐ Own
- ☐ Prefer not to answer

54. What type of residence do you live in?*

- ☐ Detached house (single family home)
- ☐ Attached house (townhome, duplex, triplex)
- ☐ Apartment/condominium
- ☐ Other, please specify: _____
- ☐ Prefer not to answer

55. How many people live in your household, including yourself?

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8 or more

56. What is your age?*

- ☐ 16–20
- ☐ 21–29
- ☐ 30–39
- ☐ 40–49
- ☐ 50–59
- ☐ 60–69
- ☐ 70–79
- ☐ 80+
- ☐ Prefer not to answer

57. How do you prefer to describe your gender?*

- ☐ Female
- ☐ Male
- ☐ Transgender

- ☐ Not listed: _____
- ☐ Prefer not to answer

58. What is the highest level of education you have completed?*

- ☐ 12th grade or less
- ☐ High school graduate or equivalent
- ☐ Some college, no degree
- ☐ Associate's degree
- ☐ Bachelor's degree
- ☐ Postgraduate degree
- ☐ Prefer not to answer

59. What is your current annual gross household income from all sources (i.e. before taxes)?*

- ☐ Less than \$25,000
- ☐ \$25,000 to \$49,999
- ☐ \$50,000 to \$74,999
- ☐ \$75,000 to \$99,999
- ☐ \$100,000 to \$124,999
- ☐ \$125,000 to \$149,999
- ☐ \$150,000 to \$174,999
- ☐ \$175,000 to \$199,999
- ☐ \$200,000 to \$249,999
- ☐ \$250,000 to \$299,999
- ☐ \$300,000 to \$399,999
- ☐ \$400,000 to \$499,999
- ☐ \$500,000 or more
- ☐ Prefer not to answer

60. Are you Hispanic or Latino?*

- ☐ Yes
- ☐ No
- ☐ Prefer not to answer

61. How do you prefer to describe your racial identity? (Select all that apply.)*

☐ Black or African American

☐ East Asian

☐ Middle Eastern or North African

☐ Native American or Alaska Native

☐ Native Hawaiian or other Pacific Islander

☐ South Asian

☐ Southeast Asian

☐ White or Caucasian

☐ Other, please specify: _____ *

☐ Prefer not to answer

Final Page

62. Please rank the following clean energy programs in order of how much you would like to see SCP offer it in the future.

Drag items from the left to the right starting with the program you would most like to see. If you do not wish to rank an option, leave it in the left-hand column	
EV rebates and incentives	
Rebates for public fleet EVs (e.g., city buses)	
Investments in public EV charging infrastructure projects	
Residential battery storage	
No-cost LEDs, low-flow shower heads and faucet aerators	
Incentives for home insulation and weatherization	
Incentives for all-electric, efficient appliances (e.g., heat pump water heaters, induction stoves, heat pump space heating/cooling)	

63. Please provide any feedback you have on the Drive EV program in the box below. We are especially interested in how we can better support EV adoption in Sonoma and Mendocino counties.

64. If you would like to be entered for a chance to win a \$30 Amazon.com gift card, please enter your contact information below before clicking “Submit” and completing this survey.

We will only use your information to contact you if you are a winner. Gift card winners will be notified within the next 6-8 weeks via email. A digital gift card from Amazon will be sent to the winners.

First Name: _____

Last Name: _____

Email Address: _____

Phone Number: _____

Thank you for taking our survey. Your response is very important to SCP.

If you have questions about this research project or if you experience technical difficulties, you may contact the Center for Sustainable Energy at 858-429-5158 or jamie.oroase@energycenter.org

Appendix D: Dealer Interview Protocol

Opening Interview Steps

Before you begin the interview, please be sure to do the following:

1. Introduce yourself and your role at CSE and on this project.
2. Thank your participant and encourage them to be open and honest – their feedback is important to the evaluation of the program.
3. Tell your participant that the conversation will **not** be recorded, but that detailed notes will be taken, which will be summarized in a report with program recommendations.
4. Remind your participant that their personal details will not be revealed.
5. Confirm that they have your contact information, should they wish to follow up for any reason.

Dealer Interview Questions

These questions are intended to provide guidelines for semi-structured interviews. Slight deviations from the text to maintain a conversational tone are acceptable. This might include skipping parts of a question if the respondent has adequately addressed it already or probing for additional information if the response triggers a different question.

1. Could you start by briefly describing your role at your dealership and your involvement with the Drive EV program?
2. What feedback do you have on the process for claiming and receiving reimbursement for a Drive EV certificate?
3. How do you feel the dealership training provided by SCP did, or did not, prepare your team to participate in the Drive EV program?
4. How do you think Drive EV affected sales at your dealership?
5. How do you feel the marketing events you participated in with SCP affected program participation at your dealership?
6. In what other ways, if any, did you promote the Drive EV incentive to your customers outside of the SCP marketing events?
7. Were manufacturer discounts negotiated by SCP exclusively offered to SCP customers? Why or why not?
8. Were dealer discounts negotiated by SCP exclusively offered to SCP customers? Why or why not?
9. Considering this is the last year of the Drive EV program, what plans, if any, do you have to continue promoting EV sales at your dealership?
10. Do you have any other feedback, challenges, or successes about the program that you would like to share at this time?

Nissan/BMW/Kia/Chevy Dealers Only

11. What was your experience offering incentives for used EVs? What factors would lead you to offer used EVs to customers over new? What successes or challenges did you face selling incentivized used EVs?



As a mission-driven nonprofit organization, CSE works with energy policymakers, regulators, public agencies and businesses as an expert implementation partner and trusted information resource. Together, we are the catalysts for sustainable energy market development and transformation.

HEADQUARTERS

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