

# NYSERDA Drive Clean Rebate Ownership Survey: 2017-2018 Results

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# **NYSERDA Drive Clean Rebate Ownership Survey: 2017–2018 Results**

*Final Report*

Prepared for:

**New York State Energy Research and Development Authority**

Albany, NY

David McCabe  
Project Manager

Prepared by:

**Center for Sustainable Energy**

San Diego, CA

Amy Lastuka  
Senior Research Analyst

Keir Havel  
Research Analyst Assistant

Ryan Bodanyi  
Senior Transportation Specialist

## Notice

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## **Abstract**

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This report summarizes results of a survey of rebate recipients approximately one year after adopting an electric vehicle (EV) through the New York State Energy Research and Development Authority's (NYSERDA) Drive Clean Rebate program between 2017 and 2018. The program offered point-of-sale rebates on new car purchases and leases for eligible electric cars.

Survey results are grouped by technology type, i.e., plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs). Results summarize demographics, i.e. home-owners vs. renters, residence type, gender, age, income and racial/ethnic identity, electric car driving patterns, charging behaviors and concerns.

The Ownership Survey showed high levels of participant satisfaction. Charging infrastructure and vehicle range limitations were the most commonly reported concern, and to a lesser extent, cold-weather performance of the vehicles. Typical daily mileage was similar for both PHEV and BEV owners, although PHEV owners were much more likely to use their vehicle for long distances.

## **Keywords**

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Electric cars, electric vehicles (EVs), plug-in electric hybrid vehicles (PHEVs), battery electric vehicles (BEVs), all-battery cars, Drive Clean Rebate program, point-of-sale rebates, rebate importance, Rebate Essentiality, auto dealers, EV ownership.

## **Acknowledgments**

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The Center for Sustainable Energy would like to acknowledge the guidance and enthusiasm of project manager Betsy McDonald Llanwarne, who worked with Patrick Bolton and Adam Ruder of NYSERDA to launch the Drive Clean Rebate program. Betsy passed away in October 2018. We would also like to thank Laura Parsons and Marcus Gilmore of the Center for Sustainable Energy for their project support.

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# Executive Summary

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NYSERDA's Drive Clean Rebate program provides point-of-sale rebates to consumers who purchase or lease eligible new electric vehicles, both plug-in hybrid and battery vehicles included. The program launched in March 2017, administered by the Center for Sustainable Energy (CSE). Participants in the program are invited to take an Ownership Survey approximately one year after acquiring their vehicle. The survey asks about ownership experience and what could make electric vehicle ownership more attractive. This report summarizes findings for rebated vehicles purchased between March 23, 2017 and March 31, 2018.

A total of 6,381 program participants received a rebate for vehicles purchased during this time, and each received an invitation to complete the survey. Of these, 1,650 completed the survey, for a response rate of 25.9%. To better represent the larger population of program participants, survey data were then weighted; key findings include the following:

- Respondents have driven an average<sup>1</sup>of:
  - 13,000 miles (for plug-in hybrid electric vehicles, or PHEVs)
  - 11,000 miles (for all-battery electric vehicles, or BEVs)
- Typical vehicle uses<sup>2</sup> include:
  - Running errands (91%)
  - Commuting (81%)
- Respondents are satisfied with their electric vehicles:
  - 90% are “very” or “extremely” satisfied with their ownership experience.
  - 92% would “probably” or “definitely” recommend electric vehicle (EV) ownership to others.

Despite the high levels of overall satisfaction reported by participants, challenges remain.

- Most respondents have concerns about the availability of public charging infrastructure:
  - 70% of respondents selected “access to public charging stations” as one of the top three challenges of owning an electric vehicle, and only 7% agreed with the statement “there are enough public chargers.”
  - 40% of BEV respondents agreed with the statement “I frequently see gasoline-fueled cars parked in spaces with public electric chargers.”

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<sup>1</sup> Program participants are invited to take the Ownership Survey once per quarter. Therefore, the time since they have acquired their vehicle ranges from 10.5–13.5 months.

<sup>2</sup> Defined as using their vehicle a few times per week or more.



- Range is a greater concern for owners of BEVs:
  - 70% of BEV respondents selected “range limitations” as one of their top three challenges, versus 60% of PHEV respondents.
  - 22% of BEV respondents say they never use their electric vehicle for trips greater than 50 miles from home; among PHEV respondents, that number is only 6%.
- Performance in cold weather is also a greater concern for owners of BEVs:
  - 47% of BEV respondents selected this as one of their top three challenges.
  - Among PHEV respondents, this number is only 35%.

# 1 Introduction

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NYSERDA's Drive Clean Rebate program provides point-of-sale rebates to consumers who purchase or lease eligible new all-battery or plug-in hybrid electric cars. Hydrogen fuel-cell electric cars will be eligible when they are available in New York State.

The program launched in March 2017 and is administered by the Center for Sustainable Energy (CSE). Individual program participants<sup>3</sup> are invited to take two voluntary surveys designed to help researchers better understand owner experience and behavior. The first is shared with participants two weeks after the rebate is approved and is referred to as the Adoption Survey. This report summarizes findings from the second survey—referred to as the Ownership Survey—which is designed to better understand rebated electric car ownership experiences in New York, and to identify ways to make ownership attractive and sustainable.

## 1.1 Administration Details

The Drive Clean Rebate Ownership Survey is administered on a quarterly basis. Program participants receive a survey invitation by email approximately one year after they acquired their vehicle.<sup>4</sup> The participants included in this analysis purchased or leased electric cars between March 23, 2017 and March 31, 2018 (Table 1). A total of 6,381 participants received a rebate for cars acquired during this window and were invited to take the survey.

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<sup>3</sup> Program participants are defined as applicants who applied for and received a rebate for an electric car through NYSERDA's Drive Clean Rebate program.

<sup>4</sup> For example, participants who purchased their vehicle during Q1 2017 receive the survey invitation in the middle of Q1 2018. Therefore, they may have been in possession of their vehicle anywhere from 10.5–13.5 months.

**Table 1. 2017–2018 Drive Clean Rebate Ownership Survey**

	<b>Date Ranges</b>
Survey Administration Dates:	6/21/2018–3/15/2019
Survey Invitations:	6/21/2018–3/13/2019
Responses Received:	6/21/2018–3/15/2019
Rebate Application Approval Dates:	4/03/2017–8/03/2018 <sup>a</sup>
Vehicle Purchase/Lease Dates:	3/23/2017–3/31/2018 <sup>b</sup>

<sup>a</sup> Of the survey sample. Note that the last rebate approval date occurs over four months after the last vehicle purchase in this data set. While dealers are required to submit applications within 90 days of the date of sale, NYSERDA occasionally grants exceptions so that dealers can submit applications outside of this eligibility window.

<sup>b</sup> Of the survey sample.

Of those invited to take the survey, 1,650 responded, resulting in a response rate of 25.9%.

These respondents completed the survey between June 21, 2018 and March 15, 2019.

## **1.2 Representativeness and Weighting**

Since the Ownership Survey is voluntary and not everyone chooses to complete it, responses may not be representative of the entire Drive Clean Rebate participant population. However, using application information available for all program participants, response weights were created to compensate for over- or under-representation among various groups.<sup>5</sup> The dimensions used for weighting were car model, purchase versus lease, county, and technology type (plug-in hybrid electric vehicle [PHEV] versus battery electric vehicle [BEV]). The weights were calculated using the raking method.<sup>6</sup> Weighted responses are presented in this report and are representative of applicants who purchased their cars between March 23, 2017 and March 31, 2018. In this report, responses are segmented by technology type when

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<sup>5</sup> The weighting approach was developed in C. Johnson, B.D. Williams, C. Hsu, J.B. Anderson, Summary Documentation of the Electric Vehicle Consumer Survey, 2013–2015 Edition | Clean Vehicle Rebate Project, Center for Sustainable Energy (CSE), San Diego CA, 2017. <https://cleanvehiclerebate.org/eng/content/summary-documentation-electric-vehicle-consumer-survey-2013-2015-edition> (accessed February 5, 2020)

<sup>6</sup> Raking, also known as iterative proportional fitting, is a technique used to match a distribution from one data set to another, generally more comprehensive, data set.

the differences between these two are statistically significant.<sup>7</sup> Rao-Scott adjusted Pearson’s Chi-square testing with weighted data was used to test for differences between PHEV and BEV respondents.<sup>8</sup>

**Table 2. 2017–2018 Drive Clean Rebate Ownership Survey Sample Size and Representativeness**

Program Participant Population	N=6,381
Responses in Data Set	n=1,650 (25.9%)
Weighting Method	Raking
Representative Dimensions	Car Model, Purchase vs. Lease, County, Technology Type

Frequencies shown in figures throughout this report have been made proportionate based on the applied weights. In other words, all “%” results given below are proportionately weighted. Although the weighted frequency percentages tend to be the most-used summary statistics, the reader can approximate the number of program participants per each response option, if desired, using the program population size (N=6,381) and the percentages given in the tables below. For example, approximately 1,579 respondents answered the question “Do you own or rent your residence?” making the number of respondents to the question 95.7% of the survey sample (n=1,650 respondents in the data set). Ninety-one percent of those responses indicated home ownership. Thus, the number of program participants represented by the respondents answering that they own their home is approximately 5,557 (6,381 x 91% x 95.7%).

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<sup>7</sup> Similar segmentation methodology is used in B.D. Williams, J. Orose, M. Jones, J.B. Anderson, Summary of Disadvantaged Community Responses to the Electric Vehicle Consumer Survey, 2013–2015 Edition | Clean Vehicle Rebate Project, Center for Sustainable Energy (CSE), San Diego CA, 2018. <https://cleanvehiclerebate.org/eng/content/summary-disadvantaged-community-responses-electric-vehicle-consumer-survey-2013-2015-edition> (accessed July 1, 2020).

<sup>8</sup> Rao, J. N. K., and A. J. Scott. 1984. On chi-squared tests for multiway contingency tables with cell proportions estimated from survey data. *Annals of Statistics* 12: 46–60.

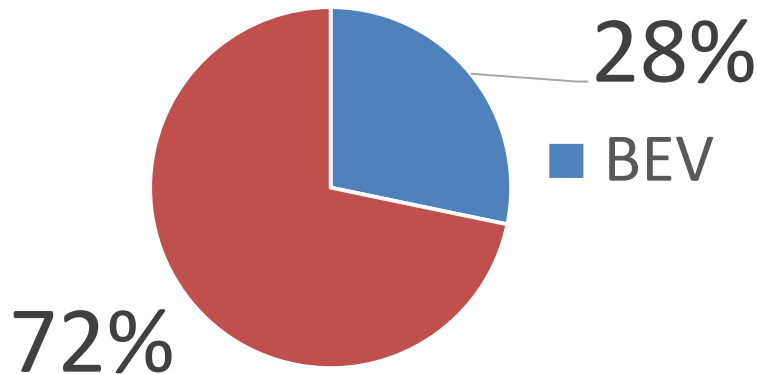
## 1.3 Results

Please note, all frequencies and percentages given below are proportionately weighted.

### 1.3.1 Technology Types

Figure 1 shows that PHEVs were more commonly rebated than BEVs (72% versus 28%).

**Figure 1. Rebates by Technology Type**



Weighted n = 1650

### 1.3.2 Car Status

Nearly all respondents (99.2%) said their household still had the rebated electric car, with 0.5% saying their household now has a different electric car, and the remaining 0.3% saying they no longer own any electric car. Of the 14 who no longer had the rebated car, nine sold or traded it in, four lost it to damaged or theft, and one selected “other.” Exact question wording can be found in the appendix.

### 1.3.3 Demographics and Housing Characteristics

Table 3 compares program participants with new car buyers in the United States, based on data from the National Household Travel Survey (NHTS).<sup>9</sup>

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<sup>9</sup> The NHTS does not report whether a vehicle was purchased new or used. Information on the age of the car and the odometer reading are used to infer the new or used vehicle status.

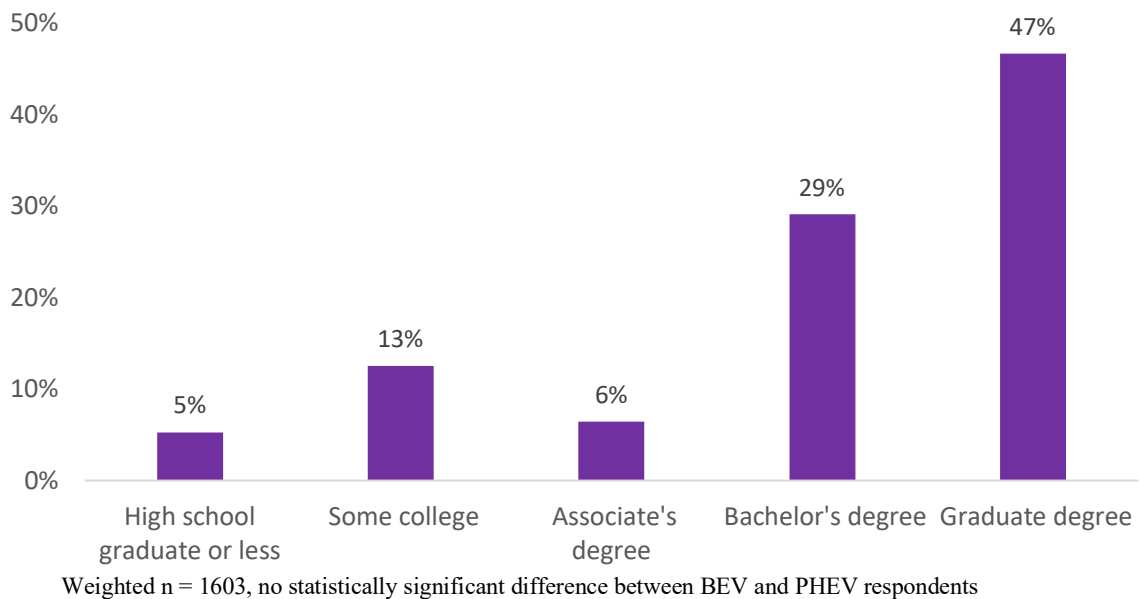
**Table 3. Comparison of Program Participants with New Car Buyers in the United States**

Characteristic	Drive Clean Program Participants	New Car Buyers in the US (NHTS 2017)
Male	72%	49%
Selected Solely White/Caucasian	90%	74%
50+ Years Old	64%	43%
Bachelor's Degree or Higher	76%	50%
Family Income \$150,000+	39%	23%
Own Home	91%	73%

Table 3 provides a helpful reference point when interpreting the data from rebate recipients, shown in greater detail below. This is because new car buyers—rather than the population of New York State in general as a whole—is a more appropriate basis for comparison.

Program participants more frequently have college degrees, have higher incomes, and are older than average new car buyers in the United States. Over three-quarters of program participants (76%) have at least a bachelor’s degree (relative to 50% of new car buyers; Figure 2).<sup>10</sup>

**Figure 2. Highest Level of Education Completed**



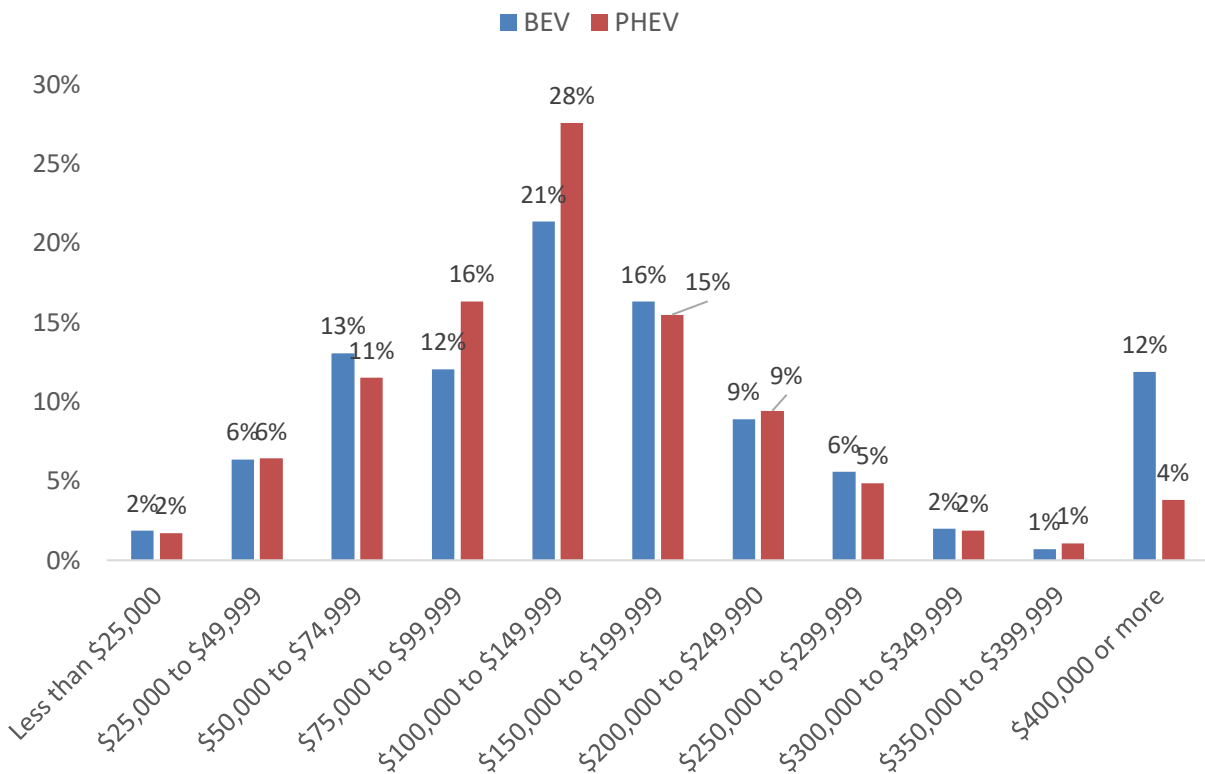
<sup>10</sup> Level of education was not significantly different between PHEV and BEV drivers.

Thirty-nine percent of program participants have an annual household income of \$150,000 or more compared to 23% of new car buyers. Figure 3 shows that there were also significant differences in income between PHEV and BEV drivers, with BEV drivers more likely to report annual household incomes of \$400,000 or more.

Sixty-four percent of rebate recipients are 50 years old or older, versus 42% of new car buyers overall. Figure 4 shows that there were also significant age differences between PHEV and BEV drivers, with BEV drivers younger than PHEV drivers.

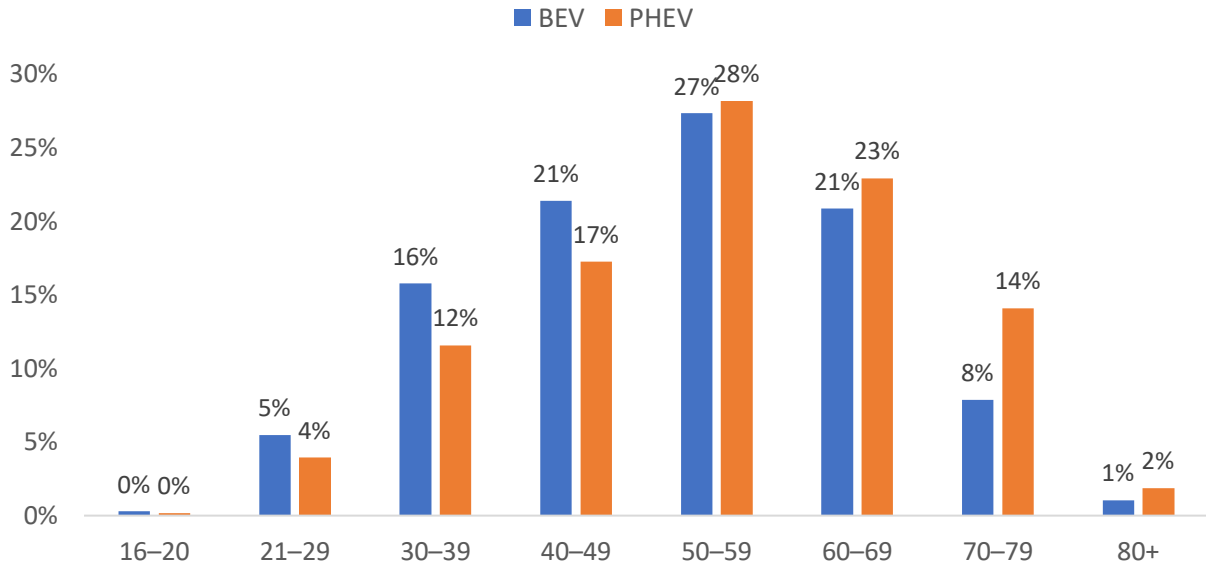
While new car buyers are evenly split between male and female (49% male), program participants were 72% male. Figure 5 shows that females make up a larger portion of PHEV drivers than BEV drivers (31% versus 25%, respectively).

**Figure 3. Annual Gross Household Income from All Sources**



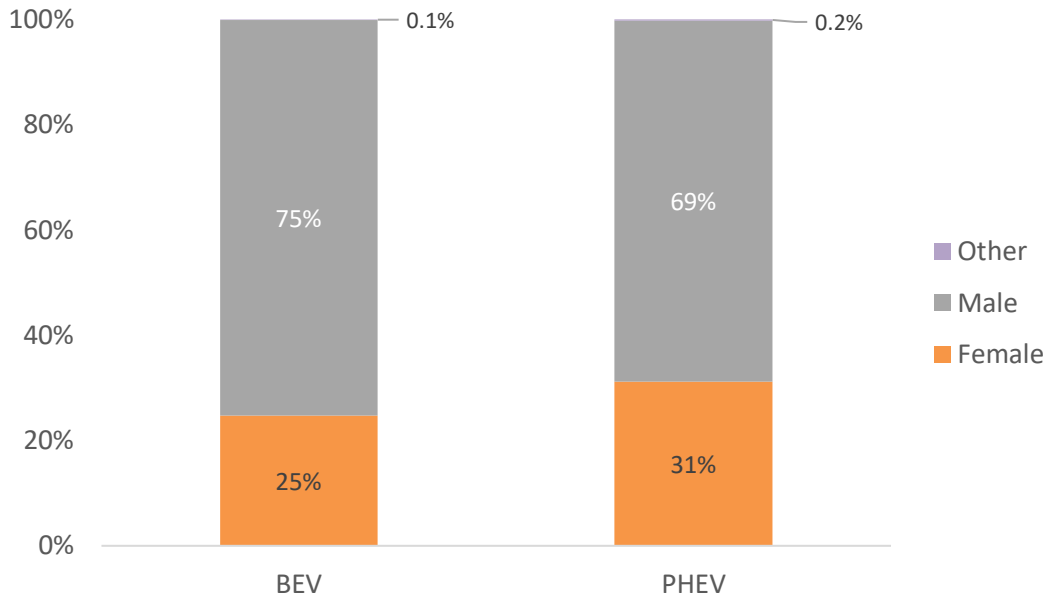
Weighted n = 1348, statistically significant difference in BEV and PHEV in income, (p=0.000)

**Figure 4. Age**



Weighted n = 1598, statistically significant difference between BEV and PHEV respondents in income, (p=0.007)

**Figure 5. Gender**

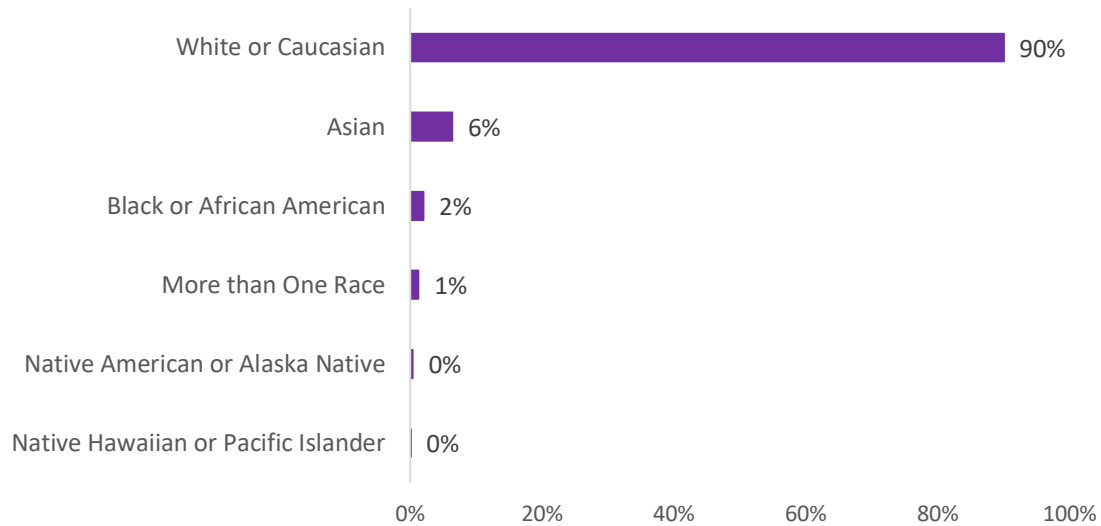


Weighted n = 1586, statistically significant difference between BEV and PHEV respondents in gender (p=0.010)



**Figure 6. “How do you prefer to describe your racial/ethnic identity?”**

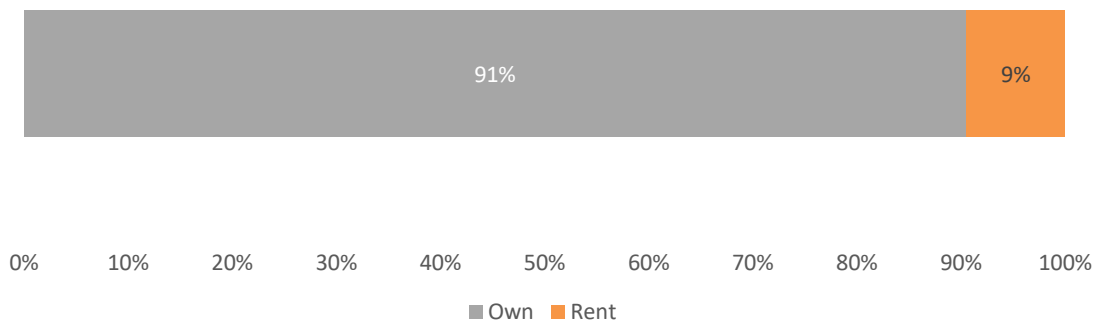
Respondents can select all that apply for this question. Response options were: “Black or African American,” “East Asian,” “Latino/a or Hispanic,” “Middle Eastern,” “Native American or Alaska Native,” “Native Hawaiian or Pacific Islander,” “South Asian,” “White or Caucasian,” “Other,” and “Prefer not to answer.”



Weighted n = 1551

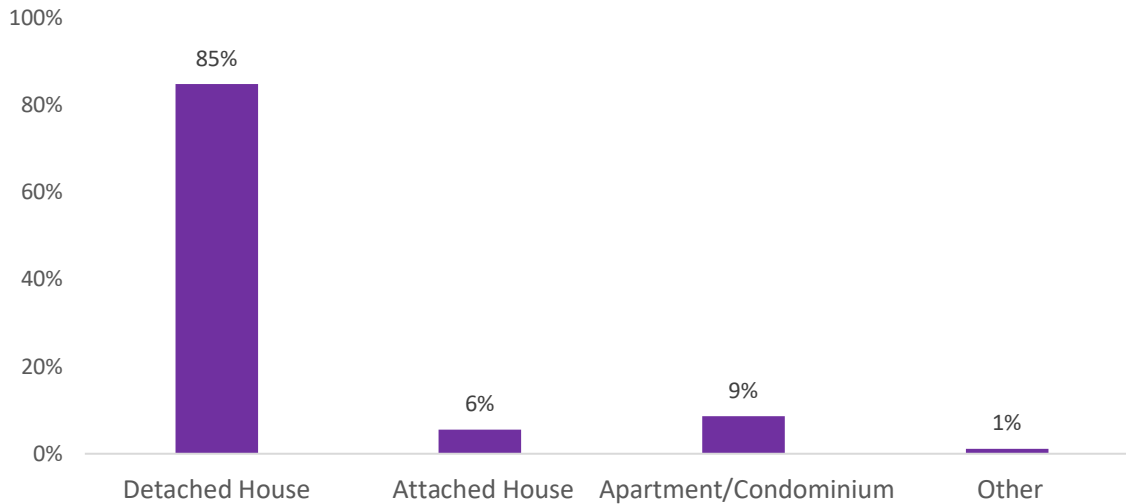
Figure 6 shows that program participants are more likely to identify as white or Caucasian than new car buyers overall (90% versus 74%). It is important to note that respondents who selected “Middle Eastern” are grouped with respondents who selected “White or Caucasian,” while the NHTS survey (Table 3) did not include a Middle Eastern option. Four percent of respondents selected “Latino/a or Hispanic.”

**Figure 7. “Do you own or rent your residence?”**



Weighted n = 1579, no statistically significant difference between BEV and PHEV drivers

**Figure 8. “What type of residence do you live in?”**

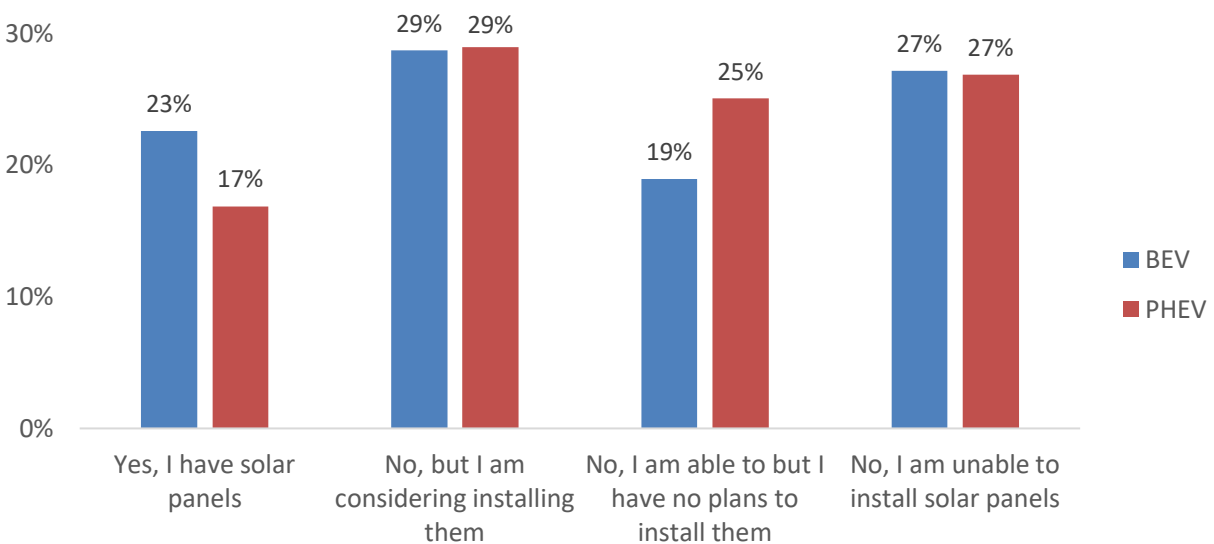


Weighted n = 1606, no statistically significant difference between BEV and PHEV respondents; adds to 101% due to rounding

Figure 7 shows that respondents are more likely to be homeowners than the average new car buyer (91% versus 73%, respectively). Figure 8 shows that most (85%) respondents live in detached houses.

Overall, 20% of respondents own solar panels (Figure 9), with BEV drivers more likely than PHEV drivers to have solar panels installed at their residence (23% versus 17%, respectively).

**Figure 9. “Do you have solar electric panels at your residence?”**

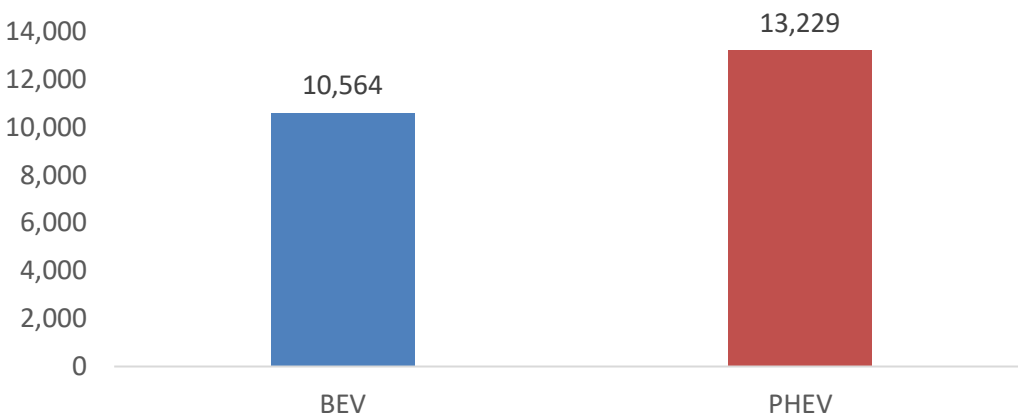


Weighted n = 1632, statistically significant difference between BEV and PHEV respondents (p=0.020)

### 1.3.4 Electric Car Driving

Respondents were asked how many miles they drive their electric car per day and the total miles driven so far. Total miles driven should approximate the respondent's annual mileage, since they've owned the car for about one year. The average respondent drove 38 miles per day; this did not differ substantively by technology type. Despite the similarity in daily driving distance across technology types, the annual mileage was significantly larger for PHEV than for BEV respondents, as shown in Figure 10.

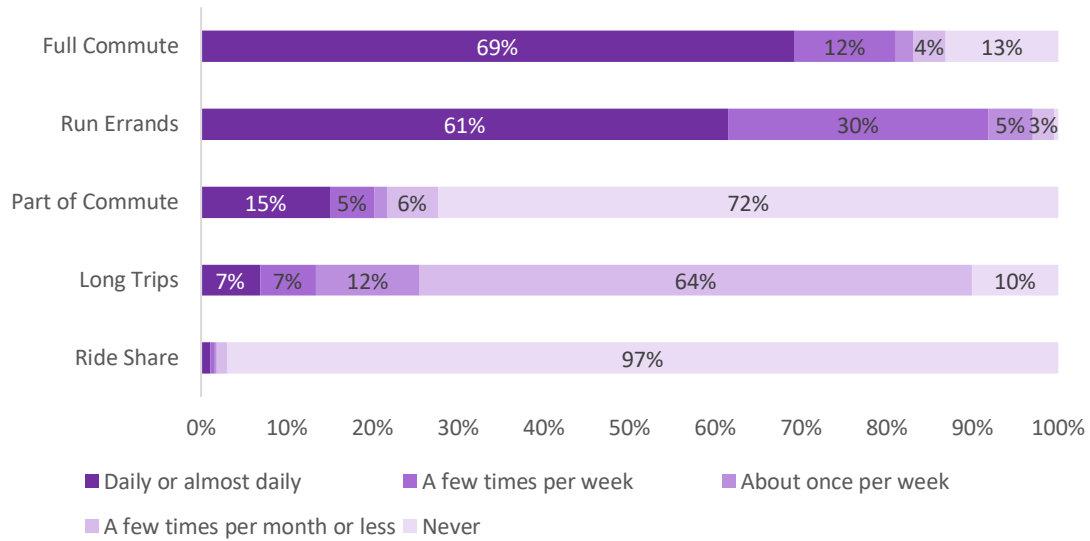
**Figure 10. "How many total miles have you driven your electric car so far?"**



Weighted n = 1516, statistically significant difference between BEV and PHEV respondents (p=0.000)

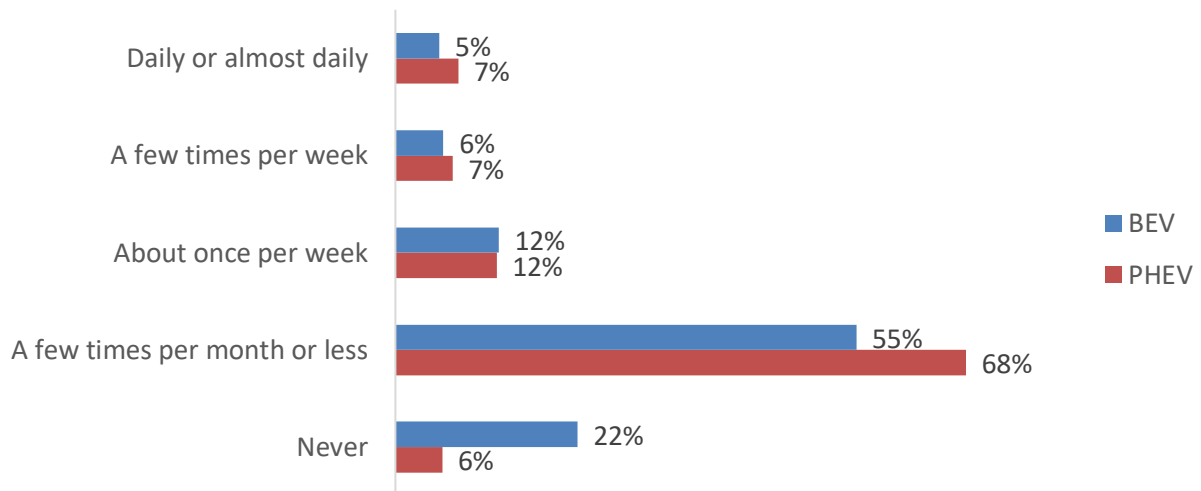
Respondents were asked how often they use their electric car for a variety of tasks (Figure 11). Most respondents reported using their car at least a few times a week for their commute (81%) and to run errands (91%). Very few respondents (3%) have ever used their electric car for ride sharing (e.g., Uber/Lyft). The only task that exhibited statistically significant differences between BEV and PHEV respondents was taking long trips (defined as >50 miles from home). Figure 12 shows that BEV respondents were more likely than PHEV respondents to report never using their electric car for long trips (22% versus 6%).

**Figure 11. Frequency of Electric Car Use for Various Tasks**



Weighted n = 1623

**Figure 12. Frequency of Long Trips (>50 miles from home) by Vehicle Type**

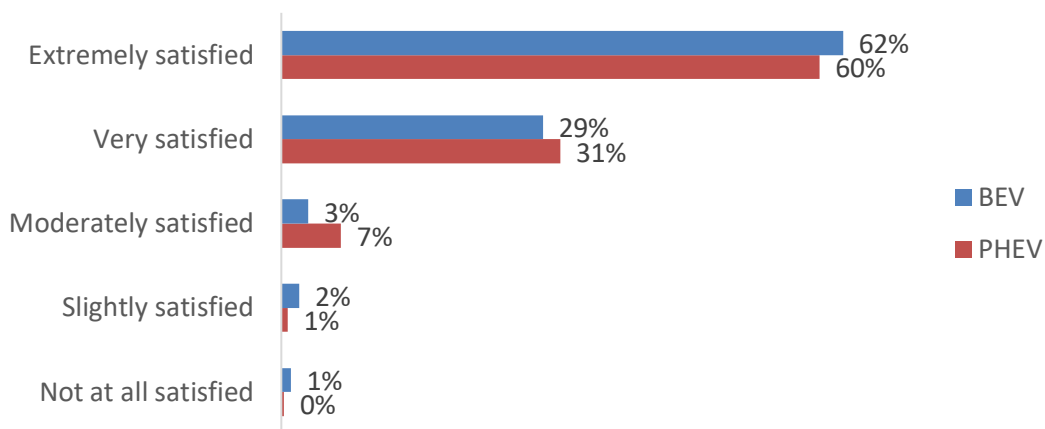


Weighted n = 1609, statistically significant difference between BEV and PHEV respondents (p=0.000)

### 1.3.5 Participant Satisfaction

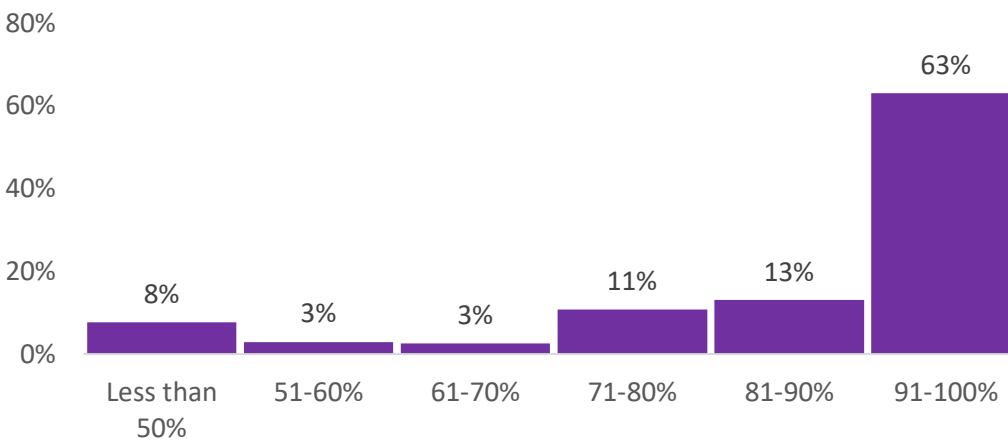
Respondents were asked how satisfied they were with the experience of owning an electric car. Overall, 90% of respondents rated their satisfaction as “Very satisfied” or “Extremely satisfied” (Figure 13). Only half of one percent of respondents described themselves as “Not at all satisfied.” In write-in responses, half of this group mentioned a lack of charging stations. Respondents were also asked how likely they were to purchase an electric car again. Figure 14 shows that almost two-thirds (63%) assigned a probability of 90% or greater for a repeat electric car purchase.

**Figure 13. Participant Satisfaction**



Weighted n = 1623, statistically significant difference between BEV and PHEV respondents ( $p = 0.005$ )

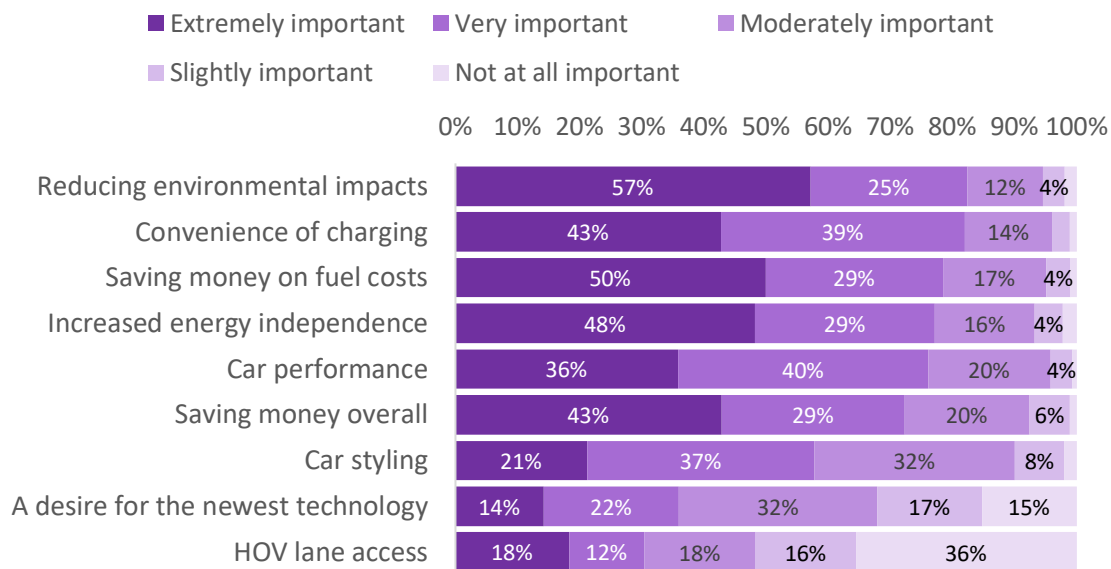
**Figure 14. “How likely are you to purchase/lease another electric car in the future?”**



Weighted n = 1607

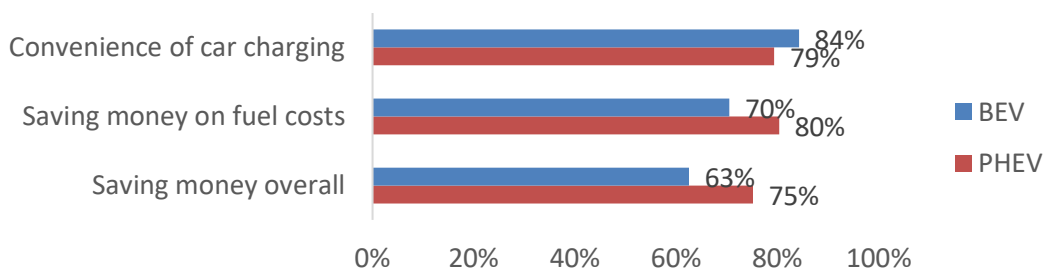
Respondents were asked to rate importance of various aspects of owning an electric car, from “Not at all important” to “Extremely important” (Figure 15). Across all respondents, the most important factors were “reducing environmental impacts,” “convenience of charging,” and “saving money on fuel costs.” Figure 16 shows the difference in priorities by technology type, where statistically significant differences exist. BEV drivers were more likely to rate “convenience of charging” as very or extremely important, while PHEV drivers were more likely to cite “saving money on fuel costs” or “saving money overall” as very or extremely important.

**Figure 15. Importance of Aspects of Electric Car Ownership (ordered by sum of extremely and very important)**



Weighted n = 1635, no statistically significant difference between BEV and PHEV drivers

**Figure 16. Aspects of Electric Car Ownership by Technology Type (percent responding “very” or “extremely important”)**

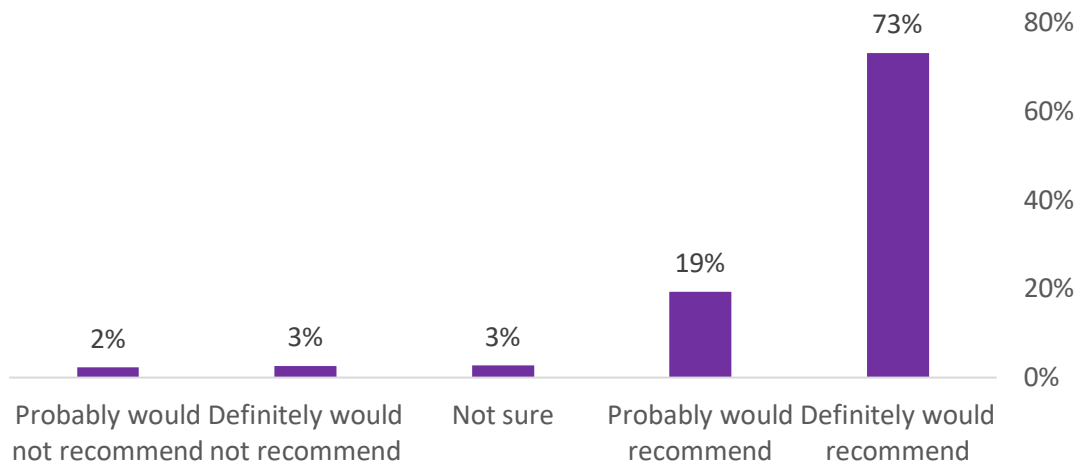


Weighted n = 1631, statistically significant difference between BEV and PHEV respondents for convenience of charging (p=0.000), saving money on fuel cost (p=0.000), and saving money overall (p=0.000)

### 1.3.6 Program Performance

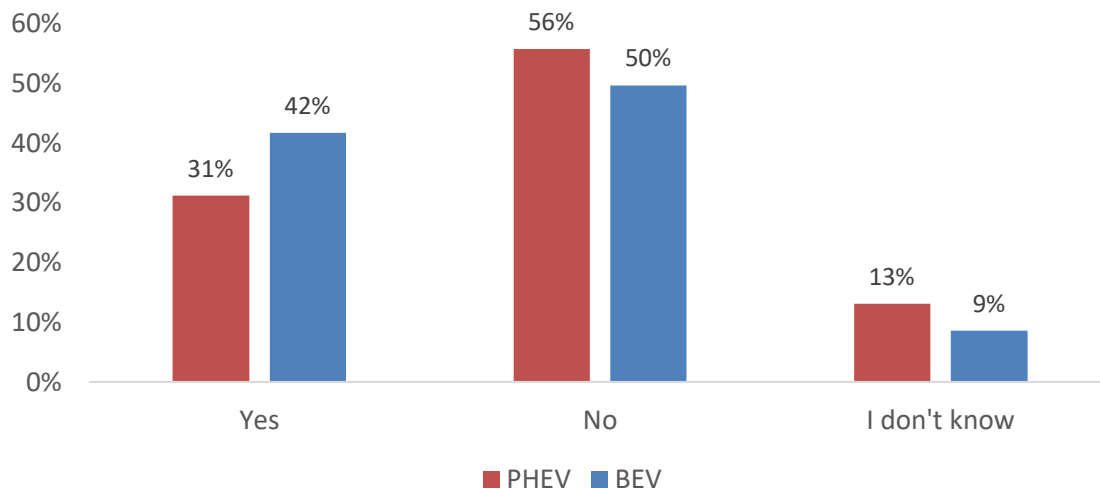
Survey respondents were very likely to be electric car promoters with 92% reporting that they would “probably” (19%) or “definitely” (73%) recommend electric car ownership to others (Figure 17). Approximately one-third of respondents (34%) have had at least one family member or friend purchase an electric car since their own acquisition of an electric car. BEV respondents are more likely than PHEV respondents to report that a friend or family member has purchased an electric car (Figure 18).

**Figure 17. Respondents Who Would Recommend Electric Car Ownership to Others**



Weighted n = 1617, no statistically significant difference between BEV and PHEV respondents

**Figure 18. Respondents Whose Friends or Family Purchased/Leased an Electric Car since the Purchase of Their Electric Car**

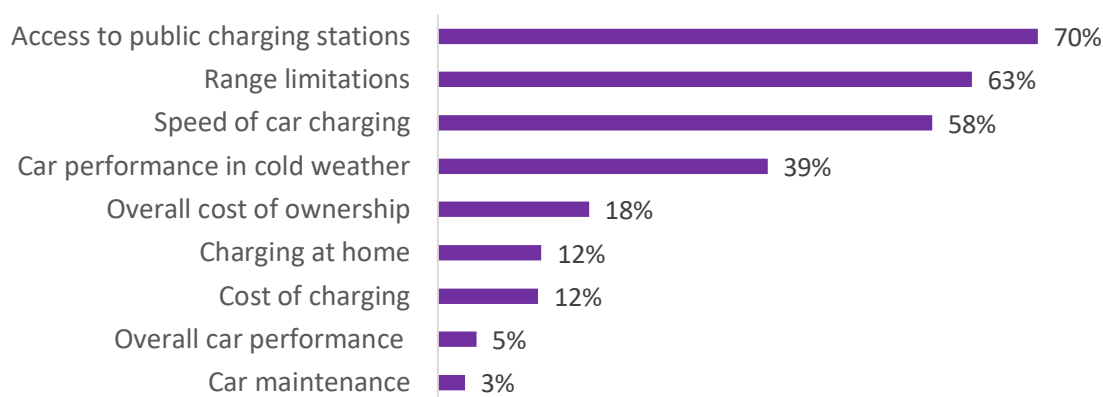


Weighted n = 1631, statistically significant difference between BEV and PHEV respondents (p=0.039)

### 1.3.7 Participant Concerns

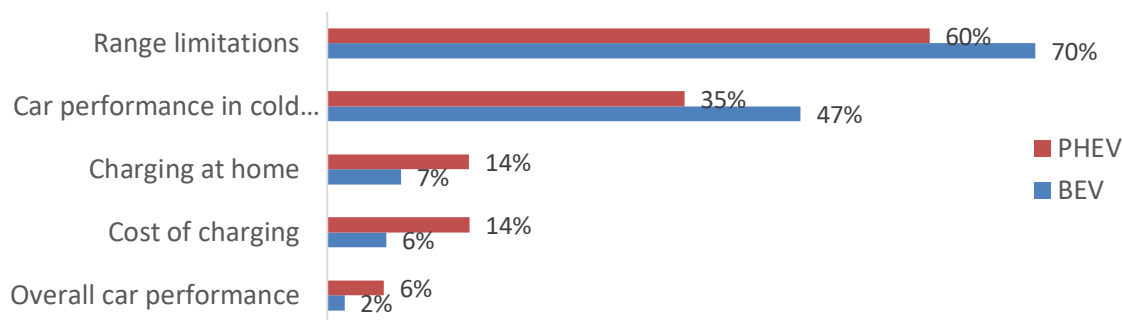
To understand the program participants’ concerns and challenges, respondents were asked to rank “the three greatest challenges to owning an electric car in New York” from a list of possible options. The challenges most frequently selected by participants (regardless of their rank as 1st, 2nd, or 3rd) were “access to public charging stations,” “range limitations,” and “speed of car charging” (Figure 19). Figure 20 shows the concerns that differed significantly by technology type. Unsurprisingly, range limitations and performance in cold weather were much greater challenges for BEV respondents than for PHEV respondents. Figure 21 includes only the top-ranked challenges, which differed by technology type, depicting car performance in cold weather and range limitations as bigger concerns for BEV respondents, and the cost of charging as a bigger concern for PHEV respondents.

**Figure 19. Greatest Challenges of Owning an Electric Car in New York, Regardless of Ranking**



Weighted n = 1589, no statistically significant difference between BEV and PHEV respondents

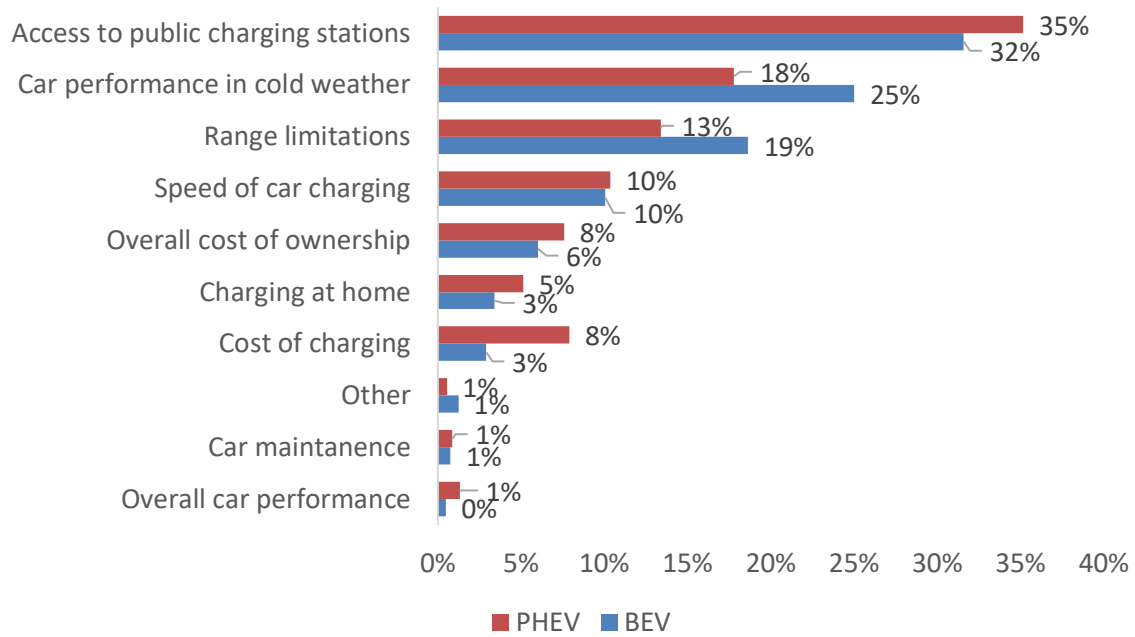
**Figure 20. Concerns by Technology Type, Regardless of Ranking**



Weighted n = 1589, statistically significant difference between BEV and PHEV for range limitations (p=0.001), cold weather performance (p=0.000), charging at home (p=0.001), charging cost (p=0.000), and car performance (p=0.001).



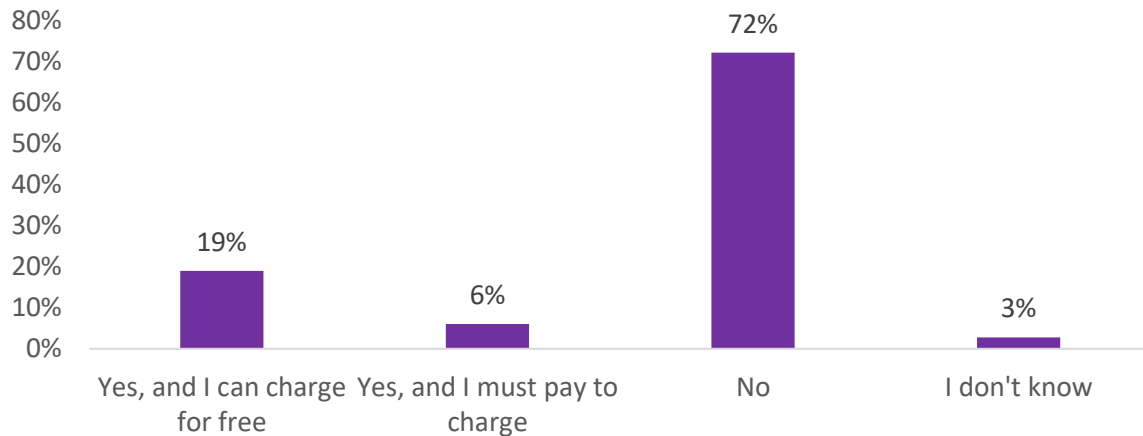
**Figure 21. Top Ranked Concern**



Weighted n = 1589, statistically significant difference between BEV and PHEV respondents (p=0.000)

### 1.3.8 Charging

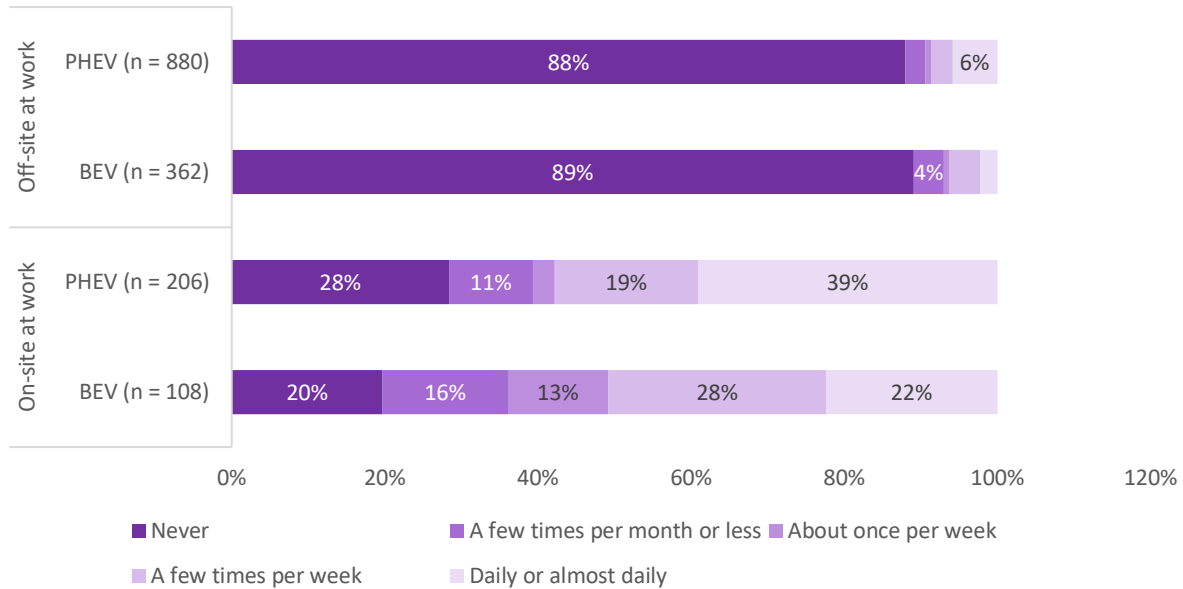
**Figure 22. “Do you have access to charging at your place of work?”**



Weighted n = 1266, no statistically significant difference between BEV and PHEV respondents

Figure 22 shows that only 25% of respondents have access to charging at their workplace. Figure 23 shows that of the respondents who do have access to workplace charging, 80% of BEV drivers and 72% of PHEV drivers charge at work at least occasionally.

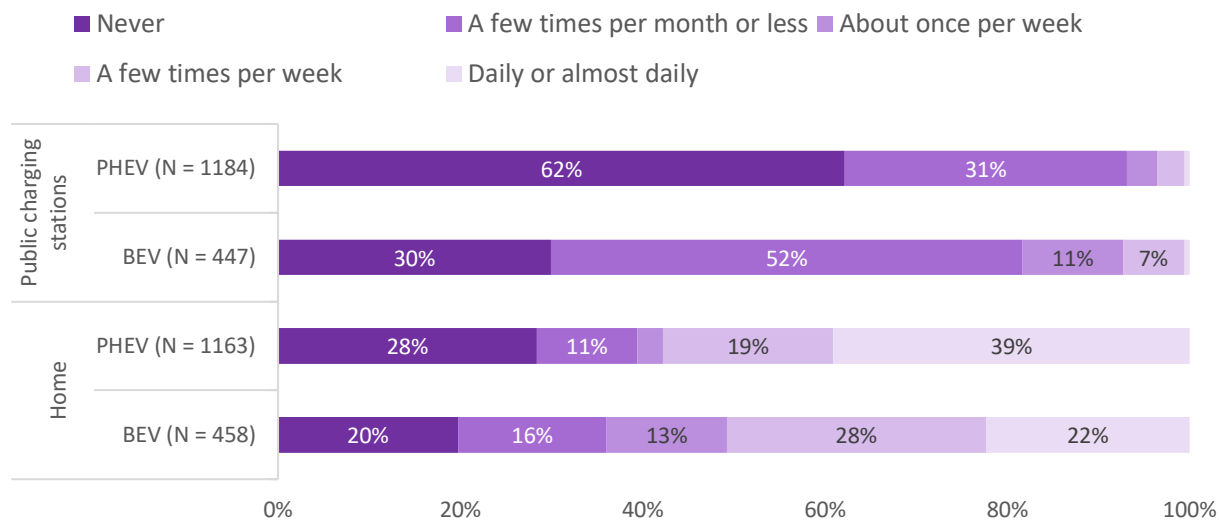
**Figure 23. Frequency of Workplace Charging**



Statistically significant difference between BEV and PHEV in use of on-site workplace charging (p=0.000)

Figure 24 shows that almost all respondents charge their vehicles at home, with only 7% saying they never charge at home. PHEV drivers were much more likely than BEV drivers to charge their vehicles “daily or almost daily” (70% versus 49%, respectively), while BEV drivers were more likely to charge their vehicles a “few times per week” (24% versus 12%, respectively).

**Figure 24. Frequency of Charging at Given Locations**



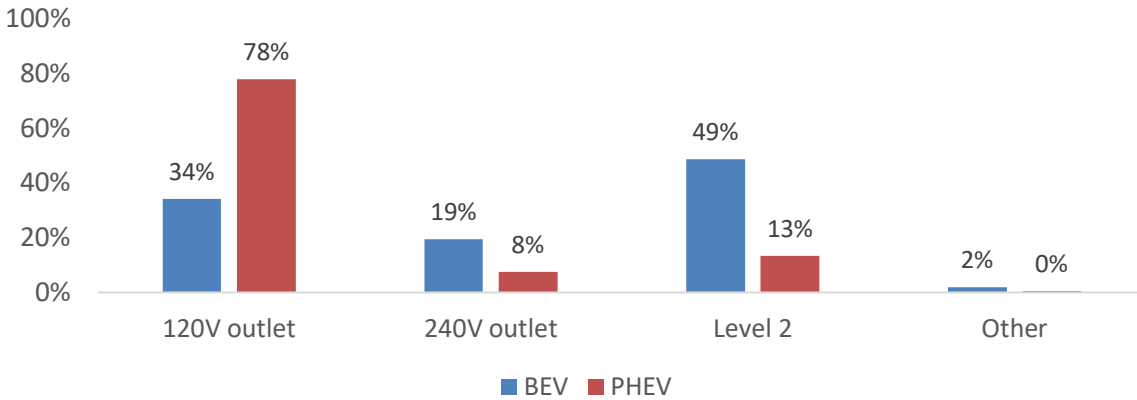
Statistically significant difference between BEV and PHEV in use of at home charging, and public charging (p=0.000). “Other” responses not shown.

Participants’ homes and workplaces are the most frequently used locations for charging their vehicles. BEV drivers were more likely than PHEV drivers to charge at public charging stations (7% versus 4%, respectively); however, many of the write-in responses for “Other” (N = 114) included local stores and Tesla supercharging stations, so the number of respondents who selected public charging may be an underestimate of the number who use them.

Figure 25 shows that PHEV respondents who charge at home were much more likely than BEV respondents to report using a standard 120V outlet (76% versus 34%), while BEV respondents were more likely to use a Level 2 charger (48% versus 13%).<sup>11</sup> Sixty-seven percent of BEV drivers use either a 240V outlet (typical clothes dryer outlet) or a Level 2 charging station. The higher prevalence of Level 2 charging among BEV respondents is unsurprising given the larger battery size of these cars and the inability to fall back on gasoline if a battery is not adequately charged.

<sup>11</sup> Note that multiple options could be selected, so percentages do not add to 100%.

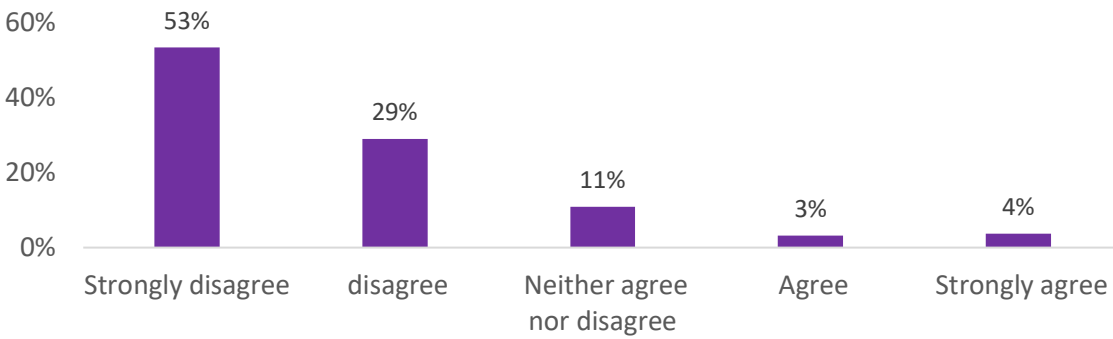
**Figure 25. How Respondents Charge at Home**



Weighted n = 1560, statistically significant difference between BEV and PHEV for use of 120 V outlet, 240V outlet, and Level 2 charger (p=0.000).

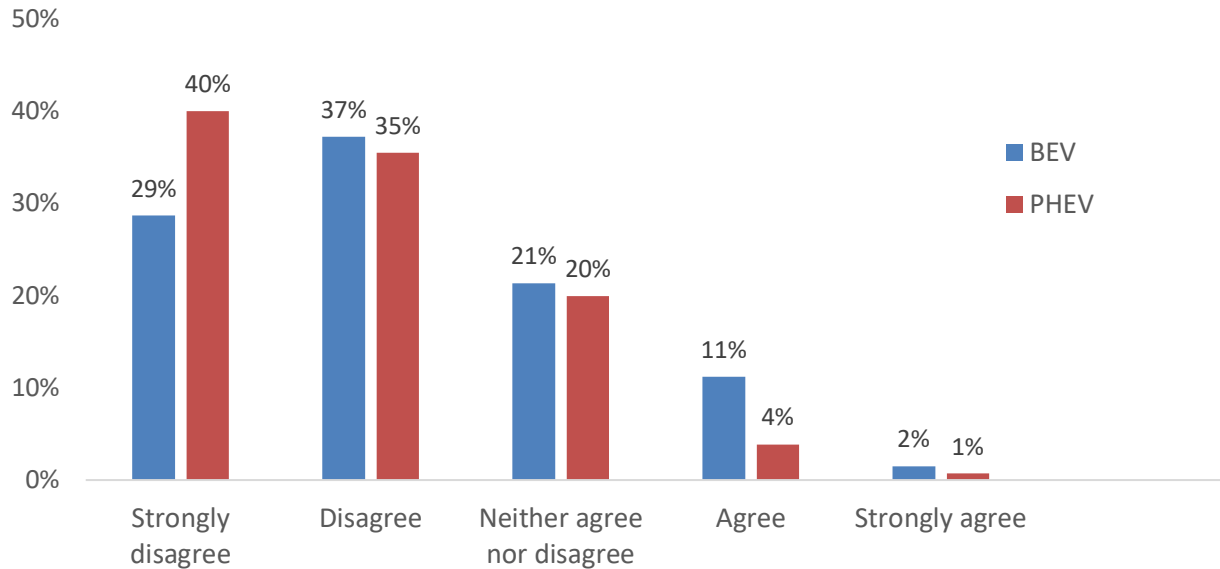
The survey results indicate that many respondents have concerns about the availability of public charging stations. Figure 26 shows that a large majority of respondents (82%) disagreed with the statement “There are enough public chargers.”

**Figure 26. Agreement/Disagreement with the Statement “There are enough public chargers”**



**n = 1608, no statistically significant difference between BEV and PHEV respondents**

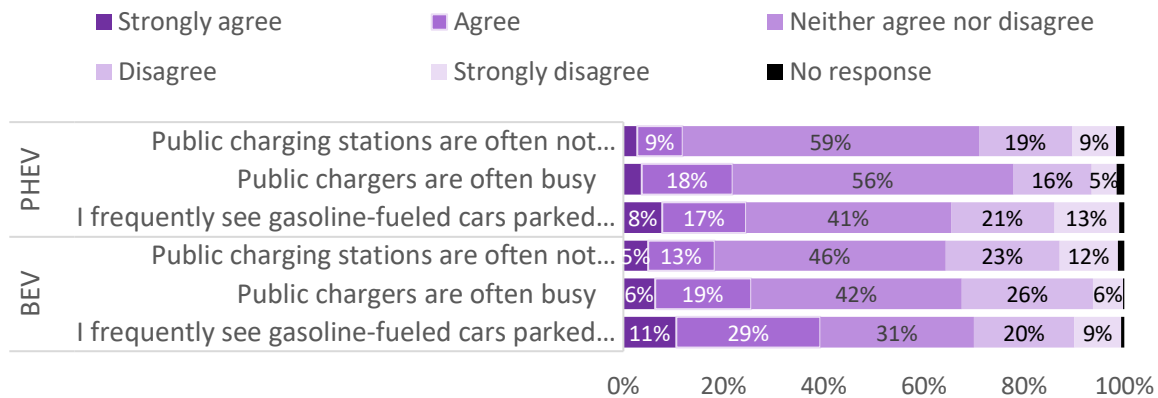
**Figure 27. Agreement/Disagreement with the Statement “There are public chargers where I need them”**



Weighted n = 1612, statistically significant difference between BEV and PHEV drivers (p=0.000)

Echoing the top concerns reported by respondents, only 7% of respondents agreed with the statement “There are public charging stations in the places where I need them” (Figure 27). As shown in Figure 28, approximately 29% of respondents agreed or strongly agreed with the statement “I frequently see gasoline-fueled cars parked in spaces with public electric chargers”; this concern was more common for BEV respondents. BEV respondents are also more likely to report that public charging stations are not working when they want to use them.

**Figure 28. Problems with Charging Availability**



Weighted n = 1612, statistically significant difference between BEV and PHEV for all statements (p=0.000)

## 2 Discussion

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The Ownership Survey results provide multiple indications that participants are satisfied with their electric cars. Almost all respondents (90%) said they were very or extremely satisfied and 92% said they would recommend EV ownership to others. Most respondents reported a high likelihood of purchasing an electric car again, with 76% of participants assigning a probability of 80% or higher to a repeat purchase.

While the overall satisfaction with electric car ownership was high, the survey did highlight some challenges faced by electric car drivers. Issues related to charging infrastructure were frequently experienced by participants: 70% reported that access to public charging stations was one of the top challenges they've faced, and only 7% thought there were enough public chargers. Similarly, only 9% of respondents agreed that there are public charging stations where they need them. Respondents' top two overall concerns were access to public charging stations and vehicle range limitations.

In addition to a perceived lack of charging infrastructure, another concern was how electric cars perform in cold weather. This issue was selected as a challenge by almost 40% of respondents—and 47% of BEV respondents.

The survey provided insight into the driving habits of respondents and showed some key differences between PHEV and BEV drivers. Both PHEV and BEV respondents were very likely to use their car at least a few times a week to commute (81%) and to run errands (91%) and the reported daily mileage was the same for both groups (38 miles per day). However, PHEV respondents were much more likely than BEV respondents to have ever used their electric car for a long trip (94% versus 78%). Finally, the approximate annual mileage was significantly higher (~25%) for PHEV respondents than for BEV respondents.

# Appendix: Ownership Survey Questionnaire

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## Introduction

### Welcome to NYSERDA's Drive Clean Rebate "Electric Car Ownership Survey."

Your participation in this survey is voluntary. However, your input is valuable for enhancing the electric car experience for all New Yorkers, and it is important that you try to answer all of the questions. The information you provide will be **kept private** to the extent permitted by law. The analysis will only use summary level data; no individual respondents will be identified.

The survey should be completed by the primary driver of the car. If you aren't the primary driver, we encourage you to have them complete the survey.

If you have any questions about this research project or if you experience any technical difficulties, you may contact the Center for Sustainable Energy (CSE), the Drive Clean Rebate Program Administrator for NYSERDA, at:

Phone: (866) 595-7917

Email: [NYDriveClean@energycenter.org](mailto:NYDriveClean@energycenter.org)

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## Car Status

**Page exit logic:** Skip / Disqualify LogicIF: #1 Question "According to our records, you received a rebate for a [question('value'), id='17'] [question('value'), id='18']. Does your household still have this electric car?" is one of the following answers ("No, but my household has a different electric car", "No, my household no longer owns an electric car") **THEN:** Jump to page 11 - Disqualification - rebated car no longer in use

**Logic: Show/hide trigger exists.**

1) According to our records, you received a rebate for a [question('value'), id='17'] [question('value'), id='18']. Does your household still have this electric car?\*

Yes

No, but my household has a different electric car

No, my household no longer owns an electric car

**Logic: Hidden unless: #1 Question "According to our records, you received a rebate for a [question('value'), id='17'] [question('value'), id='18']. Does your household still have this electric car?" is one of the following answers ("Yes", "No, but my household has a different electric car")**

2) Are you the primary driver of your electric car?

Yes

No

**Logic: Hidden unless: #1 Question "According to our records, you received a rebate for a [question('value'), id='17'] [question('value'), id='18']. Does your household still have this electric car?" is one of the following answers ("No, but my household has a different electric car", "No, my household no longer owns an electric car")**

3) Please describe what happened to your rebated [question("value"), id="17"] [question("value"), id="18"].

I sold it or traded it in.

I donated it or gave it to someone else.

It was damaged or stolen.

Other, please specify: \_\_\_\_\_

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## Household Cars

4) Please tell us how many of each of the following cars your household currently owns (exclude motorcycles, RVs, and non-highway-capable cars)

	<b>0</b>	<b>1</b>	<b>2</b>	<b>3 or more</b>
Gasoline car:	_____ _____	_____ _____	_____ _____	_____ _____



	_____	_____	_____	_____
Conventional hybrid car (fueled with gasoline only):	_____	_____	_____	_____
Plug-in hybrid electric car (recharged with electricity and/or fueled with gasoline):	_____	_____	_____	_____
All-battery electric car (recharged with electricity only):	_____	_____	_____	_____
Hydrogen fuel-cell electric car:	_____	_____	_____	_____
Diesel car:	_____	_____	_____	_____
Compressed natural gas car:	_____	_____	_____	_____
Flex-fuel (E85 ethanol) car:	_____	_____	_____	_____
Other alternatively fueled car:	_____	_____	_____	_____

	_____	_____	_____	_____
	_____	_____	_____	_____

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## Satisfaction with Electric Car Ownership

5) Overall, how satisfied are you with your experience owning an electric car?

- Not at all satisfied
- Slightly satisfied
- Moderately satisfied
- Very satisfied
- Extremely satisfied

6) On a scale of 1 to 5 (with 1 representing "Not at all important" and 5 representing "Extremely important"), please indicate how important the following aspects of electric car ownership are to you.

	<b>Not at all important (1)</b>	<b>Slightly important (2)</b>	<b>Moderately important (3)</b>	<b>Very important (4)</b>	<b>Extremely important (5)</b>
Saving money on fuel costs	( )	( )	( )	( )	( )
Saving money overall	( )	( )	( )	( )	( )
Reducing environmental impacts	( )	( )	( )	( )	( )
Carpool or High Occupancy	( )	( )	( )	( )	( )

Vehicle (HOV) lane access					
Increased energy independence	( )	( )	( )	( )	( )
Convenience of charging	( )	( )	( )	( )	( )
Speed of refueling	( )	( )	( )	( )	( )
Car performance	( )	( )	( )	( )	( )
Car styling, finish, and comfort	( )	( )	( )	( )	( )
Owning the newest technology	( )	( )	( )	( )	( )

**Logic: Hidden unless: (nyfueltype matches regex pattern "BEV" OR nyfueltype matches regex pattern "PHEV")**

7) What are the three greatest challenges to owning an electric car in New York?

**[SELECT ONLY UP TO THREE]**

- Cost of charging
- Cost of hydrogen fueling
- Overall cost of ownership
- Car performance in cold/inclement weather
- Car maintenance
- Overall car performance
- Charging at home
- Access to public charging stations

- \_\_\_\_\_ Speed of car charging
- \_\_\_\_\_ Access to fueling stations
- \_\_\_\_\_ Functionality of fueling stations
- \_\_\_\_\_ Range limitations
- \_\_\_\_\_ Other

**Logic: Hidden unless: nyfueltype matches regex pattern "FCEV"**

8) What are the three greatest challenges to owning an electric car in New York?

- \_\_\_\_\_ Cost of charging
- \_\_\_\_\_ Cost of hydrogen fueling
- \_\_\_\_\_ Overall cost of ownership
- \_\_\_\_\_ Car performance in cold/inclement weather
- \_\_\_\_\_ Car maintenance
- \_\_\_\_\_ Overall car performance
- \_\_\_\_\_ Charging at home
- \_\_\_\_\_ Access to public charging stations
- \_\_\_\_\_ Speed of car charging
- \_\_\_\_\_ Access to fueling stations
- \_\_\_\_\_ Functionality of fueling stations
- \_\_\_\_\_ Range limitations
- \_\_\_\_\_ Other

9) If you selected "Other" in the previous question, please describe what challenge you face as an electric car driver in New York.

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## Electric Car Driving

10) How often do you use your electric car to do the following?

	Never	A few times per month or less	About once per week	A few times per week	Daily or almost daily	Not applicable
Commute all the way to and from work	( )	( )	( )	( )	( )	( )
Commute partway to or from work (e.g., driving to a park-and-ride lot)	( )	( )	( )	( )	( )	( )
Run local errands (< 10 miles from home)	( )	( )	( )	( )	( )	( )
Take long trips (>50 miles from home)	( )	( )	( )	( )	( )	( )
As a car for ride sourcing services (e.g., Uber, Lyft)	( )	( )	( )	( )	( )	( )

11) About how many miles do you drive your electric car per day?

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12) How many total miles have you driven your electric car so far?

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**Logic: Hidden unless: nyfueltype matches regex pattern "PHEV"**

13) What percent of your total miles driven have been **electric** miles?

0 \_\_\_\_\_ [ ] \_\_\_\_\_ 100

14) Please list the 5-digit ZIP code of your place of employment, if applicable.

**Logic: Show/hide trigger exists.**

ZIP code:: \_\_\_\_\_

**Logic: Show/hide trigger exists. Hidden unless: Question "ZIP code:"**

**OR** select one of the following:

I don't work

I work at home

My work location varies

---

**Page entry logic:** This page will show when: (nyfueltype matches regex pattern "PHEV" OR nyfueltype matches regex pattern "BEV")

## Charging

**Logic: Show/hide trigger exists. Hidden unless: Question "OR select one of the following:" is not one of the following answers ("I don't work", "I work at home", "My work location varies")**

15) Do you have access to charging at your place of work?

Yes, and I can charge for free.

Yes, and I must pay to charge.

No

I don't know

16) How often do you charge at each of the following locations?

	Never	A few times a month or less	About once per week	A few times per week	Daily or almost daily
At my home:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Onsite at my workplace:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Where I park during work (I don't park onsite at work):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
At other public charging stations:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17) Which of the following do you use to charge your car at home? [select all that apply]

- 120V outlet (typical wall outlet)
- 240V outlet (e.g., clothes dryer outlet)
- Level 2 (240V) charging station
- Other
- None of the above

18) How much do you disagree or agree with the following statements?

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither agree nor disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
There are enough public chargers.	( )	( )	( )	( )	( )
Public charging stations are often in use by others when I want to charge.	( )	( )	( )	( )	( )
There are public charging stations in the places where I need them.	( )	( )	( )	( )	( )
Public charging stations are often not working when I want to use them.	( )	( )	( )	( )	( )
I frequently see gasoline-fueled cars parked in spaces with public electric car chargers.	( )	( )	( )	( )	( )



**Logic: Hidden unless: #15 Question "Do you have access to charging at your place of work?" is one of the following answers ("Yes, and I can charge for free.", "Yes, and I must pay to charge.")**

19) How much do you disagree or agree with the following statements?

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither agree nor disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
There are enough workplace chargers.	( )	( )	( )	( )	( )
Workplace charging stations are often in use by others when I want to charge.	( )	( )	( )	( )	( )
Workplace stations are often not working when I want to use them.	( )	( )	( )	( )	( )
I frequently see gasoline-fueled cars parked in spaces with workplace electric car chargers.	( )	( )	( )	( )	( )

## Fueling

20) How often do you refuel your fuel-cell electric car?

- Less than once per month
- About once per month
- A few times per month
- About once per week
- A few times per week
- Daily or almost daily

21) When you visit a fueling station, how often is it out of order?

- I have never encountered a station that was out of order
  - Rarely
  - Sometimes
  - Frequently
  - Almost always
-

## Program Performance/Efficacy

**Logic: Show/hide trigger exists.**

22) Would you recommend electric car ownership to other people?

- Definitely would not recommend
- Probably would not recommend
- Not sure
- Probably would recommend
- Definitely would recommend

23) Have any of your friends or family purchased/leased an electric car since you bought your electric car?

- Yes
- No
- I don't know

**Logic: Hidden unless: #22 Question "Would you recommend electric car ownership to other people?" is one of the following answers ("Definitely would not recommend", "Probably would not recommend")**

24) Please share the main reason(s) why you wouldn't recommend an electric car.

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25) How likely are you to purchase/lease another electric car in the future?

0 \_\_\_\_\_ [ ] \_\_\_\_\_ 100

26) Would you purchase or lease another electric car if the New York State electric car rebate (Drive Clean Rebate) were not available?

Yes

No

---

## Household and Demographic Characteristics

27) Do you own or rent your residence?\*

Own

Rent

Prefer not to answer

28) What type of residence do you live in?\*

Detached house (single family home)

Attached house (e.g., townhome, duplex, triplex)

Apartment/condominium

Other, please specify: \_\_\_\_\_ \*

Prefer not to answer

29) Do you have solar electric panels at your residence?

Yes, I have solar electric panels installed.

No, but I am considering installing them.

No, I am able to but I have no plans to install them.

No, I am unable to install solar panels.

Other, please specify: \_\_\_\_\_

30) How many people live in your household, including yourself?\*

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9 or more
- Prefer not to answer

31) What is your age?\*

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

32) How do you prefer to describe your gender?\*

- Female
- Male
- Not listed:: \_\_\_\_\_
- Prefer not to answer

33) What is the highest level of education you have completed?\*

- High school graduate or less
- Some college, no degree
- Associate degree
- Bachelor's degree
- Graduate degree
- Prefer not to answer

34) 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 \$149,999
- \$150,000 to \$199,999
- \$200,000 to \$249,999
- \$250,000 to \$299,999
- \$300,000 to \$349,999
- \$350,000 to \$399,999
- \$400,000 or more
- Prefer not to answer

35) How do you prefer to describe your racial/ethnic identity? [select all that apply]\*

Black or African American

East Asian

Latino/a or Hispanic

Middle Eastern

Native American or Alaska Native

Native Hawaiian or Pacific Islander

South Asian

White or Caucasian

Other (please specify):

\*

Prefer not to answer

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Other comments

**Page exit logic:** Skip / Disqualify LogicIF: #1 Question "According to our records, you received a rebate for a [question('value'), id='17'] [question('value'), id='18']. Does your household still have this electric car?" is one of the following answers ("Yes")  
**THEN:** Jump to [page 12 - Thank You!](#) Flag response as complete

36) Please share any additional comments about your electric car ownership experience or this survey in the box below.

Please be sure to click "Next" at the bottom of the page to complete the survey.

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Disqualification - rebated car no longer in use

37) Please share any comments in the box below.

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Thank You!



NYSERDA, a public benefit corporation, offers objective information and analysis, innovative programs, technical expertise, and support to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce reliance on fossil fuels. NYSERDA professionals work to protect the environment and create clean-energy jobs. NYSERDA has been developing partnerships to advance innovative energy solutions in New York State since 1975.

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**New York State  
Energy Research and  
Development Authority**

17 Columbia Circle  
Albany, NY 12203-6399

**toll free:** 866-NYSERDA  
**local:** 518-862-1090  
**fax:** 518-862-1091

[info@nyserdera.ny.gov](mailto:info@nyserdera.ny.gov)  
[nyserdera.ny.gov](http://nyserdera.ny.gov)



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