

**VERMONT STATE AND DISTRIBUTION UTILITY ELECTRIC VEHICLE  
PROGRAMS EVALUATION  
PHASE II REPORT**

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## Executive Summary

The State of Vermont continues to work to reduce greenhouse gas (GHG) emissions by promoting electrification of its transportation sector. Tier III of the Vermont Renewable Energy Standard (RES), enacted in 2016, mandates that the state's electricity distribution utilities (DUs) implement projects to expedite the shift from fossil fuels to clean energy sources, including offering incentives to utility customers to encourage the purchase of electric vehicles (EVs). In 2020, the Vermont Legislature sought to further accelerate EV adoption when it passed the Energy Efficiency Modernization Act of 2020 (Act 151), authorizing the state's energy efficiency utilities (EEUs) to spend funds from the Energy Efficiency Charge to help customers reduce fossil fuel use through thermal energy and transportation projects. EEUs are also using this funding to undertake public education campaigns to educate prospective buyers about the benefits of EVs and to reach out to auto dealers to better prepare them to sell EVs. The Legislature also authorized funding for EV purchase incentives of \$950,000 in FY2020 (Act 154), \$2.7 million in FY2022 (Act 55), and \$12 million in FY2023 (Act 184).

This report is Phase II of the evaluation of Vermont's DU and EEU EV incentive programs, which include both the Tier III incentives and the Act 151 education and EV incentive. Phase I, the Interim Report, was authored by Cadmus and was published on July 28, 2023.<sup>1</sup>

## Evaluation Objectives

The Vermont Department of Public Service (PSD) retained Cadmus to evaluate the impacts of the DU and State Agency of Transportation (AOT) incentive programs on residential purchases of EVs, the consumer experience with Vermont's EV incentive and education programs, and the impacts of EV outreach and education programs on the readiness of car dealerships to sell EVs. Phase I of the evaluation focused on the impacts of DU (Tier III) programs and State AOT incentives. This evaluation, Phase II, is focused on the Act 151 programs and the effect of the programs on low-income Vermonters.

More specifically, this evaluation (Phase II) has the following research objectives:

- Assess the effect of Act 151 on EV adoption.
- Assess the effect of the programs on low-income households' participation.
- Assess barriers to participation for low-income households.
- Estimate the impacts of Act 151 incentives on the purchases of all-electric vehicles (AEVs) and plug-in hybrid electric vehicles (PHEVs) by Vermont residents.

For this Phase II research, Cadmus undertook the following activities:

- Reviewed EV incentive, education, and outreach program materials.
- Interviewed administrators of State AOT, DU, and EEU EV programs.

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<sup>1</sup> Vermont State and Distribution Utility Electric Vehicle Programs Evaluation: Interim Report. July 28, 2023. [https://publicservice.vermont.gov/sites/dps/files/documents/Vermont%20Electric%20Vehicle%20Programs%20Evaluation%20Report%20-CLEAN%20-%20Incorporated%2002JUN2023\\_PSD\\_Comments.pdf](https://publicservice.vermont.gov/sites/dps/files/documents/Vermont%20Electric%20Vehicle%20Programs%20Evaluation%20Report%20-CLEAN%20-%20Incorporated%2002JUN2023_PSD_Comments.pdf)

- Conducted surveys with more than 1,000 EV buyers who received purchase incentives from the State AOT or a DU.
- Interviewed representatives from six car dealerships that sell EVs to Vermont residents.

## Conclusions

Cadmus reached the following conclusions about the administration of Vermont's EV programs, consumers' experience with these programs, and the impacts of the programs on EV purchases.

### CONCLUSION 1: Incentives are crucial for EV adoption among lower-income Households.

The survey attribution analysis showed that the incentives played a crucial role in EV purchase decisions across all income levels, but the data suggests that these incentives were significantly more impactful for low-income households compared to middle- and high-income households. Nearly 100% of low-income respondents reported that Tier III, Act 151, or a combination of these incentives influenced their decision. In contrast, 52% of middle-income households and 60% of high-income households were affected by the Act 151 or Tier III incentives.

### CONCLUSION 2: Dealers are satisfied with the program but would like to see faster incentive delivery.

The interviewed dealers demonstrated high satisfaction with the incentives, highlighting that the incentives contributed to the increase in EV sales (4 of 6). However, half of the interviewed dealers (3 of 6) cited the time it took to receive the rebate as the main improvement suggestion. Dealers highlighted significant delays and complicated procedures, with one dealer noting that the process is "not fast enough," leading to extended wait times for substantial payments. Furthermore, communication between Efficiency Vermont and EV dealers emerged as an area needing improvement, with two out of five dealers suggesting more accessible and frequent communication.

## RECOMMENDATIONS

To improve dealer satisfaction and streamline the incentive process, reduce rebate processing times and enhance communication with more accessible and frequent updates.

### CONCLUSION 3: The barrier to adoption caused by the lack of inventory of EV models popular with or appealing to Vermont residents has decreased since Phase I.

In Phase I of this evaluation the Cadmus team found that lack of the inventory of EV models popular with or appealing to Vermont residents had hindered EV adoption. All program administrators interviewed agreed that the lack of inventory and the price increases caused by supply chain issues had constrained EV adoption in Vermont. Conversely, few respondents mentioned lack of availability of certain models during Phase II research. Additionally, in Phase I, respondents to the customer survey who reported difficulty with the availability of EVs as a barrier to choosing an EV ranged from 17% to 31% across the various respondent groups, compared to only 12% in Phase II.

**CONCLUSION 4:** For incentive recipients the main source of information has shifted from manufacturers to the DU's and Drive Electric Vermont.

The survey results indicate a notable shift in the main sources of information influencing EV purchase decisions between Phase I and Phase II. The importance of electric utilities as a source of information increased by 4%, solidifying its position as the primary source at 54%. This trend was particularly pronounced among lower-income respondents, who found their electric utilities to be the most critical source of information. Additionally, the Drive Electric Vermont website saw a significant 9% increase in importance, while friends or family members who drive EVs also became more influential, with a 4% rise. These findings underscore the growing role of electric utilities and the Drive Electric Vermont website in informing potential EV buyers, especially those from lower-income households.

**CONCLUSION 5:** As In Phase I, environmental concerns remain the main motivation to purchase an EV, however the availability of incentives moved from the last motivator to the second highest motivator.

As in Phase I, environmental concerns remain the primary motivation for purchasing an EV, though slightly less pronounced (48% in Phase II compared to 54% in Phase I). However, the availability of incentives has surged from being the least cited reason to the second most important motivation, increasing from 6% in Phase I to 17% in Phase II. This shift may be attributed to the enhanced prominence of electric utilities and the Drive Electric Vermont website as information sources, which have likely increased awareness and understanding of available incentives. Respondents with annual household incomes below \$75,000 were particularly influenced by incentive availability, while those with higher incomes were more motivated by environmental impact, supporting EV technology growth, and increasing energy independence.

**CONCLUSION 6:** While range anxiety remains a barrier to purchasing an EV, concerns about public charging availability have increased.

The survey results indicate that the most commonly reported barriers to purchasing an EV were limited driving range (43%), limited public charging stations (42%), and high purchase/lease price (30%). These concerns, particularly range anxiety, remain significant among potential EV buyers. Comparing Phase I to Phase II, the percentage of respondents citing limited driving range decreased slightly from 47% to 43%, while concerns about public charging increased from 39% to 42%. Additionally, the percentage of respondents reporting no concerns decreased from 24% in Phase I to 18% in Phase II, underscoring the constantly evolving challenges related to EV adoption. Notably, respondents with annual household incomes of less than \$50,000 reported relatively lower concerns about limited driving range and charging availability compared to the total survey population.

## RECOMMENDATIONS

To address barriers to EV adoption, include information about current public chargers and ongoing investments in public charging infrastructure in the program communication strategy.



## CONCLUSION 7: Most participants reported participation in the program was very easy or somewhat easy.

Half of the respondents in the Anonymous survey received their incentive through the dealership at the time of sale or lease, while 46% received it through an application process after the purchase or lease. Additionally, 78% of respondents reported that applying for the incentive from their electric utility or the State AOT was very easy (55%) or somewhat easy (23%). This ease of application was even higher among respondents with annual household incomes of less than \$50,000, with 82% reporting the process as very easy or somewhat easy. Among those with incomes between \$50,000 and \$74,999, 74% reported similar ease in the application process. Furthermore, 74% of all respondents were very satisfied or somewhat satisfied with the time it took to receive their incentive, and another 11% of all respondents found this question not applicable because they received their incentive instantly at the dealership.

## CONCLUSION 8: Lower income incentive recipients are more likely to use more expensive public chargers instead of at home chargers.

Respondents with an annual household income of less than \$75,000 were more likely to rely on public charging stations (41%), which are significantly more expensive than at-home charging. These findings highlight an equity issue, as lower-income individuals are disproportionately burdened by the higher costs associated with public EV charging.

## RECOMMENDATIONS

Continue to include information about incentives for the installation of home chargers in the program communication strategy.

## CONCLUSION 9: Multifamily residents are more dependent on public and workplace charging than single-family residents.

Residents of duplexes, condos, and multifamily apartments are significantly more reliant on public charging stations and workplace chargers compared to single-family home residents. While 90% of single-family home residents reported charging their EV at home, only 85% of duplex residents, 68% of condo residents, and 38% of multifamily residents could do so. Moreover, multifamily residents were more likely to rely on public chargers (59%) and workplace chargers (27%) than single-family residents, of whom only 35% used public chargers and 12% charged at work. These findings indicate a need for more accessible and affordable charging options for residents of multifamily housing.

## Introduction

The State of Vermont seeks to decrease its greenhouse gas (GHG) emissions by reducing dependence on fossil fuels in the electricity generation, building, industrial, agricultural, and transportation sectors. Tier III of the Vermont Renewable Energy Standard (RES), passed in 2015, requires the state's electricity distribution utilities (DUs) to undertake projects that accelerate the transition from dirty fossil fuels to clean power sources. A key component of DU efforts to reduce GHG emissions under Tier III has been providing Vermont residents with financial incentives for purchasing electric vehicles (EVs). In 2020, the Vermont Legislature sought to further accelerate EV adoption when it passed the Energy Efficiency Modernization Act of 2020 (Act 151), authorizing the state's energy efficiency utilities (EEUs) to spend funds from the Energy Efficiency Charge to build thermal energy and transportation projects. The Legislature also authorized funding for EV purchase incentives of \$950,000 in FY2020 (Act 154), \$2.7 million in FY2022 (Act 55), and \$12 million in FY2023 (Act 184).

Vermont's transportation electrification programs aim to address externalities in the markets for new and used automobiles. Some consumers may not internalize the environmental benefits of EVs (e.g., fossil fuel savings and reductions in tailpipe emissions including GHGs) or the costs of EVs (e.g., higher power plant GHG emissions), and they may purchase fewer EVs than is socially optimal. Vermont's EV incentive programs attempt to address this market failure by making EVs more affordable and lifting EV sales.<sup>2,3</sup> Another market failure is the lack of knowledge among prospective buyers and dealers about EV technology and the benefits and costs of owning an EV. If prospective EV buyers and sellers better understand the benefits of EVs, they may purchase more of them. Using Act 151 funding, two Vermont EEUs—Efficiency Vermont and Burlington Electric Department—have undertaken public education and outreach campaigns to educate prospective buyers and deliver auto dealer education and incentives programs to promote EV adoption.

Vermont requires evaluation of its programs to understand whether they are having their intended impact. The Vermont Department of Public Service (PSD) retained Cadmus to evaluate the impacts of DU Tier III programs and EEU Act 151 programs since 2019. The following is a summary of the State AOT incentive, DU, and EEU programs this evaluation covers. This report is Phase II of the evaluation of the State of Vermont's suite of EV incentive programs, which includes both the Tier III incentives and the Act

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<sup>2</sup> As of January 2024, 12,754 all-electric or plug-in hybrid electric light-duty vehicles were registered in Vermont. Source: Drive Electric Vermont January 2024 EV Registration Update.

<sup>3</sup> As of April 2023, EVs constitute 6.5% of all light-duty vehicle registrations in Vermont. Source: Table 4 of Report to the Vermont Legislature. Act 151 Energy Efficiency Programs Pursuant to Act No.151 (2020). Submitted by the Vermont Public Utility Commission. April 28, 2023.

151 education and EV incentive. Phase I, or the Interim Report, was authored by Cadmus as well and was published on July 28, 2023.<sup>4</sup>

## State Agency of Transportation EV Purchase Incentive Program

Table 1 shows all incentives available through the State of Vermont’s Agency of Transportation (AOT). The State AOT incentive program is administered by The Center for Sustainable Energy (CSE). It offers an incentive of \$1,500 to \$3,000 for the purchase of a new plug-in hybrid electric vehicle (PHEV) and \$2,500 to \$5,000 for the purchase of a new all-electric vehicle (AEV), depending on adjusted gross income (AGI). Incentives are higher for buyers with AGI of \$60,000 or less and unavailable to buyers with household incomes above \$100,000, \$125,000, or \$150,000 depending on the buyer’s income tax filing status.

**Table 1. State of Vermont’s AOT New EV Purchase Incentives, July 2023 to Present**

Tax Filing Status	AGI Limits for Enhanced and Standard Incentives	State Incentive Amount	
		PHEV	AEV
Individual filing as single	\$60,000 or less	\$3,000	\$5,000
	\$60,001 to \$100,000	\$1,500	\$2,500
Individual filing as head of household	\$75,000 or less	\$3,000	\$5,000
	\$75,001 to \$125,000	\$1,500	\$2,500
Individual filing as qualifying widower/surviving spouse	\$90,000 or less	\$3,000	\$5,000
	\$90,001 to \$150,000	\$1,500	\$2,500
Married filing jointly	\$90,000 or less	\$3,000	\$5,000
	\$90,001 to \$150,000	\$1,500	\$2,500
Married filing separately	\$60,000 or less	\$3,000	\$5,000
	\$60,001 to \$100,000	\$1,500	\$2,500

Source: Drive Electric Vermont. <https://www.driveelectricvt.com/incentives/vermont-state-incentives>. Accessed July 16, 2024. The state last adjusted the income limits and incentive amounts in July 2023.

As part of the evaluation, Cadmus conducted surveys of incentive recipients to assess program experiences, and motivations and barriers to EV adoption. Some survey respondents reported annual household incomes greater than the State AOT incentive income limit of \$150,000. However, some survey respondents received only Tier III incentives from their utility, which does not have an income cap. Additionally, the income some respondents reported on the survey may not equal the income used for purposes of incentive eligibility. This may have occurred for several reasons, such as changes in household incomes since the incentive was received or discrepancies between the income reported by survey respondents and the income calculated by program administrators or used for tax purposes.

Since Phase I of the evaluation was published, the income limits and incentives of the State AOT program have been adjusted. Table 2 compares the income limits and incentive amounts from August 2021 to July 2023 with those from July 2023 to present day. The higher level of incentive for AEVs increased from \$4,000 to \$5,000. The income limit for individuals filing as single and married filing

<sup>4</sup> Vermont State and Distribution Utility Electric Vehicle Programs Evaluation: Interim Report. July 28, 2023. [https://publicservice.vermont.gov/sites/dps/files/documents/Vermont%20Electric%20Vehicle%20Programs%20Evaluation%20Report%20-CLEAN%20-%20Incorporated%2002JUN2023\\_PSD\\_Comments.pdf](https://publicservice.vermont.gov/sites/dps/files/documents/Vermont%20Electric%20Vehicle%20Programs%20Evaluation%20Report%20-CLEAN%20-%20Incorporated%2002JUN2023_PSD_Comments.pdf)

separately has been raised from \$50,000 to \$60,000 for the highest incentive level. The income limit for individuals filing as head of household was raised from \$50,000 to \$75,000 for the higher incentive level, and from \$100,000 to \$125,000 for the lower incentive level. The income limit for individuals filing as a qualifying widower/surviving spouse and for married filing jointly has increased from \$75,000 to \$90,000 for the higher incentive level, and from \$125,000 to \$150,000 for the lower incentive level.

**Table 2. Updates to Income Limits and Incentive Amounts**

Applicability Time Period	Aug 2021 to July 2023			July 2023 to Present		
Tax Filing Status	AGI Limits for Enhanced and Standard Incentives	State AOT Incentive Amount - PHEV	State AOT Incentive Amount - AEV	AGI Limits for Enhanced and Standard Incentives	State AOT Incentive Amount - PHEV	State AOT Incentive Amount - AEV
Individual filing as single	\$50,000 or less	\$3,000	\$4,000	\$60,000 or less	\$3,000	\$5,000
	\$50,001 up to \$100,000	\$1,500	\$2,500	\$60,001 up to \$100,000	\$1,500	\$2,500
Individual filing as head of household	\$50,000 or less	\$3,000	\$4,000	\$75,000 or less	\$3,000	\$5,000
	\$50,001 up to \$100,000	\$1,500	\$2,500	\$75,001 up to \$125,000	\$1,500	\$2,500
Individual filing as qualifying widower/surviving spouse	\$75,000 or less	\$3,000	\$4,000	\$90,000 or less	\$3,000	\$5,000
	\$75,001 up to \$125,000	\$1,500	\$2,500	\$90,001 up to \$150,000	\$1,500	\$2,500
Married filing jointly	\$75,000 or less	\$3,000	\$4,000	\$90,000 or less	\$3,000	\$5,000
	\$75,001 up to \$125,000	\$1,500	\$2,500	\$90,001 up to \$150,000	\$1,500	\$2,500
Married filing separately	\$50,000 or less	\$3,000	\$4,000	\$60,000 or less	\$3,000	\$5,000
	\$50,001 up to \$100,000	\$1,500	\$2,500	\$60,001 up to \$100,000	\$1,500	\$2,500

Source: Table derived from Drive Electric Vermont and Phase I of the evaluation.

Incentives are available only for new vehicle purchase or lease with a base manufacturer’s suggested retail price (MSRP) of up to \$52,500,<sup>5</sup> an increase from the \$40,000 for PHEVs and \$45,000 for AEVs noted in the Phase I evaluation.

<sup>5</sup> A list of vehicles currently eligible for state incentives based on the MSRP is available here: <https://www.driveelectricvt.com/Media/Default/docs/purchase-incentives/electric-vehicle-vermont-state-incentive-guidelines.pdf>

For used high fuel-efficiency vehicles, the state, through the MileageSmart program administered by Capstone Community Action (“Capstone”), offers low- and moderate-income (LMI) car buyers an incentive covering 25% of the upfront cost up to \$2,500, with SNAP benefit recipients eligible for up to \$5,000.<sup>6</sup>

### Tier III and Act 151 Programs

Both the Act 151 and Tier III incentive programs in Vermont are strategically designed to promote EV adoption as part of the state's comprehensive efforts to enhance energy efficiency and reduce GHG emissions. However, these programs have distinct features and structures that differentiate their approaches to achieving these goals.

#### Tier III Incentive Program

Tier III incentives are part of Vermont's RES, established under Act 56 of 2015. These incentives are designed to reduce fossil fuel consumption by requiring electric DUs to achieve fossil fuel savings through energy transformation projects. Tier III provides financial incentives for purchases of new and used AEVs and PHEVs and offers additional support for low-income customers. For example, Vermont Electric Cooperative (VEC) offers a \$500 incentive for AEVs and a \$250 incentive for PHEVs, with enhanced incentives (up to \$1,000) for income-qualified consumers. Beyond EV incentives, the Tier III program promotes other energy transformation projects, such as installation of home and public EV charging stations and efficient heating and cooling technologies.

The DU programs do not impose income eligibility caps for vehicle incentives, but they do offer higher incentives for LMI EV buyers. All utilities also offer incentives for the purchase of used EVs

Table 3 presents the incentives per EV available from the DUs for various vehicle and purchase types.

**Table 3. Vermont Utility EV Incentives**

Distribution Utility	Purchase Type	Base PHEV Incentive	LMI PHEV Adder	Base AEV Incentive	LMI AEV Adder	MSRP Cap
Green Mountain Power (GMP)	New	\$1,000	\$1,000	\$2,200	\$1,000	None
	Used	\$750		\$1,500		
Burlington Electric Department (BED) <sup>a</sup>	New	\$2,000	\$300	\$2,300	\$700	\$60,000
	Used	Lower of \$1,300 or 50% MSRP	\$200	Lower of \$1,300 or 50% MSRP	\$200	
Vermont Public Power Supply Authority (VPPSA)	New	\$500	\$400	\$1,250	\$400	None
	Used	\$250		\$500		
Stowe Electric Department (SED)	New	\$750	\$500	\$750	\$500	None
	Used	\$375	\$625	\$500		

<sup>6</sup> [State of Vermont Incentives - Drive Electric Vermont \(driveelectricvt.com\)](https://driveelectricvt.com/)

Vermont Electric Coop (VEC)	Purchase <sup>7</sup>	\$250	\$500	\$500	\$500	None
	Lease	\$50/year		\$100/year		
Washington Electric Coop (WEC)	New	\$250	None	\$500	\$700	\$50,000
	Used					

<sup>a</sup> The base BED incentive amounts include an additional \$500 provided through Act 151 funds. Excluding this additional \$500 via Act 151, the base PHEV incentive is \$1500 (new)/\$800 (used), and the base AEV incentive is \$1,800 (new)/\$800 (used).

## Act 151 Program

Act 151, passed in 2020, authorized the state’s EEs to spend funds from the Energy Efficiency Charge to support thermal energy and transportation measures. Using Act 151 funding, Vermont EEs have undertaken public education and outreach campaigns to educate prospective buyers and deliver auto dealer education and incentive programs to promote EV adoption.

The dealership program run by Efficiency Vermont under Act 151 consists of dealer training, dealer sales incentives, and dealer capital incentives. Efficiency Vermont’s dealer training does not aim to replicate training from automakers about vehicle capabilities and characteristics, but rather to educate dealers about Vermont-specific programs and policies, such as state incentives and tax credits. It also covers Vermont-specific driving considerations, such as charging infrastructure and winter performance and range. To cover charging infrastructure, the training materials employ tools such as the PlugShare and AFDC maps of charging sites, as well as trip planning software.

Burlington Electric Department uses its Act 151 funds to provide additional incentives for the purchase of EVs, which is unique among Vermont EEs. Unlike Efficiency Vermont, the BED program structure layers Act 151 incentives with Tier III incentives to amplify the overall financial benefits for consumers. BED also provides an incentive for EV chargers for low-income customers.

## Comparative Analysis

While both the Act 151 and Tier III programs aim to stimulate EV adoption and reduce GHG emissions, their approaches and scopes differ. Efficiency Vermont’s Act 151 program is more focused on financial incentives for the development of the EV market. BED’s Act 151 program features a clear structure for combining State AOT and utility incentives to maximize consumer benefits, and explicitly targets equity by offering additional incentives for LMI customers.

In contrast, the Tier III program operates within the broader framework of the RES, requiring utilities to achieve fossil fuel savings through various energy transformation projects. This program provides more-comprehensive support for both new and used EVs and includes incentives for other clean energy

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<sup>7</sup> VEC does not differentiate between new or used AEVs or PHEVs when determining incentive amounts.

technologies. Tier III incentives are integrated into a larger strategy to reduce fossil fuel consumption across multiple sectors, making it a more holistic approach to energy transformation.

Table 4 shows the range of available Tier III incentives available for the purchase or lease of an EV by DUs, and demonstrates how BED customers can receive an enhanced \$500 via funding made available by Act 151 programs.

**Table 4. Tier III and Act 151 Incentives by DU**

DU	Tier III Incentive Range	Act 151 incentive
Green Mountain Power (GMP)	\$750–\$3,200	-
Burlington Electric Department (BED)	\$800–\$2,500	\$500
Vermont Public Power Supply Authority (VPPSA)	\$250–\$1,650	-
Stowe Electric Department (SED)	\$375–\$1,250	-
Vermont Electric Coop (VEC)	\$250–\$1,000	-
Washington Electric Coop (WEC)	\$250–\$1,200	-

## Organization of this Report

The *Evaluation Objectives and Approach* section describes the research aims, approach, and methodologies, including the sources used and the details of how each research activity took place. The *Evaluation Findings* section presents the results, organized by topic. The first topic is the Vermont EV market and the administration of State AOT, DU, and Act 151 EV programs. The next topic is the experience of incentive recipients. The final topic is an attribution analysis of the impacts of the Act 151 and Tier III incentives on purchases of EVs.

## Evaluation Objectives and Approach

This report is the second phase of the evaluation of the incentives for EVs in the State of Vermont. In Phase I, the evaluation analyzed the impacts of the DU and State AOT incentive programs on purchases of EVs; the consumer experience with Vermont's EV incentive and education programs; and the impacts of EV outreach and education programs on the readiness of car dealerships to sell EVs. In this phase, the research is focused on the effects of the Act 151 program on EV adoption and the effect of the program on low-income Vermonters.

More specifically, this evaluation has the following research objectives:

- Assess the effect of Act 151 on EV adoption.
- Assess the effect of the program on low-income households' participation.
- Assess barriers to participation for low-income households.
- Estimate the impacts of Act 151 incentives on the purchases of AEVs and PHEVs by Vermont residents.

## Research Methodology and Activities

Cadmus' approach to addressing the research objectives above, which largely mirrored our approach in Phase I, was to speak to participants on the supply and demand sides of Vermont's EV market. On the supply side, we interviewed the representatives of auto dealerships selling EVs to Vermont residents. These individuals shed light on the challenges they face learning about EVs, selling EVs, navigating supply constraints, and processing EV incentives. On the demand side, we surveyed EV buyers who have received incentives from the State AOT or DUs since 2022. We collected data about their experiences with the incentive programs, the barriers to purchasing an EV, and the impacts of the incentives on their purchase decisions. Finally, we conducted interviews with Vermont EV program administrators, who spoke about the barriers their programs aim to overcome and opportunities to grow the EV market. The following sections describe these research activities at greater length.

### Program Administrators and Dealer Interviews

Cadmus conducted telephone interviews with two program administrators of EV programs in Vermont. The team developed the interview list in consultation with PSD, focusing on the two main administrators of Act 151:

- Efficiency Vermont, a nonprofit organization that aims to help the State of Vermont transition to a more affordable and cleaner future. Efficiency Vermont serves as a primary implementer for Act 151 programs throughout the State of Vermont with the exception of the city of Burlington.
- Burlington Electric Department (BED), the largest municipal utility in Vermont. BED serves as both the distribution utility and the EEU for its service territory and as an implementer of Act 151 in Burlington.



Cadmus developed a set of interview guides tailored to the program administrators. The specific questions used in the interview guide can be found in Appendix C. Key interview topics included:

- Respondent’s experience with both developing and administering specific EV programs
- Design of Act 151 programs
- Changes to design of program over time
- Dealer interaction such as engagement, recruitment, challenges, and successes
- Dealer feedback
- Adequacy of incentive caps and incentive levels in achieving program goals
- Challenges and success involved with program implementation

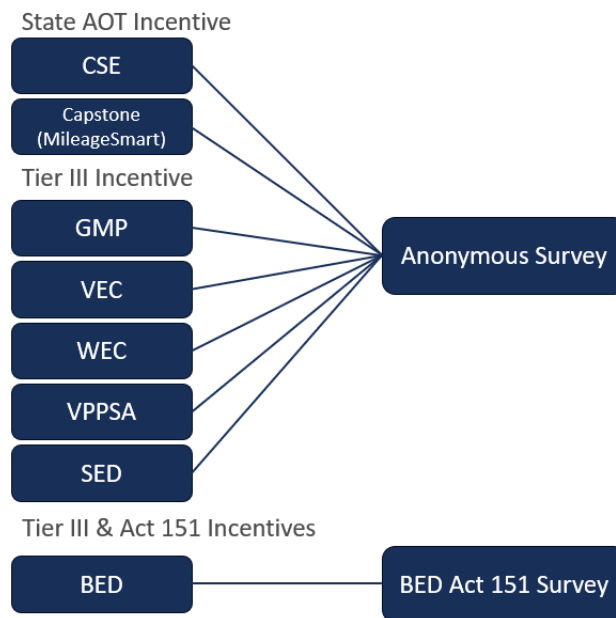
Cadmus also interviewed market participants, focusing on EV dealerships in or neighboring Vermont. Cadmus tailored the market participant interview guide to ensure shorter interviews, given the expected difficulty of obtaining hour-long interviews with dealership staff. Cadmus asked market participants to briefly describe their experience with the program. The specific interview questions included can be found in Appendix D. Key topics included:

- EV incentives
- Dealer capital improvement programs
- EV dealer sales incentives
- Dealer training programs
- Dealer education and outreach programs
- Challenges, successes, and communication

## EV Purchase Incentive Recipient Surveys

Cadmus surveyed incentive recipients who received the incentives from the Tier III program and from the Act 151 program between January 2022 through June 2024. The incentive structure of Act 151 funds several programs throughout the state. The only set of customers that receive direct incentives for EV purchases through the Act 151 fund are the BED customers, who receive the incentives directly from the utility. For this reason, Cadmus developed a specific survey for the Act 151 incentive recipients and an anonymous survey for the Tier III incentive recipients who received their incentives from the DUs as well as from the State AOT though CSE. Figure 1 shows the type of survey received based on a recipient's incentive type and incentive administrator.

**Figure 1. Surveys by Incentive Type and Administrator**



### Burlington Electric Department (BED) Act 151 Survey

This survey was distributed via email to BED customers who were recipients of additional EV purchase incentives through Act 151 funding. The survey is largely equivalent to the Phase I survey with questions on program satisfaction and experience, motivations for purchasing an EV, and driving and charging behaviors. This survey also includes an incentive attribution component so that the results can be directly compared to Phase I, and to determine the marginality of the Act 151 incentive in comparison to the Incentive from Tier III funding. The survey guide is available in *Appendix B*.

### Anonymous Survey

The anonymous survey was sent via anonymous link and email link to the incentive recipients from the DUs and state administrators. The survey is largely equivalent to the Phase I survey and BED Act 151 survey with questions on program satisfaction and experience, motivations for purchasing an EV, and driving and charging behaviors. This survey includes self-reported income information and includes a self-reported incentive attribution question (which only has qualitative, not statistical, value). The link to the anonymous survey was sent to the respondents by the participating DUs and Capstone, and by Cadmus via email link for the Center for Sustainable Energy (CSE) respondents. The survey guide is available in *Appendix B*.

Table 5 shows the survey sample sizes and response rates for the BED Act 151 survey and the anonymous survey.

**Table 5. EV Recipient Survey Samples and Survey Response Rates**

EV Incentive Recipient Population	Sources	Sample Size	Survey Responses	Response Rate
BED Act 151 Survey				
Act 151 incentive recipients who also received the Tier III incentive from BED	Burlington Electric Department (BED)	231	103	45%
Anonymous Survey				
Anonymous and known (CSE) recipients and unconfirmed incentive amounts	Center for Sustainable Energy (CSE)	430	133	31%
	Green Mountain Power (GMP) Capstone Community Action (Capstone) Vermont Electric Cooperative (VEC) Washington Electric Cooperative (WEC) VPPSA	GMP: 3,260 Capstone: 535 VEC: 243 WEC: 87 VPPSA: 80	862	20%
Included both Tier III and State AOT incentive recipients	Stowe Electric Department (SED)	SED: 28 Total: 4,233		
	Anonymous Survey Total	4,663	995	21%
<b>Total Survey Sample</b>				
		<b>4,894</b>	<b>1,098</b>	<b>22%</b>

Overall, the surveys generated an excellent 22% response rate. However, the response rate was notably higher among respondents who received the survey via email compared to those who received the survey via anonymous link.

### Survey Sample Respondent Incentives and Demographic Attributes

The following section provides an analysis of the demographic characteristics of the respondents, offering valuable insights into the diversity and inclusivity of these programs. Overall, survey respondents, and thus EV buyers, tended to be older, well educated, single-family homeowners, with relatively high annual household incomes.

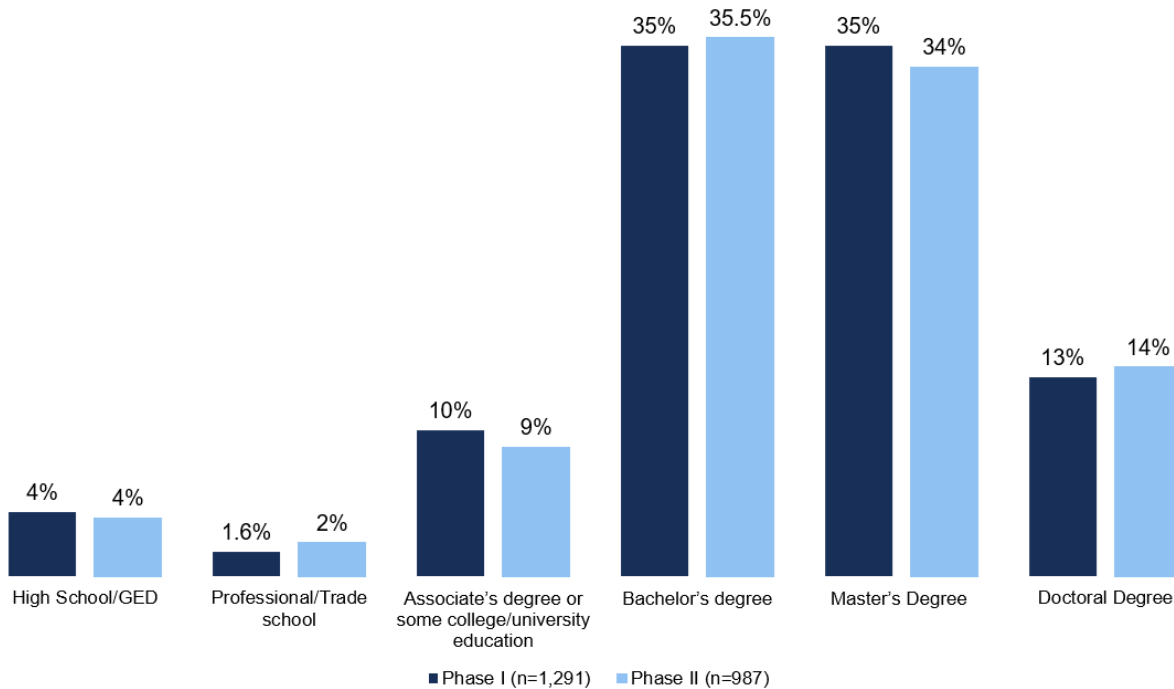
As seen in Figure 2, most survey respondents reported having obtained a bachelor's degree or higher degrees. Among anonymous survey respondents, only 15% said they did not have a bachelor's degree or higher. BED survey respondents reported slightly higher levels of educational attainment, with 95% of respondents reported having obtained a bachelor's degree or more, compared to 85% of respondents in the anonymous survey. According to American Community Survey 2022 five-year estimates, 41% of Vermonters aged 18 or older have obtained a bachelor's degree or higher<sup>8</sup>. These results suggest that the average survey respondent has a higher level of education than the average Vermonter.

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<sup>8</sup> Source: American Community Survey, 2022-5 Year Estimates: S1501 Educational Attainment: <https://data.census.gov/table/ACSST5Y2022.S1501?q=educational%20attainment&g=040XX00U50>

The Phase II survey sample did not demonstrate significant differences in educational attainment compared to Phase I.

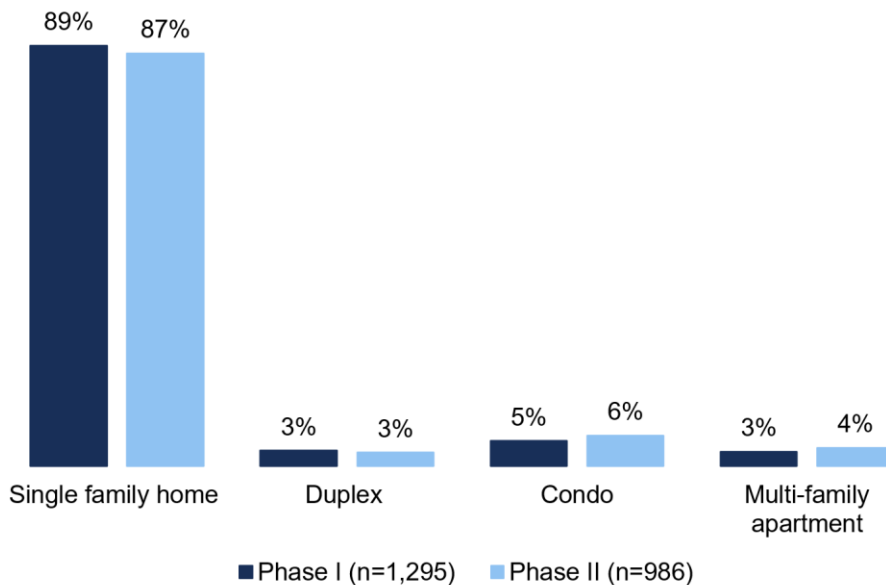
**Figure 2. Comparison of Phase I and Phase II Results: Educational Attainment**



Source: Survey question A1/B1: What is your highest level of education completed? (n=987)

Among all survey respondents, single-family homes were the most reported primary residence type as shown in Figure 3. Residence types among respondents were largely similar between Phase I and Phase II, though slightly higher percentages of respondents in Phase II than Phase I reported living in duplexes, condos, and multifamily apartments. BED survey respondents were less likely to live in single family homes, and more likely to live in condos or multifamily apartments. This reflects the relatively urban environment of Burlington compared to the rest of the state, given that the anonymous survey was distributed more widely across the state.

**Figure 3. Comparison of Phase I and Phase II Results: Primary Residence Type**

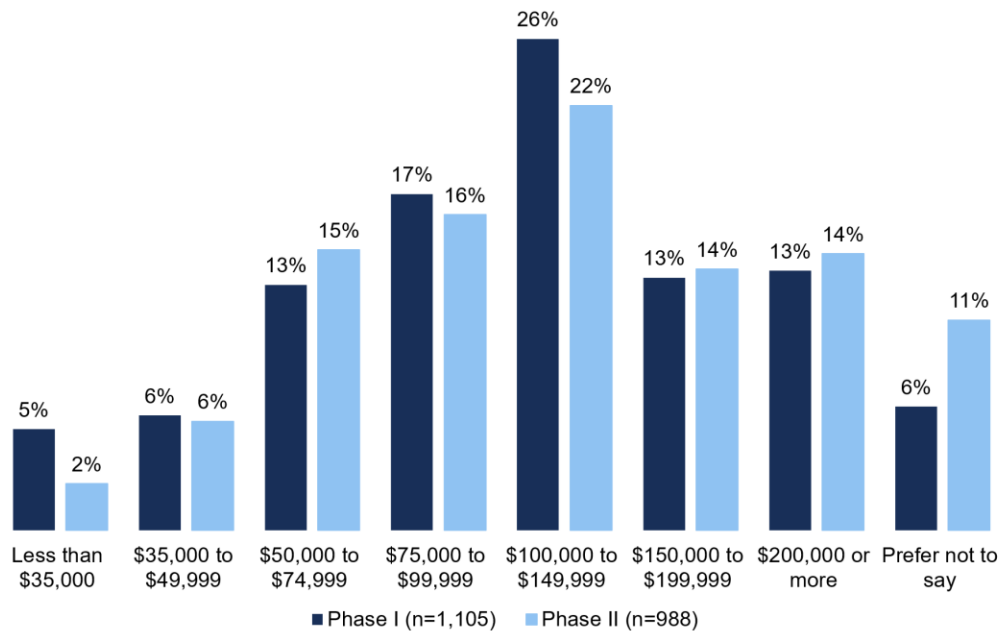


Source: Survey question A3/B3: Which of the following best describes your primary residence? (n=986)

As shown in Figure 4, the distribution of respondents’ annual household incomes did not change significantly between Phase I and Phase II. In Phase II, the most common annual household incomes reported were \$75,000 to \$99,000 (16%), and \$100,000 to \$149,000 (22%). In Phase II, 4% fewer respondents reported a household income of \$100,000 to \$149,000, but slightly greater percentages of respondents reported household incomes of \$50,000 to \$74,999, \$150,000 to \$199,999, and \$200,000 or more.

BED survey respondents were more likely than anonymous survey respondents to report an annual household income of \$200,000 or more. Anonymous survey respondents were slightly more likely to report annual household incomes of \$74,999 or less. These results may reflect that BED respondents reside in Burlington, where the cost-of-living is higher compared to the rest of the state.

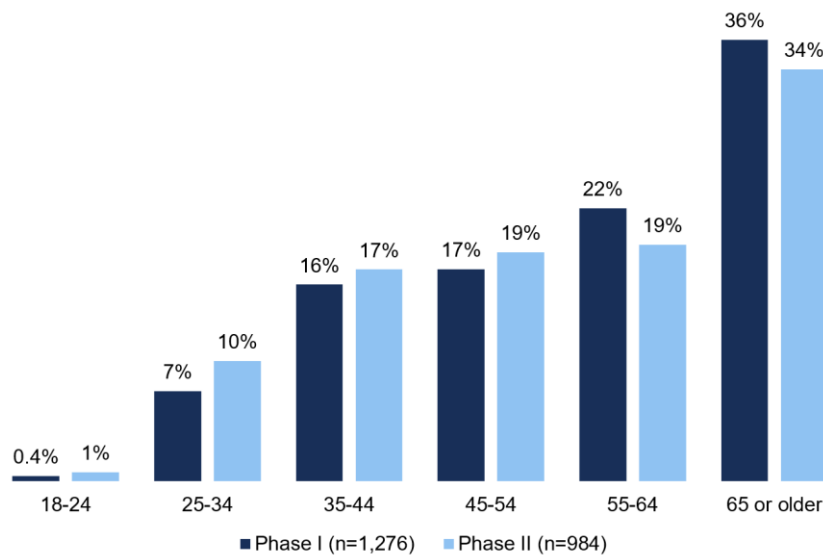
**Figure 4. Comparison of Phase I and Phase II Results: Annual Household Income**



Source: Survey question A5/B5: Which of the following best describes your annual household income before taxes? (n=988)

As shown in Figure 5, survey respondents in Phase II were slightly younger than survey respondents in Phase I. Lower percentages of respondents were of ages 55 to 64 or 65 and older, and greater percentages of respondents were 25 to 24, 35 to 44, and 45 to 54 years of age.

**Figure 5. Comparison of Phase I and Phase II Results: Age of Respondents**



Source: Survey question A8/B8: How old are you? (n=984)

Among Phase II respondents, the age distribution among BED survey respondents was more balanced, and respondents were more likely to be between ages 25 and 54 compared to anonymous survey respondents. Anonymous survey respondents were more likely to be older, with 55% of respondents reporting being 55 or older, compared to 38% of BED survey respondents. This result again reflects the urban environment of Burlington compared to the more widely distributed statewide population of the anonymous survey. In 2021, 36% of Vermont residents were 55 years or older<sup>9</sup>. These results overall demonstrate that EV buyers skewed towards older residents.

## EV Incentives Attribution Analysis

In Phase II of the EV incentives attribution analysis, Cadmus conducted an attribution analysis of only the respondents who received Act 151 incentives. The survey design and coding process for Phase II closely mirrored those of Phase I. The survey aimed to determine the attribution of the incentive amount received to the decision to purchase an EV and to assess the marginal impact of the incentive amount. The main difference between the Phase I and Phase II attribution analyses is in the incentive combinations received by respondents. In Phase I, respondents could have received the State AOT incentive, the Tier III incentive, or both. In contrast, all respondents in Phase II received both the Tier III and Act 151 incentives. Additionally, in Phase I, the State AOT incentive could be either larger or smaller than the Tier III incentive. In Phase II, the Act 151 incentive was \$500 for all recipients, which was smaller than the Tier III incentive, which ranged from \$800 to \$2,500.

Attributing an EV purchase to a specific financial incentive was a challenge because of the large number of different incentives available to potential EV buyers including the Tier III incentives, Act 151 incentives, State AOT incentive, and the federal tax credit<sup>10</sup>. Another confounding factor was the concurrent efforts of other government entities to drive EV sales (e.g., consumer education and financial support for building public charging stations), which complicated efforts to isolate and quantify the impact of Tier III and Act 151 incentives.

The survey asked respondents who received Tier III *and* Act 151 incentives between one and three counterfactual scenario questions. Whether a respondent saw a second or third question depended on their response to the question that preceded it. The first question asked respondents to estimate the likelihood that they would have made the same purchase decision if they had received neither incentive. The second question concerned the impact of the smaller of the two incentives, and a third question concerned the larger of the two incentives. Figure 6 shows a question Cadmus presented to recipients of both Tier III and Act 151 incentives.

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<sup>9</sup> Source: Distribution of resident population of Vermont in 2021, by age group: <https://www.statista.com/statistics/1174420/vermont-population-share-age-group/#:~:text=In%202021%2C%20about%2012.8%20percent,old%20in%20that%20same%20year.>

<sup>10</sup> At the time of the evaluation, customers could receive up to \$7,500 in federal tax incentives to purchase a new EV or up to \$4,000 to purchase an used EV ([www.fueleconomy.gov](http://www.fueleconomy.gov)).

**Figure 6. Incentive Attribution Survey Question for Act 151 and Tier III Incentive Recipients**

C6. **[IF C3 ≠ 2 AND IF C5 = 2,3,4,5]** Of the \$**[INCENTIVEAMOUNTTOTAL]** you received from **BED** after purchasing or leasing your plug-in electric vehicle, \$500 of that came from an additional incentive enabled by Vermont’s Act 151 of 2020, which permitted BED to spend additional budget on programs, measures, and services that reduce greenhouse gas emissions in the transportation sectors. If you had received just **\$500** rather than the \$**[INCENTIVEAMOUNTTOTAL]** you did receive, would you still have purchased an EV? Please assume all other incentives you would have received if you purchased an EV (e.g., a federal tax credit) were the same. **[FORCE RESPONSE]**

1. Definitely
2. Very likely
3. Somewhat likely
4. Not likely
5. Definitely not

Based on each respondent’s answer(s), Cadmus categorized the purchase as *influenced* or *not influenced* by the incentive received. If a respondent replied that they would *Not Likely* or *Definitely Not* have purchased an EV in the absence of a particular incentive, we interpreted this response to mean that the incentive did affect the purchase decision. We refer to these buyers and these incentives as “marginal.”

Conversely, if a respondent replied that they *Definitely* or *Very Likely* would have purchased an EV in the absence of a particular incentive, we interpreted this response to mean the incentive did *not* affect the purchase decision. We refer to these buyers and these incentives as being “inframarginal.”

Respondents who received both incentives could fall into four possible groups: neither incentive was marginal, only the Act 151 incentive was marginal, only the Tier III incentive was marginal, or the two incentives combined were marginal. *Appendix A* provides additional details about the coding of the survey responses.

We then analyzed the responses to estimate the percentage of EV buyers for whom a Tier III incentive, an Act 151 incentive, or both types of incentives influenced their purchase decisions.

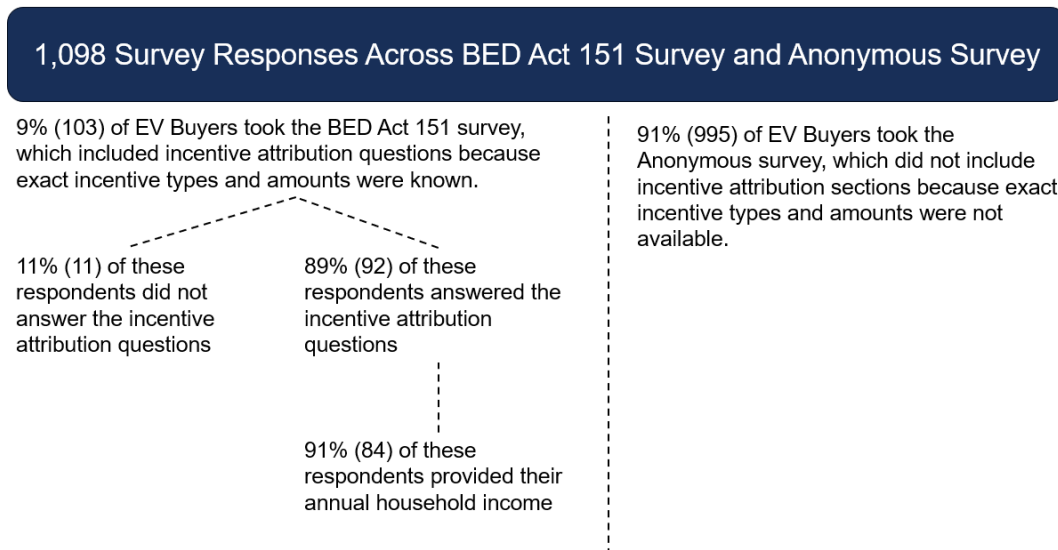
For this research, Cadmus did not attempt to attribute causality to other financial incentives such as the federal tax credit as the goal is to focus on the incentives specific to Vermont.

**Analysis Sample**

For the Act 151 and Tier III attribution analysis, Cadmus analyzed survey responses for 92 EV buyers who completed the incentive attribution questions and whose identities and incentive types were known. Figure 7 shows how the sample for incentive attribution analysis was determined.



**Figure 7. Incentive Attribution Analysis Sample**



**Summary Statistics**

All 92 EV buyers received both the Act 151 \$500 incentive and the Tier III incentive. Table 6 shows summary statistics for the dollar amounts of each type of incentive (Act 151 or Tier III). The average Tier III incentive amount was \$1,559, which was approximately three times the average Act 151 incentive amount. As such, we expect Tier III incentives to have had a larger influence on EV purchases than Act 151 incentives. Table 6 shows the distribution of the incentives in total and by incentive type.

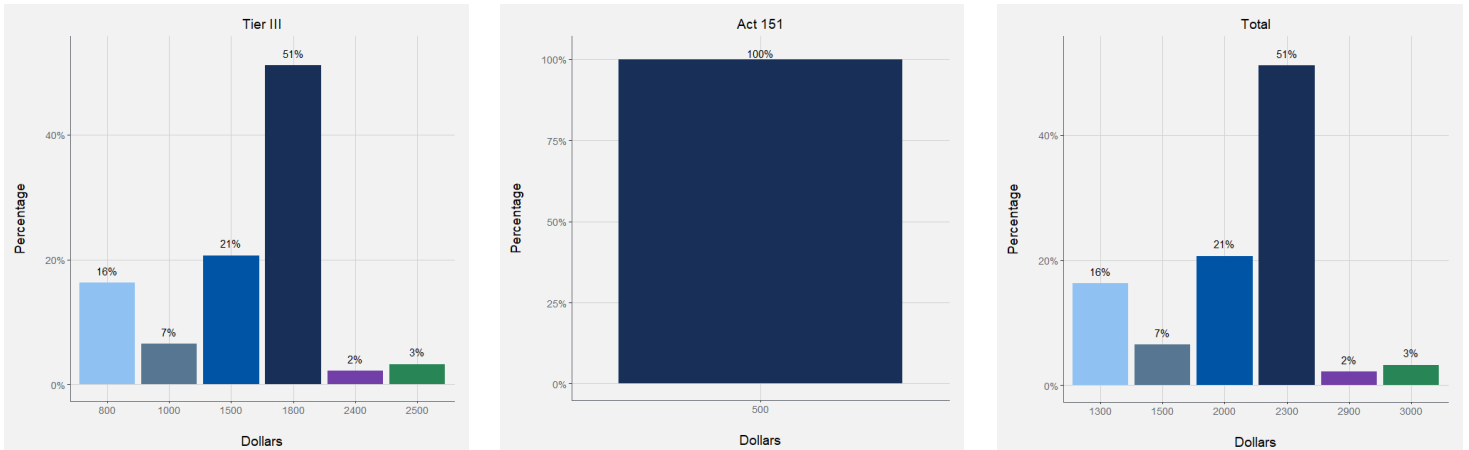
**Table 6. Act 151 and Tier III Incentives Summary Statistics**

Incentive Type	n	Mean	Standard deviation	Minimum	Maximum	Median
Act 151	92	\$500	0	\$500	\$500	\$500
Tier III	92	\$1,559	\$437	\$800	\$2,500	\$1,800
Total	92	\$2,059	\$437	\$1,300	\$3,000	\$2,300

Notes: Based on analysis of incentives received for 92 recipients in the attribution analysis sample.

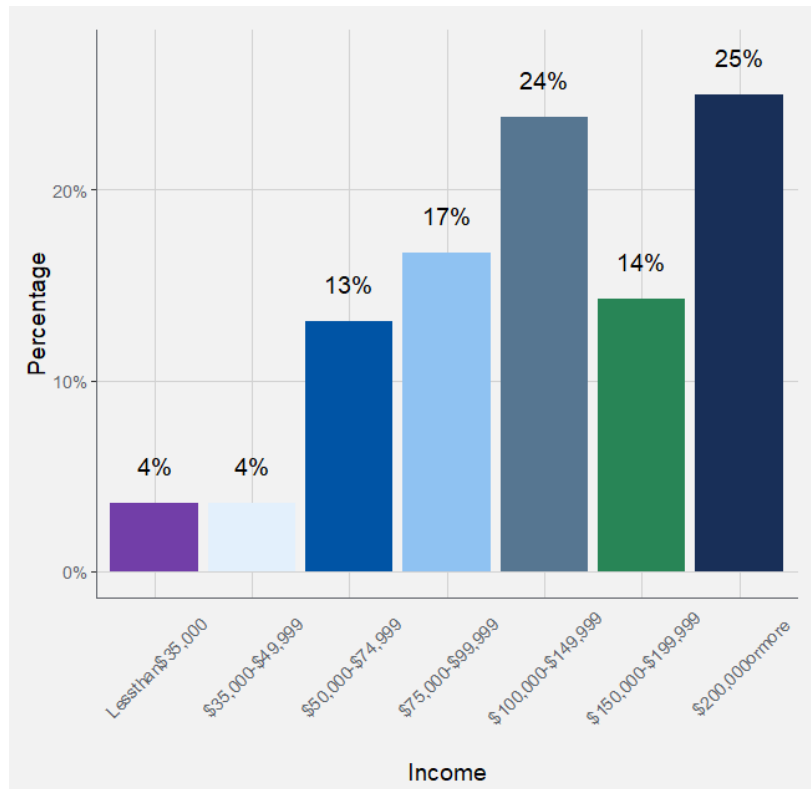
Figure 8 shows that the Tier III incentive amounts ranged from \$800 to \$2,500, with most respondents receiving \$1,800. With an additional \$500 from the Act 151 incentive, the total incentive ranged from \$1,300 to \$3,000, with around 50% of respondents receiving \$2,300.

**Figure 8. Distributions of Incentives by Incentive Type**



In the attribution analysis sample, 84 respondents provided information about their annual gross (before-tax) household income. Figure 9 shows a wide distribution of income among households receiving Act 151 and Tier II incentives. Only about 8% of respondents had income below \$50,000 and about 30% had a middle income below \$100,000. About 50% of respondents in our sample had a high income above \$100,000.

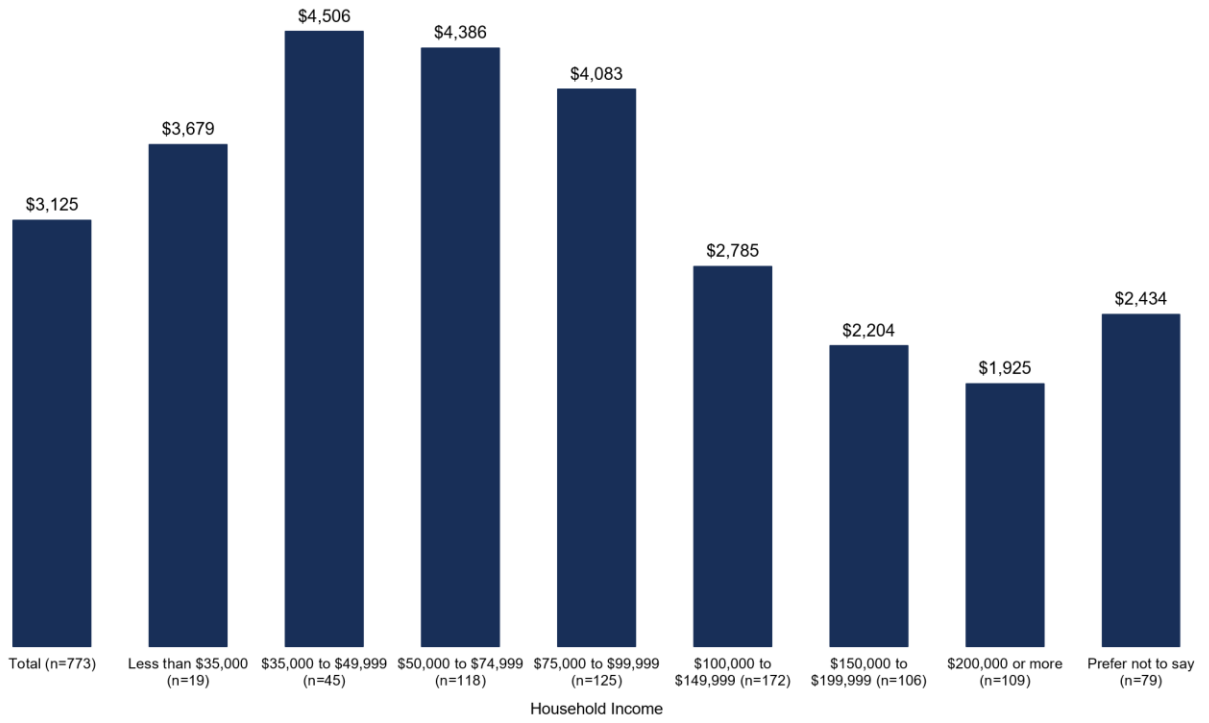
Figure 9. Distribution of Incentive Recipient Household Income



**Anonymous Survey Self-Reported Incentives**

Cadmus also asked anonymous survey respondents to self-report the total incentive amount they received. While this data was not used for the attribution analysis, it does provide qualitative value. Responses to the anonymous survey are shown in Figure 10. Average and median self-reported incentive amounts were greatest for respondents with an annual household income below \$100,000.

Figure 10. Anonymous Survey Self-Reported Incentive Amounts



## Evaluation Findings

### EV Dealer Interview Findings

#### Act 151 Incentives on EV Sales

The dealer sales incentives were helpful in encouraging dealers to increase EV sales, and dealer infrastructure improvement incentives have helped prepare dealerships for selling EVs by alleviating the costs of having to install chargers.

Many of the EV dealers who participated in the Efficiency Vermont Act 151 program mentioned in interviews that the sales and EV readiness programs were impactful in encouraging the increase of EV sales. The majority of dealers (3 of 5) who offered the EV readiness incentive said it has helped them sell and leasing EVs (2 others were neutral, and 1 didn't participate). Additionally, most (4 of 6) dealers said that the dealer incentives contributed to increased EV sales. One dealer specifically mentioned that if the federal and state incentives for EVs go away there would be a big downturn in the sales of EVs.

#### Incentive Levels and Income Caps

According to EV dealers, income caps are too low to encourage market adoption.

Half of participating dealers (3 of 6) said the biggest challenge is the income caps on customer incentives through the State AOT incentive program. Specifically, dealers expressed that despite the availability of incentives, EVs remain relatively expensive, which hinders affordability for low-income populations. Consequently, the current income caps are viewed as insufficient to encourage widespread adoption of EVs. Rather than facilitating easier access to EVs for low-income groups, the existing caps are seen by dealers as limiting the overall number of potential buyers.

#### Dealer Trainings

Manufacturer trainings were more useful than Efficiency Vermont trainings for communicating EV specific information.

Overall, while the majority of participating dealers engaged in Efficiency Vermont trainings (5 of 6), they found manufacturer-provided training more beneficial as it offered information specific to each individual car model. Dealers emphasized that Efficiency Vermont could enhance its training offerings by shifting its focus toward helping dealers navigate the incentives including applications and processing.

#### Additional Challenges and Successes

Dealers reported several successful aspects of Vermont's suite of EV programs that underscore their positive impacts.

Dealers participating in the Efficiency Vermont Act 151 program particularly appreciate the robust support for sales initiatives, which enhance their ability to promote and sell EVs. With regard to the State AOT incentive program, two dealers specifically cited the ability to process incentives on site,

which eliminates the burden for customers, as an operational advantage. Dealers also expressed a sense of pride in contributing to a greener future.

When asked about program challenges, EV dealers serving Vermont said the incentive processing system worked in some instances but generally took too long and was too convoluted.

EV dealers in Vermont generally perceive the incentive processing system as functional in certain cases but criticized its overall efficiency, with half of participating dealers (3 out of 6) noting that it often takes too long and is overly complex. According to one dealer, "[incentive] process is not fast enough, as a dealer sometimes they are waiting for \$5,000 which is a lot. Getting payment is definitely slow, could be improved on." Another dealer also expressed frustration, stating that after submitting an application, there could be a delay of up to a month before receiving any communication, and even after approval, there remains a significant wait time for the incentive to be disbursed. While the questions posed to dealerships were specifically in reference to Efficiency Vermont's programs, the responses received indicated that this feedback was applicable to both Efficiency Vermont and State of Vermont AOT programs.

Communication between Efficiency Vermont and EV dealers could be improved.

Among those interviewed, two out of five dealers highlighted the need for better communication with Efficiency Vermont. Specifically, one dealer reported difficulty reaching Efficiency Vermont staff by phone, while another emphasized the desire for more frequent in-person communication. Another dealer suggested that Efficiency Vermont could distribute a monthly newsletter with information about the program, EVs, and the incentive process. This feedback indicates a clear opportunity for Efficiency Vermont to strengthen its communication channels with dealers.

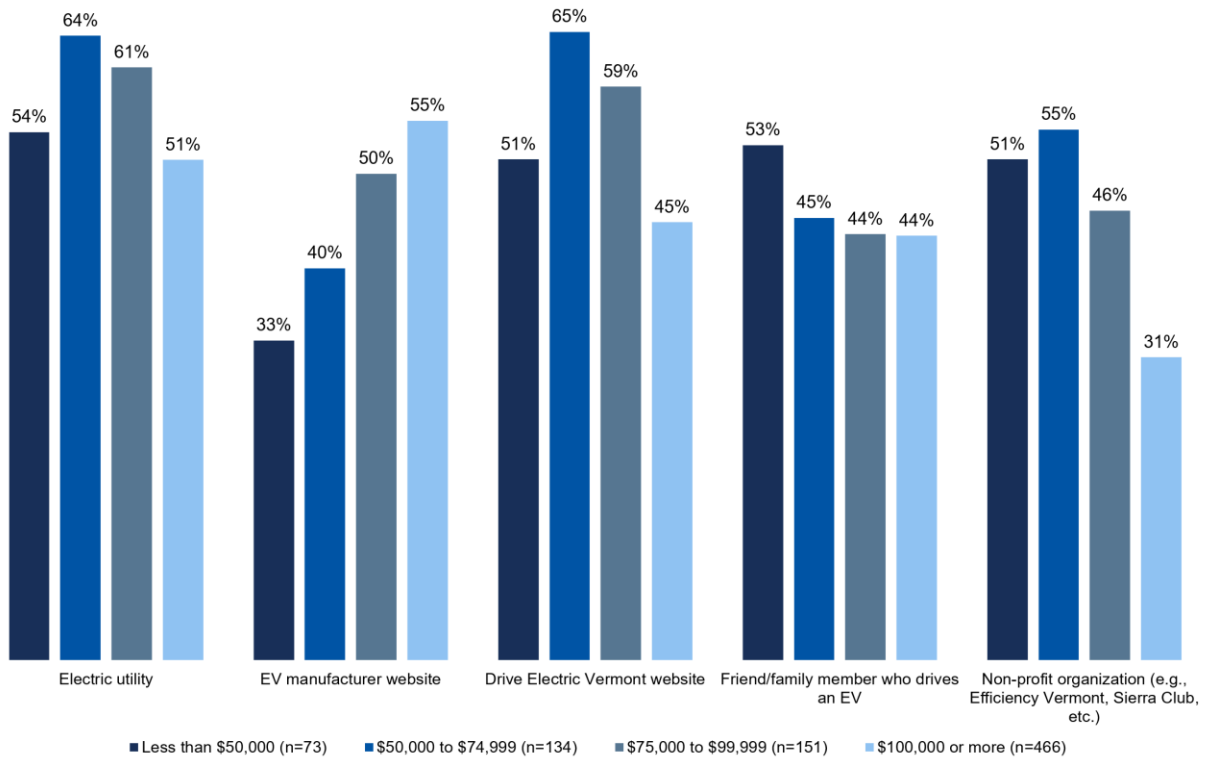
## Market Participant Experience Findings

### EV Awareness and Motivations

This section details the awareness of available EV incentives and the motivations for purchasing EVs among survey respondents.

Figure 11 shows that the most important source of information in the decision to choose an EV was respondents' electric utilities (54%), followed by EV manufacturer websites (51%), the Drive Electric Vermont website (50%), friends or family members who drive EVs (45%), and nonprofit organizations (39%). Respondents with annual household income of less than \$50,000 were less likely than respondents with higher incomes to find the Drive Electric Vermont website or EV manufacturer websites important, but more likely to report that nonprofit organizations and friends or family members who drive EVs were important in these respondents' decision to purchase or lease an EV.

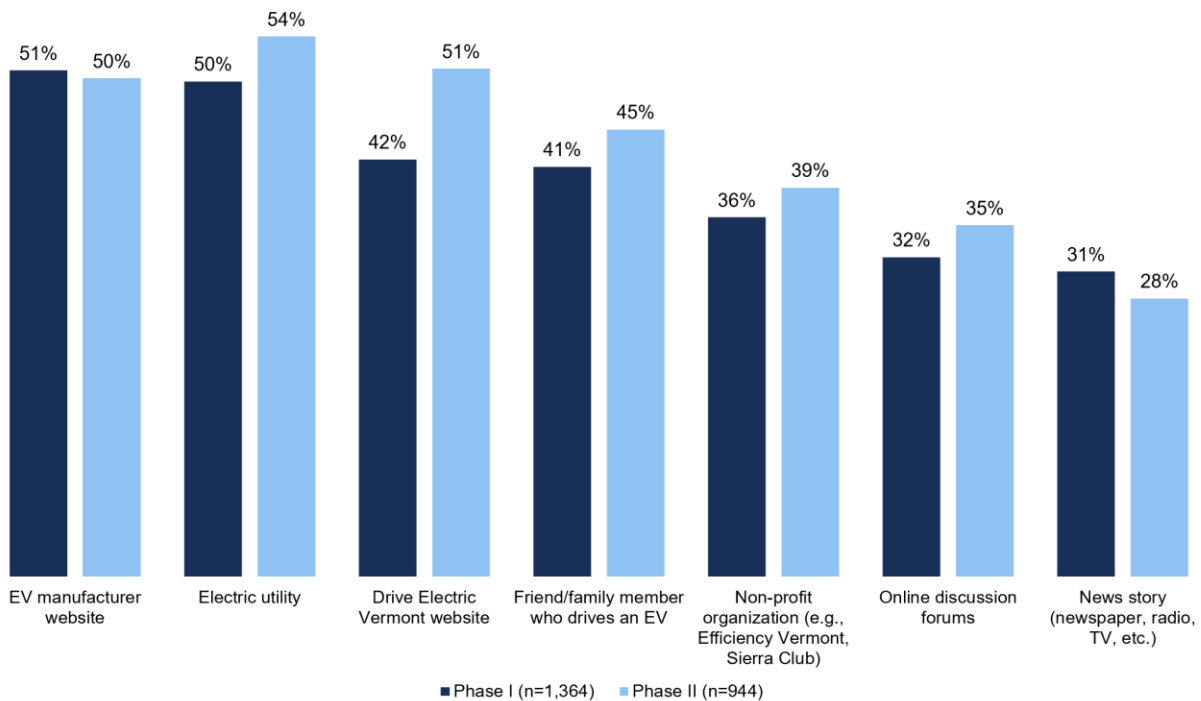
**Figure 11. Important Sources of Information in Decision to Choose EV over Gas-Powered Vehicle**



Source: Survey question B3/C3: For each source, please rate how important the source’s information was in your decision to acquire an electric vehicle (EV) over a similar gas-powered vehicle. Includes the 5 most common sources considered important or very important. (n=903)

Figure 12 compares the responses to this question between Phase I and Phase II. Notably, the percentage of respondents reporting that electric utilities, the Drive Electric Vermont website, and friends or family members who drive an EV were *important* or *very important* increased by 4%, 9%, and 4%, respectively.

Figure 12. Important Sources of Information: Comparison of Phase I and Phase II Results



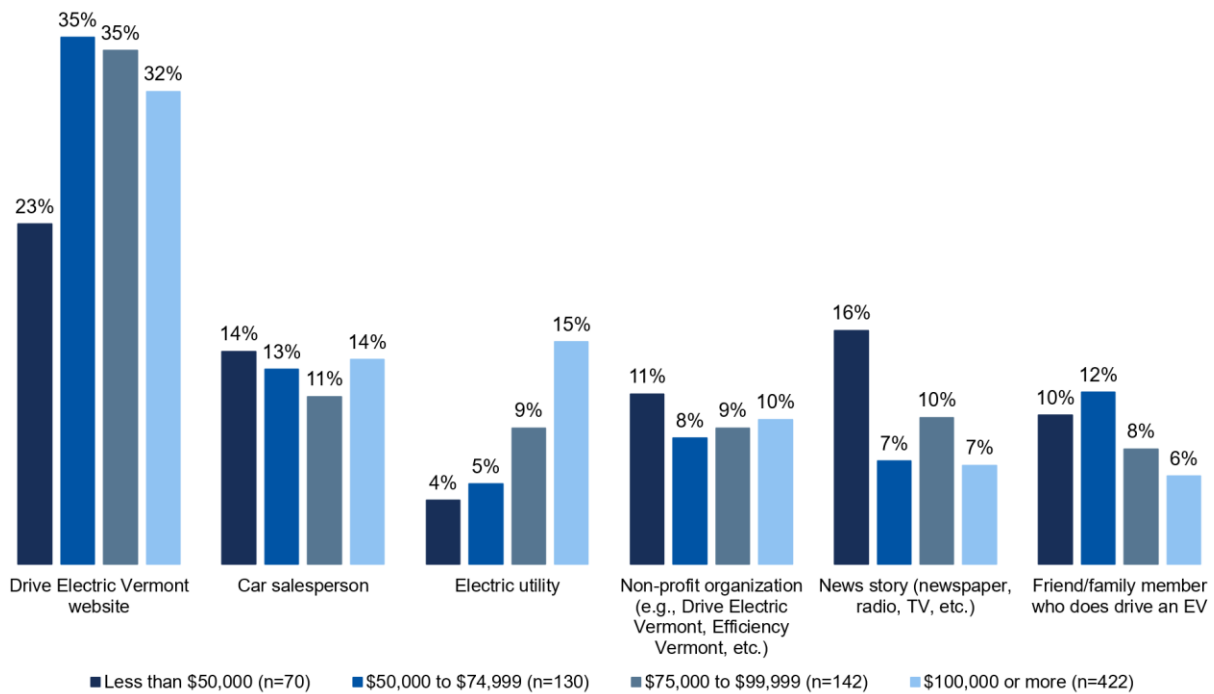
Source: Survey question B3/C3: For each source, please rate how important the source’s information was in your decision to acquire an electric vehicle (EV) over a similar gas-powered vehicle. Includes the 5 most common sources considered important or very important. (n=944)

### Awareness of EV Incentives

The most common source of information for respondents to learn about the available EV incentives was the Drive Electric Vermont website, with 32% of respondents reporting that they first heard about the incentives via this website (Figure 13), followed by car salespeople, electric utilities, nonprofit organizations, news stories, and friends and family members who drive an EV were common means for respondents to learn about the incentives. An interesting result is that car salespeople were the second most common method for respondents to learn about the incentives but were the 10th most important source of information (by percentage reporting a source as *important* or *very important*) in choosing an EV over a similar gas-powered vehicle. This suggests that while car salespeople are a common method to hear about incentives, the information provided by car salespeople may not be seen as valuable relative to other sources.



Figure 13. How Respondents Learned about Incentives



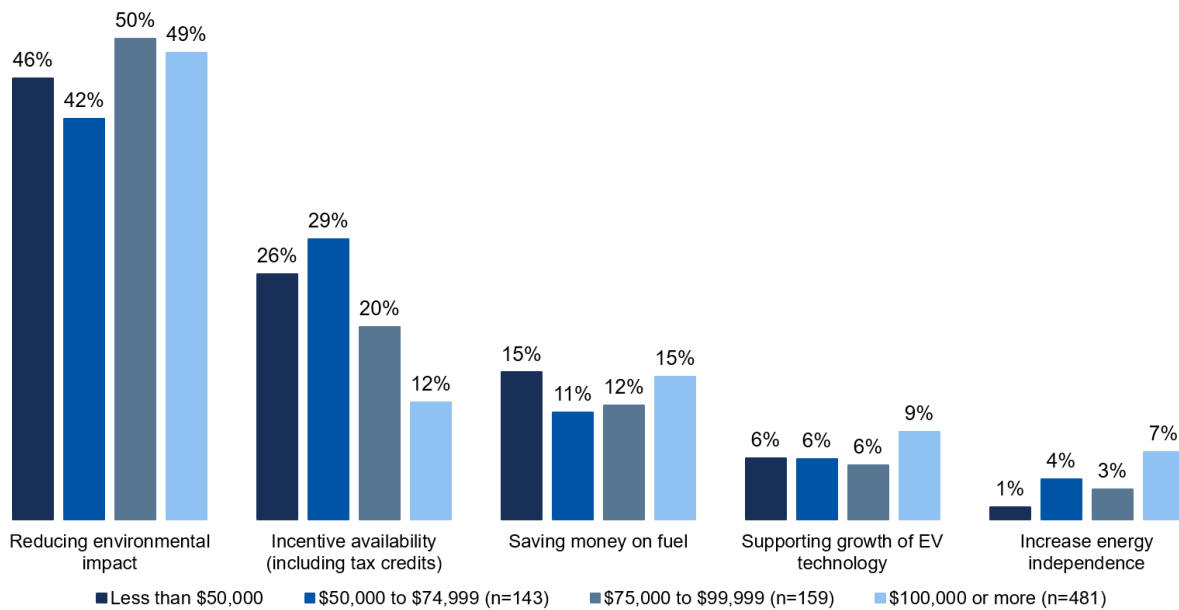
Source: Survey question C1/D2: How did you first hear about the incentive(s) you received? (n=852)

Respondents with annual household incomes below \$50,000 were more likely than the total survey population to first learn about incentives through nonprofit organizations, news stories, and friends or family who drive an EV. These same respondents were less likely than the larger survey population to first learn about incentives through the Drive Electric Vermont website or their electric utility.

### Reasons for Buying an EV

Figure 14 details the most important reasons for choosing an EV over a similar gas-powered vehicle. Overall, the most important reason reported was reducing environmental impact (48%), followed distantly by incentive availability (17%), saving money on fuel (14%), supporting growth of EV technology (8%), and increasing energy independence (6%). Respondents with annual household incomes below \$75,000 were more likely to be motivated by incentive availability. Those with an annual household income of \$75,000 or more were more likely to be motivated by reducing environmental impact, supporting growth of EV technology, and increasing energy independence.

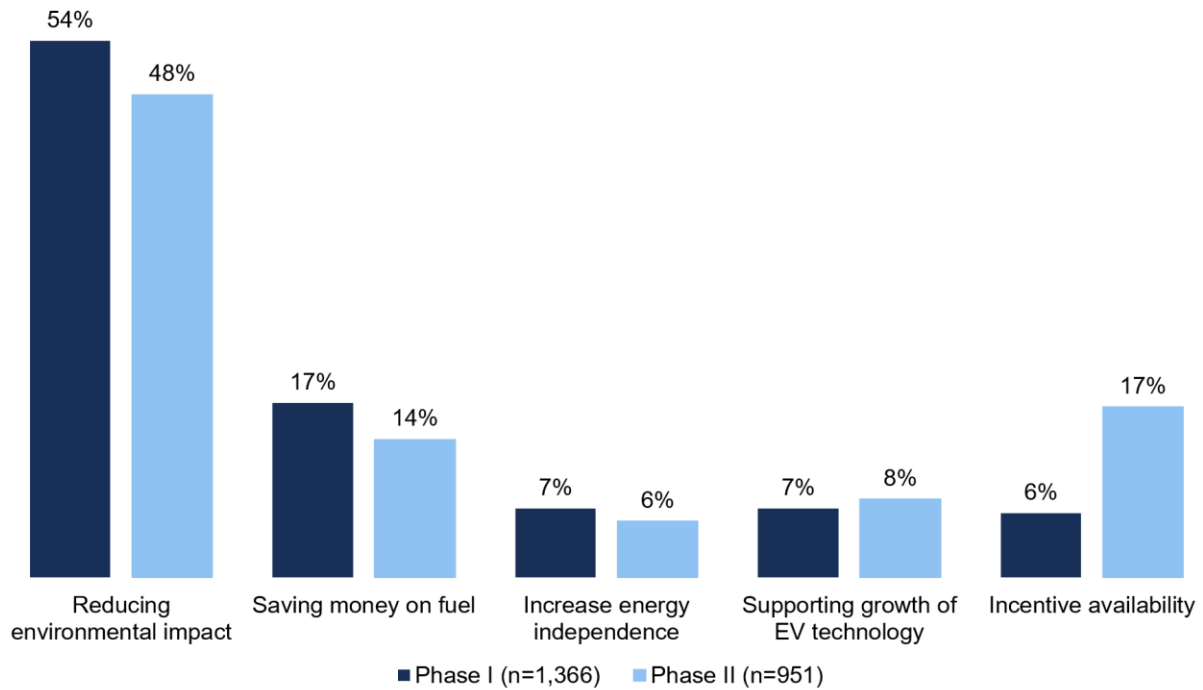
Figure 14. Most Important Reasons for Choosing an EV



Source: Survey question B4/C4: Which of the following best describes the most important reason you chose an EV rather than a similar gas-powered vehicle? (n=951)

As shown in Figure 15, in Phase II, respondents were slightly less likely than those in Phase I to claim that reducing environmental impact was the most important reason for choosing an EV over a similar gas-powered vehicle (48% in Phase II, 54% in Phase I). Additionally, respondents in Phase II were more likely to claim that incentive availability was the most important reason for choosing an EV; this percentage increased from 6% in Phase I to 17% in Phase II and may be linked to the higher importance of electric utilities and the Drive Electric Vermont as sources of information in Phase II compared to Phase I. With the increased reliance on these reliable sources, Phase II respondents may be more aware and knowledgeable about EV incentives than respondents in Phase I, and thus more likely to claim incentive availability as an important reason for choosing an EV.

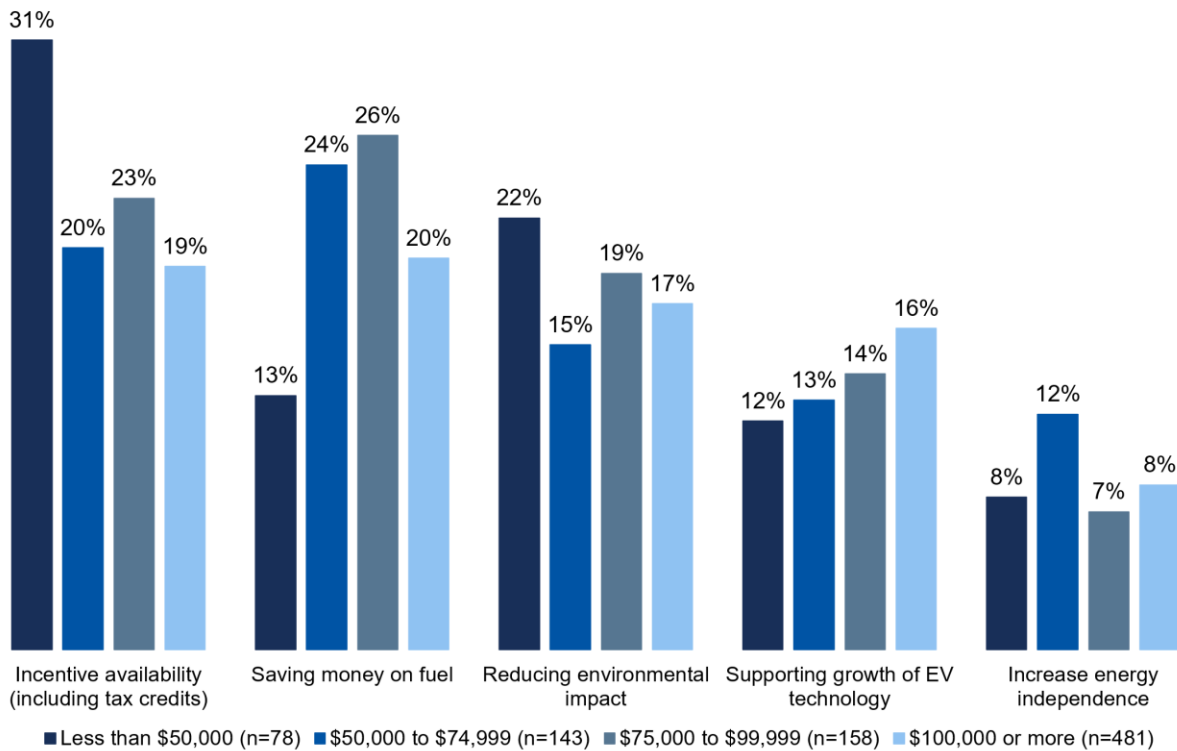
Figure 15. Most Important Reasons for Choosing an EV: Comparison of Phase I and Phase II Results



Source: Survey question B4/C4: Which of the following best describes the most important reason you chose an EV rather than a similar gas-powered vehicle? (n=951)

Respondents' *second* most important reason for choosing an EV over a similar gas-powered vehicle were much more varied. Figure 16 shows that the most common second most important reasons were incentive availability (21%), saving money on fuel (21%), reducing environmental impact (18%), supporting growth of EV technology (15%), and increasing energy independence (9%). Compared to the total survey population, respondents with annual household income below \$50,000 were more likely to report a second most important reason of incentive availability and reducing environmental impact.

Figure 16. Second Most Important Reasons for Choosing an EV

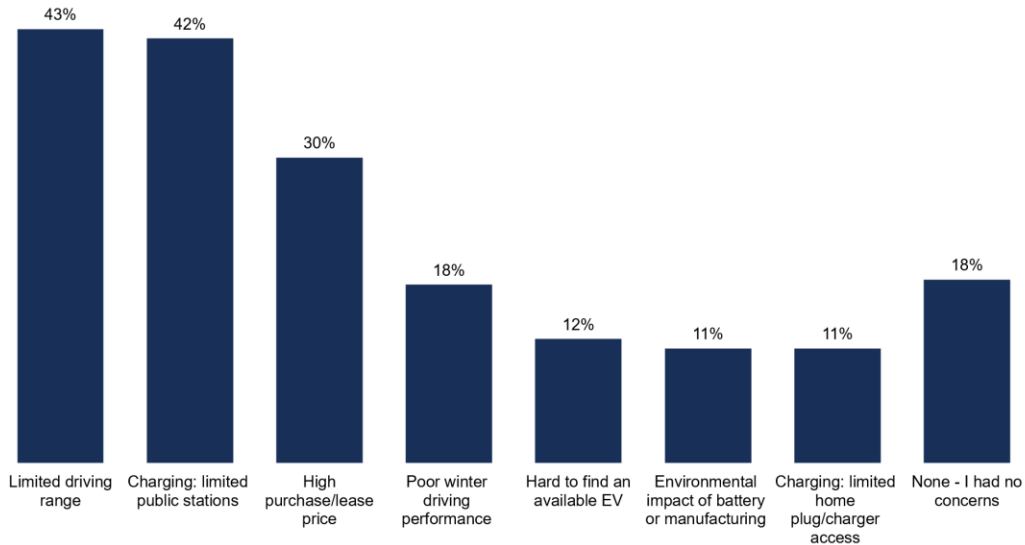


Source: Survey question B5/C5: Which of the following best describes the second most important reason you chose an EV rather than a similar gas-powered vehicle? (n=950)

### Barriers to Choosing an EV

Figure 17 details barriers that survey respondents encountered when purchasing an EV. Overall, the most commonly reported reasons for hesitation when considering an EV were limited driving range (43%), charging: limited public charging stations (42%), and high purchase/lease price (30%). The two most common reasons reflect range anxiety, which is a common concern among potential EV buyers.

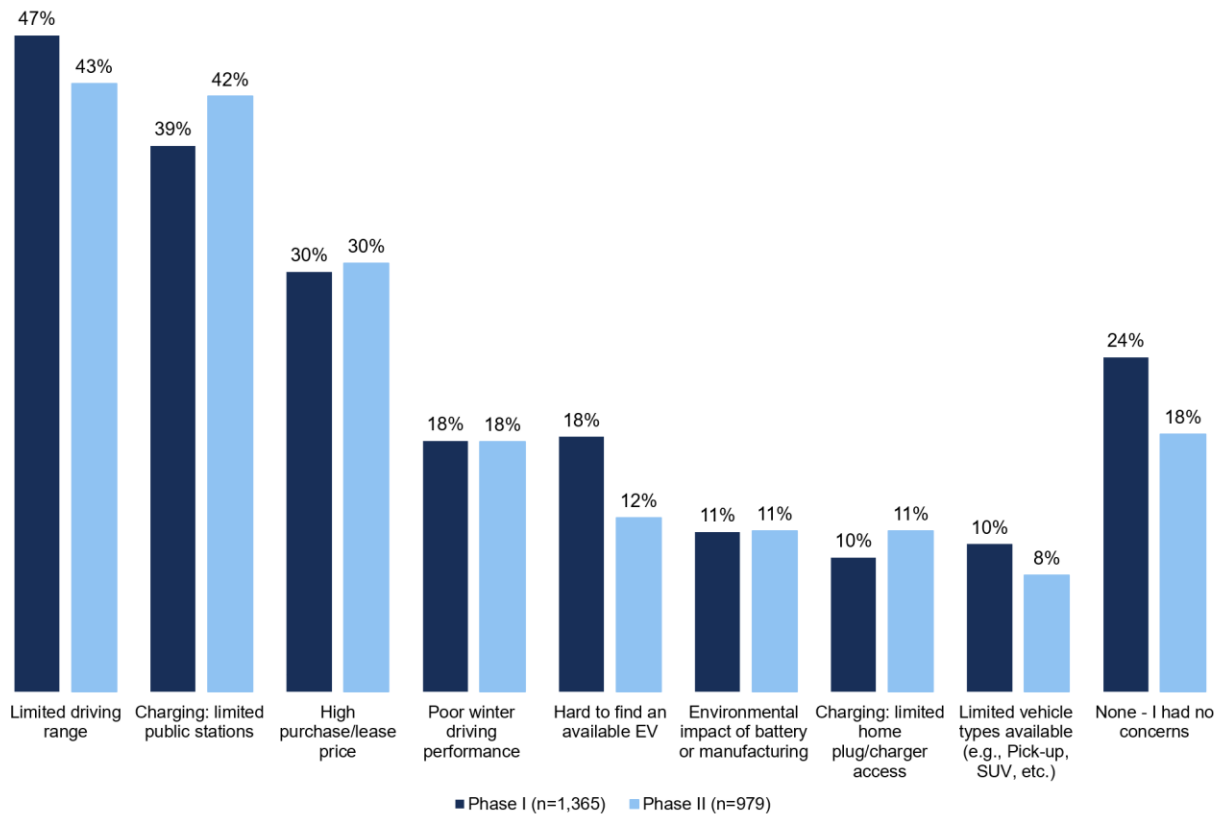
Figure 17. Barriers to Choosing an EV



Source: Survey question B6/C6: The following are reasons some people say they would not choose an EV. Which of these, if any, caused you to hesitate when choosing an EV rather than a gas-powered vehicle? If you had no hesitations about choosing an EV rather than a gas-power vehicle, please select “None – I had no concerns.” (n=979)

As shown in Figure 18, Phase I and Phase II results were quite similar for this question. Limited driving range, as a reason for hesitation, decreased from 47% to 43%, but concerns about public charging increased from 39% to 42%. Another notable result is that the percentage of respondents reporting they had no concerns was 6% lower in Phase II, decreasing from 24% to 18%.

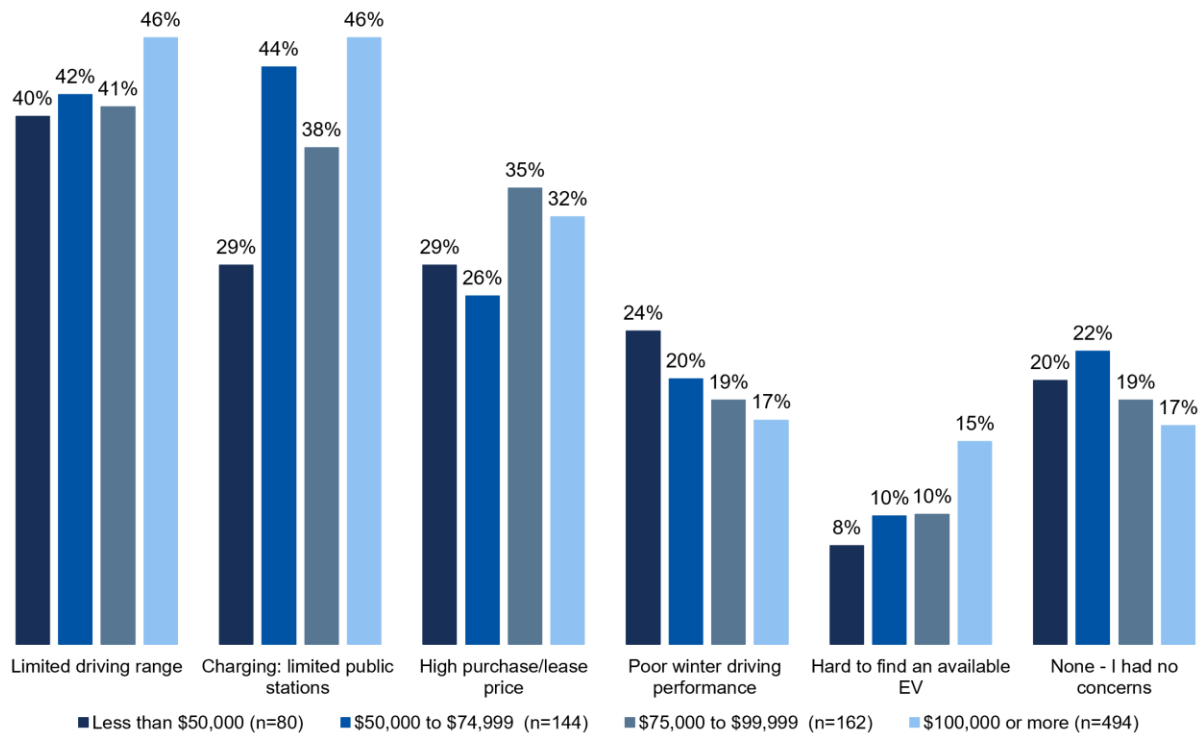
Figure 18. Barriers to Choosing an EV: Comparison of Phase I and Phase II Results



Source: Survey question B6/C6: The following are reasons some people say they would not choose an EV. Which of these, if any, caused you to hesitate when choosing an EV rather than a gas-powered vehicle? If you had no hesitations about choosing an EV rather than a gas-power vehicle, please select “None – I had no concerns.” (n=979)

Figure 19 shows the Phase II results compared by annual household income. Among respondents with an annual household income of less than \$50,000, concerns about limited driving range and charging availability were relatively lower than for the total survey population.

Figure 19. Barriers to Choosing an EV by Income



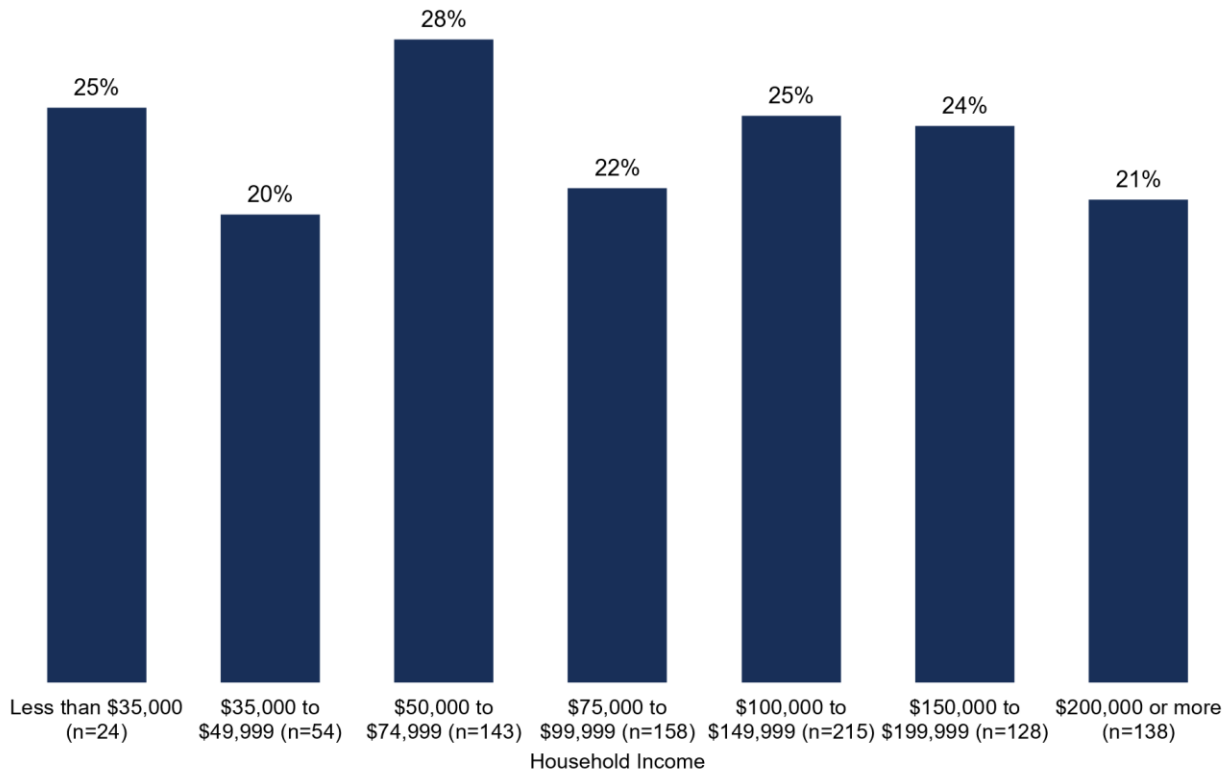
Source: Survey question B6/C6: The following are reasons some people say they would not choose an EV. Which of these, if any, caused you to hesitate when choosing an EV rather than a gas-powered vehicle? If you had no hesitations about choosing an EV rather than a gas-power vehicle, please select “None – I had no concerns.” (n=979)

### Vehicle Options Considered

Overall, 23% of respondents also considered buying or leasing a conventional gas vehicle when they shopped for an EV. In Phase I, this percentage was 14%, indicating that a higher percentage of survey respondents in Phase II considered a conventional gas vehicle. As Figure 20 shows, there were no significant differences between income groups; between 20% and 25% of all income groups considered buying or leasing a conventional gas vehicle when they purchased an EV.

In Phase I, 14% of respondents considered purchasing a gas vehicle, compared to 23% in Phase II.

Figure 20. Percentage of Respondents Who Also Considered a Conventional Gas Vehicle



Source: Survey question B7/C7: When you shopped for your EV, did you also consider buying or leasing a conventional gas vehicle? (n=950)

Table 7 details the EVs purchased by survey respondents by make, model, and year.

Table 7. EVs Purchased by Make, Model, and Year

Make (n=976)	Count
Chevrolet	16.2%
Tesla	15.7%
Volkswagen	12.3%
Toyota	11.3%
Nissan	9.4%
Model (n=970)	Count
Tesla Model Y Long Range AWD	9.5%
Chevrolet Bolt EUV	8.0%
Chevrolet Bolt EV	7.8%
Toyota RAV4 Prime 4WD	6.5%
Volkswagen ID.4 AWD Pro S	4.9%



Year (n=927)	Count
2019 or earlier	5.6%
2020	2.0%
2021	3.7%
2022	10.4%
2023	66.6%
2024	11.8%

Source: Survey question B1/C1: Please provide the make, model and year of the electric vehicle you received the incentive for. (n=976)

The most common vehicle manufacturers (or “makes”) among survey respondents were Chevrolet, Tesla, Volkswagen, Toyota, and Nissan. The most common vehicle models among survey respondents were the Tesla Model Y Long Range AWD, Chevrolet Bolt EUV, Chevrolet Bolt EV, Toyota RAV4 Prime 4WD, and the Volkswagen ID.4 AWD Pro S. Most vehicles purchased by survey respondents were model year 2022 or newer (88.7%).

## Program Experience and Satisfaction

This section details the experience and satisfaction of incentive recipients. Specifically, it details survey respondents’ ease of applying for the incentive, satisfaction with the time it took to receive the incentive, satisfaction with the quality of information provided about the incentive, and satisfaction with the incentive amount itself.

## Program Participation Among Low- and Moderate-Income Residents

### Participation Rates

Overall, residents with annual household incomes below \$75,000 were less likely than respondents with higher annual income to participate in the program or receive incentives from their electric utility or the State of Vermont’s AOT to purchase or lease an EV. Only 8% of the survey population reported an annual household income of \$49,999 or less; an additional 15% reported an annual household income between \$50,000 and \$74,999. However, according to the 2022 American Community Survey’s five-year estimates, 44.6% of Vermont households have an annual household income of \$74,999 or less.<sup>11</sup> This suggests that in survey population, and potentially the population of EV buyers, households with incomes less than \$75,000 are underrepresented.

### Barriers to Participation

Relative to the whole population, survey respondents with annual household incomes below \$50,000 were more likely to learn about available incentives through news stories, nonprofit organizations, or friends or family members who drive an EV and less likely to learn about incentives through the Drive

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<sup>11</sup> Source: <https://data.census.gov/table/ACSST5Y2022.S1901?q=annual household income&g=040XX00US50>

Electric Vermont website or their electric utility. Similarly, this group of respondents rated the Drive Electric Vermont website as a less important source of information in their choice to purchase or lease an EV over a similar conventional gas vehicle (relative to the total survey population) and that nonprofit organizations and friends and family members who drive an EV were a more important source of information in this choice.

Respondents with low and moderate incomes also reported different motivations than those of the overall survey population for purchasing an EV, citing the availability of incentives and saving money on fuel as their primary motivations. They also reported higher levels of hesitation about the high purchase or lease price of EVs. These respondents also demonstrated different charging and driving habits, as they were less likely to charge their EVs at home and more likely to use public chargers. When charging at home, these respondents were also less likely to use managed Level 2 chargers. Additionally, these respondents reported driving fewer miles per year relative to the total survey population, but they drove a higher percentage of those miles in their EVs and tended to take fewer trips.

### Processing of EV Incentives

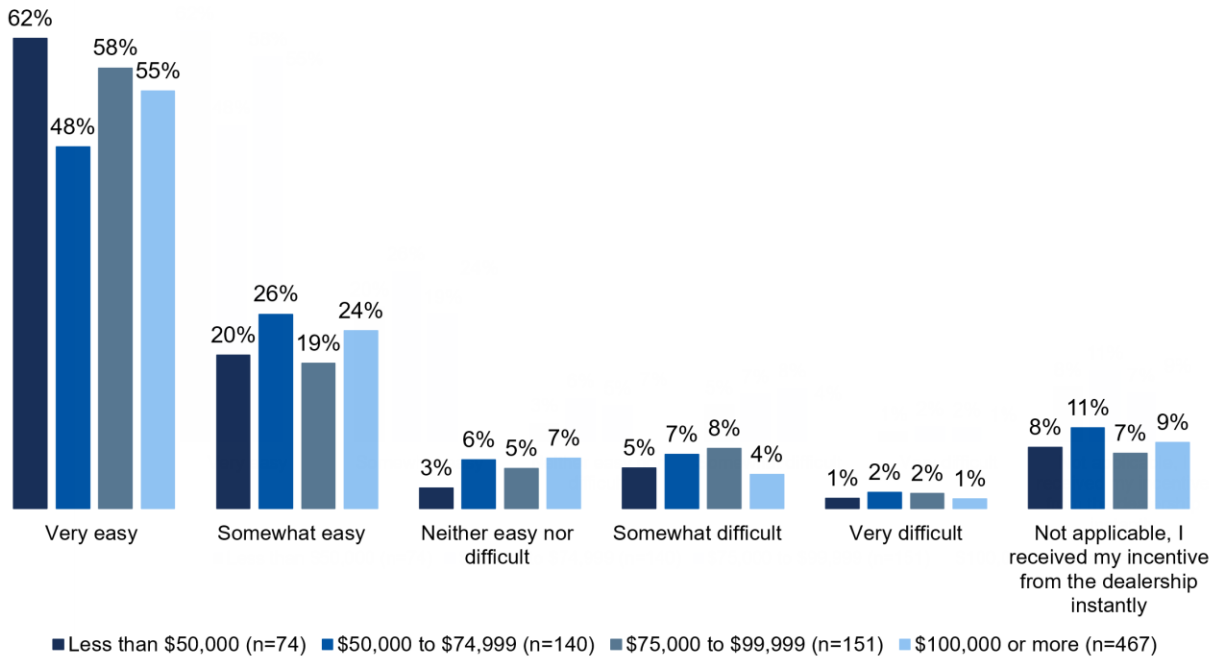
50% of Anonymous survey respondents reported receiving their incentive through the dealership at the time of sale or lease. Slightly fewer (46% of Anonymous survey respondents) reported receiving their incentive through an incentive application after purchasing or leasing, and the remaining 4% respondents did not know the delivery channel of their incentive<sup>12</sup>.

Figure 21 examines the ease of applying for the incentive from a respondent's electric utility or the State of Vermont's AOT. Overall, 78% of respondents reported this as *very easy* (55%) or *somewhat easy* (23%). Among respondents with an annual household income of less than \$50,000, 82% of respondents reported this process as *very easy* or *somewhat easy*. Of respondents with an annual household income between \$50,000 and \$74,999, 74% reported this same result.

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<sup>12</sup> Source: Survey question D1 (anonymous survey): Did you receive your incentive at a participating dealership at the time of sale/lease or by submitting an incentive application after the sale/lease was completed? (n=850)

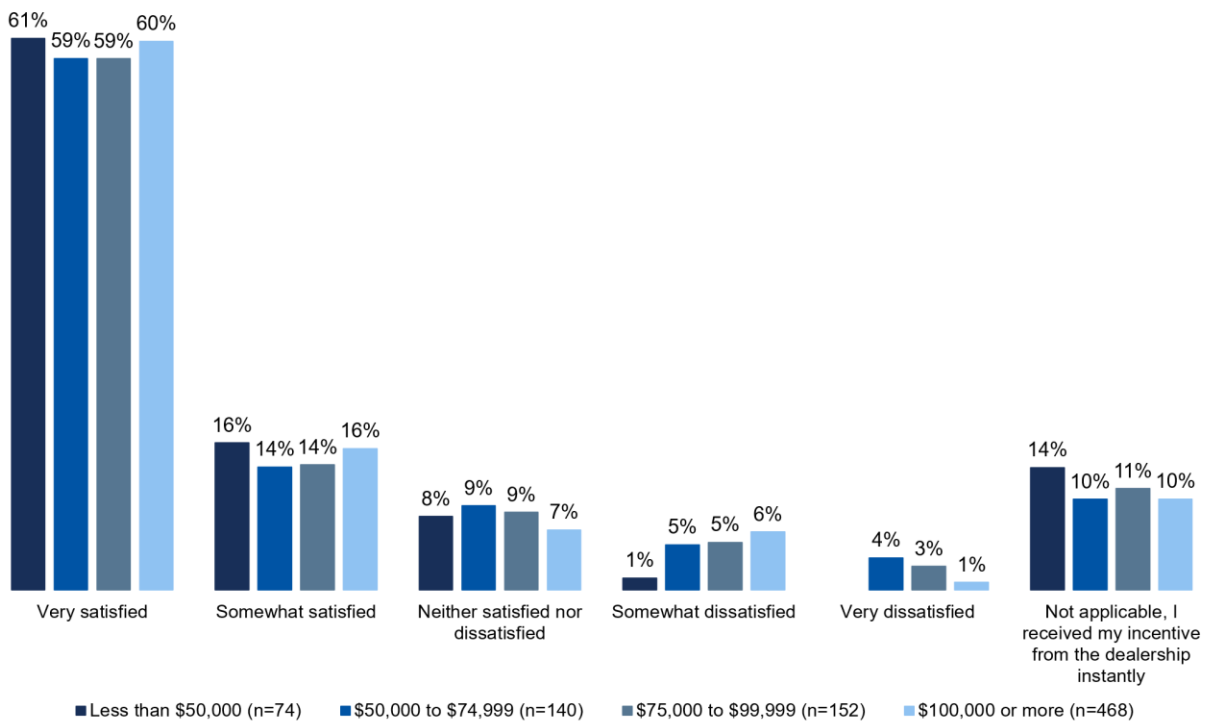
Figure 21. Ease of Applying for Incentive



Source: Survey question D1/E1: How easy was the process of applying for the incentive from your electric utility (or BED) or the State of Vermont? Percentages shown indicate the percentage of respondents who answered “easy” or “very easy.” (n=929)

In Figure 22, we asked about respondents’ satisfaction with the time it took to receive their incentive. Overall, 74% of respondents reported being very satisfied or somewhat satisfied with the time it took to receive their incentive, and another 11% respondents claimed that this question was not applicable because they received their incentive instantly at the dealership.

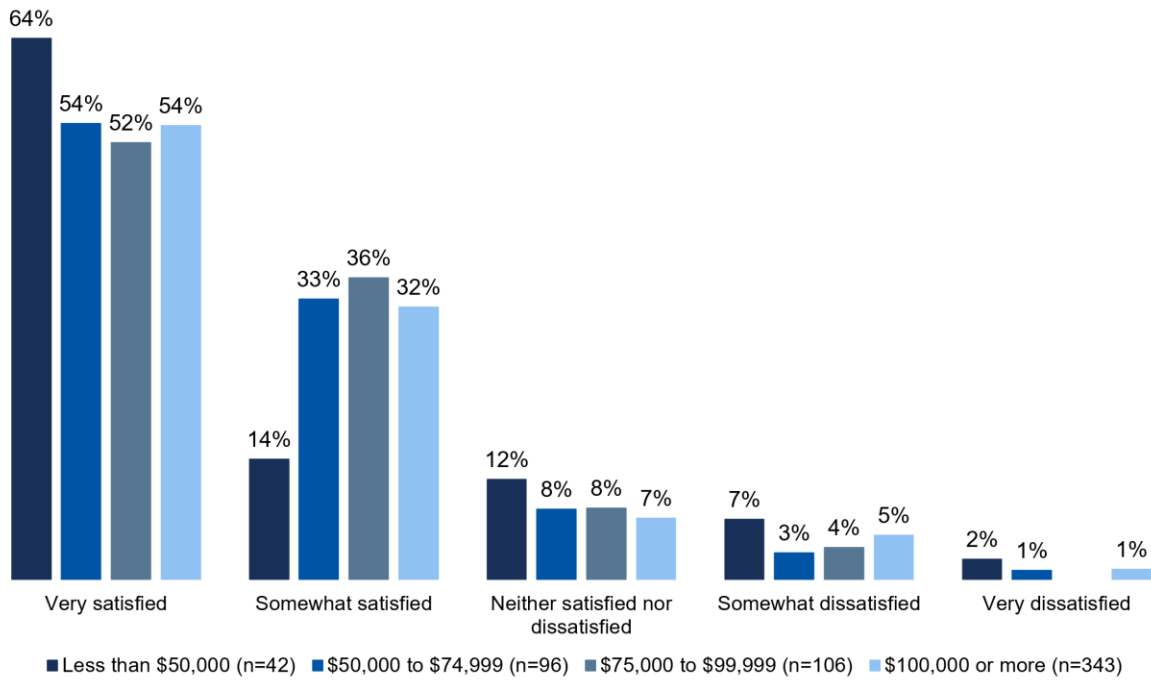
Figure 22. Satisfaction with Time to Receive Incentive



Source: Survey question D2/E2: How satisfied or dissatisfied were you with the time it took to receive the incentive for purchasing an EV? Percentages shown indicate the percentage of respondents who answered “satisfied” or “very satisfied.” (n=931)

We then asked about respondents’ satisfaction with the quality of the information available about EV incentives. As shown in Figure 23, 85% of respondents reported being *very satisfied* or *somewhat satisfied* with the quality of information about available EV incentives. Respondents with an annual household income of less than \$50,000 were much more likely to report being *very satisfied*, but these respondents also reported slightly higher levels of dissatisfaction with the quality of information available.

Figure 23. Satisfaction with Quality of Information about EV Incentives

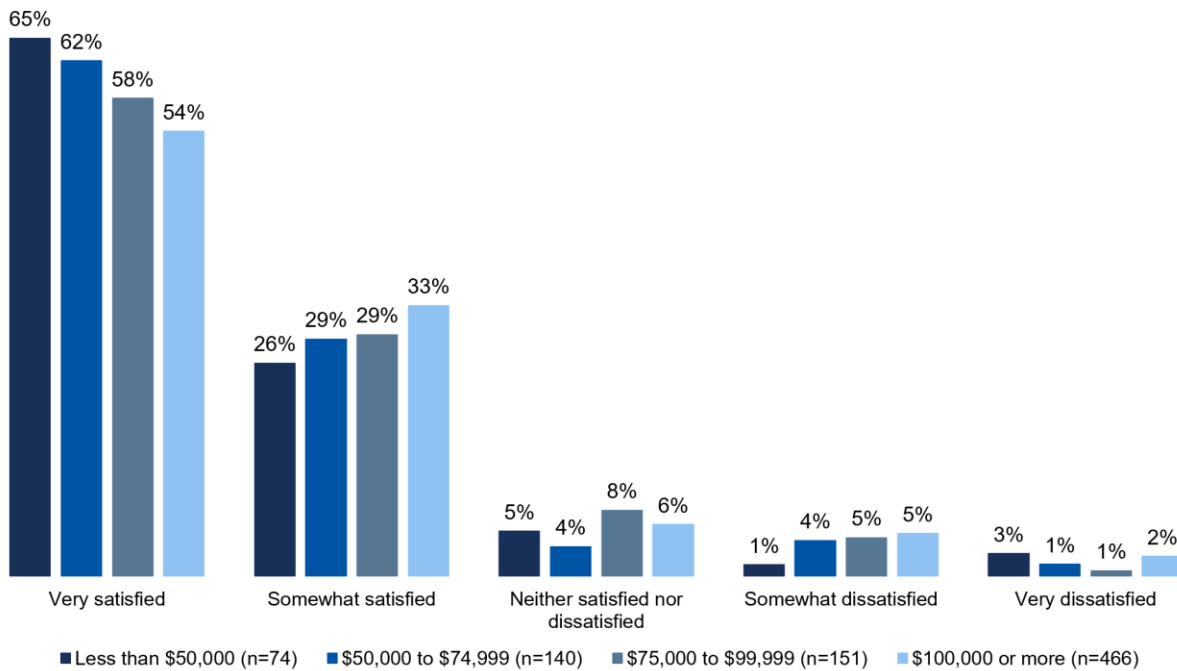


Source: Survey question D5/E5: How satisfied or dissatisfied were you with the quality of information provided about the available EV incentives? Percentages shown indicate the percentage of respondents who answered “satisfied” or “very satisfied.” (n=654)

**86%** of respondents reported being *very satisfied* or *somewhat satisfied* with the incentive amount they received

Figure 24 shows respondents’ satisfaction with the incentive amounts received. 86% of respondents reported being *very satisfied* or *somewhat satisfied* with the incentive amount they received. Respondents with a household income below \$50,000 were more likely to report being *very satisfied*.

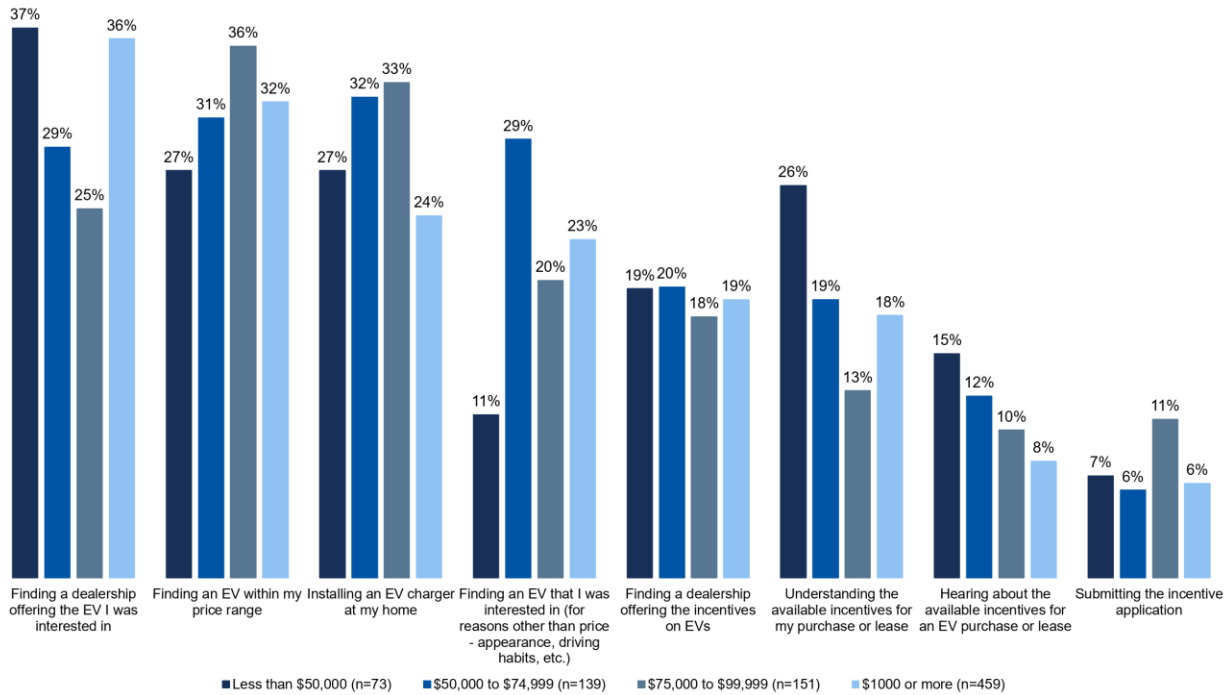
Figure 24. Satisfaction with Incentive Amounts



Source: Survey question D4/E4: How satisfied or dissatisfied were you with the incentive amount you received from your utility or the State of Vermont? Percentages shown indicate the percentage of respondents who answered “satisfied” or “very satisfied.” (n=927)

We then asked about the ease/difficulty of various specific aspects of the EV purchase and incentive process. As shown in Figure 25, among all survey respondents, the most commonly reported *difficult* or *very difficult* aspect of the EV purchase and incentive process was finding a dealership offering the EV they were interested in. This result may reflect the supply chain issues that have been present in the wider automotive industry over the last several years. The next most common reported *difficult* aspect of the EV purchase and incentive process was finding an EV within the respondent’s price range. Compared to the total survey population, those with an annual household income of less than \$50,000 were more likely to report difficulty with finding a dealership offering the incentives on EVs, understanding the available incentives, and hearing about the incentives available for EV purchases or leases. These same respondents were less likely to report difficulties finding an EV they were interested in for reasons other than price. These results reflect that understanding and accessing the available EV incentives and finding an EV in their price range were more difficult for respondents with an annual household income below \$50,000.

Figure 25. Difficulty of Different Aspects of EV Purchase and Incentive Process



Source: Survey question D7/E7: Please rate the difficulty of each aspect of the electric vehicle purchase and incentive process. Percentages shown indicate the percentage of respondents who answered “difficult” or “very difficult.” (n=918)

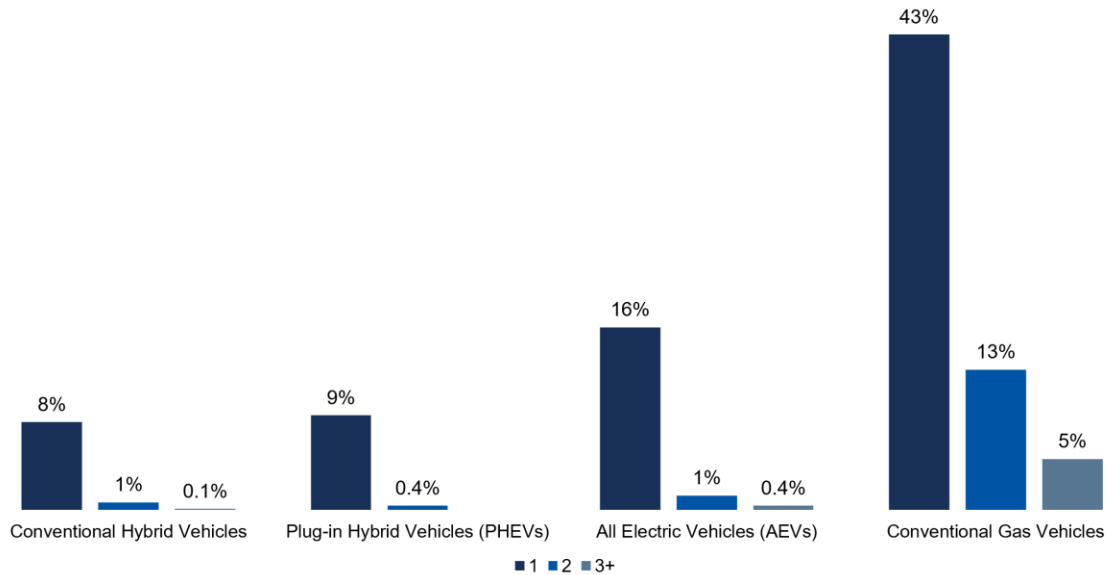
### Vehicle Ownership and Driving and Charging Habits

This section details the vehicle ownership and driving and charging habits of survey respondents. It provides insight into how respondents of various income and residence type categories drive and charge their EVs and sheds light on potential barriers to EV adoption related to charging or driving habits.

#### Vehicle Ownership

Figure 26 provides insight into the number and type of additional vehicles (excluding the incentivized EV) owned by survey respondents.

Figure 26. Number of Additional Vehicles Owned by Type



Source: Survey question E1/F1: Excluding the incentivized EV, how many vehicles does your household currently own or lease? (Provides separate entry boxes for each type of vehicle. Percentages are the percentage of full analysis sample (n=995). Because some people left boxes blank, Cadmus assumed these respondents had zero additional vehicles of this type.)

Survey respondents were much more likely to report owning an additional conventional gas vehicle than a conventional hybrid vehicle, plug-in hybrid vehicle (PHEV), or all electric vehicle (AEV). 61% of survey respondents reported owning at least one additional conventional gas vehicle. However, only 17.4% of survey respondents reported owning at least one additional AEV. This percentage was even lower for conventional hybrid vehicles (9.1%) and PHEVs (9.4%).

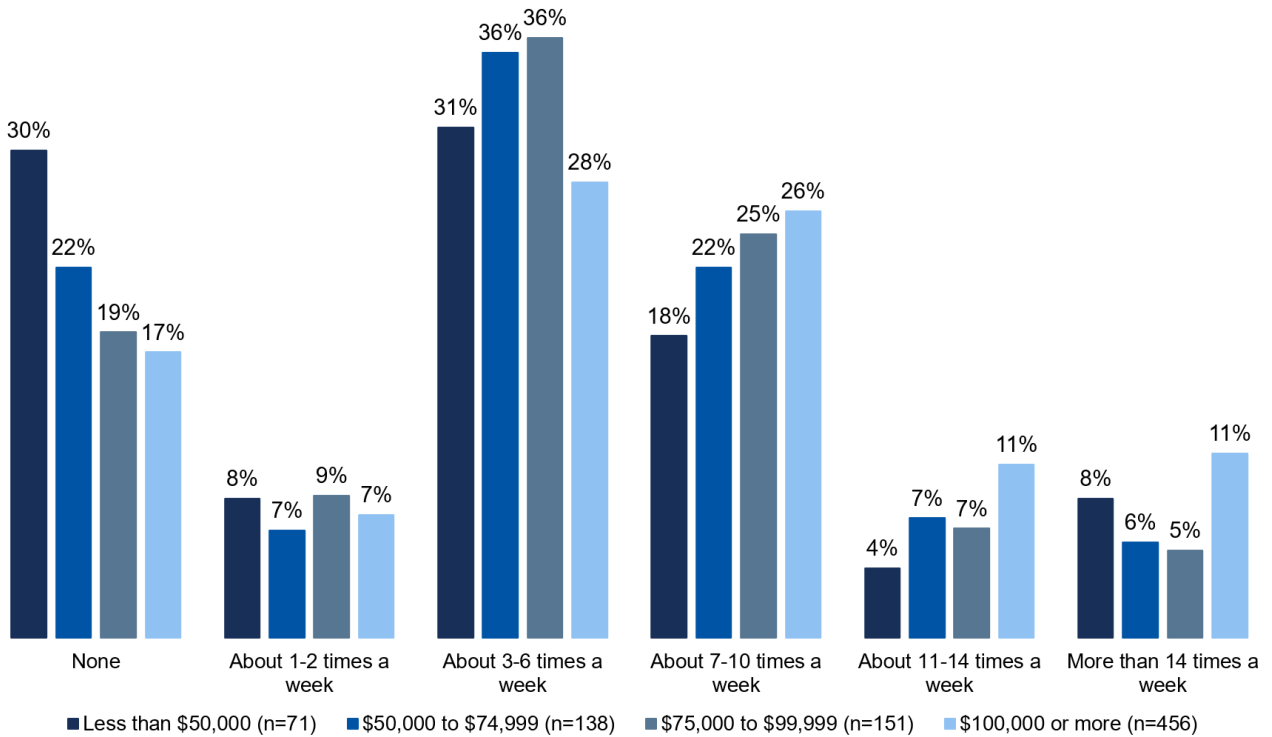
**61% of respondents reported owning at least one additional conventional gas vehicle**

**Household Driving Habits**

Detailed in Figure 27, a plurality of survey respondents reported making a total of three to six vehicle round trips per week for all members of a household. This was closely followed by respondents reporting seven to ten vehicle round trips per week. Those with an annual household income of less than \$50,000 generally reported slightly lower numbers of vehicle round trips per week for their household.



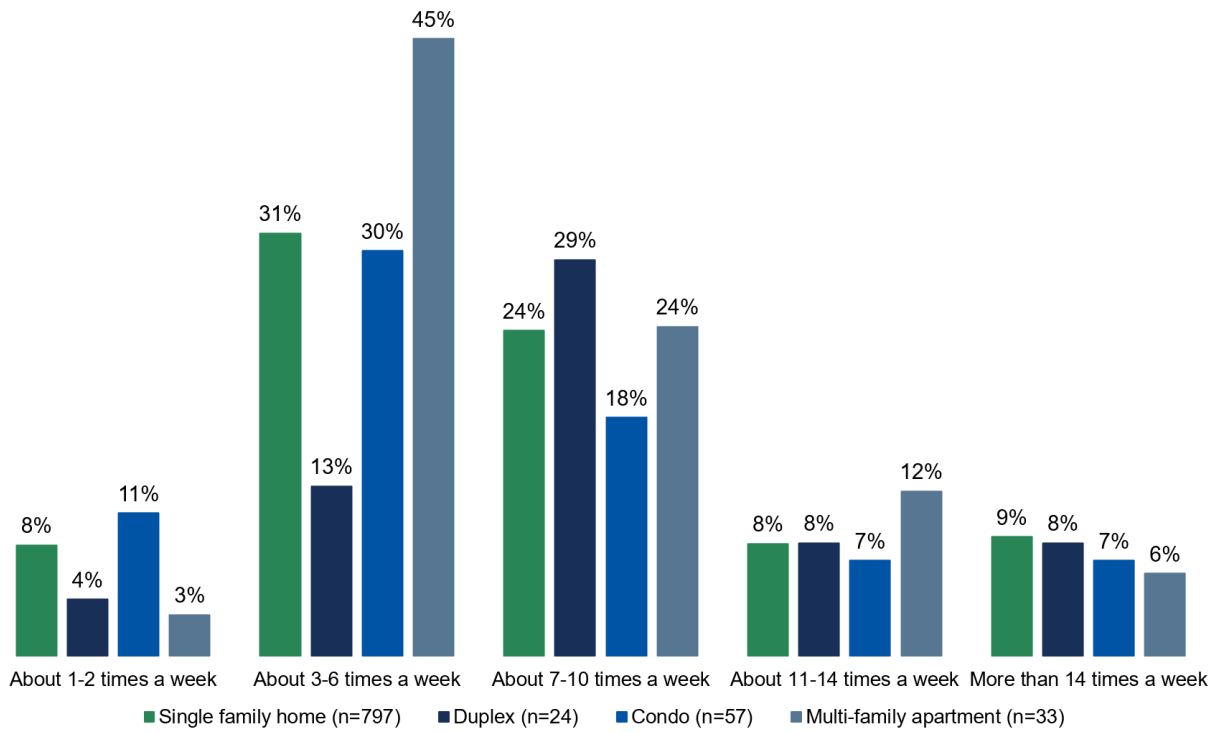
**Figure 27. Number of Vehicle Round Trips for Commuting to a Job or School Per Week by Household Income**



Source: Survey question E2/F2: How many vehicle round trips do you and others in your household take to commute to a job or school during a typical week? Please count the total number of vehicle round trips. For example, if you commute three times per week and the second member of your household separately commutes four times per week, your household’s total weekly round trips would be seven. (n=912)

Figure 28 shows the same findings as Figure 27 split by residence type. Respondents in duplexes, condos, and multifamily apartments were more likely to report taking zero vehicle round trips per week for commuting to a job or school, whereas 38% of duplex residents (n=24) reported taking zero vehicle round trips per week for commuting to a job or school.

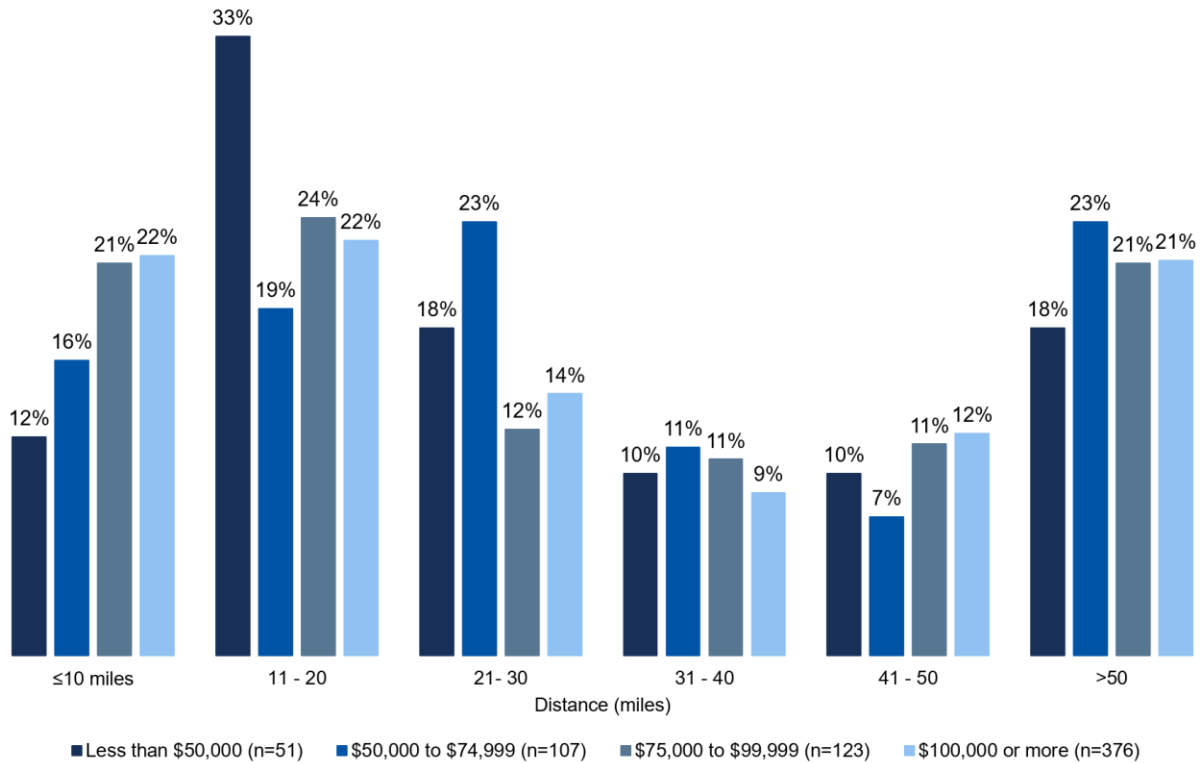
**Figure 28. Number of Vehicle Round Trips for Commuting to a Job or School Per Week by Residence Type**



Source: Survey question E2/F2: How many vehicle round trips do you and others in your household take to commute to a job or school during a typical week? Please count the total number of vehicle round trips. For example, if you commute three times per week and the second member of your household separately commutes four times per week, your household’s total weekly round trips would be seven. (n=911)

As shown in Figure 29, most (about 69%) survey respondents reported an average roundtrip commuting distance of 40 miles or less. Respondents with a household income greater than \$75,000 were more likely to report an average roundtrip commuting distance of less than or equal to 10 miles.

Figure 29. Average Roundtrip Commuting Distance by Household Income

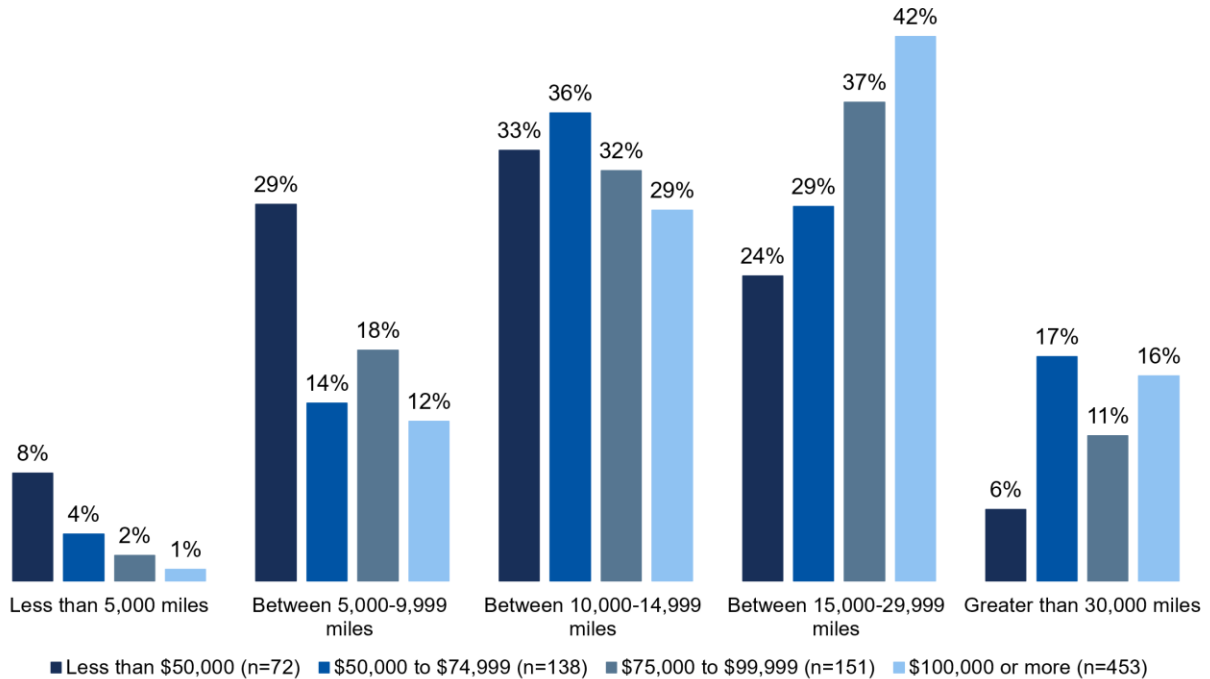


Source: Survey question E3/F3: About how many miles is the average roundtrip commute for your household? For example, if your roundtrip commute is 10 miles and the second member of your household has a separate roundtrip commute of 30 miles, your household total would be 40 miles. (n=726)

When looking at residence type, results suggest that respondents who live in condos, duplexes, or multifamily apartments typically had shorter roundtrip commuting distances. Forty percent of residents of single-family homes reported having an average roundtrip commuting distance of 20 miles or less. This number was higher for duplex residents (67%), condo residents (66%), and multifamily apartment residents (50%).

Figure 30 details respondents’ annual mileage per household. The largest percentage (38%) of survey respondents reported driving between 15,000 and 29,999 miles annually per household, followed closely by those who reported driving between 10,000 and 14,999 miles annually per household. Those with an annual household income of less than \$50,000 were more likely than the total survey population to report annual household miles driven of less than 10,000 miles, and less likely to report annual household miles driven between 15,000 and 29,999 miles. These results suggest that lower income EV buyers typically drive fewer miles per year as a household.

Figure 30. Annual Miles Driven Per Household by Household Income



Source: Survey question E4/F4: What is your best estimate of the total number of miles your household drives each year? (n=910)

When examining these same results by primary residence type, several interesting findings occur. Figure 31 shows that respondents who lived in duplexes or condos were more likely to report driving between 5,000 and 9,999 miles per year (25% and 37%, respectively) than residents of single-family homes (13%). Additionally, 15% of residents of single-family homes reported driving more than 30,000 miles per year, while only 8% of duplex residents, 4% of condo residents, and 6% of multifamily apartment residents reported a similar result. These results suggest that residents of single-family homes typically drive more miles as a household per year.

Figure 31. Annual Miles Driven Per Household by Residence Type

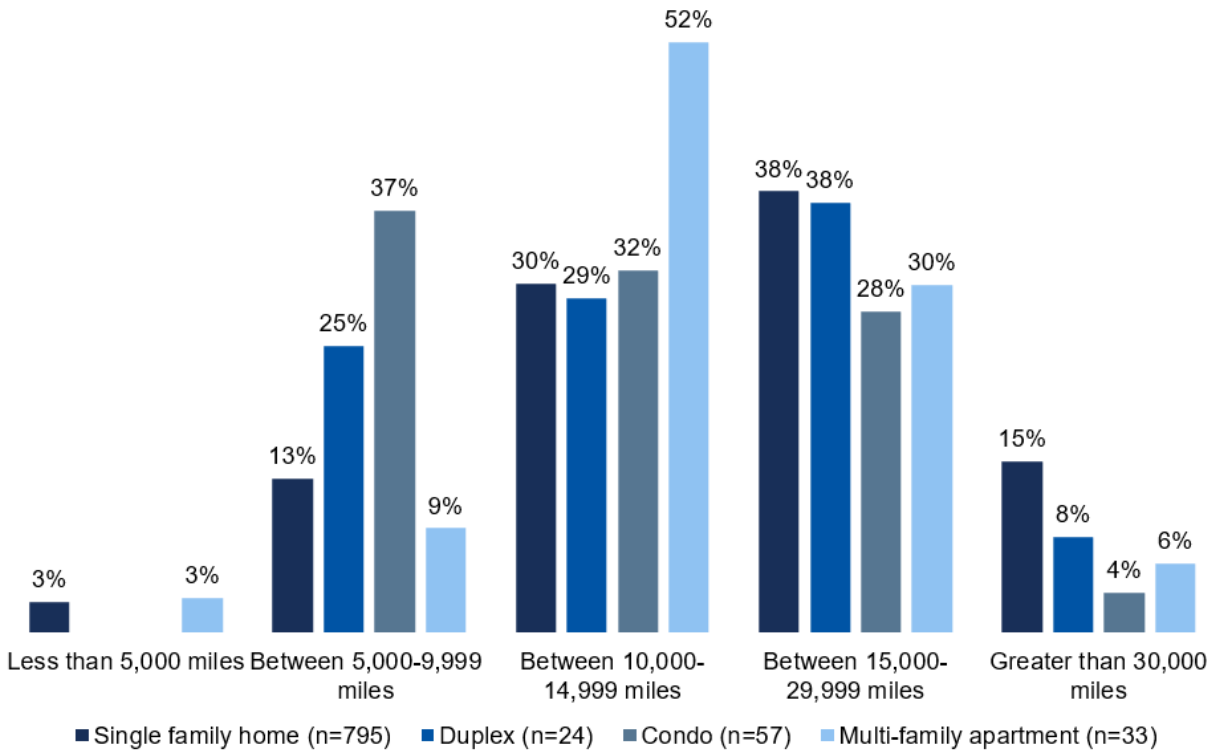
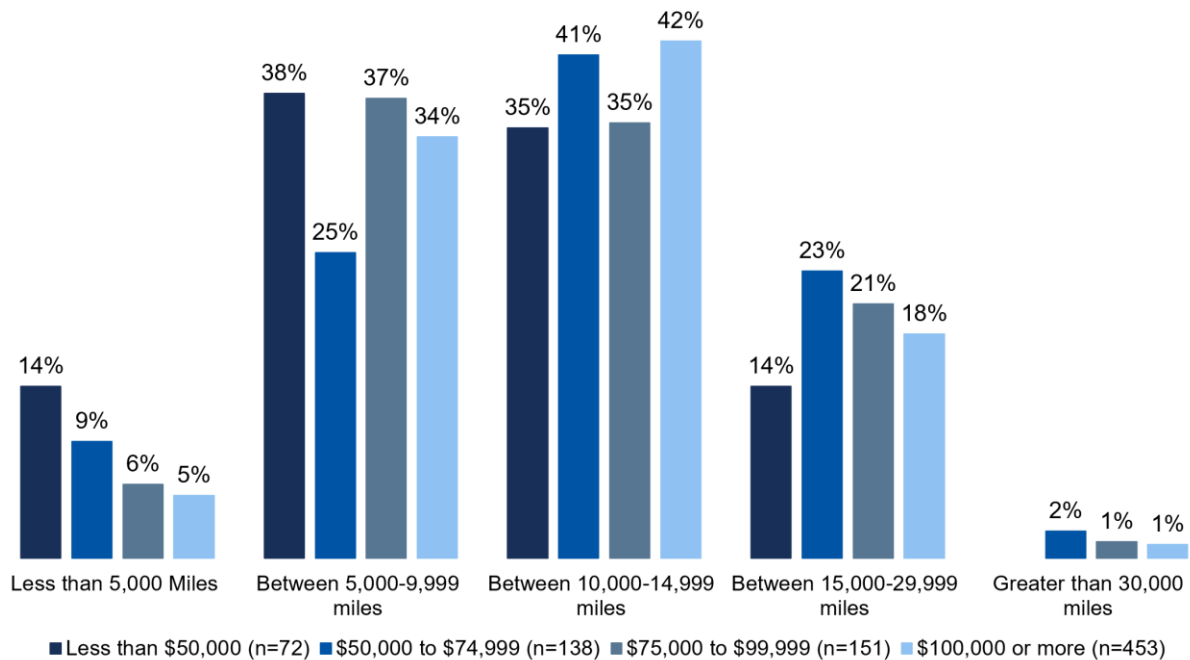


Figure 32 details the annual miles driven in the incentivized EV. Most respondents reported driving between 5,000-9,999 miles (34%), and between 10,000-14,999 miles (40%), and 19% of respondents reported driving more than 15,000 miles in their incentivized EV per year. Additionally, 7% of all respondents reported driving less than 5,000 miles per year. However, 14% of respondents with an annual household income of less than \$50,000 reported driving less than 5,000 miles per year. These results reinforce the evidence from Figure 30 that lower-income EV buyers tend to drive fewer miles per year overall.

Figure 32. Annual Miles Driven in Incentivized Vehicle by Household Income



Source: Survey question E5/F5: What is your best estimate of the number of miles your household drives in your incentivized EV each year? (n=910)

Cadmus estimated that respondents drove 63% of their annual miles in their incentivized EV.<sup>13</sup> Those with an annual household income of less than \$50,000 drove an estimated 75% of their annual miles in their incentivized EV; respondents with an annual household income between \$50,000 and \$74,999 drove an estimated 70% of their annual miles in their incentivized EV; respondents with an annual household income between \$75,000 and \$99,999 drove an estimated 69% of their annual miles in their incentivized EV; and respondents with an annual household income of \$100,000 or more drove an estimated 61% of their annual miles in their incentivized EV. These results suggest that while lower income respondents drive fewer miles, they drive more of those miles in their incentivized EV. This result could be due to lower-income respondents having fewer additional vehicles in which they could drive additional miles, especially for longer trips.

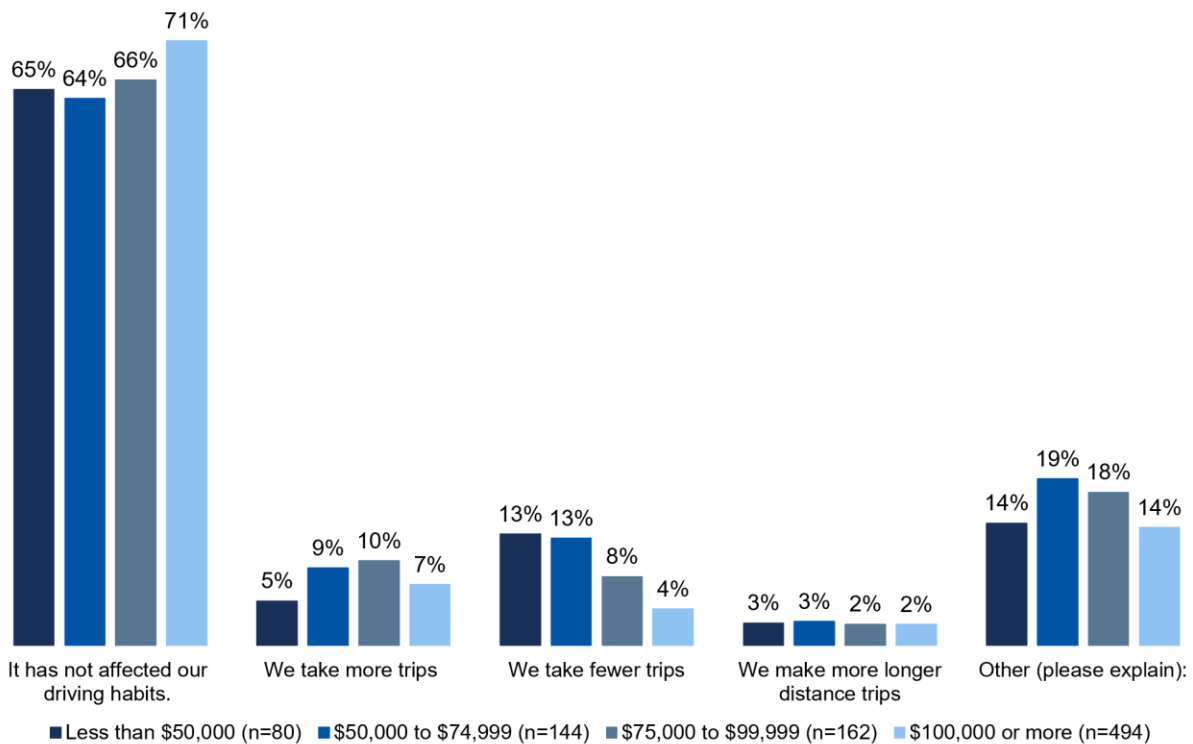
Figure 33 demonstrates how respondents’ driving habits have changed since they purchased their EV. Overall, most respondents (68%) reported that the purchase has not affected their driving habits, 7% of respondents reported that they take more trips and 7% that they take fewer trips, and 3% of

<sup>13</sup> We performed this calculation by assuming the respondent drove miles equal to the midpoint of the range they selected except for respondents in the highest range (greater than 30,000 miles). To calculate average miles driven for households in the top range, we assumed households driving more than 30,000 miles annually drove an average of 40,000 miles. We then calculated a weighted average of the mileage driven using the shares of households falling in each range.

respondents reported that they take more longer distance trips. Fifteen percent of respondents reported other changes, which included taking fewer longer distance trips; relying on conventional gas vehicles, conventional hybrid vehicles, or PHEVs for longer distance trips; being extra aware of available public chargers; and driving slower to maximize a vehicle’s range.

Respondents with an annual household income of less than \$100,000 were less likely than respondents with an annual household income of more than \$100,000 to report that their EV purchase has not affected their driving habits, and more likely to report that they take fewer trips since purchasing the EV.

**Figure 33. Changes in Driving Habits Since Purchasing the EV by Household Income**



Source: Survey Question E6/F6: How has the purchase or lease of your EV affected your household's driving habits? Please tell if the following statements are true or false about your household's driving habits. Select all that apply. (n=988)

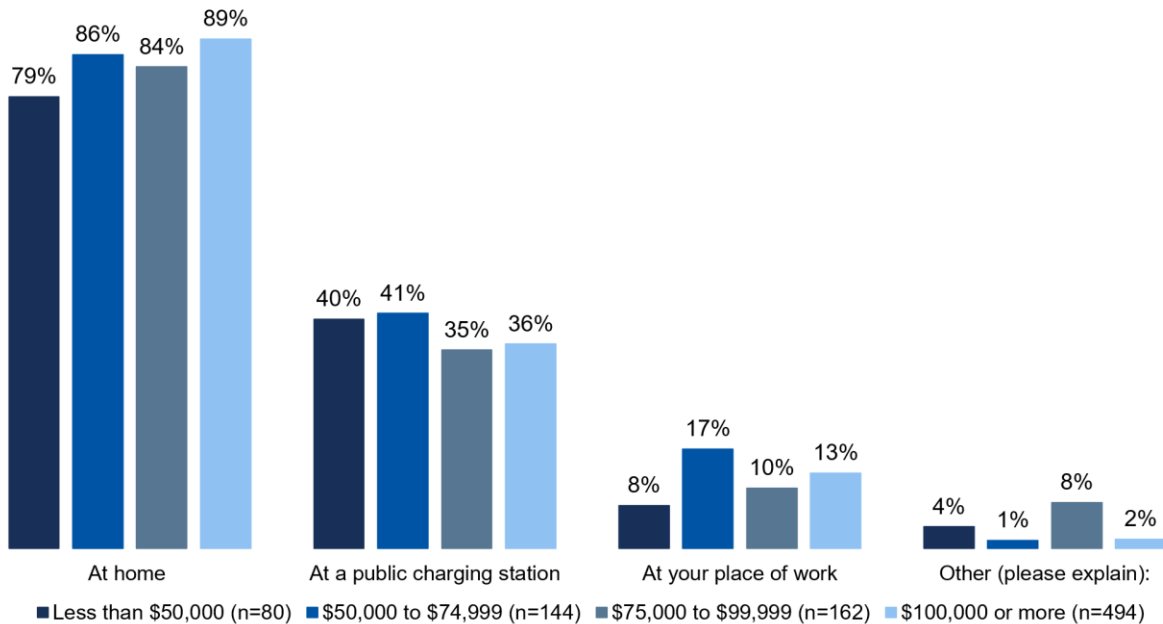
When comparing residence types, 69% of respondents who live in single-family homes reported that the purchase or lease of an EV did not affect their household’s driving habits, while 59% of respondents who lived in multifamily apartments reported that the purchase or lease of an EV did not affect their household’s driving habits.

**Charging Habits**

A total of 86% of survey respondents reported charging their incentivized electric vehicle at home, with 37% reporting charging at public charging stations and at their place of work. As Figure 34 shows, those

with an annual household income of less than \$75,000 were more likely to report using public charging stations.

**Figure 34. Charging Locations of Incentivized EV by Household Income**



Source: Survey question E7/ F7: Where do you charge your incentivized electric vehicle? Select all that apply. (n=988)

When examining this result by residence rather than by income, it is evident that those in duplexes, condos, or multifamily apartments are more reliant than residents of single-family homes on public charging stations and charging at work.

**86% of respondents reported charging their electric vehicle at home**

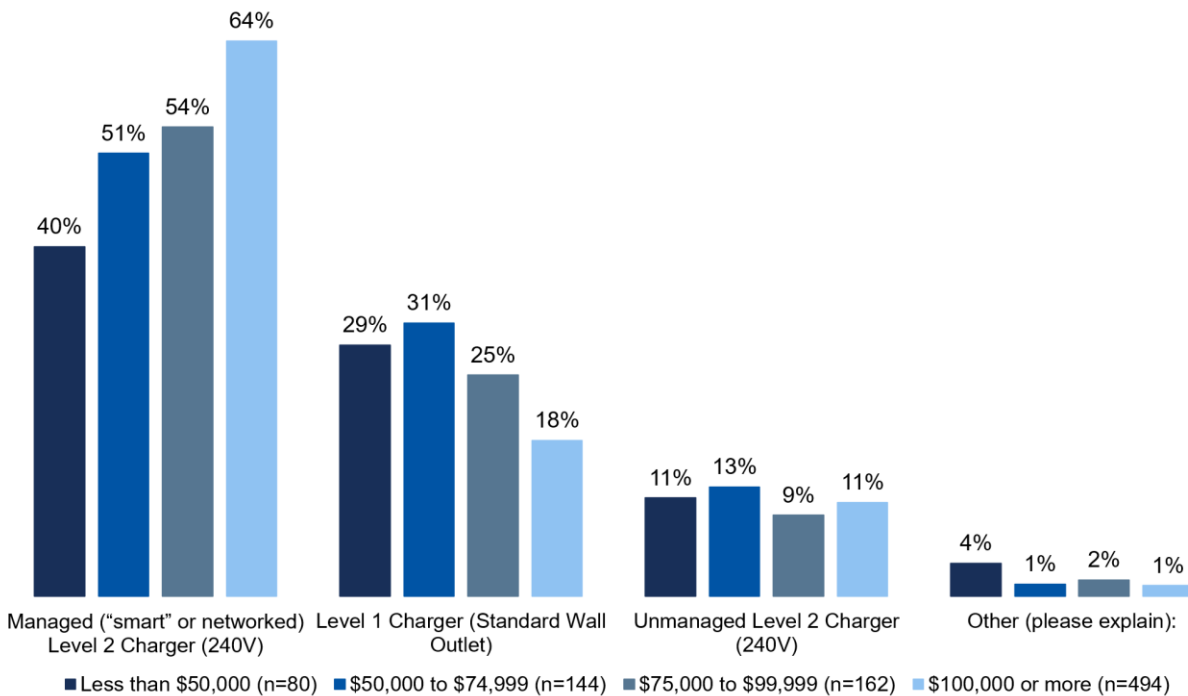
90% of residents of single-family homes reported charging their EV at home. However, 85% of duplex residents, 68% of condo residents, and 38% of multifamily residents reported charging their EV at home. Duplex, condo, and multifamily apartment residents were also more likely than single-family residents to report charging at public charging stations and at work. 35% of residents of single-family homes reported using public charging stations, and 12% reported using charging stations at work. However, 41% of duplex residents, 43% of condo residents, and 59% of multifamily apartment residents reported using public charging stations, while 11% of duplex residents, 21% of condo residents, and 27% of multifamily apartment residents reported using charging stations at work.

Figure 35 shows that the most common type of charger survey respondents used at home were managed Level 2 Chargers (57%), followed by Level 1 chargers (22%). Those with an annual household income of less than \$100,000 were more likely than those with an annual household income of more



than \$100,000 to report using a Level 1 charger or unmanaged Level 2 charger at home. This result may reflect a price and incentive knowledge barrier to installing managed Level 2 chargers among lower-income households.

**Figure 35. Types of Chargers Used at Home by Household Income**

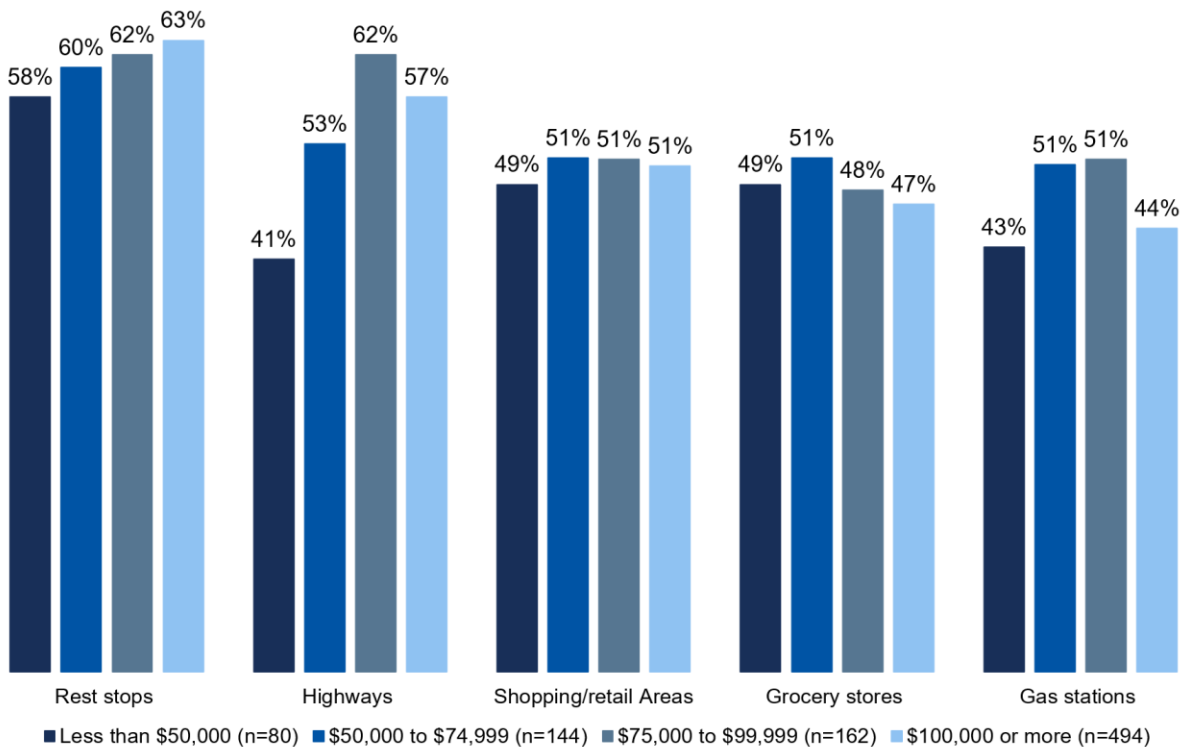


Source: Survey question E8/F8: What type(s) of charger do you use at home? Select all that apply. (n=988)

When comparing residence types, respondents who lived in condos (44%) were more likely than residents of single-family homes (21%) to report using a Level 1 charger at home, and 61% of respondents in single-family homes reported using a managed Level 2 Charger. Duplex residents, condo residents, and multifamily apartment residents reported using managed Level 2 Chargers at much lower rates: 41% 35%, and 19%, respectively.

Figure 36 shows the five most desired locations for additional public chargers. These locations were led by rest stops (62%), followed by highways (57%), shopping/retail areas (50%), grocery stores (47%), and gas stations (46%). Categories not included in the figure included hotels (44%), parks and recreation areas (40%), downtown (36%), schools/universities (28%), and airports (27%).

Figure 36. Desired Locations for Additional Public Chargers



Source: Survey question E14/F14: What specific locations would you like to see more public chargers? Select all that apply. (n=988)

## Electric Vehicle Incentive Attribution

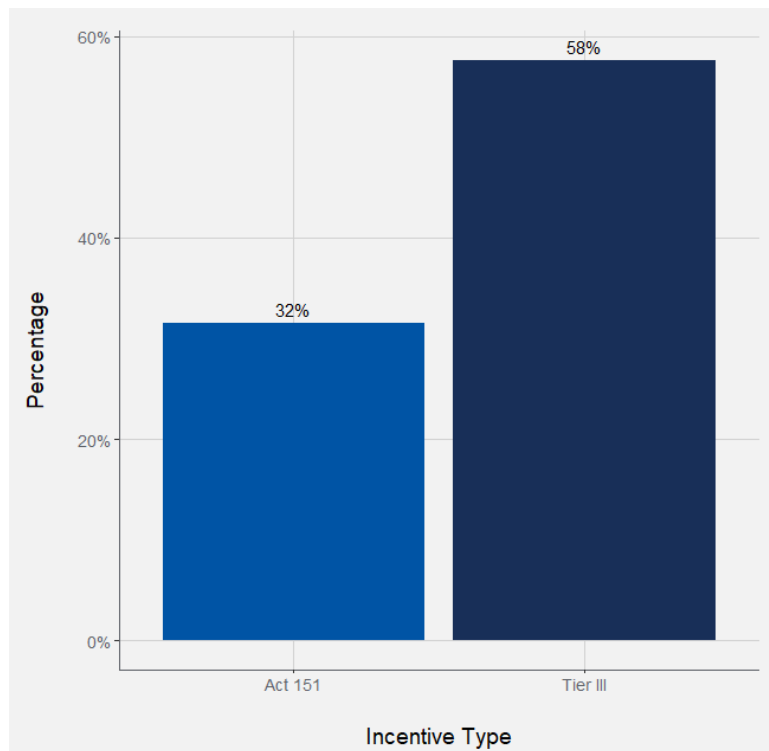
### Marginal Incentive Recipients

Figure 37 shows the percentage of BED EV incentive recipients who said the incentives influenced their purchase decisions, organized by incentive type. The main takeaways are:

- About 60% of recipients said the BED Act 151 and Tier III incentives combined affected their purchase or lease decision<sup>14</sup>.
- More than half (58%) of BED Act 151 and Tier III recipients said the Tier III incentive affected their purchase or lease decision, likely due to the larger amounts of the Tier III incentives, while 32% of BED Act 151 survey recipients said the Act 151 incentive affected their purchase/lease decision.

<sup>14</sup> Percentages of EV incentive recipients by recipient type who said the BED Act151 or Tier III incentive(s) affected their purchase decisions. Results based on analysis of 92 incentive recipients.

**Figure 37. Marginal Incentive Recipients by Incentive Type**



Notes: Percentages of BED EV incentive recipients by incentive type (Act 151 or Tier III) who said the incentive(s) affected their purchase decisions. Results based on analysis of 92 incentive recipients.

### Marginality of EV Incentive Amounts

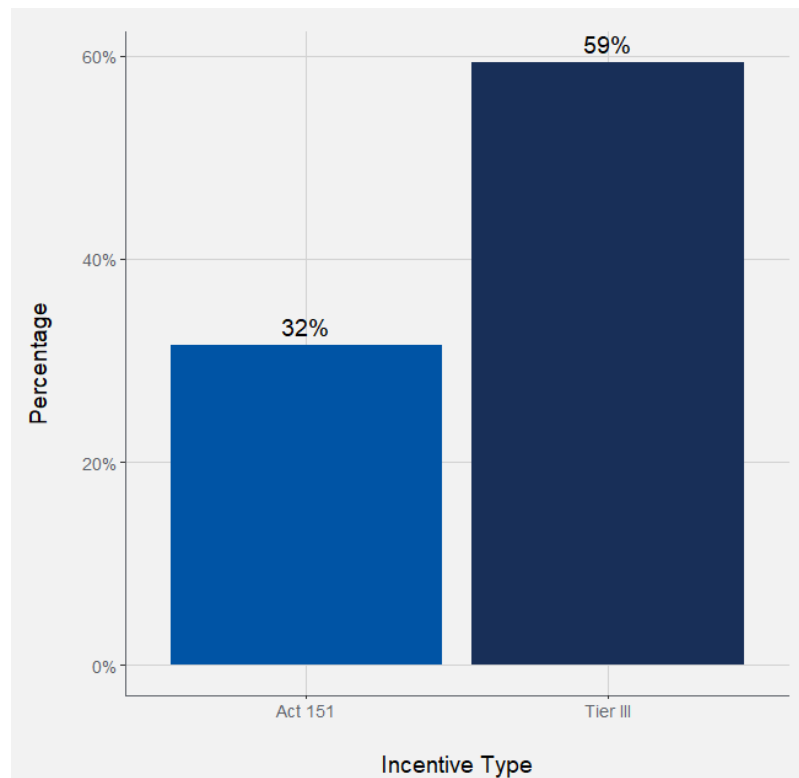
Figure 38 shows the percentage of EV incentive dollars paid to recipients who reported that incentives influenced their purchase decisions. The main takeaways from this analysis are:

- All our respondents received both BED Act 151 and Tier III incentives, and 61 % of incentive dollars went to respondents who said incentives affected their purchase decisions<sup>15</sup>.
- About 32% of all Act 151 incentive dollars went to respondents who said the Act 151 incentives affected their purchase decisions.
- About 59% of all Tier III incentive dollars went to recipients who said the Tier III incentives affected their purchase decisions.

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<sup>15</sup> Percentage of EV incentives given to recipients whose purchase decisions were affected by the incentives by recipient type. Results based on analysis of 92 incentive recipients.

**Figure 38. Marginal Incentive Dollars by Incentive Type**



Notes: Percentage of EV incentives given to recipients whose purchase decisions were affected by the incentives by recipient type. Results based on analysis of 92 incentive recipients.

### Regression Results

BED’s Act 151 incentives and some Tier III incentives are dependent on household income. More incentive dollars are available to households with lower incomes, in recognition of the high up-front costs of electric vehicles and that higher income households are better able to afford them. However, from an evaluation perspective, this difference can make it difficult to isolate and quantify the effect of incentives on EV purchases. Households that receive the largest incentives are also the least able to afford EVs, making it difficult to disentangle the effects of the incentive and income.<sup>16</sup>

The main difference between Phase I and Phase II regression result is that in Phase I, we had a variety of incentive recipient types, including State AOT, Tier III, and both State AOT and Tier III incentives; while in Phase II, we only had one type of incentive recipient, who received both Act 151 and Tier III incentives.

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<sup>16</sup> If we measured the effect of incentives by looking only at low-income households, we might wrongly conclude that the incentive is less effective at increasing EV purchases than it actually is, because these households cannot afford the vehicles even with the incentives. If we measured the effect of incentives by looking only at high-income households, we might wrongly conclude that the incentive is more effective than it is, because these households can afford the vehicles without the incentives.

Hence in the Phase II regression models, we removed the independent 0-1 indicator variable which represents incentive recipient type, leaving us two regression models that include income only, and income and incentive amount variables.

Table 8 shows results from Ordinary Least Squares (OLS) regressions of the marginality of EV incentive recipients that control for household income and that are intended to disentangle the effects of income and incentives.<sup>17</sup> The dependent 0–1 indicator variable represents whether the incentive(s) were marginal. The independent 0–1 indicator variables represent household income and incentive amount.<sup>18</sup>

**Table 8. Regression Models of the Influence of EV Incentives**

	Model 1	Model 2
Intercept	0.604*** (0.068)	0.874*** (0.131)
Low-income	0.396*** (0.068)	0.384*** (0.126)
Middle-income	-0.084*** (0.122)	-0.067 (0.123)
Total incentive ≤ \$1,500		-0.432 (0.141)
\$1,500 < Total incentive < \$2,900		-0.246 (0.131)
Adj R <sup>2</sup>	0.032	0.055
N	84	84

Notes: Dependent variable equals 1 if the incentive(s) affected the incentive recipient’s vehicle purchase decision and 0 otherwise. All models are estimated by OLS. Heteroskedasticity robust standard errors in parentheses. Asterisks indicate an estimate’s statistical significance at a specified level: \*\*\* = 1%, \*\* = 5%, \* = 10%. Omitted categories are high-income (≥\$100,000) and total incentive amount ≥ \$2,900.

Model 1 shows the results by the recipient’s self-reported income for the subsample of survey respondents who reported their incomes (n=84). Model 2 shows results by income type controlling for household income and the incentive amount.

<sup>17</sup> Regression Analysis: This is a statistical technique used to understand the relationship between a dependent variable (e.g., whether an incentive was marginal) and one or more independent variables (e.g., household income, incentive amount). It helps to determine how changes in the independent variables influence the dependent variable, while controlling for other factors.

Ordinary Least Squares (OLS): OLS is a method of estimating the unknown parameters in a linear regression model. It minimizes the sum of the squared differences between the observed dependent variable (in this case, whether an incentive was marginal) and those predicted by the model.

<sup>18</sup> Low-income households had annual income less than \$50,000, middle-income households had income between \$50,000 and \$99,999, and high-income households had income greater than or equal to \$100,000.

The main takeaway of this analysis is as follows:

- Incentives have a measurable impact on vehicle purchase decisions, particularly for low-income individuals. Higher incentives seem more effective in influencing decisions, as suggested by the negative coefficients for lower incentive categories in Model 2.
- The results are robust across models, as the main findings related to income categories remain consistent even after including additional control variables related to incentive amounts.

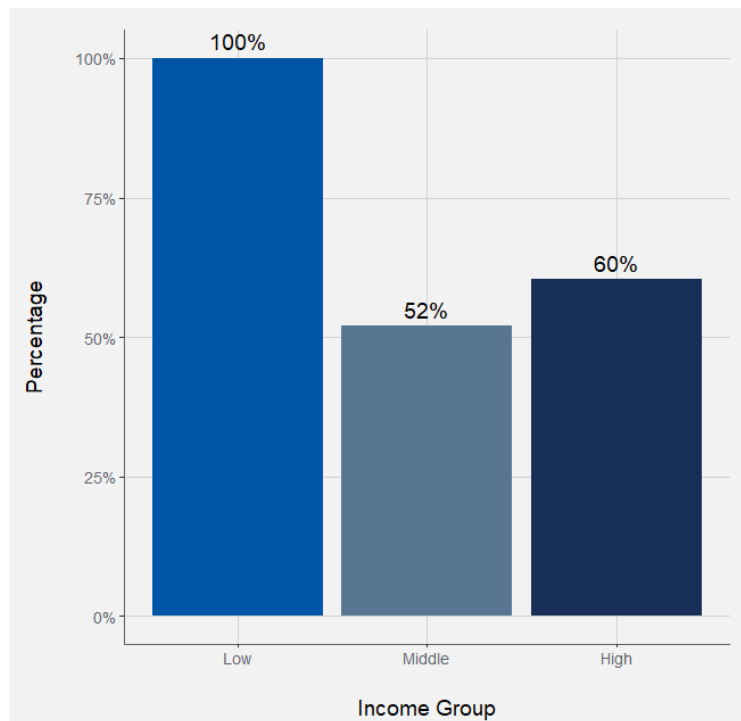
We address the impacts of household income on the marginality of incentives in the following section.

### Marginal Incentives by Household Income

Cadmus also investigated the effects of BED Act 151 and Tier III incentives across household income levels. Figure 39 illustrates the percentage of incentive recipients whose purchases were influenced by the incentives across low, middle, and high-income households. The figure highlights that incentives had a greater impact on low-income households compared to middle and high-income households. All low-income recipients reported that their purchase decisions were affected by the incentives, while 52% of middle-income recipients and 60% of high-income recipients indicated that the incentives influenced their purchases.

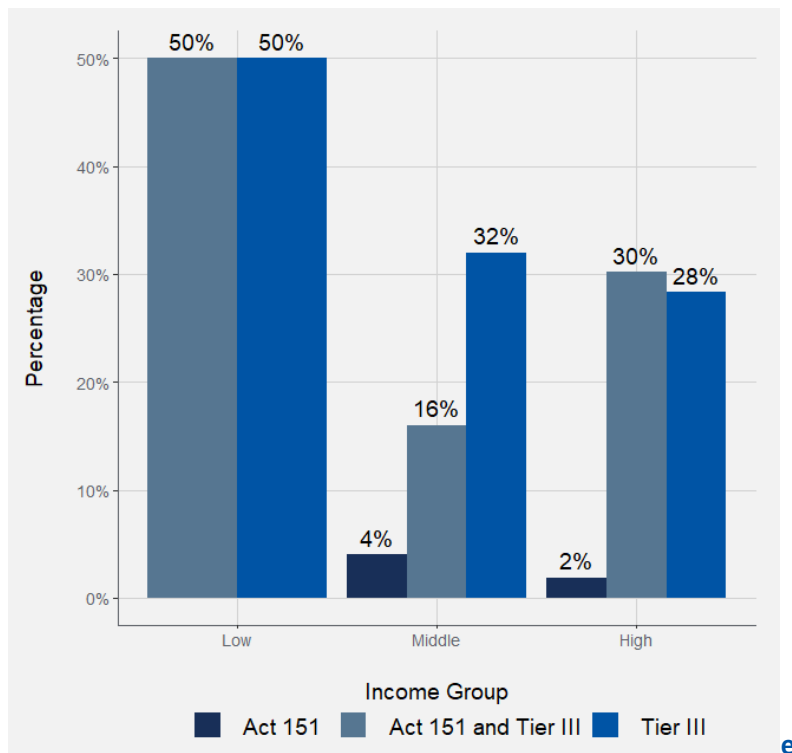
Figure 40 provides a further breakdown of Figure 39 by marginal incentive types. Among all low-income recipients, half reported that their purchase decisions were influenced by the Tier III incentive alone, while the other half indicated that their decisions were affected by both the Tier III and Act 151 incentives. Of the 52% of middle-income recipients who found the incentives marginal, 32% said their purchase decisions were influenced by the Tier III incentive alone, 16% by a combination of Tier III and Act 151 incentives, and the remaining 4% by Act 151 alone. Among the 60% of high-income recipients who found the incentives marginal, 28% reported that their decisions were affected by the Tier III incentive alone, 30% by a combination of Tier III and Act 151 incentives, and the remaining 2% by Act 151 alone.

**Figure 39. Marginal Incentive Recipients by Household Income**



Notes: Percentages of EV incentive recipients by household income who said the incentive(s) affected their purchase decisions. Results based on analysis of 92 incentive recipients. Low-income recipients had incomes below \$50,000, middle-income recipients had incomes between \$50,000 and \$99,999, and high-income households had incomes greater than or equal to \$100,000.

**Figure 40. Marginal Incentive Recipients by Household Income and Type**



Notes: Percentages of marginal EV incentive recipients by marginal incentive types. Results based on analysis of 84 incentive recipients who reported their income. Low-income recipients had incomes below \$50,000, middle-income recipients had incomes between \$50,000 and \$99,999, and high-income households had incomes greater than or equal to \$100,000.

The main takeaways were as follows:

- About 100% of low-income respondents (annual income < \$50,000) said a Tier III, Act 151, or Tier III and Act 151 incentive(s) affected their purchase decisions.
- 52% of middle-income households (\$50,000<=annual income<100,000) and 60% of high-income households (annual income ≥ \$100,000) said the BED Act 151 or Tier III incentives affected their purchase of an EV.
- BED Incentives of both types (Act 151 and Tier III) mattered more to low-income households than middle- and high-income households. Act 151 didn’t make a significant difference in terms of affecting respondents’ purchase decisions. Only 4% of middle-income households found the Act 151 incentive to be marginal, and only 2% of high-income households found the Act 151 incentive to be marginal.

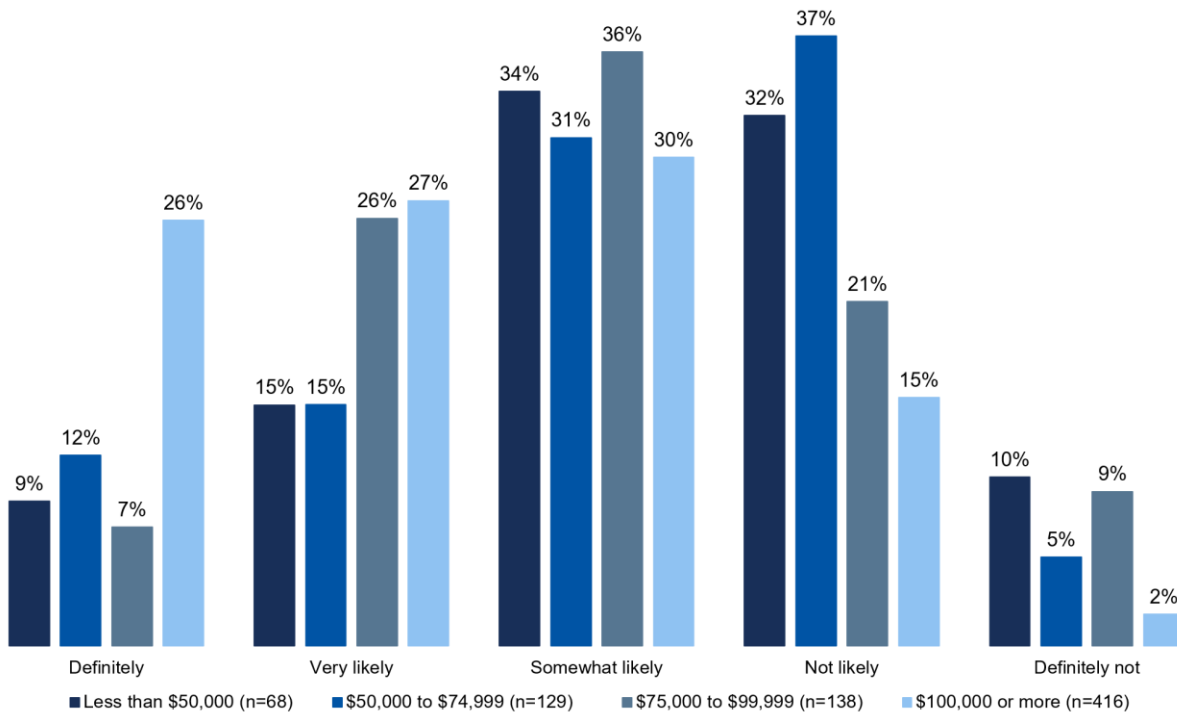
### Anonymous Survey Attribution

We asked similar questions to the anonymous survey respondents, though incentive amounts were self-reported and we were not able to parse out separate sources of incentive funds within the total incentive amount reported.



Overall, 43% of respondents reported that they were *very likely* or *definitely* would have still purchased an EV if they had not received the incentive. Figure 41 shows these results by annual household income. Among respondents with household incomes below \$75,000, these numbers were lower, with percentages ranging from 24% to 27%. In fact, 42% of respondents with incomes below \$75,000 responded *not likely* or *definitely not* when asked if they would have purchased an EV if they had not received the incentive.

**Figure 41. Anonymous Survey Incentive Attribution**



Source: Survey question D5: If you had not received this incentive, would you have still purchased an EV? Please assume all other incentives you would have received if you purchased an EV (e.g., a federal tax credit) were the same. (n=841)

## Discussion

Overall, the attribution results suggest EV incentives had large effects on the purchase decisions of Vermont households and lifted EV sales. The large impact of incentives suggests that demand for EVs is strongly price-elastic (i.e., sensitive to price), at least for Vermont households eligible for the incentives.

However, important differences emerged between marginal incentive types (Tier III, Act 151, Tier III and Act 151) and recipient types (Tier III and Act 151). Tier III incentives, which tended to be larger, had a bigger effect on purchase decisions, consistent with the notion of highly price elastic demand for EVs. In addition, the incentives had much larger impacts for low-income than middle- and high-income households. Muehlegger and Rapson (2018) similarly found a large effect from purchase subsidies on EV

purchases for California low- and middle-income households.<sup>19</sup> They estimate a price elasticity of demand of -3.9, implying a subsidy representing 10% of vehicle purchase price increased demand for EVs by 39%. In a subsequent paper, the authors (Rapson and Muehlegger 2022) perform a back-of-the-envelope calculation showing that 64% to 77% of non-Tesla EV purchases in California can be attributed to federal and state purchase incentives.<sup>20</sup>

However, as described in the *Vehicle Options Considered* section, similar to Phase I, most incentive recipients (about 77%) said they did not consider a conventional vehicle when shopping for a vehicle. However, in Phase I the analysis did not take income into account. In Phase II, while 23% of all respondents considered a conventional vehicle, this number was higher for households with income between \$50,000 and \$74,999 (28%), and less than \$35,000 (25%). This finding suggests that incentives are not causing vehicle buyers to switch from conventional gas vehicles to EVs, but simply accelerating EV purchases that would happen eventually without incentives, particularly for the lower income households.

Our research continues to suggest that governments and other agencies promoting residential transportation electrification should focus first on building public EV charging infrastructure and then shift their attention to encouraging EV adoption through purchase incentives. Vermont incentive recipients reported the biggest barriers to adoption were range anxiety and a lack of public charging infrastructure. We also provide evidence that incentive recipients in our survey sample were less concerned with the economics of EVs than the beneficial environmental impacts of their purchase. As Vermont's EV market matures, we expect more consumers to consider buying EVs versus ICE vehicles, and that the economics will matter more in these consumers' decisions.

## Limitations

Our survey-based approach for assessing attribution has several limitations that we want to acknowledge.

- Our research reaches conclusions about a small part of the EV incentive programs. In both the BED Tier III program and the Act 151 programs, the direct incentive to consumers for the purchase of EVs are one part of a larger program. Thus, the survey results are only indicative of results of the incentives of the program.
- We asked consumers to consider a counterfactual scenario and to report the impacts of the incentives. Consumers may not be very good at assessing counterfactuals and predicting what they would have done if they had not received the incentives.

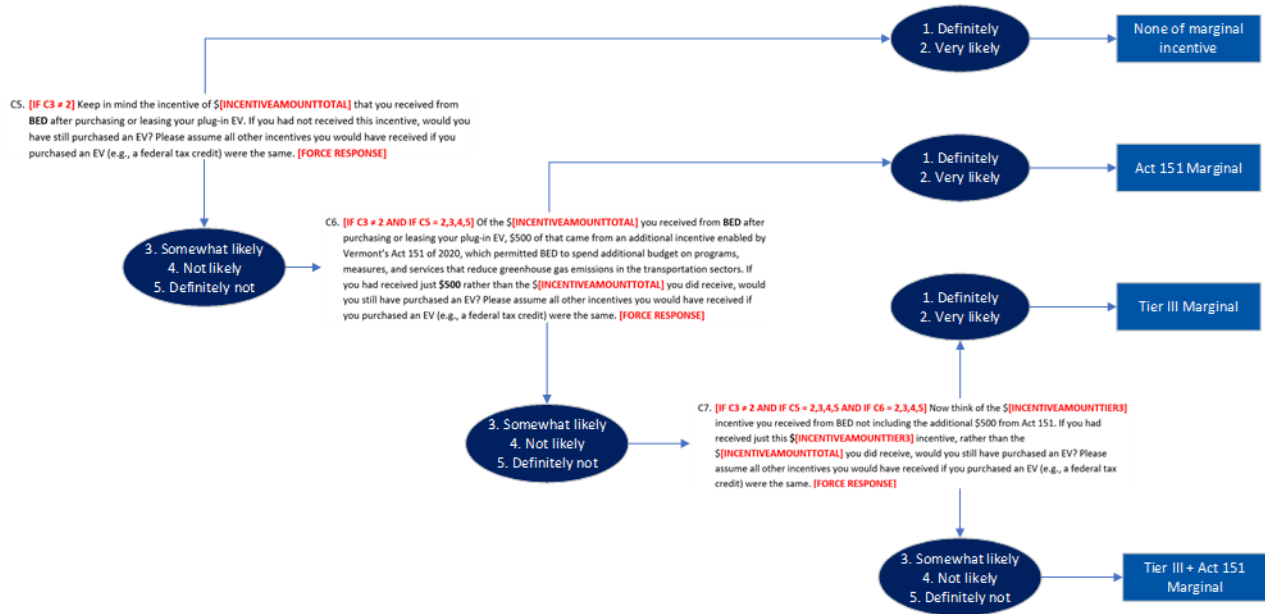
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<sup>19</sup> Muehlegger, Erich and David Rapson (2018). "Understanding the Distributional Impacts of Vehicle Policy: Who Buys New and Used Alternative Vehicles?" [UC Davis: National Center for Sustainable Transportation. https://escholarship.org/uc/item/0tn4m2tx](https://escholarship.org/uc/item/0tn4m2tx).

<sup>20</sup> Rapson, David and Erich Muehlegger (2023). "The Economics of Electric Vehicles." National Bureau of Economic Research working paper 29093.

- All respondents in our sample received incentives from the State AOT or their DUs, and they may feel pressure (possibly subconsciously) to provide answers that justify the programs.
- The EV incentive amounts are not random. They are adjusted for household income levels and the type of vehicle purchased. Means-testing makes it hard to disentangle the effect of income from the incentive and to use the results to construct counterfactuals for alternative incentive amounts.
- This analysis only studies EV buyers who received incentives. We did not survey buyers of ICE vehicles or prospective vehicle buyers. We did not assess the impact of the incentives on the overall market for vehicles, i.e., what percentage of all vehicle buyers purchased an EV because of the incentives.

## Appendix A. Attribution Analysis Coding of Survey Responses



## Appendix B. Survey Tools

### Act 151 Survey

**Survey Overview:** This survey is part of the evaluation of Vermont Electric Vehicles Incentives. Its goal is to gather information on participants’ motivations, experiences, and program awareness, as well as barriers to participation for low-income participants.

Research Questions or Objectives	Item
Demographics and Home Attributes	Section A
Awareness and Motivations Assess awareness of EV incentive programs Assess awareness of the DU incentive programs (Act 151) Assess the rates of participation by low-income customers in incentive programs Understand motivation to purchase an EV Determine the importance of non-financial factors for EV adoption Understand decision-making process when deciding between an ICE and an EV	Section B, C
Incentive Attribution/Tier III attribution of the impact of the incentives Assess the qualitative impact of the incentive program in customer’s decision to purchase an EV Determine attribution of the incentive amount received to the decision to purchase an EV Determine the marginality of the received incentive amount Effect of Act 151 on EV Uptake	Section C
Program Satisfaction & Ease Assess satisfaction with incentive process Assess satisfaction with incentive amount Assess satisfaction with available information on EVs and incentives	Section D
Drive Electric Vermont Website Assess awareness of the Drive Electric Vermont website	Section D
Driving and Charging Behaviors Assess driving habits before the EV purchase Assess EV driving habits Understand whether driving habits changed with the EV adoption Understand EV charging habits Assess charging needs not currently met	Section E

**Target Audience:** Vermont households who received an incentive from Burlington Electric Department for purchasing or leasing an electric vehicle.

Expected number of completions: \_\_\_\_\_

Estimated timeline for fielding: \_\_\_\_\_

Variables to be Pulled into Survey

- EMAIL

- **FIRSTNAME**
- **LASTNAME**
- **INCENTIVEAMOUNT151 = 500**
- **INCENTIVEAMOUNTTOTAL**
- **INCENTIVEAMOUNTTIER3 = TOTALINCENTIVEAMOUNT – 500**
- **SELFREPORTEDINCENTIVE**
- **SELFREPORTEDTIER3 = SELFREPORTEDINCENTIVE - 500**
- **EVMODEL**

## Email Invitation

To: [EMAIL]

From: Keith.Levenson@vermont.gov

Subject: Tell us about your electric vehicle purchase experience and you could win a \$75 gift card!

Dear [FIRSTNAME],

You recently received an incentive from the Burlington Electric Department for buying or leasing an electric vehicle.

We'd like to hear your thoughts about your experience with your electric vehicle and the incentives you received. Please take a moment to answer a few short questions about your experience in an online survey. The survey will only take about 10 minutes to complete.

[Click HERE to take the survey](#)

Or copy and paste the following URL into your internet browser: **[SURVEY LINK]**

For completing the survey, we are offering you a chance to enter a drawing to win the choice of a \$75 gift card. Three winners will be randomly selected.

If you have any difficulties taking this survey, please contact Barbara dos Santos at Cadmus, the research firm conducting this survey on behalf of the State of Vermont's Department of Public Service . You can reach Barbara dos Santos at (240) 204-6208 or barbara.dossantos@cadmusgroup.com.

Thank you in advance for sharing your experiences and your time.

Sincerely,

**Keith Levenson** | Energy Program Specialist

Vermont Department of Public Service  
112 State Street | Montpelier, VT 05620  
802.828.4072

## Reminder Email Invitation

To: [EMAIL]

From: Keith.Levenson@vermont.gov

Subject: Don't forget to tell us about your electric vehicle purchase experience and you could win a \$75 gift card!

Dear [FIRSTNAME AND LASTNAME],

You recently received a survey about an incentive from the Burlington Electric Department for buying or leasing an electric vehicle.

We'd like to hear your thoughts about your experience with your electric vehicle and the incentives you received. Please take a moment to answer a few short questions about your experience in an online survey. The survey will only take about 10 minutes to complete.

[Click HERE to take the survey](#)

Or copy and paste the following URL into your internet browser: **[SURVEY LINK]**

For completing the survey, we are offering you a chance to enter a drawing to win the choice of a \$75 VISA gift card. Three winners will be randomly selected.

If you have any difficulties taking this survey, please contact Barbara dos Santos at Cadmus, the research firm conducting this survey on behalf of the State of Vermont's Department of Public Service . You can reach Barbara dos Santos at (240) 204-6208 or [barbara.dossantos@cadmusgroup.com](mailto:barbara.dossantos@cadmusgroup.com).

Thank you in advance for sharing your experiences and your time.

Sincerely,

**Keith Levenson** | Energy Program Specialist

Vermont Department of Public Service  
112 State Street | Montpelier, VT 05620

802.828.4072

## Survey Introduction

Welcome! Thank you for participating in this survey of recent buyers of electric vehicles (EV). The survey is being conducted on behalf of the State of Vermont’s Department of Public Service and will help the state understand residents’ EV purchasing and leasing decisions.

This survey will take about 10 minutes to complete. Your responses will remain confidential and will only be used for research purposes.

As a thank you for participating in this survey, you will be entered into a raffle for a chance to win one of three **\$75 Visa gift cards**.

## A. Demographics

Vermont residents who purchase or lease an EV (plug-in hybrid or all electric) are eligible to receive an incentive for their purchase or lease from their electric utility. The incentive could either be applied directly at the dealership or provided after through a mail-in application.

We want to better understand how these incentives support Vermont residents in purchasing or leasing EVs. Because of this, we’d like to start by learning a little more about you and your home.

Additionally, if you purchased or received the incentive for more than one vehicle, please keep in mind the **most recent vehicle** you purchased as you answer the questions.

A1. What is your highest level of education completed?

1. High School/GED
2. Professional/Trade school
3. Associate’s degree or some college/university education
4. Bachelor’s degree
5. Master’s degree
6. Doctoral degree
7. Other (please describe): **[OPEN END TEXT BOX]**

A2. What is your zip code?

1. **[ZIP CODE – ZIPCODE VALIDATION ONLY]**

A3. Which of the following best describes your primary residence?

1. Single family home
2. Duplex
3. Condo, with about this many units: **[NUMBER ENTRY]**
4. Multi-family apartment, with about this many units: **[NUMBER ENTRY]**



A4. Where do you normally park your EV at night?

1. Garage
2. Carport
3. Dedicated outdoor parking space
4. Shared outdoor parking space
5. On-street parking
6. Other (please describe): **[OPEN END TEXT BOX]**

A5. Which of the following best describes your annual household income before taxes? **[FORCE RESPONSE]**

1. Less than \$35,000
2. \$35,000 to \$49,999
3. \$50,000 to \$74,999
4. \$75,000 to \$99,999
5. \$100,000 to \$149,999
6. \$150,000 to \$199,999
7. \$200,000 or more
8. Prefer not to say

A6. Do you consider yourself to be... ? Select all that apply **[MULTIPLE SELECTION, RANDOMIZE ORDER 1-7]**

1. Caucasian or White
2. African American or Black
3. American Indian or Alaska Native
4. Asian
5. Native Hawaiian or Pacific Islander
6. Middle Eastern or North African
7. Hispanic or Latino
8. Multi-racial or multi-ethnic
9. Other (please describe): **[OPEN END TEXT BOX]**

A7. How do you identify?

1. Woman
2. Man
3. Non-binary
4. Prefer to self-describe: **[OPEN END TEXT BOX]**

A8. How old are you?

1. 18-24
2. 25-34
3. 35-44
4. 45-54
5. 55-64
6. 65 or older

## B. Motivations for Purchasing or Leasing an Electric Vehicle

We’d like to ask some questions about the EV you purchased or leased.

If you purchased or received the incentive for more than one vehicle, please keep in mind the **most recent vehicle** you purchased as you answer the questions.

B1. Please provide the following information for the EV that you received the incentive for.

1. Make: **[DROPDOWN]**
2. Model: **EVMODEL = [DROPDOWN]**
3. Year: **[DROPDOWN: for the last 10 years]**

B2. Was the vehicle new or used?

1. New
2. Used

B3. For each source, please rate how important the source’s information was in your decision to acquire an EV over a similar gas-powered vehicle. **[RANDOMIZE A-M]**

	1. Not at all important	2. Somewhat important	3. Important	4. Very important	Not Applicable
a. Friend/family member who does not drive an EV					
b. Friend/family member who drives an EV					
c. Car salesperson					

d. EV manufacturer website					
e. Drive Electric Vermont website					
f. EV test drive event					
g. Electric utility					
h. Online discussion forums					
i. YouTube or TikTok EV videos					
j. News story (newspaper, radio, TV, etc.)					
k. Advertisement (newspaper, radio, TV, etc.)					
l. Non-profit organization (e.g., Efficiency Vermont, Sierra Club, etc.)					
m. Government agency (e.g., Agency of Transportation, etc.)					
n. Other (please explain): <b>[OPEN END TEXT BOX]</b>					

B4. Which of the following best describes the **most important** reason you chose an EV over a similar gas-powered vehicle? **[RANDOMIZE 1-8]**

1. Saving money on fuel
2. Saving money on maintenance
3. Incentive availability
4. Reducing environmental impact
5. Increase energy independence
6. Wanted the newest technology
7. Driving performance
8. Supporting growth of EV technology
9. Other (please explain): **[OPEN END TEXT BOX]**

B5. Which of the following best describes the **second-most important** reason you chose an EV over a similar gas-powered vehicle? **[RANDOMIZE 1-8. DISPLAY LIST FROM PREVIOUS QUESTION WITHOUT RESPONSE SELECTED IN PREVIOUS QUESTION]**

1. Saving money on fuel
2. Incentive availability
3. Saving money on maintenance
4. Reducing environmental impact
5. Increase energy independence
6. Wanted the newest technology
7. Driving performance
8. Supporting growth of EV technology
9. Other (please explain): **[OPEN END TEXT BOX]**

B6. The following are reasons some people say they would **not** choose an EV. Which of these, if any, **caused you to hesitate** when choosing an EV over a gas-powered vehicle? If you had no hesitations about choosing an EV rather than a gas-power vehicle, please select “None – I had no concerns.” **[ALLOW MULTIPLE SELECTIONS, RANDOMIZE 1-10]**

1. Environmental impact of battery or manufacturing
2. High purchase/lease price
3. High maintenance cost
4. Poor reliability
5. Limited driving range
6. Poor winter driving performance
7. Charging: limited public stations
8. Charging: limited home plug/charger access
9. Limited vehicle types available (e.g., Pick-up, SUV, etc.)
10. Hard to find an available EV
11. Other (please explain): **[OPEN END TEXT BOX]**
12. None – I had no concerns **[Make exclusive]**

B7. When you shopped for your EV, did you also consider buying or leasing a conventional gas vehicle?

1. Yes
2. No

**B8. [IF B7= 1]** What were your reasons for doing so?

1. **[OPEN ENDED – MEDIUM TEXT BOX]**

## C. Electric Vehicle Incentive Attribution

Now, we'd like to ask you questions about the financial incentive(s) you received for your EV. You may have received this incentive at the dealership at the time of sale/lease or after you purchased/leased your EV.

If you purchased or received the incentive for more than one vehicle, please keep in mind the **most recent vehicle** you purchased as you answer the questions.

C1. How did you first hear about the EV incentive(s)?

1. Friend/family member who does not drive an EV
2. Friend/family member who does drive an EV
3. Car salesperson
4. EV manufacturer website
5. Drive Electric Vermont website
6. EV test drive event
7. Online discussion forums
8. Blogs (not on manufacturer websites)
9. News story (newspaper, radio, TV, etc.)
10. Advertisement (newspaper, radio, TV, etc.)
11. Non-profit organization (e.g., Drive Electric Vermont, Efficiency Vermont, etc.)
12. Government agency (e.g., Department of Transportation, etc.)
13. Electric utility
14. Other (Please describe): **[OPEN END TEXT BOX]**

15. Don't know

C2. Besides the incentive offered by your electric utility, BED, did you receive or will you receive any of these other incentives for purchasing or leasing your EV?

1. Federal tax credits **[YES/NO/DON'T KNOW OPTIONS]**
2. Low-and moderate-income supplemental incentives **[YES/NO/ DON'T KNOW OPTIONS]**
3. Utility EV charging rates (Time of Use Rates, Flat Rates, Tiered Rates) **[YES/NO/ DON'T KNOW OPTIONS]**
4. State of Vermont Incentive **[YES/NO/DON'T KNOW OPTIONS]**
5. Other (Please describe): **[OPEN END TEXT BOX]**

C3. Our records show that you received an incentive of \$**[INCENTIVEAMOUNTTOTAL]** from **BED** after purchasing or leasing your plug-in EV. Is this correct?

1. Yes
2. No
3. Don't know

C4. **[DISPLAY IF C3 = 2]** What was the incentive amount you received from **BED** after purchasing/leasing your plug-in EV?

1. **SELFREPORTEDINCENTIVE = [NUMBER ENTRY BOX]**  
**SELFREPORTEDTIER3 = SELFREPORTEDINCENTIVE - 500**

C5. **[IF C3 ≠ 2]** Keep in mind the incentive of \$**[INCENTIVEAMOUNTTOTAL]** that you received from **BED** after purchasing or leasing your plug-in EV. If you had not received this incentive, would you have still purchased an EV? Please assume all other incentives you would have received if you purchased an EV (e.g., a federal tax credit) were the same. **[FORCE RESPONSE]**

1. Definitely
2. Very likely
3. Somewhat likely
4. Not likely
5. Definitely not

- C6. **[IF C3 ≠ 2 AND IF C5 = 2,3,4,5]** Of the \$**[INCENTIVEAMOUNTTOTAL]** you received from **BED** after purchasing or leasing your plug-in EV, \$500 of that came from an additional incentive enabled by Vermont’s Act 151 of 2020, which permitted BED to spend additional budget on programs, measures, and services that reduce greenhouse gas emissions in the transportation sectors. If you had received just **\$500** rather than the \$**[INCENTIVEAMOUNTTOTAL]** you did receive, would you still have purchased an EV? Please assume all other incentives you would have received if you purchased an EV (e.g., a federal tax credit) were the same. **[FORCE RESPONSE]**
1. Definitely
  2. Very likely
  3. Somewhat likely
  4. Not likely
  5. Definitely not
- C7. **[IF C3 ≠ 2 AND IF C5 = 2,3,4,5 AND IF C6 = 2,3,4,5]** Now think of the \$**[INCENTIVEAMOUNTTIER3]** incentive you received from BED not including the additional \$500 from Act 151. If you had received just this \$**[INCENTIVEAMOUNTTIER3]** incentive, rather than the \$**[INCENTIVEAMOUNTTOTAL]** you did receive, would you still have purchased an EV? Please assume all other incentives you would have received if you purchased an EV (e.g., a federal tax credit) were the same. **[FORCE RESPONSE]**
1. Definitely
  2. Very likely
  3. Somewhat likely
  4. Not likely
  5. Definitely not
- C8. **[IF C3 = 2]** Keep in mind the incentive of \$**[SELFREPORTEDINCENTIVE]** that you received from **BED** after purchasing or leasing your plug-in EV. If you had not received this incentive, would you have still purchased an EV? Please assume all other incentives you would have received if you purchased an EV (e.g., a federal tax credit) were the same. **[FORCE RESPONSE]**
1. Definitely
  2. Very likely
  3. Somewhat likely
  4. Not likely
  5. Definitely not

- C9. **[IF C3 = 2 AND IF C8 = 2,3,4,5]** Of the \$**[SELFREPORTEDINCENTIVE]** you received from **BED** after purchasing or leasing your plug-in EV, \$500 of that came from an additional incentive enabled by Vermont’s Act 151 of 2020, which permitted BED to spend additional budget on programs, measures, and services that reduce greenhouse gas emissions in the transportation sectors. If you had received just **\$500** rather than the \$**[SELFREPORTEDINCENTIVE]** you did receive, would you still have purchased an EV? Please assume all other incentives you would have received if you purchased an EV (e.g., a federal tax credit) were the same. **[FORCE RESPONSE]**
1. Definitely
  2. Very likely
  3. Somewhat likely
  4. Not likely
  5. Definitely not
- C10. **[IF C3 = 2 AND IF C8 = 2,3,4,5 AND IF C9 = 2,3,4,5]** Now think of the \$**[SELFREPORTEDTIER3]** incentive you received from BED not including the additional \$500 from Act 151. If you had received just this \$**[SELFREPORTEDTIER3]** incentive, rather than the \$**[SELFREPORTEDINCENTIVE]** you did receive, would you still have purchased an EV? Please assume all other incentives you would have received if you purchased an EV (e.g., a federal tax credit) were the same. **[FORCE RESPONSE]**
1. Definitely
  2. Very likely
  3. Somewhat likely
  4. Not likely
  5. Definitely not

## D. Satisfaction with Electric Vehicle and Incentive Process

We’d also like to ask about your satisfaction with the process of applying for and receiving this incentive for your EV purchase.

If you purchased or received the incentive for more than one vehicle, please keep in mind the **most recent vehicle** you purchased as you answer the questions.

- D1. How easy was the **process of applying** for the incentive from BED?
1. Very easy
  2. Somewhat easy
  3. Neither easy nor difficult
  4. Somewhat difficult
  5. Very difficult
  6. Not applicable, I received my incentive from the dealership instantly



D2. How satisfied or dissatisfied were you with the **time it took to receive** the incentive from BED for purchasing an EV?

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
6. Not applicable, I received my incentive from the dealership instantly.

D3. **[IF D1 OR D2 = 3,4,5]** How could the incentive application process have been better?

1. **[OPEN END TEXT BOX]**

D4. How satisfied or dissatisfied were you with the **incentive amount** you received?

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied

D5. **[IF C1 = 3,5,6, 10, 11,12,13]** How satisfied or dissatisfied were you with the **quality of information** provided about the available EV incentives?

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied

D6. **[IF D5 = 3,4,5]** How could the information provided have been better?

1. **[OPEN END TEXT BOX]**

D7. Please rate the difficulty of each aspect of the electric vehicle purchase and incentive process.

	Very Difficult	Difficult	Neither easy nor difficult	Easy	Very Easy
a. Hearing about the available incentives for an EV purchase or lease					
b. Understanding the available incentives for my purchase or lease					
c. Finding an EV within my price range					
d. Finding an EV that I was interested in (for reasons other than price - appearance, driving habits, etc.)					

e. Finding a dealership offering the vehicle I was interested in					
f. Finding a dealership offering the incentives on EVs					
g. Submitting the incentive application					
h. Installing an EV charger at my home					

D8. Have you ever visited the DriveElectricVermont.com website for information on energy efficiency programs?

1. Yes
2. No
3. Don't know

## E. Household Driving and Charging

Next, we'd like to ask questions about your household driving and charging behaviors.

If you purchased or received the incentive for more than one vehicle, please keep in mind the **most recent vehicle** you purchased as you answer the questions.

E1. Excluding the incentivized EV **[EVMAKE] [EVMODEL]**, how many vehicles does your household currently own or lease?

1. Conventional Gas Vehicles: **[NUMBER ENTRY BOX]**
2. Conventional Hybrid Vehicles: **[NUMBER ENTRY BOX]**
3. Plug-in Hybrid Vehicles (PHEV): **[NUMBER ENTRY BOX]**
4. All Electric Vehicles (AEV): **[NUMBER ENTRY BOX]**

E2. How many vehicle round trips do you and others in your household take to commute to a job or school during a typical week? Please count the total number of vehicle round trips. For example, if you commute three times per week and the second member of your household separately commutes four times per week, your household's total weekly round trips would be seven.

1. None
2. About 1-2 times a week
3. About 3-6 times a week
4. About 7-10 times a week
5. About 11-14 times a week
6. More than 14 times a week

- E3. **[IF E2=2-6]** About how many miles is the average roundtrip commute for your household? For example, if your roundtrip commute is 10 miles and the second member of your household has a separate roundtrip commute of 30 miles, your household total would be 40 miles.
1. Less than or equal to 10 miles
  2. Between 11-20 miles
  3. Between 21-30 miles
  4. Between 31-40 miles
  5. Between 41-50 miles
  6. Between 51-60 miles
  7. Between 61-70 miles
  8. Between 71-80 miles
  9. Between 81-90 miles
  10. Between 91-100 miles
  11. Greater than 100 miles
- E4. What is your best estimate of the total number of miles your household drives each year?
1. Less than 5,000 Miles
  2. Between 5,000-9,999 miles
  3. Between 10,000-14,999 miles
  4. Between 15,000-29,999 miles
  5. Greater than 30,000 miles
- E5. What is your best estimate of the number of miles your household drives in your incentivized EV **[EVMAKE] [EVMODEL]** each year?
1. Less than 5,000 Miles
  2. Between 5,000-9,999 miles
  3. Between 10,000-14,999 miles
  4. Between 15,000-29,999 miles
  5. Greater than 30,000 miles
- E6. How has the purchase or lease of your EV **[EVMAKE] [EVMODEL]** affected your household's driving habits? Please tell if the following statements are true or false about your household's driving habits. Select all that apply: **[RANDOMIZE ORDER 1-3]**
1. We take fewer trips
  2. We take more trips
  3. We make more longer distance trips
  4. It has not affected our driving habits.
  5. Other (please explain): **[OPEN END TEXT BOX]**

**[ADD PAGE BREAK]**

Now we'd like to ask about how and where you charge the EV [EVMAKE] [EVMODEL].

- E7. Where do you charge your incentivized EV? Select all that apply. **[ALLOW MULTIPLE SELECTIONS]**
1. At home
  2. At my place of work
  3. At a public charging station
  4. Other (Please Specify): **[OPEN END TEXT BOX]**
- E8. **[IF E7 = 1]** What type(s) of charger do you use at home?
1. Level 1 Charger (Standard Wall Outlet)
  2. Managed (smart or networked) Level 2 Charger (240V)
  3. Unmanaged Level 2 Charger (240V)
  4. Other (please explain): **[OPEN END TEXT BOX]**
  5. Don't know
- E9. **[IF E7 = 1]** About what percentage of your incentivized vehicle's charging occurs at home?
1. **[DROP-DOWN WITH 10% INCREMENTS: 0% – 10%, 11% - 20%, 21% - 30%, 31% - 40%, 41% - 50%, 51% - 60%, 61% - 70%, 71% - 80%, 81% - 90%, 91% – 100%]**
- E10. **[IF E7 = 2]** What type(s) of charger do you use at work? **[ALLOW MULTIPLE SELECTIONS]**
1. Level 1 charger / standard wall outlet
  2. Level 2 charger
  3. DC fast charger
  4. Don't know
  5. Other (please explain): **[OPEN END TEXT BOX]**
- E11. **[IF E7 = 2]** About what percentage of your incentivized vehicle's charging occurs at work?
1. **[DROP-DOWN WITH 10% INCREMENTS: 0% – 10%, 11% - 20%, 21% - 30%, 31% - 40%, 41% - 50%, 51% - 60%, 61% - 70%, 71% - 80%, 81% - 90%, 91% – 100%]**
- E12. **[IF E7 = 3]** What type(s) of public chargers do you use? **[ALLOW MULTIPLE SELECTIONS]**
1. Level 1 charger / standard wall outlet
  2. Level 2 charger
  3. DC fast charger
  4. Other (please explain): **[OPEN END TEXT BOX]**
  5. Don't know
- E13. **[IF E7 = 3]** About what percentage of your vehicle's charging occurs at public chargers?
1. **[DROP-DOWN WITH 10% INCREMENTS: 0% – 10%, 11% - 20%, 21% - 30%, 31% - 40%, 41% - 50%, 51% - 60%, 61% - 70%, 71% - 80%, 81% - 90%, 91% – 100%]**

E14. What specific locations would you like to see more public chargers? **[ALLOW MULTIPLE SELECTIONS, RANDOMIZE ORDER 1-10]**

1. Highways
2. Grocery stores
3. Rest stops
4. Parks and recreation areas
5. Downtown
6. Shopping/Retail Areas
7. Gas stations
8. Hotels
9. Airports
10. School/university campuses
11. Other (please describe): **[OPEN END TEXT BOX]**

## F. Closing

Thank you for your participation!

If you'd like to know more about the EV incentive program and other resources visit [Drive Electric Vermont \(driveelectricvt.com\)](https://driveelectricvermont.com).

The survey prize raffle will be in **June 2024**. We will contact the winners via the email we have on record. If you'd like to change your email on record, please contact [barbara.dossantos@cadmusgroup.com](mailto:barbara.dossantos@cadmusgroup.com).

Thank you!

## Anonymous Survey

**Survey Overview:** This survey is part of the evaluation of Vermont Electric Vehicles Incentives. Its goal is to gather information on participants’ motivations, experiences, and program awareness.

Research Questions or Objectives	Item
Demographics and Home Attributes	Section B
Awareness and Motivations Assess overall awareness of EV incentive programs Assess awareness of State EV incentives and programs Understand motivation to purchase an EV Determine the importance of non-financial factors for EV adoption Understand decision-making process when deciding between an ICE and an EV	Sections B, C, Questions D1– C2
Satisfaction with Program Aspects Assess satisfaction with incentive process Assess satisfaction with incentive amount Assess satisfaction with EV information available	Section E
Incentive Attribution Assess the qualitative impact of the incentive program in customer’s decision to purchase an EV Determine attribution of the incentive amount received to the decision to purchase an EV Determine the marginality of the received incentive amount	Section D
Program Ease Assess program ease	Questions E1, E2
Driving and Charging Behaviors Assess driving habits before the EV purchase Assess EV driving habits Understand whether driving habits changed with the EV adoption Understand EV charging habits Assess charging needs not currently met	Section F
Drive Electric Vermont Website Assess the awareness of the Drive Electric Vermont Website	Section E

**Target Audience:** Vermont households who received an incentive from a Vermont electric distribution utility or the State of Vermont for purchasing or leasing an electric vehicle.

Expected number of completions: \_\_\_\_\_

Estimated timeline for fielding: \_\_\_\_\_

## Email Invitation

To: [EMAIL]

From: Keith.Levenson@vermont.gov

Subject: Tell us about your electric vehicle purchase experience and you could win a \$75 gift card!

Dear [FIRSTNAME AND LASTNAME],

You recently received an incentive from your electric distribution utility or the State of Vermont for buying or leasing an electric vehicle.

We'd like to hear your thoughts about your experience with your electric vehicle and the incentives you received. Please take a moment to answer a few short questions about your experience in an online survey. The survey will only take about 10 minutes to complete.

[Click HERE to take the survey](#)

Or copy and paste the following URL into your internet browser: **[SURVEY LINK]**

For completing the survey, we are offering you a chance to enter a drawing to win the choice of a \$75 gift card. Three winners will be randomly selected.

If you have any difficulties taking this survey, please contact Barbara dos Santos at Cadmus, the research firm conducting this survey on behalf of Vermont Public Service Department. You can reach Barbara dos Santos at (240) 204-6208 or [barbara.dossantos@cadmusgroup.com](mailto:barbara.dossantos@cadmusgroup.com).

Thank you in advance for sharing your experiences and your time.

Sincerely,

**Keith Levenson** | Energy Program Specialist

Vermont Department of Public Service

112 State Street | Montpelier, VT 05620

802.828.4072

## Survey Introduction

Welcome! Thank you for participating in this survey of recent buyers of electric vehicles (EV). The survey is being conducted on behalf of Vermont Public Service Department and will help the state understand residents' vehicle buying and leasing decisions.

This survey will take about 10 minutes to complete. Your responses will remain confidential and will only be used for research purposes.

As a thank you for participating in this survey, you will be entered into a raffle of 10 **\$75 Visa gift cards**. Be sure to enter your email address at the end of the survey to enter the raffle.

## A. Screener

Vermont residents who purchase or lease an EV (plug-in hybrid or all electric) are eligible to receive an incentive for their purchase or lease from their electric utility or the State of Vermont. The incentive could either be applied directly at the dealership or provided after through a mail-in application.

A1. Have you received an incentive from **your electric utility** for purchasing or leasing an EV since the start of 2022? Electric utilities offering financial incentives for the purchase of an EV include Burlington Electric Department, Green Mountain Power, Stowe Electric Department, Vermont Electric Coop and VPPSA (Vermont Public Power Supply Authority).

1. Yes
2. No
3. Don't know

[TERMINATE IF A1=2 OR 3]

**[TERMINATION MESSAGE]** Unfortunately, you are not eligible to take this survey. Thank you for your willingness to help improve incentives for Electric Vehicles in Vermont!

## B. Demographics

Thanks for confirming. We want to better understand how these incentives support Vermont residents in purchasing or leasing EVs. Because of this, we'd like to start by learning a little more about you and your home.

If you purchased or received the incentive for more than one vehicle, please keep in mind the **most recent vehicle** you purchased as you answer the questions.

B1. What is your highest level of education?

1. High School/GED
2. Professional/Trade school
3. Associate's degree or some college/university education
4. Bachelor's degree
5. Master's degree
6. Doctoral degree
7. Other (please describe) **[TEXT ENTRY BOX]**

B2. What is your zip code?

1. **[ZIP CODE – ZIPCODE VALIDATION ONLY]**

B3. Which of the following best describes your primary residence?

1. Single family home
2. Duplex
3. Condo, with about this many units: **[NUMBER ENTRY]**
4. Multi-family apartment, with about this many units: **[NUMBER ENTRY]**



B4. Where do you normally park your EV at night?

1. Garage
2. Carport
3. Dedicated outdoor parking space
4. Shared outdoor parking space
5. On-street parking
6. Other (please describe) **[TEXT ENTRY BOX]**

B5. **[FORCE RESPONSE]** Which of the following best describes your annual household income before taxes?

1. Less than \$35,000
2. \$35,000 to \$49,999
3. \$50,000 to \$74,999
4. \$75,000 to \$99,999
5. \$100,000 to \$149,999
6. \$150,000 to \$199,999
7. \$200,000 or more
8. Prefer not to say

B6. Do you consider yourself to be... ? Select all that apply **[MULTIPLE SELECTION, RANDOMIZE ORDER 1-7]**

1. Caucasian or White
2. African American or Black
3. American Indian or Alaska Native
4. Asian
5. Native Hawaiian or Pacific Islander
6. Middle Eastern or North African
7. Hispanic or Latino
8. Multi-racial or multi-ethnic
9. Other (please describe) **[TEXT ENTRY BOX]**

B7. How do you identify?

1. Woman
2. Man
3. Non-binary
4. Prefer to self-describe **[TEXT ENTRY BOX]**

B8. How old are you?

1. 18-24
2. 25-34
3. 35-44
4. 45-54
5. 55-64
6. 65 or older

## C. Motivations for Purchasing or Leasing an Electric Vehicle

We'd like to ask some questions about the electric vehicle you purchased or leased.

If you purchased or received the incentive for more than one vehicle, please keep in mind the **most recent vehicle** you purchased as you answer the questions.

C1. Please provide the following information for the EV that you received the incentive for.

1. Make: **[DROPDOWN]**
2. Model: **[DROPDOWN]**
3. Year: **[DROPDOWN: for the last 10 years]**

C2. Was the vehicle new or used?

1. New
2. Used

C3. For each source, please rate how important the source's information was in your decision to acquire an EV over a similar gas-powered vehicle. **[RANDOMIZE A-M]**

	1. Not at all important	2. Somewhat important	3. Important	4. Very important	Not Applicable
a. Friend/family member who does not drive an EV					
b. Friend/family member who drives an EV					
c. Car salesperson					

d. EV manufacturer website					
e. Drive Electric Vermont website					
f. EV test drive event					
g. Electric utility					
h. Online discussion forums					
i. YouTube or TikTok EV videos					
j. News story (newspaper, radio, TV, etc.)					
k. Advertisement (newspaper, radio, TV, etc.)					
l. Non-profit organization (e.g., Efficiency Vermont, Sierra Club, etc.)					
m. Government agency (e.g., Agency of Transportation, etc.)					
n. Other (please explain): <b>[OPEN END TEXT BOX]</b>					

C4. Which of the following best describes the **most important** reason you chose an EV over a similar gas-powered vehicle? **[RANDOMIZE 1-8]**

1. Saving money on fuel
2. Saving money on maintenance
3. Incentive availability
4. Reducing environmental impact
5. Increase energy independence
6. Wanted the newest technology
7. Driving performance
8. Supporting growth of EV technology
9. Other (please explain): **[OPEN END TEXT BOX]**

C5. Which of the following best describes the **second-most important** reason you chose an EV over a similar gas-powered vehicle? **[RANDOMIZE 1-8. DISPLAY LIST FROM PREVIOUS QUESTION WITHOUT RESPONSE SELECTED IN PREVIOUS QUESTION]**

1. Saving money on fuel
2. Incentive availability
3. Saving money on maintenance
4. Reducing environmental impact
5. Increase energy independence
6. Wanted the newest technology
7. Driving performance
8. Supporting growth of EV technology
9. Other (please explain): **[OPEN END TEXT BOX]**

C6. The following are reasons some people say they would **not** choose an EV. Which of these, if any, **caused you to hesitate** when choosing an EV over a gas-powered vehicle? If you had no hesitations about choosing an EV rather than a gas-power vehicle, please select “None – I had no concerns.” **[ALLOW MULTIPLE SELCTIONS, RANDOMIZE 1-10]**

1. Environmental impact of battery or manufacturing
2. High purchase/lease price
3. High maintenance cost
4. Poor reliability
5. Limited driving range
6. Poor winter driving performance
7. Charging: limited public stations
8. Charging: limited home plug/charger access
9. Limited vehicle types available (e.g., Pick-up, SUV, etc.)
10. Hard to find an available EV
11. Other (please explain): **[OPEN END TEXT BOX]**
12. None – I had no concerns **[Make exclusive]**

C7. When you shopped for your EV, did you also consider buying or leasing a conventional gas vehicle?

1. Yes
2. No

**C8. [IF B7 B7= 1]** What were your reasons for also considering a gas vehicle?

1. **[OPEN ENDED – MEDIUM TEXT BOX]**

## D. Electric Vehicle Incentives

Now, we'd like to ask you questions about the financial incentive(s) you received for your EV. You may have received this incentive at the dealership at the time of sale/lease or after you purchased/leased your EV.

If you purchased or received the incentive for more than one vehicle, please keep in mind the **most recent vehicle** you purchased as you answer the questions.

D1. Did you receive your incentive at a participating dealership at the time of sale/lease or by submitting an incentive application after the sale/lease was completed?

1. Through the dealership at the time of sale or lease
2. Through an incentive application after purchasing or leasing
3. Don't know

D2. How did you first hear about the EV incentive(s)?

1. Friend/family member who does not drive an EV
2. Friend/family member who does drive an EV
3. Car salesperson
4. EV manufacturer website
5. Drive Electric Vermont website
6. EV test drive event
7. Online discussion forums
8. Blogs (not on manufacturer websites)
9. News story (newspaper, radio, TV, etc.)
10. Advertisement (newspaper, radio, TV, etc.)
11. Non-profit organization (e.g., Drive Electric Vermont, Efficiency Vermont, etc.)
12. Government agency (e.g., Department of Transportation, etc.)
13. Electric utility
14. Other (Please describe) **[OPEN TEXT ENTRY BOX]**
15. Don't know

D3. Did/will you receive any of these other incentives for purchasing or leasing your EV?

1. Federal tax credits **[YES/NO/DON'T KNOW OPTIONS]**
2. Low-and moderate-income supplemental incentives **[YES/NO/ DON'T KNOW OPTIONS]**
3. Utility EV charging rates (Time of Use Rates, Flat Rates, Tiered Rates) **[YES/NO/ DON'T KNOW OPTIONS]**
4. State of Vermont Incentive **[YES/NO/DON'T KNOW OPTIONS]**
5. Other **[PLEASE DESCRIBE BOX]**

D4. What was the incentive amount you received from your utility after purchasing/leasing your plug-in EV? Please do not consider other incentives such as federal incentives. If you don't remember the exact number an approximation is okay.

1. **[OPEN TEXT ENTRY – valid numbers only]**

D5. If you had not received this incentive, would you have still purchased an EV? Please assume all other incentives you would have received if you purchased an EV (e.g., a federal tax credit) were the same. **[FORCE RESPONSE]**

1. Definitely
2. Very likely
3. Somewhat likely
4. Not likely

5. Definitely not

## E. Satisfaction with Electric Vehicle and Incentive Process

We'd also like to ask about your satisfaction with the process of applying for and receiving the incentive for your EV purchase.

If you purchased or received the incentive for more than one vehicle, please keep in mind the **most recent vehicle** you purchased as you answer the questions.

E1. How easy was **the process of applying for the incentive** from your electric utility?

1. Very easy
2. Somewhat easy
3. Neither easy nor difficult
4. Somewhat difficult
5. Very difficult
6. Not applicable, I received my incentive from the dealership instantly

E2. How satisfied or dissatisfied were you with the **time it took to receive the incentive** from your electric utility for purchasing an EV?

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied
6. Not applicable, I received my incentive from the dealership instantly

E3. **[IF E1 or E2 = 3,4, or 5]** How could the incentive application process have been better?

1. **[OPEN TEXT ENTRY BOX]**

E4. How satisfied or dissatisfied were you with the **incentive amount** you received from your utility?

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied

E5. **[IF D2=3,5,6, 10, 11,12,13]** How satisfied or dissatisfied were you with the **quality of information** provided about the available EV incentives?

1. Very satisfied
2. Somewhat satisfied
3. Neither satisfied nor dissatisfied
4. Somewhat dissatisfied
5. Very dissatisfied

E6. **[IF E5 = 3,4,5]** How could the information provided have been better?

- [OPEN TEXT ENTRY BOX]**

E7. Please rate the difficulty of each aspect of the electric vehicle purchase and incentive process.

	Very Difficult	Difficult	Neither easy nor difficult	Easy	Very Easy
a. Hearing about the available incentives for an EV purchase or lease					
b. Understanding the available incentives for my purchase or lease					
c. Finding an EV within my price range					
d. Finding an EV that I was interested in (for reasons other than price - appearance, driving habits, etc.)					
e. Finding a dealership offering the EV I was interested in					
f. Finding a dealership offering the incentives on EVs					
g. Submitting the incentives application					
h. Installing an EV charger at my home					

58. Have you ever visited the DriveElectricVermont.com website for information on energy efficiency programs?

- Yes
- No
- Don't know

98.



## F. Household Driving and Charging

Next, we'd like to ask questions about your household driving and charging behaviors.

If you purchased or received the incentive for more than one vehicle, please keep in mind the **most recent vehicle** you purchased as you answer the questions.

- F1. Excluding the incentivized EV **[EVMAKE] [EVMODEL]**, how many vehicles does your household currently own or lease?
1. Conventional Gas Vehicles: **[NUMBER ENTRY BOX]**
  2. Conventional Hybrid Vehicles: **[NUMBER ENTRY BOX]**
  3. Plug-in Hybrid Vehicles (PHEV): **[NUMBER ENTRY BOX]**
  4. All Electric Vehicles (AEV): **[NUMBER ENTRY BOX]**
- F2. How many vehicle round trips do you and others in your household take to commute to a job or school during a typical week?
- Please count the total number of vehicles round trips. For example, if you commute three times per week and the second member of your household separately commutes four times per week, your household's total weekly round trips would be seven.
1. None
  2. About 1-2 times a week
  3. About 3-6 times a week
  4. About 7-10 times a week
  5. About 11-14 times a week
  6. More than 14 times a week
- F3. **[IF E2=2-6]** About how many miles is the average roundtrip commute for your household? For example, if your roundtrip commute is 10 miles and the second member of your household has a roundtrip commute of 30 miles, your total would be 40 miles.
1. Less than or equal to 10 miles
  2. Between 11-20 miles
  3. Between 21-30 miles
  4. Between 31-40 miles
  5. Between 41-50 miles
  6. Between 51-60 miles
  7. Between 61-70 miles
  8. Between 71-80 miles
  9. Between 81-90 miles
  10. Between 91-100 miles
  11. Greater than 100 miles

- F4. What is your best estimate of the total number of miles your household drives each year?
1. Less than 5,000 Miles
  2. Between 5,000-9,999 miles
  3. Between 10,000-14,999 miles
  4. Between 15,000-29,999 miles
  5. Greater than 30,000 miles
- F5. What is your best estimate of the number of miles your household drives in your incentivized EV **[EVMAKE]** **[EVMODEL]** each year?
1. Less than 5,000 Miles
  2. Between 5,000-9,999 miles
  3. Between 10,000-14,999 miles
  4. Between 15,000-29,999 miles
  5. Greater than 30,000 miles
- F6. How has the purchase or lease of your EV **[EVMAKE]** **[EVMODEL]** affected your household's driving habits? Please tell if the following statements are true or false about your household's driving habits. Select all that apply: **[RANDOMIZE ORDER 1-3]**
1. We take fewer trips
  2. We take more trips
  3. We make more longer distance trips
  4. It has not affected our driving habits
  5. Other (please explain): **[OPEN END TEXT BOX]**

**[ADD PAGE BREAK]**

6. Now we'd like to ask about how and where you charge the EV **[EVMAKE]** **[EVMODEL]**.
- F7. Where do you charge your incentivized electric vehicle? Select all that apply. **[ALLOW MULTIPLE SELECTIONS]**
1. At home
  2. At my place of work
  3. At a public charging station
  4. Other: Please Specify **[TEXT ENTRY BOX]**

- F8. **[IF E7 = 1]** What type(s) of charger do you use at home?
1. Level 1 Charger (Standard Wall Outlet)
  2. Managed (smart or networked) Level 2 Charger (240V)
  3. Unmanaged Level 2 Charger (240V)
  4. Other (please explain): **[TEXT ENTRY BOX]**
  5. Don't know
- F9. **[IF E7 = 1]** About what percentage of your incentivized vehicle's charging occurs at home?
1. **[DROP-DOWN WITH 10% INCREMENTS: 0% – 10%, 11% - 20%, 21% - 30%, 31% - 40%, 41% - 50%, 51% - 60%, 61% - 70%, 71% - 80%, 81% - 90%, 91% – 100%]**
- F10. **[IF E7 = 2]** What type(s) of charger do you use at work? **[ALLOW MULTIPLE SELECTIONS]**
1. Level 1 charger / standard wall outlet
  2. Level 2 charger
  3. DC fast charger
  4. Don't know
  5. Other (please explain): **[TEXT ENTRY BOX]**
- F11. **[IF E7 = 2]** About what percentage of your incentivized vehicle's charging occurs at work?
1. **[DROP-DOWN WITH 10% INCREMENTS: 0% – 10%, 11% - 20%, 21% - 30%, 31% - 40%, 41% - 50%, 51% - 60%, 61% - 70%, 71% - 80%, 81% - 90%, 91% – 100%]**
- F12. **[IF E7 = 3]** What type(s) of public chargers do you use? **[ALLOW MULTIPLE SELECTIONS]**
1. Level 1 charger / standard wall outlet
  2. Level 2 charger
  3. DC fast charger
  4. Don't know
- F13. **[IF E7 = 3]** About what percentage of your vehicle's charging occurs at public chargers?
1. **[DROP-DOWN WITH 10% INCREMENTS: 0% – 10%, 11% - 20%, 21% - 30%, 31% - 40%, 41% - 50%, 51% - 60%, 61% - 70%, 71% - 80%, 81% - 90%, 91% – 100%]**
- F14. What specific locations would you like to see more public chargers? **[ALLOW MULTIPLE SELECTIONS, RANDOMIZE ORDER 1-10]**
1. Highways
  2. Grocery stores
  3. Rest stops
  4. Parks and recreation areas
  5. Downtown
  6. Shopping/Retail Areas
  7. Gas stations
  8. Hotels
  9. Airports
  10. School/university campuses

11. Other (please describe): **[OPEN END TEXT BOX]**

## G. Closing

G1. The State of Vermont Public Service Department thanks you for your participation. To enter the raffle for the gift cards please add your email below. Your email information will only be used for the raffle, and it will not be stored.

1. **[TEXT ENTRY BOX]**

If you'd like to know more about the EV incentive program and other resources visit [Drive Electric Vermont \(driveelectricvt.com\)](https://driveelectricvt.com).

The survey prize raffle will be in **June 2024**. We will contact the winners via the email entered, if you wish to change your address or request an update, please contact [barbara.dossantos@cadmusgroup.com](mailto:barbara.dossantos@cadmusgroup.com).

Thank you!

## Appendix C. Program Administrator Interviews

### A. *Introduction & Interviewee Information*

Thank you for joining us today. We are here to talk about the design and status of the Vermont Electric Vehicle Programs. These include:

- Act 151-enabled program spending by the Energy Efficiency Utilities (EEUs).

The overarching purpose of this interview is to formally document and assess the implementation of the programs. Before we get started, do you have any questions for me?

1. First, what [are/is] your role(s) at **BED**?
2. How long have you been involved with **BED**?
3. What role(s), if any, did you have in the design of the programs?
4. What role (s), if any, did you have in the implementation of the program?

**[IF NONE:** Is there someone else we should talk to who was involved with the initial program design or implementation? **[If so, capture name and contact information]**

Great. Next, we are going to move into detailed questions about the program. I'll ask you about the design, implementation, and then early lessons learned.

### B. *BED*

1. Program design
2. How would you summarize the design of the Act 151 programs (probe: incentive structures, implementation)?
3. When did **[BED]** begin designing act 151 programs
4. Have there been any major program design changes since the beginning of the program?  
**[PROBE for changes and rationale]**

5. What is the difference between the Efficiency Vermont dealers program and the Burlington Electric Department (BED) program?
  6. Is there any specific reason why the programs are so different in their design?
- C. *Program Component EV Incentives: Are EV incentives a part of Act 151 programs? If yes, ask following questions. If no, skip to section D*

Program component: **EV Incentives**

1. Do you feel like the incentive caps and rebate levels are set at appropriate levels to meet program goals?
2. What feedback have you received from dealers on how the incentives supported their sales?

D. *EV Dealer Interaction*

1. Please describe how the programs rely on dealers for program delivery or promotion.
2. How are EV dealers recruited?
3. What outreach strategies to EV dealers have you found to be most effective and why?
4. What challenges have you experienced getting EV dealers to promote the programs? Why do you think that is?
5. What is working well with EV dealer relationships in 2023?

E. *Other Program Components*

**Other Program components**

1. Are there other components to your EV programs related to Act 151? If so, what are they, and how do you feel they are working?
2. Overall, is the program achieving participation targets?

**Interaction with Other Programs**

1. Have you heard feedback from customers about other Vermont EV programs, such as the utility programs?

## F. *Challenges and Successes*

1. What aspects of program implementation have been challenging so far?
2. What steps are being taken to overcome these challenges?
3. What aspects of program implementation have been the most successful so far? Why do you think they've been successful?

## G. *Closing*

1. Is there anything else you'd like to mention that we haven't already covered that will help us understand the role of the Act 151 programs in VT's decarbonization goals?

## Appendix D. Market Participant (Dealer) Interviews

### A. *Outreach Email Template*

Subject: Help us to improve Vermont's electric vehicle programs!

Dear **[NAME]**,

I hope you are doing well. My name is **INSERT**, and I am an Analyst with the Cadmus Group, evaluating Efficiency Vermont's electric vehicle programs through a contract with the VT Department of Public Service.

The purpose of this evaluation is to determine the effectiveness of the Efficiency Vermont's EV rebate programs, and to improve these programs going forwards. I am hoping to speak with Vermont auto dealerships about how the programs and incentives are working and how they might be improved.

I would like to schedule a half-hour (or shorter) phone interview to discuss Efficiency Vermont's programs. Please let me know if any of the following times would work on your end.

**[INSERT TIMES]**

If none of these times work well on your end, we can look at other times to connect as well.

I look forward to speaking with you.

All the best,



**INSERT**

## B. *Introduction & Interviewee Information*

Thank you for joining us today. We are here to talk about the design and status of the Vermont Electric Vehicle Programs, especially Act 151 incentives, how they can benefit auto dealerships, and how they can be improved. These programs include:

- EV rebates for customers;
- Dealer training programs;
- Dealer incentives for EV sales;
- Dealer support for capital improvements; and,
- EV education and outreach programs.

The overarching purpose of this interview is to formally document and assess the implementation of the programs. Before we get started, do you have any questions for me?

1. First, what [are/is] your role(s) at **[Dealership Name]**?
2. How long have you been at **[Dealership Name]**?
3. How long has your dealership participated in the Efficiency Vermont program/programs

## C. *Dealer incentives*

B.

1. Next, we'd like to ask you a few questions about the Act 151/Efficiency Vermont EV dealer program's incentives.
2. Rebate Structure: EV Readiness
  1. Do you feel that the EV readiness incentive, which is the cost share program that dealers can access for EV related expenses, has helped you to participate in the selling and leasing of EVs?

2. Do you think the incentive is set at an appropriate level?
3. Rebate Structure: EV sales incentive
  1. Do you or any of your sales representatives participate in the EV sales incentive?
  2. **[IF YES]** Do you feel that those incentives are set at appropriate levels? Why or why not?
  3. Has this incentive encouraged you or your sales representatives to increase your knowledge of EVs?
  4. Has this incentive encouraged you or your sales representatives to increase the sales/leasings of EVs?
4. Rebate Process
  1. Does the current system for processing EV incentives work well for your dealership? Would you recommend any changes?
  5. Do you have any suggestions for how Efficiency Vermont could improve this program?

## C. *Dealer Training Programs*

1. Have you participated in any EV dealer training programs conducted by Efficiency Vermont?
  1. **[If C1 is Yes]** Did this program increase your knowledge of EVs and ability to answer buyer questions?
  2. **[If C1 is Yes]** Was this program a useful complement to manufacturer training, providing Vermont-specific information, or was it redundant?
  3. **[If C1 is Yes]** Do you have any suggestions for the training program?

## D. *EV Education and Outreach Programs*

1. Does your dealership participate in EV education and outreach programs sponsored by Drive Electric Vermont, or Efficiency Vermont?
  1. **[If F1 is Yes]** What is the nature of your participation (for example, do you provide vehicles for ride-and-drive events)?
  2. **[If F1 is Yes]** Do you have any suggestions for EV education and outreach efforts?

## E. *Challenges, Successes, Communication*

1. How easy is it for you to communicate with Efficiency Vermont? Do you think the current system of communication is working well?
2. What has been the biggest success or most beneficial part of being a part of the Act 151 programs implemented by Efficiency Vermont?
3. What have been the biggest challenges?

## F. *Closing*

1. Is there anything else you'd like to mention that we haven't already covered?

Those are all our questions for today. Thank you so much again for your time, we really appreciate it. Have a great rest of your day!