Assessing the Growth of Multi-EV Households in California

October 2024

A Research Report from the National Center for Sustainable Transportation

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16. Abstract
To meet zero-emission vehicle targets, people will have to adopt electric vehicles and convert their entire fleets. In the United States and California, most households own two or more vehicles; most of these households will need to switch their traditional vehicles for plug-in electric vehicles (PEVs). However, most of the research on PEV adoption has focused on people acquiring their first PEV. This work is the first to examine households' decision to maintain at least two PEVs in their household fleets. Utilizing a multi-year survey of PEV adopters between 2012 and 2020, 3,039 respondents who acquired a vehicle after obtaining an initial PEV are identified. Respondents are divided in two groups: those who reverted to an internal combustion engine vehicle (Single PEV) and those who added an additional PEV (Multi PEV). Modelling the groups using binary logistic regression, several factors that differentiate Single from Multi PEV households are identified. Compared to Single PEV, Multi PEV households are more likely to have owned previous PEVs, live in detached single-family homes with solar, own an SUV prior to their initial PEV, purchase a Tesla for their initial PEV, and use the initial PEV for commuting.

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EXECUTIVE SUMMARY

Electric vehicles have long been considered a way to reduce greenhouse gas emissions and combat climate change, especially in car-dependent countries like the United States. However, if the US is to reduce its transportation carbon footprint, households will need to convert their entire fleets not just adopt electric vehicles. This may prove challenging as studies show many households keep plug-in electric vehicles (PEVs) as additional vehicles for their households.

Little is known about households considering a second or third PEV purchase. This work is the first to investigate the characteristics of households buying multiple PEVs. We use a unique dataset to examine sociodemographic and household fleet characteristics that contribute to households' decision to purchase additional PEVs. We examine a set of households who acquired a PEV and then made the decision to add an additional vehicle to their fleet, investigating what differentiates those who add another PEV to their fleet from those who do not. In our survey, 3,039 households purchased a battery-electric (BEV) or plug-in hybrid (PHEV) between 2012-2020 and later went on to purchase another vehicle. Of these households, 25% went on to acquire a PEV. We explore the differences and similarities between those who purchase or leased an ICE vehicle after their first PEV and those who acquired another PEV. We estimate a binary logistic model using sociodemographic and household fleet characteristics to determine what are the most important variables differentiating these Multi and Single PEV households.

We analyze the influence of multiple variables on a household's decision to purchase an additional PEV or to revert to ICEVs after an original PEV purchase by using a binary logit model. Several sociodemographic and household fleet variables were tested.

We find several variables correlated with the decision to acquire multiple PEVs including:

- Previously purchasing PEVs: Households who had previously purchased PEVs were more likely to buy additional PEVs and this relationship was highly significant. This corroborates the idea that most PEV adopters continue to own PEVs.
- Solar: Families in detached houses with household solar were much more likely to purchase another PEV. The reasons for this could be twofold: first, those who purchase solar panels may do so because of underlying pro-environmental feelings which may cause them to buy multiple PEVs, or second, installing home solar may make home electricity prices much cheaper which makes multiple PEVs more attractive.
- Vehicle number: Households with more vehicles were more likely to acquire multiple PEVs. Two-vehicle households were statistically less likely to purchase subsequent PEVs.
- Initial PEV model: Households with Tesla vehicles were more likely to acquire additional PEVs.

- Initial PEV commuting: Households that used their initial PEV to commute were more likely to acquire multiple PEVs. However, shorter commutes were correlated with acquiring multiple PEVs.
- Land use: Suburban households were more likely than rural households to buy additional PEVs. The trend in urban households was weaker but these households were also slightly more inclined to multiple PEVs when compared to rural households.
- Education: Advanced degree holders were more likely to acquire multiple PEVs.
- Household Size: Smaller households were more likely to acquire multiple PEVs.

Most households in California own two or more vehicles, so it is critical to study those who own two or more PEVs. Research has shown that it is more difficult to charge the second, third or fourth PEV at home, but little work has been done to see why people purchase additional PEVs. Many characteristics differentiated multi PEV households from single PEV households in this survey. Owning additional PEVs, living in a detached home with solar, using their original PEV for commuting and purchasing a Tesla initially were all correlated with respondents acquiring more PEVs. As policies and the market shifts to include more PEV body types, help install home charging, promote work charging, and accelerate household solar, we expect income to play even less of a role in encouraging people to adopt multiple PEVs.

More research is needed into Multi PEV households. Work will need to be done to examine how households acquire many PEVs in longer time frames, how they adopt used PEVs, and which households are buying exclusively battery-electric vehicles. Additionally, research is needed into the problems these households face. While we expect home charging to be an issue for them, little is known about additional or the actual issues these household's encounter.

Introduction

Electric vehicles have long been considered a way to reduce greenhouse gas emissions and combat climate change, especially in car-dependent countries like the United States. However, if the US is to reduce its transportation carbon footprint, not only do most households need to *adopt* electric vehicles, but they will need to *convert* their entire fleets.

Electric vehicle adoption has been accelerating in the past decade, especially in California where 25% of new cars sold are electric. Most of these sales go towards electrifying the first car in a household. Concerns about range anxiety and performance cause many to hold on to internal-combustion engine vehicles (ICEV) even as they purchase an additional plug-in electric vehicle (PEV) for their household fleets(*1–3*).

To combat climate change, it is not enough for households to adopt just one PEV, especially in a country where owning and driving multiple vehicles is the norm. In California alone, the average household owns 2.44 vehicles (*4*). Households will need to electrify the second and third most-driven vehicles in their fleets if most miles driven are to become low-emission.

Currently, little is known about households considering their second or third PEV purchase. Hardman and Tal (*5*) investigate why some people replace their first PEV with a second one and those who discontinue owning PEVs, and Alexander et al. (*6*) show that it is more difficult for most households to charge a second PEV at home. However, no work has been done to date on people choosing to have multiple PEVs in their fleets.

This work is the first to investigate the characteristics of households buying multiple PEVs. We use a unique dataset to examine sociodemographic and household fleet characteristics that contribute to households' decision to purchase additional PEVs. We examine a set of households who acquired a PEV and then made the decision to add an additional vehicle to their fleet, investigating what differentiates those who add another PEV to their fleet from those who do not. In our survey, 3,039 households purchased a battery-electric (BEV) or plug-in hybrid (PHEV) between 2012-2020 and later went on to purchase another vehicle. About 25% of these households bought another PEV (Figure 1). We explore the differences and similarities between those who purchase or leased an ICE vehicle after their first PEV and those who continued with the new technology. We estimate a binary logistic model using sociodemographic and household fleet characteristics to determine what are the most important variables differentiating these Multi and Single PEV households.

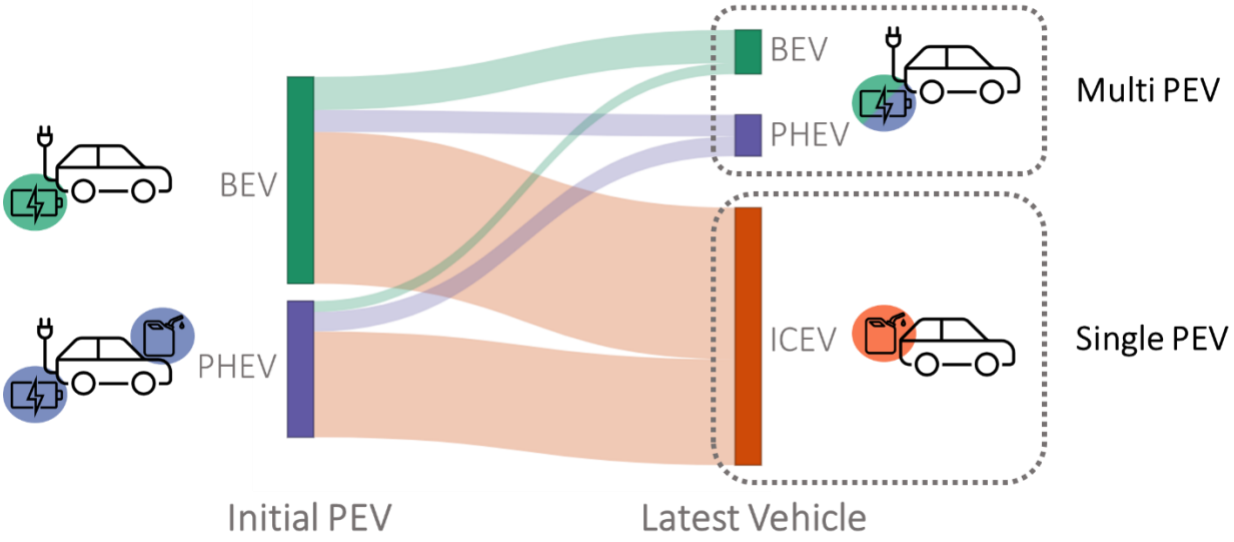

Figure 1. Illustration of the type of vehicle powertrain following the initial PEV purchase.

Background

Current Fleet Characteristics

The United States is a car-dependent country and California is no different. According to the National Household Travel Survey California Add-On (CA NHTS) (*7*), 34.8% of households owned two vehicles and 26% of households owned three or more vehicles in 2017. To put it another way, almost half the vehicles in the state (48%) belonged to households who owned three or more vehicles (3+ vehicles households) and over a third (35.7%) belonged to households who own two vehicles (two-vehicle households). In contrast, 31.7% of households own only one vehicle and 16.2% of vehicles in the state belong to these households.

Not only do Californians own many vehicles, but they tend to own larger vehicles. About 25.1% of the vehicles in the state are SUVs and vans while trucks make up another 11.9%. Households with more vehicles more frequently own at least one SUV or truck. Half of two-vehicle households (50.4%) and almost two-thirds of 3+ vehicle households (62.1%) own at least one SUV. The story is similar for trucks; 20.7% of two-vehicle and 44.1% of 3+ vehicle households own one or more trucks. Figure 2 demonstrates the number of vehicles in California by body style by various households.

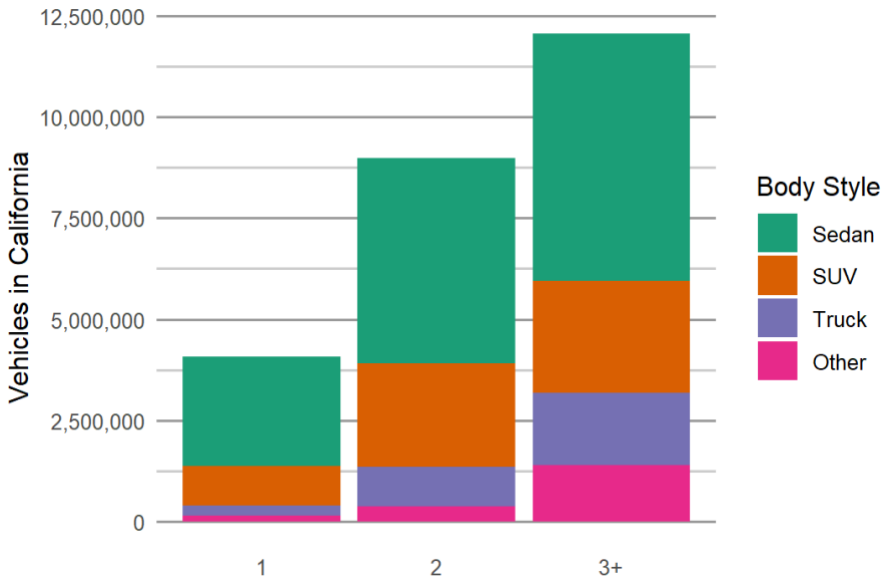

Figure 2. Number of vehicles, according to vehicle body style, owned by households with one vehicle, two vehicles, or households with three or more vehicles.

Multi-vehicle households were wealthier than single-vehicle ones. The average income for two-vehicle households was $99,000 while it was $110,000 for 3+ vehicle households. These households are also more likely to own their homes with 60% of two-vehicle and 77% of 3+ vehicle households owning their homes. Single-vehicle households, on the other hand, had an average income of $62,000 and homeownership rate of 38%.

Multi PEV Households

Most of the work on PEV diffusion focuses on adoption – households purchasing their first PEV. Research has shown most of these households are wealthy homeowners with multiple vehicles and use their PEV for commuting (*8*). A growing body of work shows that PEV adoption is moving towards the mainstream with lower-income, single-vehicle, and/or renter families adopting PEVs (*9*–*11*). There are significant differences between earlier adopters and those in the mainstream (*12*).

Less is known about people after they buy their first PEV. After making their original purchase decision, PEV owners can choose to discard their PEV in favor of an ICEV, replace their PEV with another PEV, or purchase additional PEVs or ICEVs. To decarbonize transportation, people will have to purchase PEVs and continue choosing them. Brown et al. (*13*) forecast that replacement or additional PEVs will make the majority of PEV sales by the late 2030s. Yet, research on continuing or additional PEV buyers is either nascent or nonexistent. Some work has been done on discontinuance among PEV owners; Hardman & Tal (*5*) study whether PEV buyers continue owning PEVs after an original PEV purchase. They find that about a fifth of owners discontinue owning a PEV years after their initial purchase. Similarly, some work has been done on stated preferences to buy replacement or additional PEVs. Hasan (*14*) examines

the intention to repurchase BEVs in the Norwegian market, investigating the effects of attitudes, perceived functional barriers, and subjective norms.

However, no work has studied people who own multiple PEVs; specifically, what factors are correlated with households owning two or more PEVs. These households will encompass a large portion of the population and will have unique challenges, so it is vital to understand them better. For one, it will be more difficult for them to charge at home; NREL calculates that while 33% of all households are able to charge one PEV at home, only 18% of households are able to charge an additional one (*6*). This paper is one of the first to investigate what differentiates "multi PEV" households from those with single PEVs.

While no work has looked at households with multiple PEVs, the work on initial PEV adoption can help identify possible variables that could influence multi PEV ownership. Income, gender, education, housing size, housing type and tenure, and commuting have all been key in initial PEV adoption. Other vehicle fleet characteristics and preferences have been theorized to also be important. Several studies have shown that it is easier for a household with many vehicles to adopt a PEV, showing that no behavior modification is needed for a PEV to replace the second-most driven vehicle in a household (*1*–*3*). Carley et al. show early evidence that people who bought hybrids would be interested in adopting PEVs. Many studies have shown that people with Tesla BEVs act differently from typical PEV owners. Haustein et al. (*15*) find that Tesla owners drive their vehicles differently; and that owning a Tesla was the principal factor for whether a PEV was used for cross-border trips in northern Europe. Hardman and Tal (*5*) find that Tesla owners have the lowest rates of discontinuance among PEV owners. Liang et al. (*16*) show there are positive co-adoption benefits between household solar and PEVs. We use this previous work to guide in variable selection and testing for a binary logistic model distinguishing between households with a single and multiple PEVs, single and multi PEV households.

Methods

Survey Description

The data for this study comes from multiple surveys conducted by the Plug-in Hybrid & Electric Vehicle Center at the University of California, Davis. The questionnaire surveys were administered between April 2015 and October 2020 and is a convenience sample of Californian households. Households who had recently purchased PEVs and applied for the California Clean Vehicle Rebate (CVRP) were invited to participate in the survey by the California Air Resources Board. The surveys have collected 33,455 responses to date from first-time PEV adopters and repeat PEV buyers and is detailed in the report prepared by Tal et al. (*17*).

This study is the first to examine the factors that contribute to households acquiring additional PEVs with or after an initial PEV. From the original survey population, the subset of households who purchased an additional vehicle (ICEV or PEV) after their original PEV acquisition was considered. After excluding respondents with missing or incomplete information, this subsample consisted of 3,039 households who acquired PEVs between 2012 and 2020. Of these

households, 25% purchased another PEV after their initial PEV and 75% purchased an ICE. We refer to these groups as “Multi PEV” and “Single PEV” households respectively.

Figure 3 shows the distribution of the time between the initial PEV acquisition and survey date (left) as well as the time between the initial PEV and latest vehicle acquisitions (right) where model year is used as a proxy for date acquired. As a result of the survey implementation, only respondents who frequently purchased new cars were captured in this study. The median time between initial PEV acquisition and the survey date was 13 months and the average was 14.9 months. Within this sample of frequent car buyers, there was no statistical difference between the time of the initial PEV acquisition and survey date (F-value = 0.74) between Single and Multi PEV buyers.

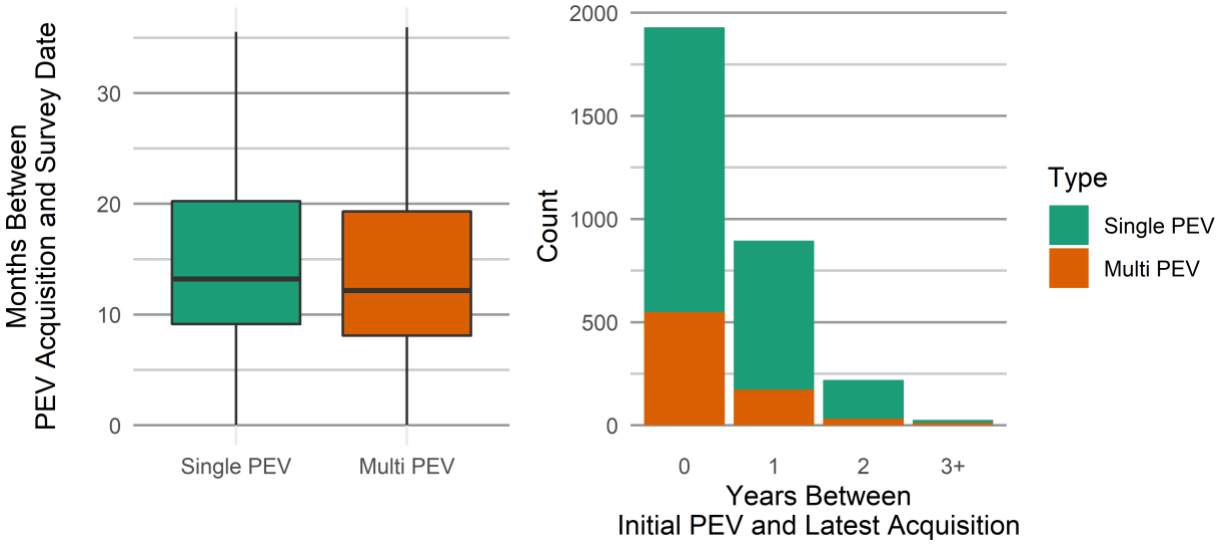

Figure 3. Graph 3a (left) showing the time (in months) between purchasing a PEV and completing the survey, and graph 3b (right) showing the time (in years) between purchasing an initial PEV and the following vehicle purchase in the household.

Sample Characteristics

The subset of households we examine, frequent new car buyers, is very different from the general population. On average, these households have very high incomes, high rates of home ownership, and are highly educated. Table 1 summarizes how this sample compares to California averages.

Table 1. Demographics comparison between the survey sample and the California averages.

	Sample	California
Income (in thousands of dollars)	216	99.7
Age	47	39.3
Advanced Degree Holders	44%	12%
Homeowners	86%	55%
Number of Vehicles	2.68	2.44
HH Size	3.22	4.40

The most common PEV models these households initially acquired were Chevrolet Volt, Tesla Model 3, and Nissan Leaf vehicles. Figure 4 depicts the most common PEVs and whether these vehicles were purchased or leased. Tesla vehicles were more commonly purchased instead of leased.

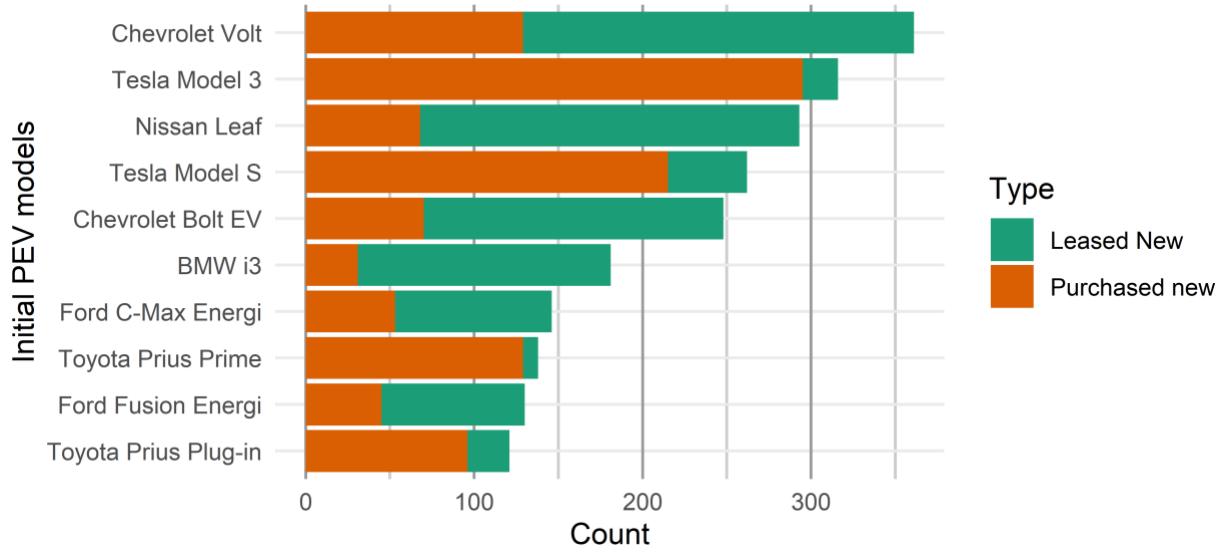

Figure 4. Initial purchase mode (lease vs. purchased) for vehicles according to vehicle model.

Figure 5 depicts the fuel types and body styles of the latest vehicle these households purchased. During the period of this survey, mostly PEV sedans were available, with only a few models of PEV SUVs/vans were available in the market, and at the time of the survey, no truck models were available with PEV powertrains.

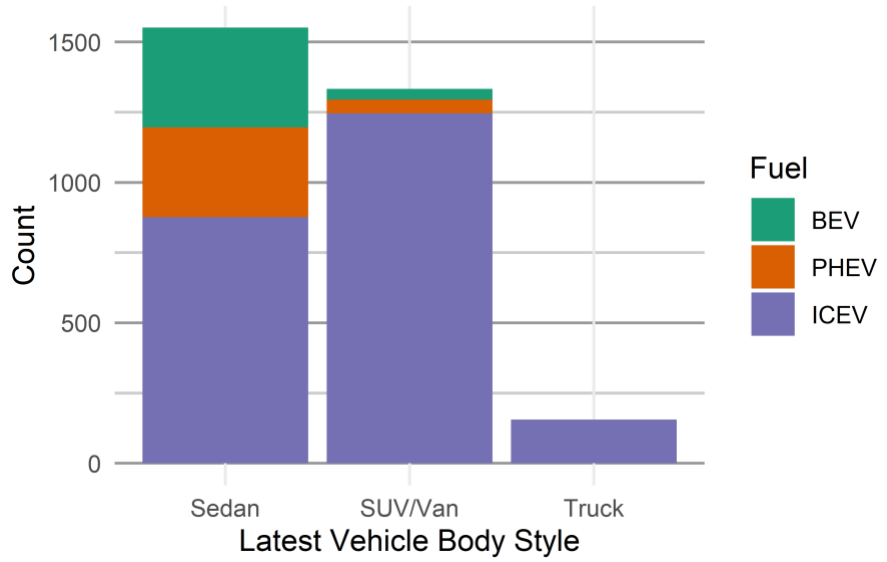

Figure 5. Fuel and body style of most recent vehicle purchased by respondents' households.

Binary Logit Design

We analyze the influence of multiple variables on a household's decision to purchase an additional PEV or to revert to ICEVs after an original PEV purchase. The probability of a household being Multi PEV is calculated using equation (1) based on (2), where V is the linear combination of sociodemographic $\boldsymbol{x}$, fleet $\boldsymbol{v}$, and context γ variables.

$$P_{multi} = \frac{1}{1 + e^{-V}} \tag{1}$$

$$V = \beta_0 + \boldsymbol{\beta_x x} + \boldsymbol{\beta_v v} + \boldsymbol{\gamma_{t,d}} \tag{2}$$

Several sociodemographic variables were tested including income, age, gender, educational attainment, household size, housing type and tenure, and land use classification. Age, gender, and educational attainment considered the survey respondent/ main driver of the initial PEV. Housing type considered whether the household lived in a multi-unit dwelling, detached, or attached single-family home and tenure considered whether the household lived in an owned or rented home. Land use classification included rural, suburban, and urban categories and was adapted from Salon et. al (*18*).

Fleet variables included attributes and usage characteristics of the initial PEV purchased and characteristics of the household fleet. Variables in the first category included whether the initial PEV was a non-Tesla BEV, a Tesla BEV or a PHEV, whether it was purchased or leased, whether it was used for commuting, and the most frequent weekday distance the vehicle travelled. Fleet attributes included whether the household had three or more vehicles or was a two-vehicle household and whether the household owned previous PEVs. For households that owned three or more vehicles, additional variables were considered including whether the household owned trucks, SUVS/vans or hybrids prior to the initial PEV acquisition.

Finally, various fixed effects were included in the model to account for temporal and spatial variability. Year fixed effects account for yearly variations in the PEV market. Several regional controls were tested including variables for the San Francisco Bay area, the Los Angeles area, and several counties.

Results

While both groups of households frequently purchased vehicles, there were certain characteristics that differentiated Single and Multi PEV households. Households who went on to purchase an additional PEV more often bought a BEV as their original PEV when compared to those who opted not to and purchased instead of leased their original PEV. Similarly, Multi PEV households more frequently had solar panels installed in their home and had larger household fleets when compared to Single PEV households. Table 2 summarizes average attributes for both types of households and indicates some variables found significant through one-way ANOVA or χ^2 tests.

Table 2. Average characteristics of households with one or more PEVs

	Total	Single PEV	Multi PEV	ANOVA	χ^2	p-value	
Total	3,039	2,277	762	-	-		
Initial PEV is BEV	60%	59%	64%	-	7.09	0.01	**
Initial PEV was leased	52%	54%	46%	-	14.65	0.00	***
Avg Income	216	218	212	1.42	-	0.23	
Avg Age	47	47	48	1.64	-	0.20	
Female	21%	21%	21%	-	0.10	0.76	
Advanced Degree Holders	44%	43%	47%	-	4.11	0.04	**
Homeowners	86%	85%	87%	-	2.24	0.13	
Household Solar	35%	33%	43%	-	23.99	0.00	***
Avg Vehicles	2.68	2.64	2.79	-	17.65	0.00	***
Avg HH Size	3.22	3.24	3.18	1.40	-	0.24	
Avg Number of Drivers	2.37	2.37	2.38	0.06	-	0.80	

Conducting ANOVA and χ^2 tests helped inform initial variable selection for the binary logistic regression model for Single and Multi PEV households. Subsequent trials of model testing narrowed the set of variables included in the regression. The final binary logit model is summarized in Table 3.

Table 3. Final Binary Logit Model results

	Estimate	t-ratio	p-value	
Intercept	-1.860	-6.931	0.000	***
Sociodemographics				
Income (Before 2016)	-0.001	-2.413	0.016	**
Income (After 2016)	-0.001	-1.566	0.117	
Education	0.196	2.195	0.028	**
Household Size	-0.088	-2.253	0.024	**
Housing				
Detached (base)	-	-	-	
Detached With Solar	0.409	4.212	0.000	***
Attached	0.359	2.520	0.012	**
Land Use				
Rural (base)	-	-	-	
Suburban	0.287	2.711	0.007	***
Urban	0.166	1.231	0.219	
Fleet				
Previous PEVs	0.670	6.749	0.000	***
Two-Vehicle Household	-0.197	-1.834	0.067	*
Three-Vehicle Household				
Earlier Trucks	0.202	1.093	0.274	
Earlier SUVs/Vans	0.349	2.612	0.009	***
Initial PEV				
Tesla	0.324	2.646	0.008	***
Lease	-0.305	-2.958	0.003	***
Commuter	0.368	2.182	0.029	**
Distance	-0.010	-3.595	0.000	***
Fixed-Effects Controls				
Santa Clara County	0.353	2.552	0.011	**
2013	-0.105	-0.498	0.618	
2014	0.213	1.034	0.301	
2015	-0.146	-0.717	0.474	
2016	0.047	0.240	0.810	
2017	0.318	1.775	0.076	*
2018	0.128	0.720	0.472	
Log Likelihood	-1615.972			
$\rho^2(0)$	0.2329			
Observations	3039			

Binary logistic regression model where the dependent variable is 1 = Multi PEV, 0 = Single PEV (* =<0.1, **=<-.05, ***=<0.01)

Education and household size have significant effects on a household being Multi PEV with advanced degree holders more likely and those with larger households being less likely to purchase another PEV. Income has a very slight negative effect on households having Multi PEV but is only statistically significant for those who purchased their first PEV before 2016. While gender and age of the survey respondent were tested, they were excluded from the final model because they showed no statistically significant trend.

Families in detached houses with household solar were much more likely to purchase another PEV. The reasons for this could be twofold: first, those who purchase solar panels may do so because of underlying pro-environmental feelings which may cause them to buy multiple PEVs, or second, installing home solar may make home electricity prices much cheaper which makes multiple PEVs more attractive.

Interestingly, living in attached housing was positively correlated with owning multiple PEVs. This is an unintuitive finding and may speak to PEV-enthusiasm within these households. Living in an attached house usually means it is more difficult to charge one let alone multiple PEVs at home(*6*). As this survey considered a convenience sample, all the families in attached houses in this survey already had to surmount the challenge of charging one PEV at home. Diffusion of PEVs is at a very early stage within families in attached housing. As such, it's possible that these families are "innovator" or "early adopter" families highly enthusiastic about PEVs and willing to deal with the challenges of charging multiple PEVs at home.

Unsurprisingly, suburban households were more likely than rural households to buy additional PEVs. The trend in urban households was weaker but these households were also slightly more inclined to multiple PEVs when compared to rural households.

Households who had previously purchased PEVs were more likely to buy additional PEVs and this relationship was highly significant. In fact, this variable had the largest coefficient in the model. This corroborates the idea that most PEV adopters continue to own PEVs (*5*). Two-vehicle households were statistically less likely to purchase subsequent PEVs. This follows the trend in initial PEV adoption; people are more likely to purchase PEVs if they have backup combustion vehicles(*1*–*3*).

Among households with three or more vehicles, the body type of earlier vehicles was correlated with purchasing additional PEVs. Households who already owned an SUV or van were statistically much more likely to purchase an extra PEV. A similar trend persists for those who owned trucks although it was not statistically significant. Although it was tested, no trend was detected for hybrid vehicles; households who owned prior hybrids were not more likely to be either Single or Multi PEV households. The trend in SUV and truck ownership is expected; at the time of this survey, there were no PEV trucks available in the market and few PEV SUVs. Since there were few PEV body types available in the market, when consumers looked to purchase a new vehicle, they often chose between larger vehicles like SUVs and trucks and PEVs. Thus, if a household already owned an SUV or truck, they may have been less inclined to purchase another and more persuaded to buy a PEV.

Finally, multiple characteristics of the initial PEV were significant in the decision to purchase and additional PEV. If the original PEV was a Tesla or if it was used for commuting, the latest vehicle was more likely to be a PEV. On the other hand, if the original PEV was leased or drove larger distances, households were less likely to purchase an additional PEV. No statistically significant trend was detected if the original PEV was a PHEV so it was excluded from the model. Fixed-year effects were included for the year the original PEV purchase was made. Santa Clara county was identified as an outlier for Multi PEV ownership, and thus spatial controls were included for it.

Further analysis reveals that current two-PEV households are typically high-income and share similar sociodemographic traits with early market adopters. However, our results indicate that these households are not vastly different from PEV-ICE households. With the implementation of targeted policies—such as enhancing charging infrastructure, supporting solar panel installations, and increasing the availability of PEVs across various body types—we expect more households to opt for a second PEV.

Discussion and Conclusion

To decarbonize transportation, people will need to adopt zero-emission vehicles like PEVs and convert their entire fleets. To-date, little is known about which households are purchasing multiple PEVs and why. Utilizing a series of cross-sectional surveys of PEV owners, we are able to identify households who added vehicles to their fleet after an initial PEV purchase and distinguish between those who reverted to purchasing ICEVs and those who continued purchasing PEVs. We construct a binary logistic regression model to determine the most significant variables differentiating these two groups.

Most households in California own two or more vehicles, so it is critical to study those who own two or more PEVs. Research has shown that it is more difficult to charge the second, third or fourth PEV at home, but little work has been done to see why people purchase additional PEVs. While the multi PEV households in our survey had very high incomes, many other characteristics differentiated them from single PEV households. Owning additional PEVs, living in a detached home with solar, using their original PEV for commuting and purchasing a Tesla initially were all correlated with respondents acquiring more PEVs. Income interestingly did not make a large difference between these two groups, maybe because both Single and Multi PEV respondents had high incomes in this sample. As policies and the market shifts to include more PEV body types, help install home charging, promote work charging, and accelerate household solar, we expect income to play even less of a role in encouraging people to adopt multiple PEVs.

More research is needed into Multi PEV households. Work will need to be done to examine how households acquire many PEVs in longer time frames, how they adopt used PEVs, and which households are buying exclusively battery-electric vehicles. Additionally, research is needed into the problems these households face. While we expect home charging to be an issue for them, little is known about additional or the actual issues these household's encounter.

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Data Summary

Products of Research

Data used in this report come from several surveys created by the Electric Vehicle Research Center at the University of California, Davis between 2015 and 2020, and is therefore subject to the UC Davis Institutional Review Board (IRB guidelines). Californian households with recent PEV acquisitions made between 2012 and early 2020 were surveyed about their household fleet characteristics and usage. The surveys have collected 33,455 total responses to date including incomplete responses. California Air Resources Board helped in survey recruitment by inviting California Clean Vehicle Rebate (CVRP) applicants to participate.

Data Format and Content

The data is stored as a comma delimited (CSV) file with rows corresponding to each respondent and columns corresponding to responses. The data falls into these broad categories:

- Demographic information such as income, gender, and age
- Locational information such as housing type, urban/rural status, and housing tenure
- Fleet information including make, model, model year, and odometer readings for the newest PEV in the household and up to four additional vehicles in the household
- Vehicle behavior information such as charging locations and commute distances
- Other household information such as installing home solar power

Data Access and Sharing

The data used in this project is subject to the UC Davis Institutional Review Board (IRB) guidelines on the treatment of human subject data, however a CSV file of the final logistic model can be provided upon request.

Reuse and Redistribution

The final logistic model can be reused and redistributed.