California Energy Commission

CONSULTANT REPORT

2015–2017 California Vehicle Survey

Prepared for: **California Energy Commission**
Prepared by: **RSG**

California Energy Commission

Edmund G. Brown Jr., Governor

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Primary Authors:

Mark Fowler
Tristan Cherry
Thomas Adler
Mark Bradley
Alex Richard

RSG
55 Railroad Row
White River Junction, VT 05001
(802) 295-4999
www.rsginc.com

Contract Number: 800-14-005

Prepared for:

California Energy Commission

Aniss Bahreinian
Commission Agreement Manager

Laura Zaninovich
Forecasting Unit Supervisor

Siva Gunda
Office Manager
Demand Analysis Office

Sylvia Bender
Deputy Director
Energy Assessments Division

Drew Bohan
Executive Director

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ABSTRACT

California Vehicle Survey report summarizes the work performed for the 2015–2017 California Vehicle Survey project. The 2015–2017 California Vehicle Survey includes revealed preference and stated preference surveys for the residential light-duty vehicle sector and the commercial light duty vehicle sector in California, as well as an add-on survey for respondents who own or lease plug-in hybrid electric and battery electric vehicles. The results of the survey will be used to update the residential and commercial light duty vehicle demand forecasting models. These updated models will be used in generating a light duty vehicle fuel demand forecast for the *2017 Integrated Energy Policy Report*.

The California Vehicle Survey has been conducted periodically over the past two decades to support updated forecasts as vehicle technologies and preferences change over time. As in previous iterations of the California Vehicle Survey, the 2015–2017 survey comprised two questionnaires: one for the household survey and one for the commercial fleet owner survey. Each survey consisted of two primary components: the revealed preference module, which collected information about current household and establishment vehicle ownership and use behavior, and the stated preference module, which collected information about vehicle preferences and future vehicle ownership and use behavior. In the 2015-2017 survey, the revealed preference module included a set of questions specific to plug-in hybrid electric and battery electric vehicle owners to better understand their purchase decision and charging behavior.

Volume one presents the main report, including chapters on survey design and implementation, sampling plan, commercial and residential focus groups, pretest and main survey results, as well as the main system of equations that form the residential and commercial vehicle choice models.

This volume includes the appendices related to the design of the survey questionnaires and instruments, the focus groups and survey pretests, and additional equations related to the system of statistical models that were developed based on the 2015-2017 survey data.

Keywords: Light Duty Vehicles, Plug-in Hybrid Electric, Battery Electric, Commercial, Residential, 2015–2017 California Vehicle Survey

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APPENDIX A: Survey Web Screenshots

Figure A-1: Survey Website Homepage

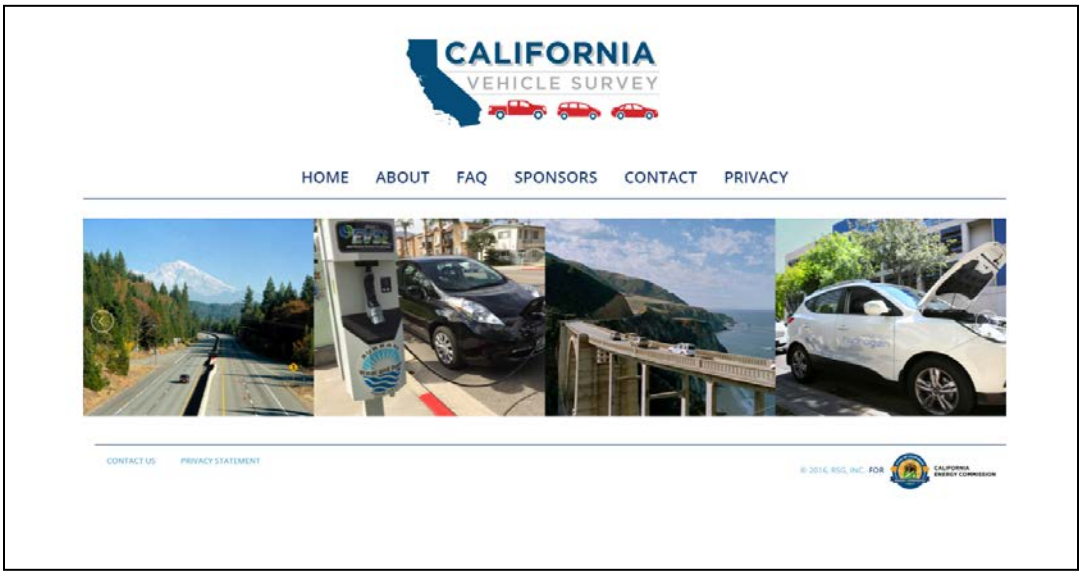
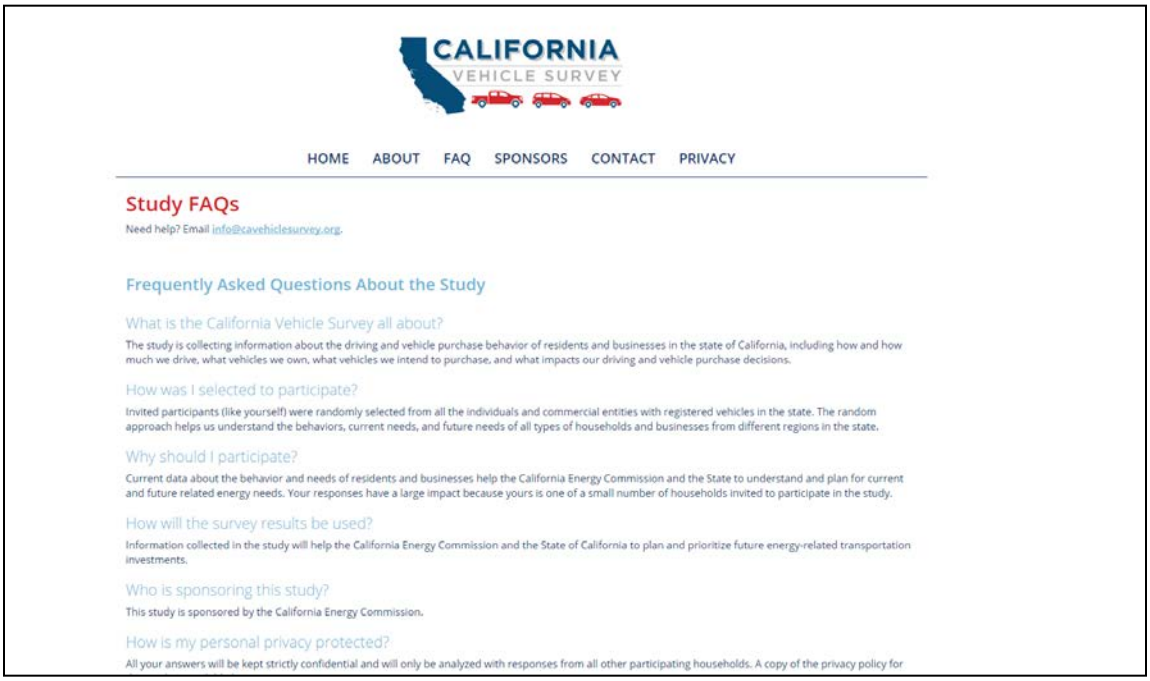


Figure 2: About the Study

Figure 3: FAQs



CALIFORNIA VEHICLE SURVEY

HOME ABOUT FAQ SPONSORS CONTACT PRIVACY

Study FAQs

Need help? Email info@cavehiclesurvey.org.

Frequently Asked Questions About the Study

What is the California Vehicle Survey all about?

The study is collecting information about the driving and vehicle purchase behavior of residents and businesses in the state of California, including how and how much we drive, what vehicles we own, what vehicles we intend to purchase, and what impacts our driving and vehicle purchase decisions.

How was I selected to participate?

Invited participants (like yourself) were randomly selected from all the individuals and commercial entities with registered vehicles in the state. The random approach helps us understand the behaviors, current needs, and future needs of all types of households and businesses from different regions in the state.

Why should I participate?

Current data about the behavior and needs of residents and businesses help the California Energy Commission and the State to understand and plan for current and future related energy needs. Your responses have a large impact because yours is one of a small number of households invited to participate in the study.

How will the survey results be used?

Information collected in the study will help the California Energy Commission and the State of California to plan and prioritize future energy-related transportation investments.

Who is sponsoring this study?

This study is sponsored by the California Energy Commission.

How is my personal privacy protected?

All your answers will be kept strictly confidential and will only be analyzed with responses from all other participating households. A copy of the privacy policy for

Figure 4: Study Sponsor

CALIFORNIA VEHICLE SURVEY

HOME ABOUT FAQ SPONSORS CONTACT PRIVACY

Study Sponsor

CALIFORNIA ENERGY COMMISSION

California Energy Commision

CONTACT US PRIVACY STATEMENT

Figure 5: Contact Information

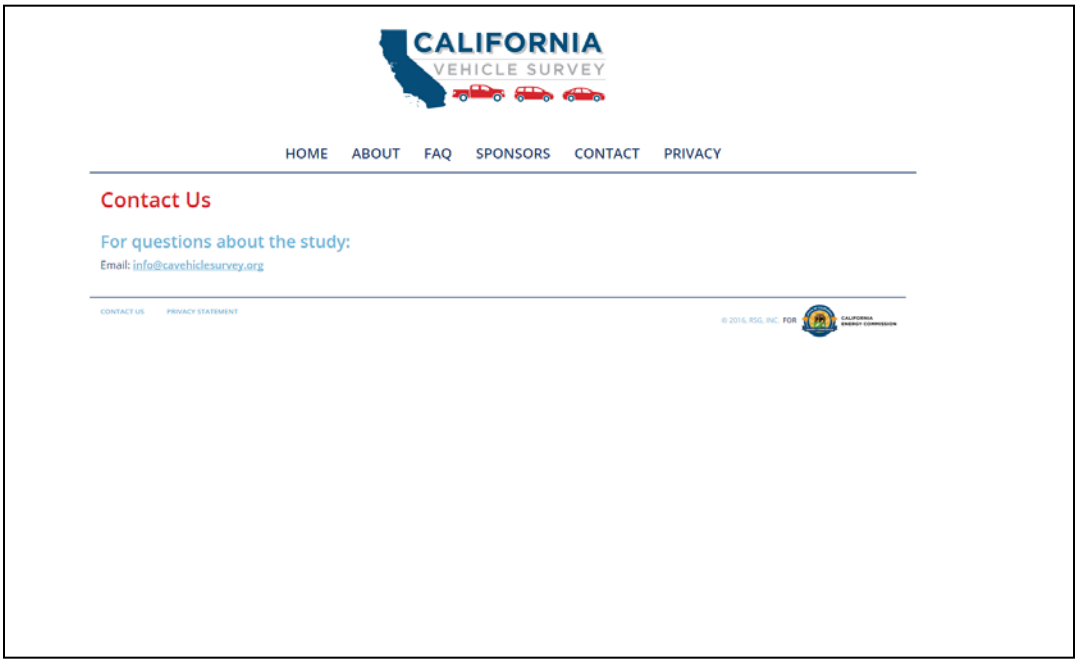


Figure 6: Privacy Statement

APPENDIX B: Stated Preference Design

This appendix summarizes the stated preference (SP) survey design conducted under the 2015–2017 California Vehicle Survey (CVS) project. This appendix includes 1) the attributes and levels used to create the alternatives presented in the eight SP exercises; and 2) a brief description of the underlying experimental design.

The 2015–2017 CVS included both revealed preference (RP) and SP surveys for the residential light-duty vehicle (LDV) sector and the commercial LDV sector in California. Respondents began the survey by completing the RP component of the survey before moving on to the SP component of the survey.

Data from the RP survey was used to construct a set of eight SP exercises for the survey. In the RP survey, respondents were asked to indicate the type of vehicle they were most likely to purchase next for their household (or fleet), including information about the vehicle type, fuel type, purchase price, vehicle age, and estimated number of miles the vehicle would be driven annually.

Each SP exercise presented respondents with four hypothetical vehicles as alternatives. The reference vehicle was presented as the new or used vehicle the respondent plans to purchase next for his/her household [or fleet], as indicated in the RP survey. The attributes that describe the reference vehicle were consistent with what the respondent reported in the RP survey. The next three alternatives were presented as vehicles of different sizes, fuel types, and MPG, among other varying attributes. The four alternatives—including the reference vehicle—for a given respondent were assigned in random order to A, B, C, and D for each choice situation.

The four alternative vehicles in each exercise were described by a set of 14 attributes, including the vehicle type and fuel type presented. Respondents were asked to select the vehicle they would most prefer to purchase based on the attribute values presented in each alternative. The values of each attribute varied according to an experimental design, requiring respondents to value attributes against each other.

Table B-1 presents an example of one of the eight SP exercises for a hypothetical respondent.

Table B-1: Example SP Exercise

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Midsize SUV	Small Pickup Truck	Van	Van
Fuel Type	Gasoline	Compressed Natural Gas	Hydrogen Fuel Cell Vehicle (FCV)	Gasoline
Vehicle Models to Choose From	15	2	1	7
Model Year	New (2016)	New (2016)	New (2016)	2012
Vehicle Price	$41,518	$32,316	$55,090	$29,831
Purchase Incentive	None	HOV lane access	None	None
MPG/Fuel Economy	18.2	21.4	34.9	13.4
Fuel Cost Per 100 Miles	$13.80	$16.50	$21.60	$12.00
Fuel Availability (Time it takes to get to this type of station)	Refuel at station (5 minutes)	Refuel at "fast fill" station (15 minutes)	Hydrogen refueling station (15 minutes)	Refuel at station (5 minutes)
Refueling Time	1 minute	14 minutes	14 minutes	1 minute
Vehicle Range	500 miles	250 miles	400 miles	400 miles
Trunk/Cargo Space	77 cubic feet	30 cubic feet	215 cubic feet	222 cubic feet
Annual Maintenance Cost	$461	$319	$524	$322
Acceleration (0-60 mph)	8.2 seconds	14.4 seconds	9.1 seconds	10.5 seconds
Select One	O	O	O	O

RSG worked closely with the California Energy Commission to finalize the attributes and levels used to describe each alternative. Respondents can become overwhelmed if too many attributes are presented in each choice exercise; therefore, only the most important attributes that have the greatest influence on vehicle choice behavior were

presented. The survey also retained similar attributes and levels from to the previous SP surveys conducted for this study for consistency and comparison purposes.

Stated Preference Attributes and Levels

This section summarizes the attributes and levels used to create the alternatives presented in the eight SP exercises. Many of the vehicle attributes—except vehicle type and fuel type—varied around base values that represent average values for all vehicles of a vehicle type, fuel type, and model year. The values for vehicle type and fuel type were selected using weighted draws; the values for the remaining attributes varied according to an efficient experimental design.

Vehicle Type and Fuel Type

The first two attributes for each vehicle alternative were vehicle type and fuel type. A total of 13 vehicle types and 10 fuel types were selected for the exercises.

Vehicle Type

The vehicle type was fixed to the response given in the RP survey for the reference vehicle. For the remaining three alternatives, vehicle type was drawn from one of the following 13 types:

1. Subcompact Car
2. Compact Car
3. Midsize Car
4. Large Car
5. Sports Car
6. Crossover, Small
7. Crossover, Midsize
8. SUV, Small/Midsize
9. SUV, Full-Size/Large
10. Pickup Truck, Small
11. Pickup Truck, Full-Size/Large
12. Van, Small
13. Van, Full-Size/Large

The selection of vehicles was made using weighted draws based on the respondent's reference vehicle type (any vehicle could be selected for the three alternative vehicles). Weighted draws were used because it was expected that respondents would have relatively strong preferences for at least a broad category of vehicle (e.g., small or large); as a result, presenting a respondent with a choice between a reference subcompact car

and a large van made little sense. In that situation, vehicle type would dominate the choice process and little or no information could be gained for the sensitivities to other attributes. On the other hand, it was also not seen as appropriate to completely restrict the different combinations of vehicle types presented to a respondent.

A set of weights was developed for each reference vehicle type. Table B-2 presents the weights that were used for the vehicle type selection for the three alternative vehicles, with the reference vehicle types presented in the table's header. With these weights, all vehicle types had a nonzero probability of being included in an exercise, but the probability was higher for vehicles that are more like the reference vehicle type. An especially high weight of over 50% was used for the reference vehicle type, which ensured that, at least for one pair of alternatives, the relative preference was not influenced by vehicle type. The reference vehicle could repeat in one other alternative, allowing respondents to compare attributes other than vehicle type. No other vehicle types were repeated across alternatives within a single exercise.

Table B-2: Vehicle Type Weights

Alternative Vehicle Type	Reference Vehicle Type													Total
	Subcompact Car	Compact Car	Midsize Car	Large Car	Sports Car	Crossover, Small	Crossover, Midsize	SUV, Small/Midsize	SUV Full-Size/Large	Van, Small	Van, Full-Size/Large	Pickup Truck, Small	Pickup Truck, Full-Size/Large	
Subcompact Car	0.52	0.05	0.03	0.03	0.05	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.93
Compact Car	0.05	0.52	0.05	0.03	0.05	0.05	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.97
Midsize Car	0.05	0.05	0.52	0.05	0.05	0.03	0.05	0.04	0.03	0.04	0.03	0.04	0.03	1.01
Large Car	0.03	0.04	0.05	0.52	0.03	0.04	0.04	0.05	0.05	0.03	0.04	0.04	0.04	1.00
Sports Car	0.05	0.05	0.05	0.03	0.52	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.95
Crossover, Small	0.05	0.05	0.04	0.04	0.04	0.52	0.05	0.04	0.04	0.04	0.04	0.03	0.04	1.02
Crossover, Midsize	0.04	0.04	0.05	0.04	0.04	0.05	0.52	0.05	0.05	0.04	0.04	0.04	0.04	1.04
SUV, Small/Midsize	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.52	0.05	0.05	0.04	0.04	0.04	1.06
SUV, Full-Size/Large	0.03	0.03	0.03	0.04	0.03	0.05	0.05	0.05	0.52	0.05	0.05	0.05	0.05	1.03
Van, Small	0.04	0.04	0.04	0.03	0.04	0.04	0.04	0.05	0.04	0.52	0.05	0.05	0.05	1.03
Van, Full-Size/Large	0.03	0.03	0.03	0.05	0.03	0.03	0.03	0.04	0.05	0.05	0.52	0.05	0.05	0.99
Pickup Truck, Small	0.04	0.03	0.04	0.04	0.04	0.03	0.04	0.04	0.04	0.05	0.05	0.52	0.05	1.01
Pickup Truck, Full-Size/Large	0.03	0.03	0.03	0.05	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.52	0.96
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**13.00**

Fuel Type

Fuel type was fixed to the respondent's RP response for the reference vehicle. The remaining fuel types were derived from the following list:

1. Gasoline
2. Gasoline Hybrid Electric Vehicle (HEV)
3. Gasoline Plug-in Hybrid Electric Vehicle (PHEV)
4. Gasoline—Ethanol Flex Fuel Vehicle
5. Diesel
6. Diesel HEV
7. Compressed Natural Gas (CNG)
8. CNG HEV
9. Battery Electric Vehicle (BEV)
10. Hydrogen Fuel Cell Vehicle (FCV)

The selection of fuel type was also made using weighted draws based on the respondent's reference fuel type as in the case of the vehicle type attribute. It was expected that respondents would have relatively strong preferences for their reference fuel type; therefore, presenting respondents with a choice between a reference gasoline car and a CNG car was not deemed appropriate. On the other hand, it was also not seen as appropriate to completely restrict the different combinations of fuel types presented to a respondent. As a result, a set of weights was developed for each reference fuel type. Table B-3 presents the weights that were used for the fuel type selection for the three alternative vehicles, with the reference fuel types presented in the table's header.

Some fuel types, including HEV, diesel HEV, CNG, and hydrogen FCV are not as common as the other fuel types and respondents may have limited knowledge of these vehicle fuel technologies. Additionally, diesel HEV and CNG HEV do not currently exist in the US market. Therefore, it was decided to reduce the probability associated with these four fuel type categories. The reference vehicle fuel type could repeat in one (at most) of the three alternative vehicles; this allowed respondents to compare attributes other than fuel type. No other fuel types could repeat across alternatives within a single choice exercise.

Table B-3: Fuel Type Weights

Alternative Fuel Type	Reference Fuel Type								Total
	Gasoline Only	Gasoline HEV	Gasoline PHEV	Gasoline—Ethanol FFV	Diesel Only	CNG Only	BEV	Hydrogen FCV	
Gasoline Only	0.25	0.11	0.11	0.11	0.11	0.11	0.11	0.11	1.02
Gasoline HEV	0.11	0.25	0.11	0.11	0.11	0.11	0.11	0.11	1.02
Gasoline PHEV	0.11	0.11	0.25	0.11	0.11	0.11	0.11	0.11	1.02
Gasoline—Ethanol FFV	0.11	0.11	0.11	0.25	0.11	0.11	0.11	0.11	1.02
Diesel only	0.11	0.11	0.11	0.11	0.25	0.11	0.11	0.11	1.02
Diesel HEV	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.24
CNG Only	0.11	0.11	0.11	0.11	0.11	0.25	0.11	0.03	0.94
CNG HEV	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.24
BEV	0.11	0.11	0.11	0.11	0.11	0.11	0.25	0.11	1.02
Hydrogen FCV	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.25	0.46
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**8.00**

Model Year

The model year of each vehicle depended on the respondent's response from the RP survey. The reference vehicle model year was always presented as the same model year as the response from the RP survey. Diesel HEVs and CNG HEVs were fixed as new vehicles only. Plug-in hybrid electric (PHEV), battery electric (BEV), and hydrogen FCVs were presented at the following levels:

1. Two years older than the reference vehicle (min. of 2012).
2. One year older than the reference vehicle (min. of 2012).
3. Same age as the reference vehicle.
4. New vehicle.

Vehicles with other fuel types were selected from one of the following levels:

1. Three years older than the reference vehicle.
2. Two years older than the reference vehicle.
3. Same age as the reference vehicle.
4. Two years younger than the reference vehicle (max. of current year/new).
5. Three years younger than the reference vehicle (max. of current year/new).
6. New vehicle.

Other Vehicle Attributes

The remaining vehicle attributes were dependent on the vehicle type, fuel type, and model year. While values for vehicle type and fuel type were selected using weighted draws, the values for the remaining attributes varied according to an efficient experimental design.

Many of the vehicle attributes varied around a base value. In the cases of number of vehicle models available, new vehicle purchase price, maintenance cost, trunk space, fuel economy, and acceleration, the Energy Commission provided tables of base values, and RSG worked with the Energy Commission to refine the base values for use in the survey. These base values represent average values for all vehicles of a vehicle type, fuel type, and model year; these base values are reported in a separate Vehicle Attributes file.

Vehicle Models Available

The attribute for number of vehicle models available is the number of available makes and models for a given combination of vehicle type, fuel type, and model year. The base values are reported in the Vehicle Attributes file. The levels for this attribute varied based on the fuel type. Gasoline, diesel, E85 FFV, or HEV vehicles had percentage-based levels:

1. Base number of models +30%
2. Base number of models +10%
3. Base number of models –10% (min. of 1)
4. Base number of models –30% (min. of 1)

There were many fewer PHEV, diesel hybrid electric, CNG-only, CNG hybrid electric, BEV, and FCV vehicles available in the market (at the time of the survey) compared to gasoline diesel, flex fuel, and hybrid vehicles. Because of this, the levels for these alternative fuel vehicles were based on the following:

1. Base number of models +3
2. Base number of models +1
3. Base number of models –1 (min. of 1)
4. Base number of models –3 (min. of 1)

Vehicle Purchase Price

The purchase price of the vehicle varied around an adjusted base value. For the reference vehicle, the adjusted base value was the response given in the RP survey. For the three remaining alternative vehicles, the base value given in the Vehicle Attributes file represents a “list price” determined from the combination of vehicle type, fuel type, and model year. The list price represented an average price for all vehicles of a particular vehicle type, fuel type, and model year. Therefore, the base price was adjusted by the

ratio between the indicated price of the reference vehicle in the RP survey and the list price for that vehicle; this accounted for the possibility that a respondent was considering a higher- or lower-than-average price for the reference vehicle.

This is represented by the equation:

Adjusted base price for alternative vehicles =

$$\frac{\text{Base price for vehicle} \times \text{RP survey price for reference vehicle}}{\text{Base price for reference vehicle}}$$

The adjusted base price values were varied using the following levels:

1. Adjusted base price -20%
2. Adjusted base price -7%
3. Adjusted base price +7%
4. Adjusted base price +20%

Purchase Incentive

The purchase incentives levels varied based on the fuel type. Gasoline, Diesel, E85 FFV, or HEV vehicles were presented with no purchase incentive, shown as "None," while the remaining alternative fuel vehicles had one of the following levels:

PHEV, BEV, or hydrogen vehicles:

1. No purchase incentive ("None").
2. HOV lane access.
3. Tax credit ($2,500, $5,000, or $7,500).
4. Rebate ($1,000, $1,500, or $2,500, $5,000).

CNG vehicles:

1. No purchase incentive ("None").
2. HOV lane access.
3. Tax credit ($1,000).
4. Rebate ($500, $1,000, $1,500, or $2,500).

Miles per Gallon Equivalent (MPGe)

A base value for miles per gallon equivalent for a given vehicle type, fuel type, and model year is provided in the Vehicle Attributes file. This value was varied according to the following levels:

1. Base miles per gallon equivalent -25%
2. Base miles per gallon equivalent -10%
3. Base miles per gallon equivalent +10%

4. Base miles per gallon equivalent +25%

Fuel Cost per Gallon Equivalent

Fuel cost per gallon equivalent was not shown to respondents; however, this value was used to calculate the annual fuel cost and fuel cost per 100 miles. Fuel cost in gasoline gallon equivalents was calculated for each type of fuel using different levels for fuel prices, which was applied to a base value for each type of fuel:

1. Base fuel cost per gallon equivalent -40%
2. Base fuel cost per gallon equivalent
3. Base fuel cost per gallon equivalent +50%
4. Base fuel cost per gallon equivalent +100%

Vehicle alternatives with the same fuel type in each experiment were constrained to use the same fuel cost per gallon equivalent in the fuel cost per 100 miles calculation.

Cost Per 100 Miles

The fuel cost per 100 miles was calculated using the fuel cost in gasoline gallon equivalents; the vehicle efficiency was calculated in miles per gallon equivalent. This attribute did not vary independently; rather, it was a calculated value based on the independently varying fuel cost and vehicle efficiency attributes.

Fuel Availability

Fuel availability represents the driving time required to refuel a vehicle. The fuel availability attribute had different levels based on fuel type. Refueling at a station with the following travel time levels was the only option for all gasoline, diesel, E85 FFV, and HEV vehicles:

1. 3 minutes
2. 5 minutes
3. 7 minutes
4. 10 minutes

Refueling at home, work, or at a charging station with the following travel time levels were the options for battery electric and plug-in electric vehicles:

1. Plug-in only at home (0 min.)
2. Plug-in at work (0 min.)
3. Plug-in at a charging station.
    - 5 minutes
    - 10 minutes
    - 15 minutes
    - 20 minutes

Respondents had the option of refueling at a “fast fill” station with the following travel time levels for CNG-only vehicles:

1. 5 minutes
2. 10 minutes
3. 15 minutes
4. 20 minutes

Similarly, for hydrogen vehicles, the only option was refueling at a hydrogen fueling station with the following travel time levels:

1. 5 minutes
2. 10 minutes
3. 15 minutes
4. 20 minutes

Refueling Time

Refueling time represents the time needed to refuel a vehicle. This attribute had different levels based on fuel type as with the fuel availability attribute. All gasoline, diesel, E85 FFV, and HEV vehicles had the following levels:

1. 3 minutes
2. 5 minutes
3. 8 minutes
4. 10 minutes

All battery electric and plug-in electric vehicles had the following levels:

1. 30 minutes
2. 2.5 hours
3. 3.5 hours
4. 8 hours

All hydrogen and CNG-only vehicles had the following levels:

1. 5 minutes
2. 10 minutes
3. 15 minutes
4. 20 minutes

Vehicle Range

Vehicle range represented the maximum distance a vehicle could travel on a full tank of fuel or a full charge without refueling. This attribute had four levels for each fuel type. The levels for gasoline, diesel, E85 FFV, HEV, and PHEV vehicles were pivoted off the base values given in the Vehicle Attributes file:

1. Base range -10%
2. Base range -5%
3. Base range +5%
4. Base range +10%

All BEVs had the following levels:

5. 80 miles
6. 100 miles
7. 150 miles
8. 300 miles

All CNG and hydrogen vehicles had the following levels:

7. 150 miles
8. 200 miles
9. 250 miles
10. 300 miles

Trunk/Cargo Space

Trunk/cargo space represents the trunk space measured in cubic feet. This attribute was also presented in terms of number of suitcases that could be accommodated. The levels were pivoted off the base values given in the Vehicle Attributes file:

1. Base trunk space -15%
2. Base trunk space -10%
3. Base trunk space +10%
4. Base trunk space +15%

Annual Maintenance Cost

The annual maintenance cost represents the cost to maintain a vehicle over the course of a year. Maintenance costs include all costs associated with normal routine maintenance during a year including oil and filter changes. It does not include insurance, registration, fees, or unexpected repairs. A base maintenance cost per year for each vehicle was given in the Vehicle Attributes file, based on the vehicle type, fuel type, and model year. These annual maintenance costs were varied according to the following levels:

1. Base annual maintenance cost -25%
2. Base annual maintenance cost -10%
3. Base annual maintenance cost +10%
4. Base annual maintenance cost +25%

Acceleration

The acceleration attribute represents the time (in seconds) it takes a vehicle to accelerate to 60 mph. The acceleration of each vehicle was given in the Vehicle Attributes file, based on the vehicle type, fuel type and model year, and was varied according to the following two levels:

1. Two seconds slower than the base acceleration value
2. Two seconds faster than the base acceleration value

Appendix C summarizes the attributes and levels described above.

APPENDIX C: Attributes and Levels for the SP Survey

Attribute	Notes	Vehicle A Reference Vehicle	Vehicle B SP Alternative 1	Vehicle C SP Alternative 2	Vehicle D SP Alternative 3
Vehicle Type	*Reference vehicle fixed to RP vehicle type. Other vehicle types weighted based on reference vehicle*	RP vehicle type [fixed]	*RP is only repeated in 1 alternative* Subcompact Car Compact Mid-size Car Large Car Sports Car Small cross-over Mid-size cross-over Small/Mid-size SUV Mid-size SUV Small Pick-up truck Standard Pick-up truck Minivan Van	*RP is only repeated in 1 alternative* Subcompact Car Compact Mid-size Car Large Car Sports Car Small cross-over Mid-size cross-over Small/Mid-size SUV Mid-size SUV Small Pick-up truck Standard Pick-up truck Minivan Van	*RP is only repeated in 1 alternative* Subcompact Car Compact Mid-size Car Large Car Sports Car Small cross-over Mid-size cross-over Small/Mid-size SUV Mid-size SUV Small Pick-up truck Standard Pick-up truck Minivan Van
Fuel type	*Vehicle A fixed to RP fuel type. RP may be repeated once in vehicles B, C, or D*	RP fuel type [fixed]	*RP is only repeated in 1 alternative* Gasoline only vehicle Gasoline Hybrid Electric vehicle (HEV) Gasoline Plug-in Hybrid Electric vehicle (PHEV) Gasoline-ethanol Flex Fuel vehicle (E85 FFV) Diesel only vehicle Diesel HEV Compressed Natural Gas (CNG) only vehicle CNG Hybrid Electric Vehicle (HEV) Battery Electric vehicle (BEV) Hydrogen Fuel Cell vehicle (FCV)	*RP is only repeated in 1 alternative* Gasoline only vehicle Gasoline Hybrid Electric vehicle (HEV) Gasoline Plug-in Hybrid Electric vehicle (PHEV) Gasoline-ethanol Flex Fuel vehicle (E85 FFV) Diesel only vehicle Diesel HEV Compressed Natural Gas (CNG) only vehicle CNG Hybrid Electric Vehicle (HEV) Battery Electric vehicle (BEV) Hydrogen Fuel Cell vehicle (FCV)	*RP is only repeated in 1 alternative* Gasoline only vehicle Gasoline Hybrid Electric vehicle (HEV) Gasoline Plug-in Hybrid Electric vehicle (PHEV) Gasoline-ethanol Flex Fuel vehicle (E85 FFV) Diesel only vehicle Diesel HEV Compressed Natural Gas (CNG) only vehicle CNG Hybrid Electric Vehicle (HEV) Battery Electric vehicle (BEV) Hydrogen Fuel Cell vehicle (FCV)
Vehicle Models Available	*Number of vehicles available with similar features*	*All* Base number of models + 30% (min + 3) Base number of models + 10% (min + 1) Base number of models – 10% (min of 1) Base number of models – 30% (min of 1)	*All* Base number of models + 30% (min + 3) Base number of models + 10% (min + 1) Base number of models – 10% (min of 1) Base number of models – 30% (min of 1)	*All* Base number of models + 30% (min + 3) Base number of models + 10% (min + 1) Base number of models – 10% (min of 1) Base number of models – 30% (min of 1)	*All* Base number of models + 30% (min + 3) Base number of models + 10% (min + 1) Base number of models – 10% (min of 1) Base number of models – 30% (min of 1)
Model Year	*Reference vehicle fixed to RP model year*	RP model year [fixed]	*PHEV, BEV, or Hydrogen* RP model year - 2 *(min 2012)* RP model year - 1 *(min 2012)* RP age New *Diesel HEV and CNG HEV* New *All other fuel types* RP model year - 3 RP model year - 2 RP age RP model year + 2 *(max 2016/New)* RP model year + 3 *(max 2016/New)* New	*PHEV, BEV, or Hydrogen* RP model year - 2 *(min 2012)* RP model year - 1 *(min 2012)* RP age New *Diesel HEV and CNG HEV* New *All other fuel types* RP model year - 3 RP model year - 2 RP age RP model year + 2 *(max 2016/New)* RP model year + 3 *(max 2016/New)* New	*PHEV, BEV, or Hydrogen* RP model year - 2 *(min 2012)* RP model year - 1 *(min 2012)* RP age New *Diesel HEV and CNG HEV* New *All other fuel types* RP model year - 3 RP model year - 2 RP age RP model year + 2 *(max 2016/New)* RP model year + 3 *(max 2016/New)* New
Vehicle Purchase Price (MSRP)	*Base price dependent on vehicle type, model year, and fuel type*	RP vehicle price (based on RP) - 20% RP vehicle price (based on RP) - 7% RP vehicle price (based on RP) + 7% RP vehicle price (based on RP) + 20%	Base SP price - 20% Base SP price - 7% Base SP price + 7% Base SP price + 20%	Base SP price - 20% Base SP price - 7% Base SP price + 7% Base SP price + 20%	Base SP price - 20% Base SP price - 7% Base SP price + 7% Base SP price + 20%
Purchase Incentive	*Some vehicles will always see "none"*	*Gasoline, Diesel, E85 FFV, HEV* None [fixed] *PHEV, BEV, Hydrogen* None HOV access Tax credit ($2,500, $5,000, or $7,500) Rebate ($1,000, $1,500, $2,500, or *CNG* None HOV access Tax credit ($1,000) Rebates ($500, $1,000, $1,500, or $2,500)	*Gasoline, Diesel, E85 FFV, HEV* None [fixed] *PHEV, BEV, Hydrogen* None HOV access Tax credit ($2,500, $5,000, or $7,500) Rebate ($1,000, $1,500, $2,500, or *CNG* None HOV access Tax credit ($1,000) Rebates ($500, $1,000, $1,500, or $2,500)	*Gasoline, Diesel, E85 FFV, HEV* None [fixed] *PHEV, BEV, Hydrogen* None HOV access Tax credit ($2,500, $5,000, or $7,500) Rebate ($1,000, $1,500, $2,500, or *CNG* None HOV access Tax credit ($1,000) Rebates ($500, $1,000, $1,500, or $2,500)	*Gasoline, Diesel, E85 FFV, HEV* None [fixed] *PHEV, BEV, Hydrogen* None HOV access Tax credit ($2,500, $5,000, or $7,500) Rebate ($1,000, $1,500, $2,500, or *CNG* None HOV access Tax credit ($1,000) Rebates ($500, $1,000, $1,500, or $2,500)
Fuel Cost per Gallon Equivalent *(Not shown)*	*The fuel cost per gallon equivalent will remain the same for same fuel types in a given*	Base cost - 40% Base cost Base cost + 50% Base cost + 100%	Base cost - 40% Base cost Base cost + 50% Base cost + 100%	Base cost - 40% Base cost Base cost + 50% Base cost + 100%	Base cost - 40% Base cost Base cost + 50% Base cost + 100%
MPG Equivalent	*Base MPGE dependent on vehicle type, model year, and fuel type*	Base MPGE + 25% Base MPGE + 10% Base MPGE - 10% Base MPGE - 25%	Base MPGE + 25% Base MPGE + 10% Base MPGE - 10% Base MPGE - 25%	Base MPGE + 25% Base MPGE + 10% Base MPGE - 10% Base MPGE - 25%	Base MPGE + 25% Base MPGE + 10% Base MPGE - 10% Base MPGE - 25%
Cost per 100 miles		(Fuel cost per gallon) x 100 / (MPGE)	(Fuel cost per gallon) x 100 / (MGPE)	(Fuel cost per gallon) x 100 / (MGPE)	(Fuel cost per gallon) x 100 / (MGPE)
Fuel Availibility	*Time respondent must drive out of way to refuel vehicle*	*Gasoline, Diesel, E85 FFV, HEV* Refuel at station 3 min 5 min 7 min 10 min *BEV/PHEV* Plug-in at home (0 min) Plug-in at work (0 min) Plug-in at a charging station 5 min 10 min 15 min 20 min *CNG/Hydrogen* Refuel at "fast fill" station (CNG only) 5 min 10 min 15 min 20 min Hydrogen fueling station (Hydrogen only) 5 min 10 min 15 min 20 min	*Gasoline, Diesel, E85 FFV, HEV* Refuel at station 3 min 5 min 7 min 10 min *BEV/PHEV* Plug-in at home (0 min) Plug-in at work (0 min) Plug-in at a charging station 5 min 10 min 15 min 20 min *CNG/Hydrogen* Refuel at "fast fill" station (CNG only) 5 min 10 min 15 min 20 min Hydrogen fueling station (Hydrogen only) 5 min 10 min 15 min 20 min	*Gasoline, Diesel, E85 FFV, HEV* Refuel at station 3 min 5 min 7 min 10 min *BEV/PHEV* Plug-in at home (0 min) Plug-in at work (0 min) Plug-in at a charging station 5 min 10 min 15 min 20 min *CNG/Hydrogen* Refuel at "fast fill" station (CNG only) 5 min 10 min 15 min 20 min Hydrogen fueling station (Hydrogen only) 5 min 10 min 15 min 20 min	*Gasoline, Diesel, E85 FFV, HEV* Refuel at station 3 min 5 min 7 min 10 min *BEV/PHEV* Plug-in at home (0 min) Plug-in at work (0 min) Plug-in at a charging station 5 min 10 min 15 min 20 min *CNG/Hydrogen* Refuel at "fast fill" station (CNG only) 5 min 10 min 15 min 20 min Hydrogen fueling station (Hydrogen only) 5 min 10 min 15 min 20 min
Refueling Time	*Additional time to refuel the vehcile*	*Gasoline, Diesel, E85 FFV, HEV* 3 min 5 min 8 min 10 min *PHEV* 30 min charging (5 min gas) 2.5 hr charging (5 min gas) 3.5 hr charging (5 min gas) 8 hr charging (5 min gas) *BEV* 30 min 2.5 hours 3.5 hours 8 hours *CNG/Hydrogen* 5 min 10 min 15 min 20 min	*Gasoline, Diesel, E85 FFV, HEV* 3 min 5 min 8 min 10 min *PHEV* 30 min charging (5 min gas) 2.5 hr charging (5 min gas) 3.5 hr charging (5 min gas) 8 hr charging (5 min gas) *BEV* 30 min 2.5 hours 3.5 hours 8 hours *CNG/Hydrogen* 5 min 10 min 15 min 20 min	*Gasoline, Diesel, E85 FFV, HEV* 3 min 5 min 8 min 10 min *PHEV* 30 min charging (5 min gas) 2.5 hr charging (5 min gas) 3.5 hr charging (5 min gas) 8 hr charging (5 min gas) *BEV* 30 min 2.5 hours 3.5 hours 8 hours *CNG/Hydrogen* 5 min 10 min 15 min 20 min	*Gasoline, Diesel, E85 FFV, HEV* 3 min 5 min 8 min 10 min *PHEV* 30 min charging (5 min gas) 2.5 hr charging (5 min gas) 3.5 hr charging (5 min gas) 8 hr charging (5 min gas) *BEV* 30 min 2.5 hours 3.5 hours 8 hours *CNG/Hydrogen* 5 min 10 min 15 min 20 min
Vehicle Range	*Range dependent on vehicle type and fuel type*	*Gasoline, Diesel, E85 FFV, HEV, PHEV* Base range - 10% Base range - 5% Base range + 5% Base range + 10% *BEV* 80 miles 100 miles 150 miles 300 miles *CNG/Hydrogen* 150 miles 200 miles 250 miles 300 miles	*Gasoline, Diesel, E85 FFV, HEV, PHEV* Base range - 10% Base range - 5% Base range + 5% Base range + 10% *BEV* 80 miles 100 miles 150 miles 300 miles *CNG/Hydrogen* 150 miles 200 miles 250 miles 300 miles	*Gasoline, Diesel, E85 FFV, HEV, PHEV* Base range - 10% Base range - 5% Base range + 5% Base range + 10% *BEV* 80 miles 100 miles 150 miles 300 miles *CNG/Hydrogen* 150 miles 200 miles 250 miles 300 miles	*Gasoline, Diesel, E85 FFV, HEV, PHEV* Base range - 10% Base range - 5% Base range + 5% Base range + 10% *BEV* 80 miles 100 miles 150 miles 300 miles *CNG/Hydrogen* 150 miles 200 miles 250 miles 300 miles
Trunk/Cargo Space	*Base trunk space dependent on vehicle and fuel type*	Base trunk space - 15% Base trunk space - 10% Base trunk space + 10% Base trunk space + 15%	Base trunk space - 15% Base trunk space - 10% Base trunk space + 10% Base trunk space + 15%	Base trunk space - 15% Base trunk space - 10% Base trunk space + 10% Base trunk space + 15%	Base trunk space - 15% Base trunk space - 10% Base trunk space + 10% Base trunk space + 15%
Maintenance Costs	*Base cost dependent on vehicle type and fuel type*	Base cost - 25% Base cost - 10% Base cost + 10% Base cost + 25%	Base cost - 25% Base cost - 10% Base cost + 10% Base cost + 25%	Base cost - 25% Base cost - 10% Base cost + 10% Base cost + 25%	Base cost - 25% Base cost - 10% Base cost + 10% Base cost + 25%
Acceleration	*Acceleration dependent on vehicle type and fuel type*	Base acceleration - 2 sec Base acceleration + 2 sec	Base acceleration - 2 sec Base acceleration + 2 sec	Base acceleration - 2 sec Base acceleration + 2 sec	Base acceleration - 2 sec Base acceleration + 2 sec

APPENDIX D: Experimental Design

The experimental design for the SP survey was based on an underlying efficient design. In contrast to an orthogonal design, which was used in previous iterations of CVS, an efficient design does not merely minimize the correlation between attribute levels, but also aims to result in a design that generates coefficient estimates with minimum possible standard errors.

The generation of an efficient design requires prior parameter values for all coefficients, and *a priori* decisions in relation to model structure and utility specification. It was possible to generate an efficient design to estimate the coefficient parameters with minimal standard errors since the prior information about all parameters and the likely utility structures were available from the previous iterations of this study. Efficient designs always perform better than orthogonal designs in cases where information about the parameters is available. The efficient design helps derive the most information from each choice experiment by using the knowledge of the prior parameters to optimize the design (e.g., dominant alternatives can be avoided as the utilities can be computed).

Vehicle type and fuel type were not included directly in the design. Instead, they were added to the design in a second stage after the generation of the base efficient design. This reduced the complexity of the efficient design and obviated the need to generate a large number of different designs for different combinations of vehicle types and fuel types. The final design combined the efficient design with random allocation of fuel type and weighted random allocation of vehicle types.

Base Efficient Design

The base design was split into several blocks of eight choices. The blocking was used to avoid any correlation between the attributes and the blocks (e.g., avoiding the situation where one respondent gets all the high-priced options). The design contained the levels for 12 attributes (the attributes other than vehicle type and fuel type) and four alternatives. The vehicle types and fuel types drawn according to the approach were used as inputs for calculating the base values for the levels in the underlying design.

In the survey, each respondent was presented with one block of eight choice situations. Care was taken to ensure that the different blocks were presented the same number of times and that there was no correlation between sample subgroups and blocks. The choice situations were constructed based on the set of vehicle type/fuel type combinations drawn for that respondent, and the block of eight choice situations used from the experimental design for that respondent. The order in which the eight choice situations from a given block were presented to a respondent was also randomized across respondents.

Ordering of Alternatives

Several steps were taken to eliminate potential ordering effects in the design. In each choice set, a respondent was faced with four alternatives: the reference alternative and three remaining alternatives. All four alternatives in each of the eight choice situations were assigned in random order. In this way, each alternative had an equal probability of being assigned the reference vehicle type.

APPENDIX E: Survey Instrument Design

Residential Questionnaire

Outline

Survey Section	Information Collected
	Check age, residency, decision role, & intent to purchase vehicle in the next 5 years.
	Household size & identifying names to be used in individual info section.
	Demographic & commuting info for everyone 16 years of age or older.
	Full details for each vehicle in the household.
	Experience and satisfaction questions for current PEV owners.
	Seen if replacing a vehicle only. Full details on the expected next replacement vehicle.
	Only seen if adding an additional vehicle to household. Full details on the expected next additional vehicle.
	Information on the vehicle purchase tradeoffs are contained in a separate document.
	Interest level and primary concerns relating to PEV's and vehicle automation.
	Miscellaneous household questions

Non-qualifiers (those not purchasing a vehicle) skip to this section for a few questions.

Screener

1. [*language*] In which language would you prefer to take the survey?
   ¿En qué idioma prefiere para tomar la encuesta?

   - English
   - Español

2. *If [language] = "Español"*

   [*Spanish email*] Actualmente estamos en la fase piloto del estudio y la encuesta sólo está disponible en Inglés. Si proporciona su dirección de correo electrónico, le notificaremos cuando en la versión en español está disponible. Por favor, seleccione una opción a continuación:

   - Me gustaría continuar la encuesta en Inglés →continue to [intro]
   - Introducir correo electrónico para recibir una notificación cuando la versión en español está disponible: _____ [open end] → **End Survey.** Message: "Gracias por su interés usted. Nos pondremos en contacto con usted cuando que la versión española de la encuesta está disponible."

3. *[intro]* Welcome to the California Vehicle Survey. Your answers will help the California Energy Commission, a State of California agency, understand your vehicle needs now and in the future. The information you provide will be kept confidential by the California Energy Commission and RSG (the company that is collecting the survey data), based on the California Information Practices Act and the non-disclosure agreement between RSG and the Energy Commission.

   (skip if Research Now) Complete this survey and you will have the option to **receive a $10 gift** card to spend at Amazon.com or Walmart.

   Please use the **"Next"** button in the lower left-hand corner of the screen to go forward. To review and change a previous question, use the **"Previous"** button. It is important that you **do not use** your web browser's "forward" or "back" buttons because your new answers may not be recorded.

   On average, answering all of the questions will take approximately *30* minutes.

   (skip if Research Now) If you can't finish the survey in one sitting, you can stop at any time and return to where you left off by re-entering your password.

(skip if Research Now) Please enter the password from the postcard and click "Next" to begin.

Password: _____

<Error: Sorry the password you entered is not valid, please check the postcard and try again.>

4. *[age]* **First, which of these four groups does your age fall into?**
   Please select all that apply.
   - Under 18 years old → [Disqualify]
   - 18 to 34
   - 35 to 64
   - 65 or older
   -

5. *[california]* **Is your permanent residence in the state of California?**

   For the purpose of this survey, a permanent resident is someone who lives in California for at least 6 months out of the year and holds a valid State of California Driver's License or Identification Card.

   - Yes
   - No → [Disqualify]

6. *[county]* **What county do you currently live in?**

   Select county from list: ***<Drop down list of counties>***

[county] drop-down list

1. Alameda County
2. Alpine County
3. Amador County
4. Butte County
5. Calaveras County
6. Colusa County
7. Contra Costa County
8. Del Norte County
9. El Dorado County
10. Fresno County
11. Glenn County
12. Humboldt County
13. Imperial County
14. Inyo County
15. Kern County
16. Kings County
17. Lake County
18. Lassen County
19. Los Angeles County
20. Madera County
21. Marin County
22. Mariposa County
23. Mendocino County
24. Merced County
25. Modoc County
26. Mono County
27. Monterey County
28. Napa County
29. Nevada County
30. Orange County
31. Placer County
32. Plumas County
33. Riverside County
34. Sacramento County
35. San Benito County
36. San Bernardino County
37. San Diego County
38. San Francisco County
39. San Joaquin County
40. San Luis Obispo County
41. San Mateo County
42. Santa Barbara County
43. Santa Clara County
44. Santa Cruz County

45. Shasta County
46. Sierra County
47. Siskiyou County
48. Solano County
49. Sonoma County
50. Stanislaus County
51. Sutter County
52. Tehama County
53. Trinity County
54. Tulare County
55. Tuolumne County
56. Ventura County
57. Yolo County
58. Yuba County
59. Other

7. *(skip if Research Now) [email] [phonenum]* **Can you provide an email address and phone number for us to contact you?**
Your personal contact information will only be used to provide technical assistance, survey completion reminders or to gather feedback about the questionnaire and your experience. We will not sell or distribute your email address for any commercial marketing purposes.

Name (optional): _____
Email *(optional)*: _____ [allow no answer, enforce a valid email if text is entered]

Phone number (*optional*):

( ) - ext:

[allow no answer, enforce a valid phone # (area code + number)]

8. *[future decision role]* **For your household, what will be the extent of your involvement in future vehicle purchase or lease decisions?**
   - o I will be the sole decision maker
   - o I will be the primary decision maker with input from another household member
   - o I will share equally in making the decision with another household member(s)
   - o I will provide input into the decision, but I will not be the primary decision maker → [Disqualify]
   - o Another person will be the sole decision maker → [Disqualify]

9. *[household vehicles]* **How many vehicles do you or any member of your household currently own or lease?**
Please include cars, SUVs, minivans, vans, or pick-up trucks that are used for general transportation of household members and are not employer/company owned. This does not include motorcycles, RVs, or vehicles owned/leased by household members who are away at school.

Number of vehicles: ____ [allow 0-8]

10. *[housing]* **What type of housing do you live at?**

- Single family house not attached to any other house
- Single family house attached to one or more houses (townhouse, duplex, triplex) each with separate entry
- A mobile home
- Building with 2-4 apartments/ condos / studios /rooms
- Building with 5-19 apartments/ condos / studios / rooms
- Building with 20 or more apartments/ condos / studios / rooms
- Boat, RV, Van, etc.
- Other, please specify: _____

11. *[parking type]* What type of parking do you primarily use at your residence?
    - Personal garage
    - Personal driveway
    - Parking garage
    - Parking lot
    - Street parking
    -

12. *[parking pay]* Do you pay to park at your residence?
    - Yes
    - No

-

13. *If 'yes' in [parking pay]*

- *[park amt] [park period]* How much do you pay to park?
-
- I pay $___ [allow .50 to $500]
- per ____ [drop down: day, week, month]

14. *[company vehicles]* **Do you or any member of your household have access to a company or employer supplied vehicle for personal use?**
    - Yes
    - No
    -

15. *[purchase 10years]* **How many vehicles have you or any member of your household purchased or leased over the last 10 years?**
    Please include vehicles that are no longer part of your household

    Vehicles purchased new: _____ [allow 0-50]

    Vehicles purchased used: _____ [allow 0-50]

    Vehicles leased: _____ [allow 0-50]

16. *Shown to everyone*

If 0 cars and expect to purchase w/in 10 year, go to [hhsize] questions then to #22 (# of cars)

[future first] **When do you anticipate purchasing or leasing a car, SUV, van, or pick-up truck in your household?**
Do NOT include vehicles that will be supplied by employers.

- Less than 1 year
- 1 to 2 years
- 3 to 5 years
- 6 to 10 years
- More than 10 years
- I never plan to purchase or lease a vehicle [Demo only flag: if Research Now, disqualify]
-

17. *If [household vehicles] > 0*
[PEV owner] **Do you or any other members of your household currently own a Plug-In Electric Vehicle (plug-in hybrid or full electric)?**

- Yes
- No

Household Size & Names

18. *[household members]*

- **In order to help us understand your household's current and future vehicle needs we first need to ask about the basic characteristics of your household. All identifying information you provide will be kept confidential.**

  How many people in the following age groups, including yourself, are part of your household either part-time or full-time?

  Include *in this number children, roommates, housemates, people living there* ***most of the time*** *while working, even if they have another place to live.*

  Do not include *college students living away while attending college or people who live at another place most of the time.*

  Under the age of 5: _____

  Between the ages of 5 to 11: _____

  Between the ages of 12 to 15: _____

  16 or older (including yourself): _____

  Total Household Members: <automatic sum>

Everyone with a "Demo Only Flag" is now sent to Demo Only section and then disqualified.

Individual Information

This page is repeated for each household member.

19. *[individual info]* **Please complete the form below with information about <yourself / the next member of your household>.**

    Show table at the right of the page with each name after info is entered.

• *[name]* **Name/nickname/initials:**	• _____
• *[age]* **Age:**	• <DROP DOWN>
• *[gender]* **Gender:**	• <DROP DOWN>

• *[ethnicity]* **Ethnic background:**	• **<DROP DOWN>** **If 'other' then open end**
• *[education]* **Highest level of education completed:**	• **<DROP DOWN>**
• *[driving frequency]* **How often does this person drive?**	• **<DROP DOWN>**
• *[transit frequency] One*-**way public transit trips per week (bus, metro, etc.)?** • *(Please consider a round trip - for instance, from home to work and then back - as two one-way trips)*	• **_____ trips**
• *[employment status]* **Employment status:**	• **<DROP DOWN>**
• *If work 'full-time' or 'part-time' or 'both' in [employment status]* • *[commute work]* **Does this person leave home to travel to work?**	• **<DROP DOWN>**
• *If work 'full-time' or 'part-time' or 'both' in [employment status]* • *[work transport]* **Primary type of transportation used to get to work:**	• **<DROP DOWN>** **If 'other' then open end**
• *If 'yes' on [commute work]* • *[commute distance]* **Miles to <u>primary</u> workplace (one way):**	• **_____ miles**
• *If 'yes' on [commute work]* • *[weekly commute]* **<u>Total weekly</u> miles driven for <u>work</u>:**	• **_____ miles**
• *If 'yes' on [commute work]* • *[work days]* **<u>Number of days per week</u> with travel to <u>primary</u> workplace:**	• **<DROP DOWN>**
• *If work 'full-time' or 'part-time' or 'both' in [employment status] and [household vehicles] > 0* *[work vehicle]* **Use household vehicle for part or all of the trip to work?**	• **<DROP DOWN>**
•	•
• *[enrolled]* **Currently enrolled in college/university?**	• **<DROP DOWN>**
• *If school 'full-time' or 'part-time' [employment status]* • *[school commute]* **About how many miles is it one-way from your home to school?**	• **_____**
• *If work 'full-time' or 'part-time' or 'both' in [employment status]* *[school transport]* **What is the primary type of transportation you use to get to school?**	• **<DROP DOWN>**

[age] drop-down list
[allow 16 to 115]

[gender] drop-down list
- Male
- Female
- Other
- Prefer not to answer

[ethnicity] drop-down list
- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic or Latino
- Native Hawaiian or Other Pacific Islander
- White
- Other, please specify_____
- Prefer not to answer

[education] drop-down list
- Less than high school
- High school graduate/GED
- Technical school/professional business school
- Some college
- Community college graduate (Associate degree, 2-year degree)
- College graduate (4-year degree)
- Post-graduate work
- Post graduate degree

[driving frequency] drop-down list
- Frequently (i.e. every day)
- Sometimes (i.e. once or twice a week)
- Rarely (i.e. once a month or less)
- Never
- Not applicable, no license

[transit frequency]
[allow 0 – 100]

[employment status] drop-down list
- Full-time (total 35 or more hours per week)
- Part-time (total less than 35 hours per week)
- Both full- and part-time
- Do not work for pay (e.g. retired, unemployed)
- Self employed

[commute work] drop-down list
- Yes
- No

[commute distance]

[allow 0 to 200]

[weekly commute]
[allow 0 to 2,000]

[work days] drop-down list
- One
- Two
- Three
- Four
- Five
- Six
- Seven

[work vehicle] drop-down list
- Part
- All
- Not at all

[work transport] drop-down list
- Drive alone using a personal vehicle
- Carpool/vanpool
- Rail (light/heavy, subway/metro, etc.)
- Bus
- Walk
- Motorcycle
- Bicycle
- Telecommute
- Other

[enrolled] drop-down list
- Full-time on campus
- Part-time on campus
- Full-time or part-time online
- Not currently enrolled
-

[school commute]
[allow 0 – 200]

[school transport] drop-down list
- Drive alone using a car, SUV, pickup, or van
- Carpool/vanpool
- Rail (light/heavy, subway/metro, trolley, etc.)
- Bus
- Walk
- Motorcycle
- Bicycle
- Online courses/online programs
- Other

Current Vehicle Details

20. [*current vehicle intro*]

- Thanks for providing information about your household, now we need some more detailed information about the vehicle(s) in your household. Just to remind you, vehicles include cars, SUVs, pick-ups, or vans, NOT including vehicles supplied by employers.
- **You indicated that you have <[household vehicles] total)> vehicle(s) in your household. Please provide some additional details for each vehicle in the table below.**
- Vehicle <n> of <[household vehicles]> household vehicles.
-
- Allow input for the number of vehicles entered in *[household vehicles]*. If *[household vehicles]* = 0 then skip to **ADDITIONAL VEHICLE** section.

Vehicle 1	• **Vehicle type** ⓘ: <DROP DOWN> • **Model year** ⓘ: <DROP DOWN> • **Make** ⓘ: <DROP DOWN> • **Model** ⓘ: _____ • **Engine / fuel type** ⓘ: <DROP DOWN>
Vehicle 2	• **Vehicle type:** <DROP DOWN> • **Model year:** <DROP DOWN> • **Make:** <DROP DOWN> • **Model:** _____ **Engine / fuel type:** <DROP DOWN>
Vehicle n	• **Vehicle type:** <DROP DOWN> • **Model year:** <DROP DOWN> • **Make:** <DROP DOWN> • **Model:** _____ • **Engine / fuel type :** <DROP DOWN>

[vehicle type] drop-down list

- Subcompact car
- Compact car
- Midsize car
- Large car
- Sports car
- Cross-over, small
- Cross over, midsize
- SUV small/midsize

- SUV full-size/large
- Pick-up truck, small
- Pick-up truck, full-size/large
- Van, small
- Van, full-size/large

[vehicle type] *info text*

Vehicle Type	Examples
Subcompact Car	Ford Fiesta, Chevrolet Spark, Kia Rio, Hyundai Accent, Fiat 500, Smart Fortwo, MINI Cooper, Toyota Prius C, Toyota Yaris, Nissan Versa
Compact Car	Toyota Corolla, Honda Civic, Hyundai Elantra, Mazda3, Chevrolet Cruz, Ford Focus, Volkswagen Jetta, Toyota Prius, Chevrolet Volt, Subaru Impreza
Midsize Car	Toyota Camry, Honda Accord, Hyundai Sonata, Chevrolet Malibu, Chrysler 200, Ford Fusion, Kia Optima, Nissan Altima, Subaru Legacy, Volkswagen Passat, Acura TLX, Audi A4, BMW 3 Series, Mercedes-Benz C-Class
Large Car	Chevrolet Impala, Ford Taurus, Nissan Maxima, Kia Cadenza, Toyota Avalon, Cadillac CTS, Chrysler 300, Lincoln MKZ, Buick LaCrosse, BMW 7 Series, Lexus LS, Mercedes-Benz S-Class, Porsche Panamera
Sports Car	Mazda Miata, Ford Mustang, Chevrolet Camaro, Dodge Challenger, Nissan 370Z, Audi TT, BMW Z4, Porsche Boxster, Mercedes-Benz SLK, Tesla Model S, Chevrolet Corvette
Cross-over, small	Nissan Juke, Nissan Rogue, Mazda CX-3, Honda HR-V, Mini Countryman, BMW X1, Buick Encore, Jeep Renegade, Volkswagen Tiguan
Cross-over, midsize	Nissan Murano, Ford Edge, Volkswagen Touareg, Subaru Forester, Subaru Outback, BMW X3
SUV, Small/Midsize	Ford Escape, Honda CR-V, Toyota RAV4, Toyota Highlander, Chevrolet Equinox, Jeep Wrangler, Jeep Compass, GMC Terrain, Kia Sportage, Ford Edge, Hyundai Santa Fe, Jeep Cherokee
SUV, Full-size/Large	GMC Yukon, Ford Expedition, Chevrolet Tahoe, Chevrolet Suburban, Toyota Sequoia, Volvo XC90, Cadillac Escalade
Pick-up Truck, Small	Toyota Tacoma, GMC Canyon, Ford Ranger, Chevrolet Colorado, Nissan Frontier
Pick-up Truck, Full-size/Large	Ford F-150, Chevrolet Silverado, Dodge Ram, GMC Sierra, Nissan Titan, Toyota Tundra, Ford Super Duty
Van, Small	Honda Odyssey, Toyota Sienna, Chrysler Town and Country, Kia Sedona, Nissan Quest, Dodge Grand Caravan
Van, Full-size/Large	Chevrolet Express, Ford Econoline, Ford Transit, Mercedes-Benz Sprinter, Volkswagen Multivan

[model year] *drop-down list*

Range from 2017 to 1900

[model year] *info text*

Model year describes approximately when the manufacturer produced the vehicle. It may or may not match the year that you purchased the vehicle.

[make] drop-down list

Acura	GMC	Maserati	Saab
Aston Martin	Honda	Maybach	Saturn
Audi	HUMMER	Mazda	Scion
Bentley	Hyundai	Mercedes-Benz	Smart
BMW	Infiniti	Mercury	Subaru
Acura	Isuzu	MINI	Suzuki
Buick	Jaguar	Mitsubishi	Toyota
Cadillac	Jeep	Nissan	Tesla
Chevrolet	Kia	Oldsmobile	Volkswagen
Chrysler	Lamborghini	Panoz	Volvo
Dodge/Ram	Land Rover	Pontiac	Other
Ferrari	Lexus	Porsche	
Fiat	Lincoln		
Ford	Lotus	Rolls-Royce	

if 'Other' is selected show text box to enter make

[make] ℹ info text

Vehicle make is the manufacturer name or brand of the vehicle.

[model] ℹ info text

Model is the name given to a vehicle by the manufacturer. Examples of vehicle models are Accord, Civic or Taurus.

[engine /fuel type] drop-down list

- Gasoline
- Hybrid (Gasoline)
- Plug-in Hybrid Electric vehicle (PHEV)
- Gasoline - ethanol Flex Fuel vehicle (E85 FFV)
- Diesel
- Compressed Natural Gas (CNG) vehicle
- Full Electric vehicle
- Hydrogen vehicle

[engine /fuel type] *info text*

Fuel Type	Description of Fuel Type
Gasoline	A vehicle that operates on gasoline only.
Hybrid (Gasoline)	A gasoline vehicle with a small battery that is charged inside the car and does not plug in for charging the battery (e.g. Toyota Prius).
Plug-in Hybrid Electric vehicle (PHEV)	A gasoline vehicle with a larger battery that plugs into an electrical outlet to charge (e.g. Chevy Volt) which allows the vehicle to operate like a battery electric vehicle for a short distance (10-50 miles) and then operate on gasoline for a much longer distance (~300-400 miles)
Gasoline - ethanol Flex Fuel vehicle (E85 FFV)	A vehicle that will operate on gasoline and/or ethanol (E85 with 85% ethanol), or any blend of the two fuels.
Diesel	A vehicle that operates on diesel or biodiesel
Hybrid (Diesel)	A diesel vehicle with a small battery that is charged inside the car and does not plug in for charging the battery.
Compressed Natural Gas (CNG) vehicle	A vehicle that only operates on compressed natural gas (CNG). It can be filled up at home, with special equipment, or at a fast fill station.
Hybrid (CNG)	A CNG vehicle with a small battery that is charged inside the car and does not plug in for charging the battery.
Full Electric vehicle	A vehicle that operates only on electricity, with a battery that charges by plugging into an electrical outlet at home, at work, or at a fast charge station (e.g. Nissan Leaf, Tesla).
Hydrogen vehicle	A vehicle that uses hydrogen to generate its own electricity in a fuel cell (e.g. Toyota Mirai). Hydrogen is stored in a tank onboard the vehicle and can be filled up at a hydrogen station.

This section loops for each vehicle entered in *[current vehicle intro].*

21. *[current vehicle info]* **Please complete the form below focusing on your <vehicle x year> <vehicle x make> <vehicle x model>.**

<year> <make> <model>	
• *[how acquired]* **How was this vehicle acquired by your household?**	**<DROP DOWN>**
• *[replacement]* **Was this vehicle a replacement for a previous vehicle in your household?**	**<DROP DOWN>**
• *[year acquired]* **What year was this vehicle acquired?**	**<DROP DOWN>**
• *[season acquired]* **What time of year was this vehicle acquired?**	**<DROP DOWN>**
• *[purchase mileage]* **What was the mileage when it was acquired?**	_____
• *[current mileage]* **What is the mileage on odometer today?**	_____

• *[annual mileage]* **How many miles per year is this vehicle driven?**	_____
[MPG] **About how many miles per gallon (MPG or MPGe ⓘ) does this vehicle get?** • *Please enter the expected city/highway combine average.*	_____
• *Skip if [household members] = 1 and populate with [name]* • *[primary driver]* **Who is the primary driver of this vehicle?** •	<DROP DOWN>
• *if [household over 16] > 1* *[other drivers]* **How often is this vehicle driven by other members of the household?**	<DROP DOWN>
• *[replace intent]* **When do you expect to replace this vehicle?**	<DROP DOWN>
• *if plan to 'replace' or 'dispose and not replace' in [replace intent]* • *[dispose]* **How will you dispose of this vehicle?**	<DROP DOWN>
• *if plan to replace in [replace intent]* • *[replace type]* **What type of vehicle do you expect to purchase or lease as a replacement?**	<DROP DOWN>
• *if plan to replace in [replace intent]* • *[replace new used]* **Do you expect the replacement vehicle to be new or used?**	<DROP DOWN>
• *if plan to replace in [replace intent]* • *[replace powertrain]* **What type of engine/fuel type ⓘ do you expect the replacement vehicle to have?**	<DROP DOWN>

[how acquired] drop-down list
- Purchased new
- Leased new
- Purchased used or previously owned
- Other (e.g. gifted or inherited)

[replacement] drop-down list
- Yes
- No, it was an additional vehicle

[acquired year] drop-down list
Range 2016 to 1960

[season acquired] drop-down list
- Winter (January-March)
- Spring (April-June)
- Summer (July-September)
- Fall (October-December)
- Don't know

[purchase mileage]
[allow 0-500,000]

[current mileage]
[allow 0-500,000]

[annual mileage]
[allow 0-100,000]

[mpg] *info text*
MPGe, or miles per gasoline gallon equivalent, is a measure of the average distance traveled per unit of energy consumed. It is used to compare energy consumption of alternative fuel vehicles and plug-in electric vehicles with conventional fuel (gasoline/diesel) vehicles.

[primary driver] *drop-down list*
- I am the primary driver
- <name/nickname/initials from [household names]
- <name/nickname/initials from [household names]
- …

[other drivers] *drop-down list*
- Frequently (i.e. every day)
- Sometimes (i.e. once or twice a week)
- Rarely (i.e. once a month or less)
- Never

[replace time] *drop-down list*
- In less than 1 year
- In 1 to 3 years
- In 3 to 5 years
- In 5 to 10 years
- In more than 10 years
- Never, I am going to keep it
- Never, I am going to dispose of it and NOT replace it

[dispose] *drop-down list*
- Trade it in
- Sell it
- Give it away to family/friends
- Donate it to charity
- Junk it, scrap it
- Return it to leasing company
- Other
- Don't know

[replace type] *drop-down list*
- use same example list as *[vehicle type]*

[replace type] *info text*
use same example info as *[vehicle type] info text*

[replace new used] *drop-down list*
- New
- Used, 1 to 3 years old
- Used, 3 to 5 years old

- Used, 5 to 10 years old
- Used, 10+ years old

[replace powertrain] drop-down list

- Gasoline
- Hybrid (Gasoline)
- Plug-in Hybrid Electric vehicle (PHEV)
- Gasoline - ethanol Flex Fuel vehicle (E85 FFV)
- Diesel
- Compressed Natural Gas (CNG) vehicle
- Full Electric vehicle
- Hydrogen vehicle

[replace powertrain] info text
Use same table as [engine /fuel type]

Repeat section until information is known for all household vehicles.

PEV Owners Only

These questions are currently available in a separate document.

Next Replacement Vehicle Details

Identify the vehicle to be replaced soonest from *[replace intent].*

22. *If 'Never replace' in [replace intent & Indicated they would purchase a new vehicle w/in 10 years in]*
    [replace catch] **Thanks for all the information so far! We have just a few more sets of questions to ask before we're finished.**

    At the beginning of the survey you indicated that you plan to purchase a vehicle. Will this purchase be a replacement for a current vehicle or an additional vehicle for the household?

    - This vehicle will be a replacement for my <year1 / make1 / model1>
    - This vehicle will be a replacement for my <year2 / make2 / model2>
    - ….
    - This vehicle will be an additional vehicle for my household → skip to Additional vehicle

23. *If replacement chosen in [replace catch]*
    [replace catch2] **Please answer the following questions about the replacement of your <year/make/model from [replace catch]>.**

[replace type] **What type of vehicle do you expect to purchase or lease as a replacement?**	**<DROP DOWN>**

• *[replace new used]* **Do you expect the replacement vehicle to be new or used?**	**<DROP DOWN>**
• *[replace powertrain]* **What type of engine/fuel type ⓘ do you expect the replacement vehicle to have?**	**<DROP DOWN>**

Use the same drop-down lists as Current Vehicle section.

24. *If tie in [replace intent]*
    [replace soonest] **Which vehicle do you expect to replace first?**
    - <year / make / model of vehicle tied for next replacement>
    - <year / make / model of vehicle tied for next replacement>
    - …

25. *[replacement details]* **Thank you for providing information on your household's current vehicles. You indicated that your <year/make/model of vehicle to be replaced soonest> is the vehicle you plan to replace next. We will now ask you questions about what type of vehicle you plan to purchase or lease as a replacement.**

    In the previous section you provided the following information about the most likely replacement vehicle for your <year/make/model of vehicle to be replaced soonest>:

• ***<[replace new used] response>***
• ***<[replace powertrain] response>***
• **<[replace type] response>**

Please complete the following with additional information about this replacement vehicle:
Please respond to the best of your ability. If you're not sure about these details, please provide your best guess.

• *[replace make]* **What make do you expect this vehicle to be?**	• **<DROP DOWN>**
• *[replace price]* **About how much do you plan on spending for this vehicle?**	• _____
• *if [replace powertrain] is 'PHEV' or 'CNG' or 'BEV'* • *[home fuel]* **Do you expect to purchase home refueling equipment and/or upgrade your current house to be able to refuel this vehicle?**	• **<DROP DOWN>**
• *[replace mpg]* **About how many miles per gallon (MPG or MPGe ⓘ) do you expect this vehicle to get?** • *Please enter the expected city/highway combine average.*	• _____

• *[replace annual miles]* **About how many miles per year do you expect this vehicle to be driven?**	• _____
• *[replace primary driver]* **Who do you expect will be the primary driver of this vehicle?**	• **<DROP DOWN>**

[replace make] drop-down list

Use the same list as *[make]*
Include "Don't know" option

[replace price]
[allow 500-300,000]

[home fuel] d*rop-down list*
- Yes
- No

[replace mpg]
[allow 0-200]

[replace mpg] *info text*
MPGe is a measure of the average distance traveled per unit of energy consumed. It is used to compare energy consumption of alternative fuel and vehicles (such as natural and plug in electric) with conventional fuel (gasoline/diesel) vehicles.

[replace annual mileage]
[allow 0-100,000]

[replace primary driver] drop-down list
- I will be the primary driver
- <name/nickname/initials from [household names]
- <name/nickname/initials from [household names]
- …
- Other

Next Additional Vehicle Details

26. *If NEXT REPLACEMENT vehicle questions are completed*
    [future addition]

    Do you anticipate purchasing or leasing an <u>ADDITIONAL</u> car, SUV, van, or pick-up truck for your household?
    Do NOT include vehicles supplied by employers.

    - o Yes, in less than 1 year
    - o Yes, in 1 to 3 years
    - o Yes, in 3 to 5 years
    - o Yes, in 5 to 10 years
    - o Yes, in more than 10 years
    - o No, I never plan to add another vehicle to my household → **Skip to CBC**

27. *If [replacement catch] is 'This vehicle will be an additional vehicle for my household'*
    [future addition catch] **When do you anticipate purchasing or leasing the <u>ADDITIONAL</u> car, SUV, van, or pick-up truck for your household?**
    Do NOT include vehicles supplied by employers.

    - o In less than 1 year
    - o In 1 to 3 years
    - o In 3 to 5 years
    - o In 5 to 10 years
    - o In more than 10 years

•

28. *[Additional number]* **In total, how many vehicles do you plan to add to your household over the next 10 years?**
    - o 1
    - o 2
    - o 3
    - o 4
    - o 5 or more

29. *[Additional details]* **We would like to ask some details about the ADDITIONAL vehicle you plan to purchase or lease NEXT. Please complete the following for the NEXT ADDITIONAL vehicle you plan to add to your household:**

• *[if plan to add in [add intent]* • *[additional type]* **What type ⓘ of vehicle do you expect to add to your household?**	**<DROP DOWN>**
• *[if plan to add in [replace intent]* • *[additional new used]* **Do you expect this vehicle to be new or used?**	**<DROP DOWN>**
• *[if plan to replace in [replace intent]*	**<DROP DOWN>**

• *[additional powertrain]* **What type of engine/fuel type do you expect this vehicle to have?**	
<INCLUDE ALL QUESTIONS FROM [replacement details] FORM>	

[additional type] drop-down list
- *Use same list as [vehicle type]*

[additional type] info text
Use same table as [vehicle type]

[additional new used] drop-down list
- New
- Used, 1 to 3 years old
- Used, 3 to 5 years old
- Used, 5 to 10 years old

Used, 10+ years old

•

[additional powertrain] drop-down list
- Gasoline
- Hybrid (Gasoline)
- Plug-in Hybrid Electric vehicle (PHEV)
- Gasoline - ethanol Flex Fuel vehicle (E85 FFV)
- Diesel
- Compressed Natural Gas (CNG) vehicle
- Full Electric vehicle
- Hydrogen vehicle
- I don't know

[additional powertrain] info text
Use same table as [engine /fuel type]

Tradeoff Exercises

- *For Phone survey this needs to be moved after [income]*

30. [*cbc intro*] **You're almost done! Thanks for hanging in there!**

•

- For the next part of the survey, we have created sets of vehicle choices for you with each set including four vehicles. Please carefully review the features for each of the vehicles and select the ONE vehicle you would most likely buy or lease. Please choose one vehicle from each set of options.

•

- We understand that some of the combinations of features and fuel types may not currently exist. For these hypothetical scenarios, please assume the combinations of features do exist and you could buy any of the vehicles presented to you.

•

- Some features that you may find important are not listed here, such as warranty, safety, technology and entertainment features, etc. Please assume that these features are identical across the four vehicles and only focus on the features that are listed when making your decision.
-
- We also understand that the vehicles offered may not completely suit your needs. For the purpose of this study, please assume the four vehicles on each page are the only four available and you must buy one.
-
- You will see that each feature has an information icon ⓘ next to it. If you put your cursor over the ⓘ you will see a definition. It is important that you take some time to read and consider the definitions of any unfamiliar terms before answering any questions.

Alternative Vehicle Consideration

[autonomous agree] **You're doing great! Before finishing up we'd like to know a little bit about your thoughts about some newer and emerging technologies that will affect how Californians move around in the future**.

31.

- **How strongly do you agree or disagree with the following statements?**
-

	Strongly agree	Moderately agree	Neither agree nor disagree	Moderately disagree	Strongly disagree
I would consider purchasing a vehicle that has automated driver assistance capabilities, such as smart/adaptive cruise control, self-parking, vehicle to vehicle communication, etc.	• O	• O	• O	• O	• O
I would consider purchasing a vehicle that is fully self-driving, (i.e. the vehicle drives itself).	• O	• O	• O	• O	• O

Self-driving vehicles will become successful mainstream vehicles in the future.	• O	• O	• O	• O	• O
I am concerned about the safety of self-driving vehicles.	• O	• O	• O	• O	• O

•

32. *[consider alt]* **Have you purchased or considered purchasing any of the following vehicle types for your household?**

- ☐ Hybrid
- ☐ Plug-In Hybrid
- ☐ Diesel
- ☐ Natural Gas (CNG or LNG)
- ☐ Propane (LPG)
- ☐ Fuel Cell (Hydrogen)
- ☐ Full Battery Electric
- ☐ None of the above

33. *[BEV concerns]* **What are your <u>top five concerns</u> about purchasing/leasing an <u>electric only vehicle</u>?**
*Please select your **<u>top five</u>** concerns*

- *[Randomize list]*
  - ☐ Too expensive
  - ☐ Limited driving range on the electric battery
  - ☐ Limited seating capacity
  - ☐ Limited hauling capacity
  - ☐ Limited vehicle body/styling of vehicle
  - ☐ Battery life uncertainty
  - ☐ Uncertain gasoline/electricity price
  - ☐ Cost of installing charging equipment for your home
  - ☐ Lack of charging facilities
  - ☐ Time to charge the battery
  - ☐ Uncertain resale value
  - ☐ Technology is still too new/unreliable
  - ☐ Fear of getting stranded
  - ☐ Other: __*Please specify…*_____ *[anchor]*
  - ☐ I don't have any concerns *[anchor]*
  - ☐ I don't know enough about this technology *[anchor]*

34. *[PHEV concerns]* **What are your <u>top five concerns</u> about purchasing/leasing a plug-in hybrid electric vehicle?**
*Please select your **<u>top five</u>** concerns*

- ☐ Too expensive
- ☐ Limited driving range on the electric battery

- ☐ Limited seating capacity
- ☐ Limited hauling capacity
- ☐ Limited vehicle body/styling of vehicle
- ☐ Battery life uncertainty
- ☐ Uncertain gasoline/electricity price
- ☐ Cost of installing charging equipment for your home
- ☐ Lack of charging infrastructure outside your home
- ☐ Time to charge the battery
- ☐ Uncertain resale value
- ☐ Technology is still too new/unreliable
- ☐ Other: __*Please specify…*_____ *[anchor]*
- ☐ I don't have any concerns *[anchor]*
- ☐ I don't know enough about this technology *[anchor]*

35. *[FCV concerns]* **What are your <u>top five concerns</u> about purchasing/leasing a <u>hydrogen fuel cell vehicle?</u>**
*Please select your <u>**top five**</u> concerns*
    - ☐ Too expensive
    - ☐ Limited seating capacity
    - ☐ Limited hauling capacity
    - ☐ Limited vehicle body/styling of vehicle
    - ☐ Safety of hydrogen tank
    - ☐ Uncertain hydrogen price
    - ☐ Cost of installing fueling equipment for your home
    - ☐ Lack of fueling infrastructure outside your home
    - ☐ Uncertain resale value for vehicle
    - ☐ Technology is still too new/unreliable
    - ☐ Other: ___*Please specify…*_____ *[anchor]*
    - ☐ I don't have any concerns *[anchor]*
    - ☐ I don't know enough about this technology *[anchor]*

36. *[car-share]* **What is your level of participation in car-share programs where you can rent/access a car for short periods of time?**
Example car-share programs include Zipcar, Car2Go, CarShare, JustShareIt, RelayRides, etc.
    - o I currently participate
    - o I have participated in the past, but am not currently participating
    - o I have not participated in the past, but I plan to participate
    - o I might participate someday
    - o I am not interested in participating

37. *If NOT 'I currently participate' in [car-share]*
[why not car-share] **What is the primary reason you are not currently participating in a car-share?**
    - o I am not aware of these programs
    - o It's not available in my area
    - o Too expensive
    - o Not convenient
    - o Public transit already meets my needs

- o I already have access to a vehicle when I need one
- o Other: __*Please specify…*_____

38. *[ride-share]* **What is your level of participation as a passenger in ride sharing and ride share programs, such as Uber, Lyft, Sidecar, etc.?**

- o I currently participate
- o I have participated in the past, but am not currently participating
- o I have not participated in the past, but I plan to participate
- o I might participate someday
- o I am not interested in participating

39. *If 'currently participates' or 'has participated in the past' on [ride-share]*
[ride-share why] **When do you typically use ride share?**
Please select all that apply.

- ☐ Travel or special events (e.g. concerts, sporting events, etc.)
- ☐ Everyday commuting trips (e.g. trips to work, school, errands, etc.)
- ☐ Other: ___*Please specify…*____

40. *If NOT 'I currently participate" on [ride-share]*

- **What is the primary reason you are not currently using ride sharing?**
  - o I am not aware of these services
  - o It's not available in my area
  - o Too expensive
  - o Not convenient
  - o Public transit already meets my needs
  - o I already have access to a vehicle when I need one
  - o I prefer to ride alone
  - o Other: ____*Please specify…*_____

41. *[ride-share agree]* **How strongly do you agree or disagree with the following statement?**

-
- **"Car-sharing and ride-sharing programs will affect my decisions about owning a personal vehicle in the future."**
  - o Strongly agree
  - o Moderately agree
  - o Neither agree nor disagree
  - o Moderately disagree
  - o Strongly disagree

42. **When selecting a vehicle to buy or lease, what do you consider to be the top 3 attributes**

Select 3 attributes

- ☐ Vehicle price
- ☐ MPG/Fuel economy
- ☐ Acceleration
- ☐ Maintenance cost
- ☐ Fuel Cost
- ☐ Range
- ☐ Towing capacity
- ☐ Cargo capacity
- ☐ Seating capacity
- ☐ Reliability
- ☐ Fuel availability
- ☐ Refueling time
- ☐ Horsepower
- ☐ Warranty
- ☐ Brand/Vehicle make

43. *[future mileage]* **The current price of a gallon of regular gasoline in the State of California is about $2.80. How much do you think gas will cost, per gallon, in 5 years?**

Expected price per gallon in dollars: _____ [allow 0-99.99]

Additional Household Questions

44. *[solar]*

This is the LAST set of questions. Thanks for your time and attention!

Do you currently have solar panels installed on your permanent residence?

- o Yes
- o No

- *If 'No' on [solar]*

45. *[solar future]* **Are you planning on purchasing solar panels for your permanent residence within the next 5 years?**

- o Yes
- o No

46. *[income]* **To make certain our study represents all income groups in California could you select the range below that best represents your annual household income?**

- Less than $9,999
- $10,000 to $24,999
- $25,000 to $34,999
- $35,000 to $49,999
- $50,000 to $74,999
- $75,000 to $99,999
- $100,000 to $149,999
- $150,000 to $199,999
- $200,000 to $249,999
- $250,000 or more

-

Phone survey only

47. *[address verify]* **Thank you for taking the time to answer these questions today. As I mentioned before we started there are a few additional questions that will be sent to you in the mail. Instructions for completing these will be included in the mailing. Would you like us to send this to the same address at which you received your postcard?**

    <mailing address>

    - Yes
    - No, please list correct address: _____

You should receive the additional survey questions in the mail within 2 weeks. Once you have them please call back and complete the survey.

Phone survey only

48. *[interviewer comment]* Note to interviewer: This concludes the first portion of the survey. Please enter any comments below in regards to the mailing and click "Next".

    Comments*: [open end]*

Phone survey only

49. *[interviewer note]* Note to interviewer: Do not proceed to the next section of the survey until the participant has a printed copy of the tradeoff exercises. Please verify that they have received the follow-up mailing before clicking next.

-
- **Note to programmer: At this point the database needs to have completed all calculations for values displayed in the CBC so that we can extract these values into word a document and mail a copy of the to the respondent.**
-

Phone survey only

50. *[phone CBC]* Phone respondents should see the CBC here.

-
-

- *Skip if Phone survey or Research Now*

51. *[prize email]* Thanks for participating in the survey! Before you finish, please enter an email address where we can send you a $10 electronic gift card from an online retailer of your choice. Your email address will only be used to send along your prize.
    - email: _____ - *enforce a valid email address*
    -
    - No thanks – *send to [end]*

-
- *If entered a valid email*
- *Skip if Phone survey or Research Now*

52. *[prize]* Which online retailor would you like to have a $10 electronic gift card to spend at?

    You should receive your prize at the email address you provided in three to four weeks from 'California Energy Commission'

    1. Walmart
    2. Amazon.com

-

Phone survey only

53. *[phone incentive]* Thank you for participating. You have completed the survey and now qualified to receive a $10 VISA gift card. Are you interested in the gift card?

    1. Yes → "Okay, the card will be mailed to the address we have on file. You should expect to receive the card in the next 2 weeks."
    2. No thanks
    -

54. *[open end]* Thank you for participating!

- If you have additional comments or suggestions either about the survey or the survey experience itself, please enter them in the box below and click the "Next" button.
- **[Open End]**
-
-
    -

55. *[end]* Thanks again for completing the survey. All of your answers have been saved, you may now close your browser and exit the survey.

Demo-Only questions for Non-Qualifiers

56. *[do not qualify]* **Based on your responses you do not qualify to receive payment for participating in this survey. Would you be willing to answer a few questions about your household before you're finished?**
    - o Yes
    - o No thanks → **End Survey**

57. *[number employed]* **Of the members of your household who are 16 years of age or older, how many are employed full-time (35+ hours per week)?**

    Household members employed full time: _____ [max = household members 16 or older]

58. *[individual info]* **Please complete the form below with information about yourself.**

• *[age]* **Age:**	• **<DROP DOWN>**
• *[gender]* **Gender:**	• **<DROP DOWN>**
• *[ethnicity]* **Ethnic background:**	• **<DROP DOWN>** **If 'other' then open end**
• *[education]* **Highest level of education completed:**	• **<DROP DOWN>**
• *[income]* **Household income:**	• **<DROP DOWN>**

59. *[non-qualify end survey]* ***No incentive Thank you text.***

Commercial Questionnaire

Outline

Survey Section	Information Collected
	Checks business type, fleet size, vehicle types, vehicle purchase intentions
	Additional details on up to five fleet vehicles
	Seen if replacing a vehicle only. Full details on the expected next replacement vehicle
	Current refueling systems and expected cost of future installations
	Alternative vehicle consideration and autonomous vehicle interest
	Questions about company type, size, and refueling capabilities
	Information on the vehicle tradeoff exercises in contained in a separate document

Screener

60. *[intro]* Welcome to the California Vehicle Survey. Your answers will help the California Energy Commission, a State of California agency, understand your organization's vehicle and fuel needs now and in the future. The information you provide will be kept confidential by the California Energy Commission and RSG (the company that is collecting the survey data), based on the California Information Practices Act and the

non-disclosure agreement between RSG and the Energy Commission. *(skip if Research Now)* Complete this survey and you will have the option to receive a $20 gift card to spend at Amazon.com or Walmart.

Please use the **"Next"** button in the lower left-hand corner of the screen to go forward. To review and change a previous question, use "Previous" button. It is important that you do not use your web browser's "forward" or "back" buttons because your new answers will be lost.

Answering all of the questions will take approximately *30* minutes. *Infogroup only:* If you can't finish the survey in one sitting, you can stop at any time and return to where you left off by clicking on the link in your invitation email.

(skip if Research Now) Please enter the password from the postcard and click **"Next"** to begin. If you can't finish the survey in one sitting, you can stop at any time and return to where you left off by re-entering your password.

Password: _____

<Error: Sorry the password you entered is not valid, please check the postcard and try again.>

61. *[decision maker]* **First, are you the person that is most knowledgeable about all of the vehicles used and purchased for your company at this location?**
Please select all that apply.

    - Yes
    - No

62. *If 'no' on [decision maker]*
[switch respondent] **This survey must be completed by the person most knowledgeable about the vehicles used and purchased for your company at this location. Please ask that person to log on with the unique password provided on the postcard to continue the survey. Thank you.**

63. *[org type]* **Is your organization a for-profit company, a not-for-profit company, or a government agency?**

    - For-profit company
    - Not-for-profit company
    - Car rental company→ [Disqualify]
    - Taxi cab company → [Disqualify]
    - Government agency → [Disqualify]
    - I don't know → [Disqualify]

-

64. *Infogroup only*

- *[zip] [county]* **What is the zip code at your business's location?**
    - [Enforce a valid zip]

Zip code: [ ]

Which county is your office or place of business located in?

Select county from list: *<Drop down list of counties>*

1. Alameda County
2. Alpine County
3. Amador County
4. Butte County
5. Calaveras County
6. Colusa County
7. Contra Costa County
8. Del Norte County
9. El Dorado County
10. Fresno County
11. Glenn County
12. Humboldt County
13. Imperial County
14. Inyo County
15. Kern County
16. Kings County
17. Lake County
18. Lassen County
19. Los Angeles County
20. Madera County
21. Marin County
22. Mariposa County
23. Mendocino County
24. Merced County
25. Modoc County
26. Mono County
27. Monterey County
28. Napa County
29. Nevada County
30. Orange County
31. Placer County
32. Plumas County
33. Riverside County
34. Sacramento County
35. San Benito County
36. San Bernardino County
37. San Diego County
38. San Francisco County
39. San Joaquin County
40. San Luis Obispo County
41. San Mateo County
42. Santa Barbara County
43. Santa Clara County
44. Santa Cruz County
45. Shasta County
46. Sierra County
47. Siskiyou County
48. Solano County
49. Sonoma County
50. Stanislaus County
51. Sutter County
52. Tehama County
53. Trinity County
54. Tulare County
55. Tuolumne County
56. Ventura County
57. Yolo County
58. Yuba County
59. Other

65. *(skip if Research Now) [email] [phonenum]* **Can you provide an email address and phone number for us to contact you?**
Your personal contact information will only be used to provide technical assistance, survey completion reminders or to gather feedback about the questionnaire and your experience. We will not sell or distribute your email address for any commercial marketing purposes.

Name *(optional)*:_____
Email *(optional)*: _____ [allow no answer, enforce a valid email if text is entered]

Phone number(*optional*):

( ) - ext:

[allow no answer, enforce a valid phone # (area code +number)]

66. *[biz type]* **How would you describe the type of business activity or industry associated with your company?**

Business type: _____

67. *[title]* **What is your title or role in the company?**

Title: _____

68. *[cal locations]* **About how many business locations, in total, does your company have in California?**

Business locations in California: _____ [allow 1-500]

69. *[total locations]* **How many business locations, in total, does your company have in <u>other</u> U.S. states (not including California)?**

Business locations outside of California: _____ [allow 0-5,000]

70. *[purchase 10years]* **How many total light-duty vehicles (cars, SUVs, Cross-over, pickup trucks and vans) has your company purchased or leased at your location over <u>the last 10 years</u>?**
Please include vehicles that are no longer part of your fleet.

Vehicles purchased new: _____ [allow 0-500]

Vehicles purchased used: _____ [allow 0-500]

Vehicles leased: _____ [allow 0-500]

71. *[num light]* **How many of each of the <u>light-duty commercial vehicle</u> types listed below does your company have <u>registered for business purposes at least 50% of the time at <insert address></u>** *<u>(Infogroup and RN respondents see "the location where you work")</u>* **?**

- Note: Do **not include** any vehicles weighing over 10,000lbs below.

Number of vehicles owned or leased [allow 0-5,000 each] [default each to 0]	**Vehicle Type**	**Examples**
_____	Car	Toyota Corolla, Honda Civic, Hyundai Elantra, Mazda3, Chevrolet Cruz, Ford Focus, Volkswagen Jetta, Toyota Prius, Chevrolet Volt, Subaru Impreza, Chevrolet Impala, Ford Taurus, Nissan Maxima, etc.
_____	SUV/Crossover	Honda CRV, Toyota RAV4, Subaru Forester and Outback, Jeep Renegade, Hyundai Santa Fe, Chevrolet Tahoe, Toyota Sequoia, etc.
_____	Van/Mini Van	Honda Odyssey, Toyota Sienna, Chrysler Town and Country, Kia Sedona, Dodge Grand Caravan, Chevrolet Express, Ford Econoline, etc.
_____	Pick-up Truck	Toyota Tacoma, Ford Ranger, Ford F-150, Dodge Ram, GMC Sierra, Ford Super Duty, etc.

Total: <u><sum of all vehicles entered></u>

If total (excluding Neighborhood electric) = "0" → [Disqualify]

-

72. *[num alt]* **You indicated that your company has <num_light total> light vehicles at at <insert address>** *(Infogroup and RN respondents see "the location where you work")* **?**

How many of each of the following types of light-duty vehicles does your company own or lease?

Number of vehicles owned or leased	Vehicle Type	Description
_____	Gasoline	An engine that runs on gasoline only.
_____	Hybrid (Gasoline)	A gasoline vehicle with a small battery that is charged inside the car and does not plug in for charging the battery (e.g. Toyota Prius).
_____	Plug-in Hybrid Electric vehicle (PHEV)	A gasoline vehicle with a larger battery that plugs into an electrical outlet to charge (e.g. Chevy Volt) which allows the vehicle to operate like a battery electric vehicle for a short distance (10-50 miles) and then operate on gasoline for a much longer distance (~300-400 miles)
_____	Gasoline - ethanol Flex Fuel vehicle (E85 FFV)	A vehicle that will operate on gasoline and/or ethanol (E85 with 85% ethanol), or any blend of the two fuels.
_____	Diesel	A vehicle that operates on diesel or biodiesel
_____	Compressed Natural Gas (CNG) vehicle	A vehicle that only operates on compressed natural gas (CNG). It can be filled up at home, with special equipment, or at a fast fill station.
_____	Full Electric vehicle	A vehicle that operates only on electricity, with a battery that charges by plugging into an electrical outlet at home, at work, or at a fast charge station (e.g. Nissan Leaf, Tesla).
_____	Hydrogen vehicle	A vehicle that uses hydrogen to generate its own electricity in a fuel cell (e.g. Toyota Mirai). Hydrogen is stored in a tank onboard the vehicle and can be filled up at a hydrogen station.

Total Number of Vehicles: <sum of all vehicles entered>

Total must < or = to [num light].

73. *[purch intent 5]* **When do you think you may purchase or lease one or more light-duty vehicles that will be company-owned/leased and/or used for business purposes in California at least 50% of the time?**

Again, by light duty vehicle, we mean vehicles that are 10,000 pounds or less.

- o Within the next 5 years
- o Within the next 6-10 years
- o More than 10 years from now
- o Never → [Disqualify]

74. *If >5 vehicles based on Polk data and [num light]*

[veh current] **For the next part of this survey we'd like to know about some of the light-duty (under 10,000lbs) vehicles your company uses for business purposes in California. This includes cars, cross over/station wagons, SUVs, pick-ups, or vans.**

If no pre-loaded data

You indicated that you have <[num light] total)> light duty vehicle(s) in your company's fleet. Please provide some additional details <*if 6+ veh* - for the <u>five most frequently used</u> vehicles in your fleet> <*if 5 or fewer* - for these vehicles>.

Vehicle <n> of <[num light]>

	•	• *If Polk data:* **<Vehicle is no longer in fleet>**
Vehicle 1	• **Vehicle type** ⓘ: <DROP DOWN> • **Model year** ⓘ: <DROP DOWN> • **Make** ⓘ: <DROP DOWN> • **Model** ⓘ: _____ • **Engine / fuel type** ⓘ: <DROP DOWN>	☐
if [num light] total > 1 **Vehicle 2**	• **Vehicle type:** <DROP DOWN> • **Model year:** <DROP DOWN> • **Make:** <DROP DOWN> • **Model:** _____ **Engine / fuel type:** <DROP DOWN>	☐
if [num light] total > 2 **Vehicle 3**	• **Vehicle type :** <DROP DOWN> • **Model year:** <DROP DOWN> • **Make:** <DROP DOWN> • **Model:** _____ • **Engine / fuel type :** <DROP DOWN>	☐
if [num light] total > 3 **Vehicle 4**	• **Vehicle type :** <DROP DOWN> • **Model year:** <DROP DOWN> • **Make:** <DROP DOWN> • **Model:** _____ • **Engine / fuel type :** <DROP DOWN>	☐

if [num light] total > 4 **Vehicle 5**	• **Vehicle type :** <DROP DOWN> • **Model year:** <DROP DOWN> • **Make:** <DROP DOWN> • **Model:** _____ • **Engine / fuel type :** <DROP DOWN>	☐

If 'no' to all then ***Disqualify***

[vehicle type] drop-down list

- Subcompact car
- Compact car
- Midsize car
- Large car
- Sports car
- Cross-over, small
- Cross over, midsize
- SUV small/midsize
- SUV full-size/large
- Pick-up truck, small
- Pick-up truck, full-size/large
- Van, small
- Van, full-size/large

[vehicle type] info text

Vehicle Type	Examples
Subcompact Car	Ford Fiesta, Chevrolet Spark, Kia Rio, Hyundai Accent, Fiat 500, Smart Fortwo, MINI Cooper, Toyota Prius C, Toyota Yaris, Nissan Versa
Compact Car	Toyota Corolla, Honda Civic, Hyundai Elantra, Mazda3, Chevrolet Cruz, Ford Focus, Volkswagen Jetta, Toyota Prius, Chevrolet Volt, Subaru Impreza
Midsize Car	Toyota Camry, Honda Accord, Hyundai Sonata, Chevrolet Malibu, Chrysler 200, Ford Fusion, Kia Optima, Nissan Altima, Subaru Legacy, Volkswagen Passat, Acura TLX, Audi A4, BMW 3 Series, Mercedes-Benz C-Class
Large Car	Chevrolet Impala, Ford Taurus, Nissan Maxima, Kia Cadenza, Toyota Avalon, Cadillac CTS, Chrysler 300, Lincoln MKZ, Buick LaCrosse, BMW 7 Series, Lexus LS, Mercedes-Benz S-Class, Porsche Panamera
Sports Car	Mazda Miata, Ford Mustang, Chevrolet Camaro, Dodge Challenger, Nissan 370Z, Audi TT, BMW Z4, Porsche Boxster, Mercedes-Benz SLK, Tesla Model S, Chevrolet Corvette
Cross-over, small	Nissan Juke, Nissan Rogue, Mazda CX-3, Honda HR-V, Mini Countryman, BMW X1, Buick Encore, Jeep Renegade, Volkswagen Tiguan
Cross-over, midsize	Chevrolet Equinox, Nissan Murano, Ford Edge, Volkswagen Touareg, Subaru Forester, Subaru Outback, BMW X3
SUV, Small/Midsize	Ford Escape, Honda CR-V, Toyota RAV4, Toyota Highlander, Chevrolet Equinox, Jeep Wrangler, Jeep Compass, GMC Terrain, Kia Sportage, Ford Edge, Hyundai Santa Fe, Jeep Cherokee
SUV, Full-size/Large	GMC Yukon, Ford Expedition, Chevrolet Tahoe, Chevrolet Suburban, Toyota Sequoia, Volvo XC90, Cadillac Escalade
Pick-up Truck, Small	Toyota Tacoma, GMC Canyon, Ford Ranger, Chevrolet Colorado, Nissan Frontier
Pick-up Truck, Full-size/Large	Ford F-150, Chevrolet Silverado, Dodge Ram, GMC Sierra, Nissan Titan, Toyota Tundra, Ford Super Duty
Van, Small	Honda Odyssey, Toyota Sienna, Chrysler Town and Country, Kia Sedona, Nissan Quest, Dodge Grand Caravan
Van, Full-size/Large	Chevrolet Express, Ford Econoline, Ford Transit, Mercedes-Benz Sprinter, Volkswagen Multivan

[model year] drop-down list

Range from 2017 to 1900

[model year] info text

Model year describes approximately when the manufacturer produced the vehicle. It may or may not match the year that you purchased the vehicle.

[make] drop-down list

Acura	GMC	Maserati	Saab
Aston Martin	Honda	Maybach	Saturn
Audi	HUMMER	Mazda	Scion
Bentley	Hyundai	Mercedes-Benz	Smart
BMW	Infiniti	Mercury	Subaru

Acura	Isuzu	MINI	Suzuki
Buick	Jaguar	Mitsubishi	Toyota
Cadillac	Jeep	Nissan	Tesla
Chevrolet	Kia	Oldsmobile	Volkswagen
Chrysler	Lamborghini	Panoz	Volvo
Dodge	Land Rover	Pontiac	Other
Ferrari	Lexus	Porsche	
Fiat	Lincoln	Rolls-Royce	
Ford	Lotus	Tesla	

if 'Other' is selected show text box to enter make

[make] *info text*

Vehicle make is the manufacturer name or brand of the vehicle.

[model] *info text*

Model is the name given to a vehicle by the manufacturer. Examples of vehicle models are Accord, Civic or Taurus.

[engine /fuel type] *drop-down list*

- Gasoline
- Hybrid (Gasoline)
- Plug-in Hybrid Electric vehicle (PHEV)
- Gasoline - ethanol Flex Fuel vehicle (E85 FFV)
- Diesel
- Compressed Natural Gas (CNG) vehicle
- Full Electric vehicle
- Hydrogen vehicle

[engine /fuel type] *info text*

Fuel Type	Description of Fuel Type
Gasoline	A vehicle that operates on gasoline only.
Hybrid (Gasoline)	A gasoline vehicle with a small battery that is charged inside the car and does not plug in for charging the battery (e.g. Toyota Prius).
Plug-in Hybrid Electric vehicle (PHEV)	A gasoline vehicle with a larger battery that plugs into an electrical outlet to charge (e.g. Chevy Volt) which allows the vehicle to operate like a battery electric vehicle for a short distance (10-50 miles) and then operate on gasoline for a much longer distance (~300-400 miles)
Gasoline - ethanol Flex Fuel vehicle (E85 FFV)	A vehicle that will operate on gasoline and/or ethanol (E85 with 85% ethanol), or any blend of the two fuels.
Diesel	A vehicle that operates on diesel or biodiesel
Hybrid (Diesel)	A diesel vehicle with a small battery that is charged inside the car and does not plug in for charging the battery.
Compressed Natural Gas (CNG) vehicle	A vehicle that only operates on compressed natural gas (CNG). It can be filled up at home, with special equipment, or at a fast fill station.
Hybrid (CNG)	A CNG vehicle with a small battery that is charged inside the car and does not plug in for charging the battery.
Full Electric vehicle	A vehicle that operates only on electricity, with a battery that charges by plugging into an electrical outlet at home, at work, or at a fast charge station (e.g. Nissan Leaf, Tesla).
Hydrogen vehicle	A vehicle that uses hydrogen to generate its own electricity in a fuel cell (e.g. Toyota Mirai). Hydrogen is stored in a tank onboard the vehicle and can be filled up at a hydrogen station.

75. *[operation loc]* **Are these vehicles operated for business purposes in the state of California at least 50% of the time?**
Insert vehicles from [veh current]

	Yes	No
<Year> <Make> <Model>	☐	☐
<Year> <Make> <Model>	☐	☐
<Year> <Make> <Model>	☐	☐
<Year> <Make> <Model>	☐	☐
<Year> <Make> <Model>	☐	☐

Current Vehicle Details

This section loops for each vehicle entered in *[current veh].*

76. *[current vehicle info]* **Thanks for the information you've provided us so far. Next, we'd like to know a little more about each of the vehicles in your fleet that were detailed in the previous section.**

Please complete the form below focusing on vehicle <vehicle #>, the <vehicle x year> <vehicle x make> <vehicle x model>.

<year> <make> <model> <engine/fuel type>

[how acquired] **How was this vehicle acquired by your company?**	**<DROP DOWN>**
[replacement] **Was this vehicle a replacement for a previous vehicle in your company?**	**<DROP DOWN>**
[year acquired] **What year was this vehicle acquired?**	**<DROP DOWN>**
[season acquired] **What time of year was this vehicle acquired?**	**<DROP DOWN>**
[annual mileage] **How many miles per year is this vehicle driven?**	_____
[MPG] **About how many miles per gallon (MPG or MPGe) does this vehicle get?** *Please enter the expected city/highway combined average. For CNG, electric, and hydrogen vehicles, please provide the energy equivalent of a gallon of gasoline, or MPGe, if that is easier.*	_____ **MPG** **or** _____ **MPGe**
[current use] **What is this vehicle primarily used for?**	**<DROP DOWN>**
[replace time] **When do you expect to replace this vehicle?**	**<DROP DOWN>**
if plan to 'replace' or 'dispose and not replace' in [replace intent] *[dispose]* **How will you dispose of this vehicle?**	**<DROP DOWN>**

[how acquired] drop-down list

- Purchased new
- Leased new
- Purchased used or previously owned
- Other (e.g. gifted or inherited)

[replacement] drop-down list

- Yes
- No, it was an additional vehicle

[acquired year] drop-down list

Range 2016 to 1960

[season acquired] drop-down list

- Winter
- Spring
- Summer
- Fall
- Don't know

[purchase mileage]

[allow 0-500,000]

[current mileage]

[allow 0-1,000,000]

[annual mileage]
[allow 0-300,000]

[mpg]
[allow 7-300]

[mpg] *info text*
MPGe, or miles per gasoline gallon equivalent, is a measure of the average distance traveled per unit of energy consumed. It is used to compare energy consumption of alternative fuel vehicles and plug-in electric vehicles with conventional fuel (gasoline/diesel) vehicles.

[current use] *drop-down list*
- Delivery/Pick Up
- Employee / Customer Transportation
- Making Sales Calls
- Making Service Calls
- Transporting Materials or Equipment
- Some other purpose → show text box

[current tow]
Pounds [allow 0-40,000] Tons [allow 0-20.00]

[replace time] *drop-down list*
- 1 year or less
- In 2 or 3 years
- In 4 or 5 years
- In more than 5 years
- Never, I am going to keep it
- Never, I am going to dispose of it and NOT replace it

[dispose] *drop-down list*
- Trade it in
- Sell it
- Give it away
- Donate it to charity
- Junk it, scrap it
- Return it to leasing company
- Other

PEV Owner Details

These questions are currently available in a separate document.

Only shown to respondents who own 'Gasoline Plug-in Hybrid Electric vehicle (PHEV)' or 'Battery Electric vehicle (BEV)' as one of their current cars in [engine / fuel type]. If own both BEV & PHEV ask questions for BEV.

Next Vehicle Details

77. *[next veh]* **Thanks for all the information so far! We have a couple more sets of questions to ask before we're finished.**

The following questions will ask about the next vehicle your company plans on purchasing, either to replace a current vehicle or add to your existing fleet. If you anticipate purchasing more than one vehicle, please answer the following questions based on the NEXT company-owned, light-duty vehicle purchase or lease that will be used for business in CA at least 50% of the time.

• *[new used]* **Will this vehicle most likely be…?**	• **<DROP DOWN>**
• *[purchase lease]* **Will this vehicle most likely be <u>purchased or leased</u>?**	• **<DROP DOWN>**
• *[add replace]]* **Will this vehicle be an <u>addition</u> to your fleet or a <u>replacement</u>?**	• **<DROP DOWN>**
• *[next veh type]* **What type of vehicle is your company most likely to purchase or lease next?**	• **<DROP DOWN>**
• *[next powertrain]* **What type of engine/fuel type is the vehicle most likely to have?**	• **<DROP DOWN>**
• *[next make]* **What make is this vehicle most likely to be?**	• **<DROP DOWN>**
• *[next MPG]* **About how many miles per gallon (MPG or MPGe ⓘ) do you expect this vehicle to get, on average?** • *Please enter the expected city/highway combined average.*	• _____
• *If "PHEV" or "BEV" in [powertrain]* • *[next charge time]* **In hours, how much time do you expect it would take to fully charge this vehicle?** • *If you don't know you may leave the response blank.*	• _____ **hours**
• *[next price]* **About how much money do you expect the company will spend to purchase/lease this vehicle?**	• _____

[new used] *drop-down list*
- o New
- o Used, 1 to 3 years old
- o Used, 3 to 5 years old
- o Used, 5 to 10 years old
- o Used, 10+ years old

[next purchase lease] *drop-down list*
- o Purchased
- o Leased

[add replace] *drop-down list*
- o An addition to the vehicle(s) currently in your fleet
- o A replacement for a current vehicle in your fleet

[next veh type] drop-down list

Use list from [vehicle type]

[next veh type] info text

Use table from [vehicle type]

[next powertrain] drop-down list

Use list from [engine / fuel type]

[next powertrain] info text

[next make] drop-down list

Use list from [make]

ADD "Don't know"

[next mpg]

[allow 0-200]

[mpg] info text

MPGe, or miles per gasoline gallon equivalent, is a measure of the average distance traveled per unit of energy consumed. It is used to compare energy consumption of alternative fuel vehicles and plug-in electric vehicles with conventional fuel (gasoline/diesel) vehicles.

[next charge time]

hours: [allow 0-99]

[nextreplace annual mileage]

[allow 0-100,000]

[nextreplace price]

[allow 500-300,000]

Refueling Capabilities

You're doing great! Before finishing up we'd like to know a little bit about your company's use of some newer and emerging technologies that will affect how California moves around in the future.

78. *[refueling current]* **Does your company currently have any of the following at <postcard address>** *(Infogroup and RN respondents see "the location where you work")* **?**
Please select all that apply.

- ☐ Solar panels
- ☐ Wind tower/turbine
- ☐ 240 volt level II charger
- ☐ DC Fast Charger
- ☐ E85 fueling capabilities
- ☐ Compressed natural gas fueling capabilities
- ☐ Diesel fueling capabilities
- ☐ Gasoline fueling capabilities
- ☐ None of the above

79. *Skip if ALL refueling options selected in [refueling current]*
[refueling future] **Does your company plan on purchasing/installing any of the following in the next 5 years for use at <postcard address>** *(Infogroup and RN respondents see "the location where you work")* **?**
Please select all that apply.
only show options not selected in [refueling current]

- ☐ Solar panels
- ☐ Wind tower/turbine
- ☐ 240 volt level two charger
- ☐ DC Fast Charger
- ☐ E85 fueling capabilities
- ☐ Compressed natural gas fueling capabilities
- ☐ Diesel fueling capabilities
- ☐ Gasoline fueling capabilities
- ☐ None of the above
-

80. *Only show if a refueling option is selected in [refueling future]*
[refueling future] **How much do you anticipate paying for the installation for the following?**
Please select all that apply.

only show options not selected in [refueling future]	**Expected cost in dollars…**
Solar panels	_____
Wind tower/turbine	_____
240 volt level two charger	_____
DC Fast Charger	_____
E85 fueling capabilities	_____
Compressed natural gas fueling capabilities	_____
Diesel fueling capabilities	_____
Gasoline fueling capabilities	_____

•

Alternative Vehicle Consideration

•

81. *[autonomous agree]* **How strongly do you agree or disagree with the following statements?**

•

	Strongly disagree	Moderately disagree	Neither agree nor disagree	Moderately agree	Strongly agree
My company would consider purchasing vehicles that have automated driver assistance capabilities, such as smart/adaptive cruise control, self-parking, vehicle to vehicle communication, etc.	• O	• O	• O	• O	• O
My company would consider purchasing vehicles that are fully self-driving (i.e., autonomous vehicles that drive themselves).	• O	• O	• O	• O	• O
Self-driving or autonomous vehicles will become successful mainstream vehicles in the future.	• O	• O	• O	• O	• O
Self-driving or autonomous vehicles would be beneficial to our business.	• O	• O	• O	• O	• O

•

82. *[consider alt]* **Has your company considered purchasing any of the following vehicle types?**
Select all that apply.

- ☐ Gasoline
- ☐ Hybrid (Gasoline)
- ☐ Plug-in Hybrid Electric vehicle (PHEV)
- ☐ Gasoline - ethanol Flex Fuel vehicle (E85 FFV)
- ☐ Diesel
- ☐ Compressed Natural Gas (CNG) vehicle
- ☐ Full Electric vehicle
- ☐ Hydrogen vehicle

•

83. *[BEV concerns]* **What are your <u>top five concerns</u> about purchasing/leasing an <u>electric only vehicle for use at your company</u>?**

*Please select **<u>up to five</u>** concerns.*

- *[Randomize list]*
  - ☐ Too expensive
  - ☐ Limited driving range on the electric battery
  - ☐ Limited seating capacity
  - ☐ Limited hauling capacity
  - ☐ Limited vehicle body/styling of vehicle
  - ☐ Battery life uncertainty
  - ☐ Uncertain gasoline/electricity price
  - ☐ Cost of installing charging infrastructure
  - ☐ Lack of charging infrastructure outside the company
  - ☐ Time to charge the battery
  - ☐ Uncertain resale value
  - ☐ Technology is still too new/unreliable
  - ☐ Fear of getting stranded on a job or route
  - ☐ Other, please specify: _____ *[anchor]*
  - ☐ I don't have any concerns *[anchor]*
  - ☐ I don't know enough about this technology *[anchor]*

84. *[PHEV concerns]* **What are your <u>top five concerns</u> about purchasing/leasing <u>plug-in hybrid electric vehicles (PHEV)</u> for use at your company?**

*Please select **<u>up to five</u>** concerns..*

- ☐ Too expensive
- ☐ Limited seating capacity
- ☐ Limited hauling capacity
- ☐ Limited vehicle body/styling of vehicle:
- ☐ Battery life uncertainty
- ☐ Uncertain gasoline/electricity price
- ☐ Cost of installing charging infrastructure
- ☐ Lack of charging infrastructure outside the company
- ☐ Time to charge the battery
- ☐ Uncertain resale value
- ☐ Technology is still too new/unreliable
- ☐ Other, please specify: _____ *[anchor]*
- ☐ I don't have any concerns *[anchor]*
- ☐ I don't know enough about this technology *[anchor]*

85. *[FCV concerns]* **What are your <u>top five concerns</u> about purchasing/leasing a <u>hydrogen fuel cell vehicle</u> for use at your company?**

*Please select **<u>up to five</u>** concerns..*

- ☐ Too expensive
- ☐ Limited seating capacity
- ☐ Limited hauling capacity
- ☐ Limited vehicle body/styling of vehicle
- ☐ Safety of hydrogen tank
- ☐ Uncertain hydrogen price
- ☐ Cost of installing fueling equipment at your work location
- ☐ Lack of fueling infrastructure outside your work location
- ☐ Uncertain resale value for vehicle
- ☐ Technology is still too new/unreliable
- ☐ Other, please specify: _____ *[anchor]*

- ☐ I don't have any concerns *[anchor]*
- ☐ I don't know enough about this technology *[anchor]*

•

Company Information

86. *[services]* **In the past year, how frequently has your company at <postcard address>** *(Infogroup and RN respondents see "the location where you work")* **used the following business services?**

• *[rental]* **Rental vehicles**	**<DROP DOWN>**
• *[currier]* **Courier service**	**<DROP DOWN>**
• *[delivery]* **Contract delivery service**	**<DROP DOWN>**
• *[taxi]* **Taxi service (including Uber/Lyft)**	**<DROP DOWN>**

drop-down list

- o Never
- o Once or twice in the past 12 months
- o 3 to 6 times in the past 12 months
- o 7 to 11 times in the past 12 months
- o 1 to 3 times a month
- o 1 to 2 times a week
- o 3 to 4 times a week
- o Every day or nearly every day

87. *[employee num]* **How many employees are there at <postcard address>** *(Infogroup and RN respondents see "the location where you work")* **?**
Please include all shifts and all employees that work off-site but are <u>based at this address</u>.

Number of employees: _____ [allow 1-100,000]

88. **What kinds of dedicated parking does your company have access to at <postcard address>** *(Infogroup and RN respondents see "the location where you work")* **?**
Select all types of parking that is owned or used exclusively for your company's vehicles <u>at this address.</u>
    - ☐ Surface parking lot
    - ☐ Parking garage
    - ☐ On-street parking
    - ☐ Paid parking ($____) [if selected 'Paid parking']
        - ▪ Per day
        - ▪ Per month
    - ☐ None

89. **When selecting a vehicle for your business, what do you consider to be the top 3 attributes?**

Select **up to 3** attributes

- ☐ Vehicle price
- ☐ MPG/Fuel economy
- ☐ Acceleration
- ☐ Maintenance cost
- ☐ Fuel Cost
- ☐ Range
- ☐ Towing capacity
- ☐ Cargo capacity
- ☐ Seating capacity
- ☐ Reliability
- ☐ Fuel availability
- ☐ Refueling Time
- ☐ Horse Power
- ☐ Warranty
- ☐ Brand/Vehicle Make

90. *[future gas]* **The current price of a gallon of regular gasoline in the State of California is about $2.80. How much do you think gas will cost, per gallon, in 5 years?**

Expected price per gallon in dollars: _____ [allow 0.50-15.00]

Tradeoff Exercises

91. [*cbc intro*] **You're almost done! Thanks for hanging in there! This last section is the most important part of the study and will be used to help inform important decisions.**

For the next part of the survey, we have created sets of vehicle choices for you with each set including four vehicles. Please carefully review the features for each of the vehicles and select the ONE vehicle you would most likely buy or lease for your business. Please choose one vehicle from each set of options.

•

We understand that some of the combinations of features and fuel types may not currently exist. For these hypothetical vehicle options, please assume the combinations of features do exist and you could buy any of the vehicles presented to you.

•

Some features that you may find important are not listed here, such as warranty, safety, technology and entertainment features, etc. Please assume that these features are identical across the four vehicles and only focus on the features that are listed when making your decision.

•

We also understand that the vehicles offered may not completely suit your business needs. For the purpose of this study, please assume the four vehicles on each page are the only four available and you must buy one.

•

You will see that each feature has an information icon ⓘ next to it. If you put your cursor over the ⓘ you will see a definition. It is important that you take some time to read and consider the definitions of any unfamiliar terms before answering any questions.

End / Contact Information

92. *[open end]* **If you have any comments or suggestions about the content of the survey or the survey experience itself, please enter them in the box below:**

[text box]

- *Skip if Research Now*

93. *[contact name]* Thanks for participating in the survey! Before you finish, please enter an email address where we can send you a $20 electronic gift card from an online retailer of your choice. Your email address will only be used to send along your prize.
    - email: _____ - *enforce a valid email address*
    -
    - No thanks – *send to [end]*

-
- *If entered a valid email*

94. *[prize]* Which online retailor would you like to have a $20 electronic gift card to spend at?

    You should receive your prize at the email address you provided in three to four weeks from 'California Energy Commission'

    1. Walmart
    2. Amazon.com

95. *[end]* **Thank you for participating! Your responses will help the California Energy Commission understand the future vehicle needs of California businesses and residents. If you have any questions about the survey, please email us at info@cavehiclesurvey.org.**

APPENDIX F: Web Interface Design

Residential Survey Screen Captures

Figure F-1: Language

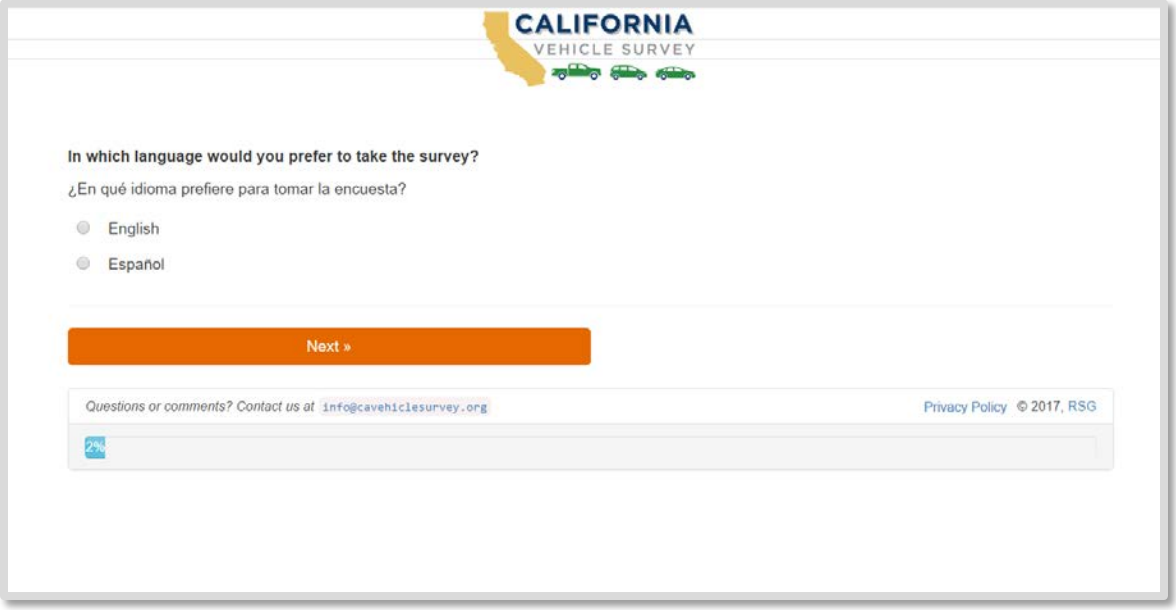


Figure F-2: English Introduction

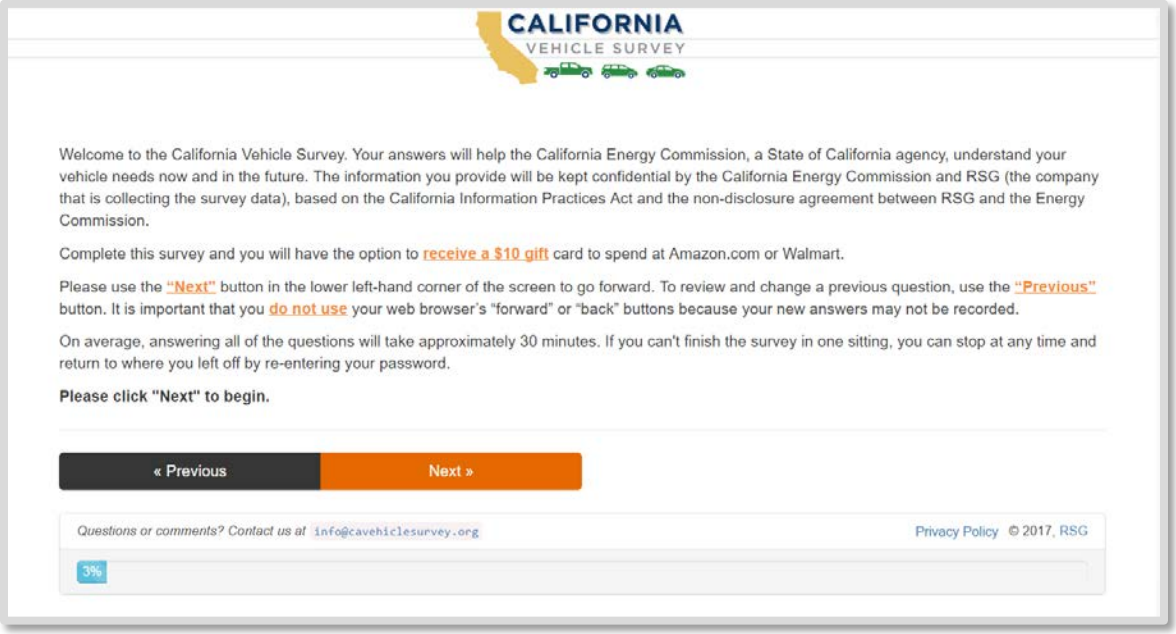


Figure 7: Spanish Introduction

Screener Questions & Basic Respondent Information

Figure F-4: Age

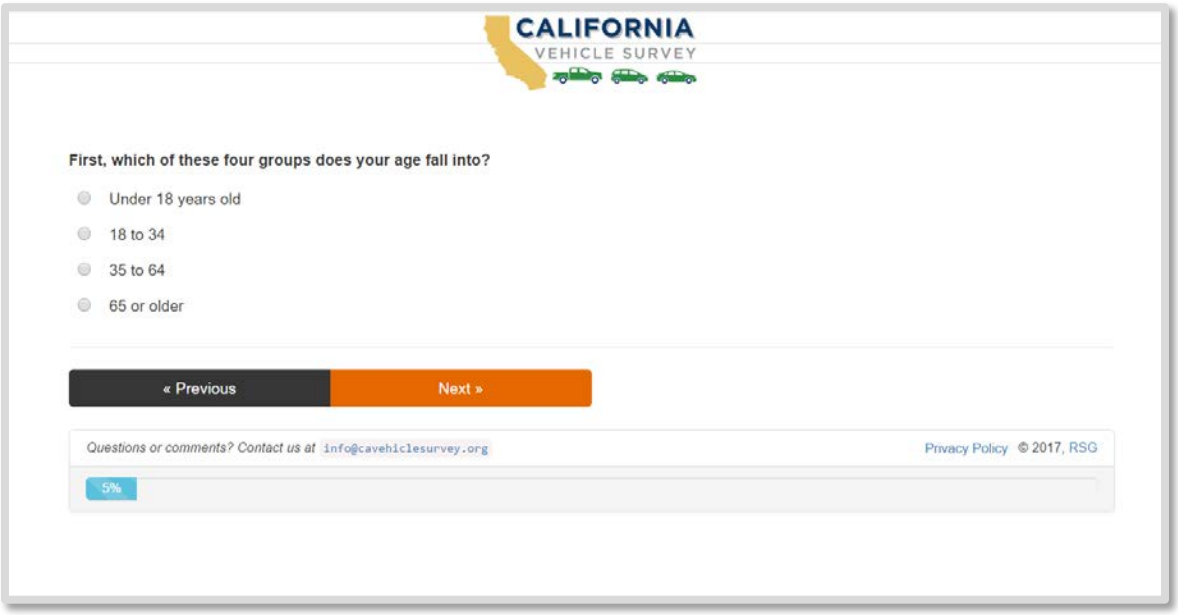


Figure 8: Termination

If respondent is under 18 years of age

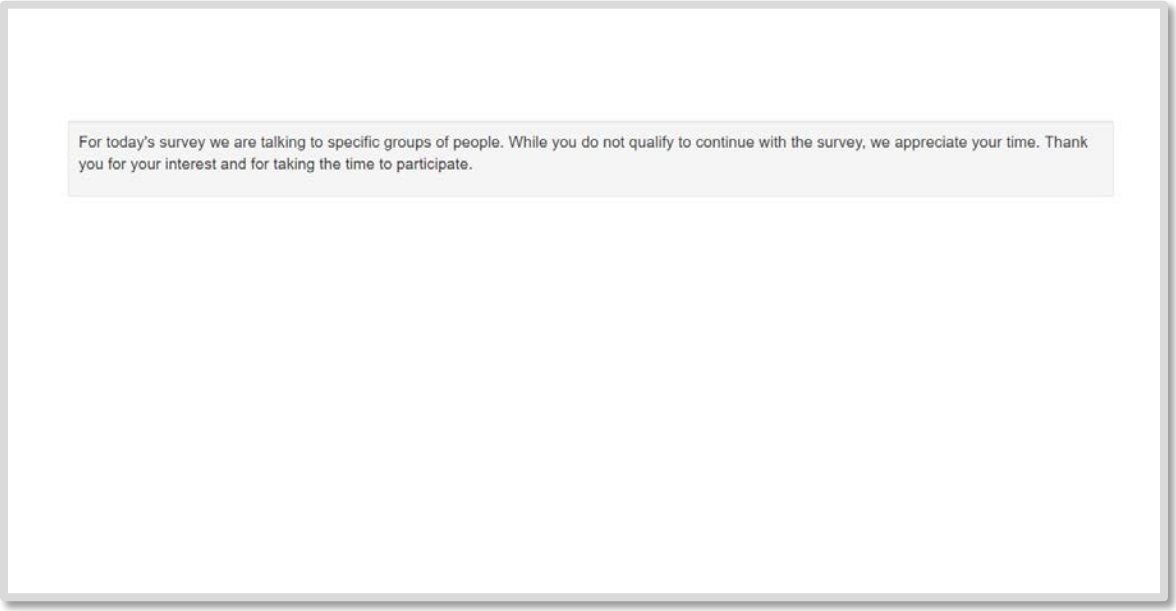


Figure F-6: State of Residence

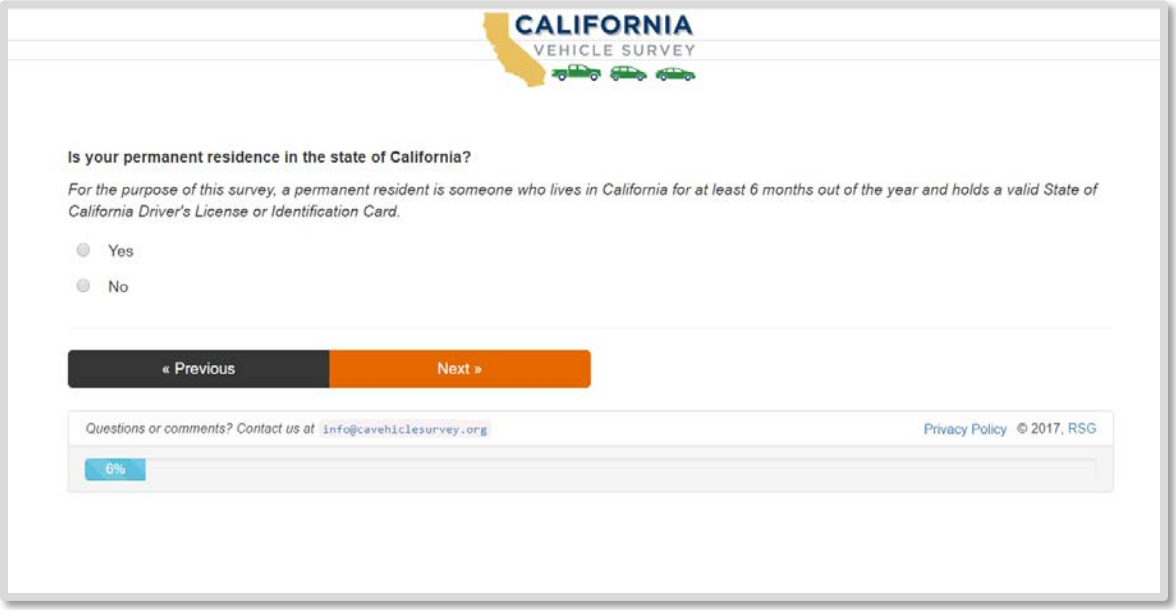


Figure F-7: County of Residence

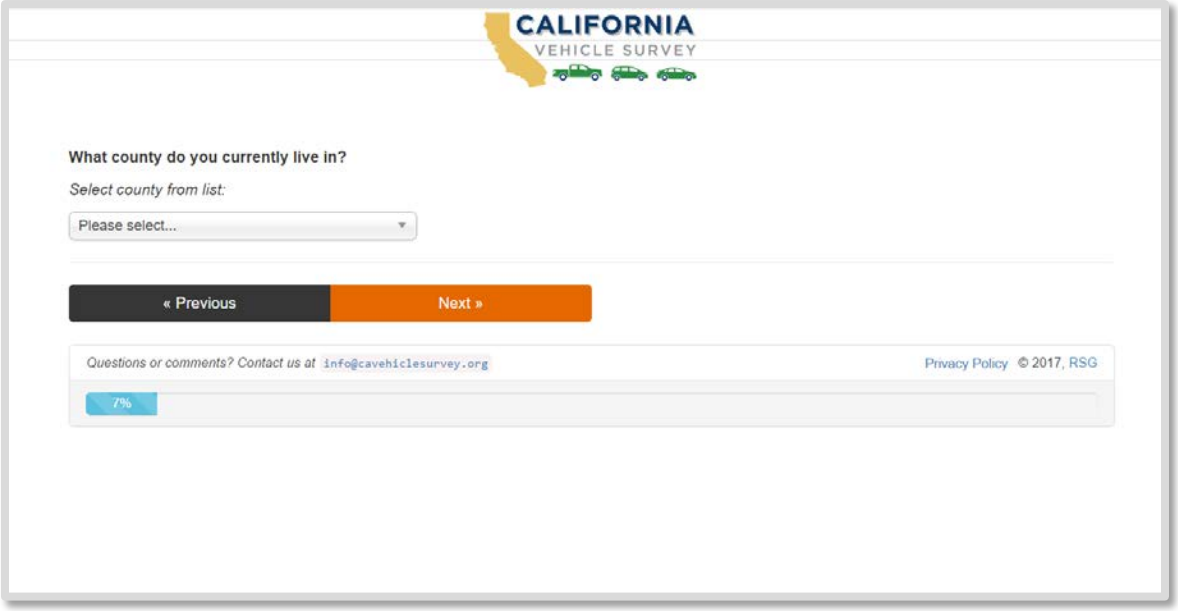


Figure F-8: Contact Information

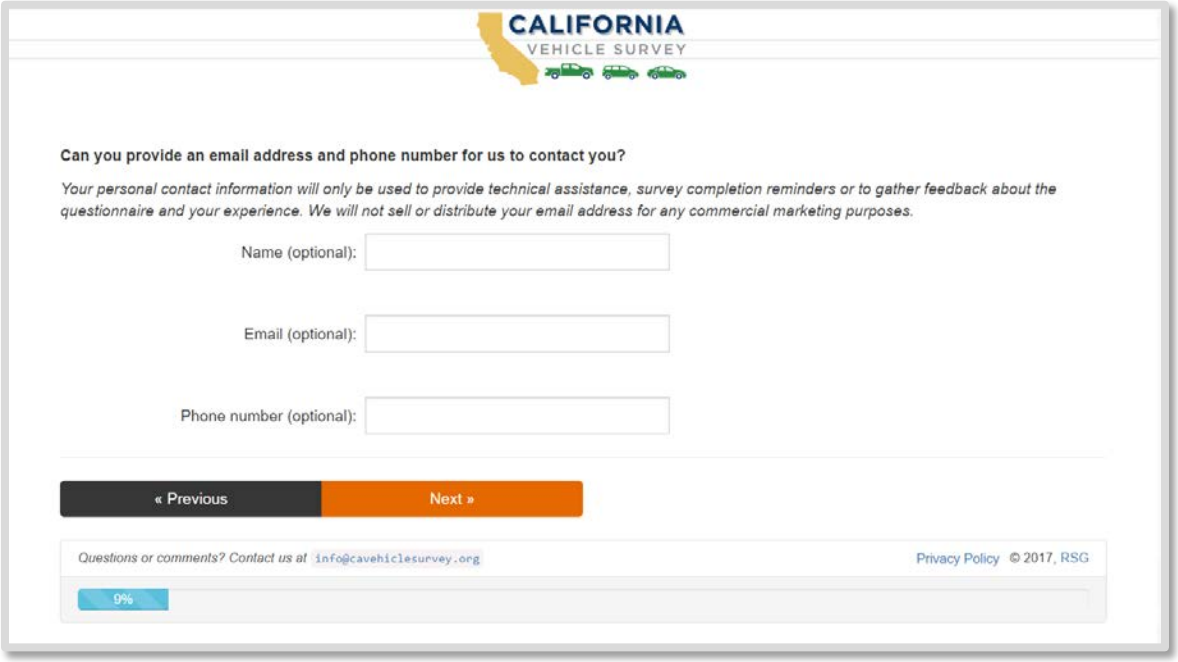


Figure F-9: Vehicle Purchase Involvement

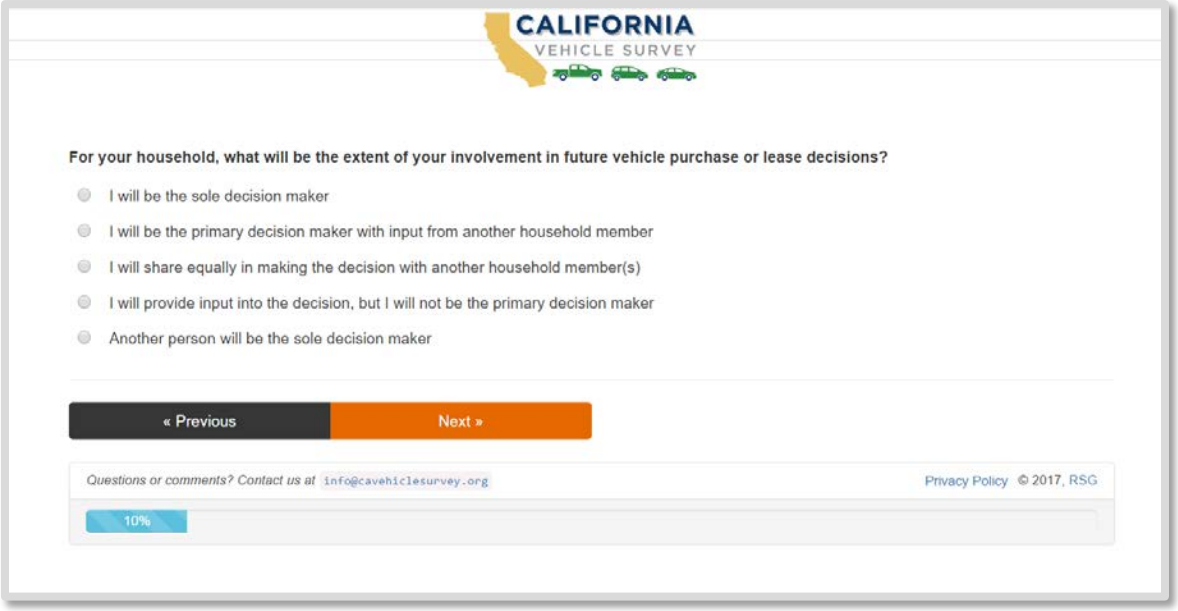


Figure F-10: Number of Vehicles in Household

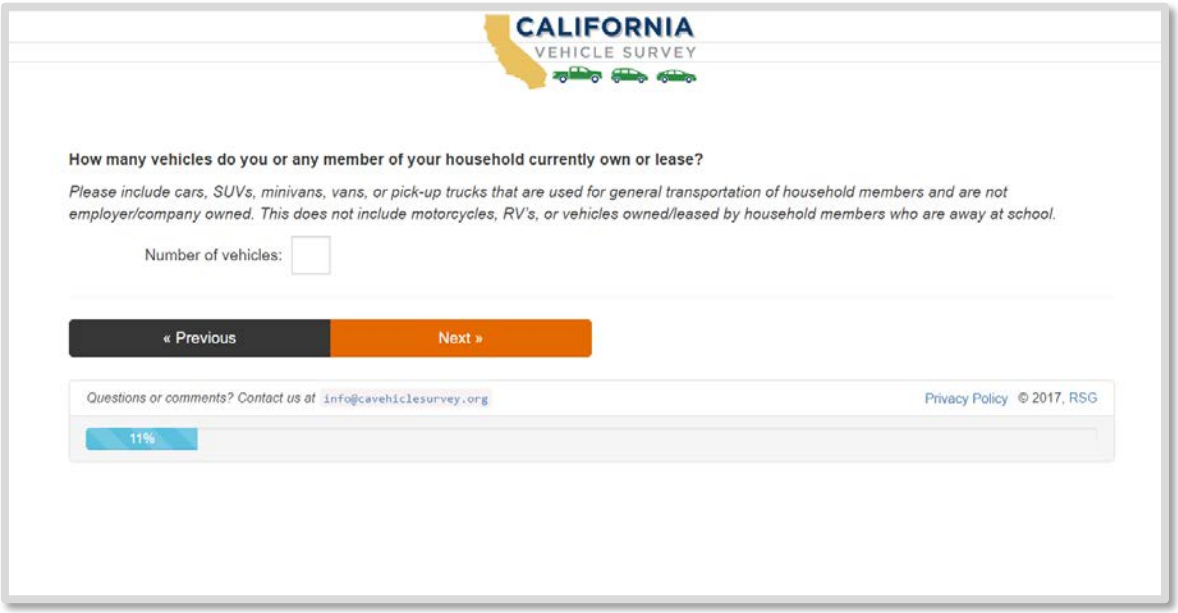


Figure F-11: Type of Residence

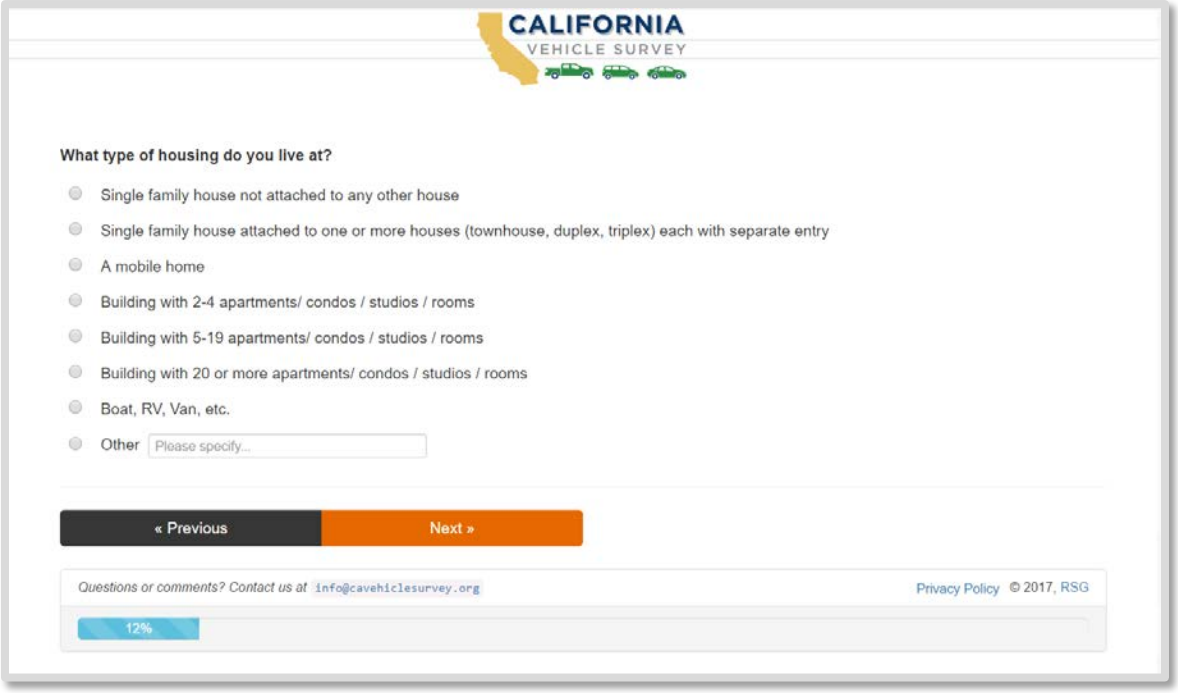


Figure F-12: Parking at Residence

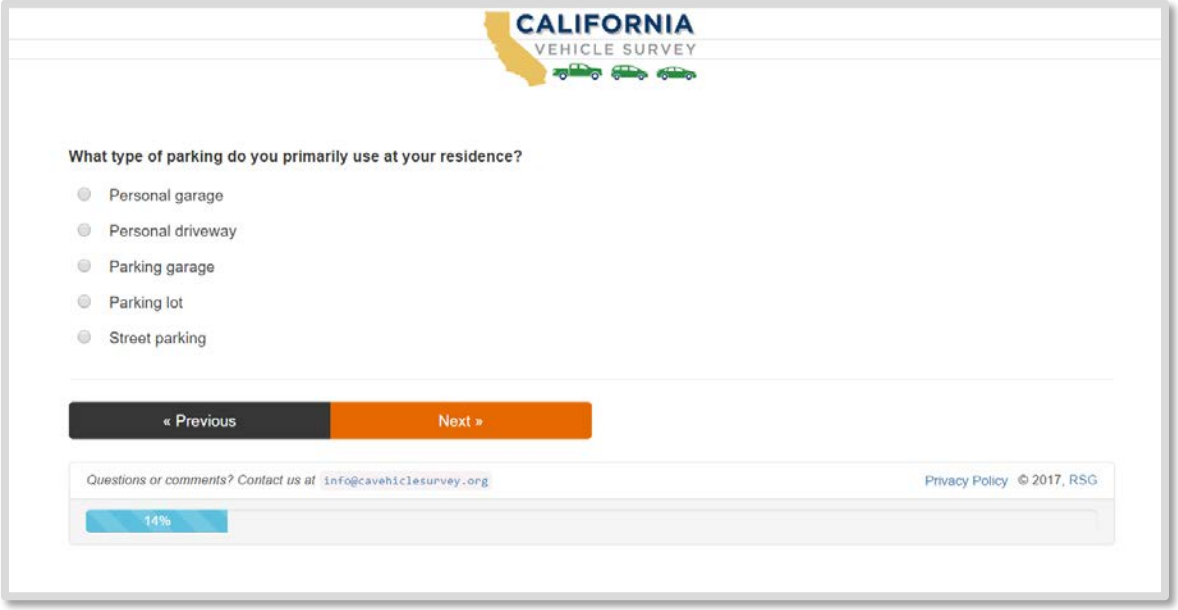


Figure F-13: Payment for Parking at Residence

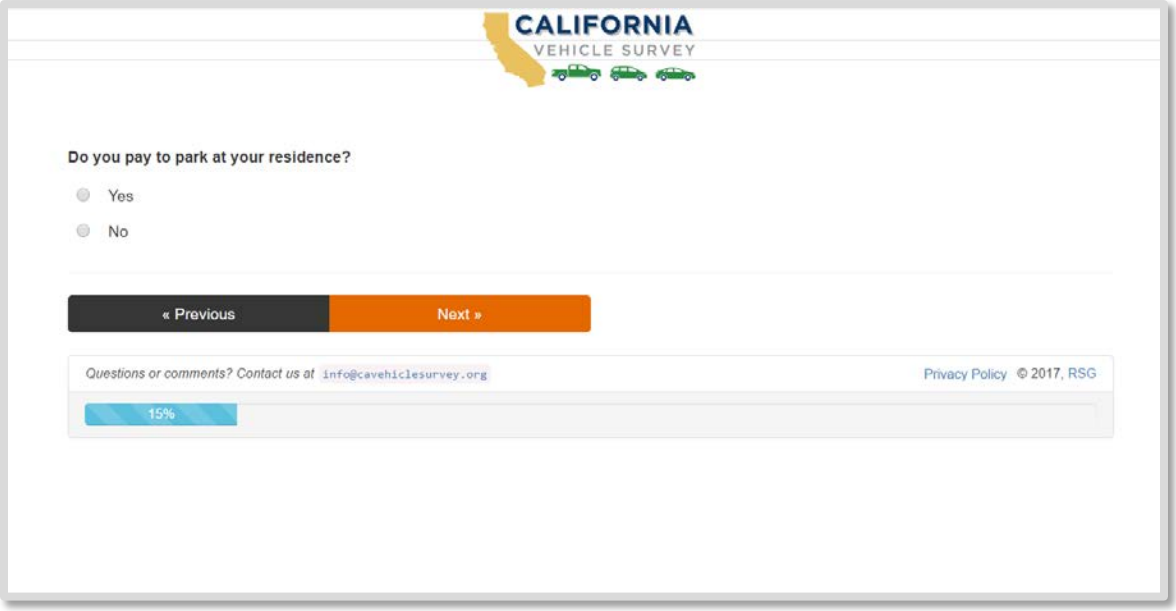


Figure F-14: Cost of Parking at Residence

If respondent pays to park at residence

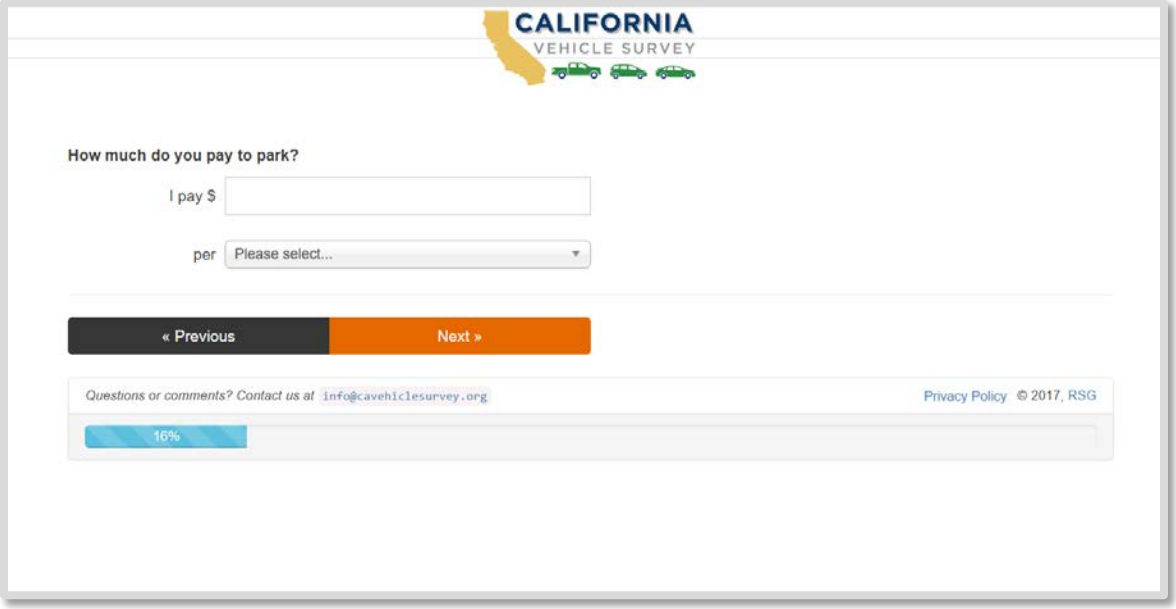


Figure F-15: Company Vehicle for Personal Use

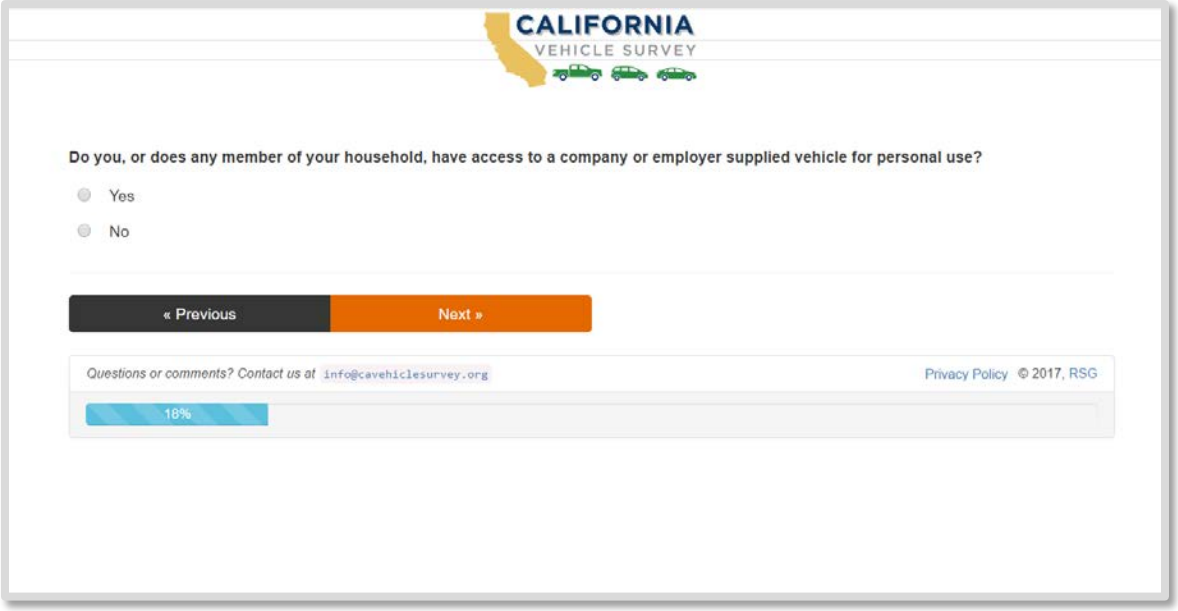


Figure F-16: Vehicles Purchased or Leased in Last 10 Years

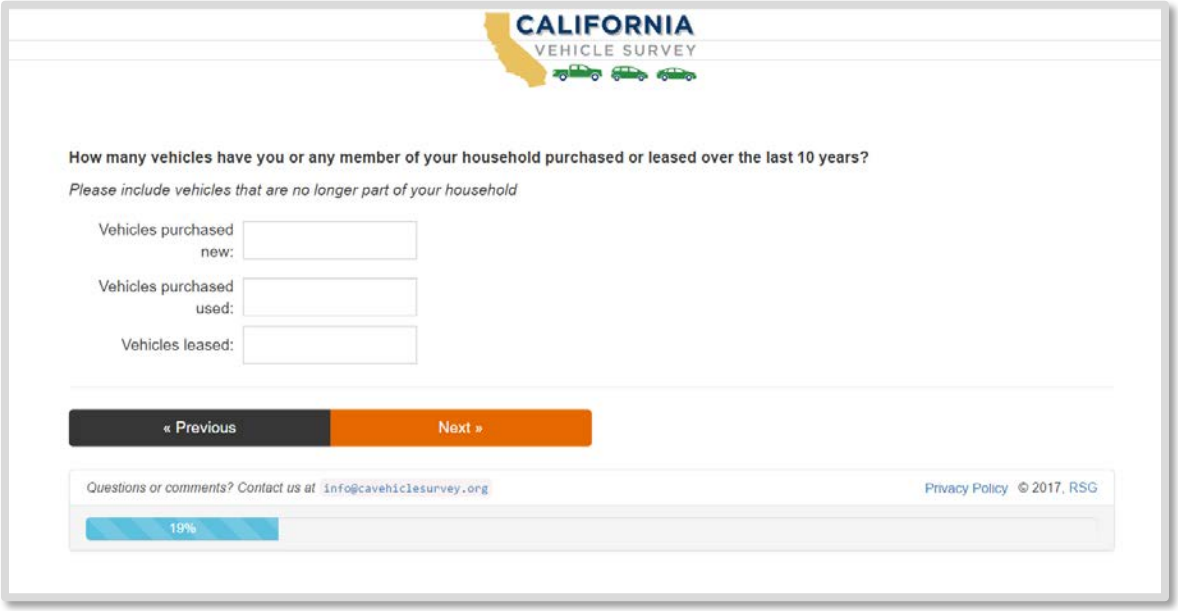


Figure F-17: Anticipated Timeframe of Next Purchase or Lease

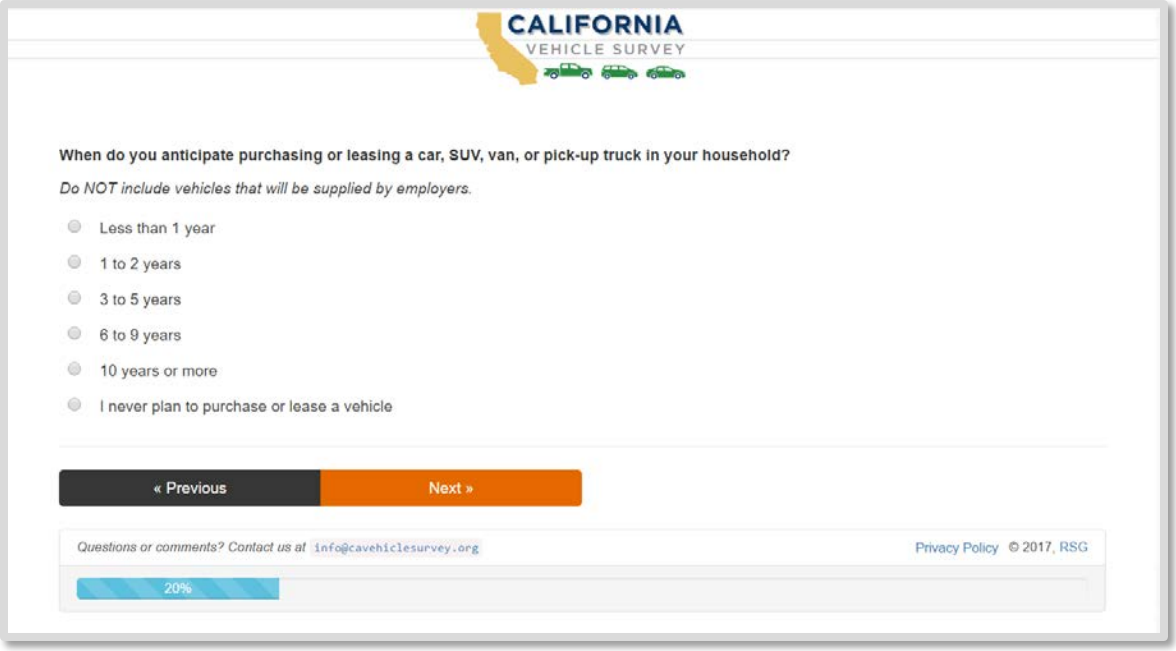
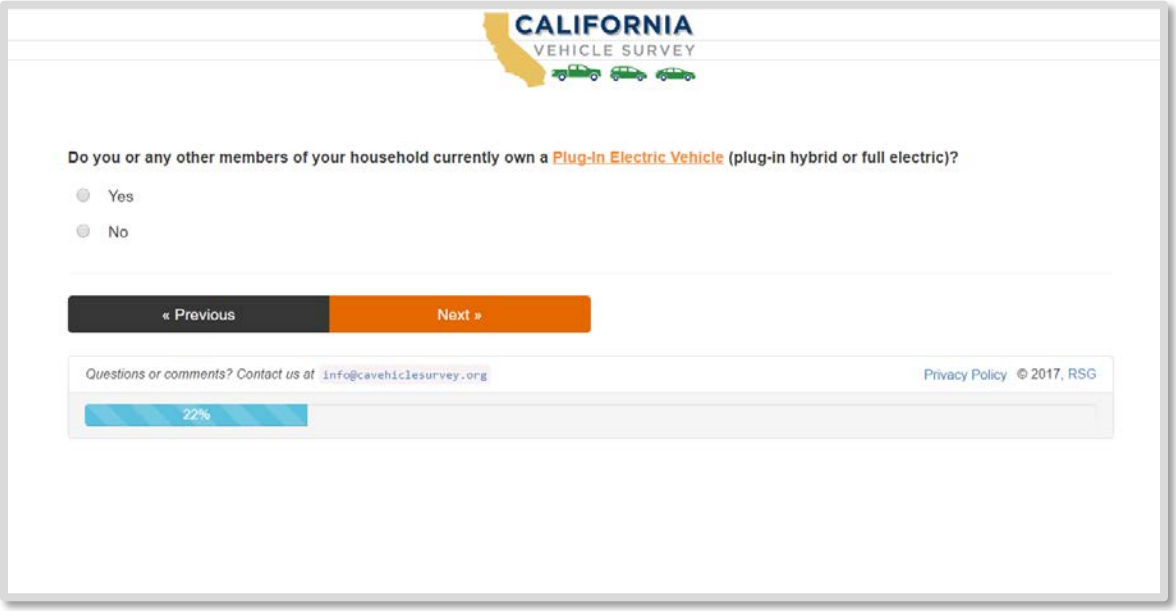


Figure F-18: Plug-in Electric Vehicle Ownership



Household & Personal Information

Figure F-19: Household Size

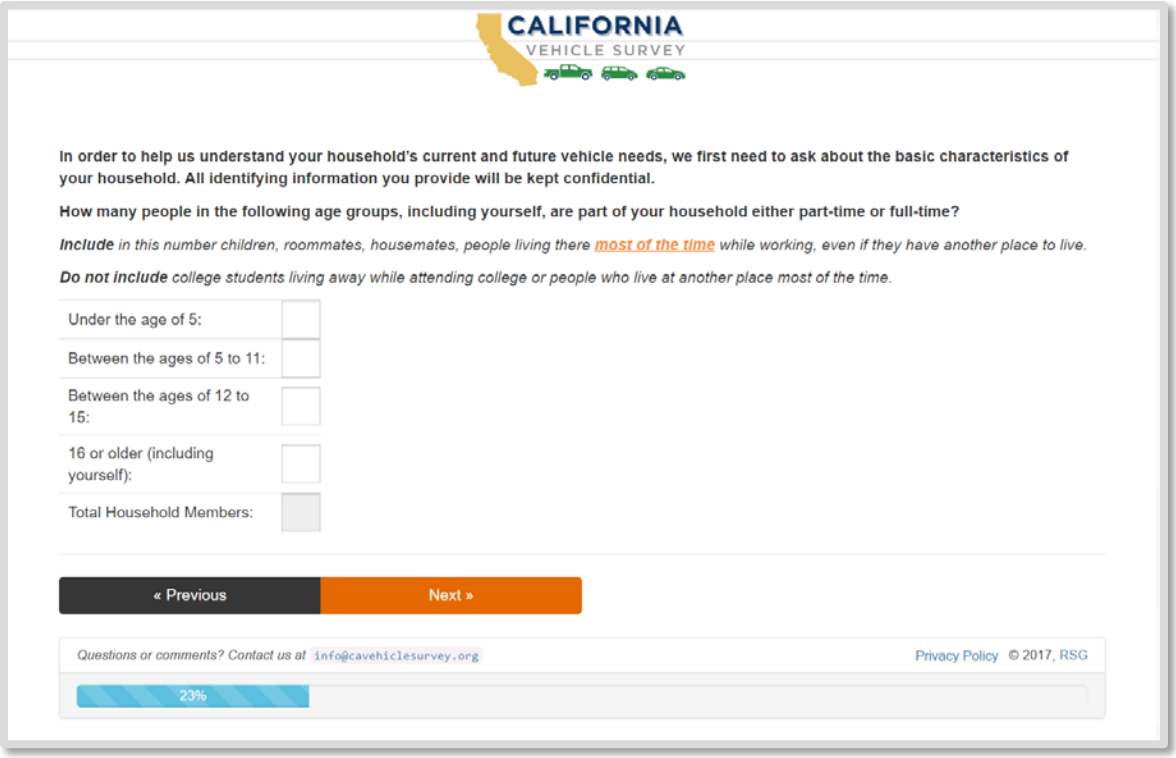


Figure F-20: Demographic Information – Self

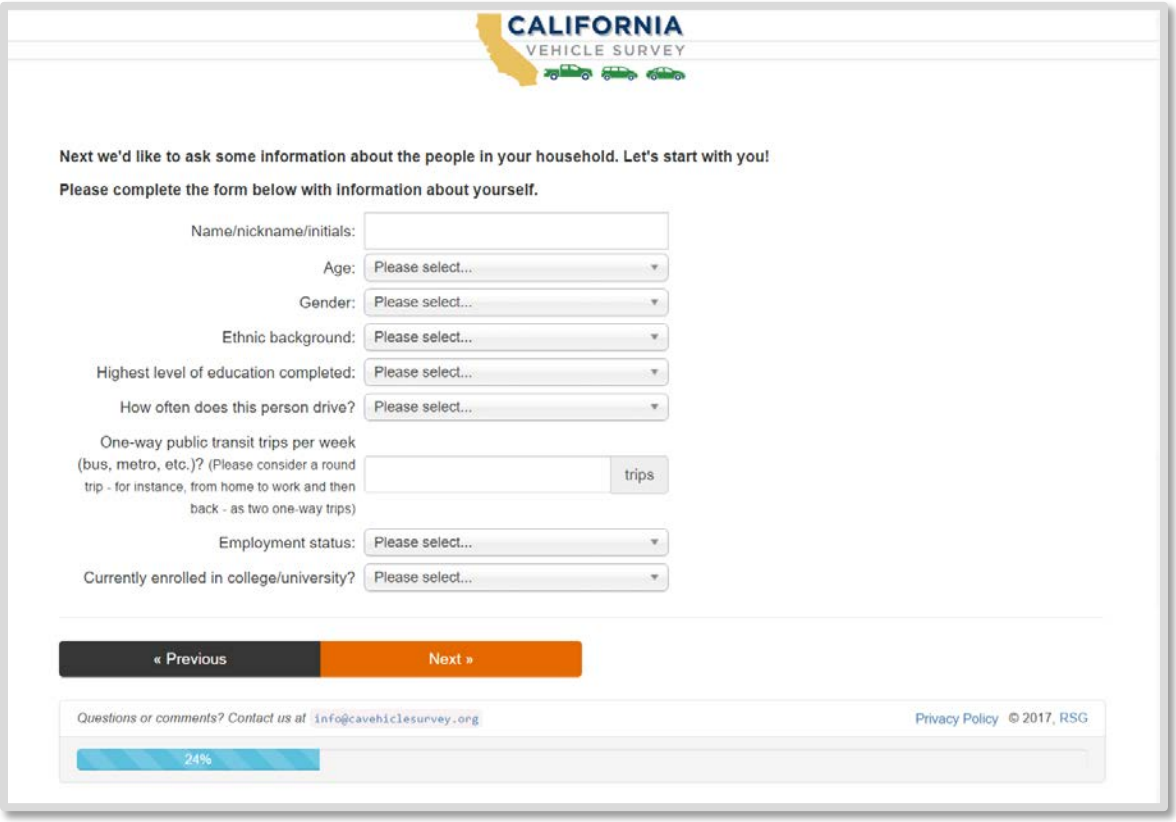
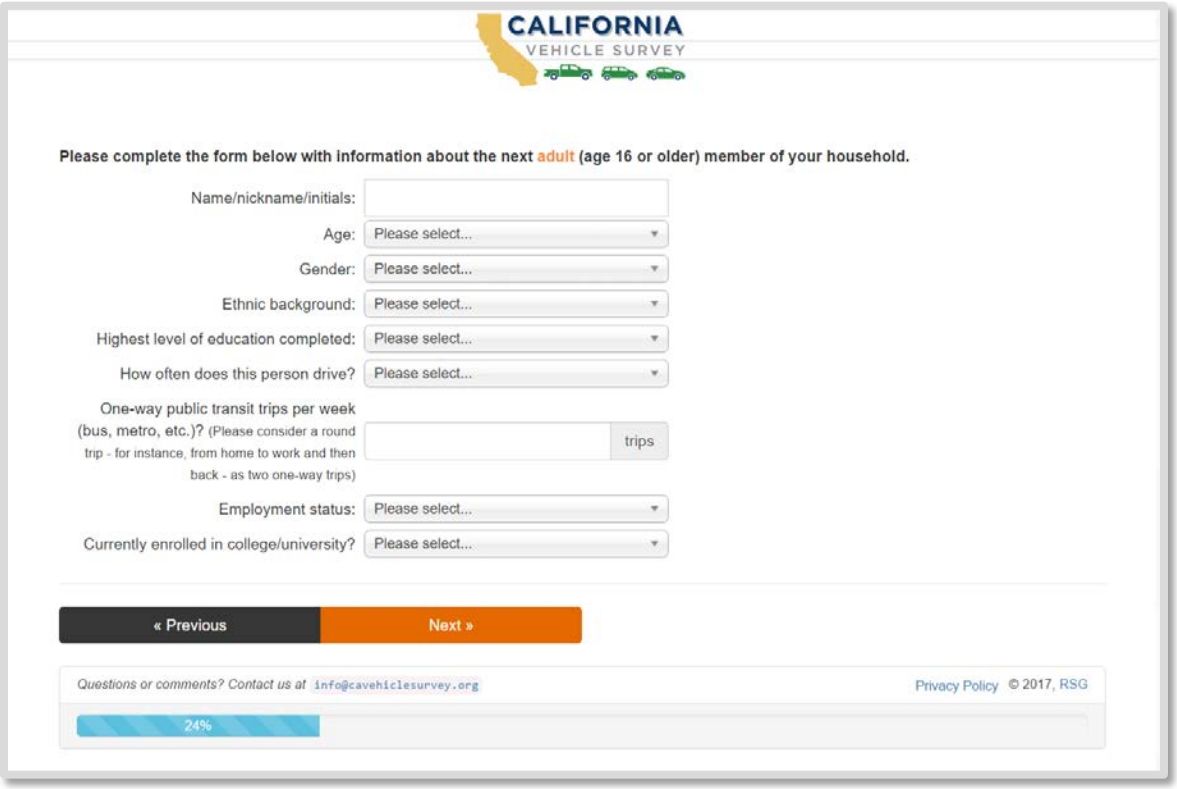


Figure F-21: Demographic Information – Others in Household



Current Vehicle Information

Figure F-22: Household Vehicle(s) – Basic Information

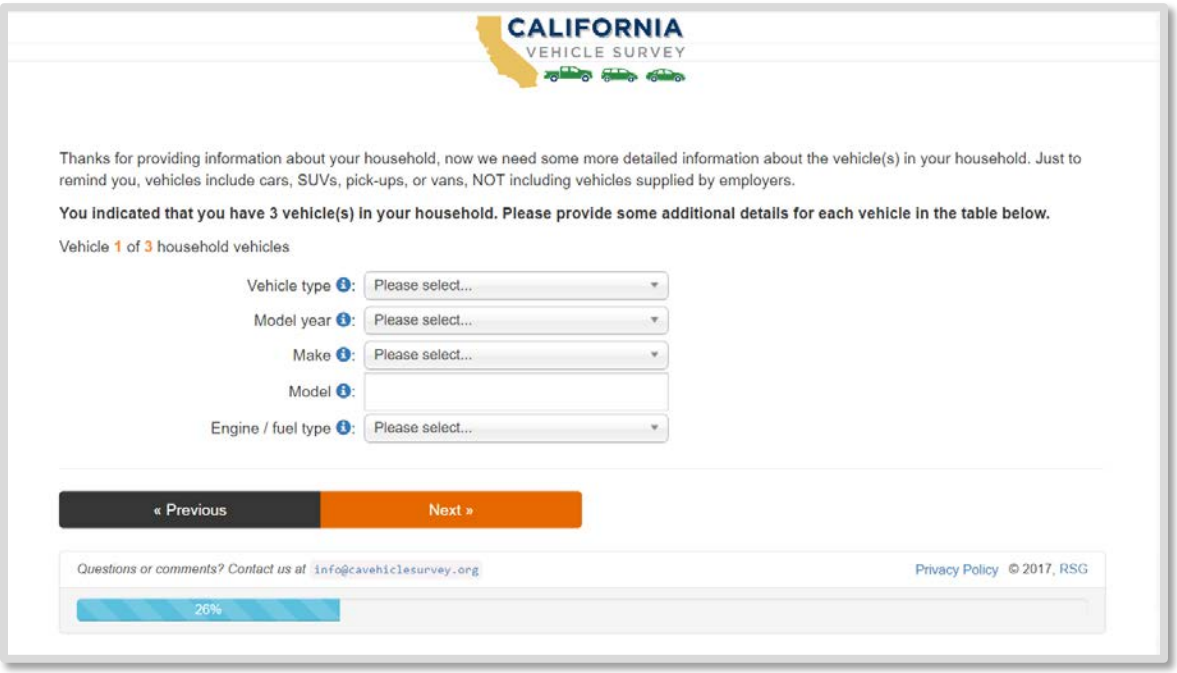
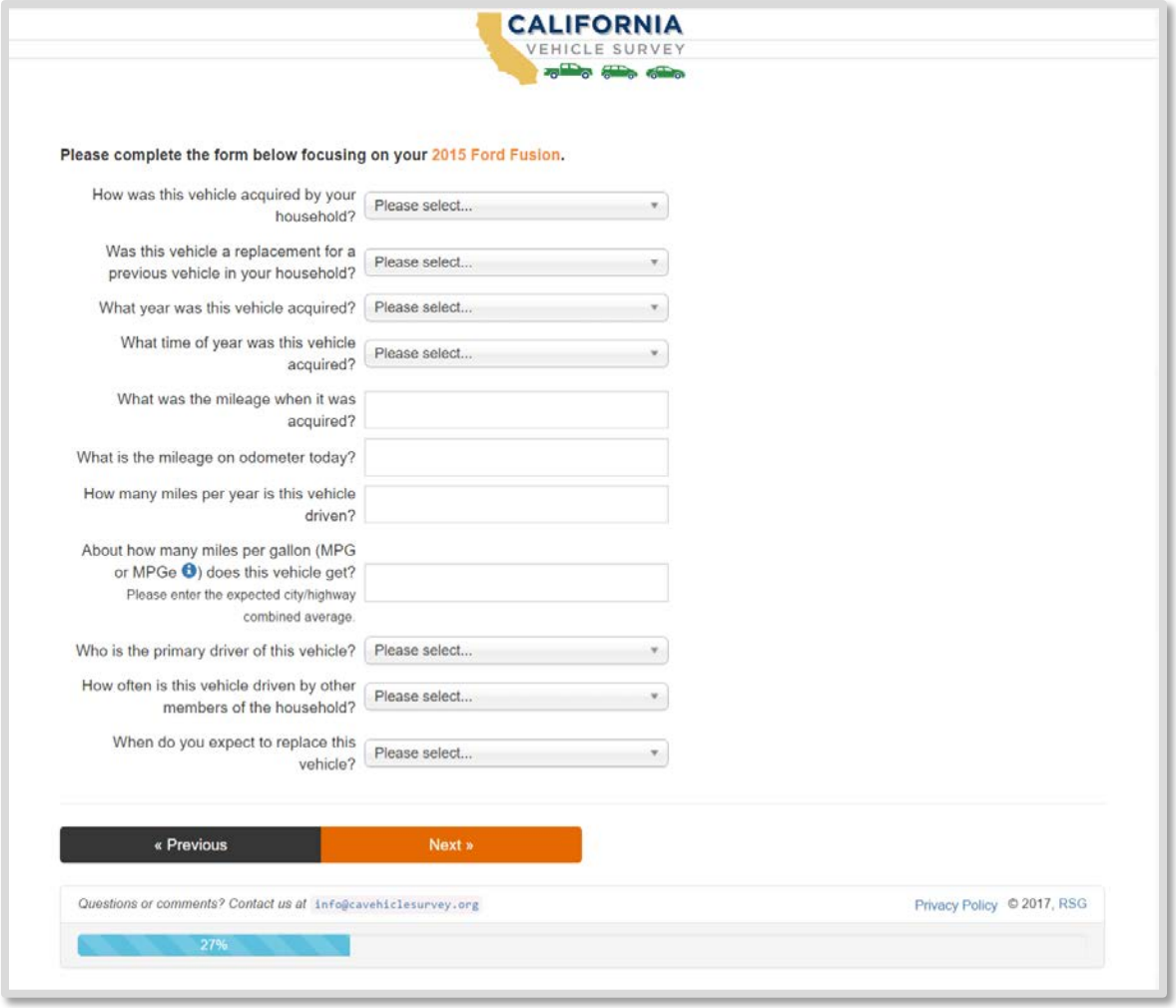


Figure F-23: Household Vehicle(s) – Acquisition and Use Information

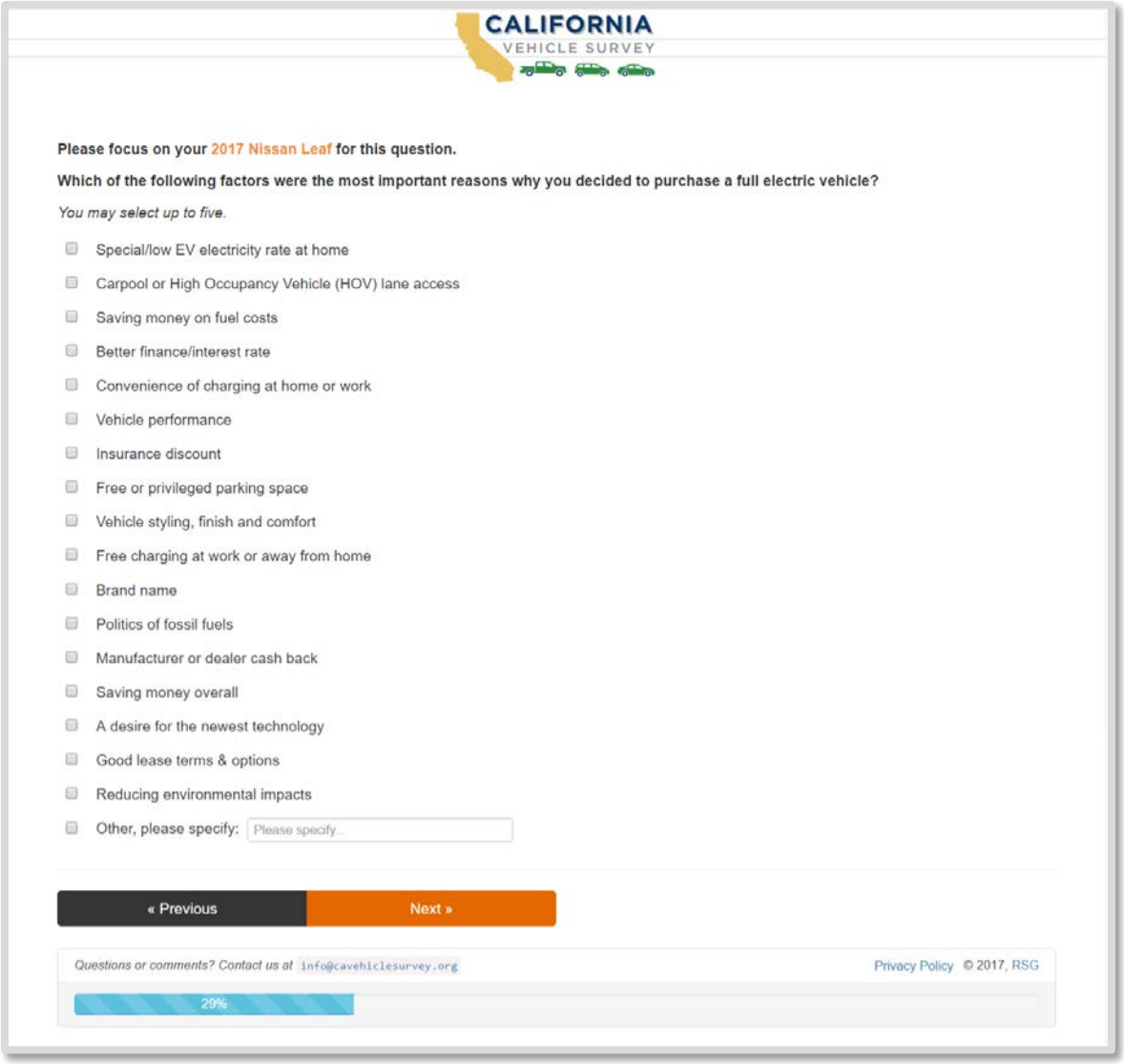


Plug-in Hybrid Electric Vehicle (PHEV) or Battery Electric Vehicle (BEV) Information

Questions in this section were only seen by respondents indicating ownership of a PHEV or BEV.

Figure F-24: Reasons for Purchasing a Full Electric Vehicle

If one or more household vehicles are full electric vehicles



CALIFORNIA
VEHICLE SURVEY

Please focus on your 2017 Nissan Leaf for this question.

Which of the following factors were the most important reasons why you decided to purchase a full electric vehicle?

You may select up to five.

- [ ] Special/low EV electricity rate at home
- [ ] Carpool or High Occupancy Vehicle (HOV) lane access
- [ ] Saving money on fuel costs
- [ ] Better finance/interest rate
- [ ] Convenience of charging at home or work
- [ ] Vehicle performance
- [ ] Insurance discount
- [ ] Free or privileged parking space
- [ ] Vehicle styling, finish and comfort
- [ ] Free charging at work or away from home
- [ ] Brand name
- [ ] Politics of fossil fuels
- [ ] Manufacturer or dealer cash back
- [ ] Saving money overall
- [ ] A desire for the newest technology
- [ ] Good lease terms & options
- [ ] Reducing environmental impacts
- [ ] Other, please specify: Please specify...

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29%

Figure F-25: Reasons for Purchasing a Plug-in Hybrid Vehicle

If one or more household vehicles are plug-in hybrid vehicles, but none are full electric vehicles

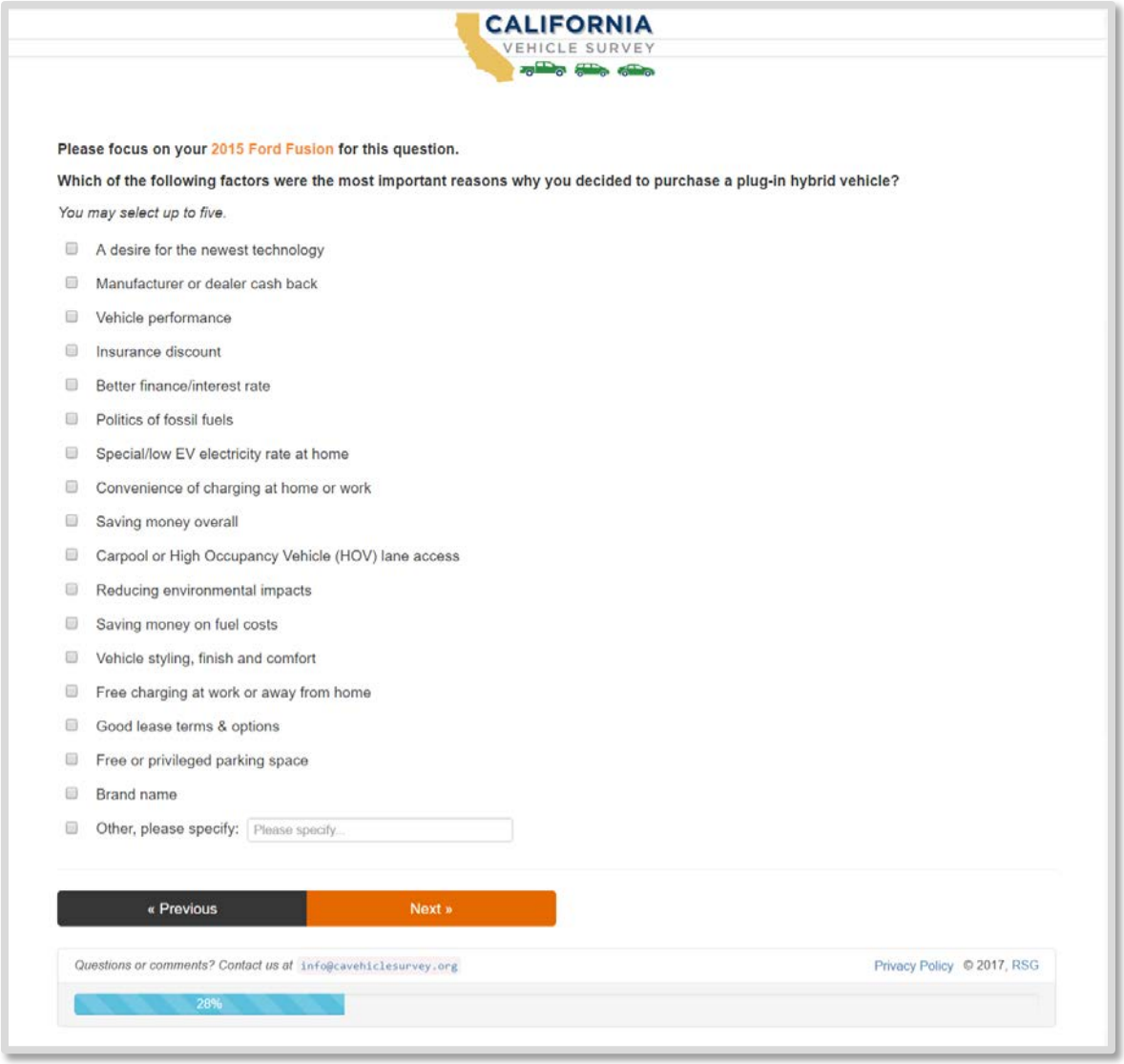

Figure F-26: Factors in Purchasing Electric Vehicle

CALIFORNIA VEHICLE SURVEY

Please focus on your 2017 Nissan Leaf for this question.

How important were each of the following factors in making it possible for you to buy or lease your electric vehicle?

	Extremely important	Very important	Moderately important	Slightly important	Not at all important	Not applicable
Availability of carshare/car rental as part of purchase						
Parking incentives (employer, business, or government)						
Federal tax incentives (up to $7,500)						
HOV lane access						
Special electricity rates for charging						
Having free charging locations available						
California state vehicle rebate (up to $2,500)						
Manufacturer or dealer incentives (e.g. low interest rate, cash back)						
Attractive lease terms						

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31%

Figure F-27: Purchase of Home Charging Equipment

CALIFORNIA VEHICLE SURVEY

Please focus on your 2017 Nissan Leaf for this question.

Did you purchase home charging equipment and/or upgrade your current house to be able to charge your vehicle?

- Yes
- No

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32%

Figure F-28: Cost of Home Charging Equipment

If respondent has purchased home charging equipment

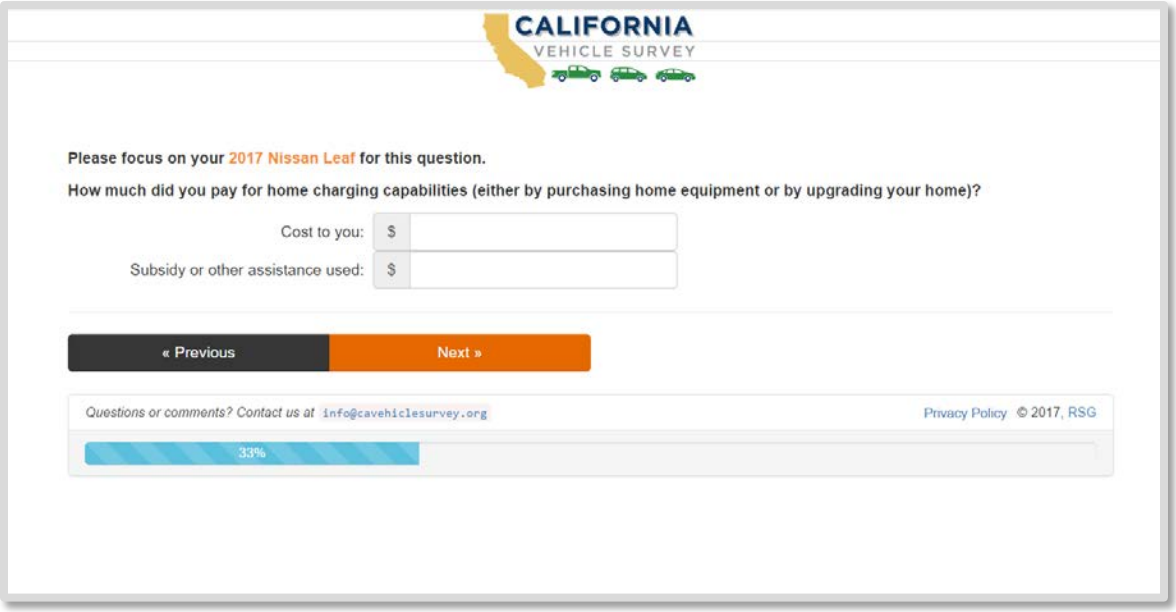


Figure F-29: Charging Technologies Used

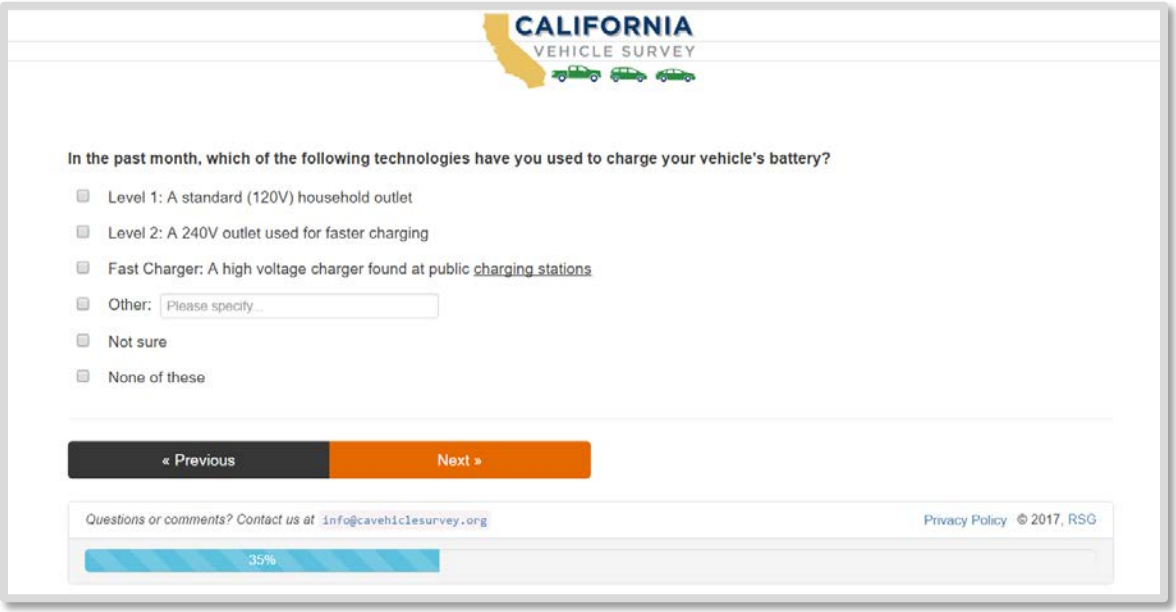


Figure F-30: Charging Frequency

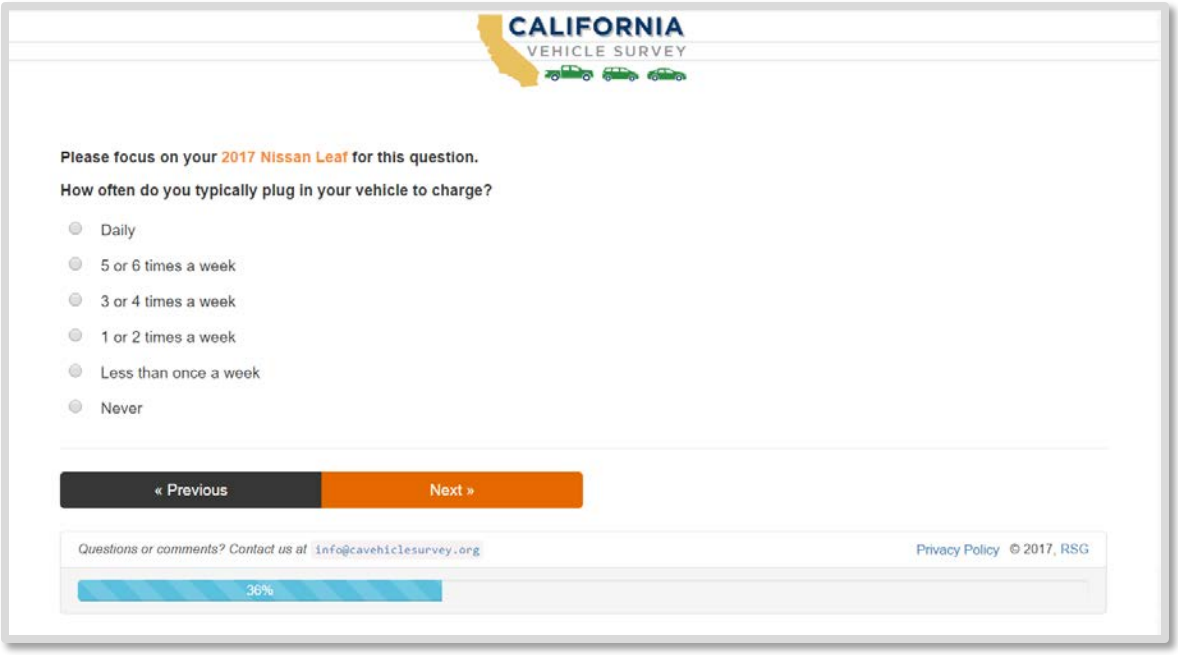


Figure F-31: Charging Locations and Times – Weekday Mornings

If vehicle is ever plugged in to charge

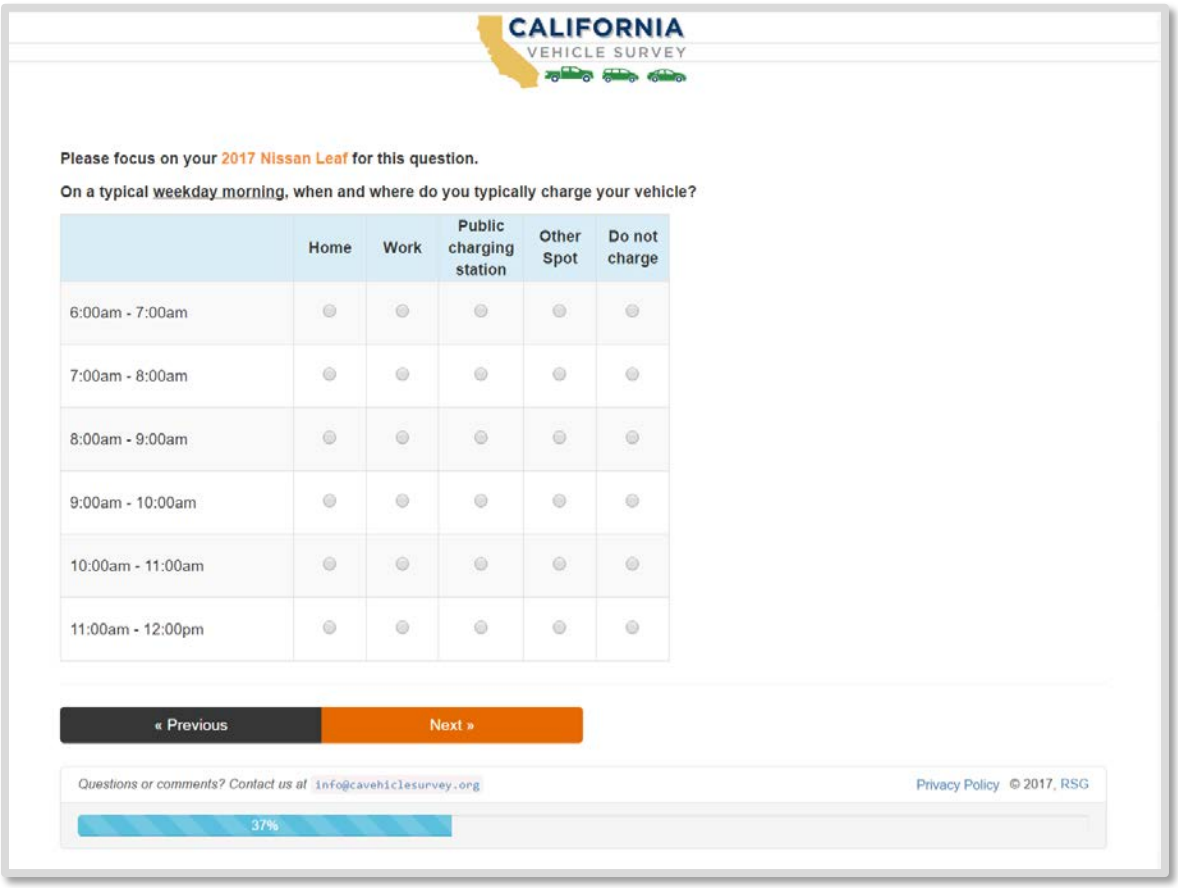
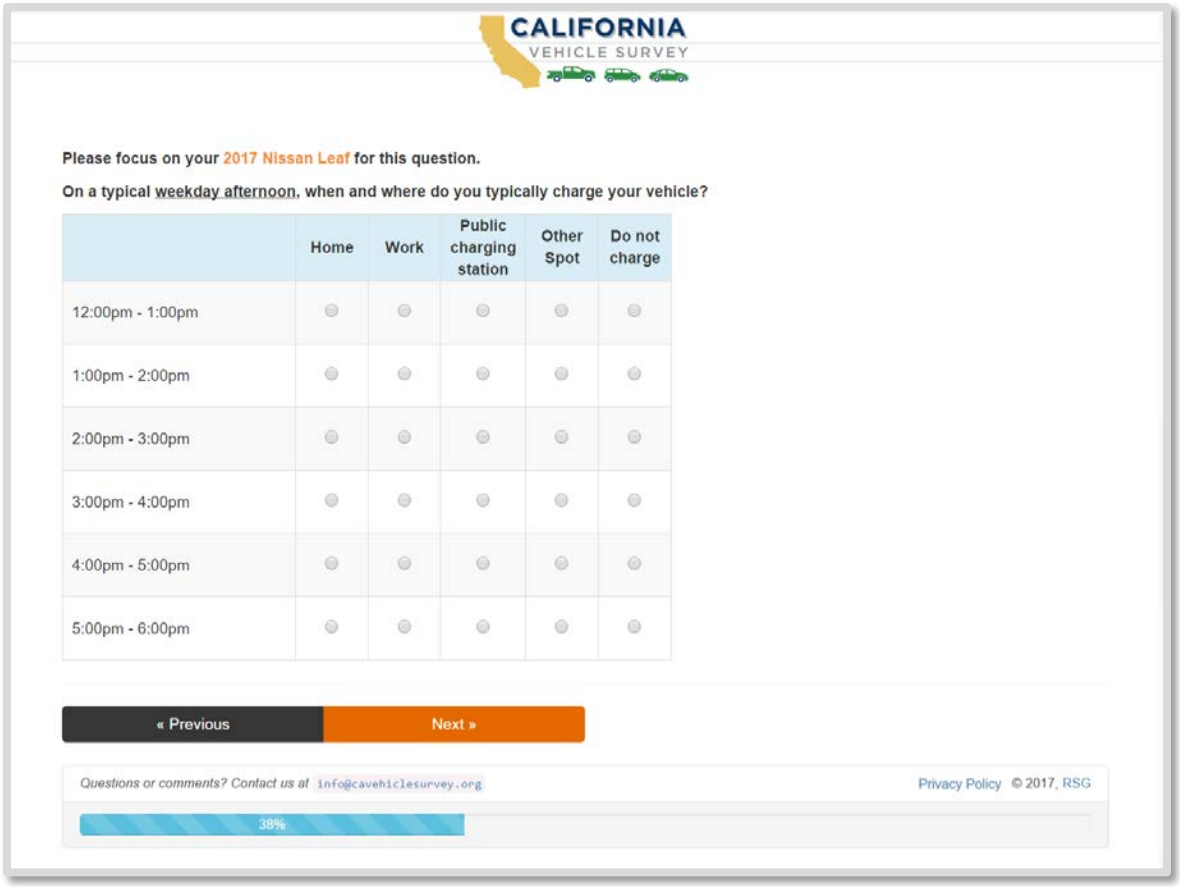


Figure F-32: Charging Locations and Times – Weekday Afternoons

If vehicle is ever plugged in to charge



CALIFORNIA VEHICLE SURVEY

Please focus on your 2017 Nissan Leaf for this question.

On a typical weekday afternoon, when and where do you typically charge your vehicle?

	Home	Work	Public charging station	Other Spot	Do not charge
12:00pm - 1:00pm					
1:00pm - 2:00pm					
2:00pm - 3:00pm					
3:00pm - 4:00pm					
4:00pm - 5:00pm					
5:00pm - 6:00pm					

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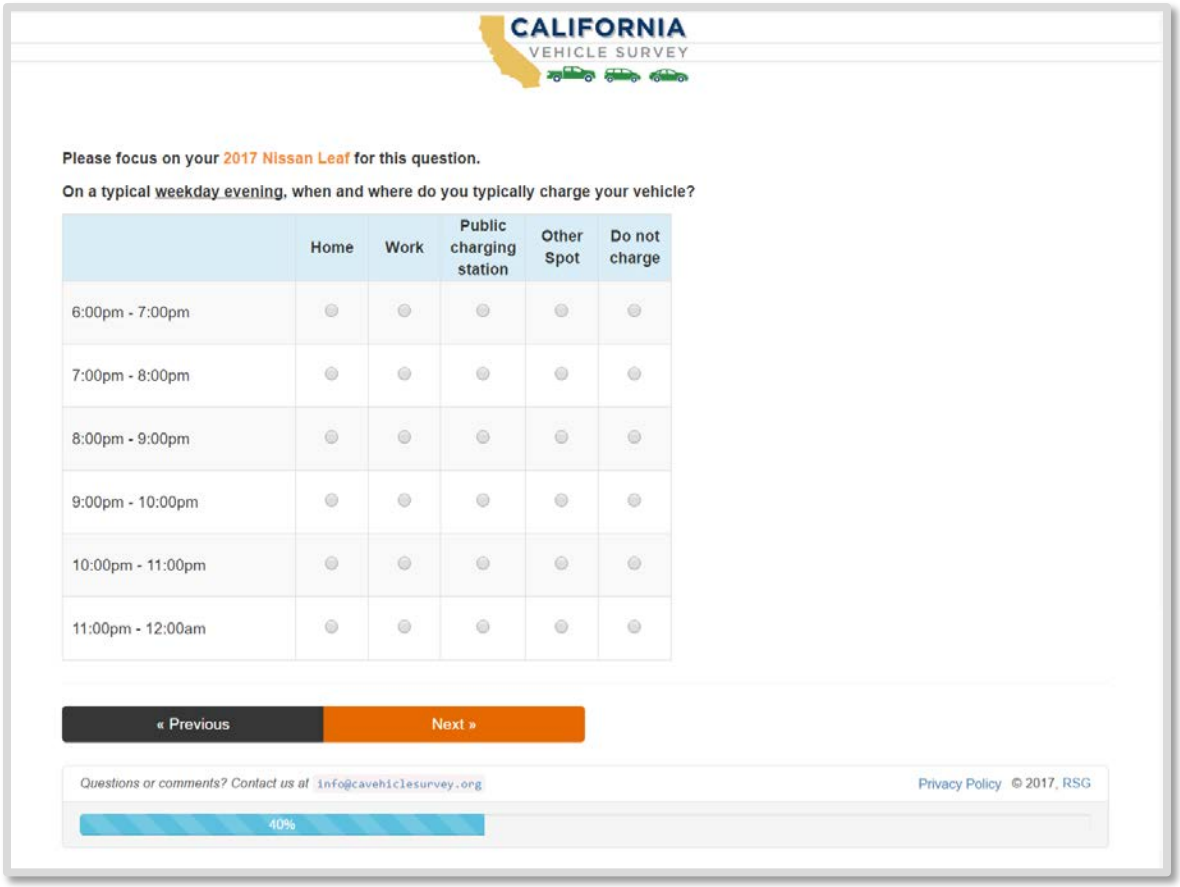
38%

Figure F-33: Charging Locations and Times – Weekday Evenings

If vehicle is ever plugged in to charge



CALIFORNIA VEHICLE SURVEY

Please focus on your 2017 Nissan Leaf for this question.

On a typical weekday evening, when and where do you typically charge your vehicle?

	Home	Work	Public charging station	Other Spot	Do not charge
6:00pm - 7:00pm					
7:00pm - 8:00pm					
8:00pm - 9:00pm					
9:00pm - 10:00pm					
10:00pm - 11:00pm					
11:00pm - 12:00am					

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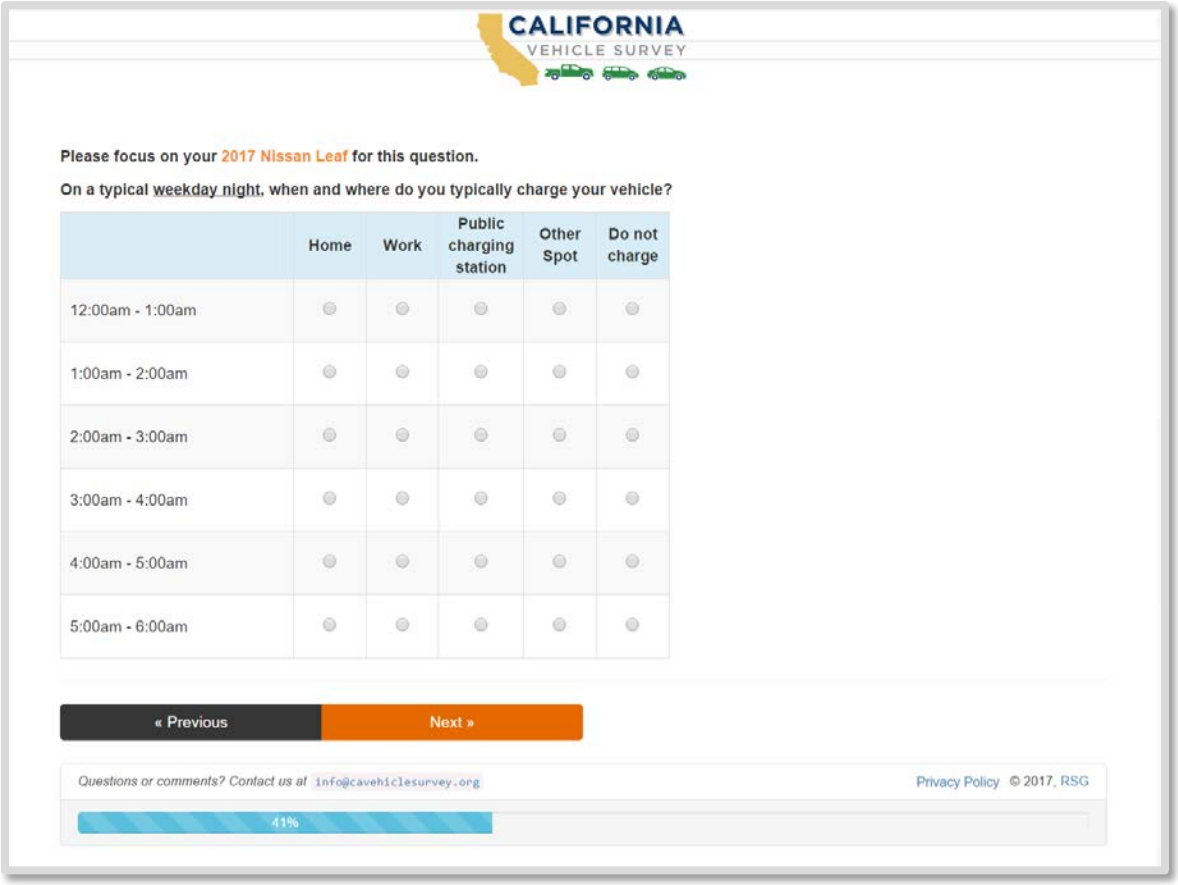
40%

Figure F-34: Charging Locations and Times – Weekday Nights

If vehicle is ever plugged in to charge



CALIFORNIA VEHICLE SURVEY

Please focus on your 2017 Nissan Leaf for this question.

On a typical weekday night, when and where do you typically charge your vehicle?

	Home	Work	Public charging station	Other Spot	Do not charge
12:00am - 1:00am					
1:00am - 2:00am					
2:00am - 3:00am					
3:00am - 4:00am					
4:00am - 5:00am					
5:00am - 6:00am					

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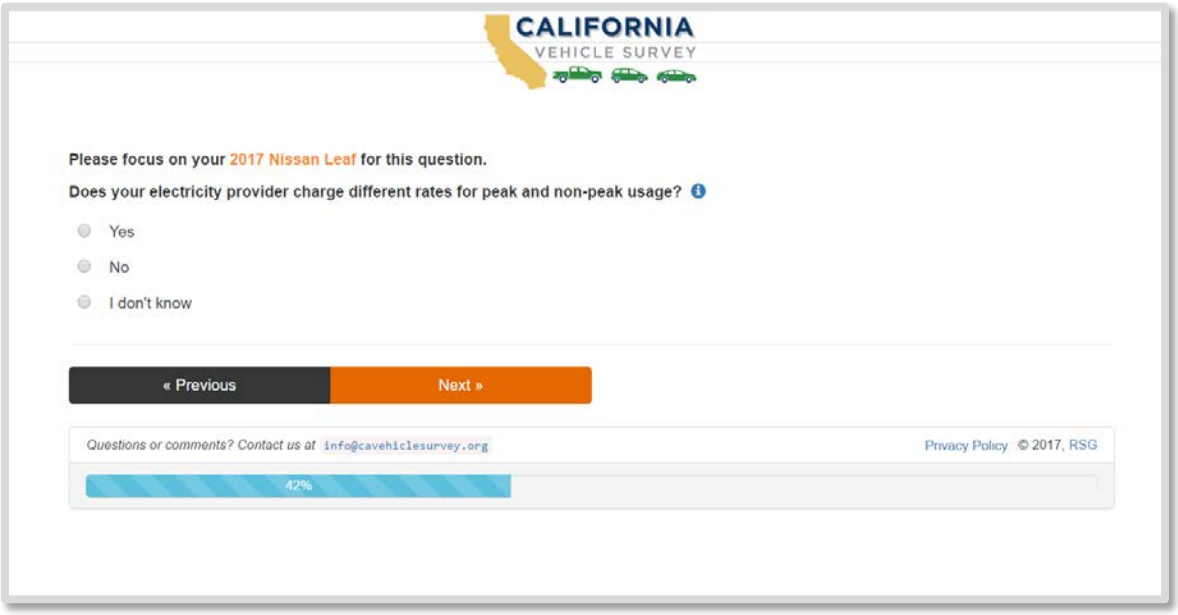
41%

Figure F-35: Peak vs. Off Peak Electricity Rates



CALIFORNIA VEHICLE SURVEY

Please focus on your 2017 Nissan Leaf for this question.

Does your electricity provider charge different rates for peak and non-peak usage?

- Yes
- No
- I don't know

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42%

Figure F-36: Separate Vehicle Electricity Meter

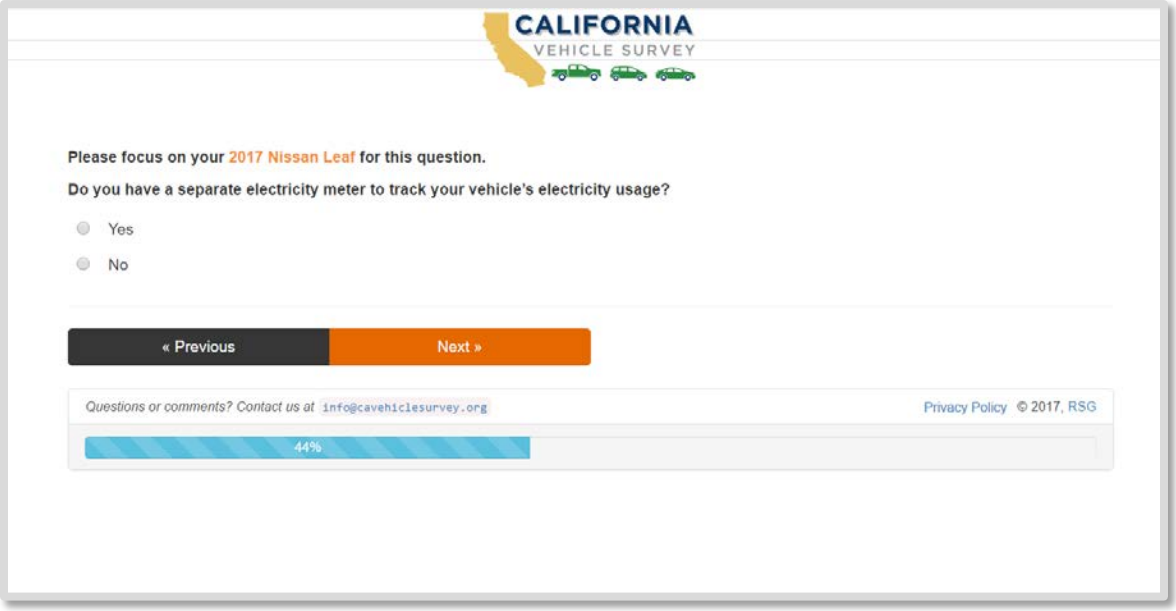


Figure F-37: Separate Vehicle Electricity Rate

If respondent has separate vehicle electricity meter

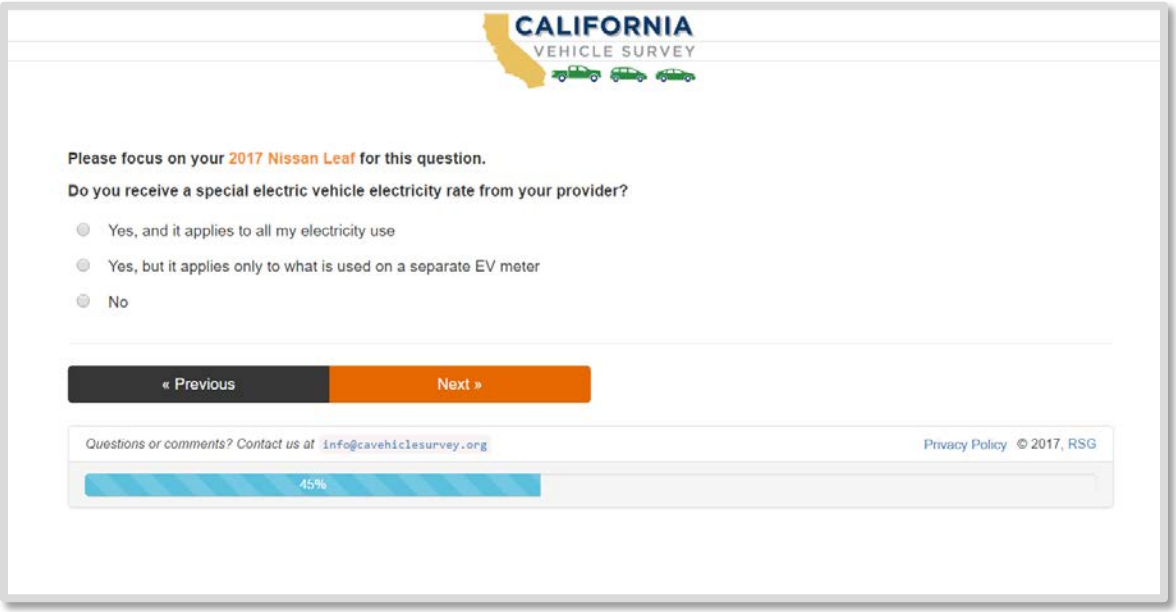


Figure F-38: Vehicle Charging Cost

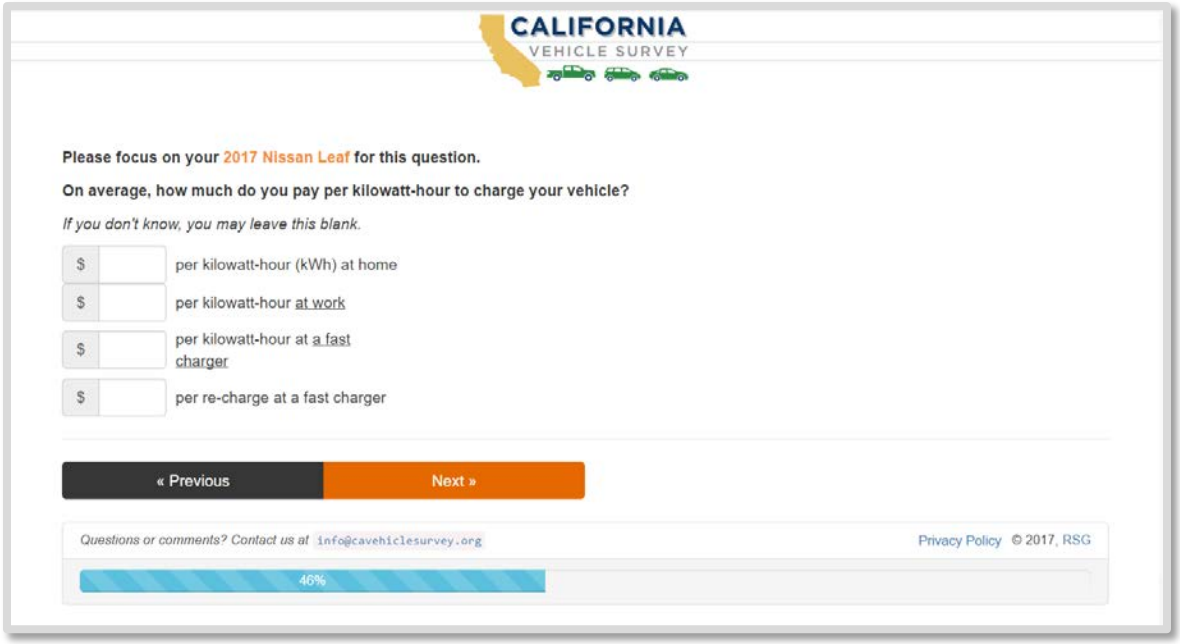


Figure F-39: Electric Range of Vehicle

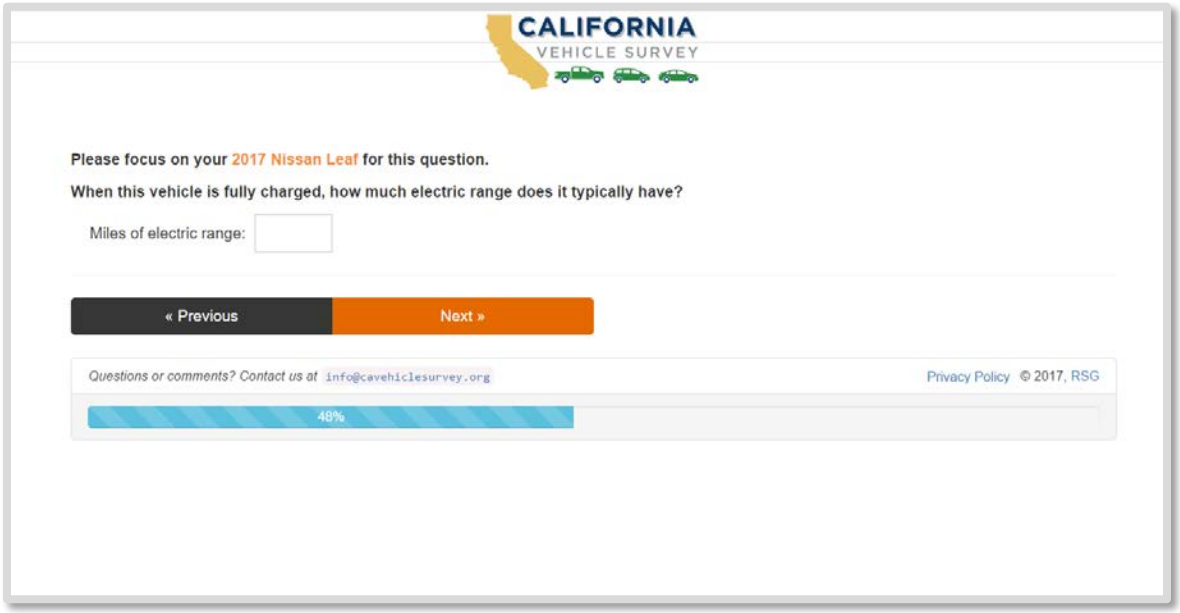
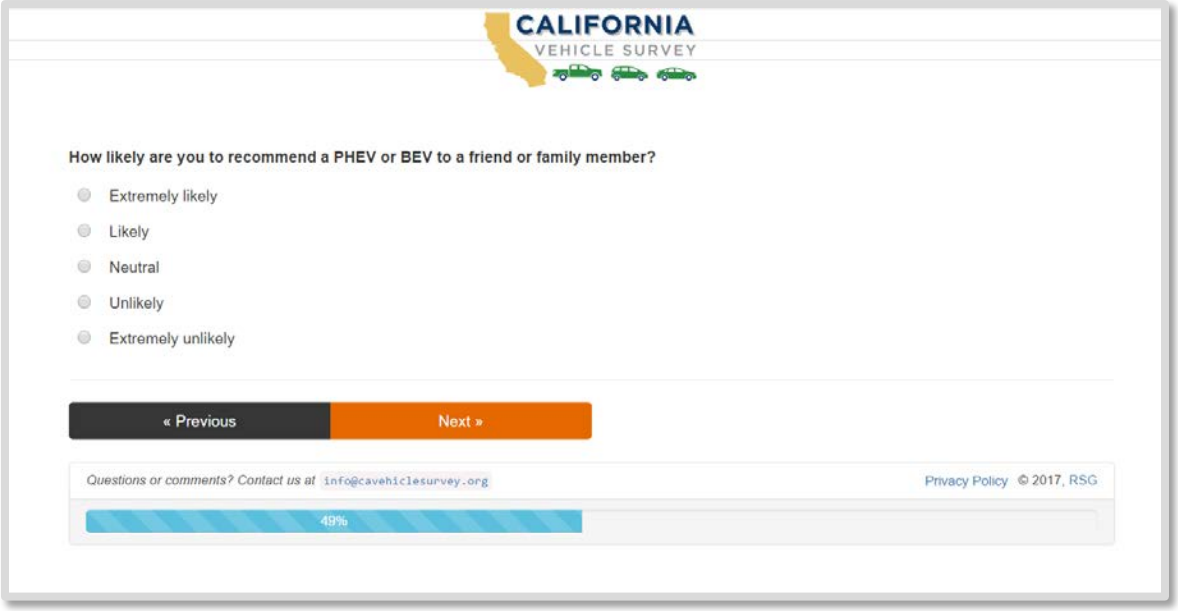


Figure F-40: Likelihood of Recommending Battery Electric or Plug-in Hybrid Electric Vehicle



New Vehicle Information

Figure F-41: Replacement vs. Additional Vehicle

If respondent previously indicated no plans to replace current vehicle(s), but intends to purchase new vehicle in next 10 years

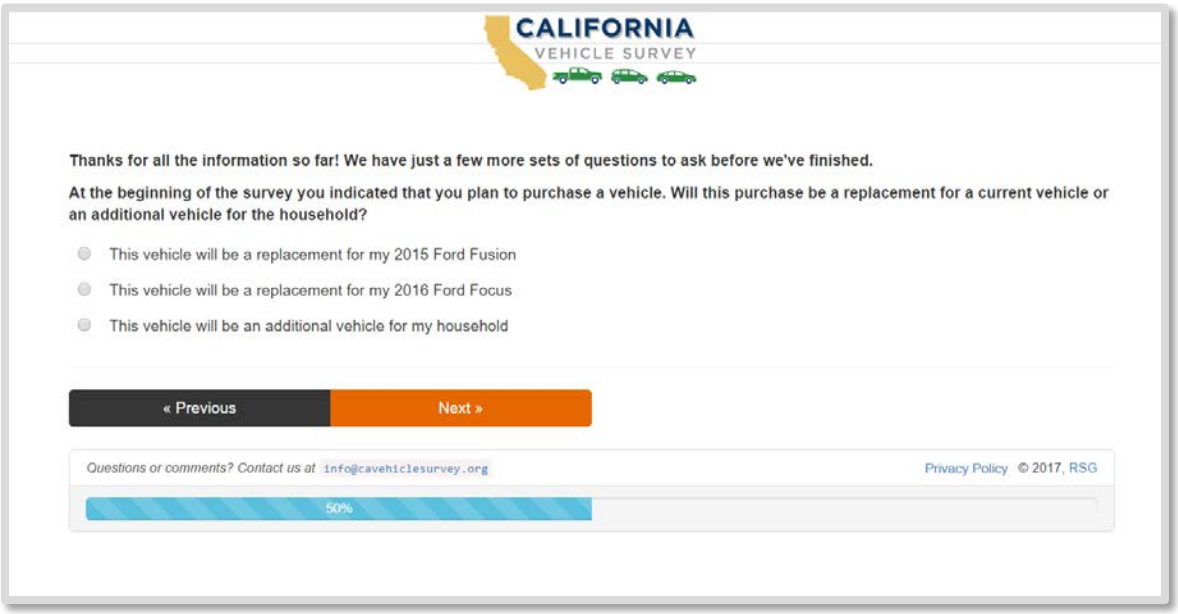


Figure F-42: Replacement Vehicle – Basic Information

If respondent indicated that next vehicle will replace a current vehicle

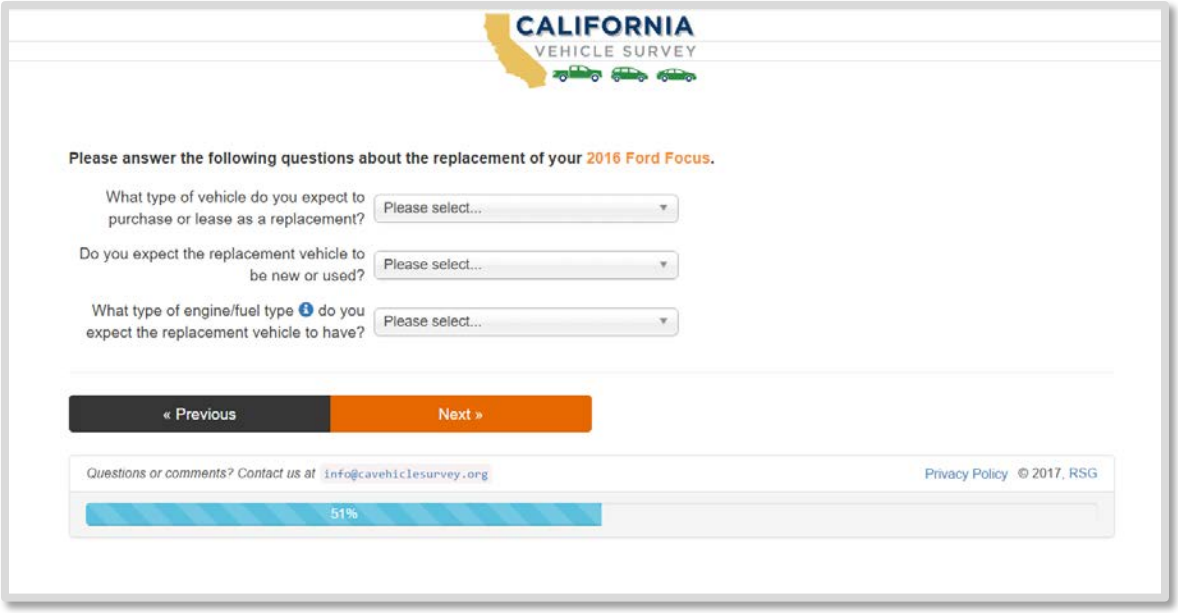


Figure F-43: First Vehicle to Replace

If respondent indicated same replacement timeframe for more than one current vehicle

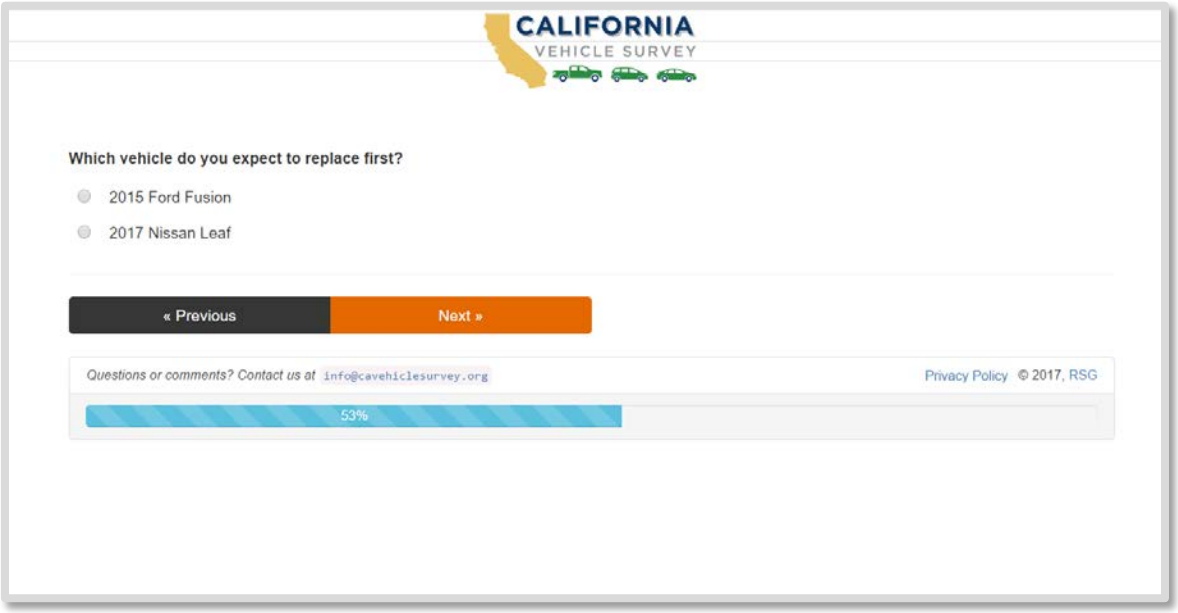
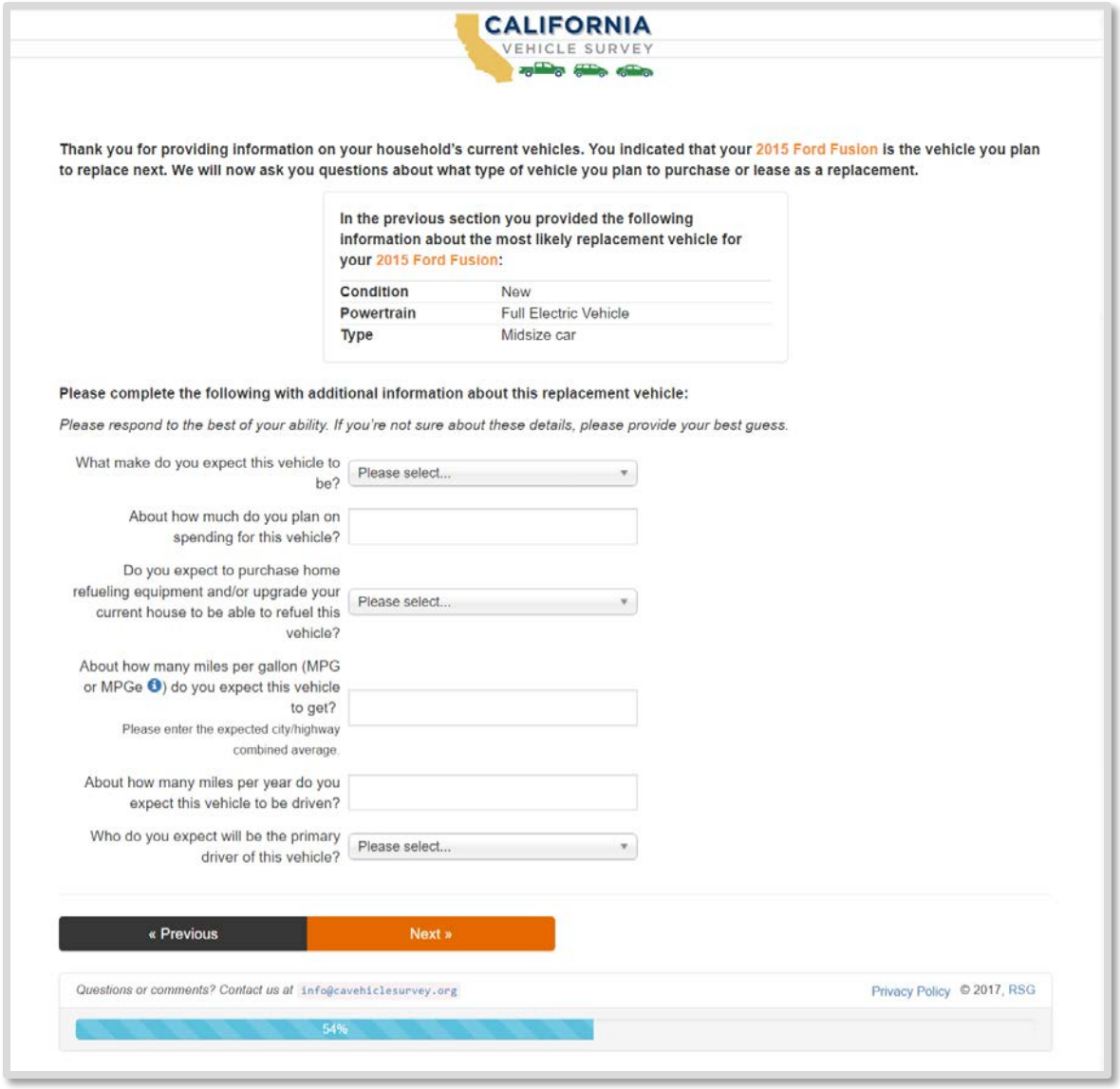


Figure F-44: Replacement Vehicle – Additional Information



CALIFORNIA
VEHICLE SURVEY

Thank you for providing information on your household's current vehicles. You indicated that your 2015 Ford Fusion is the vehicle you plan to replace next. We will now ask you questions about what type of vehicle you plan to purchase or lease as a replacement.

In the previous section you provided the following information about the most likely replacement vehicle for your 2015 Ford Fusion:

Condition	New
Powertrain	Full Electric Vehicle
Type	Midsize car

Please complete the following with additional information about this replacement vehicle:

Please respond to the best of your ability. If you're not sure about these details, please provide your best guess.

What make do you expect this vehicle to be? Please select...

About how much do you plan on spending for this vehicle?

Do you expect to purchase home refueling equipment and/or upgrade your current house to be able to refuel this vehicle? Please select...

About how many miles per gallon (MPG or MPGe) do you expect this vehicle to get?
Please enter the expected city/highway combined average.

About how many miles per year do you expect this vehicle to be driven?

Who do you expect will be the primary driver of this vehicle? Please select...

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54%

Figure F-45: Plans to Acquire Additional Vehicle – A

If respondent indicated next vehicle will be a replacement vehicle

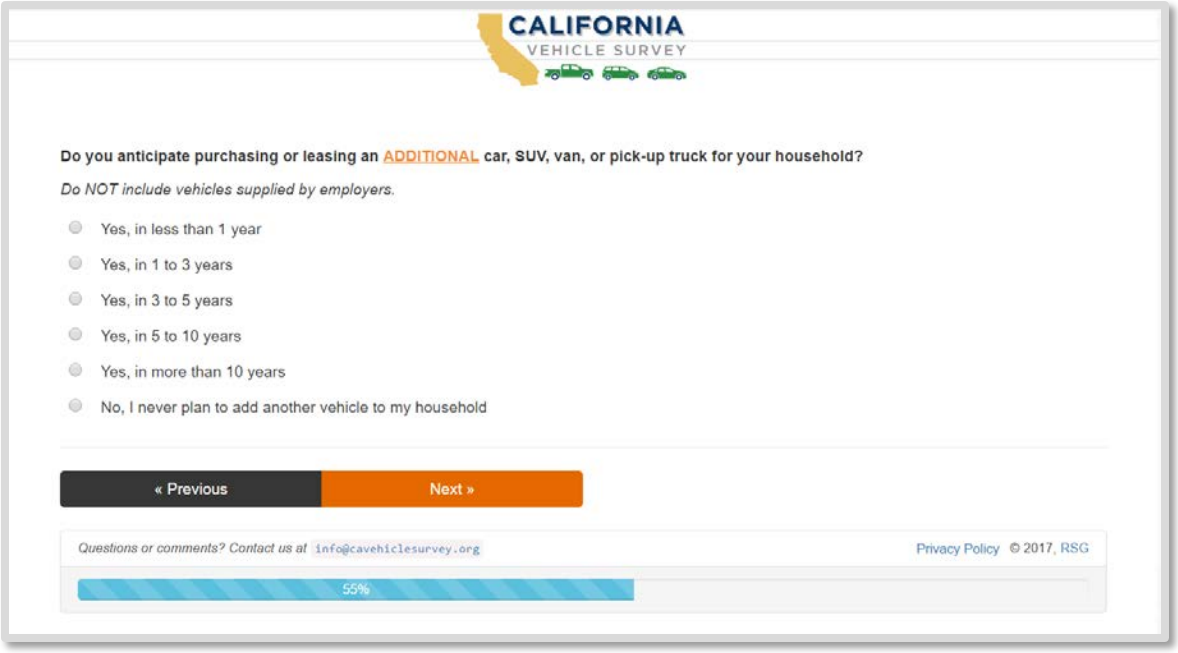


Figure F-46: Plans to Acquire Additional Vehicle – B

If respondent indicated next vehicle will be an additional vehicle

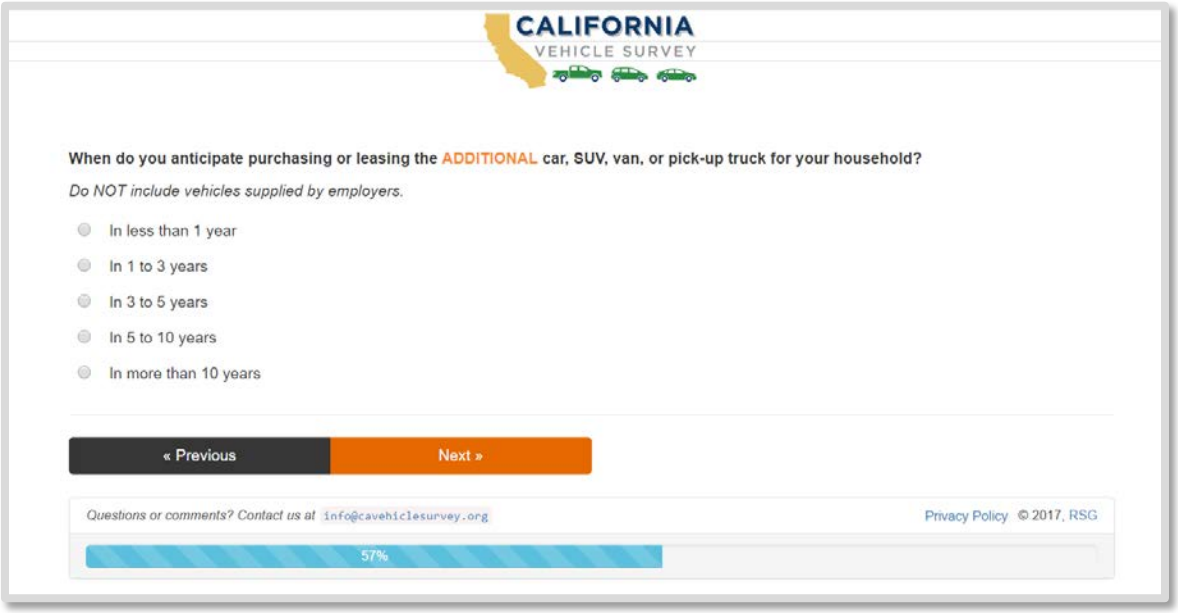


Figure F-47: Number of Additional Vehicle(s)

If respondent indicated plans to acquire additional vehicle(s)

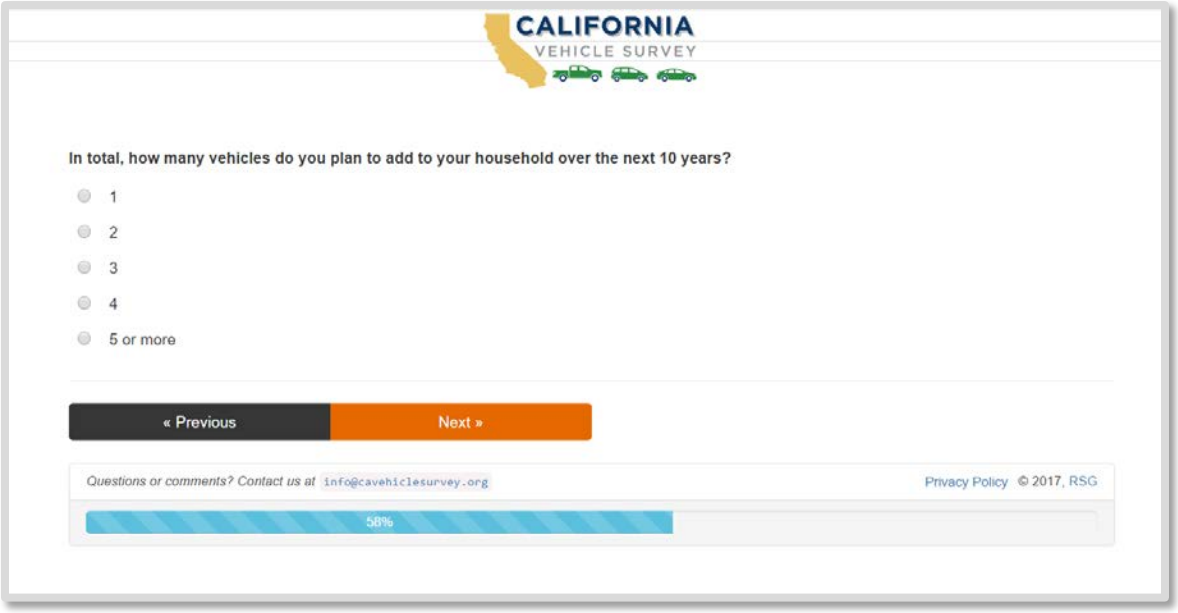
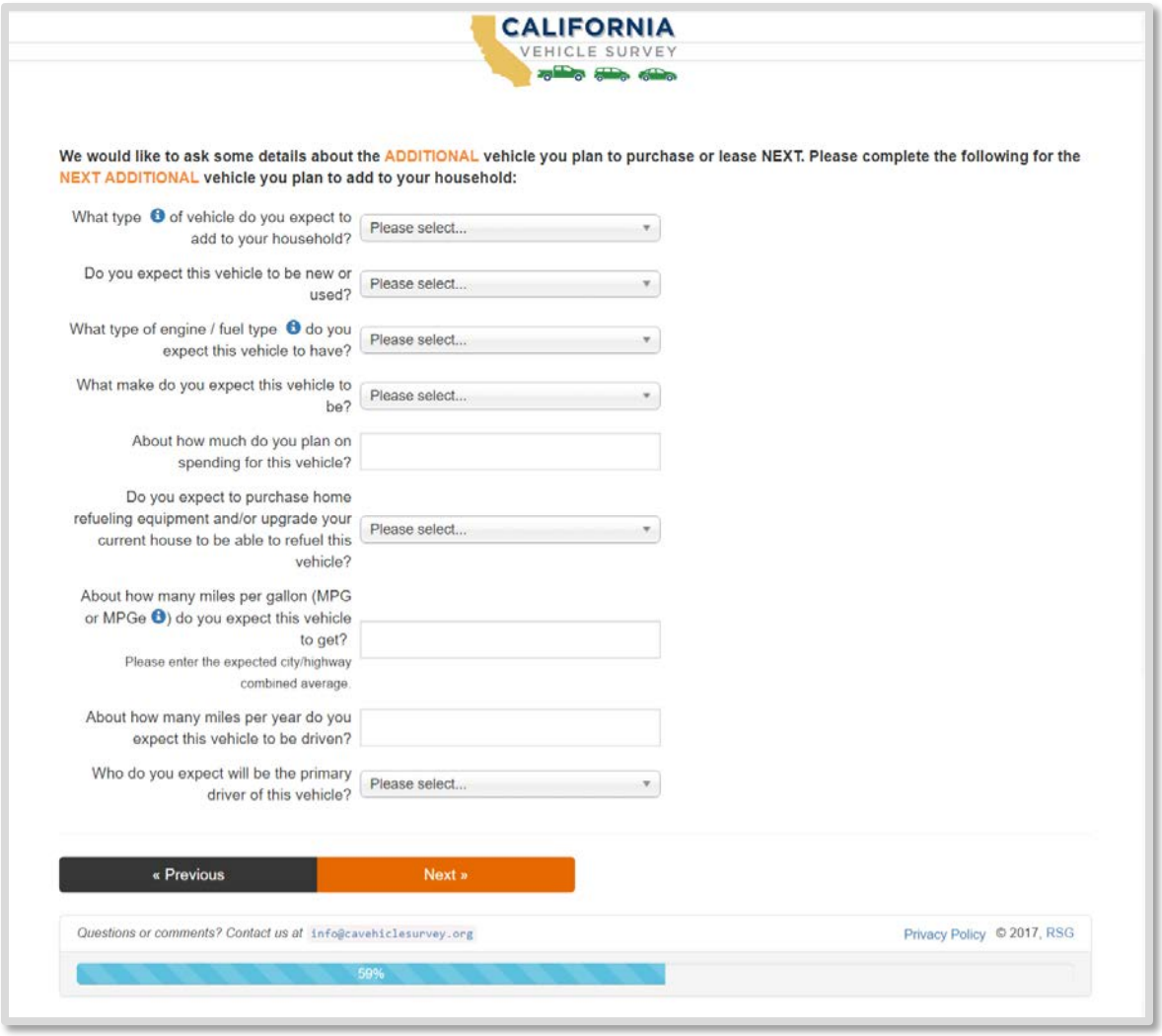


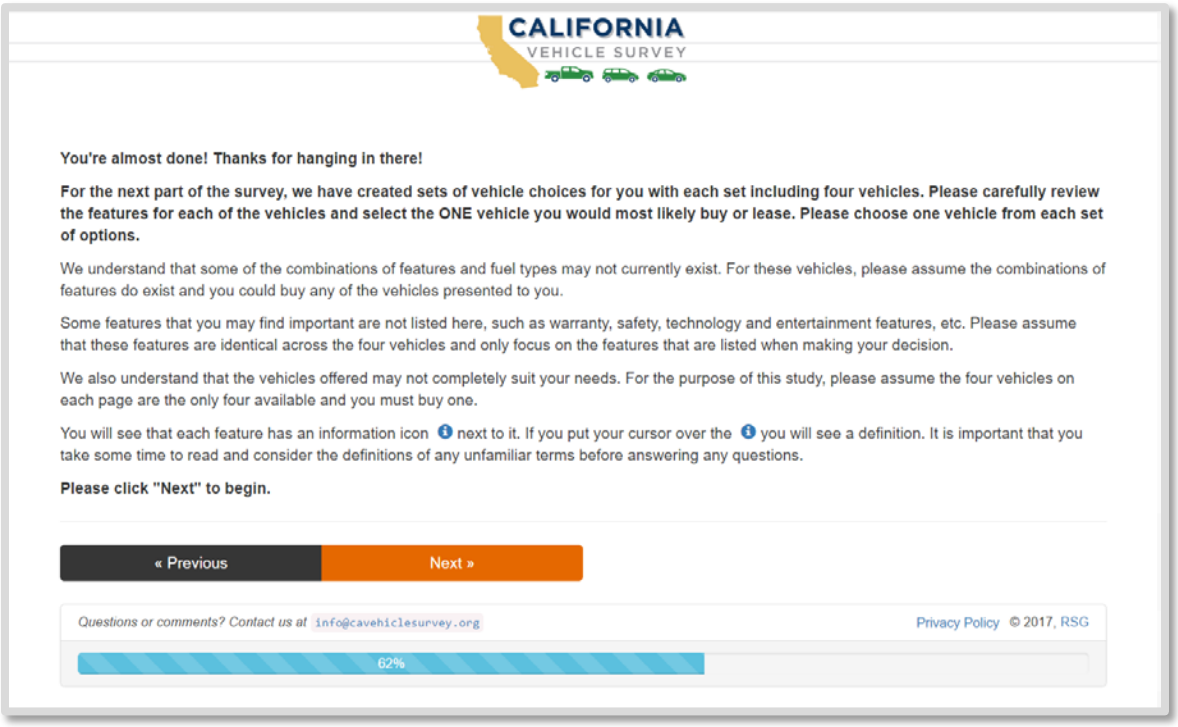
Figure F-48: Additional Vehicle Information

If respondent indicated plans to acquire additional vehicle



Vehicle Trade-off Stated Preference (SP) Exercises

Figure F-49: Stated Preference (SP) Instructions



CALIFORNIA
VEHICLE SURVEY

You're almost done! Thanks for hanging in there!

For the next part of the survey, we have created sets of vehicle choices for you with each set including four vehicles. Please carefully review the features for each of the vehicles and select the ONE vehicle you would most likely buy or lease. Please choose one vehicle from each set of options.

We understand that some of the combinations of features and fuel types may not currently exist. For these vehicles, please assume the combinations of features do exist and you could buy any of the vehicles presented to you.

Some features that you may find important are not listed here, such as warranty, safety, technology and entertainment features, etc. Please assume that these features are identical across the four vehicles and only focus on the features that are listed when making your decision.

We also understand that the vehicles offered may not completely suit your needs. For the purpose of this study, please assume the four vehicles on each page are the only four available and you must buy one.

You will see that each feature has an information icon next to it. If you put your cursor over the you will see a definition. It is important that you take some time to read and consider the definitions of any unfamiliar terms before answering any questions.

Please click "Next" to begin.

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62%

Figure F-50: SP Experiment Example #1

CALIFORNIA
VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase. Please hover-over each feature, if you are not familiar with it, to see description.

(1 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Compact car	Van, full-size/large	Compact car	Sports car
Fuel Type	Full Electric Vehicle	Diesel	Full Electric Vehicle	Hybrid (Gasoline)
Vehicle Models Available	1	1	1	2
Model Year	New (2016)	New (2016)	New (2016)	New (2016)
Vehicle Price	$26,700	$26,400	$26,700	$50,200
Purchase Incentive	Up to $2,500 tax credit	None	$5,000 rebate	None
MPG/Fuel Economy	93	17.7	93	28.5
Fuel Cost per 100 miles	$12.02	$21.37	$12.02	$10.21
Refueling Station (Time it takes to get to this type of station)	Plug-in at home (0 min)	Refuel at station (7 min)	Plug-in at a charging station (10 min)	Refuel at station (5 min)
Refueling Time	3.5 hours	10 min	8 hours	10 min
Vehicle Range	100 miles	398 miles	80 miles	449 miles
Trunk/Cargo Space	12 cubic feet (3 suitcases)	128 cubic feet (32 suitcases)	9 cubic feet (2 suitcases)	11 cubic feet (2 suitcases)
Annual Maintenance Cost	$481	$504	$289	$743
Acceleration Rate (0-60 mph)	6.1 secs	8.7 secs	10.1 secs	4.1 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

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63%

Figure 9: SP Experiment Example #2

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase. Please hover-over each feature, if you are not familiar with it, to see description.

(2 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	SUV small/midsize	Cross-over, small	Compact car	Compact car
Fuel Type	Full Electric Vehicle	Plug-in Hybrid Electric vehicle (PHEV)	Full Electric Vehicle	Hybrid (Gasoline)
Vehicle Models Available	2	2	2	10
Model Year	New (2016)	New (2016)	New (2016)	New (2016)
Vehicle Price	$61,000	$34,200	$40,000	$28,500
Purchase Incentive	$1,500 rebate	HOV Access	Up to $7,500 tax credit	None
MPG/Fuel Economy	51.5	53.1	129.1	31
Fuel Cost per 100 miles	$10.85	$11.24	$4.33	$14.08
Refueling Station (Time it takes to get to this type of station)	Plug-in at a charging station (5 min)	Plug-in at home (0 min)	Plug-in at a charging station (15 min)	Refuel at station (3 min)
Refueling Time	8 hours	3.5 hours charging time (5 min to refuel with gas)	30 min	3 min
Vehicle Range	300 miles	935 miles	150 miles	443 miles
Trunk/Cargo Space	22 cubic feet (5 suitcases)	12 cubic feet (3 suitcases)	12 cubic feet (3 suitcases)	11 cubic feet (2 suitcases)
Annual Maintenance Cost	$506	$468	$481	$446
Acceleration Rate (0-60 mph)	8.9 secs	10.1 secs	10.1 secs	11.4 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

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Figure F-52: SP Experiment Example #3

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase. Please hover-over each feature, if you are not familiar with it, to see description.

(3 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Compact car	Cross over, midsize	Compact car	Midsize car
Fuel Type	Full Electric Vehicle	Plug-in Hybrid Electric vehicle (PHEV)	Full Electric Vehicle	Hybrid (Gasoline)
Vehicle Models Available	2	1	2	24
Model Year	New (2016)	Used (2014)	New (2016)	New (2016)
Vehicle Price	$31,000	$29,700	$31,000	$22,900
Purchase Incentive	Up to $2,500 tax credit	None	Up to $2,500 tax credit	None
MPG/Fuel Economy	93	28.4	93	49.5
Fuel Cost per 100 miles	$9.02	$21.02	$9.02	$8.82
Refueling Station (Time it takes to get to this type of station)	Plug-in at a charging station (5 min)	Plug-in at work (0 min)	Plug-in at a charging station (5 min)	Refuel at station (7 min)
Refueling Time	2.5 hours	2.5 hours charging time (5 min to refuel with gas)	30 min	10 min
Vehicle Range	300 miles	625 miles	80 miles	705 miles
Trunk/Cargo Space	10 cubic feet (2 suitcases)	16 cubic feet (4 suitcases)	10 cubic feet (2 suitcases)	16 cubic feet (4 suitcases)
Annual Maintenance Cost	$289	$528	$347	$365
Acceleration Rate (0-60 mph)	10.1 secs	9.4 secs	6.1 secs	10.3 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

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Figure F-53: SP Experiment Example #4

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase. Please hover-over each feature, if you are not familiar with it, to see description.

(4 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Compact car	Subcompact car	Compact car	Large car
Fuel Type	Full Electric Vehicle	Plug-in Hybrid Electric vehicle (PHEV)	Full Electric Vehicle	Hybrid (Gasoline)
Vehicle Models Available	2	1	4	2
Model Year	Used (2014)	New (2016)	New (2016)	New (2016)
Vehicle Price	$27,200	$28,400	$40,000	$38,400
Purchase Incentive	None	None	Up to $5,000 tax credit	None
MPG/Fuel Economy	124	50.4	93	31.1
Fuel Cost per 100 miles	$6.76	$7.90	$9.02	$18.71
Refueling Station (Time it takes to get to this type of station)	Plug-in at a charging station (5 min)	Plug-in at a charging station (5 min)	Plug-in at a charging station (20 min)	Refuel at station (10 min)
Refueling Time	8 hours	2.5 hours charging time (5 min to refuel with gas)	3.5 hours	3 min
Vehicle Range	300 miles	610 miles	150 miles	532 miles
Trunk/Cargo Space	10 cubic feet (2 suitcases)	10 cubic feet (2 suitcases)	12 cubic feet (3 suitcases)	16 cubic feet (4 suitcases)
Annual Maintenance Cost	$481	$383	$424	$484
Acceleration Rate (0-60 mph)	10.1 secs	7 secs	10.1 secs	5.7 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

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63%

Figure F-54: SP Experiment Example #5

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase. Please hover-over each feature, if you are not familiar with it, to see description.

(5 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Van, full-size/large	Cross-over, small	Compact car	Compact car
Fuel Type	Full Electric Vehicle	Plug-in Hybrid Electric vehicle (PHEV)	Diesel	Full Electric Vehicle
Vehicle Models Available	4	2	4	2
Model Year	Used (2015)	New (2016)	Used (2014)	New (2016)
Vehicle Price	$39,100	$34,200	$16,700	$26,700
Purchase Incentive	None	None	None	$1,500 rebate
MPG/Fuel Economy	74.4	36.2	34.4	93
Fuel Cost per 100 miles	$7.51	$10.99	$5.42	$6.01
Refueling Station (Time it takes to get to this type of station)	Plug-in at a charging station (20 min)	Plug-in at a charging station (20 min)	Refuel at station (7 min)	Plug-in at work (0 min)
Refueling Time	2.5 hours	30 min charging time (5 min to refuel with gas)	8 min	3.5 hours
Vehicle Range	150 miles	608 miles	402 miles	100 miles
Trunk/Cargo Space	90 cubic feet (22 suitcases)	15 cubic feet (3 suitcases)	13 cubic feet (3 suitcases)	10 cubic feet (2 suitcases)
Annual Maintenance Cost	$455	$383	$319	$424
Acceleration Rate (0-60 mph)	8.1 secs	10.1 secs	6.5 secs	10.1 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

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63%

Figure F-55: SP Experiment Example #6

CALIFORNIA
VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase. Please hover-over each feature, if you are not familiar with it, to see description.

(6 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Midsize car	Pick-up truck, full-size/large	Van, small	Compact car
Fuel Type	Gasoline	Full Electric Vehicle	Plug-in Hybrid Electric vehicle (PHEV)	Full Electric Vehicle
Vehicle Models Available	162	2	2	2
Model Year	Used (2014)	New (2016)	New (2016)	New (2016)
Vehicle Price	$18,700	$57,800	$47,600	$31,000
Purchase Incentive	None	Up to $7,500 tax credit	Up to $7,500 tax credit	$5,000 rebate
MPG/Fuel Economy	36.5	76.8	50.1	77.5
Fuel Cost per 100 miles	$11.96	$14.56	$4.77	$14.43
Refueling Station (Time it takes to get to this type of station)	Refuel at station (10 min)	Plug-in at home (0 min)	Plug-in at home (0 min)	Plug-in at a charging station (10 min)
Refueling Time	5 min	8 hours	8 hours charging time (5 min to refuel with gas)	3.5 hours
Vehicle Range	520 miles	100 miles	1102 miles	100 miles
Trunk/Cargo Space	14 cubic feet (3 suitcases)	10 cubic feet (2 suitcases)	25 cubic feet (6 suitcases)	9 cubic feet (2 suitcases)
Annual Maintenance Cost	$323	$437	$323	$424
Acceleration Rate (0-60 mph)	9.5 secs	9 secs	9.5 secs	6.1 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

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63%

Figure F-56: SP Experiment Example #7

CALIFORNIA
VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase. Please hover-over each feature, if you are not familiar with it, to see description.

(7 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	SUV full-size/large	Compact car	Cross-over, small	Compact car
Fuel Type	Compressed Natural Gas (CNG) vehicle	Full Electric Vehicle	Gasoline-ethanol Flex Fuel vehicle (E85 FFV)	Hybrid (Gasoline)
Vehicle Models Available	1	2	10	4
Model Year	New (2016)	New (2016)	New (2016)	Used (2014)
Vehicle Price	$57,100	$40,000	$19,200	$19,400
Purchase Incentive	None	$5,000 rebate	None	None
MPG/Fuel Economy	13	113.6	25.9	49.6
Fuel Cost per 100 miles	$44.15	$7.38	$8.22	$3.52
Refueling Station (Time it takes to get to this type of station)	Refuel at "fast fill" station (20 min)	Plug-in at a charging station (5 min)	Refuel at station (10 min)	Refuel at station (7 min)
Refueling Time	5 min	2.5 hours	5 min	10 min
Vehicle Range	250 miles	100 miles	373 miles	709 miles
Trunk/Cargo Space	10 cubic feet (2 suitcases)	9 cubic feet (2 suitcases)	15 cubic feet (3 suitcases)	11 cubic feet (2 suitcases)
Annual Maintenance Cost	$534	$424	$468	$365
Acceleration Rate (0-60 mph)	5.3 secs	6.1 secs	10.5 secs	7.4 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

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63%

Figure F-57: SP Experiment Example #8

CALIFORNIA
VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase. Please hover-over each feature, if you are not familiar with it, to see description.

(8 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	SUV full-size/large	Sports car	Compact car	Large car
Fuel Type	Full Electric Vehicle	Hybrid (Diesel)	Full Electric Vehicle	Gasoline-ethanol Flex Fuel vehicle (E85 FFV)
Vehicle Models Available	1	2	1	4
Model Year	New (2016)	New (2016)	New (2016)	New (2016)
Vehicle Price	$86,200	$45,100	$31,000	$41,600
Purchase Incentive	Up to $5,000 tax credit	None	$1,500 rebate	None
MPG/Fuel Economy	38.8	32.8	93	24.9
Fuel Cost per 100 miles	$14.41	$18.96	$6.01	$12.83
Refueling Station (Time it takes to get to this type of station)	Plug-in at a charging station (10 min)	Refuel at station (7 min)	Plug-in at a charging station (15 min)	Refuel at station (10 min)
Refueling Time	3.5 hours	3 min	8 hours	10 min
Vehicle Range	150 miles	443 miles	100 miles	471 miles
Trunk/Cargo Space	11 cubic feet (2 suitcases)	8 cubic feet (2 suitcases)	10 cubic feet (2 suitcases)	19 cubic feet (4 suitcases)
Annual Maintenance Cost	$326	$844	$289	$512
Acceleration Rate (0-60 mph)	8.9 secs	4.1 secs	6.1 secs	5 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

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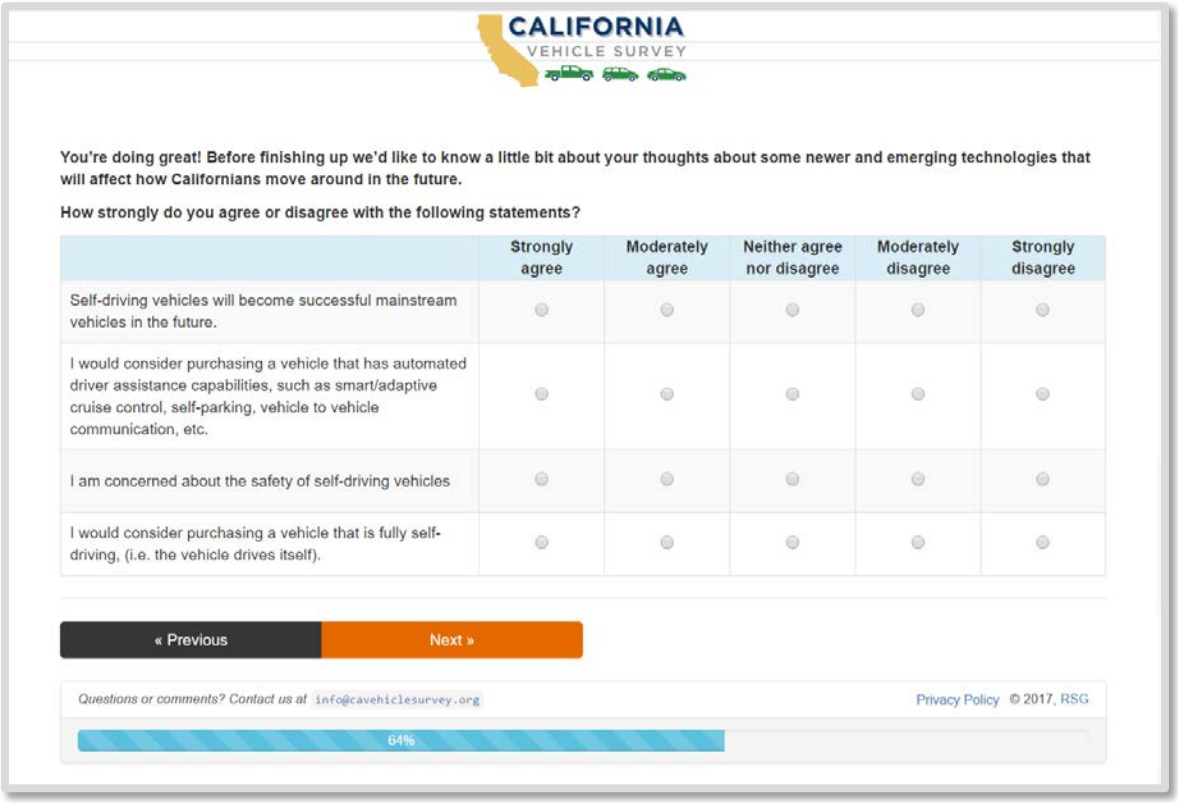
63%

Consideration of Alternative Vehicles / Transportation Options

Figure F-58: Autonomous Vehicle Opinions



CALIFORNIA
VEHICLE SURVEY

You're doing great! Before finishing up we'd like to know a little bit about your thoughts about some newer and emerging technologies that will affect how Californians move around in the future.

How strongly do you agree or disagree with the following statements?

	Strongly agree	Moderately agree	Neither agree nor disagree	Moderately disagree	Strongly disagree
Self-driving vehicles will become successful mainstream vehicles in the future.					
I would consider purchasing a vehicle that has automated driver assistance capabilities, such as smart/adaptive cruise control, self-parking, vehicle to vehicle communication, etc.					
I am concerned about the safety of self-driving vehicles					
I would consider purchasing a vehicle that is fully self-driving, (i.e. the vehicle drives itself).					

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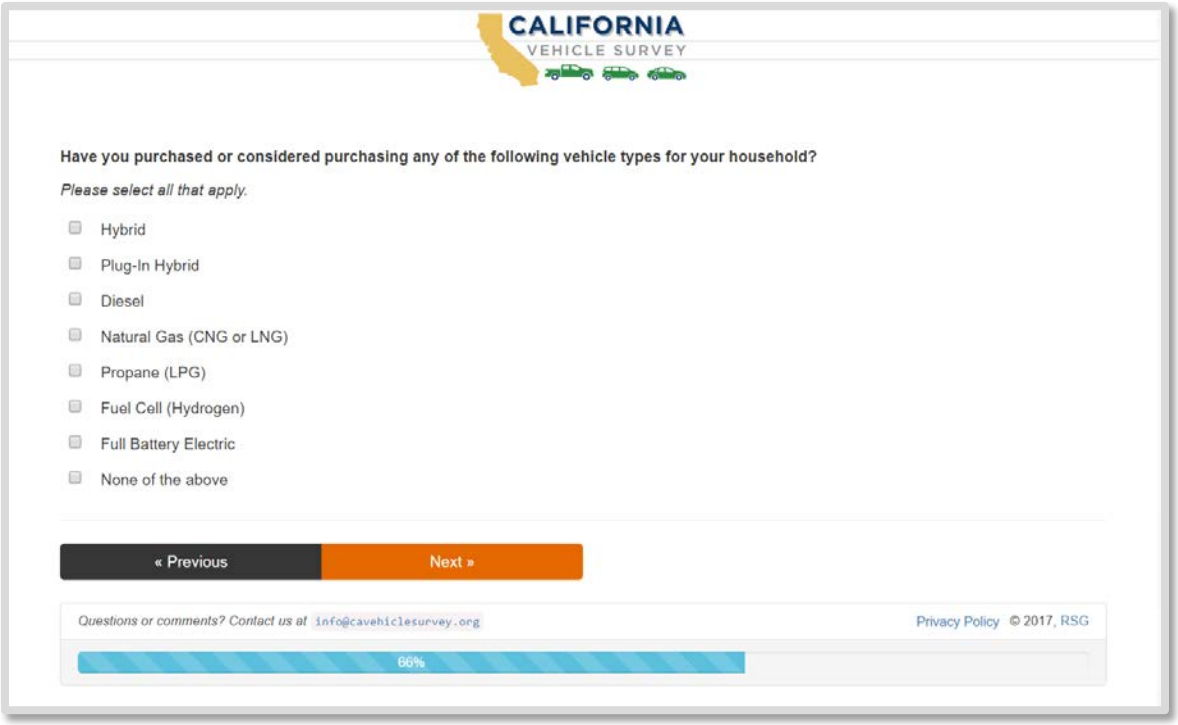
Figure F-59: Consideration of Alternative Powertrain Types



CALIFORNIA
VEHICLE SURVEY

Have you purchased or considered purchasing any of the following vehicle types for your household?

Please select all that apply.

- Hybrid
- Plug-In Hybrid
- Diesel
- Natural Gas (CNG or LNG)
- Propane (LPG)
- Fuel Cell (Hydrogen)
- Full Battery Electric
- None of the above

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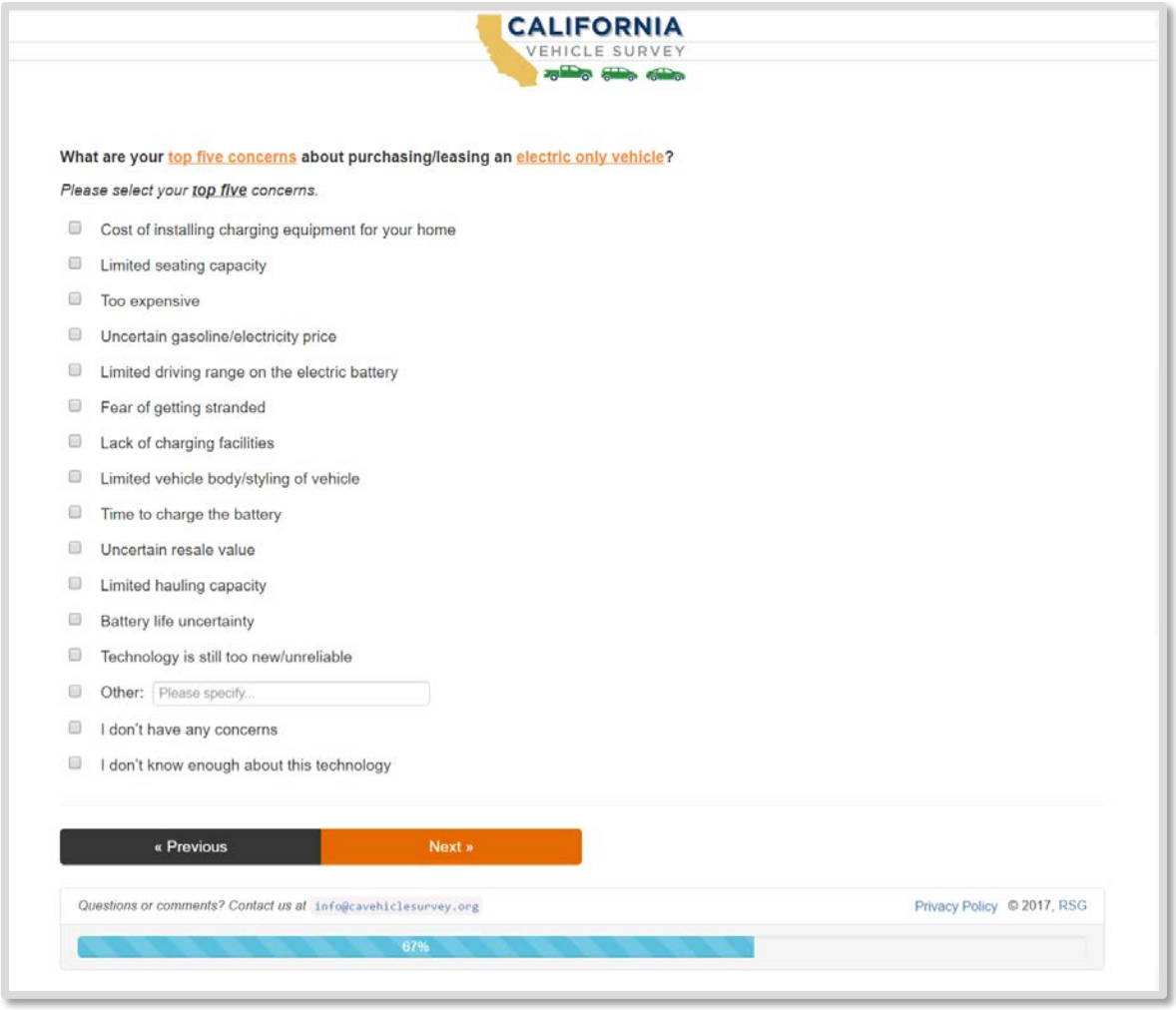
66%

Figure F-60: Electric-only Vehicle Concerns



CALIFORNIA
VEHICLE SURVEY

What are your top five concerns about purchasing/leasing an electric only vehicle?

Please select your top five concerns.

- [ ] Cost of installing charging equipment for your home
- [ ] Limited seating capacity
- [ ] Too expensive
- [ ] Uncertain gasoline/electricity price
- [ ] Limited driving range on the electric battery
- [ ] Fear of getting stranded
- [ ] Lack of charging facilities
- [ ] Limited vehicle body/styling of vehicle
- [ ] Time to charge the battery
- [ ] Uncertain resale value
- [ ] Limited hauling capacity
- [ ] Battery life uncertainty
- [ ] Technology is still too new/unreliable
- [ ] Other: Please specify...
- [ ] I don't have any concerns
- [ ] I don't know enough about this technology

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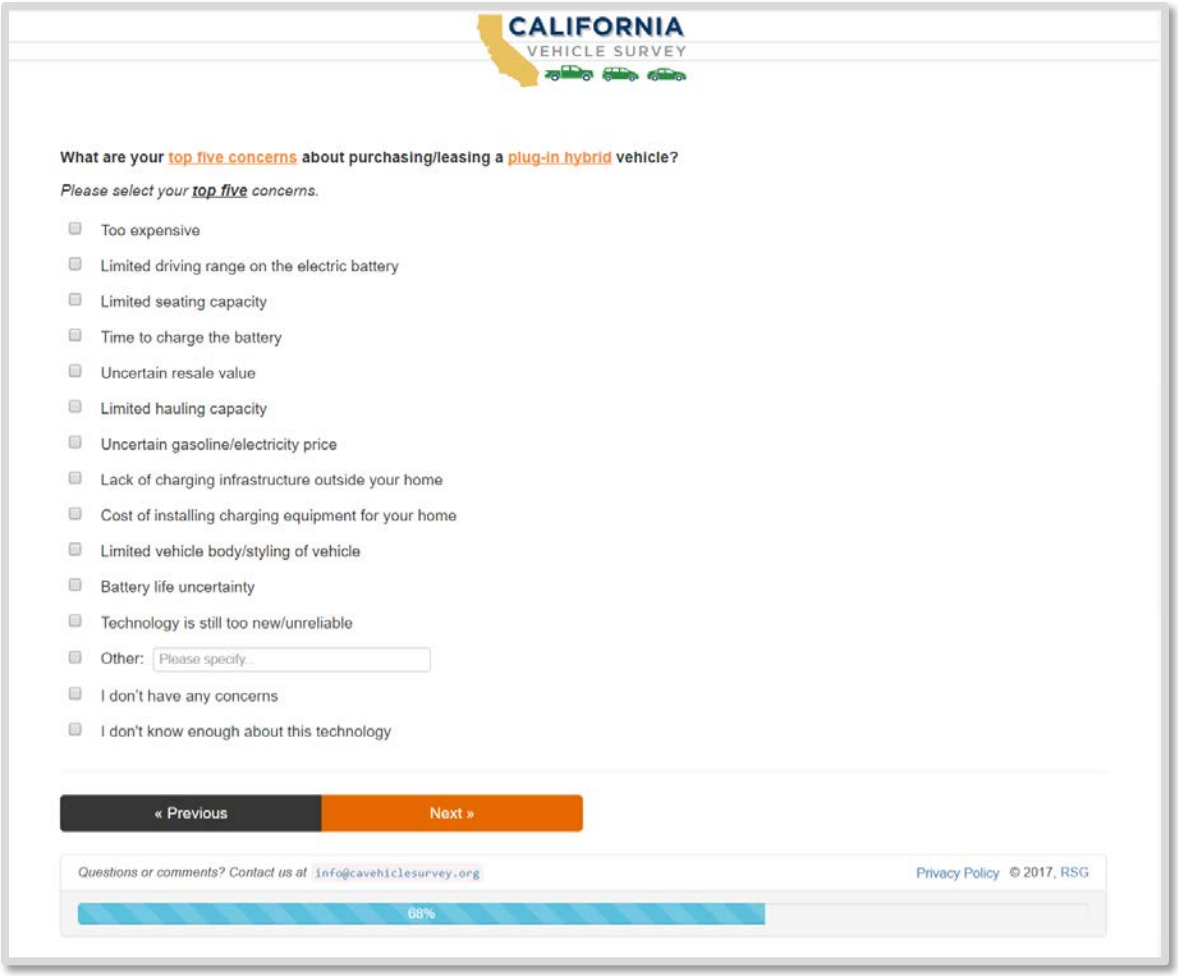
67%

Figure F-61: Plug-in Hybrid Vehicle Concerns



CALIFORNIA
VEHICLE SURVEY

What are your top five concerns about purchasing/leasing a plug-in hybrid vehicle?

*Please select your **top five** concerns.*

- [ ] Too expensive
- [ ] Limited driving range on the electric battery
- [ ] Limited seating capacity
- [ ] Time to charge the battery
- [ ] Uncertain resale value
- [ ] Limited hauling capacity
- [ ] Uncertain gasoline/electricity price
- [ ] Lack of charging infrastructure outside your home
- [ ] Cost of installing charging equipment for your home
- [ ] Limited vehicle body/styling of vehicle
- [ ] Battery life uncertainty
- [ ] Technology is still too new/unreliable
- [ ] Other: Please specify...
- [ ] I don't have any concerns
- [ ] I don't know enough about this technology

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68%

Figure F-62: Hydrogen Fuel Cell Vehicle Concerns

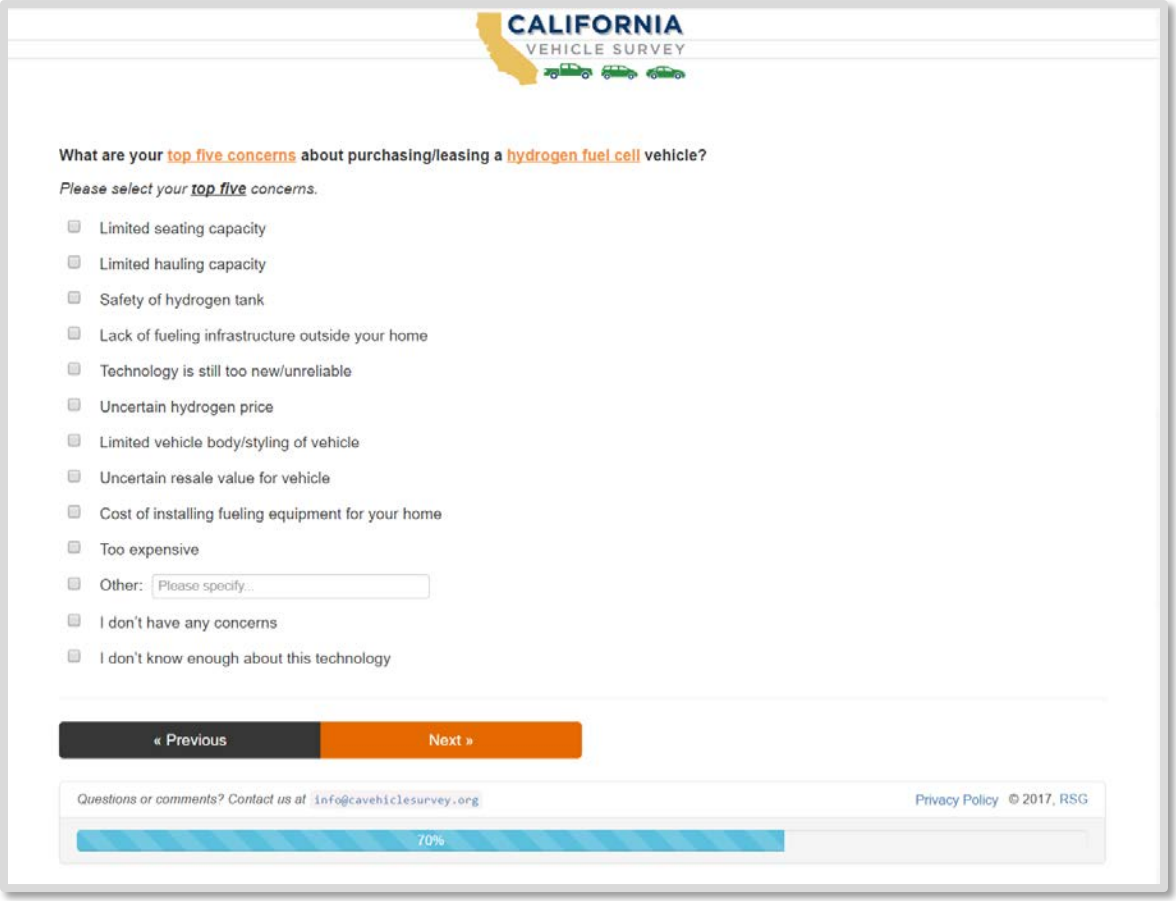


Figure F-63: Car Share Program Participation

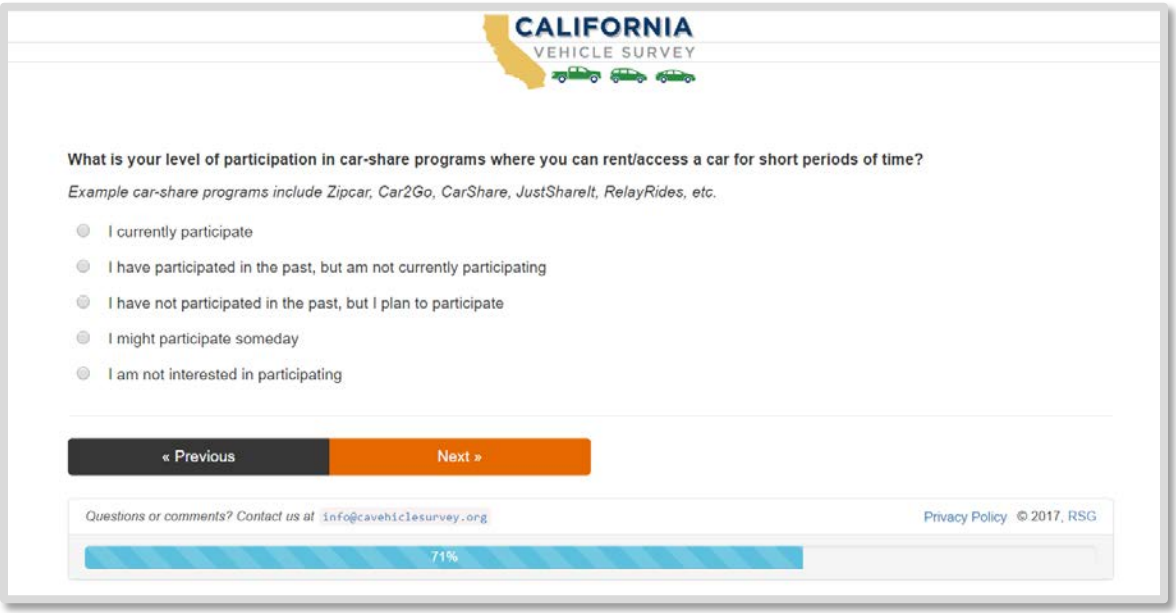


Figure F-64: Primary Reason Not Currently Participating in Car Share Program

If respondent does not currently participate in a car share program

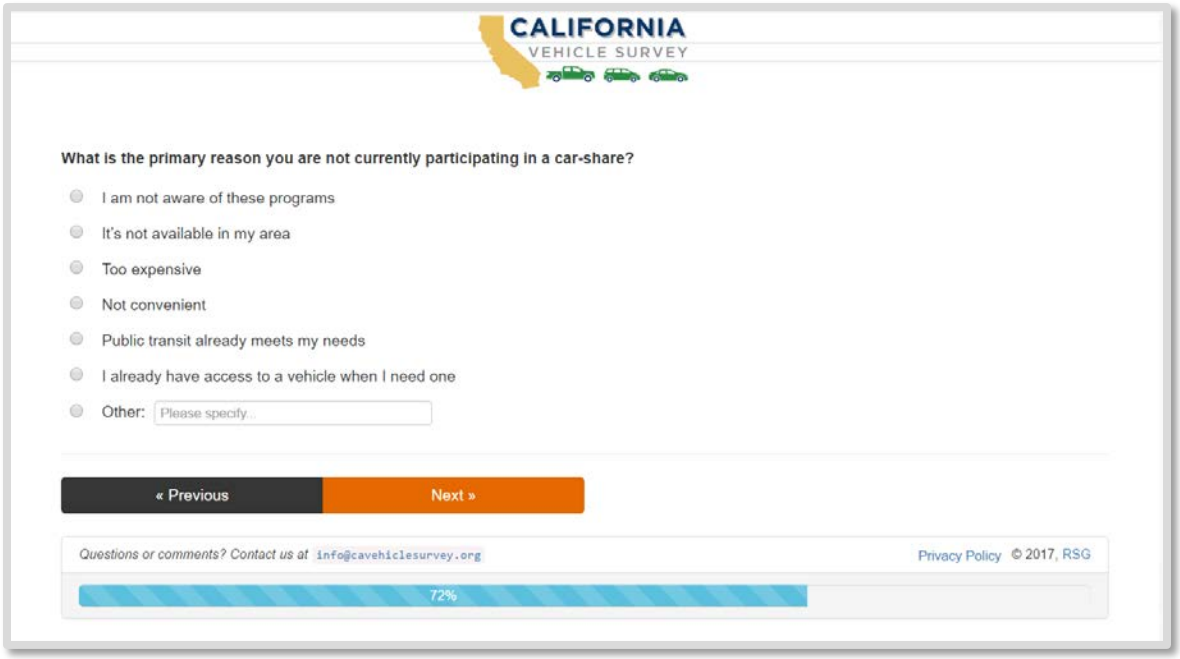


Figure F-65: Ride Share Program Participation

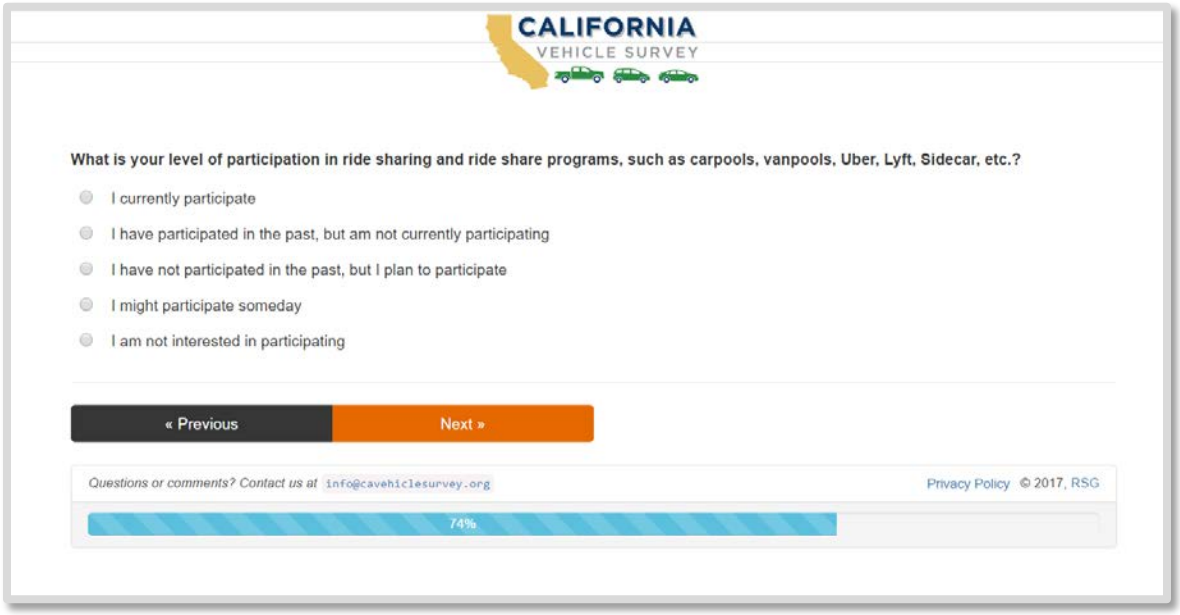


Figure F-66: Ride Share Occasions

If respondent currently participates in or has participated in a ride share program

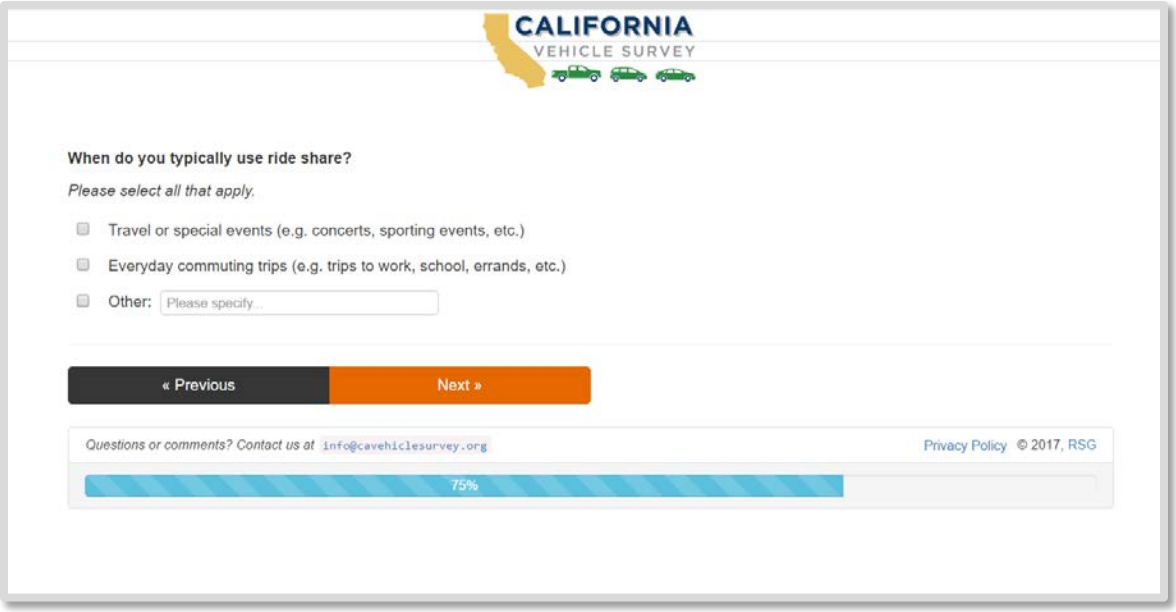


Figure F-67: Primary Reason Not Currently Participating in Ride Share Program

If respondent does not currently participate in a ride share program

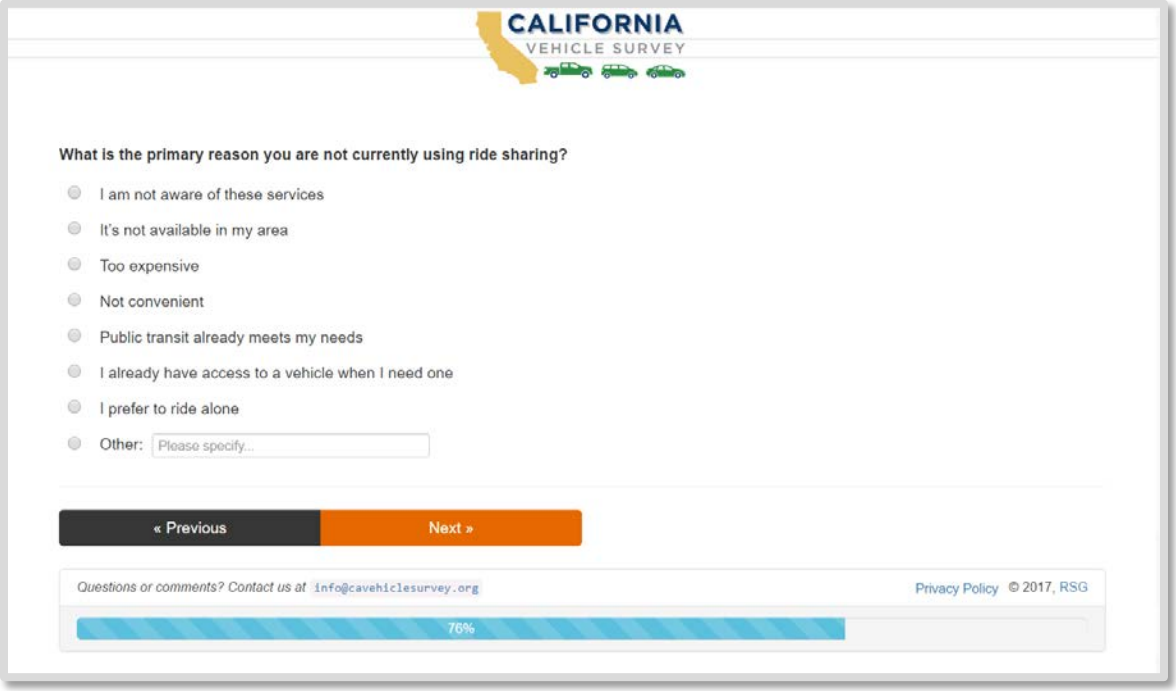


Figure F-68: Impact of Car Share and Ride Share Programs on Vehicle Ownership

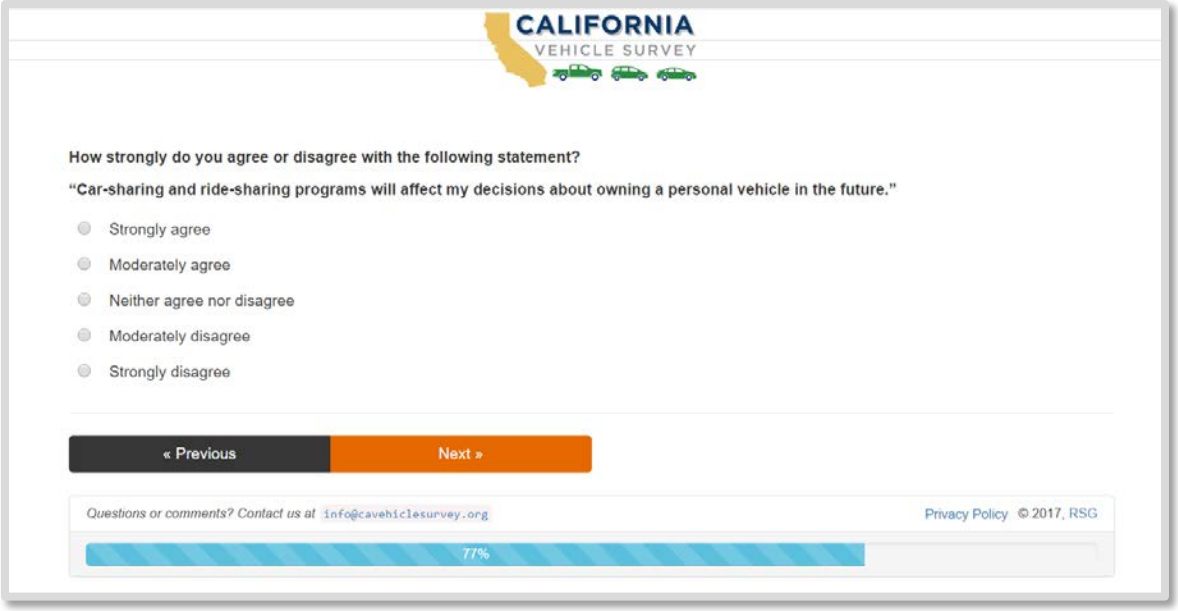


Figure F-69: Top Vehicle Attributes

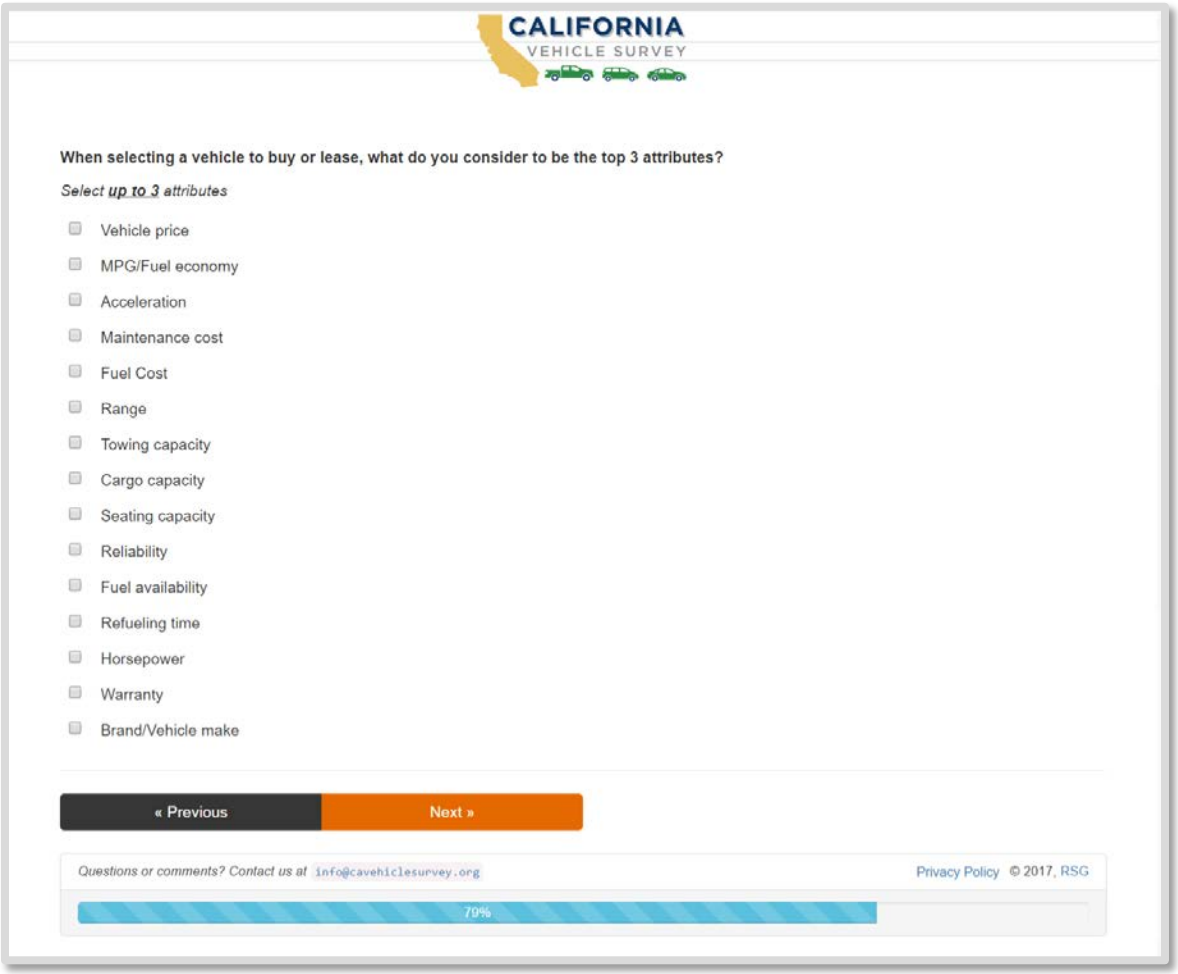
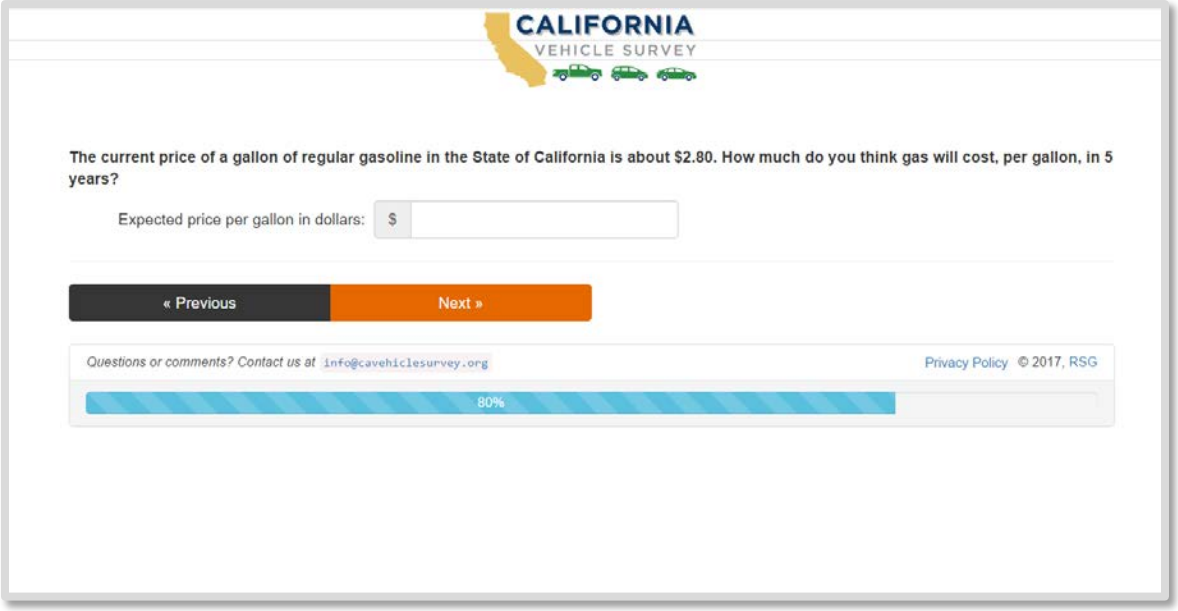


Figure F-70: Opinion About Future Gas Price



Additional Household Information

Figure F-71: Solar Panels at Residence

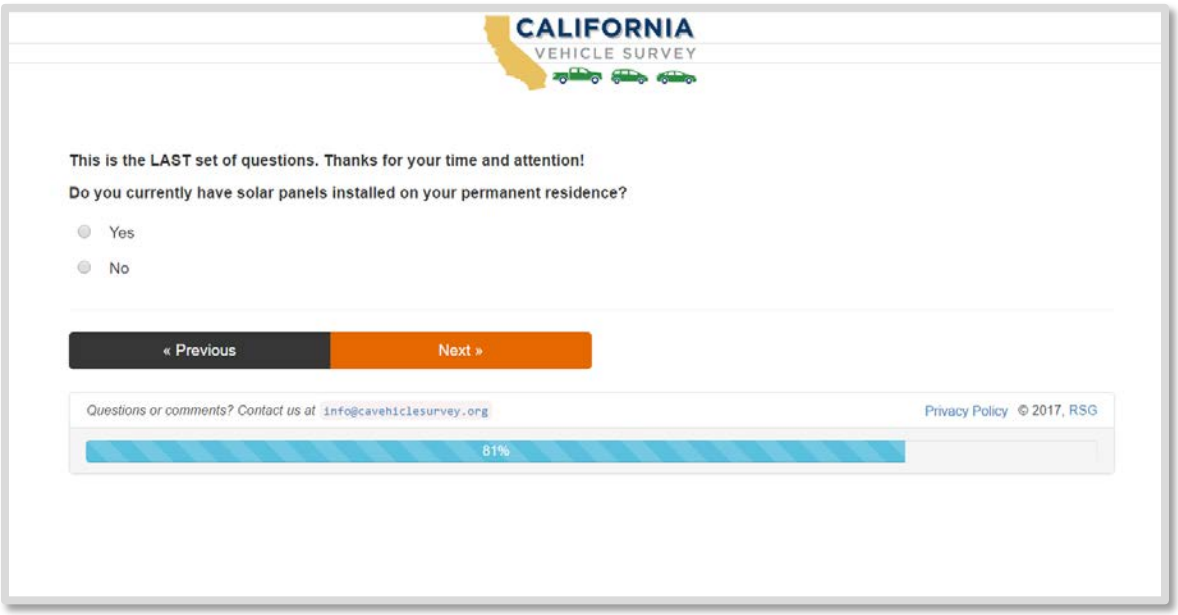


Figure F-72: Plans to Acquire Solar Panels at Residence

If respondent does not currently have solar panels at residence

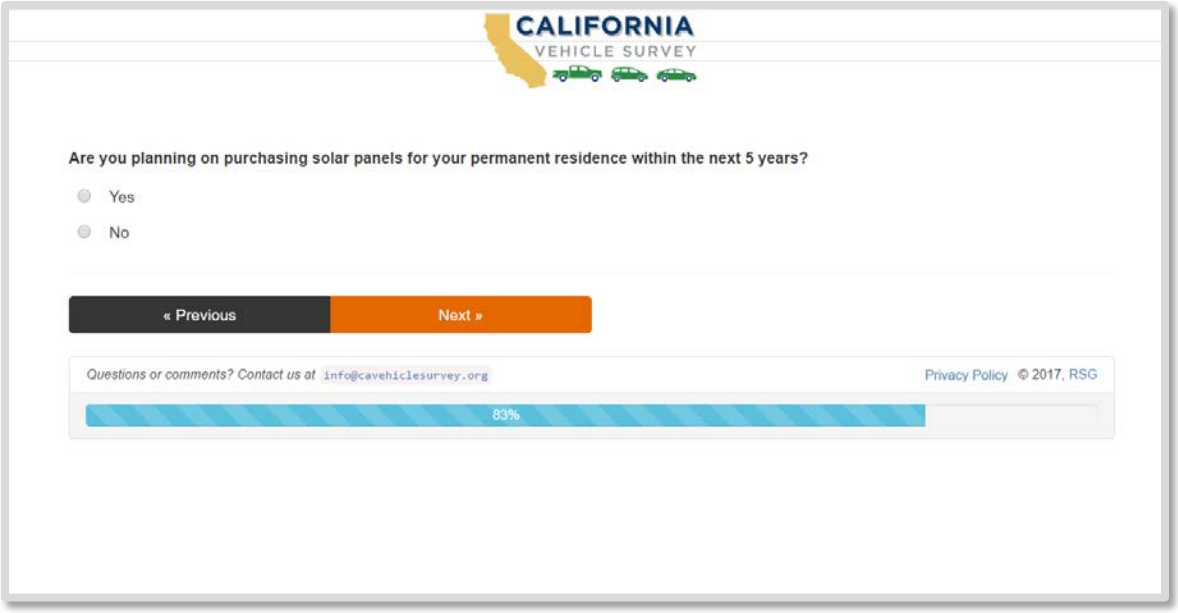
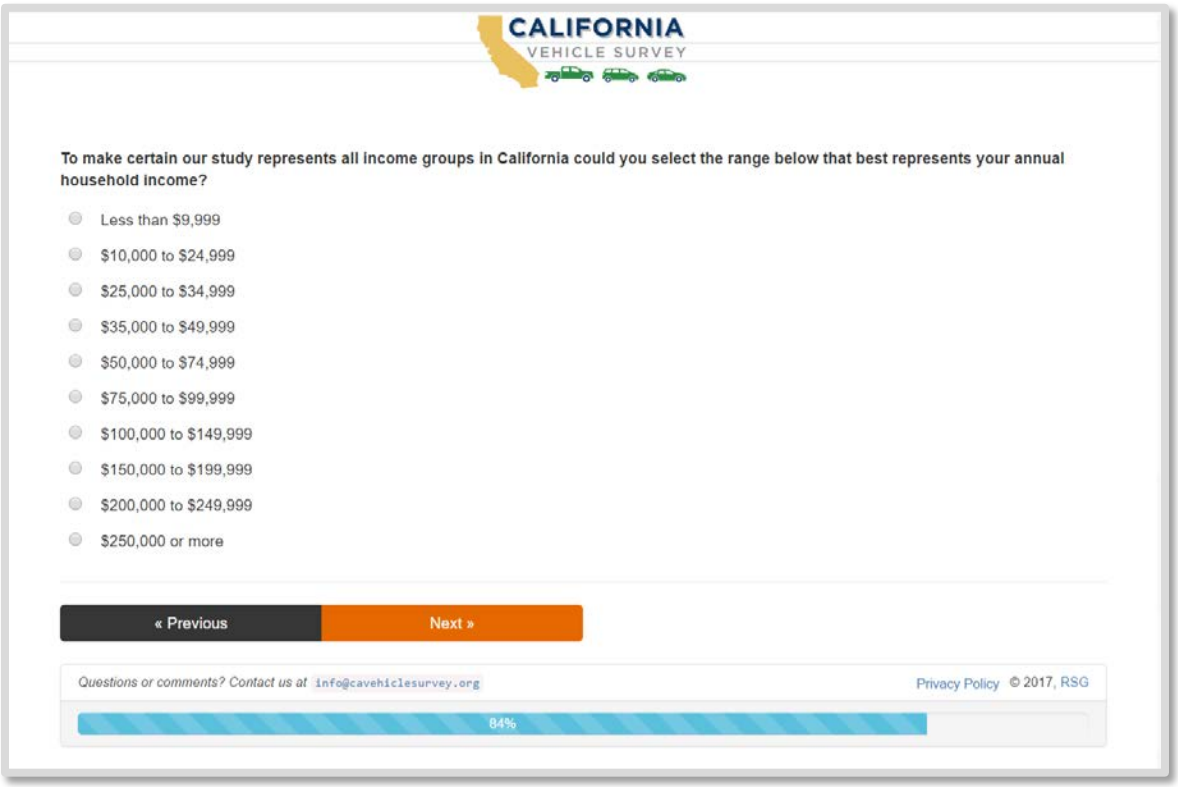


Figure F-73: Annual Household Income



Conclusion

Figure 10: Email Address for Gift Card

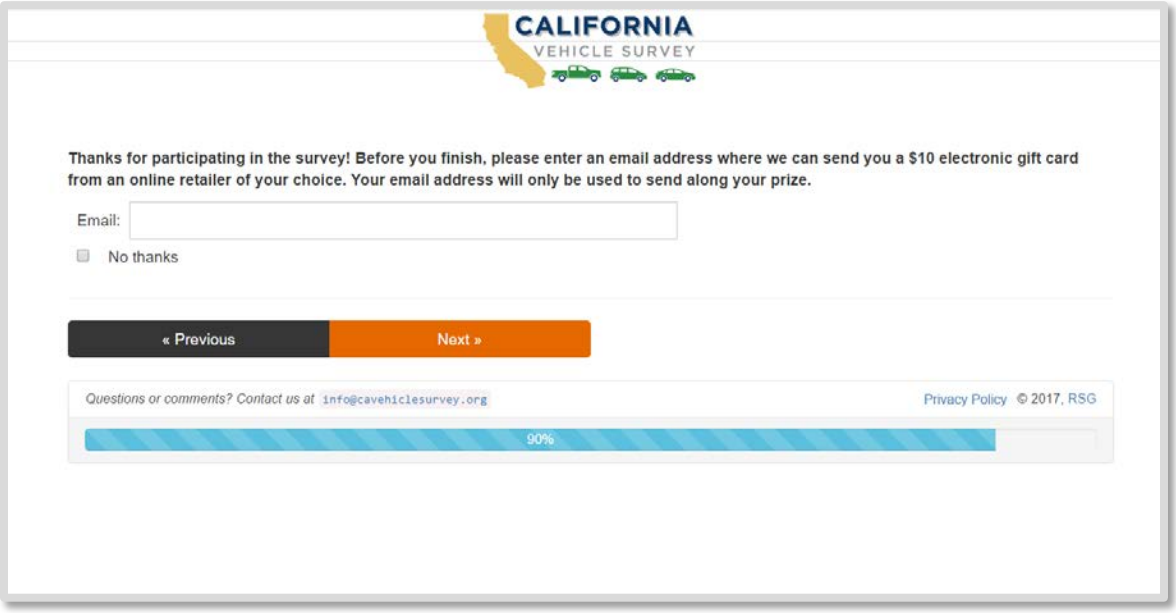


Figure F-75: Preferred Type of Gift Card

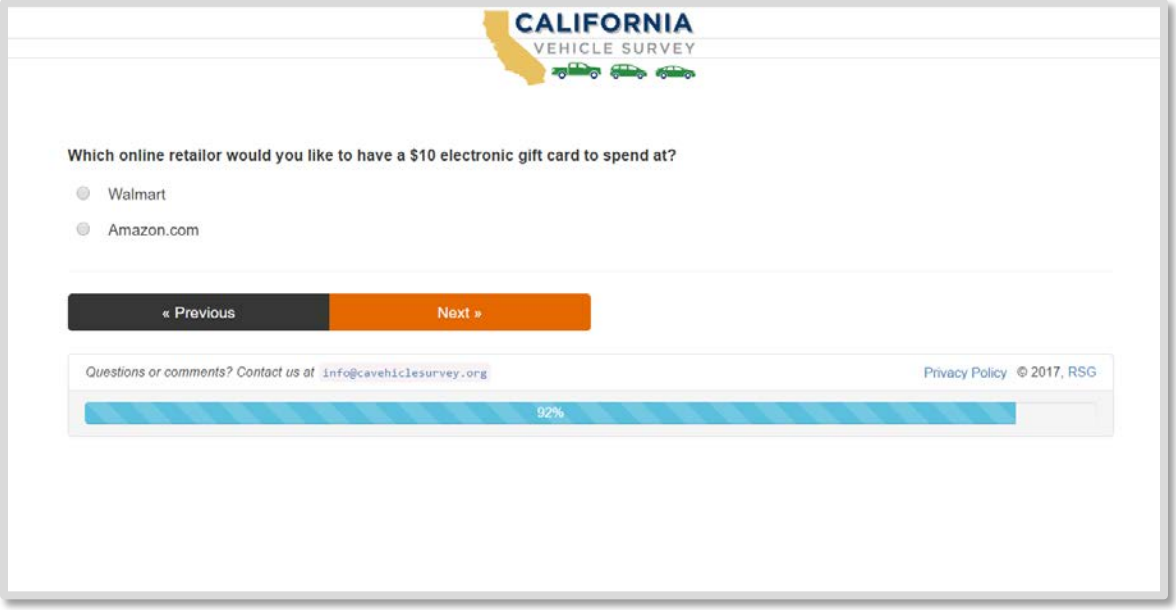


Figure F-76: Comments

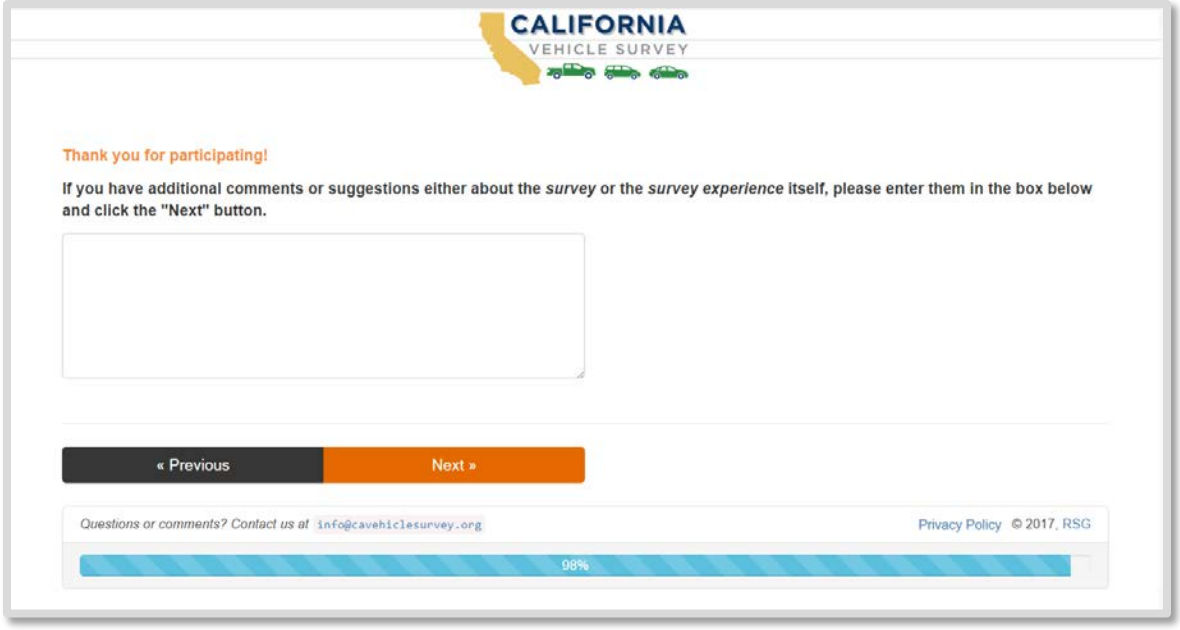
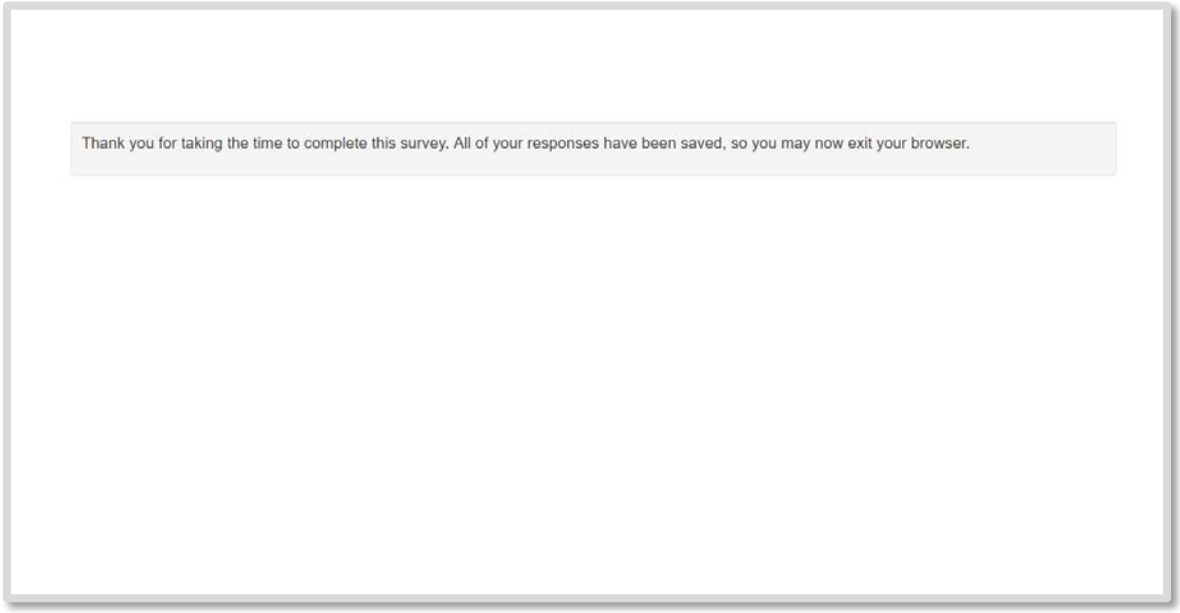


Figure F-77: End of Survey



Demographic Questions for Non-Qualified Participants

Questions in this section were only seen by respondents who did not qualify for the full/paid version of the survey.

Figure F-78: Willingness to Answer Demographic Questions

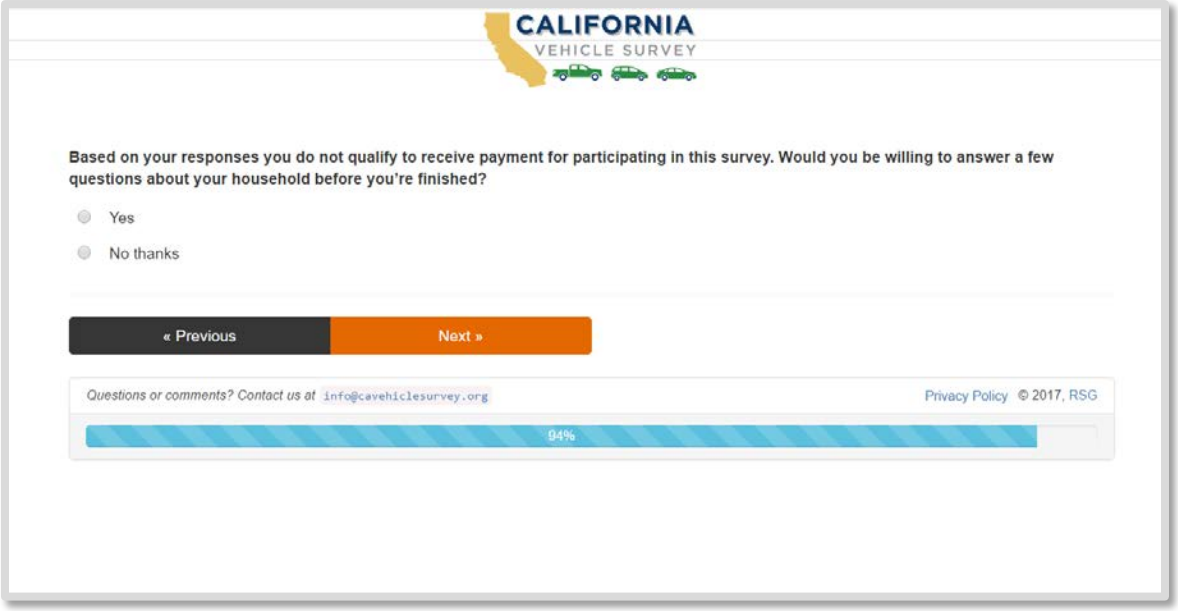


Figure F-79: Employed Members of Household

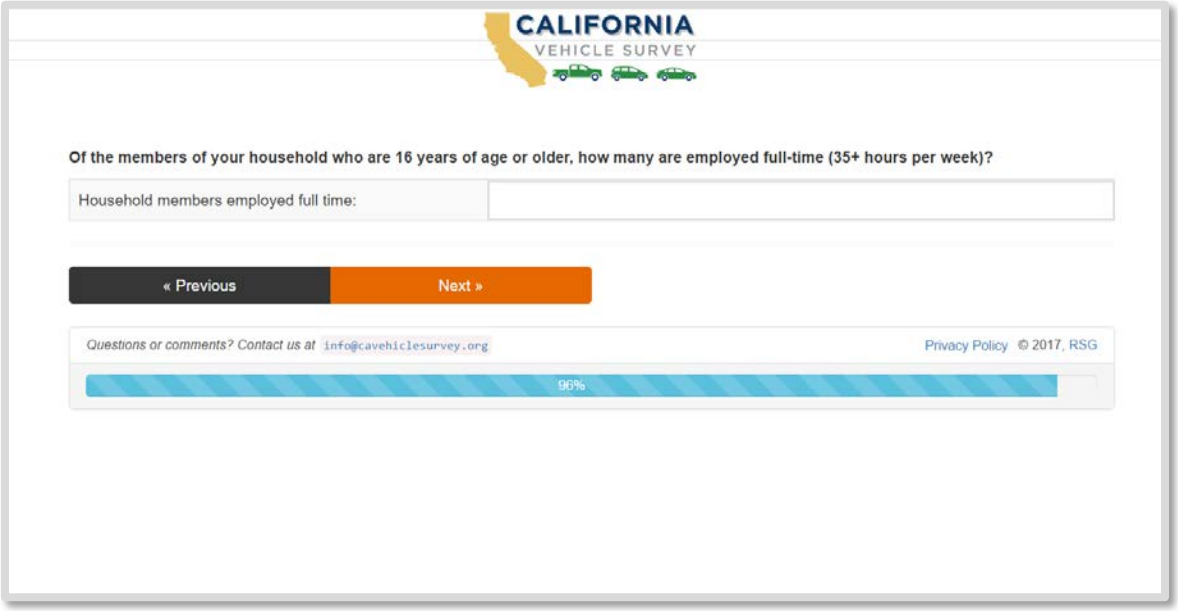
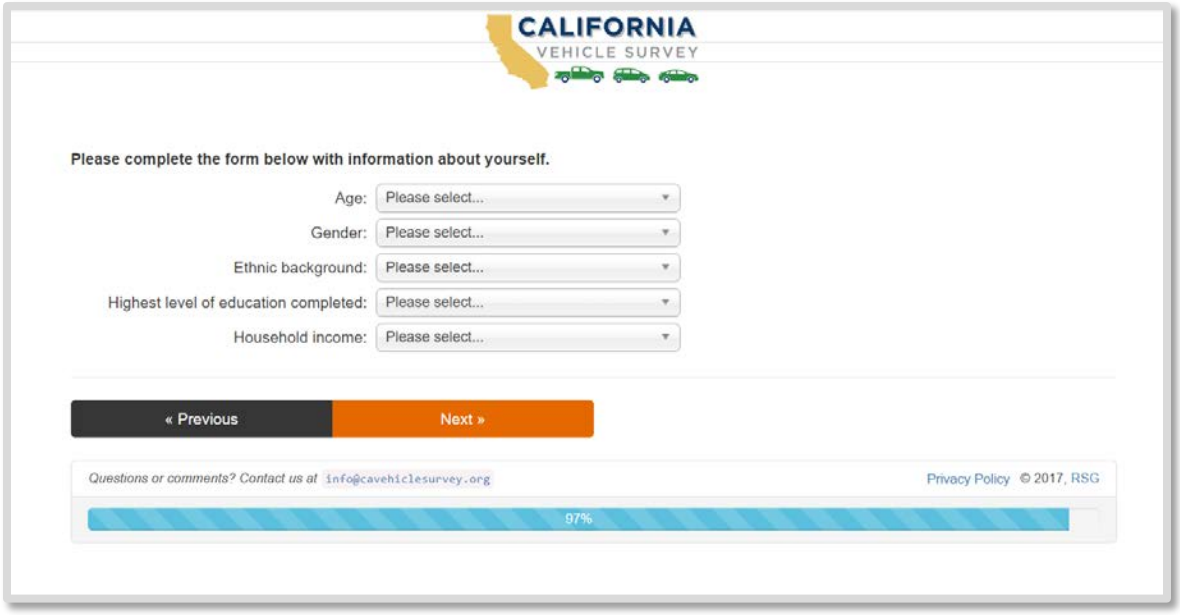
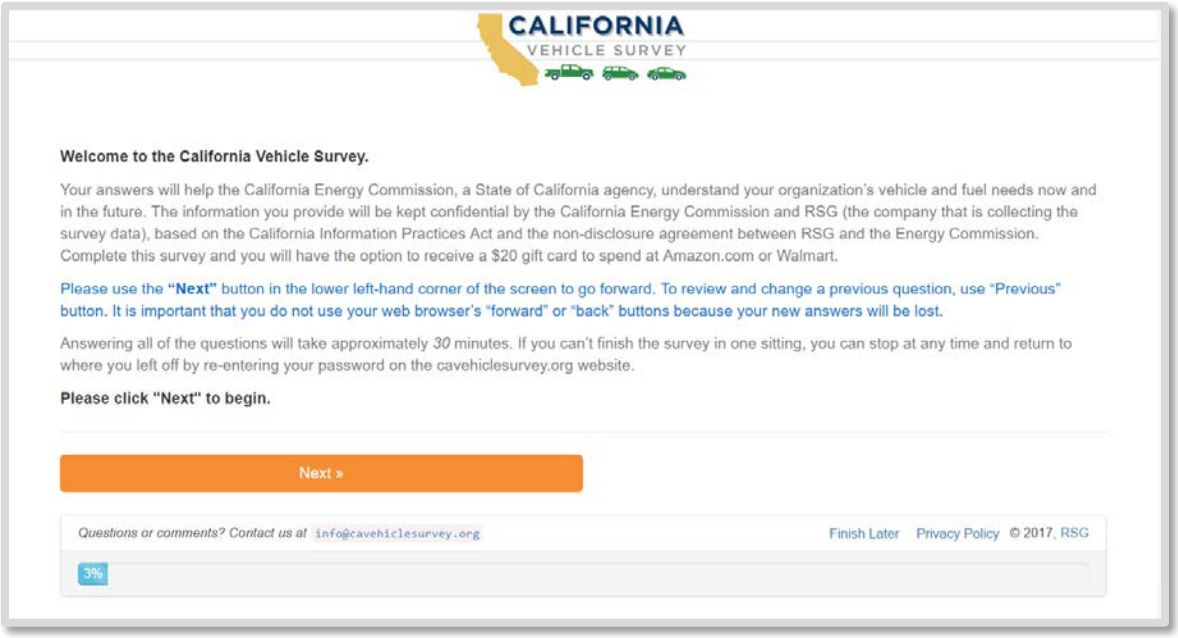


Figure F-80: Individual Demographic Information



Commercial Survey Screen Captures

Figure 11: Introduction



Screener Questions & Basic Respondent / Company Information

Figure F-82: Knowledge of Company Vehicles

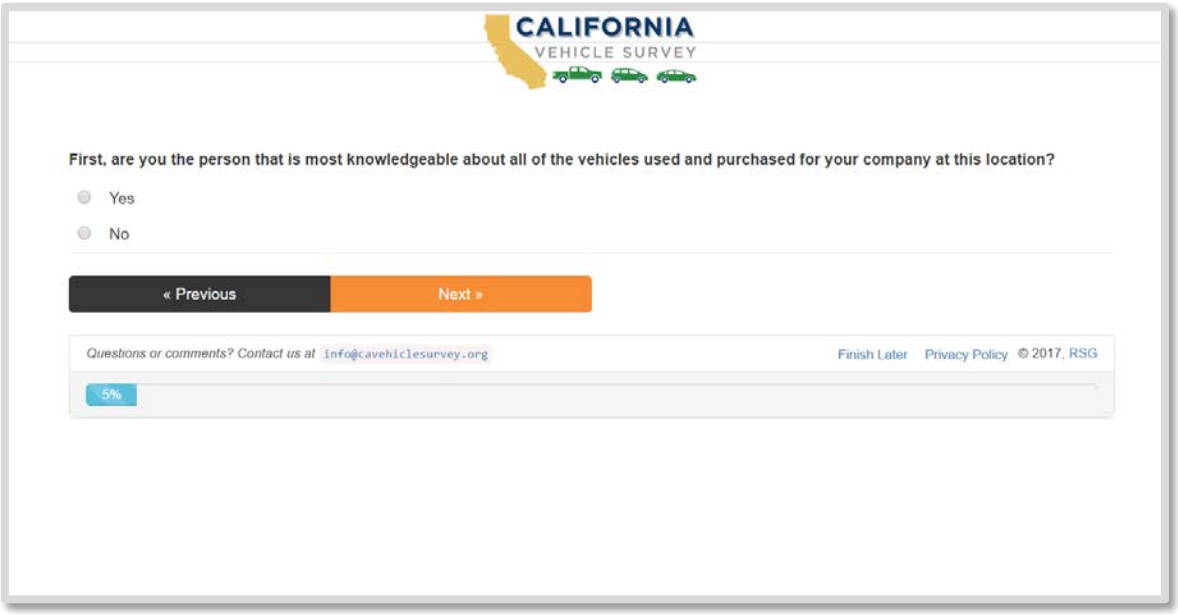


Figure F-83: Request for Person Most Knowledgeable about Company Vehicles

If respondent is not person most knowledgeable about company vehicles

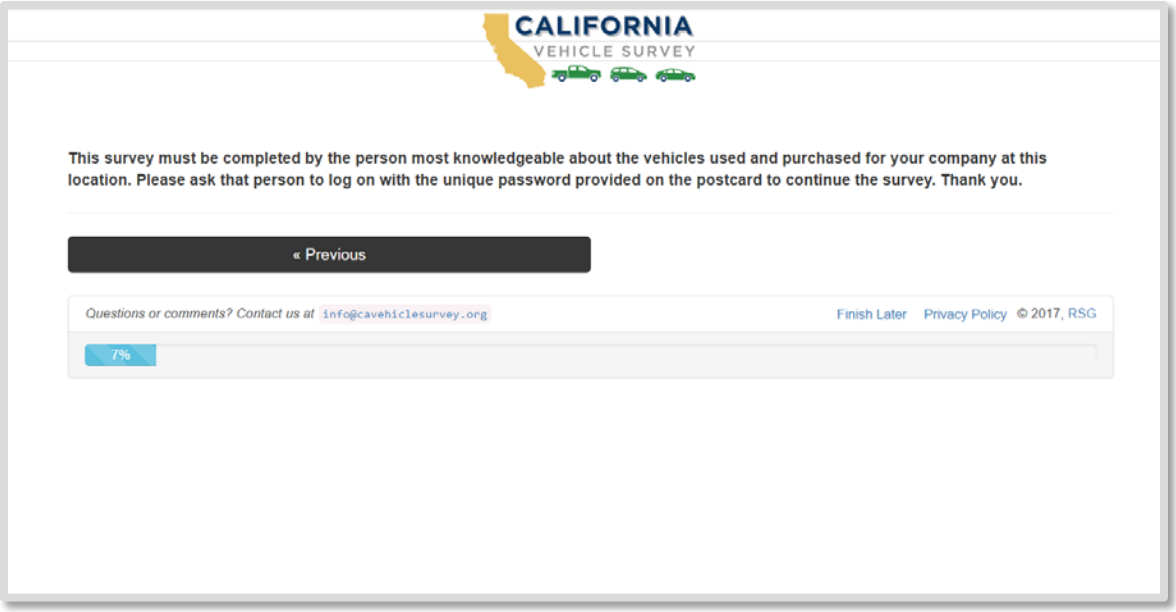


Figure F-84: Type of Organization

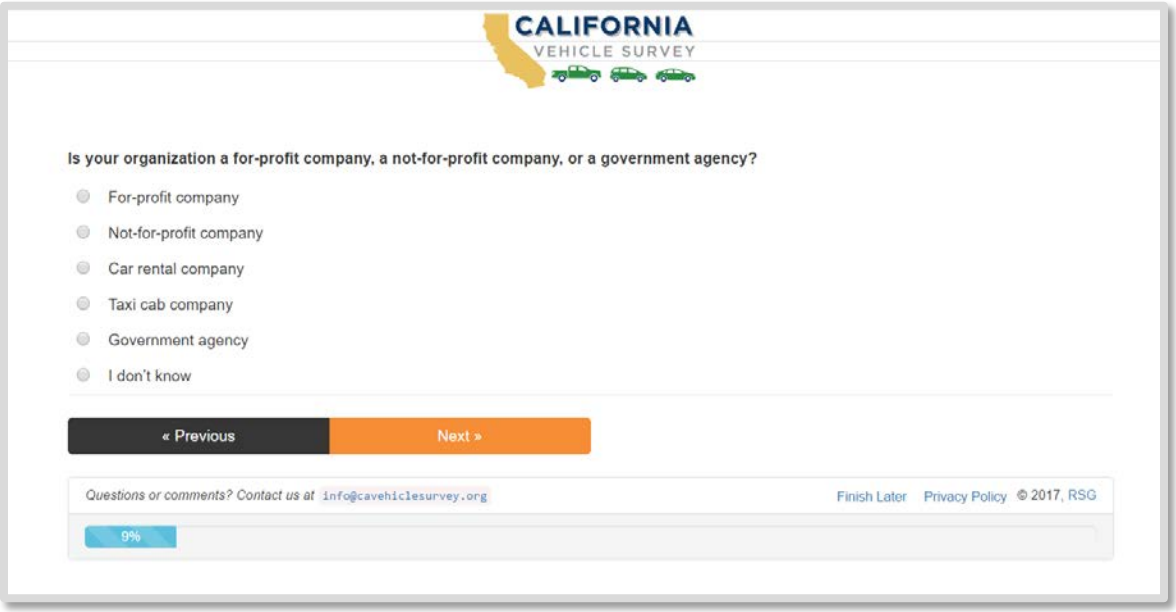


Figure F-85: Termination

If type of organization does not qualify for survey

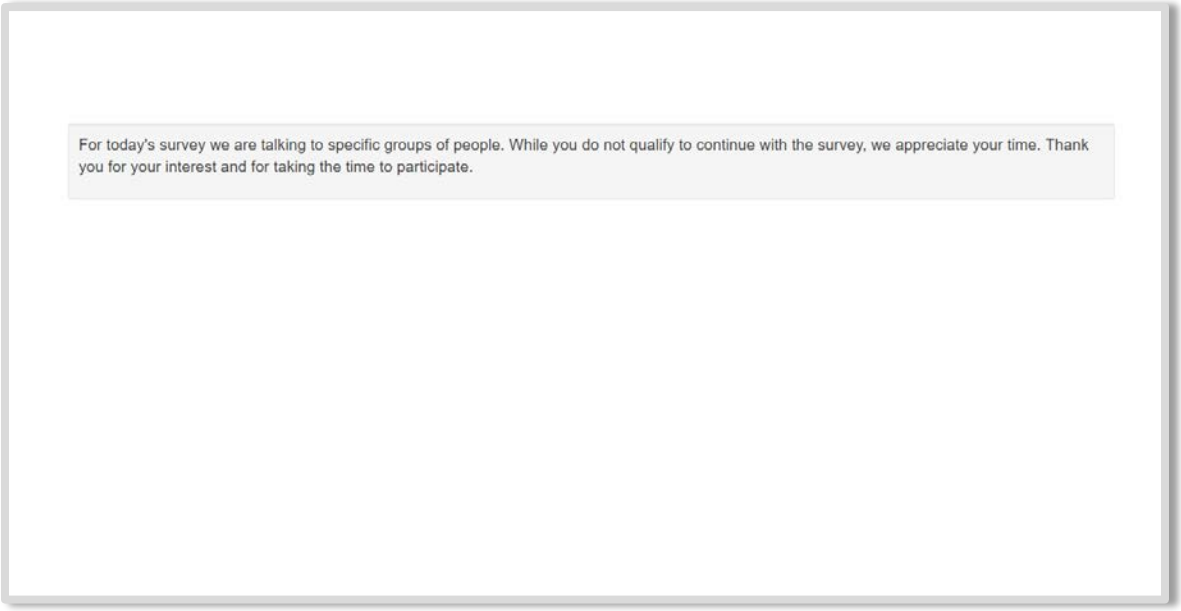


Figure F-86: Contact Information

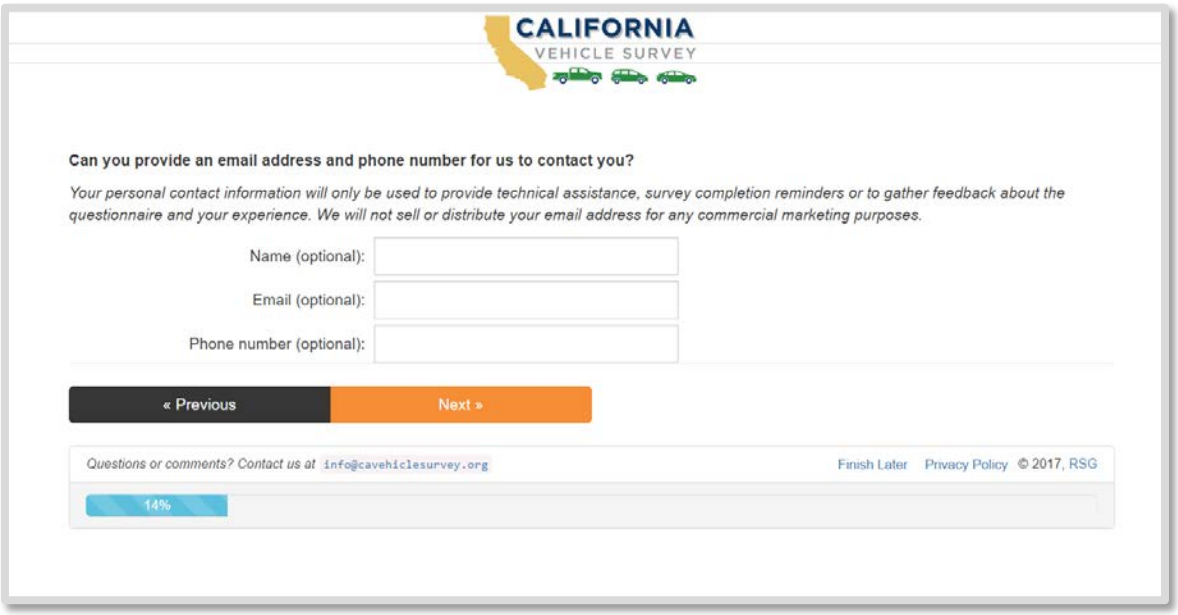


Figure F-87: Type of Business

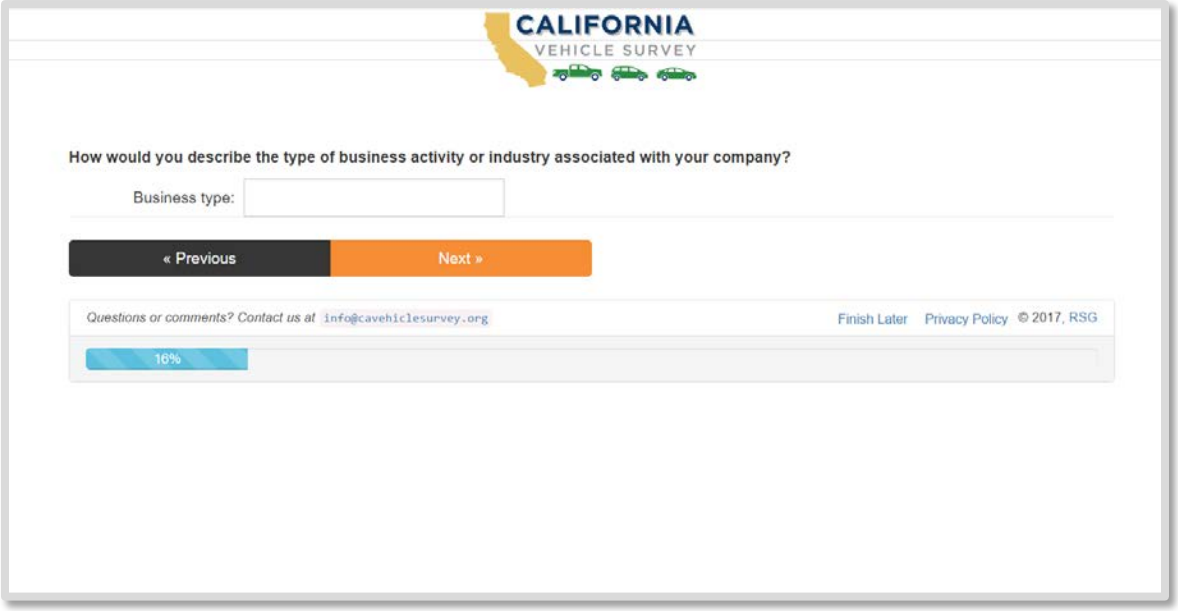


Figure F-88: Title

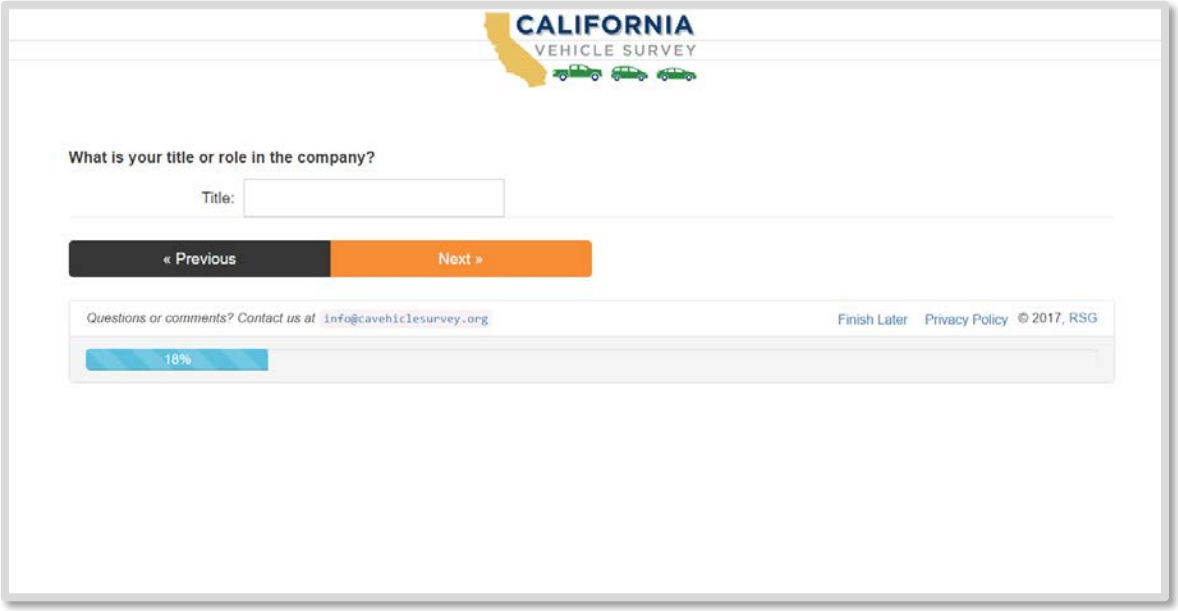


Figure F-89: Number of Business Locations in California

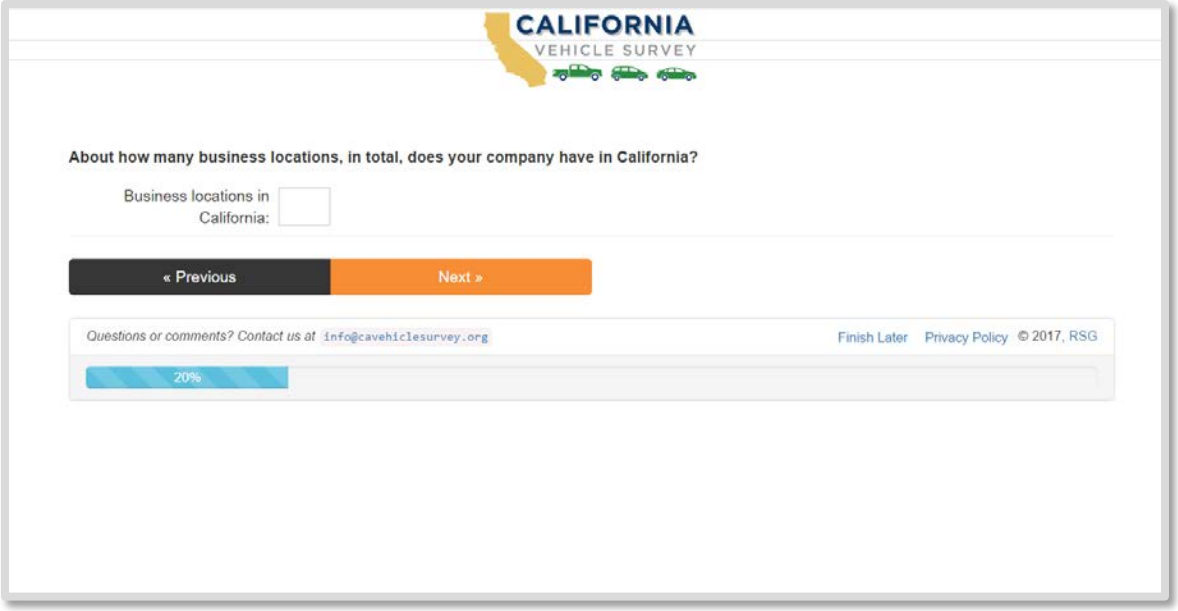
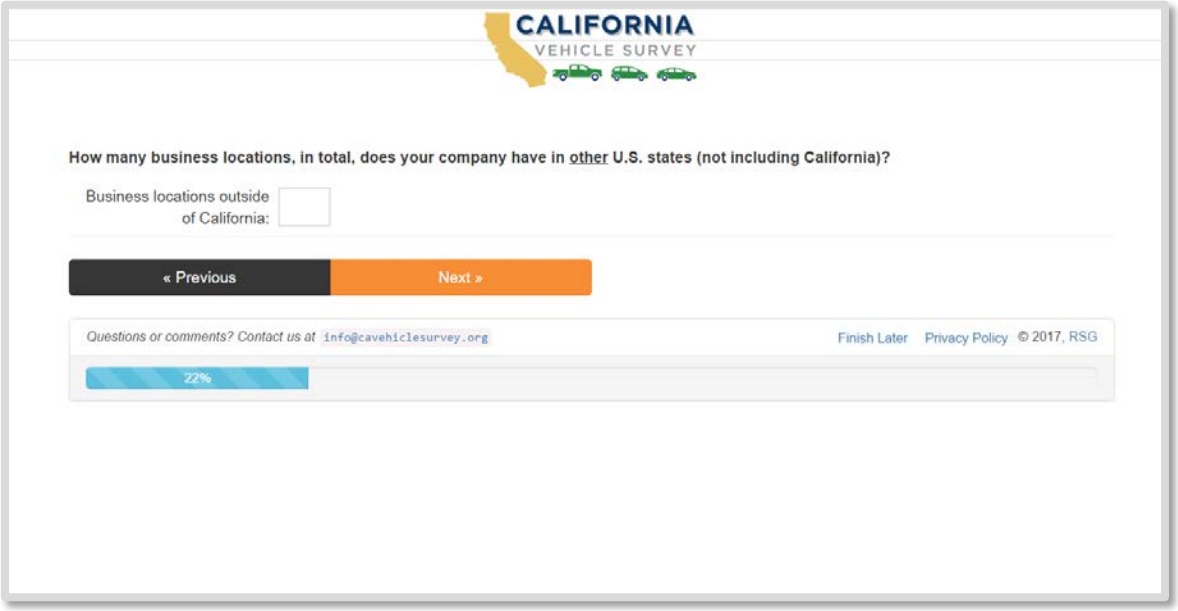
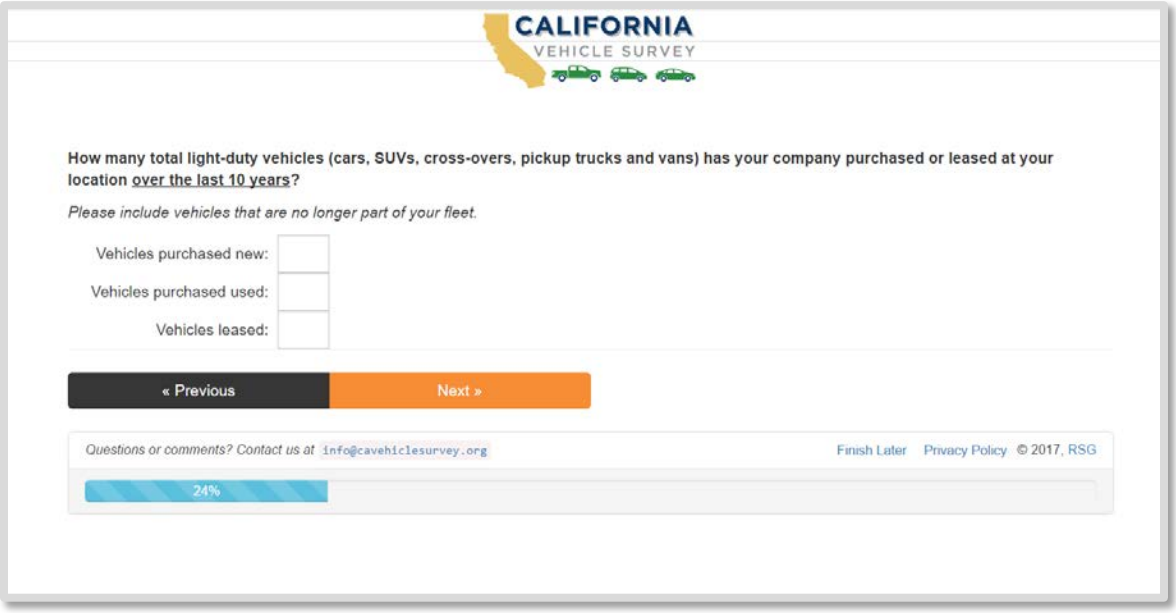


Figure F-90: Number of Business Locations outside of California



Current Vehicle Information

Figure F-91: Number of Vehicles at Location



CALIFORNIA
VEHICLE SURVEY

How many total light-duty vehicles (cars, SUVs, cross-overs, pickup trucks and vans) has your company purchased or leased at your location over the last 10 years?

Please include vehicles that are no longer part of your fleet.

Vehicles purchased new:

Vehicles purchased used:

Vehicles leased:

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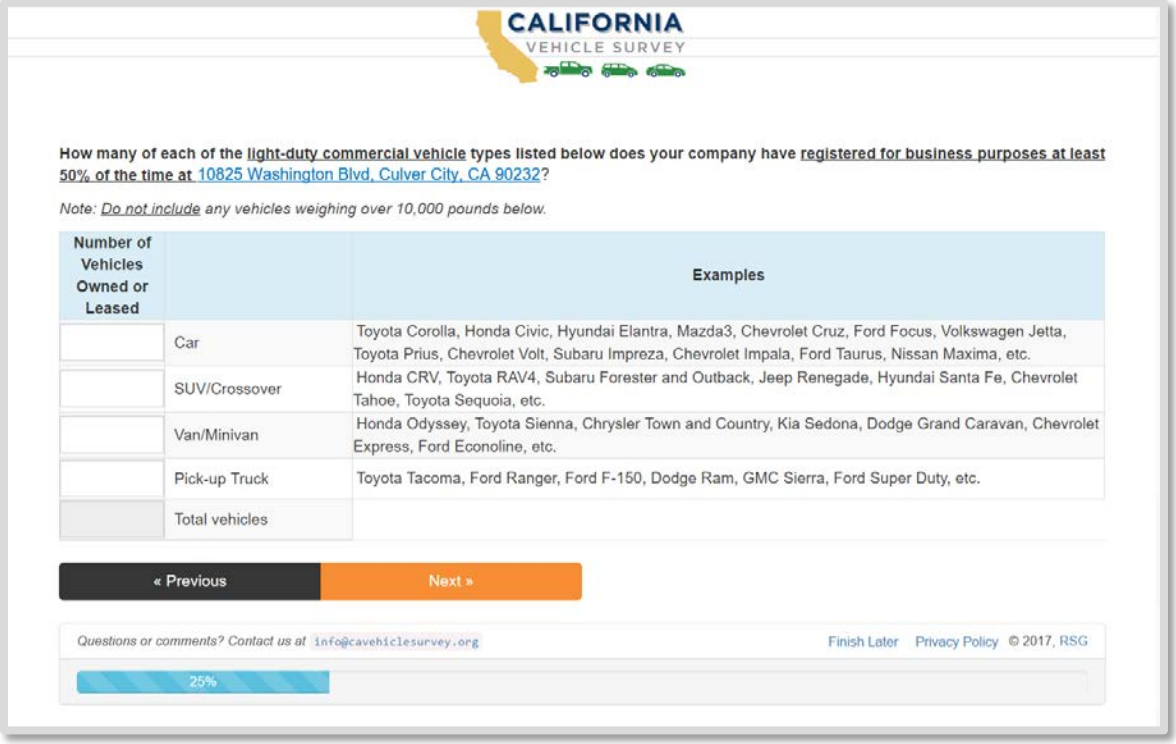
24%

Figure F-92: Types of Vehicles at Location



CALIFORNIA
VEHICLE SURVEY

How many of each of the light-duty commercial vehicle types listed below does your company have registered for business purposes at least 50% of the time at 10825 Washington Blvd, Culver City, CA 90232?

Note: Do not include any vehicles weighing over 10,000 pounds below.

Number of Vehicles Owned or Leased		Examples
	Car	Toyota Corolla, Honda Civic, Hyundai Elantra, Mazda3, Chevrolet Cruz, Ford Focus, Volkswagen Jetta, Toyota Prius, Chevrolet Volt, Subaru Impreza, Chevrolet Impala, Ford Taurus, Nissan Maxima, etc.
	SUV/Crossover	Honda CRV, Toyota RAV4, Subaru Forester and Outback, Jeep Renegade, Hyundai Santa Fe, Chevrolet Tahoe, Toyota Sequoia, etc.
	Van/Minivan	Honda Odyssey, Toyota Sienna, Chrysler Town and Country, Kia Sedona, Dodge Grand Caravan, Chevrolet Express, Ford Econoline, etc.
	Pick-up Truck	Toyota Tacoma, Ford Ranger, Ford F-150, Dodge Ram, GMC Sierra, Ford Super Duty, etc.
	Total vehicles	

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25%

Figure F-93: Powertrain Types for Vehicles at Location

CALIFORNIA VEHICLE SURVEY

You indicated that your company has 4 light vehicles at 10825 Washington Blvd, Culver City, CA 90232.

How many of each of the following types of light-duty vehicles does your company own or lease?

Number of Vehicles Owned or Leased	Vehicle Type	Description
0	Gasoline	An engine that runs on gasoline only.
0	Hybrid (Gasoline)	A gasoline vehicle with a small battery that is charged inside the car and does not plug in for charging the battery (e.g. Toyota Prius).
0	Plug-in Hybrid Electric vehicle (PHEV)	A gasoline vehicle with a larger battery that plugs into an electrical outlet to charge (e.g. Chevy Volt) which allows the vehicle to operate like a battery electric vehicle for a short distance (10-50 miles) and then operate on gasoline for a much longer distance (~300-400 miles).
0	Gasoline - ethanol Flex Fuel vehicle (E85 FFV)	A vehicle that will operate on gasoline and/or ethanol (E85 with 85% ethanol), or any blend of the two fuels.
0	Diesel	A vehicle that operates on diesel or biodiesel.
0	Compressed Natural Gas (CNG) vehicle	A vehicle that only operates on compressed natural gas (CNG). It can be filled up at home, with special equipment, or at a fast fill station.
0	Full Electric vehicle	A vehicle that operates only on electricity, with a battery that charges by plugging into an electrical outlet at home, at work, or at a fast charge station (e.g. Nissan Leaf, Tesla).
0	Hydrogen vehicle	A vehicle that uses hydrogen to generate its own electricity in a fuel cell (e.g. Toyota Mirai). Hydrogen is stored in a tank onboard the vehicle and can be filled up at a hydrogen station.
0	Total number of vehicles	

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27%

Figure F-94: Anticipated Timeframe of Next Purchase or Lease

CALIFORNIA VEHICLE SURVEY

When do you think you may purchase or lease one or more light-duty vehicles that will be company-owned/leased and/or used for business purposes in California at least 50% of the time?

Again, by light-duty vehicle, we mean vehicles that are 10,000 pounds or less.

- Within the next 5 years
- Within the next 6-10 years
- More than 10 years from now
- Never

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29%

Figure F-95: Vehicle(s) – Basic Information

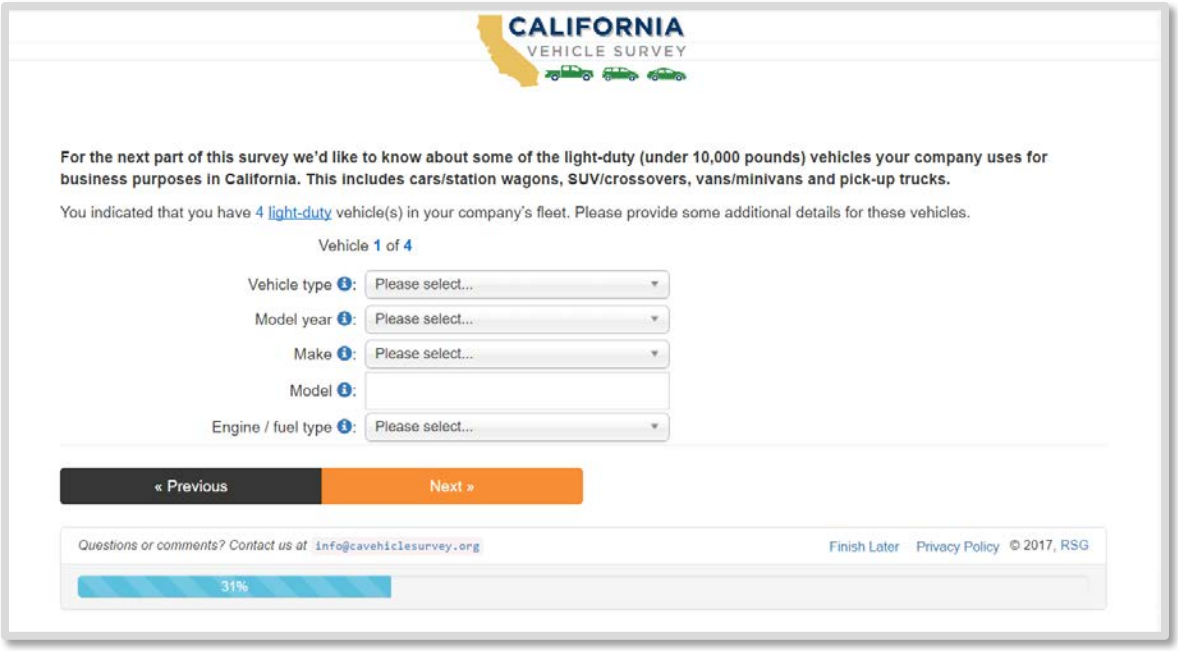


Figure F-96: Operation of Vehicle(s) for Business Purposes in California

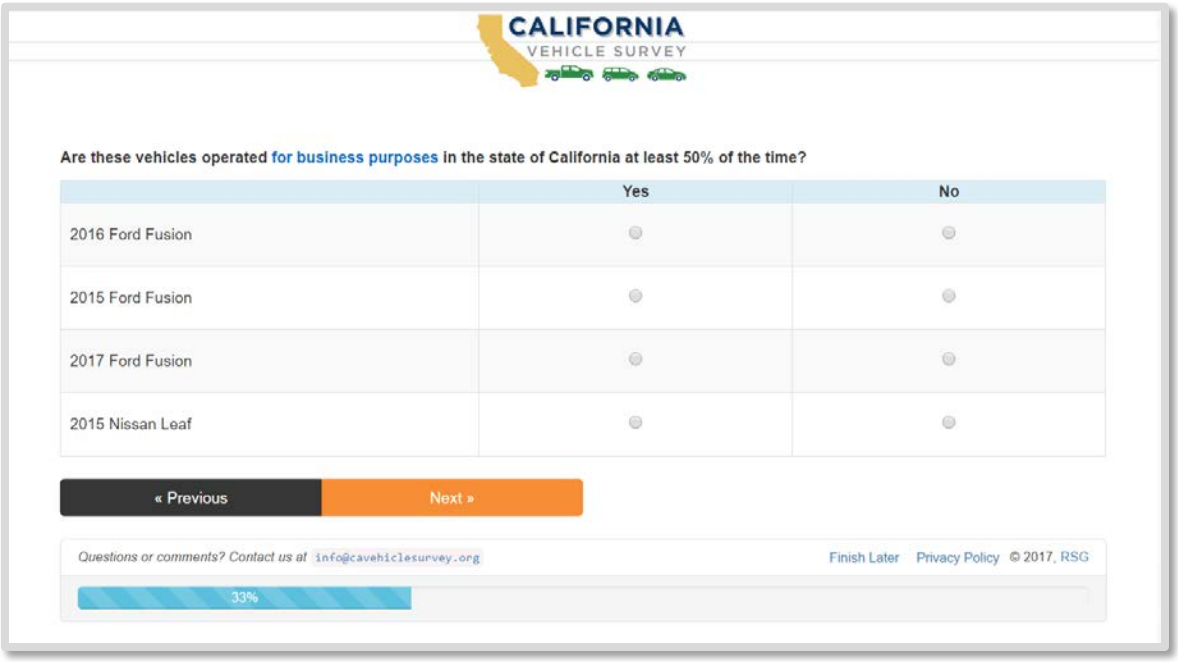
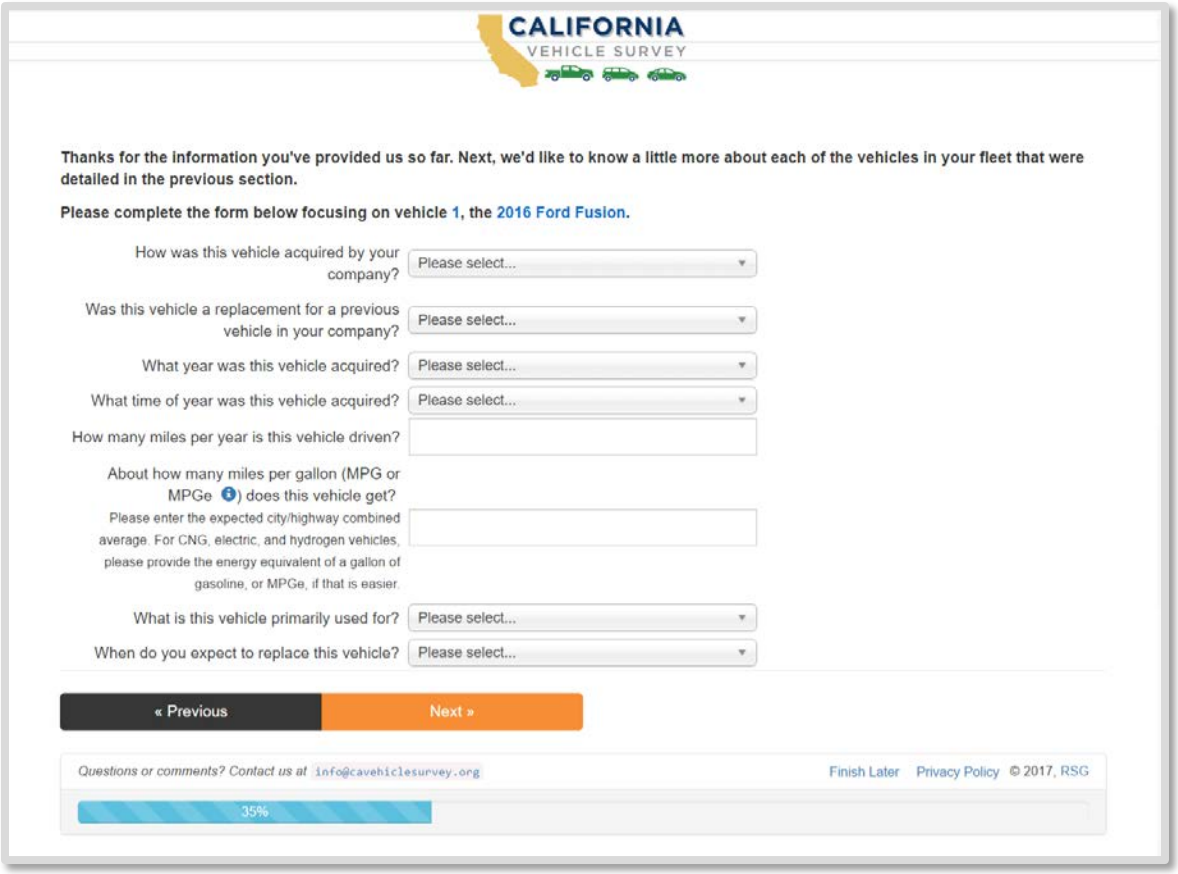


Figure F-97: Vehicle(s) – Acquisition and Use Information



Plug-in Hybrid Electric Vehicle (PHEV) or Battery Electric Vehicle (BEV) Information

Questions in this section were only seen by respondents indicating ownership of a PHEV or BEV.

Figure F-98: Reasons for Purchasing a Full Electric Vehicle

If one or more company vehicles at this location are full electric vehicles

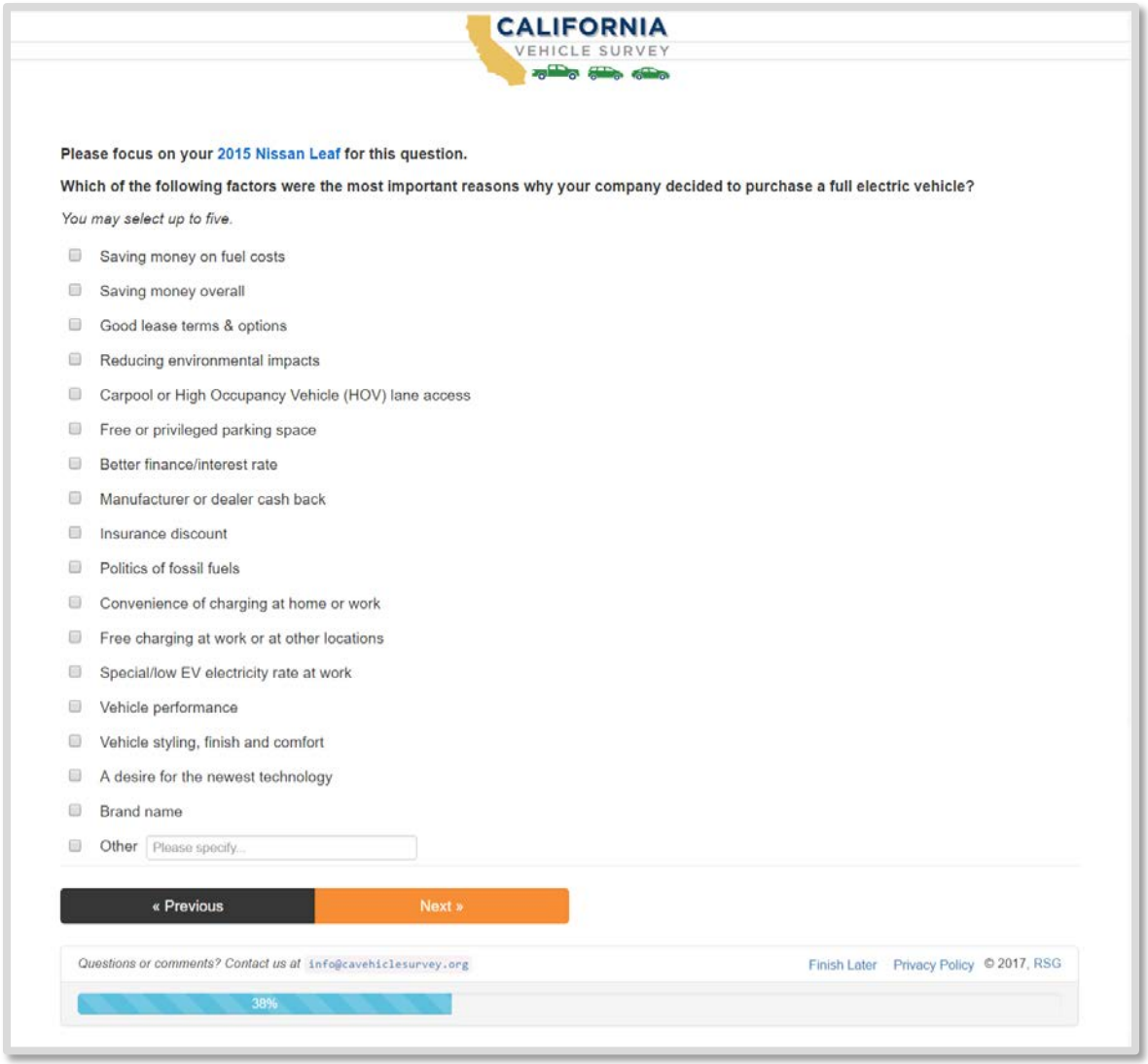
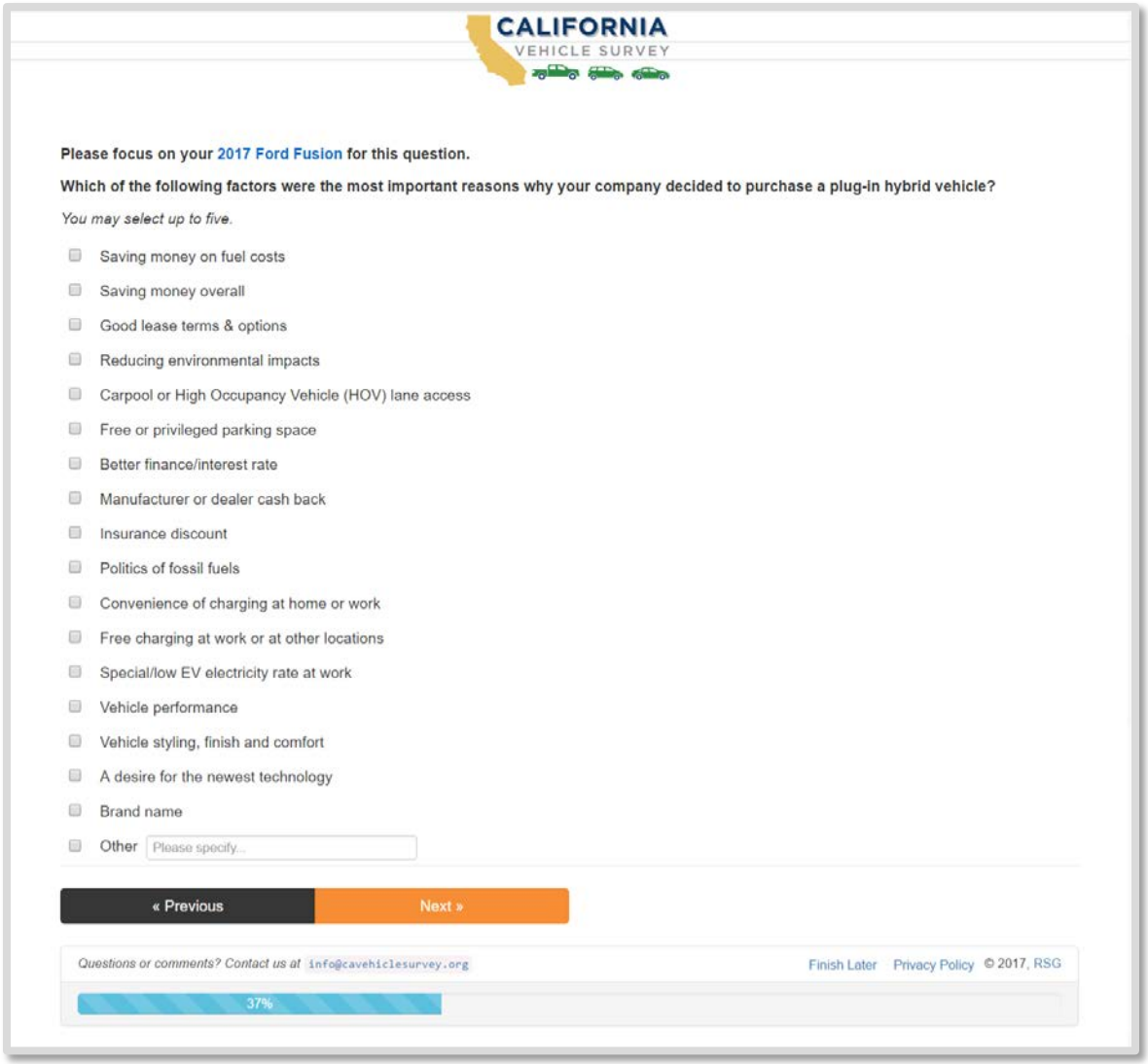


Figure F-99: Reasons for Purchasing a Plug-in Hybrid Vehicle

If one or more company vehicles at this location are plug-in hybrid vehicles, but none are full electric vehicles



CALIFORNIA
VEHICLE SURVEY

Please focus on your 2017 Ford Fusion for this question.

Which of the following factors were the most important reasons why your company decided to purchase a plug-in hybrid vehicle?

You may select up to five.

- Saving money on fuel costs
- Saving money overall
- Good lease terms & options
- Reducing environmental impacts
- Carpool or High Occupancy Vehicle (HOV) lane access
- Free or privileged parking space
- Better finance/interest rate
- Manufacturer or dealer cash back
- Insurance discount
- Politics of fossil fuels
- Convenience of charging at home or work
- Free charging at work or at other locations
- Special/low EV electricity rate at work
- Vehicle performance
- Vehicle styling, finish and comfort
- A desire for the newest technology
- Brand name
- Other Please specify...

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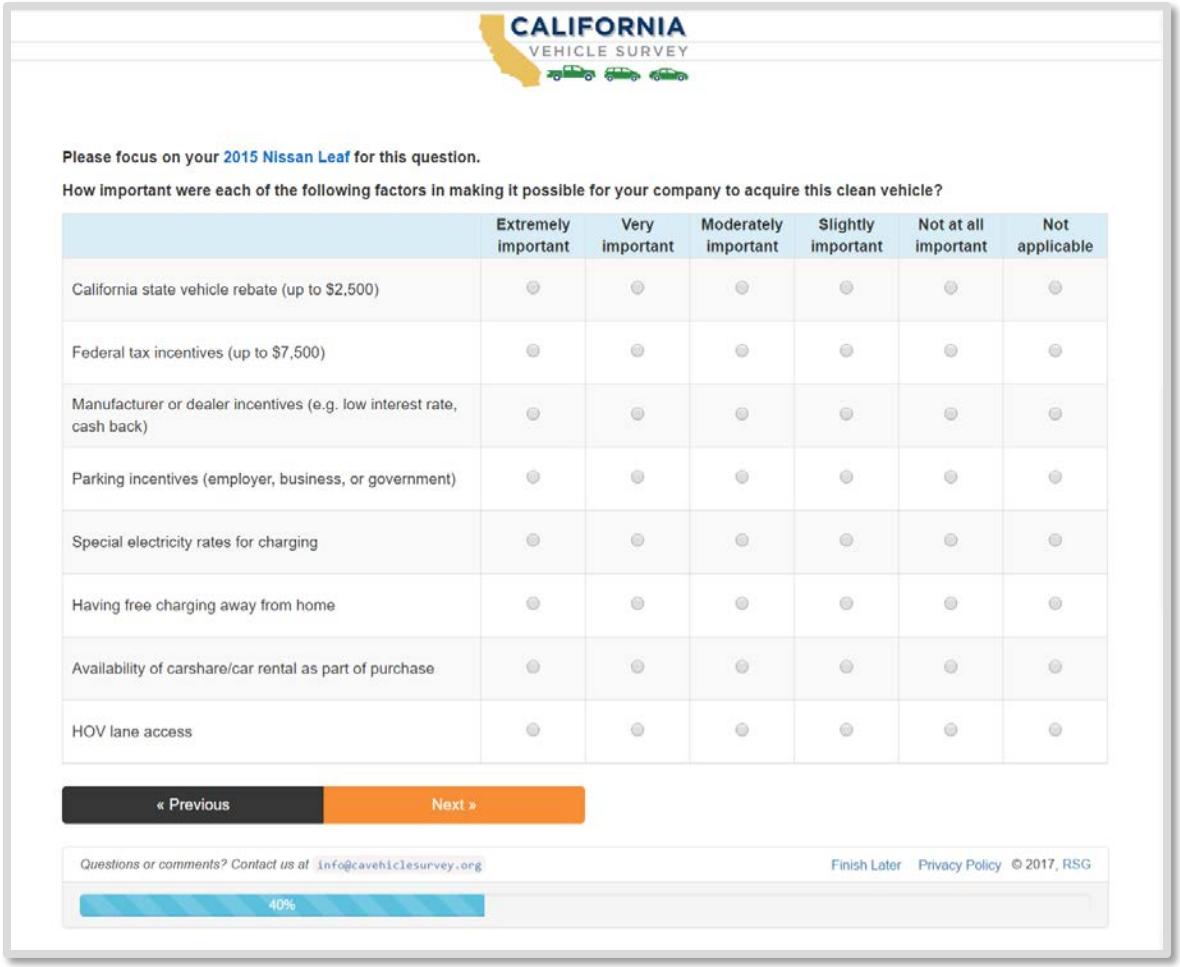
37%

Figure F-100: Factors in Purchasing Clean Vehicle



CALIFORNIA VEHICLE SURVEY

Please focus on your 2015 Nissan Leaf for this question.

How important were each of the following factors in making it possible for your company to acquire this clean vehicle?

	Extremely important	Very important	Moderately important	Slightly important	Not at all important	Not applicable
California state vehicle rebate (up to $2,500)						
Federal tax incentives (up to $7,500)						
Manufacturer or dealer incentives (e.g. low interest rate, cash back)						
Parking incentives (employer, business, or government)						
Special electricity rates for charging						
Having free charging away from home						
Availability of carshare/car rental as part of purchase						
HOV lane access						

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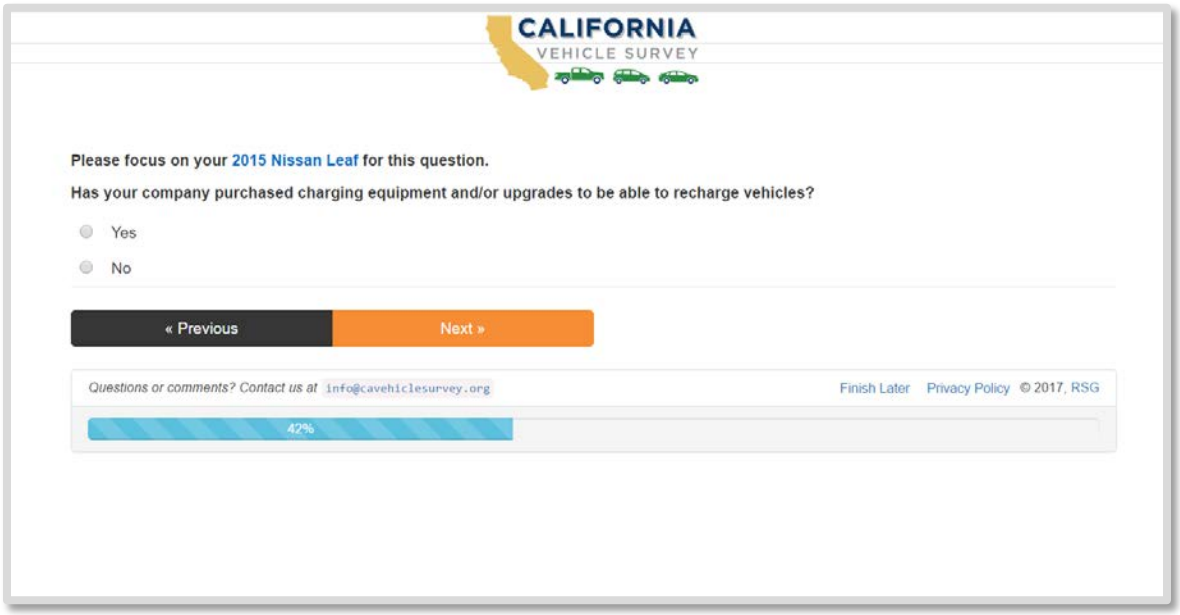
40%

Figure F-101: Purchase of Charging Equipment



CALIFORNIA VEHICLE SURVEY

Please focus on your 2015 Nissan Leaf for this question.

Has your company purchased charging equipment and/or upgrades to be able to recharge vehicles?

- Yes
- No

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42%

Figure F-102: Cost of Charging Equipment

If company has purchased charging equipment

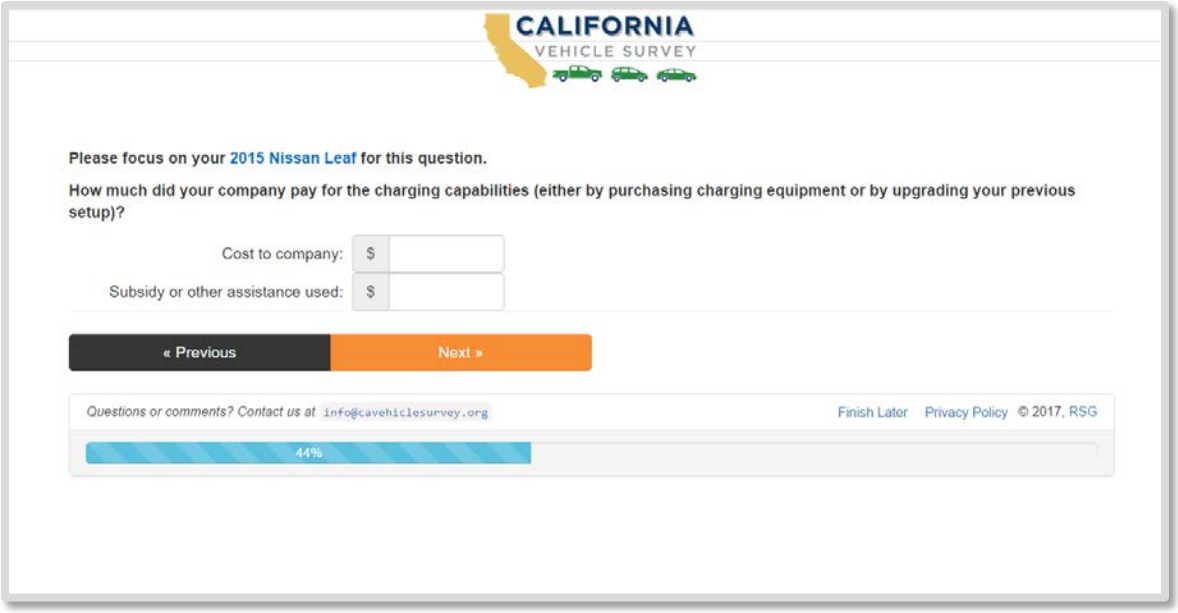


Figure F-103: Charging Frequency

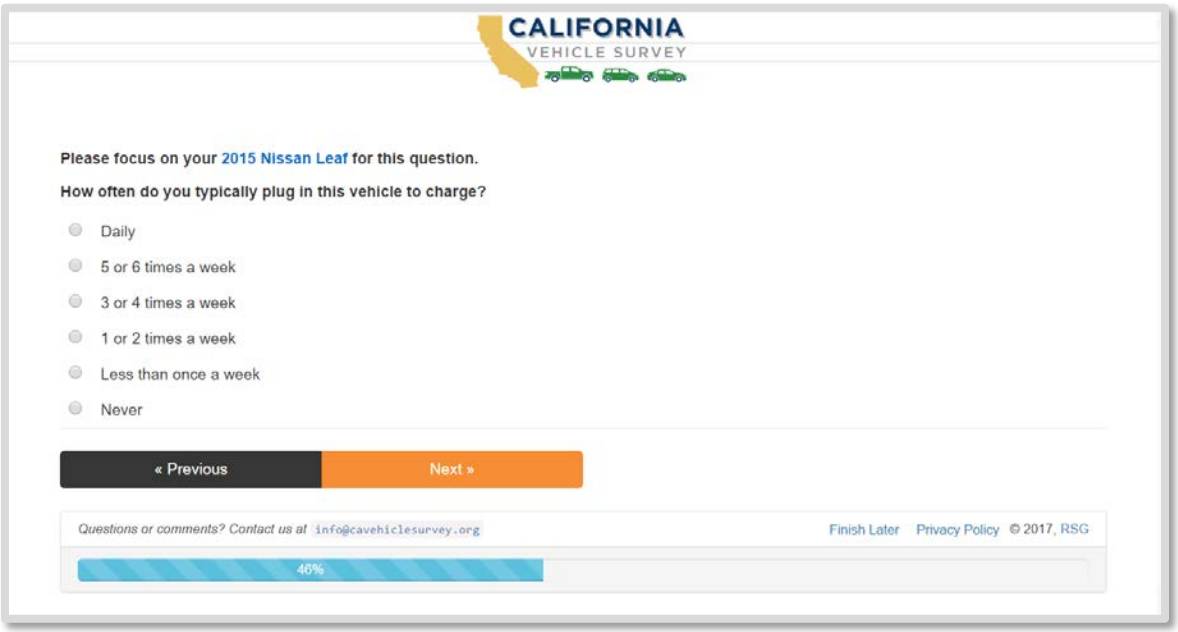
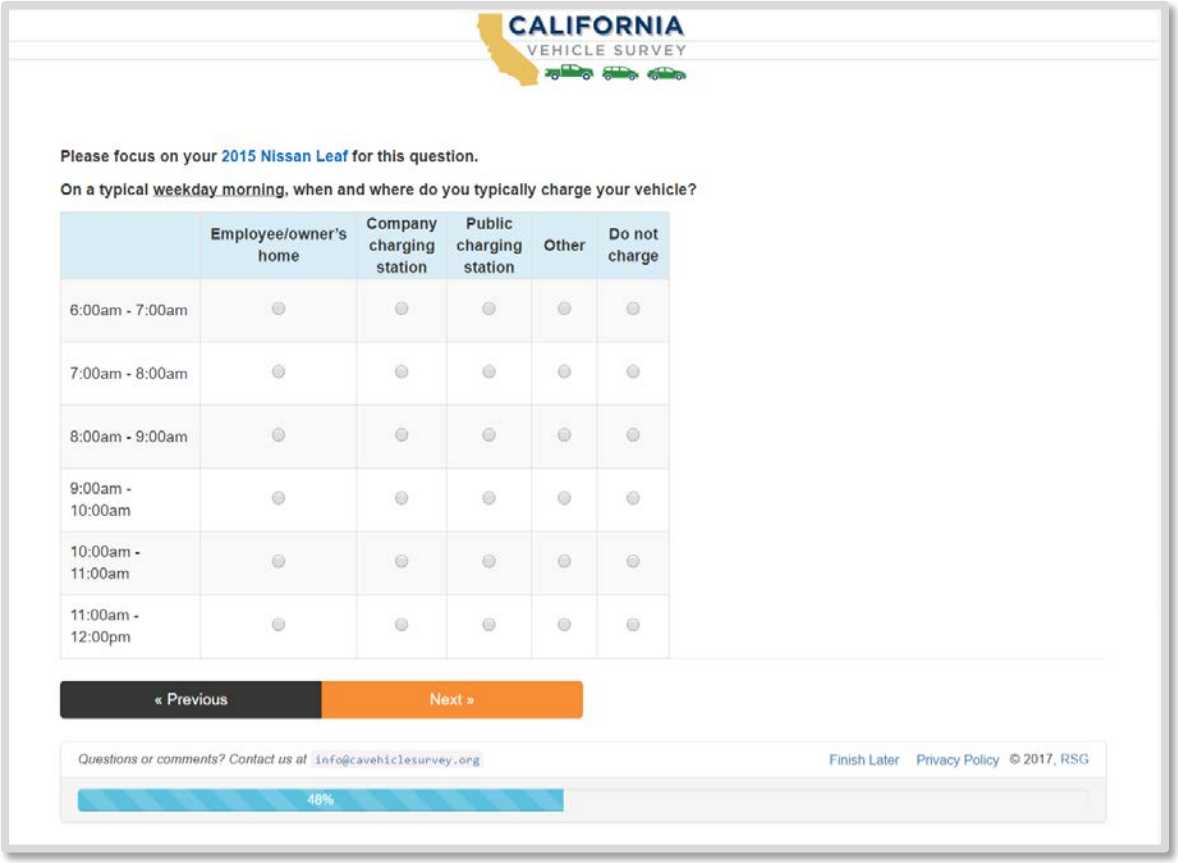


Figure F-104: Charging Locations and Times – Weekday Mornings

If vehicle is ever plugged in to charge



CALIFORNIA VEHICLE SURVEY

Please focus on your 2015 Nissan Leaf for this question.

On a typical weekday morning, when and where do you typically charge your vehicle?

	Employee/owner's home	Company charging station	Public charging station	Other	Do not charge
6:00am - 7:00am					
7:00am - 8:00am					
8:00am - 9:00am					
9:00am - 10:00am					
10:00am - 11:00am					
11:00am - 12:00pm					

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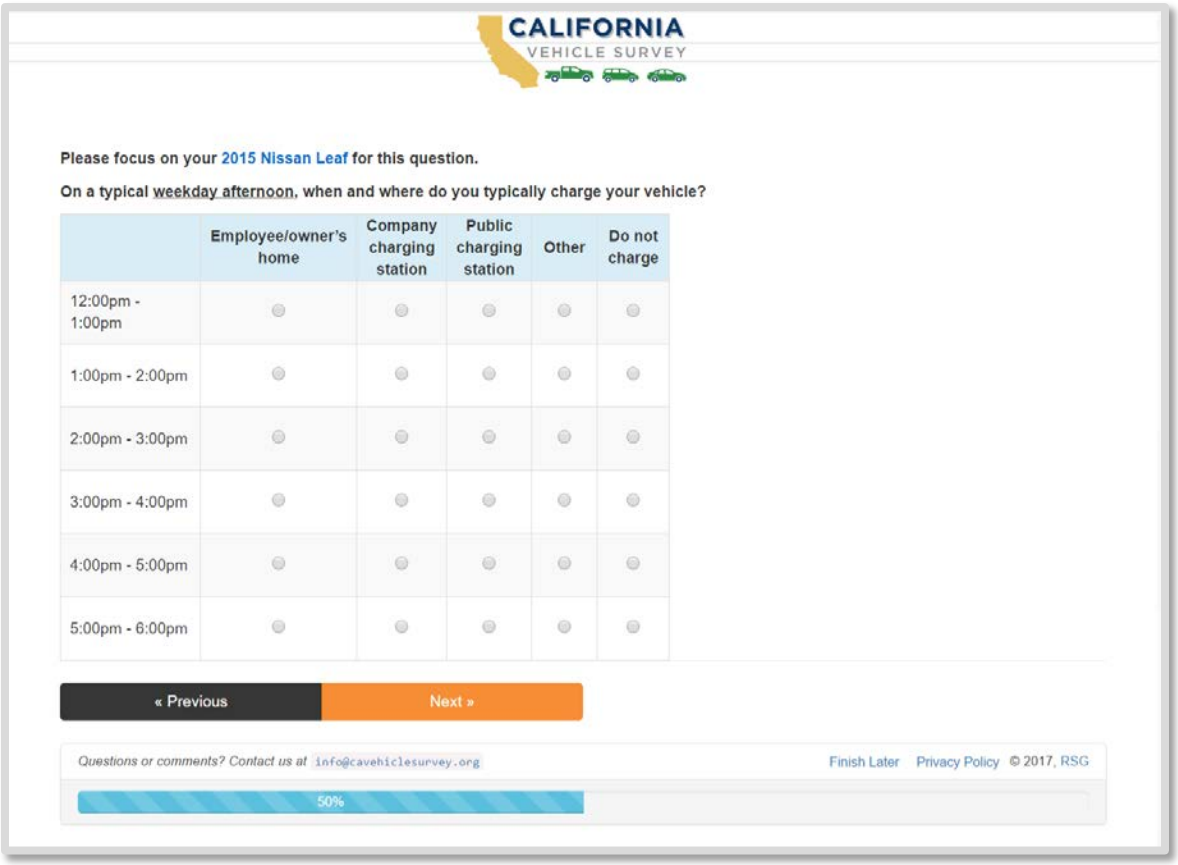
48%

Figure F-105: Charging Locations and Times – Weekday Afternoons

If vehicle is ever plugged in to charge



CALIFORNIA VEHICLE SURVEY

Please focus on your 2015 Nissan Leaf for this question.

On a typical weekday afternoon, when and where do you typically charge your vehicle?

	Employee/owner's home	Company charging station	Public charging station	Other	Do not charge
12:00pm - 1:00pm					
1:00pm - 2:00pm					
2:00pm - 3:00pm					
3:00pm - 4:00pm					
4:00pm - 5:00pm					
5:00pm - 6:00pm					

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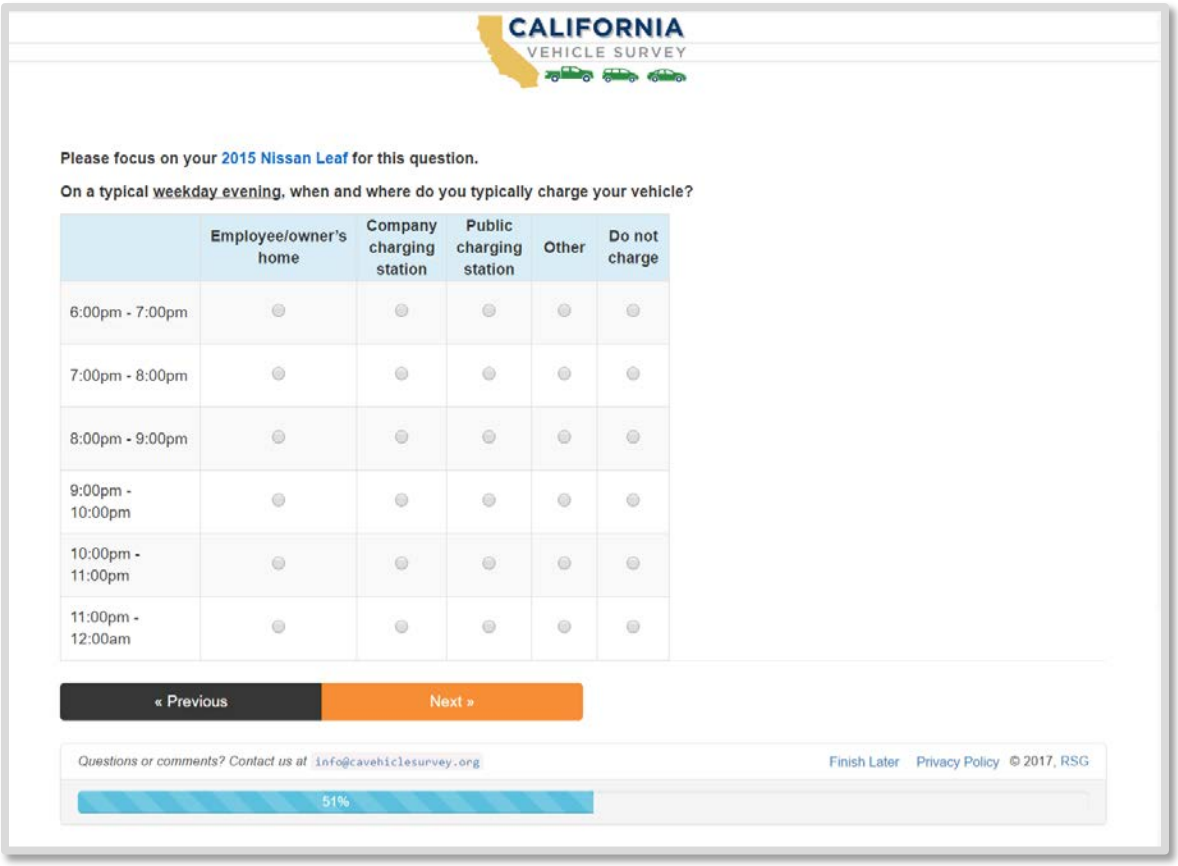
50%

Figure F-106: Charging Locations and Times – Weekday Evenings

If vehicle is ever plugged in to charge



CALIFORNIA VEHICLE SURVEY

Please focus on your 2015 Nissan Leaf for this question.

On a typical weekday evening, when and where do you typically charge your vehicle?

	Employee/owner's home	Company charging station	Public charging station	Other	Do not charge
6:00pm - 7:00pm					
7:00pm - 8:00pm					
8:00pm - 9:00pm					
9:00pm - 10:00pm					
10:00pm - 11:00pm					
11:00pm - 12:00am					

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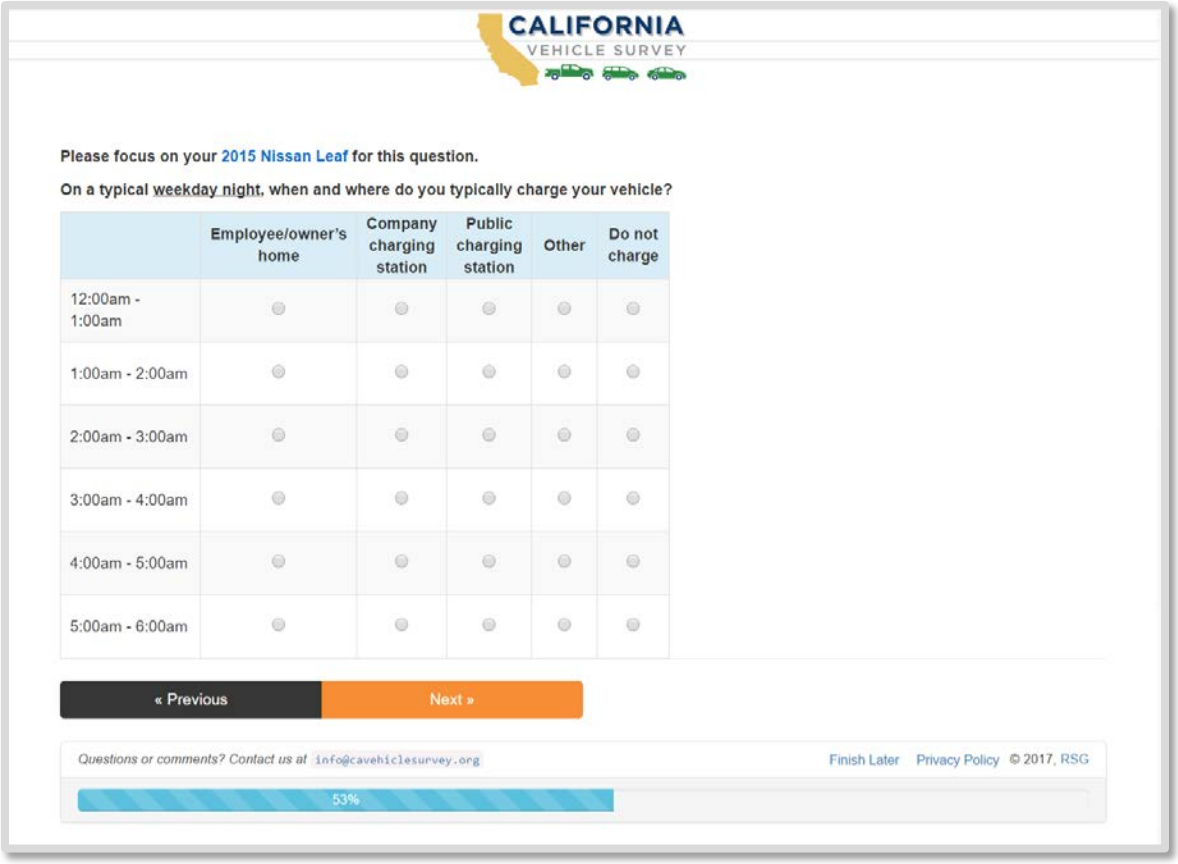
51%

Figure F-107: Charging Locations and Times – Weekday Nights

If vehicle is ever plugged in to charge



CALIFORNIA VEHICLE SURVEY

Please focus on your 2015 Nissan Leaf for this question.

On a typical weekday night, when and where do you typically charge your vehicle?

	Employee/owner's home	Company charging station	Public charging station	Other	Do not charge
12:00am - 1:00am					
1:00am - 2:00am					
2:00am - 3:00am					
3:00am - 4:00am					
4:00am - 5:00am					
5:00am - 6:00am					

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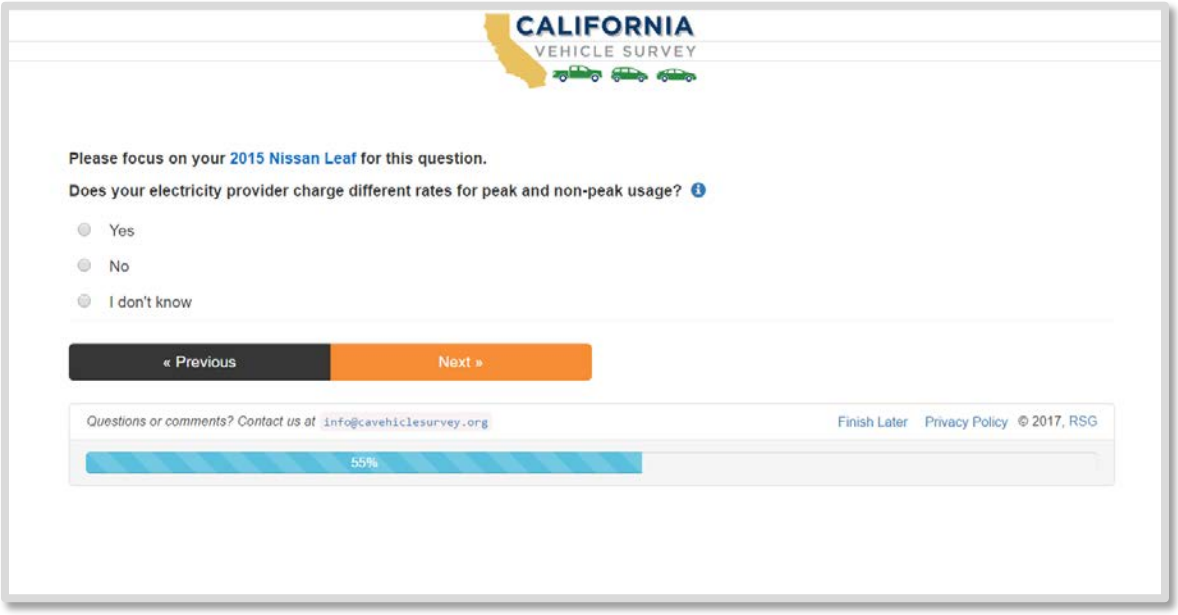
53%

Figure F-108: Peak vs. Off Peak Electricity Rates



CALIFORNIA VEHICLE SURVEY

Please focus on your 2015 Nissan Leaf for this question.

Does your electricity provider charge different rates for peak and non-peak usage?

- Yes
- No
- I don't know

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55%

Figure F-109: Separate Vehicle Electricity Meter

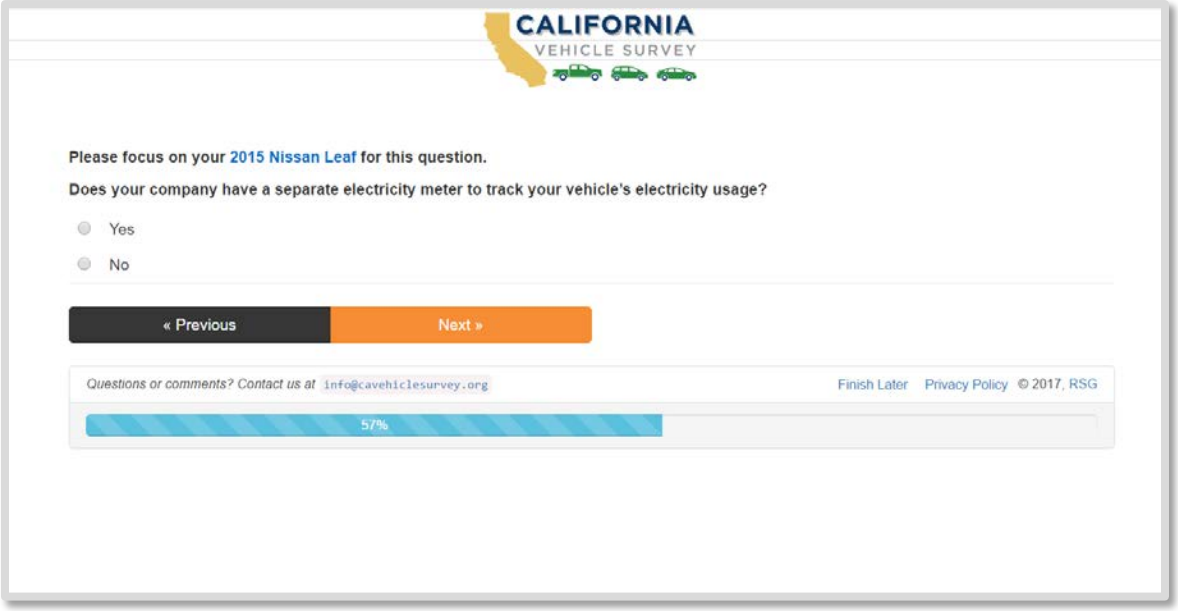


Figure F-110: Separate Vehicle Electricity Rate

If company has separate vehicle electricity meter

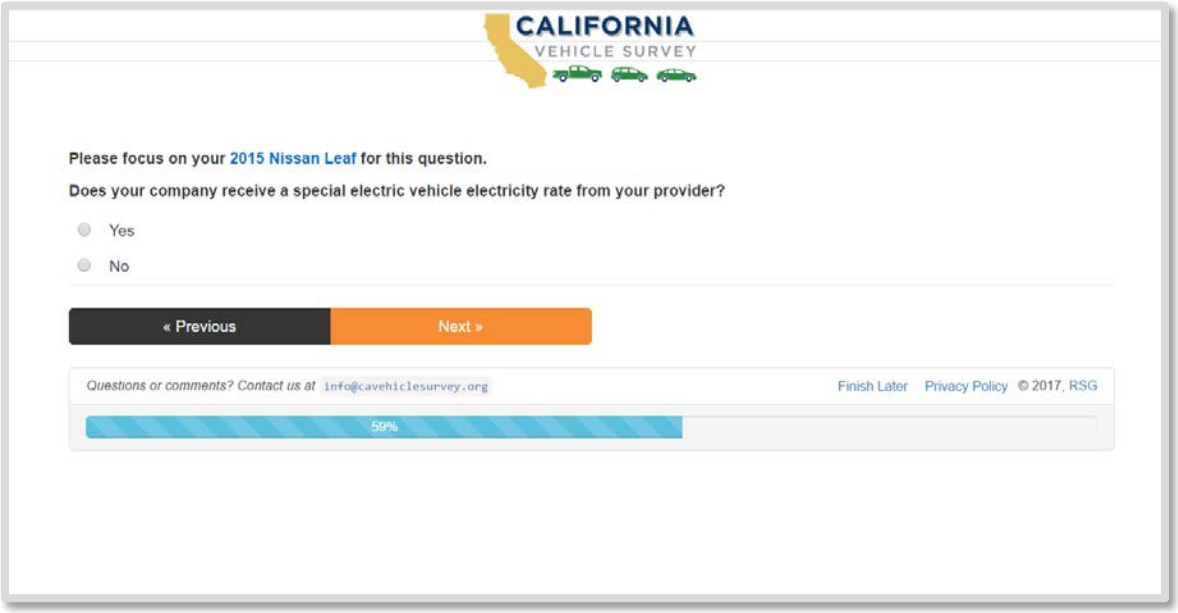


Figure F-111: Vehicle Charging Cost

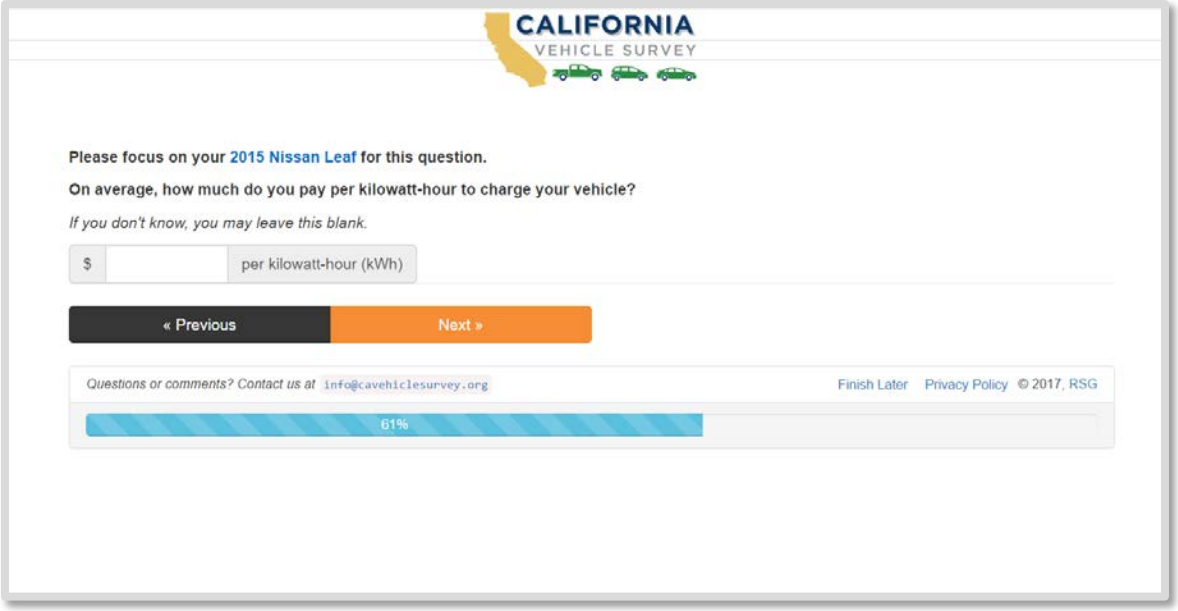
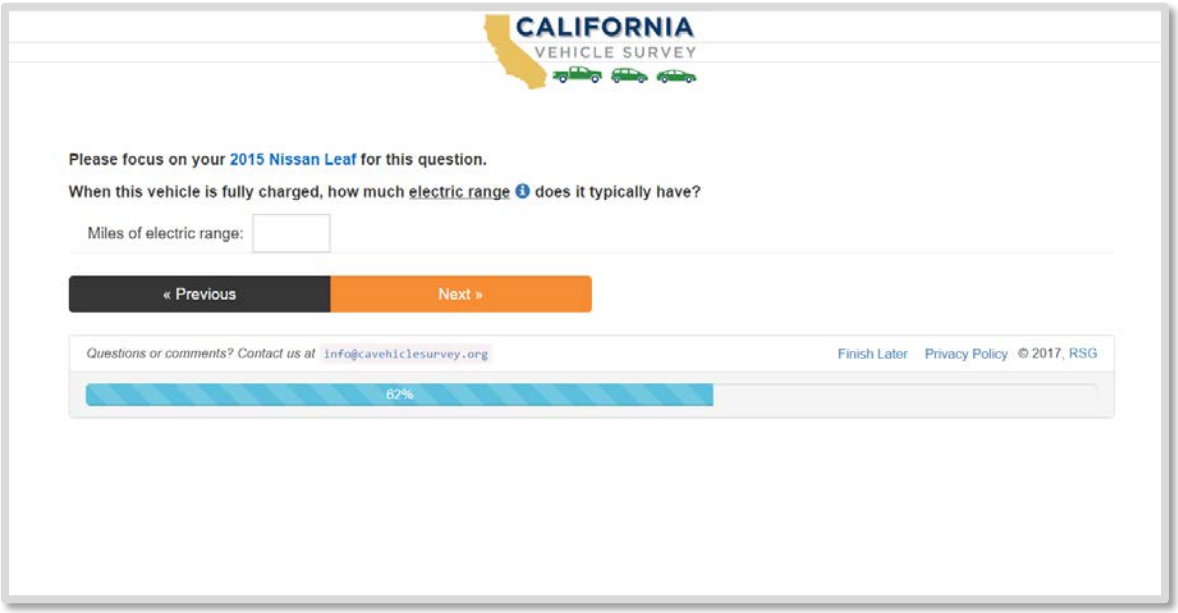


Figure F-112: Electric Range of Vehicle



New Vehicle Plans, Opinions, and Other Company Information

Figure F-113: Next Vehicle Information

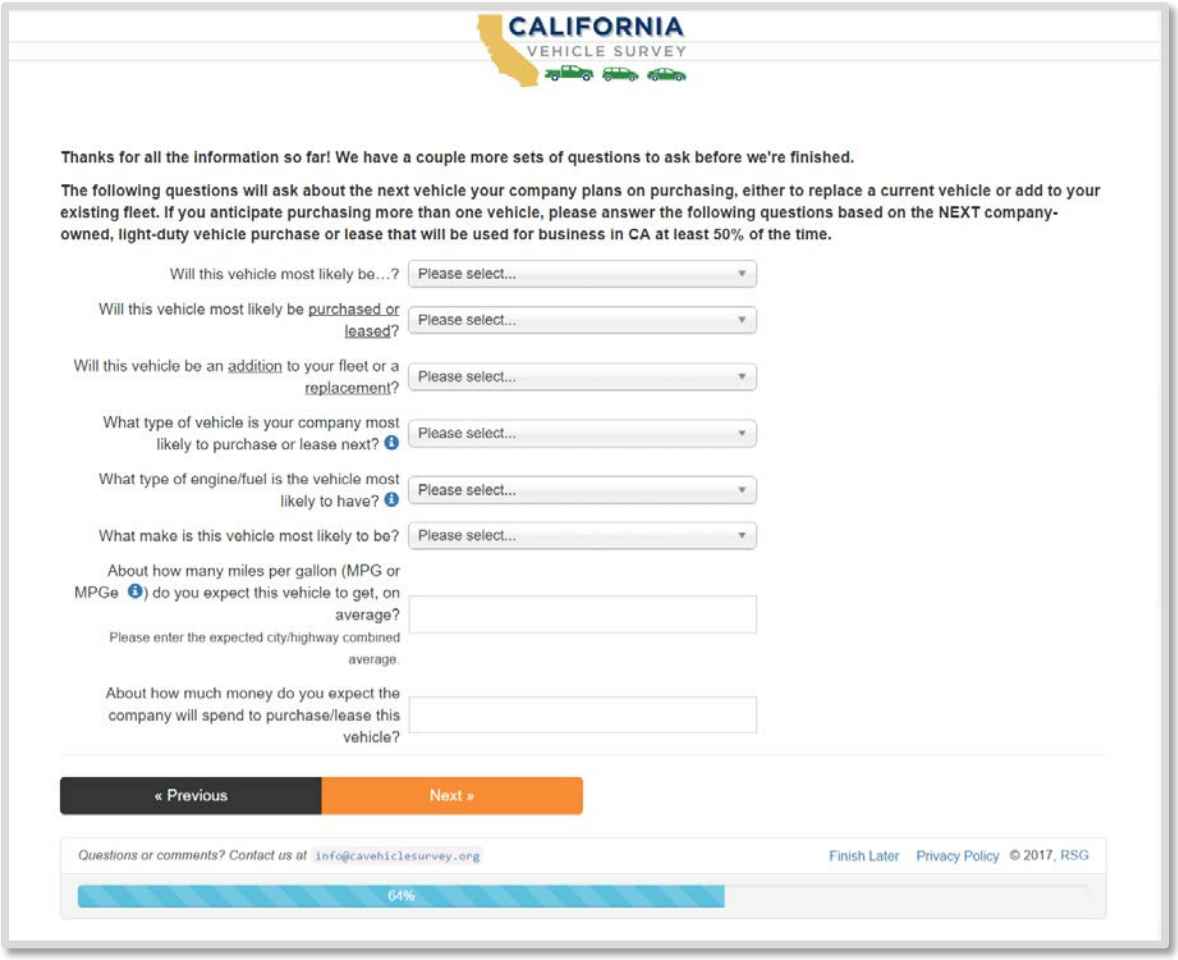


Figure F-114: Refueling Capabilities

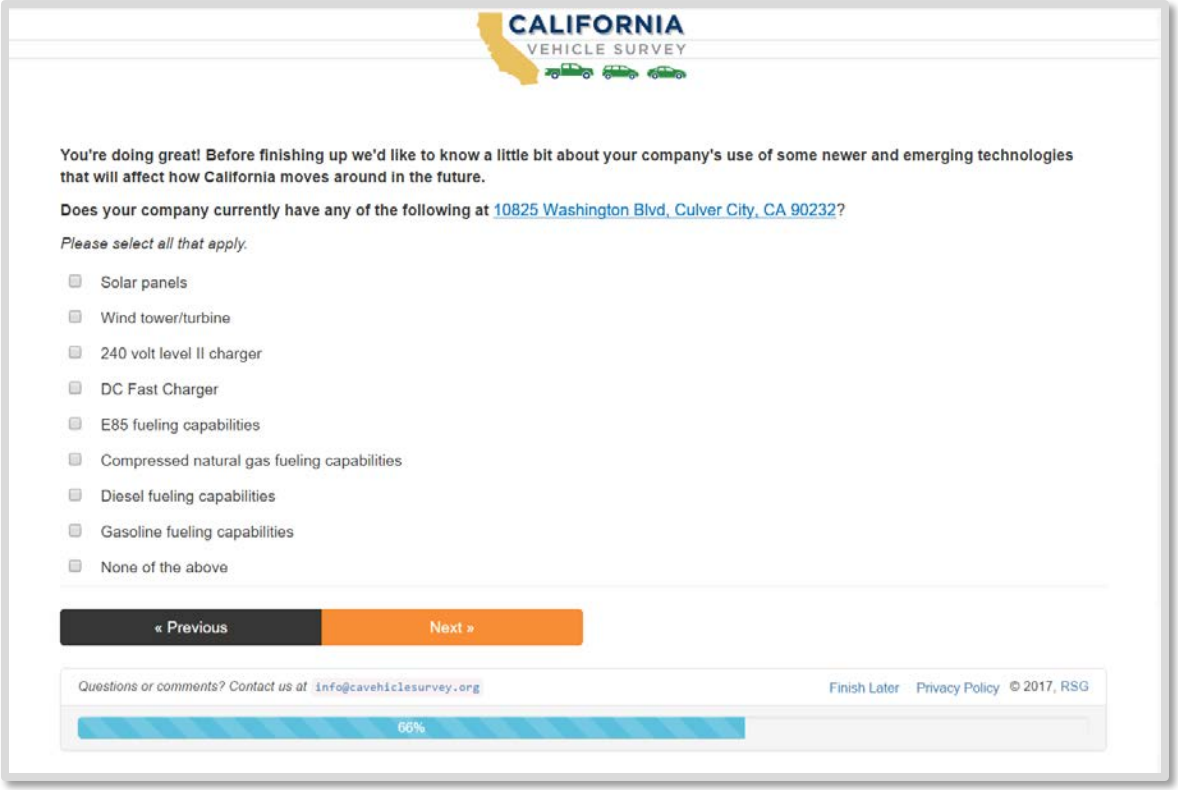


Figure F-115: Planned Refueling Capabilities

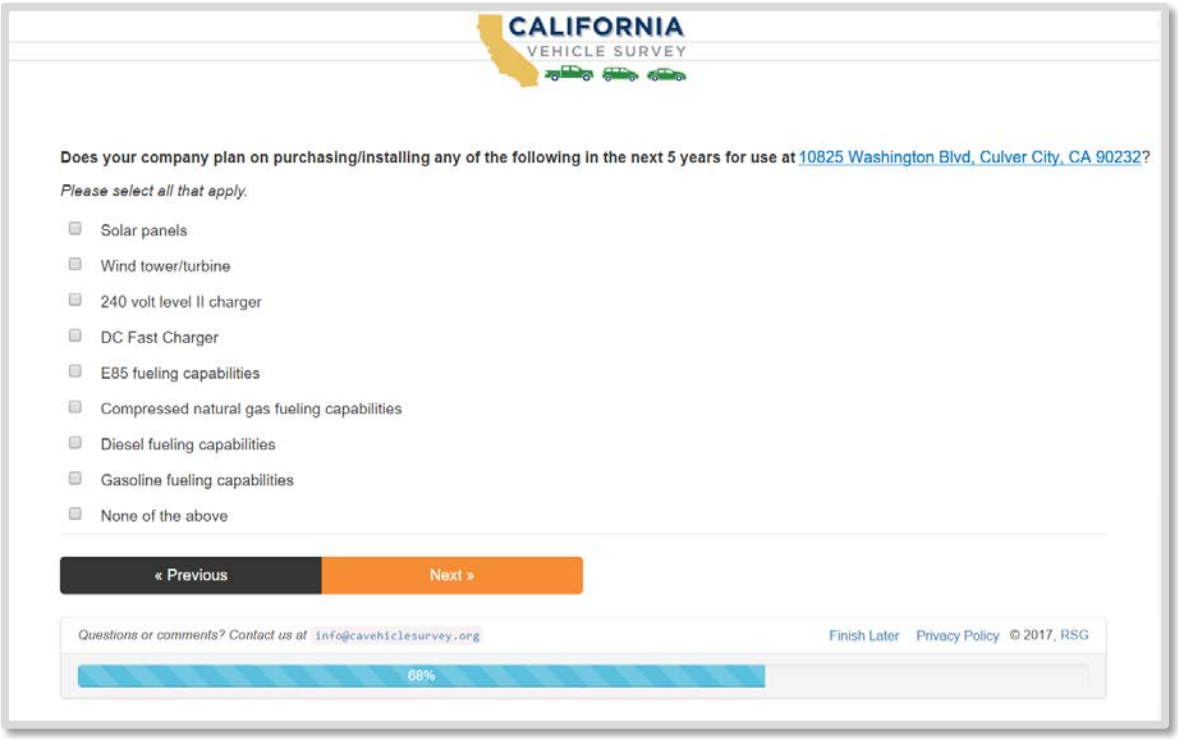


Figure F-116: Cost of Planned Refueling Capabilities

If planning on purchasing/ installing refueling capabilities in next five years

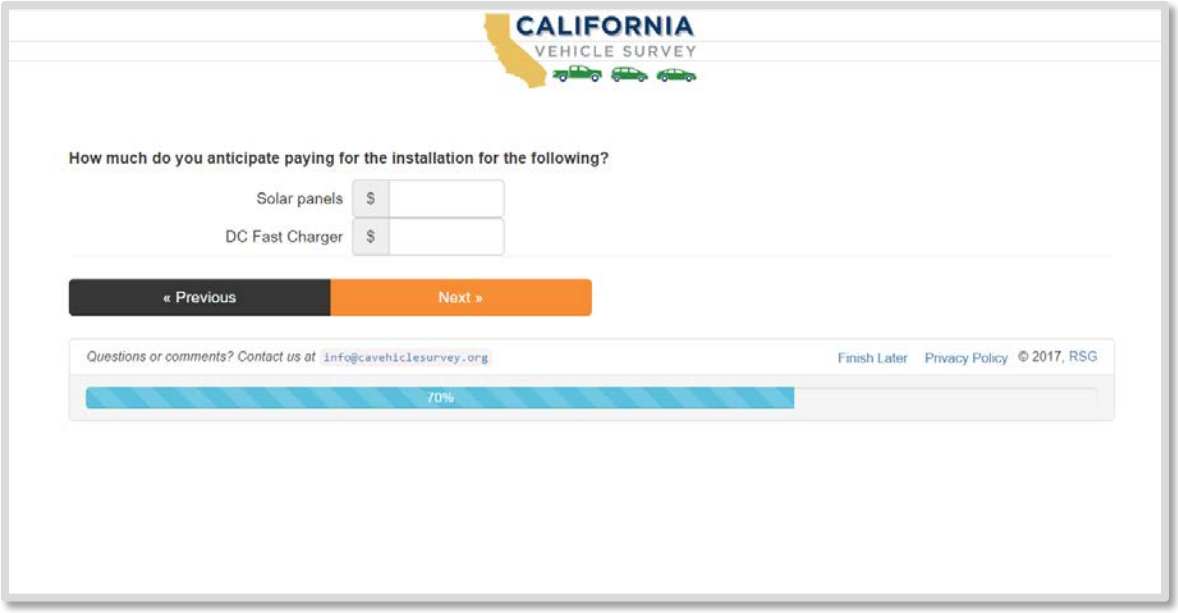


Figure F-117: Autonomous Vehicle Opinions

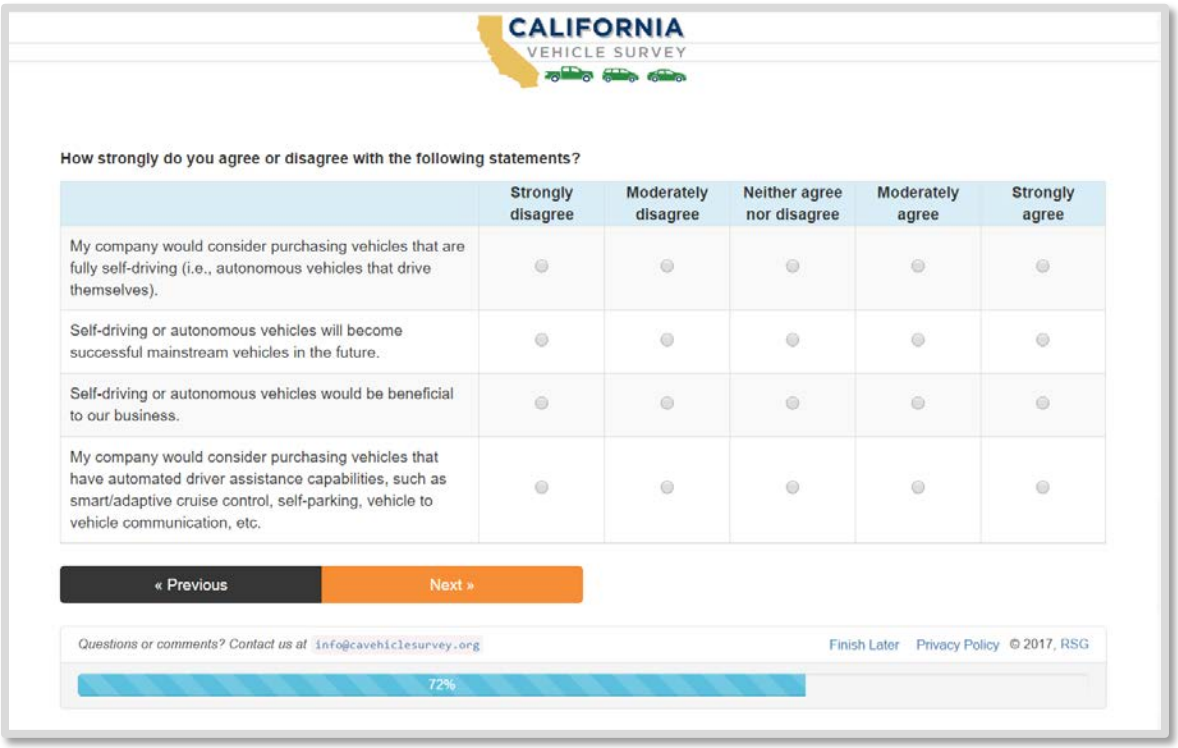


Figure F-118: Consideration of Alternative Powertrain Types

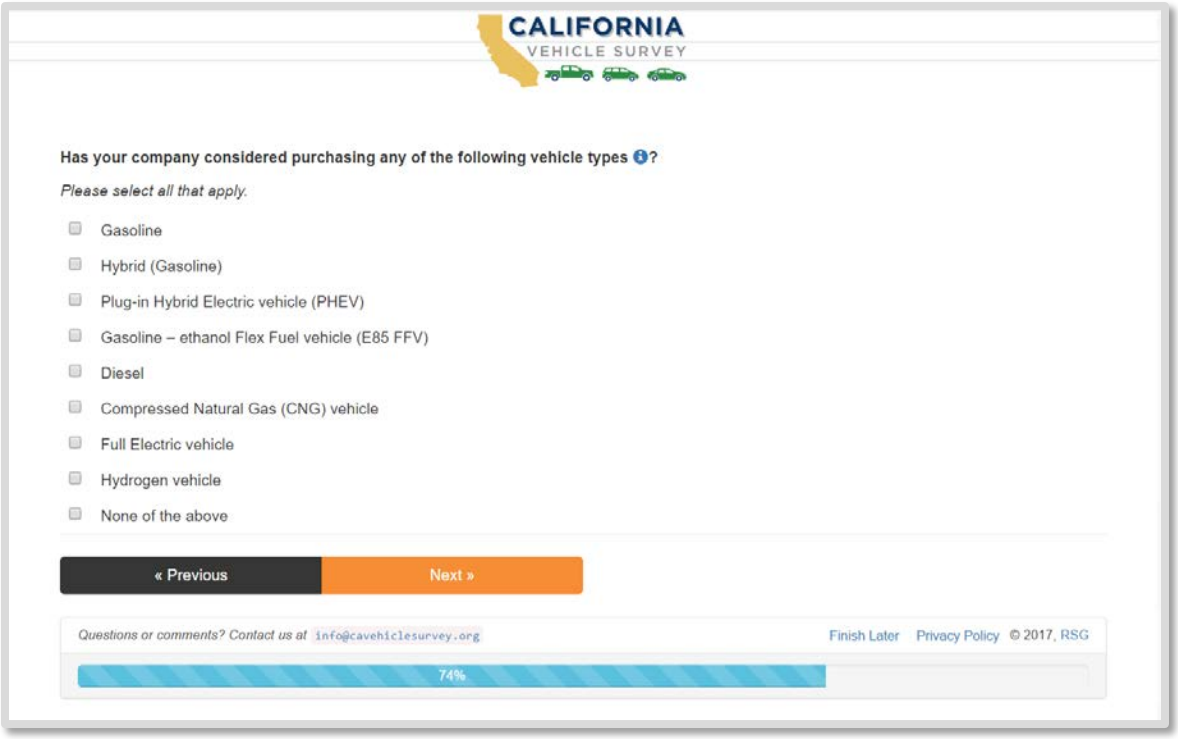


Figure F-119: Electric-only Vehicle Concerns

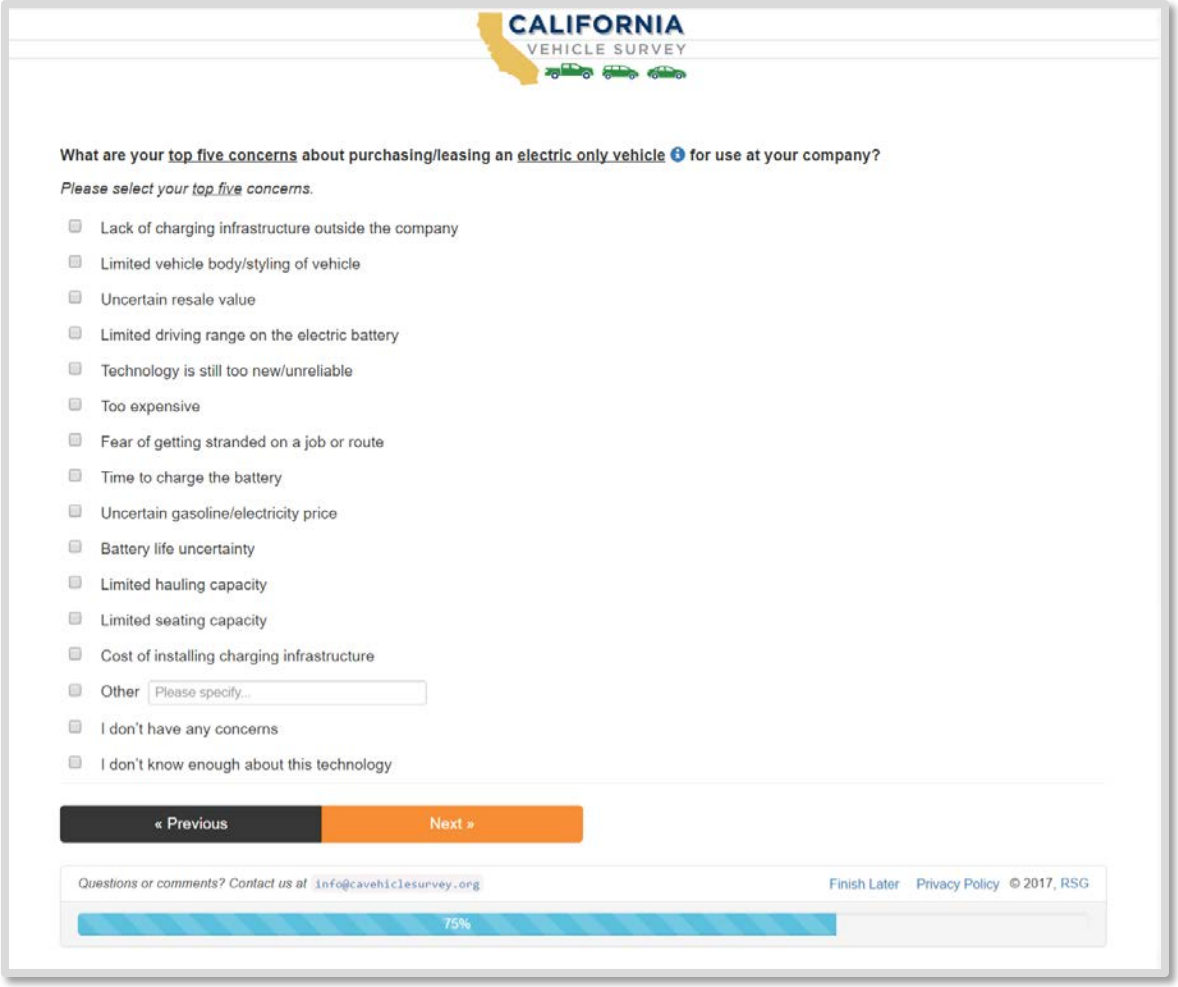


Figure F-120: Plug-in Hybrid Electric Vehicle Concerns

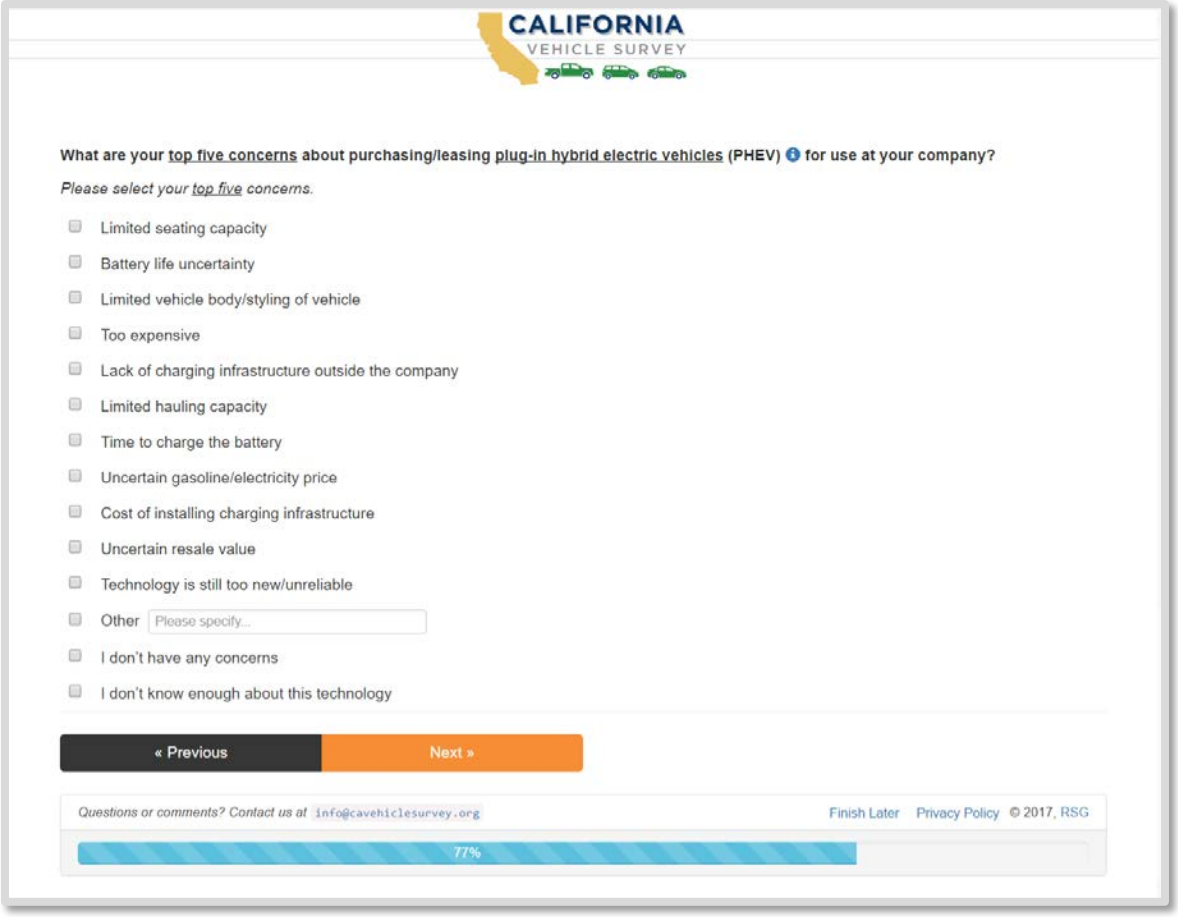


Figure F-121: Hydrogen Fuel Cell Vehicle Concerns

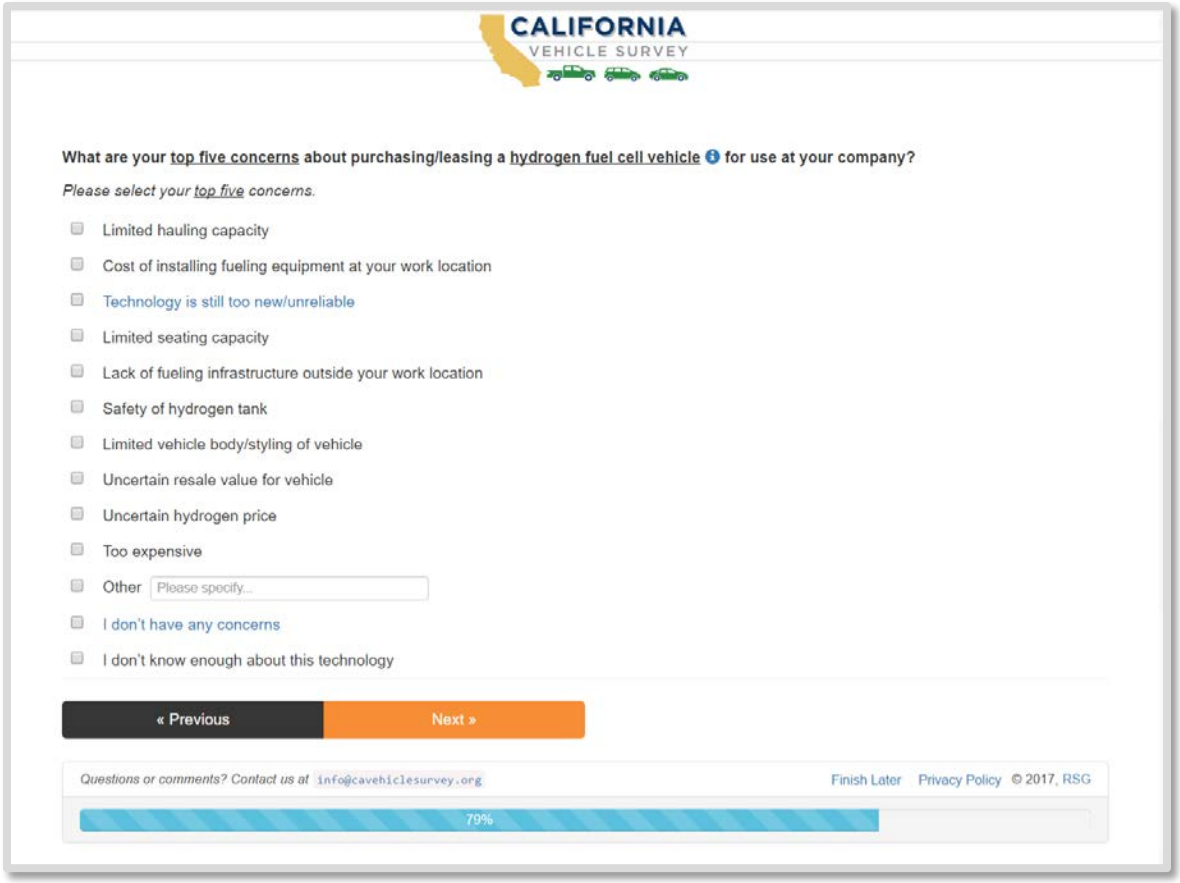


Figure F-122: Other Transportation Types

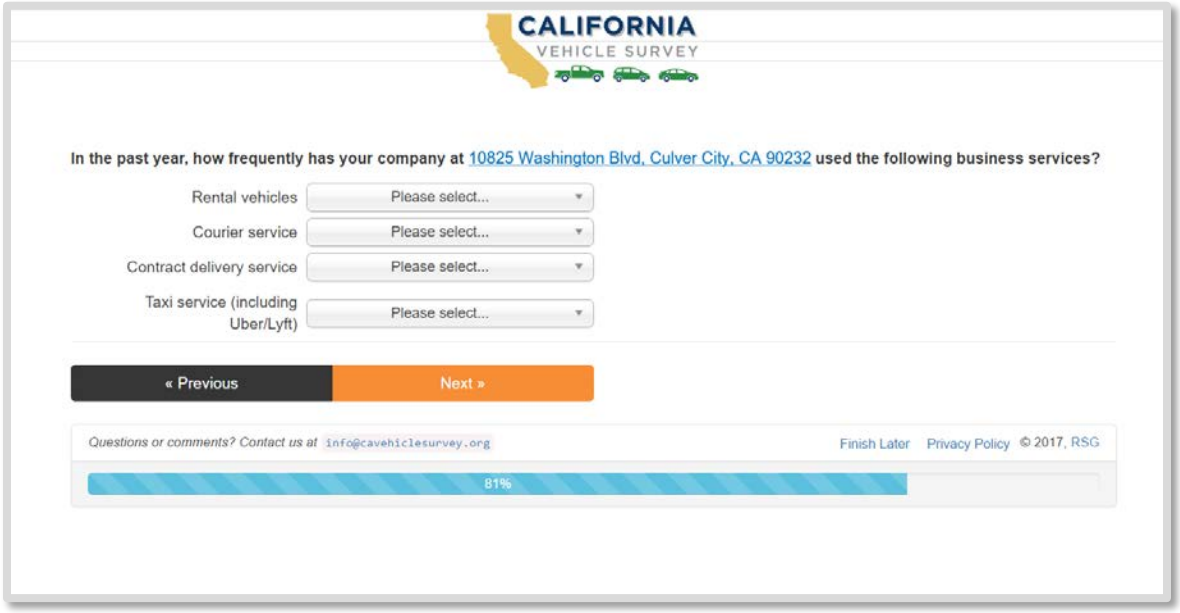


Figure F-123: Number of Employees

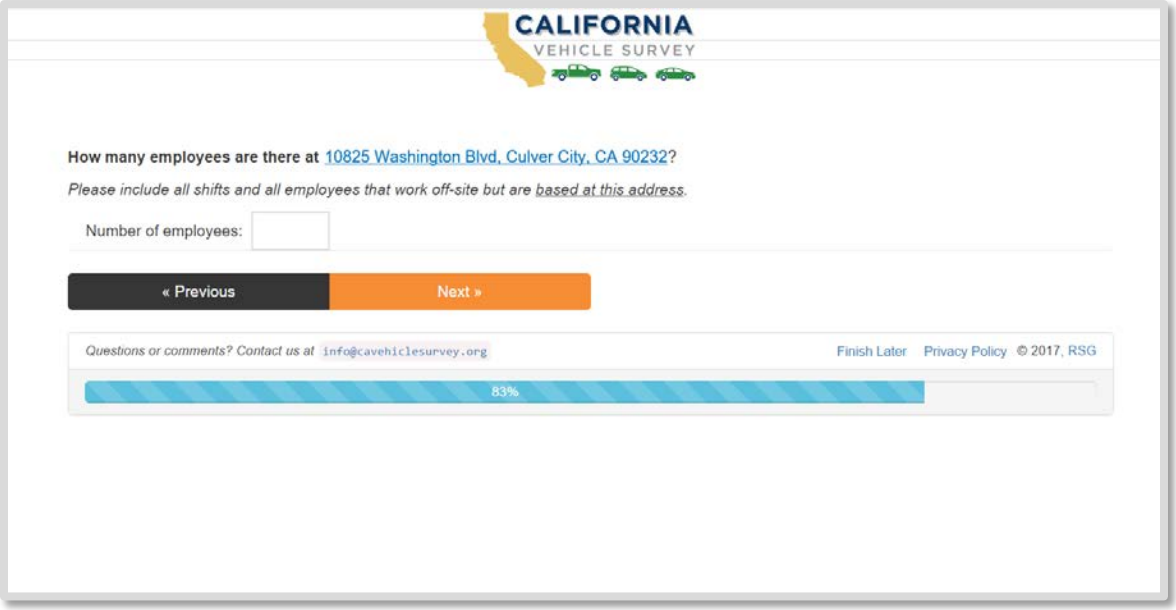


Figure F-124: Parking Options

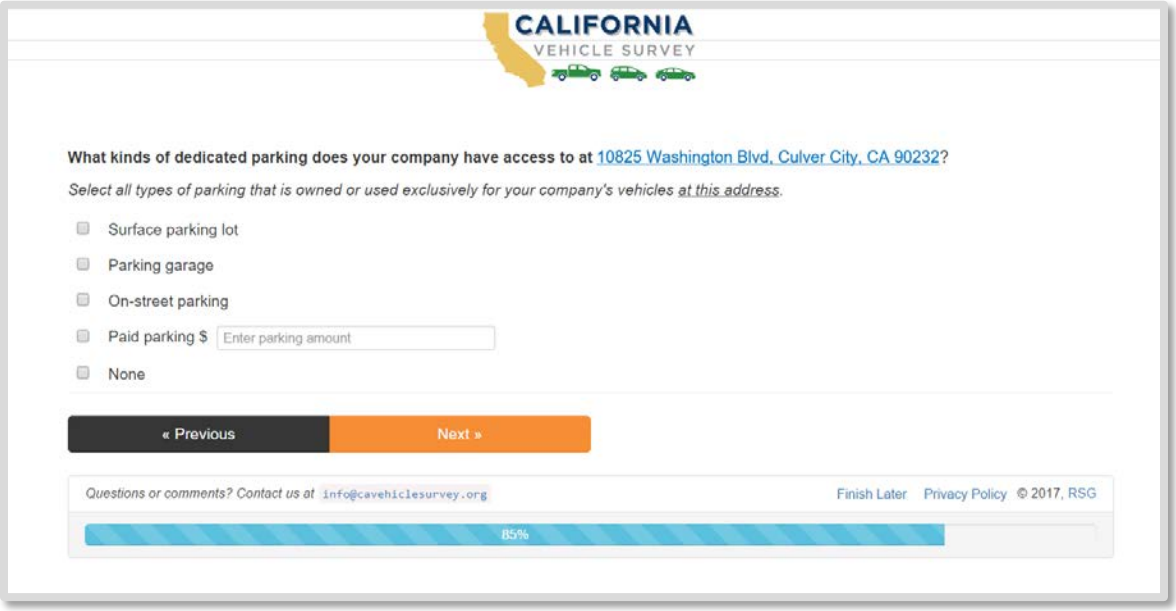


Figure F-125: Top Vehicle Attributes

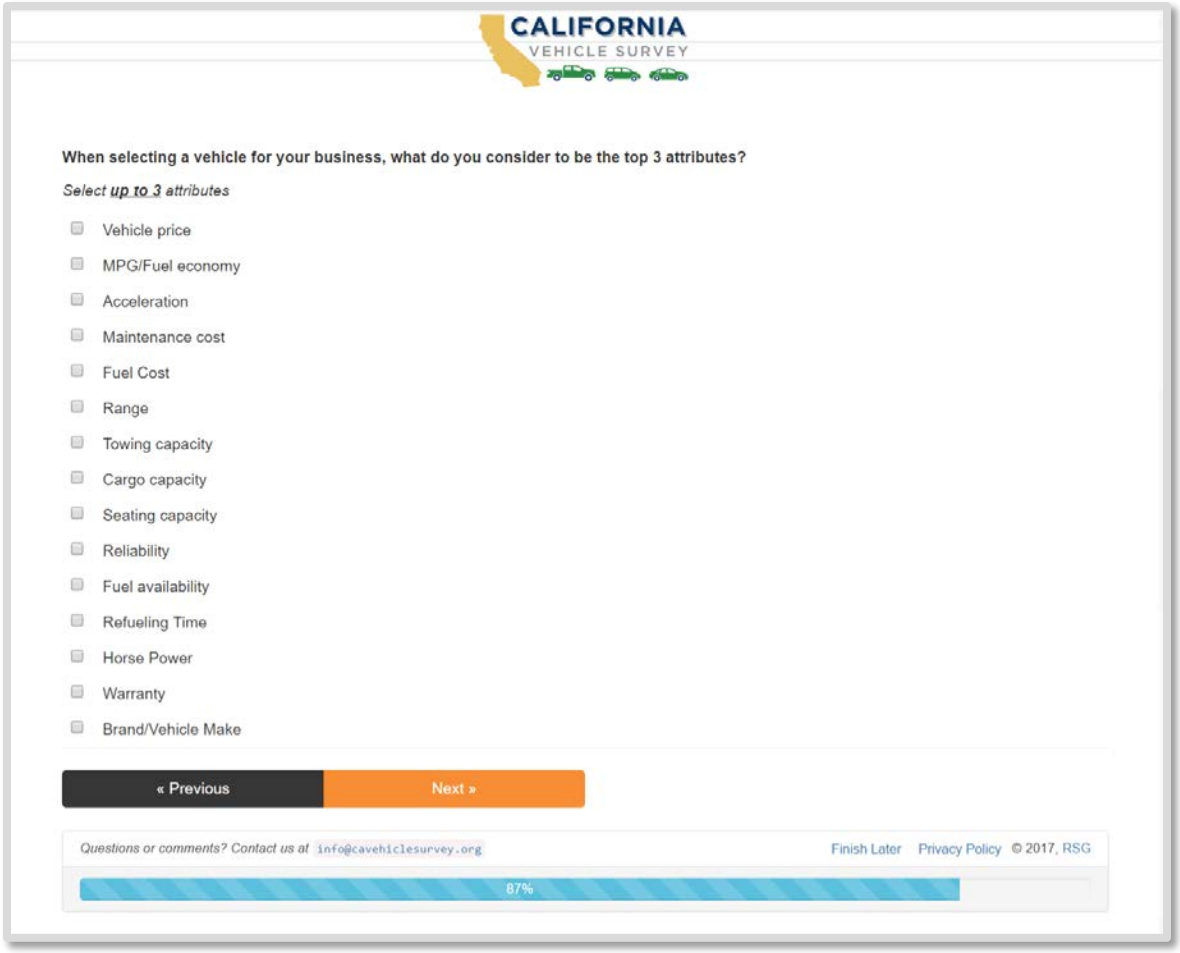
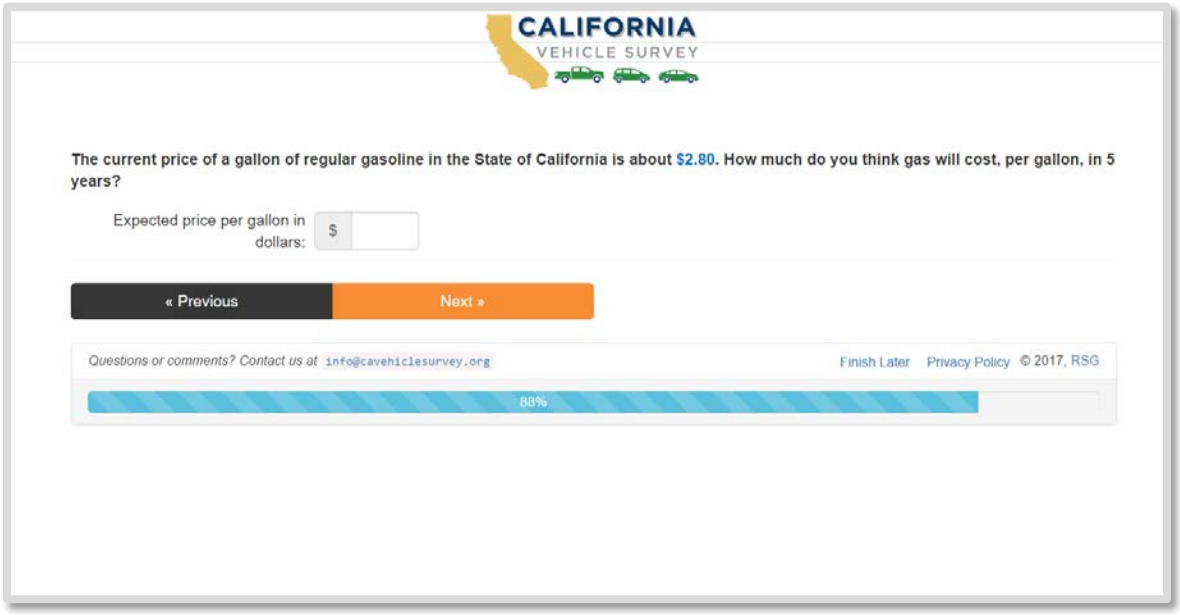
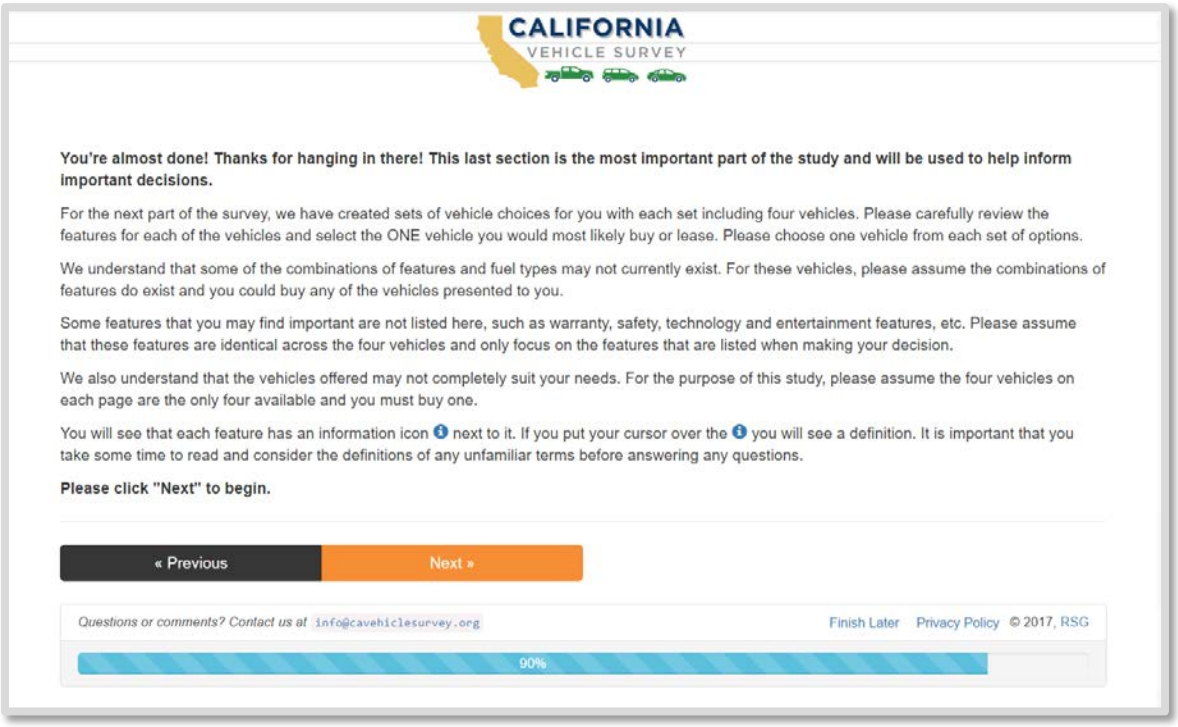


Figure F-126: Opinion About Future Gas Price



Vehicle Trade-off Stated Preference (SP) Exercises

Figure F-127: Stated Preference (SP) Instructions



CALIFORNIA
VEHICLE SURVEY

You're almost done! Thanks for hanging in there! This last section is the most important part of the study and will be used to help inform important decisions.

For the next part of the survey, we have created sets of vehicle choices for you with each set including four vehicles. Please carefully review the features for each of the vehicles and select the ONE vehicle you would most likely buy or lease. Please choose one vehicle from each set of options.

We understand that some of the combinations of features and fuel types may not currently exist. For these vehicles, please assume the combinations of features do exist and you could buy any of the vehicles presented to you.

Some features that you may find important are not listed here, such as warranty, safety, technology and entertainment features, etc. Please assume that these features are identical across the four vehicles and only focus on the features that are listed when making your decision.

We also understand that the vehicles offered may not completely suit your needs. For the purpose of this study, please assume the four vehicles on each page are the only four available and you must buy one.

You will see that each feature has an information icon next to it. If you put your cursor over the you will see a definition. It is important that you take some time to read and consider the definitions of any unfamiliar terms before answering any questions.

Please click "Next" to begin.

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90%

Figure F-128: SP Experiment Example #1

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase.

(1 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Midsize car	Midsize car	Pick-up truck, small	Sports car
Fuel Type	Hybrid (Gasoline)	Hybrid (Gasoline)	Plug-in Hybrid Electric vehicle (PHEV)	Full Electric vehicle
Vehicle Models Available	19	15	1	1
Model Year	Used (2013)	New (2016)	New (2016)	New (2016)
Vehicle Price	$17,100	$30,000	$31,000	$68,700
Purchase Incentive	None	None	$1,500 rebate	$2,500 rebate
MPG/Fuel Economy	28	36	34	99
Fuel Cost per 100 miles	$15.59	$12.13	$11.71	$5.65
Refueling Station (Time it takes to get to this type of station)	Refuel at station (10 min)	Refuel at station (3 min)	Plug-in at a charging station (15 min)	Plug-in at a charging station (10 min)
Refueling Time	10 min	10 min	3.5 hours charging time (5 min to refuel with gas)	8 hours
Vehicle Range	441 miles	594 miles	646 miles	80 miles
Trunk/Cargo Space	12 cubic feet (3 suitcases)	15 cubic feet (3 suitcases)	12 cubic feet (3 suitcases)	7 cubic feet (1 suitcases)
Annual Maintenance Cost	$365	$365	$517	$704
Acceleration Rate (0-60 mph)	6.3 secs	6.3 secs	9.5 secs	7.3 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

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Figure F-129: SP Experiment Example #2

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase.

(2 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Midsize car	Compact car	Midsize car	SUV small/midsize
Fuel Type	Hybrid (CNG)	Compressed Natural Gas (CNG) vehicle	Hybrid (Gasoline)	Plug-in Hybrid Electric vehicle (PHEV)
Vehicle Models Available	4	4	24	2
Model Year	New (2016)	Used (2014)	New (2016)	New (2016)
Vehicle Price	$26,800	$17,600	$22,400	$47,800
Purchase Incentive	HOV Access	None	None	$2,500 rebate
MPG/Fuel Economy	40	21	50	46
Fuel Cost per 100 miles	$4.31	$8.20	$11.64	$8.65
Refueling Station (Time it takes to get to this type of station)	Refuel at "fast fill" station (5 min)	Refuel at "fast fill" station (10 min)	Refuel at station (10 min)	Plug-in at a charging station (5 min)
Refueling Time	8 min	10 min	3 min	2.5 hours charging time (5 min to refuel with gas)
Vehicle Range	150 miles	250 miles	675 miles	869 miles
Trunk/Cargo Space	9 cubic feet (2 suitcases)	11 cubic feet (2 suitcases)	12 cubic feet (3 suitcases)	29 cubic feet (7 suitcases)
Annual Maintenance Cost	$387	$468	$365	$495
Acceleration Rate (0-60 mph)	10.3 secs	10.5 secs	10.3 secs	4.9 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

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Figure F-130: SP Experiment Example #3

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase.

(3 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Large car	Midsize car	Midsize car	Compact car
Fuel Type	Gasoline - ethanol Flex Fuel vehicle (E85 FFV)	Compressed Natural Gas (CNG) vehicle	Hybrid (Gasoline)	Full Electric vehicle
Vehicle Models Available	3	1	15	4
Model Year	New (2016)	New (2016)	New (2016)	New (2016)
Vehicle Price	$31,600	$34,900	$26,000	$39,200
Purchase Incentive	None	$500 rebate	None	$1,500 rebate
MPG/Fuel Economy	18	35	30	93
Fuel Cost per 100 miles	$17.75	$4.92	$5.82	$6.01
Refueling Station (Time it takes to get to this type of station)	Refuel at station (5 min)	Refuel at "fast fill" station (15 min)	Refuel at station (5 min)	Plug-in at a charging station (5 min)
Refueling Time	5 min	5 min	10 min	8 hours
Vehicle Range	308 miles	300 miles	405 miles	100 miles
Trunk/Cargo Space	16 cubic feet (4 suitcases)	11 cubic feet (2 suitcases)	12 cubic feet (3 suitcases)	12 cubic feet (3 suitcases)
Annual Maintenance Cost	$512	$387	$365	$347
Acceleration Rate (0-60 mph)	9 secs	9.5 secs	6.3 secs	10.1 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

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Figure F-131: SP Experiment Example #4

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase.

(4 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Minivan	Subcompact car	Midsize car	Midsize car
Fuel Type	Gasoline	Hybrid (Gasoline)	Hybrid (Gasoline)	Plug-in Hybrid Electric vehicle (PHEV)
Vehicle Models Available	10	4	15	3
Model Year	Used (2013)	Used (2014)	New (2016)	New (2016)
Vehicle Price	$14,800	$16,700	$30,000	$37,600
Purchase Incentive	None	None	None	$2,500 rebate
MPG/Fuel Economy	24	44	50	48
Fuel Cost per 100 miles	$7.28	$3.97	$3.49	$8.29
Refueling Station (Time it takes to get to this type of station)	Refuel at station (5 min)	Refuel at station (3 min)	Refuel at station (5 min)	Plug-in at work (0 min)
Refueling Time	3 min	10 min	3 min	3.5 hours charging time (5 min to refuel with gas)
Vehicle Range	504 miles	460 miles	788 miles	648 miles
Trunk/Cargo Space	35 cubic feet (8 suitcases)	11 cubic feet (2 suitcases)	16 cubic feet (4 suitcases)	10 cubic feet (2 suitcases)
Annual Maintenance Cost	$323	$446	$506	$387
Acceleration Rate (0-60 mph)	5.9 secs	8.5 secs	6.3 secs	9.1 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

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92%

Figure F-132: SP Experiment Example #5

CALIFORNIA
VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase.

(5 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Pick-up truck, small	Midsize car	Midsize car	Sports car
Fuel Type	Gasoline	Hybrid (Gasoline)	Hybrid (Gasoline)	Diesel
Vehicle Models Available	10	19	24	2
Model Year	Used (2014)	Used (2014)	New (2016)	New (2016)
Vehicle Price	$16,700	$20,400	$30,000	$42,000
Purchase Incentive	None	None	None	None
MPG/Fuel Economy	23	34	30	33
Fuel Cost per 100 miles	$25.30	$17.12	$19.40	$22.93
Refueling Station (Time it takes to get to this type of station)	Refuel at station (3 min)	Refuel at station (3 min)	Refuel at station (3 min)	Refuel at station (3 min)
Refueling Time	5 min	3 min	3 min	3 min
Vehicle Range	414 miles	459 miles	428 miles	470 miles
Trunk/Cargo Space	13 cubic feet (3 suitcases)	12 cubic feet (3 suitcases)	15 cubic feet (3 suitcases)	12 cubic feet (3 suitcases)
Annual Maintenance Cost	$353	$506	$304	$533
Acceleration Rate (0-60 mph)	5.9 secs	6.3 secs	6.3 secs	3.5 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

« Previous Next »

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92%

Figure F-133: SP Experiment Example #6

CALIFORNIA
VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase.

(6 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Midsize car	Midsize car	Sports car	Large car
Fuel Type	Hybrid (Diesel)	Hybrid (Gasoline)	Plug-in Hybrid Electric vehicle (PHEV)	Diesel
Vehicle Models Available	1	24	1	4
Model Year	New (2016)	New (2016)	New (2016)	New (2016)
Vehicle Price	$26,000	$30,000	$49,000	$31,000
Purchase Incentive	None	None	None	None
MPG/Fuel Economy	57	30	53	25
Fuel Cost per 100 miles	$3.98	$5.82	$4.51	$9.08
Refueling Station (Time it takes to get to this type of station)	Refuel at station (3 min)	Refuel at station (7 min)	Plug-in at a charging station (20 min)	Refuel at station (7 min)
Refueling Time	10 min	8 min	30 min charging time (5 min to refuel with gas)	3 min
Vehicle Range	941 miles	495 miles	716 miles	428 miles
Trunk/Cargo Space	15 cubic feet (3 suitcases)	12 cubic feet (3 suitcases)	10 cubic feet (2 suitcases)	16 cubic feet (4 suitcases)
Annual Maintenance Cost	$304	$304	$639	$512
Acceleration Rate (0-60 mph)	6.3 secs	10.3 secs	3.3 secs	5 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

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Figure F-134: SP Experiment Example #7

CALIFORNIA
VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase.

(7 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Van, full-size/large	Midsize car	Midsize car	SUV small/midsize
Fuel Type	Hybrid (CNG)	Hybrid (Gasoline)	Hybrid (Gasoline)	Diesel
Vehicle Models Available	2	29	29	3
Model Year	New (2016)	New (2016)	New (2016)	New (2016)
Vehicle Price	$37,600	$22,400	$33,600	$35,600
Purchase Incentive	$2,500 rebate	None	None	None
MPG/Fuel Economy	17	50	44	33
Fuel Cost per 100 miles	$25.32	$8.73	$9.92	$9.42
Refueling Station (Time it takes to get to this type of station)	Refuel at "fast fill" station (5 min)	Refuel at station (5 min)	Refuel at station (3 min)	Refuel at station (10 min)
Refueling Time	3 min	10 min	8 min	8 min
Vehicle Range	300 miles	713 miles	693 miles	624 miles
Trunk/Cargo Space	63 cubic feet (15 suitcases)	12 cubic feet (3 suitcases)	15 cubic feet (3 suitcases)	31 cubic feet (7 suitcases)
Annual Maintenance Cost	$616	$365	$446	$495
Acceleration Rate (0-60 mph)	13.7 secs	6.3 secs	6.3 secs	5.3 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

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Figure F-135: SP Experiment Example #8

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase.

(8 of 8)

	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Large car	Sports car	Midsize car	Midsize car
Fuel Type	Hybrid (Diesel)	Hybrid (Gasoline)	Hybrid (Gasoline)	Diesel
Vehicle Models Available	1	4	29	7
Model Year	New (2016)	Used (2014)	New (2016)	Used (2014)
Vehicle Price	$43,600	$19,600	$33,600	$16,900
Purchase Incentive	None	None	None	None
MPG/Fuel Economy	50	38	50	27
Fuel Cost per 100 miles	$4.54	$4.59	$3.49	$8.40
Refueling Station (Time it takes to get to this type of station)	Refuel at station (5 min)	Refuel at station (3 min)	Refuel at station (10 min)	Refuel at station (3 min)
Refueling Time	3 min	3 min	3 min	10 min
Vehicle Range	945 miles	627 miles	788 miles	425 miles
Trunk/Cargo Space	12 cubic feet (3 suitcases)	11 cubic feet (2 suitcases)	12 cubic feet (3 suitcases)	19 cubic feet (4 suitcases)
Annual Maintenance Cost	$396	$844	$365	$538
Acceleration Rate (0-60 mph)	9.7 secs	8.1 secs	6.3 secs	9.5 secs
	I prefer this option	I prefer this option	I prefer this option	I prefer this option

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Figure F-136: Comments

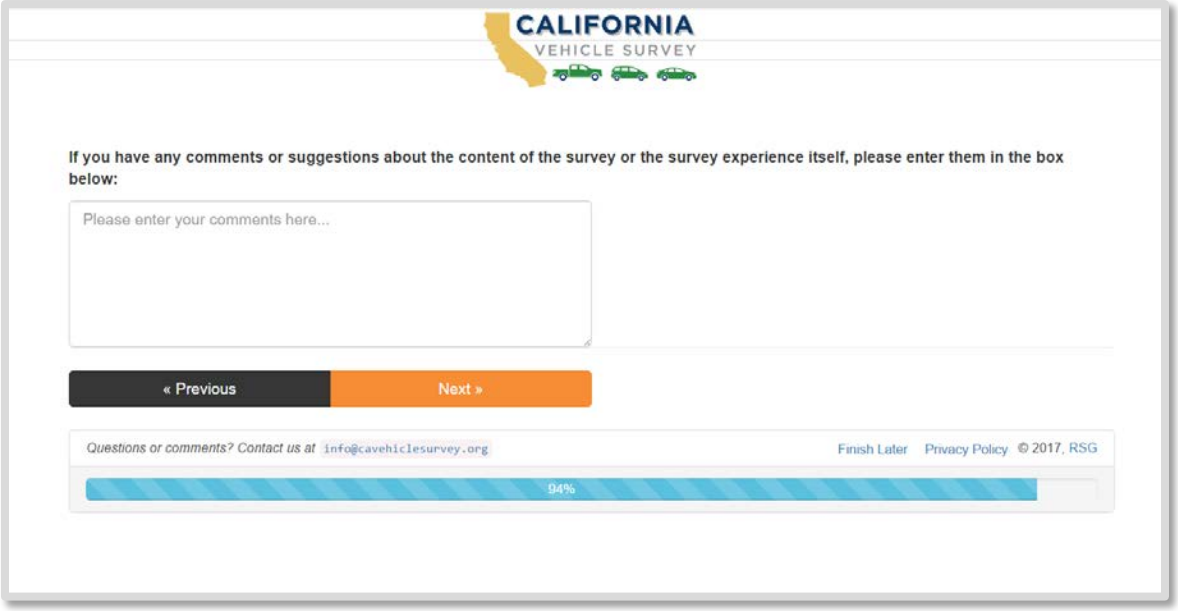


Figure F-137: Email Address for Gift Card

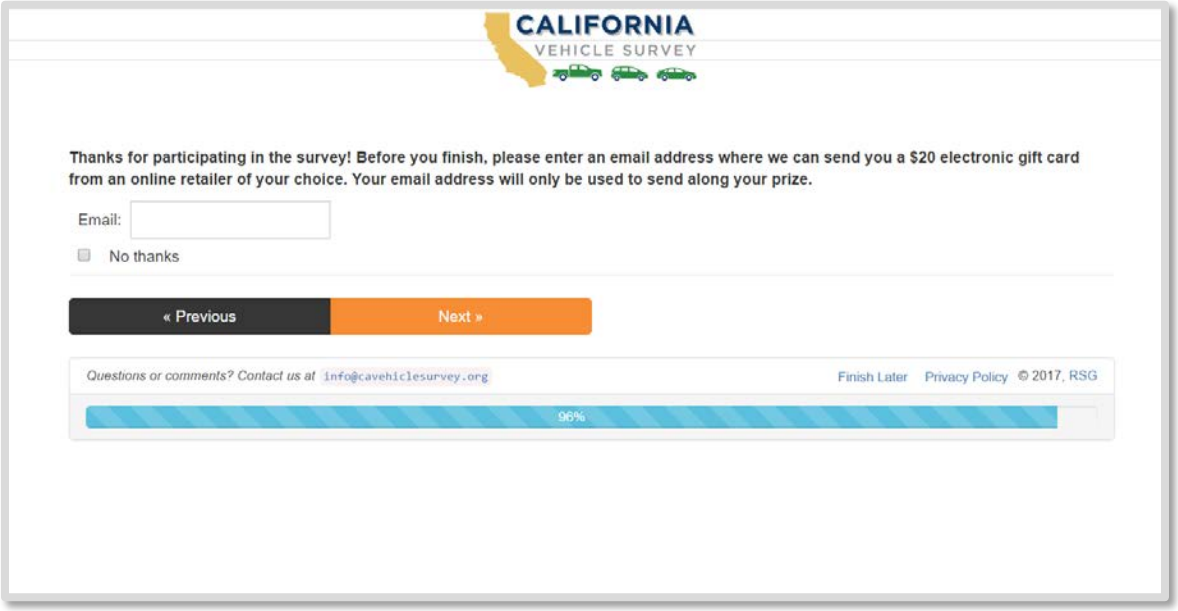


Figure F-138: Preferred Type of Gift Card

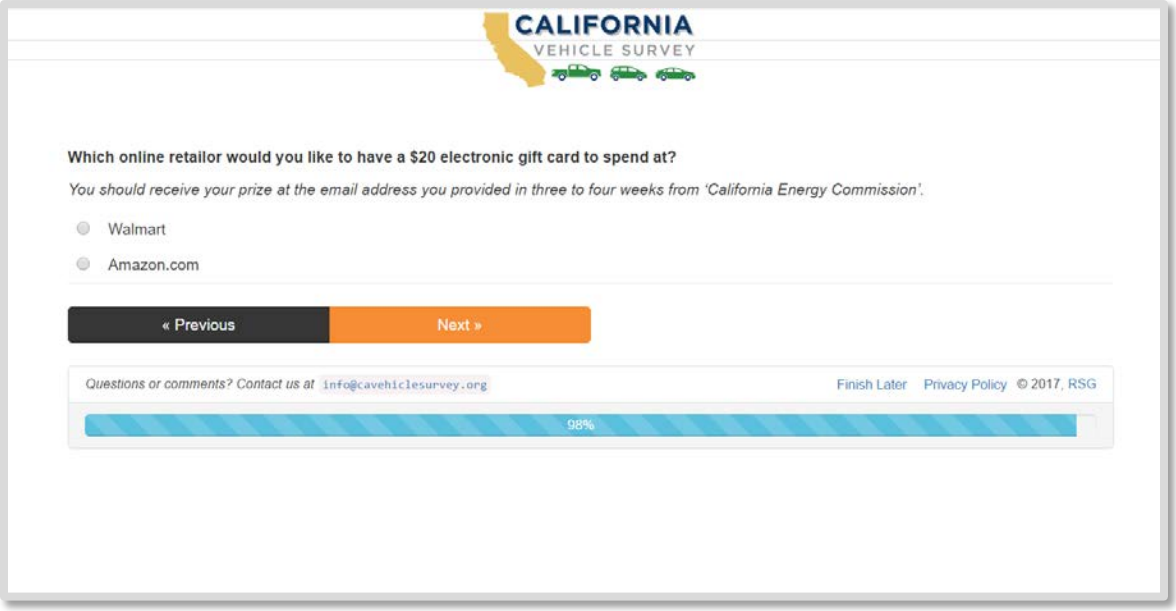
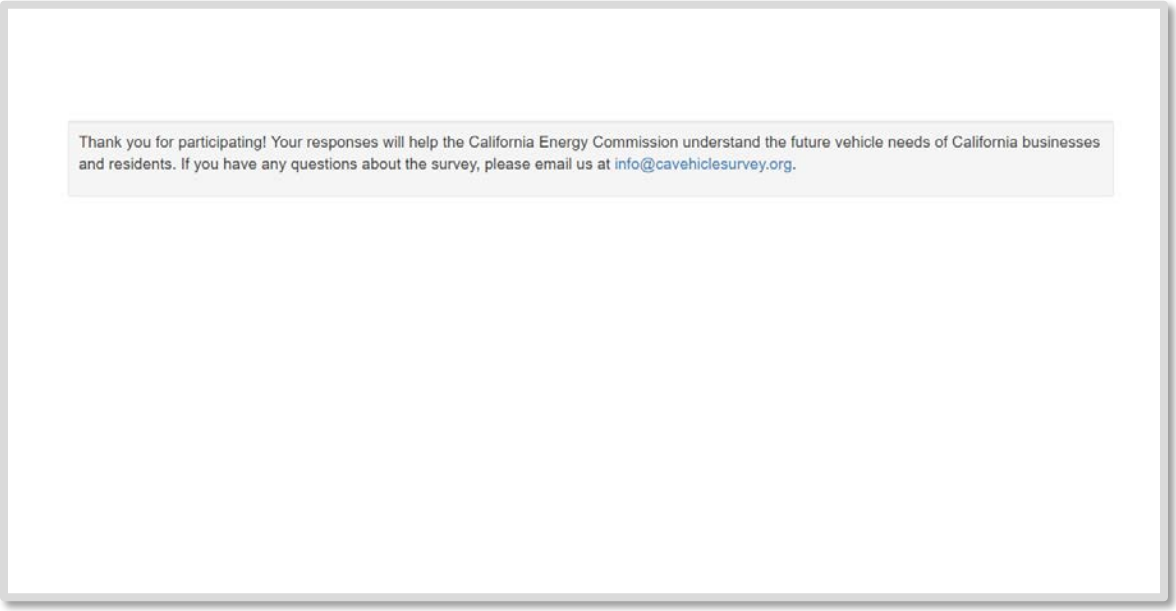


Figure F-139: End of Survey



APPENDIX G: PEV Owner Survey Add-On Questionnaire

Outline

SURVEY SECTION	INFORMATION COLLECTED
	EXPERIENCE AND SATISFACTION QUESTIONS FOR CURRENT RESIDENTIAL PEV OWNERS.
	EXPERIENCE AND SATISFACTION QUESTIONS FOR CURRENT COMMERCIAL PEV OWNERS.

Residential PEV Owners

Only shown to respondents who own 'Gasoline Plug-in Hybrid Electric vehicle (PHEV)' or 'Battery Electric vehicle (BEV)' as one of their current cars in [engine / fuel type]. If own both BEV & PHEV ask questions for BEV.

Text at the top of the page for each question in this section:
Please focus on your <year make model of PHEV or BEV> for this question.

96. *If any current vehicle is 'Gasoline Plug-in Hybrid Electric vehicle (PHEV)' in [engine /fuel type]*
[why PHEV] **Which of the following factors were the most important reasons why you decided to purchase a plug-in hybrid vehicle?**
You may select up to five.

- ☐ Saving money on fuel costs
- ☐ Saving money overall
- ☐ Good lease terms & options
- ☐ Reducing environmental impacts
- ☐ Carpool or High Occupancy Vehicle (HOV) lane access
- ☐ Free or privileged parking space
- ☐ Better finance/interest rate
- ☐ Manufacturer or dealer cash back
- ☐ Insurance discount
- ☐ Politics of fossil fuels
- ☐ Convenience of charging at home or work
- ☐ Free charging at work or away from home
- ☐ Special/low EV electricity rate at home
- ☐ Vehicle performance
- ☐ Vehicle styling, finish and comfort
- ☐ A desire for the newest technology
- ☐ Brand name
- ☐ Other, please specify: _____

97. *If any current vehicle is 'Battery Electric vehicle (BEV)' in [engine /fuel type]*
[why BEV] **Which of the following factors were the most important reasons why you decided to purchase a full electric vehicle?**
You may select up to five.

- ☐ Saving money on fuel costs
- ☐ Saving money overall
- ☐ Good lease terms & options
- ☐ Reducing environmental impacts
- ☐ Carpool or High Occupancy Vehicle (HOV) lane access
- ☐ Free or privileged parking space
- ☐ Better finance/interest rate
- ☐ Manufacturer or dealer cash back
- ☐ Insurance discount

- ☐ Politics of fossil fuels
- ☐ Convenience of charging at home or work
- ☐ Free charging at work or away from home
- ☐ Special/low EV electricity rate at home
- ☐ Vehicle performance
- ☐ Vehicle styling, finish and comfort
- ☐ A desire for the newest technology
- ☐ Brand name
- ☐ Other, please specify: _____

98. *[alt concerns]* **How important were each of the following factors in making it possible for you to buy or lease your electric vehicle?**

•

	Extremely important	• Very important	Moderately important	Slightly important	Not at all important	• Not applicable
California state vehicle rebate (up to $2,500)	• O	• O	• O	• O	• O	• O
Federal tax incentives (up to $7,500)	• O	• O	• O	• O	• O	• O
Manufacturer or dealer incentives (e.g. low interest rate, cash back)	• O	• O	• O	• O	• O	• O
Attractive lease terms	• O	• O	• O	• O	• O	• O
Parking incentives (employer, business, or government)	• O	• O	• O	• O	• O	• O
Special electricity rates for charging	• O	• O	• O	• O	• O	• O
Having free charging locations available	• O	• O	• O	• O	• O	• O
Availability of carshare/car rental as part of purchase	• O	• O	• O	• O	• O	• O
HOV lane access	• O	• O	• O	• O	• O	• O

99. *[home install]* **Did you purchase home charging equipment and/or upgrade your current house to be able to charge your vehicle?**

- o Yes
- o No

•

100. *If Yes' on [home install]*

[install cost] **How much did you pay for home charging capabilities (either by purchasing home equipment or by upgrading your home)?**

Cost to you: _____

Subsidy or other assistance used: _____

101. *[charger type]* **In the past month, which of the following technologies have you used to charge your vehicle's battery?**

- *Select all that apply.*

☐ Level 1: A standard (120V) household outlet.
☐ Level 2: A 240V outlet used for faster charging.
☐ Fast Charger: A high voltage charger found at public charging stations
☐ Other: ___*Please specify…*_____
☐ Not sure
☐ None of these

102. *[charge frequency]* **How often do you typically plug in your vehicle to charge?**

o Daily
o 5 or 6 times a week
o 3 or 4 times a week
o 1 or 2 times a week
o Less than once a week
o Never

- *If charges vehicle ever in [charge frequency]*

103. *[charge morning]* **On a typical weekday morning, when and where do you typically charge your vehicle?**

	Home	Work	Public charging station	Other	Do not charge
6:00am – 7:00am	o	o	o	o	o
7:00am – 8:00am	o	o	o	o	o
8:00am – 9:00am	o	o	o	o	o
9:00am – 10:00am	o	o	o	o	o
10:00am – 11:00am	o	o	o	o	o
11:00am – 12:00pm	o	o	o	o	o

-
- *If charges vehicle ever in [charge frequency]*

104. *[charge afternoon]* **On a typical weekday afternoon, when and where do you typically charge your vehicle?**

	Home	Work	Public Charging Station	Other Spot	Do not charge
12:00pm – 1:00pm	o	o	o	o	o
1:00pm – 2:00pm	o	o	o	o	o
2:00pm – 3:00pm	o	o	o	o	o
3:00pm – 4:00pm	o	o	o	o	o
4:00pm – 5:00pm	o	o	o	o	o
5:00pm – 6:00pm	o	o	o	o	o

- *If charges vehicle ever in [charge frequency]*

105. *[charge evening]* **On a typical weekday evening, when and where do you typically charge your vehicle?**

	Home	Work	Public Charging Station	Other Spot	Do not charge
6:00pm – 7:00pm	o	o	o	o	o
7:00pm – 8:00pm	o	o	o	o	o
8:00pm – 9:00pm	o	o	o	o	o
9:00pm – 10:00pm	o	o	o	o	o
10:00pm – 11:00pm	o	o	o	o	o
11:00pm – 12:00am	o	o	o	o	o

- *If charges vehicle ever in [charge frequency]*

106. *[charge night]* **On a typical <u>weekday night</u>, when and where do you typically charge your vehicle?**

	Home	Work	Public Charging Station	Other Spot	Do not charge
12:00am – 1:00am	o	o	o	o	o
1:00am – 2:00am	o	o	o	o	o
2:00am – 3:00am	o	o	o	o	o
3:00am – 4:00am	o	o	o	o	o
4:00am – 5:00am	o	o	o	o	o
5:00am – 6:00am	o	o	o	o	o

107. *[variable rates]* **Does your electricity provider charge different rates for peak and non-peak usage?**

- o Yes
- o No
- o I don't know

***Hover Over Text**: Peak hours for electricity usage are <u>weekdays</u> between 12PM and 6PM.*

108. *[meter]* **Do you have a separate electricity meter to track your vehicle's electricity usage?**

- o Yes
- o No

- *If 'YES' on [meter]*

  [special rate] **Do you receive a special electric vehicle electricity rate from your provider?**

  - o Yes, and it applies to all my electricity use
  - o Yes, but it applies only to what is used on a separate EV meter
  - o No

109. *[kwhrate]* **On average, how much do you pay per kilowatt-hour to charge your vehicle?**

- *If you don't know, you may leave this blank.*

  $_____ per kilowatt-hour (kWh) at home [allow $0.00 to $0.99]

  $_____per kilowatt-hour <u>at work</u>

$_____per kilowatt-hour at a fast charger

$_____per re-charge at a fast charger [allow 0 -$20]

110. *[actual range]* **When your vehicle is fully charged, how much electric range do you typically have?**

Miles of electric range: _____ [allow 0-1,000]

111. *[recommend]* **How likely are you to recommend a <PHEV/Full Electric Vehicle> to a friend or family member?**

- o Extremely likely
- o Likely
- o Neutral
- o Unlikely
- o Extremely unlikely

Commercial PEV Owners

Only shown to respondents who own 'Gasoline Plug-in Hybrid Electric vehicle (PHEV)' or 'Battery Electric vehicle (BEV)' as one of their current cars in [engine / fuel type]. If own both BEV & PHEV ask questions for BEV.

Text at the top of the page for each question in this section:
Please focus on your <year make model of PHEV or BEV> for this question.

112. *If any current vehicle is 'Gasoline Plug-in Hybrid Electric vehicle (PHEV)' in [engine /fuel type]*

[why PHEV] **Which of the following factors were the most important reasons why your company decided to purchase a plug-in hybrid vehicle?**

You may select up to five.

- ☐ Saving money on fuel costs
- ☐ Saving money overall
- ☐ Good lease terms & options
- ☐ Reducing environmental impacts
- ☐ Carpool or High Occupancy Vehicle (HOV) lane access
- ☐ Free or privileged parking space
- ☐ Better finance/interest rate
- ☐ Manufacturer or dealer cash back
- ☐ Insurance discount
- ☐ Politics of fossil fuels
- ☐ Convenience of charging at home or work
- ☐ Free charging at work or at other locations
- ☐ Special/low EV electricity rate at work
- ☐ Vehicle performance
- ☐ Vehicle styling, finish and comfort
- ☐ A desire for the newest technology
- ☐ Brand name
- ☐ Other, please specify: _____

113. *If any current vehicle is 'Battery Electric vehicle (BEV)' in [engine /fuel type] [why BEV]* **Which of the following factors were the most important reasons why your company decided to purchase a full electric vehicle?**

You may select up to five.

- ☐ Saving money on fuel costs
- ☐ Saving money overall
- ☐ Good lease terms & options
- ☐ Reducing environmental impacts
- ☐ Carpool or High Occupancy Vehicle (HOV) lane access
- ☐ Free or privileged parking space
- ☐ Better finance/interest rate
- ☐ Manufacturer or dealer cash back
- ☐ Insurance discount
- ☐ Politics of fossil fuels
- ☐ Convenience of charging at home or work
- ☐ Free charging at work or at other locations
- ☐ Special/low EV electricity rate at work
- ☐ Vehicle performance
- ☐ Vehicle styling, finish and comfort
- ☐ A desire for the newest technology
- ☐ Brand name
- ☐ Other, please specify: _____

114. *[alt concerns]* **How important were each of the following factors in making it possible for your company to acquire this clean vehicle?**

•

	Extremely important	• Very important	Moderately important	Slightly important	Not at all important	• Not applicable
California state vehicle rebate (up to $2,500)	• O	• O	• O	• O	• O	• O
Federal tax incentives (up to $7,500)	• O	• O	• O	• O	• O	• O
Manufacturer or dealer incentives (e.g. low interest rate, cash back)	• O	• O	• O	• O	• O	• O
Parking incentives (employer, business, or government)	• O	• O	• O	• O	• O	• O
Special electricity rates for charging	• O	• O	• O	• O	• O	• O
Having free charging away from home	• O	• O	• O	• O	• O	• O
Availability of carshare/car rental as part of purchase	• O	• O	• O	• O	• O	• O
HOV lane access	• O	• O	• O	• O	• O	• O

115. *[refuel install]* **Has your company purchased charging equipment and/or upgrades to be able to recharge vehicles?**

- o Yes
- o No

•

116. *If Yes' on [refuel install]*

[install cost] **How much did your company pay for the charging capabilities (either by purchasing charging equipment or by upgrading your previous setup)?**

Cost to company: _____ dollars

Subsidy or other assistance used: _____ dollars

117. *Everyone*

[charge frequency] **How often do you typically plug in this vehicle to charge?**

- o Daily

- o 5 or 6 times a week
- o 3 or 4 times a week
- o 1 or 2 times a week
- o Less than once a week
- o Never

- *If charges vehicle ever in [charge frequency]*

118. *[charge morning]* **On a typical weekday morning, when and where do you typically charge your vehicle?**

	Employee/ owner's home	Company charging station	Public charging station	Other	Do not charge
6:00am – 7:00am	o	o	o	o	o
7:00am – 8:00am	o	o	o	o	o
8:00am – 9:00am	o	o	o	o	o
9:00am – 10:00am	o	o	o	o	o
10:00am – 11:00am	o	o	o	o	o
11:00am – 12:00pm	o	o	o	o	o

- *If charges vehicle ever in [charge frequency]*

119. *[charge afternoon]* **On a typical weekday afternoon, when and where do you typically charge your vehicle?**

	Employee/ owner's home	Company charging station	Public charging station	Other	Do not charge
12:00pm – 1:00pm	o	o	o	o	o
1:00pm – 2:00pm	o	o	o	o	o
2:00pm – 3:00pm	o	o	o	o	o
3:00pm – 4:00pm	o	o	o	o	o
4:00pm – 5:00pm	o	o	o	o	o
5:00pm – 6:00pm	o	o	o	o	o

- *If charges vehicle ever in [charge frequency]*

120. *[charge evening]* **On a typical weekday evening, when and where do you typically charge your vehicle?**

	Employee/ owner's home	Company charging station	Public charging station	Other	Do not charge
6:00pm – 7:00pm	o	o	o	o	o
7:00pm – 8:00pm	o	o	o	o	o
8:00pm – 9:00pm	o	o	o	o	o
9:00pm – 10:00pm	o	o	o	o	o
10:00pm – 11:00pm	o	o	o	o	o
11:00pm – 12:00am	o	o	o	o	o

-
- *If charges vehicle ever in [charge frequency]*

121. *[charge night]* **On a typical weekday night, when and where do you typically charge your vehicle?**

	Employee/ owner's home	Company charging station	Public charging station	Other	Do not charge
12:00am – 1:00am	o	o	o	o	o
1:00am – 2:00am	o	o	o	o	o
2:00am – 3:00am	o	o	o	o	o
3:00am – 4:00am	o	o	o	o	o
4:00am – 5:00am	o	o	o	o	o
5:00am – 6:00am	o	o	o	o	o

-

122. *[variable rates]* **Does your electricity provider charge different rates for peak and non-peak usage?**

- o Yes
- o No
- o I don't know

123. *[meter]* **Does your company have a separate electricity meter to track your vehicle's electricity usage?**

- o Yes

- o No

If 'YES' on [meter]

[special rate] **Does your company receive a special electric vehicle electricity rate from your provider?**

- o Yes
- o No

124. *[kwhrate]* **On average, how much do you pay per kilowatt-hour to charge your vehicle(s)?**

- *If you don't know, you may leave this blank.*

$_____ per kilowatt-hour (kWh) [allow $0.00 to $0.99]

-
-

125. *[actual range]* **When this vehicle is fully charged, how much <u>electric range</u> does it typically have?**

Miles of electric range: _____ [allow 0-1,000]

APPENDIX H: Focus Group Screeners and Guidelines

Residential Screener

Corey, Canapary & Galanis
Screening Questionnaire * CEC Focus Groups
RESIDENTIAL

[NOTE: CONTACT/GROUP INFORMATION FILLED OUT ONLY FOR RECRUITED RESPONDENTS]

Name	☐Cell phone **(high priority)** ( )
	☐Work ☐Home ( )
Company	Email **(high priority)**
Address	Source
City ZIP	

Recruited for:
☐ Group #__ (**Residential**): _____, March___, 2016 ([DAY]) _____ pm

Introduction

Hello, I'm _____ with _____. We are recruiting drivers for input on driving in California. We are holding a focus group on _[day]___, March ___, in the _____area. The group will last approximately two (2) hours, and if you are selected and attend, you will receive $___ for your participation. *[Include as appropriate: Your participation will help the California Energy Commission, a state of California agency, understand your vehicle needs now and in the future. The information you provide will be kept confidential by Corey Research and the California Energy Commission.]* Let me ask you a few questions to see if you might qualify (if you might be a good fit).

Introduction wording may vary. OK to modify wording above this line; read questions as written below this line.

1.Do you live in California most of the time?

Yes 1
No ..... 2 *(thank and discontinue)*

2a. What City do you live in?_____
(Note: If outside of geographical range for this focus group, thank and discontinue); check with supervisor if uncertain.

2b.*(If unfamiliar with City, confirm)* ***In which county is that located?_____***

(Note: If outside of geographical range for this focus group, thank and discontinue)

3a. Are you responsible or do you have co-responsibility for the purchase or lease of vehicles in your household?

Yes 1
No ..... 2 *(thank and discontinue)*

3b. Do you drive at least one of the household vehicles?

Yes 1
No 2

4a. How many vehicles are owned/leased by your household? _____

Purchases in Past 5 years

4b. Have you purchased or leased a vehicle in the past five years?**

- ☐ Yes, purchased
- ☐ Yes, leased
- ☐ No *(skip to Q4c)*

4c. Did you purchase/lease a new vehicle or a used one?**

- ☐ New
- ☐ Used

Purchases in Next 5 years

4d. Are you likely to purchase or lease a vehicle within the next five years?**

- ☐ Yes
- ☐ Maybe
- ☐ No *(If Yes=Q4a, then skip to Q5a; if No in Q4a and this question, then thank and discontinue)*

4e. Are you planning to purchase/lease a new vehicle or a used one?**

- ☐ New
- ☐ Used

***ALL respondents should answer "YES" to EITHER Q4a OR Q4c. OK to include some who indicate they have purchased/leased or plan to purchase/lease used.*

5. Is your vehicle registered as a commercial vehicle?

- ☐ Yes*
- ☐ No (continue)
- ☐ Don't Know (continue)

**NOTE: If respondent's only/primary vehicle is registered as a commercial vehicle – check with supervisor and switch to Commercial group screener if warranted.*

6. About how many **miles** do you drive each **year**?

_____

7. [Am I correct that*] **What is the make/year/model of the vehicle that you drive most often?**

OK to ask "Am I correct that" if you already have the information from commercial vehicle list

7a. Make

- ☐ Audi
- ☐ BMW
- ☐ Cadillac
- ☐ Chevrolet
- ☐ Chrysler
- ☐ Fiat
- ☐ Ford
- ☐ General Motors (GM)
- ☐ GMC
- ☐ Honda
- ☐ Hyundai
- ☐ Infiniti
- ☐ Jeep
- ☐ Kia
- ☐ Lincoln
- ☐ Mazda
- ☐ Mercedes
- ☐ Nissan
- ☐ RAM ***(Fiat Chrysler)***
- ☐ Saab
- ☐ Subaru
- ☐ Tesla
- ☐ Toyota
- ☐ Volkswagen
- ☐ Volvo
- ☐ Other (Specify)_____

Note: This is not a complete list, but a list of common vehicles. All cars and light vehicles are eligible for this study regardless of brand. If "Other", MUST write in brand.

7b. Model_____ 7c. Year_____

7d. **(record/confirm)** Is this vehicle a: ☐Car ☐Crossover/station wagon ☐SUV ☐Van ☐Pick-up truck ☐Other (specify)_____

Thank and discontinue if vehicle is a semi-truck, cement truck/mixer, or equipment not legally used for travel, e.g. bulldozer. Confirm other/specify answers are within qualifications before proceeding.

7e. Does this vehicle operate on:

- ☐Conventional gasoline
- ☐Diesel fuel
- ☐Electricity (PHEV/all electric – NOT hybrid)**
- ☐Hybrid electricity/gasoline **
- ☐CNG
- ☐Ethanol/E85
- ☐Other (specify)_____

***See guidelines; participants with these responses should be <u>limited;</u> no more than 1 Electric vehicle per group, and no more than 2 Hybrid vehicles per group. SEE END OF SCREENER for list of fuel types.*

8. What do you do for a living?_____

[IMPORTANT: get specifics; for generic occupations, e.g. 'salesman' or 'consultant', ask "Which industry or sector do you work in?"]

9. Do you or anyone **in your immediate household** work for:

- ☐ An auto/truck/other vehicle **dealer, supplier, or manufacturer**
- ☐ An advocacy or political group which focuses on **environmental or transportation related** issues
- ☐ The California Energy Commission
- ☐ A gasoline **production, refining, or distribution** company
- ☐ A market research firm

(Terminate if ANY of the above are checked; note exceptions/explanations)

_____

_____

10a. Have you been involved in any **energy, transportation, or environmental causes**? *[if yes]* How long ago? Would you describe the research **[or 'How did you participate'?]** ***Probe for full details; if heavy involvement, call attention to supervisor and confirm person is still suitable for the group.***

_____

_____

10b. Have you participated in any **focus groups** related to passenger vehicles? *[if yes]* How long ago?

_____

_____

If 'yes' and focus group was within past 2 years, terminate.

I just have a few additional questions to ask. We ask these questions to ensure that we have a good cross-section of drivers.

11. Which category does your age fall into? ***[may wish to add: "Note that we are not looking for a specific number here, just broad ranges; let me read you the categories]***

- ☐ Under 18 *[Thank and Terminate]*
- ☐ 18 to 34 years old
- ☐ 35 to 64 years old
- ☐ 65 to 80 years old
- ☐ Over 80 years old

12. Gender ***(by observation; ask if necessary)***

☐ Male ☐ Female

13. How many people, including yourself, are part of your household? ***Do not include college students living away while attending college or people who live at another place most of the time.***

 # in Household_____

14. What would you say is your work status. Are you . . . ?* ***(read list as necessary)***

- ☐ Employed **full-time (including self-employed full-time)**
- ☐ Employed **part-time (including self-employed part-time)**
- ☐ Full-time caregiver/stay at home parent/homemaker
- ☐ Student*
- ☐ Retired
- ☐ Unemployed
- ☐ Other_____

***Try for ONLY one response. If both work and attend school, whichever activity is full-time/majority of hours should be recorded. If work part-time and school part-time, record as "employed part-time" AND "student").**

15. What is the highest level of education that you have completed?

- ☐ Less than high school
- ☐ High school diploma or GED
- ☐ Technical/vocational school
- ☐ Some college ***(including Certificate programs)***
- ☐ College degree ***(e.g. Bachelor/Associate)***
- ☐ Graduate school ***(e.g. Masters, Ph.D., legal/medical degree)***

16. What is your racial or ethnic background?

- ☐ Caucasian/White
- ☐ Hispanic/Latino/Spanish
- ☐ American Indian or Alaska Native
- ☐ Asian / Pacific Islander
- ☐ Black / African American
- ☐ Other: _____

17. For statistical purposes, what is your approximate total household income before taxes? ***[may wish to add: "Note that we are not looking for a specific number here, just broad ranges; let me read you the categories; if hesitant, can also add: Household income has been found to be related to the types of trips households typically make. We would like to be sure our study represents all income groups in California.]***

- ☐Less than $10,000
- ☐$10,000 to $24,999
- ☐$25,000 to $34,999
- ☐$35,000 to $49,999
- ☐$50,000 to $74,999
- ☐$75,000 to $99,999
- ☐$100,000 to $149,999
- ☐$150,000 to $199,999
- ☐$200,000 to $249,999
- ☐$250,000 or more

Note: OK to read these categories as …. "$10,000 to $25,000, $25,000 to $35,000". If respondent says, "It is exactly $25,000," then code to HIGHER category.

[NEXT STEPS: Verify answers as needed; check with supervisor before confirming recruit. If recruited, fill out top of Page 1, including ALL contact info – company/address, telephone number, email. OBTAIN CELL PHONE NUMBER if at all possible.]

Recruiting Guidelines:

1. Obtain a representative mix of income/age/gender/race/household size, but all participants must be at least 18 years old.

2. Obtain a mix of occupations – should be broadly representative of the local area.

4. Residential group should have no more than 1 person unemployed. Non-working respondents should *not* be a disproportionate share of the group.

5. Recruit respondents owning/leasing a range of vehicle types, makes, and models broadly representative of the local area.

6. Most respondents should either have purchased/leased or intend to purchase/lease a new vehicle; it is OK to include some respondents who have purchased/leased or intend to purchase/lease a used vehicle.

7. Electric (PEV) owners/lessees:
a. In regions where only 2 groups are being held – Bay Area, Central Valley, Sacramento – permit no more than 1 PEV/PHEV owner and no more than 2 hybrid owners per group.
b. In Los Angeles region (with its own PEV group), permit no more than 2 hybrid owners per
group. PEV owners should qualify for the PEV owner group.

Important: PEV includes PHEV (Gasoline Plug-in Hybrid Electric Vehicle) and BEV (Battery Electric Vehicle). A description of fuel types is listed below for reference:

Fuel Type	Description of Fuel Type
Gasoline only vehicle	A vehicle that operates on gasoline only and has no hybrid components.
Gasoline Hybrid Electric vehicle (HEV)	A gasoline vehicle with hybrid components to increase fuel economy (e.g. Toyota Prius) but does not plug in for charging the battery.
Gasoline Plug-in Hybrid Electric vehicle (PHEV)	A gasoline vehicle with hybrid components and a larger battery (e.g. Chevrolet Volt) which allows the vehicle to operate like a battery electric vehicle for a short distance (10-40 miles) and then operate on gasoline for a much longer distance (~300-400 miles)
Gasoline - ethanol Flex Fuel vehicle (E85 FFV)	A vehicle that will operate on gasoline, ethanol, or any blend of the two fuels and has no hybrid components.
Diesel only vehicle	A vehicle that operates on diesel or biodiesel only and has no hybrid components.
Diesel Hybrid Electric vehicle (HEV)	A diesel vehicle with hybrid components but does not plug in for charging the battery.
Compressed Natural Gas (CNG) only vehicle	A vehicle that only operates on compressed natural gas (CNG) and has no hybrid components. It can be filled up at home or at a station.
Battery Electric vehicle (BEV)	A vehicle that operates on a battery only and charges by plugging in at home or at a station (e.g. Nissan Leaf).
Hydrogen Fuel Cell Electric vehicle (FCEV)	A hybrid electric vehicle that uses hydrogen to generate its own electricity in a fuel cell. The fuel cell powers the electric motor that drives the wheels and recharges the battery. Hydrogen is stored in a tank onboard the vehicle.

Commercial Screener

Corey, Canapary & Galanis
Screening Questionnaire * CEC Focus Groups
COMMERCIAL OWNERS/FLEET DECISION-MAKERS

[NOTE: CONTACT/GROUP INFORMATION FILLED OUT ONLY FOR RECRUITED RESPONDENTS]

Name	☐Cell phone **(high priority)** ( )	
	☐Work ☐Home ( )	
Company **(REQUIRED)**		Email **(high priority)**
Address		Source
City	ZIP	

Recruited for:
☐ Group #____ (**Commercial Vehicle Decision-Makers**):
_____, March____, 2016 (___) **__:__pm**

Introduction

Hello, I'm _____ with Corey Research. We are seeking those who make decisions about vehicles used in a business for an upcoming focus group. The [focus] group will be held on ____, March ___, in the _____area. [The focus] group will last approximately two (2) hours, and if you are selected and attend, you will receive $___ for your participation. *[Include as appropriate: Your participation will help the California Energy Commission, a state of California agency, understand your vehicle needs now and in the future. The information you provide will be kept confidential by Corey Research and the California Energy Commission.]*

Let me ask you a few questions to see if you might be a good fit.

Introduction wording may vary. OK to modify wording above this line; read questions as written below this line.

1. Is your work or business located in California?*

Yes 1
No ..... 2 *(thank and discontinue)*

**Note: If respondent works for an employer based outside of California, but respondent himself/herself works within California, code as a 'yes' and continue.*

2a. In which city is it located?_____
(Note: If outside of geographical range for this focus group, thank and discontinue)

2b. *(If unfamiliar with City, confirm)* ***In which county is that located?_____***
(Note: If outside of geographical range for this focus group, thank and discontinue)

3. Are you a decision maker for the purchase or lease of light duty trucks, vans, or cars

used mostly in California?

Yes 1

No .....2 *(thank and discontinue)**

Note: if "No," but another person in the organization might be suitable, obtain contact information for that person if possible.

Purchases in Past 5 years

4a. Have you purchased or leased a light-duty commercial vehicle in the past five years?**

- ☐ Yes, purchased
- ☐ Yes, leased
- ☐ No *(skip to Q4c)*

4b. Did you purchase/lease a new vehicle or a used one?**

- ☐ New
- ☐ Used

Purchases in Next 5 years

4c. Are you likely to purchase or lease a new light-duty commercial vehicle within the next five years?**

- ☐ Yes
- ☐ Maybe
- ☐ No *(If Yes=Q4a, then skip to Q5a; if No in Q4a and this question, then thank and discontinue)*

4d. Are you planning to purchase/lease a new vehicle or a used one?**

- ☐ New
- ☐ Used

ALL respondents should answer "YES" to EITHER Q4a OR Q4c. MOST respondents should indicate that the vehicles purchased or those they plan to purchase are/will be new. OK to include some who indicate they have purchased/leased or plan to purchase/lease used.

5a. What is your position/role in this company/business?

_____

5b. *[read as necessary]* What type of business do you work in (What type of business is the company in? What sector?)

_____

5c. Are you working in this position/role . . . ***(read list)***

- ☐ Full time
- ☐ Part time ***(ask 5d.)***
- ☐ Not at all (retired, unemployed, etc.) ***(thank and discontinue)***

5d. Is this your primary/only occupation?

- ☐ Yes
- ☐ No ***(See recruiting specifications)***

6a. Do you work for:

- ☐ An auto/truck/other vehicle **dealer, supplier, or manufacturer**
- ☐ An advocacy, non-profit, or political group which focuses on **environmental or transportation related** issues
- ☐ A gasoline **production, refining, or distribution** company
- ☐ A market research firm

6b. Do you or anyone in *your immediate family* work for the California Energy Commission?

- ☐ Yes (thank and terminate)
- ☐ No

(Terminate if ANY of the above are checked; note exceptions/explanations)

7a. Have you been involved in <u>any</u> causes related to **energy, transportation, or environmental causes**? *[if yes]* How long ago? Please describe **[or 'How did you participate'?]** ***Probe for full details; if heavy involvement, call attention to supervisor and confirm person is still suitable for the group.***

7b. Have you participated in any focus groups related to passenger vehicles? *[if yes]* How long ago?

If 'yes' and focus group was within past 2 years, terminate.

I just have a few additional questions to ask. We ask these questions to ensure that we have a good cross-section of participants.

8a. Please tell me the total number of vehicles in your fleet? ***(recruit a mix)***

Total number of vehicles:_____

8b. ***Of those (above), how many (total) are 'light duty' – that is, cars, vans, trucks, or SUVs?***

_____# cars
_____# crossovers/station wagons
_____# minivans/vans
_____# pick-up trucks
_____# sport utility vehicles (SUVs)

8c. Does your business have:
____a charging station for electric vehicles?
____a fueling station for gasoline vehicles?

8d. What fuel types/technology are used by your fleet? ***(check all that apply)***

Gasoline only vehicle
Gasoline Hybrid Electric vehicle (HEV)
Gasoline Plug-in Hybrid Electric vehicle (PHEV)
Gasoline - ethanol Flex Fuel vehicle (E85 FFV)
Diesel only vehicle
Compressed Natural Gas (CNG) only vehicle
Battery Electric vehicle (BEV)
Hydrogen Fuel Cell Electric vehicle (FCEV)
Other (specify)

9. Approximately how many people, including yourself, work for your company/business (organization)?*

in Company/organization_____*

Include total number of approximate employees, both in and out of California

10. Gender ***(by observation; ask if necessary)***
☐ Male ☐ Female

11. Which category does your age fall into? *[may wish to add: "Note that we are not looking for a specific number here, just broad ranges; let me read you the categories]*

- ☐ Under 18 *[Thank and Terminate]*
- ☐ 18 to 34 years old
- ☐ 35 to 64 years old
- ☐ 65 to 80 years old
- ☐ Over 80 years old

[NEXT STEPS: Verify answers as needed; check with supervisor before confirming recruit. If recruited, fill out top of Page 1, including ALL contact info – company/address, telephone number, email. OBTAIN CELL PHONE NUMBER if at all possible.]

Recruiting Guidelines:

1. All participants must be at least 18 years old.

2. Obtain a mix of industries – should be broadly representative of the local area.

3. ALL respondents should be employed at least part-time in the company/organization for which they purchase vehicles. Most respondents should be full-time.

4. Recruit commercial respondents owning/leasing a range of fleet sizes, vehicle types, makes, and models broadly representative of the local area.

5. ALL respondents should either have purchased/leased a vehicle in the past 5 years or are planning to purchase/lease a vehicle in the next 5 years. Most of these purchases/leases should be new; however, it is OK to include some respondents who purchased/leased a used vehicle (or are planning to).

Important: PEV includes PHEV (Gasoline Plug-in Hybrid Electric Vehicle) and BEV (Battery Electric Vehicle).

A description of fuel types is listed below for reference:

Fuel Type	Description of Fuel Type
Gasoline only vehicle	A vehicle that operates on gasoline only and has no hybrid components.
Gasoline Hybrid Electric vehicle (HEV)	A gasoline vehicle with hybrid components to increase fuel economy (e.g. Toyota Prius) but does not plug in for charging the battery.
Gasoline Plug-in Hybrid Electric vehicle (PHEV)	A gasoline vehicle with hybrid components and a larger battery (e.g. Chevrolet Volt) which allows the vehicle to operate like a battery electric vehicle for a short distance (10-40 miles) and then operate on gasoline for a much longer distance (~300-400 miles)
Gasoline - ethanol Flex Fuel vehicle (E85 FFV)	A vehicle that will operate on gasoline, ethanol, or any blend of the two fuels and has no hybrid components.
Diesel only vehicle	A vehicle that operates on diesel or biodiesel only and has no hybrid components.
Diesel Hybrid Electric vehicle (HEV)	A diesel vehicle with hybrid components but does not plug in for charging the battery.
Compressed Natural Gas (CNG) only vehicle	A vehicle that only operates on compressed natural gas (CNG) and has no hybrid components. It can be filled up at home or at a station.
Battery Electric vehicle (BEV)	A vehicle that operates on a battery only and charges by plugging in at home or at a station (e.g. Nissan Leaf).
Hydrogen Fuel Cell Electric vehicle (FCEV)	A hybrid electric vehicle that uses hydrogen to generate its own electricity in a fuel cell. The fuel cell powers the electric motor that drives the wheels and recharges the battery. Hydrogen is stored in a tank onboard the vehicle.

PEV Screener

Corey, Canapary & Galanis
Screening Questionnaire * CEC Focus Groups
PEV OWNERS/DRIVERS (BOTH RESIDENTIAL AND COMMERCIAL RESPONDENTS)

[NOTE: CONTACT/GROUP INFORMATION FILLED OUT ONLY FOR RECRUITED RESPONDENTS]

Name	☐Cell phone **(high priority)** ( )	
	☐Work ☐Home ( )	
Company **(REQUIRED)**		Email **(high priority)**
Address		Source
City	ZIP	

Recruited for:
☐ Group #__ **(PEV Drivers)***: _____, March___, 2016 (WED) _____ pm
PEV Drivers is shorthand – see guidelines

Introduction

Hello, I'm _____ with Corey Research. We are seeking those who make decisions about vehicles used in a business for an upcoming focus group. The group will be held on ____, March ___, in the _____area. The group will last approximately two (2) hours, and if you are selected and attend, you will receive $___ for your participation. ***[Include as appropriate: Your participation will help the California Energy Commission, a state of California agency, understand your vehicle needs now and in the future. The information you provide will be kept confidential by Corey Research and the California Energy Commission.]***

Let me ask you a few questions to see if you might be a good fit.

Introduction wording may vary. OK to modify wording above this line; read questions as written below this line.

1. Do you currently own a Plug-In Electric Vehicle (PEV/PHEV) for personal or business use? ***(If yes)*** Is this for personal use or business use?
   - ☐ Yes, personal use
   - ☐ Yes, business use
   - ☐ Yes, both personal and business use
   - ☐ No ***(thank and discontinue)***

(Note: This question is confirming ownership per the call list of PEV/PHEV owners.)

2. Are you responsible for, or do you have co-responsibility for, the purchase or lease of this vehicle?

Yes 1

No..... 2 *(thank and discontinue)*

Note: For commercial respondents who are disqualified in this question, see if they can direct you to the proper person in the organization (if applicable).

3a. What charging equipment do you mostly use?

- ☐ Level I chargers
- ☐ Level II chargers
- ☐ Fast chargers (e.g. DC)

If respondent is unsure/needs more information, read definitions below:

- ***Level 1** charging is the technical jargon for plugging your car into an ordinary outlet at home or work, which is a 120 volt AC plug. For example, 8 hours of charging at 120V can replenish about 40 miles of electric range. Almost all electric vehicles come with standard equipment to use Level 1 chargers.*
- ***Level 2** supplies 240V, similar to what is used for an electric dryer or oven. It goes through a box and a cord that improves safety by waiting to send power to the plug until it's plugged into an EV. Level 2 allows for a wide range of charging speeds, all the way up to about 70 miles of range per hour of charging. Some work or public places like hotels offer level 2 chargers.*
- ***DC Fast Chargers** provide the fastest type of charging currently available, up to 40 miles of range for every 10 minutes of charging. These are public charging spaces, and there is a growing network of these chargers across California.*

3b. Where do you mostly charge your electric vehicle?

- ☐ Work
- ☐ Home
- ☐ At a public charger
- ☐ Other (specify location)_____

4a. In which city are you located?_____

(Note: If outside of geographical range for this focus group, thank and discontinue)

4b. *(If unfamiliar with City, confirm)* ***In which county is that located?_____***

(Note: If outside of geographical range for this focus group, thank and discontinue)

These next few questions are about your use of your PEV/PHEV vehicle.

5. About how many **miles** do you drive each **year**?

_____

6. **[Am I correct that*] What is the make/year/model of the vehicle that you drive most often?,** ***OK to ask "Am I correct that" if you already have the information from commercial vehicle list***

6a. Make

- ☐ Audi
- ☐ BMW
- ☐ Cadillac
- ☐ Chevrolet
- ☐ Chrysler
- ☐ Fiat
- ☐ Ford
- ☐ General Motors (GM)
- ☐ GMC
- ☐ Honda
- ☐ Hyundai
- ☐ Infiniti
- ☐ Jeep
- ☐ Kia
- ☐ Lincoln
- ☐ Mazda
- ☐ Mercedes
- ☐ Nissan
- ☐ RAM ***(Fiat Chrysler)***
- ☐ Saab
- ☐ Subaru
- ☐ Tesla
- ☐ Toyota
- ☐ Volkswagen
- ☐ Volvo
- ☐ Other

(Specify)_____

Note: This is not a complete list, but a list of common vehicles. All cars and light vehicles are eligible for this study regardless of brand. If "Other", MUST write in brand.

6b. Model_____ 6c. Year_____

6d. **(record/confirm)** Is this vehicle a: ☐Car ☐Crossover/station wagon ☐SUV ☐Van ☐Pick-up truck ☐Other (specify)_____

Thank and discontinue if vehicle is a semi-truck, cement truck/mixer, or equipment not legally used for travel, e.g. bulldozer. Confirm other/specify answers are within qualifications before proceeding.

7. Purchases

Purchases in Past 5 years

7a. Including your PEV/PHEV, how many new or used vehicles have you purchased or leased in the past five years?

_____ # purchased

_____ # leased

Purchases in Next 5 years

7b. Do you plan to purchase or lease any new or used vehicles within the next five years?

- ☐ Yes
- ☐ Maybe
- ☐ No

Other vehicles

8a. Including those we just talked about, what is the total number of vehicles you own? ***(recruit a mix)***

Total number of vehicles:_____

8b. What fuel types are used by these vehicles? ***(check all that apply; read list as necessary)***

Gasoline only vehicle
Gasoline Hybrid Electric vehicle (HEV)
Gasoline Plug-in Hybrid Electric vehicle (PHEV)
Gasoline - ethanol Flex Fuel vehicle (E85 FFV)
Diesel only vehicle
Compressed Natural Gas (CNG) only vehicle
Battery Electric vehicle (BEV)
Hydrogen Fuel Cell Electric vehicle (FCEV)
Other (specify)

9. Do you or anyone **<u>in your immediate household</u>** work for:

- ☐ An auto/truck/other vehicle **dealer, supplier, or manufacturer**
- ☐ An advocacy or political group which focuses on **environmental or transportation related** issues
- ☐ The California Energy Commission
- ☐ A gasoline **production, refining, or distribution** company
- ☐ A market research firm

(Terminate if ANY of the above are checked; note exceptions/explanations)

_____

_____

10a. Have you been involved in <u>any</u> **energy, transportation, or environmental causes**? *[if yes]* How long ago? Would you describe? **[or 'How did you participate'?]** ***Probe for full details; if heavy involvement, call attention to supervisor and confirm person is still suitable for the group.***

_____

_____

10b. Have you participated in any **focus groups** related to passenger vehicles? *[if yes]* How long ago?

If 'yes' and focus group was within past 2 years, terminate.

11. Gender *(by observation; ask if necessary)*

☐ Male ☐ Female

12. Which category does your age fall into? *[may wish to add: "Note that we are not looking for a specific number here, just broad ranges; let me read you the categories]*

- ☐ Under 18 *[Thank and Terminate]*
- ☐ 18 to 34 years old
- ☐ 35 to 64 years old
- ☐ 65 to 80 years old
- ☐ Over 80 years old

[NEXT STEPS: Verify answers as needed; check with supervisor before confirming recruit. If recruited, fill out top of Page 1, including ALL contact info – company/address, telephone number, email. OBTAIN CELL PHONE NUMBER if at all possible.]

Recruiting Guidelines:

1. All participants must be at least 18 years old.

2. All PEV/PHEV owners should be from the provided lists and MUST be current PEV/PHEV owners.

3. Obtain a mix of industries (among commercial owners) and mix of profession/age/etc. among all owners – should be broadly representative of the local area.

4. While questions about vehicle purchases and leasing (past/future) are asked, in the case of this group only, these do NOT disqualify someone from the group.

5. Recruit commercial respondents owning/leasing a range of fleet sizes, vehicle types, makes, and models broadly representative of the local area.

6. Try for a mix of charger types and number of miles driven.

Important: PEV includes PHEV (Gasoline Plug-in Hybrid Electric Vehicle) and BEV (Battery Electric Vehicle).

A description of fuel types is listed below for reference – those recruited for this group should own a vehicle in one of the highlighted categories:

Fuel Type	Description of Fuel Type
Gasoline only vehicle	A vehicle that operates on gasoline only and has no hybrid components.
Gasoline Hybrid Electric vehicle (HEV)	A gasoline vehicle with hybrid components to increase fuel economy (e.g. Toyota Prius) but does not plug in for charging the battery.
Gasoline Plug-in Hybrid Electric vehicle (PHEV)	A gasoline vehicle with hybrid components and a larger battery (e.g. Chevrolet Volt) which allows the vehicle to be plugged in and operate like a battery electric vehicle for a short distance (10-50 miles) and then operate on gasoline for a much longer distance (~300-400 miles)
Gasoline - ethanol Flex Fuel vehicle (E85 FFV)	A vehicle that will operate on gasoline, ethanol, or any blend of the two fuels and has no hybrid components.
Diesel only vehicle	A vehicle that operates on diesel or biodiesel only and has no hybrid components.
Diesel Hybrid Electric vehicle (HEV)	A diesel vehicle with hybrid components but does not plug in for charging the battery.
Compressed Natural Gas (CNG) only vehicle	A vehicle that only operates on compressed natural gas (CNG) and has no hybrid components. It can be filled up at home or at a station.
Battery Electric vehicle (BEV)	A vehicle that operates on a battery only and charges by plugging in at home or at a station (e.g. Nissan Leaf).
Hydrogen Fuel Cell Electric vehicle (FCEV)	A hybrid electric vehicle that uses hydrogen to generate its own electricity in a fuel cell. The fuel cell powers the electric motor that drives the wheels and recharges the battery. Hydrogen is stored in a tank onboard the vehicle.

APPENDIX I: Focus Group Moderator Guide Residential Moderator Guide

California Vehicle Survey
Focus Group
Moderator Guide - Residential
February, 2015

I. Introduction (10 minutes)

1. Moderator, purpose, agenda, affiliation, discussion rules, audio/video.
2. Introductions.

II. Current Vehicles and Driving Habits (10 minutes)

Note to moderator: write these questions on flip chart and document answers

Now let's go around the room and discuss the vehicles that you drive. For each of you, please tell me about:

1) The number of vehicles that you have in your household and how long you've had each of them
2) Whether you own or lease them, and whether they're new or used
3) How you use your vehicles? How much time do you spend in your car(s)? Where do you go? What is your vehicle for? How many people/things do you typically have with you in the vehicle?

As warranted, probe with the following:

- Tell me about how much you typically drive
- Who here has used:
  - Uber?
  - Rental car?
  - Transit bus/rail?
  - What are those like?

III. Future Car Purchase Needs and Desired Attributes (30 minutes)

Now I want to talk about what steps you took to purchase your current vehicle and factors you will consider when purchasing your next vehicle.

- What factors influenced your decision to purchase your current vehicle?
- Do any of you have plans to replace your current vehicle?
  - If yes, why? If no, why not?
  - Probe:
- When are you planning to purchase your next vehicle?
- Tell me about the kind of vehicle you are planning to purchase.
  - Probe:
    - Do you expect it to be larger/smaller/the same size as your current vehicle?
    - Do you expect better/worse/same fuel economy?

Note to moderator: if not mentioned probe for the following:

- Would you consider buying an energy efficient vehicle such as electric or hybrid car or a vehicle that does not run on gas/petroleum? Why or why not?
    - Has the recent decrease is fuel prices changed your consideration of energy efficient vehicles?
- What factors would you take into consideration before purchasing this type of vehicle? I'm curious what you will be looking for in your next vehicle. For flipchart:

    1. What are your "must haves" for your next vehicle?
    2. What are the "nice to haves" for your next vehicle?

- How did you determine whether something went into one category or the other?
- What makes these "must haves" so important?
- How much are you thinking about the changes that might happen in the world that would affect the kind of vehicle you will want to be driving 3-5 years from now?
    - How dramatic do you expect these changes to be?
    - What do you think about self-driving and autonomous vehicles?
- How much are you thinking about the price of the vehicle?
- How much are you thinking about the cost of ownership?
    - What goes into cost of ownership?
    - Which of these are most important?
    - Which of these can you affect?
- What do you think is cost of ownership? Do you consider that when you buy a vehicle?
    - How much did you pay for fuel last time?
    - What is your sense of fuel costs as a percentage of total ownership costs?
- When it comes to costs, how much do you consider:
    - Purchase price
    - Maintenance
    - Fuel
    - Insurance
    - Depreciation/Resale value

V. Alternative Vehicle Perceptions - Aided (40 minutes)

For this next part of our discussion, we are going to talk about different alternative fuel vehicles and high efficiency vehicles. Ask participants if they are familiar with alternative fuel vehicles or high efficiency vehicles. After response provide a definition to guide this part of this discussion.

Note to moderator: present each term below separately and ask the following questions:

- Diesel vehicle
- Hybrid electric vehicle
- Plug-in hybrid vehicle
- Battery electric vehicle
- Flexible Fuel vehicle
- Fuel cell vehicle
- CNG vehicle
- E85

- Who is familiar with this term? *(Ask participants to raise their hands and count the number of raised hands)*
- What do you know or what do you think it is? Why?
- Hs anybody driven this type of vehicle?
- What do/don't you like about this?
- *If Diesel, plug-in, CNG or E85:* Have you noticed the availability of charging stations, alternative fuel or diesel at gas stations in your area? If so, what kind?

After the participants have responded, hand out the definitions.

- Are you surprised by the definition? If so, what is it about that surprises you?
    - Probe:
        - After hearing the definition, is this what you thought it was? Why or why not?
        - Is the definition/description clear? Is it missing something? If so, what would you add to it? Why?
        - Do you have any comments or concerns about this type of vehicle? If so, what are your concerns?

As a group, ask the participants to develop a list on the flip chart of the strengths and weakness of the vehicles discussed.

- By show of hands, go through each vehicle type and ask if the vehicle would be considered for the next purchase. Probe on why/why not?
- If there was an incentive available to consumers who purchase an alternative fuel or high efficiency vehicle, would this motivate you to consider buying this type of vehicle? Why or why not?
    - Probe:
        - What kind of incentives?

Here is a brief summary of these vehicles including some that you may not be aware of.

Show list on flip chart of factors relevant to making an alternative vehicle decision.

Here is a chart that shows some of the factors that may be important when comparing vehicles. In a moment we will look at this chart with the details included. But for now let's talk about these features by themselves. Factors include:

- Purchase price
- MPG
- MPGe
- Fuel cost
- Convenience
- Range
- Cargo Space
- Seating capacity
- Driving comfort
- Driving performance
    - Acceleration
    - Top speed
- Impact on Environment
- Tax credit (do you figure this into price, or does it act as a separate motivation?)
- Price rebate (do you figure this into price, or does it act as a separate motivation?)
- HOV/carpool lane access

Discuss as a group:

2. What ranges are acceptable for each of these? What ranges are ideal?
3. Which factors are most important?
4. What are your reasons for these being most important?
5. What trade-offs do you make among these factors when deciding on a vehicle to purchase?
6. What features are also important that we missed? What makes these important?
7. Are there any other "nice to haves" that would be important to compare?

Explain that alternative vehicle types could have trade-offs in fuel economy, price, cargo capacity and other features.

8. How would your preference for these vehicle types change based on changes to factors such as price, fuel economy, and cargo capacity?
9. Imagine it is 5 years or 10 years from now. What factors might change that would cause you to consider these elements differently?
10. What if gas costs $3, $6, or even $9 a gallon?

Potential probes:

- What if you have solar panels? Do you have any plans for it?
- What if you gain access to HOV lane?
- What if there are more toll roads and bridges that provide exceptions for these vehicles?
- What if parking was free or cheaper?
- What happens when electric re-charge stations become more common?

VI. Survey Review (20 minutes)

Further explain survey portion of our study, and explain trade-offs. Ask respondents to read instruction page, evaluate a set of experiments (4?), and open discussion:

1. What did you understand as the instructions?
2. How did you approach the vehicle trade-offs?
3. Were there any aspects of the exercise that were difficult to understand?
4. Were there any important aspects of your purchase decisions that were missing?
5. Fuel type, vehicle models available, purchase incentive, cost per gallon, MPG, fuel availability, refueling time, vehicle range, maintenance costs

VII. End (5 minutes)

Thank you for your help!

Commercial Moderator Guide

California Vehicle Survey
Focus Group
Moderator Guide - Commercial
February, 2015

I. Introduction (10 minutes)

3. Moderator, purpose, agenda, affiliation, discussion rules, audio/video.
4. Introductions and warm-up question.

II. Company and fleet background (10 minutes)

I want to start by understanding a bit about each of the organizations where you work, and what types of vehicles are owned and operated by your companies.

Let's go around, and I'd like you to tell me about the type of business that your company is in, the size of your company, how many vehicles your company owns/leases and operates in California, and what types of vehicles those are (for example, mostly cars, trucks, SUVs? All gasoline, or any hybrids or other types?

- Probe:
  - Do you typically buy new or used vehicles? Why?
  - How often do you purchase/lease new vehicles?
  - Why would you replace a company vehicle, and how frequently do you replace them?
- How many miles does your company tend to put on its vehicles?

What are the typical driving patterns for these vehicles? What are they used for?

- What do you have to pay to operate vehicles in your fleet?
  - Probe: How do you think about fuel costs (e.g. cost per fill-up, cost per week, cost per month, cost per year)

III. Future Car Purchase Needs and Desired Attributes (30 minutes)

Now I want to talk about what steps you took to purchase your company's most recent vehicle and factors you will consider when purchasing your company's next vehicle.

- What factors influenced your decision to purchase your most recent vehicle?
- Do any of you have plans to replace a vehicle?
  - If yes, why? If no, why not?
  - Probe:
    - When are you planning to purchase the next vehicle for your company? Will it add to vehicles/fleet or replace one? Why?
    - What kind of vehicle are you planning to purchase?
    - What vehicle are you planning to replace first? Why?
    - If you could replace any vehicles in your fleet tomorrow, what would you buy? Why?
    - Do you expect your next vehicle to be larger/smaller/the same size as others in your fleet?
    - Will you be likely to purchase a vehicle with better/worse/same fuel economy as your other vehicles?

Note to moderator: if not mentioned probe for the following:

- Would you consider buying an energy efficient vehicle such as electric or hybrid car or a vehicle that does not run on gas/petroleum? Why or why not?
    - Has the recent decrease is fuel prices changed your consideration of energy efficient vehicles?

3. What are your "must haves" for your company's next vehicle?
4. What are the "nice to haves" for your company's next vehicle?

- How did you determine whether something went into one category or the other?
- What makes these "must haves" so important?
- How much are you thinking about the changes that might happen in the world, California, or economy that would affect the kind of vehicle you will want your company to be using 3-5 years from now?
    - How dramatic do you expect these changes to be?
- How much are you thinking about the price of the vehicle?
- What do you think is cost of ownership? Do you consider that when you buy a vehicle?
- How much are you thinking about the cost of ownership?
    - What goes into cost of ownership?
    - Which of these are most important?
    - Which of these can you affect?
- How much do you track your cost of ownership on your existing vehicles?
    - What is your sense of fuel costs as a percentage of total ownership costs?
- When it comes to buying/leasing a vehicle, how much do you consider:
    - Purchase price
    - Maintenance
    - Fuel
    - Insurance
    - Depreciation/Resale value

V. Alternative Vehicle Perceptions - Aided (40 minutes)

For this next part of our discussion, we are going to talk about different alternative fuel vehicles and high efficiency vehicles. Ask participants if they are familiar with alternative fuel vehicles or high efficiency vehicles. After response provide a definition to guide this part of this discussion.

Note to moderator: present each term below separately and ask the following questions:

- Diesel vehicle
- Hybrid electric vehicle
- Plug-in hybrid electric vehicle (PHEV)
- Battery electric vehicle
- Flexible Fuel vehicle (FFV)
- Fuel cell vehicle (FCV)
- CNG vehicle
- E85

- Who is familiar with this term? *(Ask participants to raise their hands and count the number of raised hands)*
- What do you know or what do you think it is? Why?
- Have any of you used this type of vehicle in your businesses?
- What do/don't you like about this?
- *If diesel, plug-in, CNG or E85:* Have you noticed the availability of charging stations, alternative fuel or diesel at gas stations in your area? What kind?
-

After the participants have responded, hand out the definitions.

- Are you surprised by the definition? If so, what is it about that surprises you?

- Probe:
  - After hearing the definition, is this what you thought it was? Why or why not?
  - Is the definition/description clear? Is it missing something? If so, what would you add to it? Why?
  - Do you have any comments or concerns about this type of vehicle? If so, what are your concerns?

As a group, ask the participants to develop a list on the flip chart of the strengths and weakness of the vehicles discussed.

- By show of hands, go through each vehicle type and ask if the vehicle would be considered for the next purchase. Probe on why/why not.
- If there was an incentive available to consumers who purchase an alternative fuel or high efficiency vehicle, would this motivate you to consider buying this type of vehicle for your company? Why or why not?
  - Probe:
    - What kind of incentives?

Here is a brief summary of these vehicles including some that you may not be aware of.

Show list on flip chart of factors relevant to making an alternative vehicle decision.

Here is a chart that shows some of the factors that may be important when comparing vehicles. In a moment we will look at this chart with the details included. But for now let's talk about these features by themselves. Factors include:

- Purchase price
- MPG
- MPGe
- Fuel cost
- Convenience
- Range
- Cargo Space
- Seating capacity
- Driving comfort
- Driving performance
  - Acceleration
  - Top speed
- Impact on Environment
- Tax credit (do you figure this into price, or does it act as a separate motivation?)
- Price rebate (do you figure this into price, or does it act as a separate motivation?)
- HOV/carpool lane access

- **Discuss as a group:**

1. What ranges are acceptable for each of these? What ranges are ideal?
2. Which factors are most important?
3. What are your reasons for these being most important?
4. What trade-offs do you make among these factors when deciding on a vehicle to purchase?
5. What features are also important that we missed? What makes these important?
6. Are there any other "nice to haves" that would be important to compare?

Explain that alternative vehicle types could have trade-offs in fuel economy, price, cargo capacity and other features.

7. How would your preference for these vehicle types change based on changes to factors such as price, fuel economy, and cargo capacity?
8. Imagine it is 5 years or 10 years from now. What factors might change that would cause you to consider these elements differently?

9. What if gas costs $3, $6, or even $9 a gallon?

Potential probes:

- What if you have solar panels? Do you have any plans for it?
- What if you gain access to HOV lane?
- What if there are more toll roads and bridges that provide exceptions for these vehicles?
- What if parking was free or cheaper?
- What happens when electric re-charge stations become more common?

VI. Survey Review (20 minutes)

Further explain survey portion of our study, and explain trade-offs. Ask respondents to read instruction page, evaluate a set of experiments (4?), and open discussion:

6. What did you understand as the instructions?
7. How did you approach the vehicle trade-offs?
8. Were there any aspects of the exercise that were difficult to understand?
9. Were there any important aspects of your purchase decisions that were missing?
10. Fuel type, vehicle models available, purchase incentive, cost per gallon, MPG, fuel availability, refueling time, vehicle range, maintenance costs

VII. End (5 minutes)

Thank you for your help!

PEV Moderator Guide

California Vehicle Survey
Focus Group
Moderator Guide - PEV
February, 2015

I. Introduction (10 minutes)

5. Moderator, purpose, agenda, affiliation, discussion rules, audio/video.
6. Introductions.

II. Current Vehicles and Driving Habits (10 minutes)

Note to moderator: write these questions on flip chart and document answers

Now let's go around the room and discuss the vehicles that you drive. For each of you, please tell me about:

4) The number of vehicles that you have in your household and how long you've had each of them
5) Whether you own or lease them, and whether they're new or used
6) How you use your vehicles? How much time do you spend in your car(s)? Where do you go? What is your vehicle for? How many people/things do you typically have with you in the vehicle?

As warranted, probe with the following:

- Tell me about how much you typically drive
- Who here has used:
  - Uber?
  - Rental car?
  - Transit bus/rail?
  - What are those like?

III. Future Car Purchase Needs and Desired Attributes (35 minutes)

Now I want to talk about what steps you took to purchase/lease your electric vehicle (if commercial – most recent PEV) and factors you will consider when purchasing/leasing your next vehicle.

- What factors influenced your decision to purchase/lease your current electric vehicle?
- Do any of you have plans to replace your current vehicle?
  - If yes, why? If no, why not?
  - Probe:
    - When are you planning to purchase your next vehicle?
- When are you planning to purchase your next vehicle?
- Tell me more about the kind of vehicle you are planning to purchase.
  - Probe:
    - Do you expect it to be larger/smaller/the same size as your current vehicle?
    - Do you expect better/worse/same fuel economy?

Note to moderator: if not mentioned probe for the following:

- Would you consider buying another plug-in electric vehicle and/or a vehicle that does not run on gas/petroleum? Why or why not?

    - How has the recent decrease in fuel prices changed your consideration of energy efficient vehicles, or electric cars?
    - Are you aware of self-driving vehicles? Will you be likely to buy one, if they are available for sale? Why?
- What factors would you take into consideration before purchasing electric vehicles? I'm curious what you will be looking for in your next vehicle. For flipchart:

    5. What are your "must haves" for your next vehicle?
    6. What are the "nice to haves" for your next vehicle?

- How did you determine whether something went into one category or the other?
- What makes these "must haves" so important?
- How much are you thinking about the changes that might happen in the world that would affect the kind of vehicle you will want to be driving 3-5 years from now?
    - How dramatic do you expect these changes to be?
- How much are you thinking about the price of the vehicle?
- How would you define the cost of ownership?
- How much are you thinking about the cost of ownership?
    - What goes into cost of ownership?
    - Which of these are most important?
    - Which of these can you affect?
- How much do you track your cost of ownership on your current vehicle?
    - What is your sense of fuel costs as a percentage of total ownership costs?
- When it comes to costs, how much do you consider:
    - Purchase price
    - Maintenance
    - Fuel
    - Insurance
    - Price depreciation/Resale value

V. PEV purchase decision and purchase experience (15 minutes)

For this next part of our discussion, we are going to talk about what led to your decision to purchase an electrified vehicle, and what your experiences were throughout the purchase process.

- What types of vehicle did you consider at the same time as you looked at purchasing/leasing your electric vehicle(s)?
- What most influenced your decision to ultimately purchase as electrified vehicle?
    - What were the major drawbacks in your mind?
    - What do you wish was different about your purchase experience when buying your current vehicle?

VI. Charging behavior (20 minutes)

For this next part of our discussion, we are going to talk about how you use your electric vehicle, and in particular about charging your vehicle.

- Tell me about the types of chargers that are available and which one(s) you have.
- Tell me about when and where you typically charge
    - Probe:
        - What is that experience like?
        - How long does it typically take?
        - Does the time to charge change based on your charging location?
- How do you think about how much it costs to charge your vehicle?
- When your vehicle is fully charged, how much electric range do you typically have?

- What are your pain points with respect to charging and driving your electric vehicle?
    - What are you pleasantly surprised by with respect to charging and/or vehicle range?
    - How does your vehicle's range affect your driving decisions/behavior?
        - Probe: Does it affect the number of miles you drive, long distance trips/commutes, use of car share or rental cars, etc.?

VII. Survey Review (20 minutes)

Further explain survey portion of our study, and explain trade-offs. Ask respondents to read instruction page, evaluate a set of experiments (4?), and open discussion:

11. What did you understand as the instructions?
12. How did you approach the vehicle trade-offs?
13. Were there any aspects of the exercise that were difficult to understand?
14. Were there any important aspects of your purchase decisions that were missing?
15. Fuel type, vehicle models available, purchase incentive, cost per gallon, MPG, fuel availability, refueling time, vehicle range, maintenance costs

VII. End (5 minutes)

Thank you for your help!

APPENDIX J: Focus Group Material Powertrain/Fuel Type Descriptions

Diesel Vehicle

A vehicle that operates on diesel or biodiesel only and has no hybrid components.

Flexible Fuel Vehicle

(FFV) (i.e. flex-fuel vehicle)

A vehicle that will operate on gasoline, ethanol, or any blend of the two fuels and has no hybrid components.

Hybrid Electric Vehicle

(HEV)

A gasoline vehicle with hybrid components to increase fuel economy (e.g. Toyota Prius) but does not plug in for charging the battery.

CNG Vehicle

(CNG)

A vehicle that only operates on compressed natural gas (CNG) and has no hybrid components. It can be filled up at home or at a station.

Plug-in Hybrid Vehicle

(PHEV)

A gasoline vehicle with hybrid components and a larger battery (e.g. Chevrolet Volt) which allows the vehicle to operate like a battery electric vehicle for a short distance (10-40 miles) and then operate on gasoline for a much longer distance (~300-400 miles)

Fuel Cell Vehicle

(FCV or FCEV)

A hybrid electric vehicle that uses hydrogen to generate its own electricity in a fuel cell. The fuel cell powers the electric motor that drives the wheels and recharges the battery. Hydrogen is stored in a tank onboard the vehicle.

Battery Electric Vehicle

(BEV)

A vehicle that operates on a battery only and charges by plugging in at home or at a station (e.g. Nissan Leaf).

E85 Fuel

E85 is an abbreviation for an ethanol fuel blend of 85% ethanol fuel and 15% gasoline by volume. E85 is commonly used by flexible-fuel vehicles (FFV).

Example Stated Preference Experiments

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase.

Vehicle Choice 1	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Mid-size Car	Small/Mid-size SUV	Mid-size Cross-over	Mid-size Car
Fuel Type	Gasoline only vehicle	Gasoline-ethanol Flex Fuel vehicle (E85 FFV)	Gasoline Hybrid Electric vehicle (HEV)	Diesel only vehicle
Vehicle Models Available	187	7	3	8
Model Year	New (2016)	Used (2014)	Used (2012)	Used (2014)
Vehicle Price	$27,265	$31,273	$34,594	$22,204
Purchase Incentive	None	None	None	None
MPG / Fuel Economy	30.4	18.4	29.7	32.7
Annual Fuel Cost (based on 12,000 miles/year)	$1,148	$1,386	$1,174	$1,141
Refueling Station (Time is takes to get to this type of station)	Refuel at station (5 minutes)	Refuel at station (5 minutes)	Refuel at station (7 minutes)	Refuel at station (10 minutes)
Refueling Time	5 minutes	5 minutes	3 minutes	8 minutes
Vehicle Range	450 miles	350 miles	600 miles	500 miles
Trunk/Cargo Space	16 cubic feet / 4 suitcases	26 cubic feet / 6 suitcases	24 cubic feet / 6 suitcases	16 cubic feet / 4 suitcases
Annual Maintenance Cost	$428	$460	$442	$392
Acceleration Rate (0-60 mph)	7.7 seconds	7.9 seconds	8.7 seconds	10.3 seconds
Select One:	○	○	○	○

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, please select the ONE vehicle you would most likely purchase.

Vehicle Choice 2	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Compact	Small Pick-up truck	Compact	Subcompact Car
Fuel Type	Hydrogen Fuel Cell vehicle (FCV)	Gasoline-ethanol Flex Fuel vehicle (E85 FFV)	Gasoline Plug-in Hybrid Electric vehicle (PHEV)	Battery Electric vehicle (BEV)
Vehicle Models Available	1	3	3	7
Model Year	New (2016)	New (2016)	Used (2015)	New (2016)
Vehicle Price	$51,217	$35,396	$22,992	$23,731
Purchase Incentive	$2,500 rebate	None	None	HOV access
MPG / Fuel Economy	68.9	18.5	44.3	120.9
Fuel Cost per 100 Miles	$22	$12	$9	$5
Refueling Station (Time is takes to get to this type of station)	Hydrogen fueling station (15 minutes)	Refuel at station (5 minutes)	Refuel at station (3 minutes)	Plug-in at home (0 min)
Refueling Time	5 minutes	5 minutes	3 minutes	3.5 hours
Vehicle Range	250 miles	370 miles	450 miles	150 miles
Trunk/Cargo Space	13 cubic feet / 3 suitcases	60 cubic feet / 15 suitcases	16 cubic feet / 4 suitcases	10 cubic feet / 2 suitcases
Annual Maintenance Cost	$435	$481	$426	$426
Acceleration Rate (0-60 mph)	9.4 seconds	7.1 seconds	9.5 seconds	8.5 seconds
Select One:	○	○	○	○

California Vehicle Survey: Definitions

Vehicle Type

Vehicle Type	Examples
Subcompact Car	Ford Fiesta, Kia Rio, Fiat 500, Mitsubishi i-MiEV, Smart Fortwo
Compact Car	Hyundai Elantra, Honda Civic, Mazda3, Toyota Corolla
Midsize Car	Chevrolet Malibu, Chrysler 200, Ford Fusion, Subaru Legacy, Volkswagen Passat, Acura TLX, Audi A4, BMW 3 Series, Mercedes-Benz C-Class
Large Car	Chevrolet Impala, Ford Taurus, Toyota Avalon, Cadillac CTS, Chrysler 300, Jaguar XF, Lincoln MKZ, Volvo S80, BMW 7 Series, Lexus LS, Mercedes-Benz S-Class, Porsche Panamera
Sports Car	BMW Z4, Mazda MX-5, Lotus Elise, Porsche Boxster, Mercedes-Benz SLK, Aston Martin DB9, Bentley Continental GT, Ferrari FF, Jaguar XK, Tesla Model S, Bugatti Veyron, Lamborghini Aventador
Cross-over, small	Ford EcoSport, Honda HR-V, Mini Countryman, Nissan Juke, BMW X1, Jeep Compass
Cross-over, midsize	Nissan Murano, Ford Edge, Volkswagen Touareg, Chevrolet Equinox
SUV, Small/Midsize	Ford Ecosport, Jeep Wrangler, Ford Escape, Honda CR-V, Jeep Compass, Kia Sportage, Audi Q5, Ford Edge, Hyundai Santa Fe, Jeep Cherokee, Volkswagen Touareg
SUV, Full-size/Large	Cadillac Escalade, Ford Explorer, Range Rover, Toyota Land Cruiser, Volvo XC90
Pick-up Truck, Small	Ford Ranger, Chevrolet Colorado, Nissan Navara, Toyota Tacoma
Pick-up Truck, Full-size/Large	Dodge Ram, Ford F-150, GMC Sierra, Nissan Titan, Toyota Tundra, Chevrolet Silverado HD, Ram Heavy Duty, Ford Super Duty
Van, Small (Minivan)	Chrysler Town and Country, Kia Carnival, Toyota Sienna
Van, Full-size/Large	Chevrolet Express 1500 Cargo, Ford Transit, Volkswagen Transporter, Chevrolet Express 1500 Passenger, Ford E350 Wagon, Mercedes-Benz Viano, Volkswagen Multivan

Fuel Type

Fuel Type	Description of Fuel Types
Gasoline only vehicle	A vehicle that operates on gasoline only and has no hybrid components.
Gasoline Hybrid Electric vehicle (HEV)	A gasoline vehicle with hybrid components to increase fuel economy (e.g. Toyota Prius), but does not plug in for charging the battery.
Gasoline Plug-in Hybrid Electric vehicle (PHEV)	A gasoline vehicle with hybrid components and a larger battery (e.g. Chevrolet Volt) which allows the vehicle to operate like a battery electric vehicle for a short distance (10-40 miles) and then operate on gasoline for a much longer distance (~300-400 miles).
Gasoline - ethanol Flex Fuel vehicle (E85 FFV)	A vehicle that will operate on gasoline, ethanol, or any blend of the two fuels and has no hybrid components.

Diesel only vehicle	A vehicle that operates on diesel or biodiesel only and has no hybrid components.
Diesel Hybrid Electric vehicle (HEV)	A diesel vehicle with hybrid components but does not plug in for charging the battery.
Compressed Natural Gas (CNG) only vehicle	A vehicle that only operates on compressed natural gas (CNG) and has no hybrid components. It can be filled up at home or at a station.
Compressed Natural Gas Hybrid vehicle (CNG HEV)	A compressed natural gas vehicle with hybrid components to increase fuel economy, but does not plug in for charging the battery. It can be filled up at home or at a station.
Battery Electric vehicle (BEV)	A vehicle that operates on a battery only and charges by plugging in at home or at a station (e.g. Nissan Leaf).
Hydrogen Fuel Cell Electric vehicle (FCEV)	A hybrid electric vehicle that uses hydrogen to generate its own electricity in a fuel cell. The fuel cell powers the electric motor that drives the wheels and recharges the battery. Hydrogen is stored in a tank onboard the vehicle.

Vehicle Models Available

For each vehicle choice, this is the number of other vehicles you might be able to purchase that have similar features. For example, if Ford, Chevrolet, and Honda each make an electric powered midsize car, and those were the only electric powered mid-size cars on the market, the Number of Makes and Models Available for this vehicle would be 3. If Ford made two models just like this one, and Chevrolet and Honda each made one, the Number of Makes and Models Available would be 4.

Model Year

This is the model year of the vehicle. A new vehicle would be a vehicle that has not been owned by anyone before. Vehicles in the choice sets range from 2016 to 1998.

Vehicle Price

This is the price you would pay to purchase this vehicle without tax, title, or tags. It represents the final retail price of the car after any dealer incentives or discounts. It does not include the trade-in value of your current vehicle, if you had one.

Purchase Incentive

Incentive	Description
None	No incentive offered
HOV lane access	This allows you to travel in the HOV carpool lane as a single driver.
Tax Credits	This allows you to receive a tax credit, which would directly reduce the amount of your annual income tax owed. This includes a $1,000 tax credit for compressed natural gas vehicles or a $2,500, $5,000, or $7,500 tax credit for battery electric, plug-in hybrid electric, or hydrogen vehicles.

Rebates	This allows you to receive a certain amount of money off of the price of the vehicle through a purchase rebate. You would receive the rebate approximately 6 months after purchasing the vehicle. For compressed natural gas, battery electric, plug-in hybrid electric, or hydrogen vehicles, this rebate may be $500, $1,000, $1,500 or $2,500 off the purchase price.

MPG/Fuel Economy

This is the fuel economy you would expect to get while driving the vehicle. The stated figure assumes 55% city driving and 45% highway driving. Fuel economy for CNG, electric, and hydrogen vehicles takes into account the number of miles the vehicle can go using the energy equivalent of a gallon of gasoline (MPGe).

Annual Fuel Cost

The total amount you would pay in fuel costs over the course of a year. This cost is calculated based on an estimated 12,000 miles driven per year.

Cost per 100 Miles

This is how much you would expect to pay for fuel in order to drive 100 miles. This number is based on the MPG or MPGe of the vehicle as explained in the above feature and the price of fuel.

Refueling Station Availability

This is how you would fuel the specific vehicle. This may be refueling at a traditional fueling station (e.g., at a gas or diesel station); or other options that are available for some of the alternative fuels. This includes:

Type of Vehicle	Type of Station	Explanation
Gasoline or Diesel only	Refuel at station	Refuel at a traditional gasoline or diesel refueling station
Compressed Natural Gas (CNG) vehicle	Refuel at “fast fill” station	Refuel at a CNG station using a fast fill system
Plug–in Hybrid Electric vehicle (PHEV)	Refuel at station	This is a traditional gasoline refueling station
Battery Electric vehicle only (BEV)	Plug in at work or charging station	This is the ability to charge your vehicle from various locations (e.g., work or charging station)
Hydrogen vehicle	Hydrogen fueling station	Refuel at a hydrogen station that provides high pressure, fast fill fueling.

Refueling Time

This is the amount of time it would take to refuel the vehicle at the location in “Refueling Station Availability.” For some vehicles, this would be the amount of time it would take to fill the vehicle to a full tank of gasoline or diesel fuel. For other vehicles which use electric batteries (e.g., a battery electric only vehicle), this would be the amount of time it

would take to fully charge the battery. For home refueling of compressed natural gas vehicles (CNG) or battery electric vehicles (BEVs), this could take hours compared to minutes at a station.

Vehicle Range

This is the maximum distance the vehicle can travel on a full tank or full charge without refueling.

Trunk/Cargo Space

This tells you how much room each vehicle has for trunk/cargo space. This is measured in cubic feet. To help understand this, one standard paper grocery bag is about 1 cubic foot and a standard suitcase is 4 cubic feet. So, for example, a trunk/cargo space of 3 cubic feet would allow enough room for about 3 standard paper grocery bags but would not fit one standard suitcase. Trunk/cargo space of 16 cubic feet would be able to fit 16 standard paper grocery bags or 4 standard suitcases.

Annual Maintenance Cost

This is the total annual maintenance cost for the vehicle considering how many miles you drive each year. Maintenance costs include all costs associated with normal routine maintenance during a year including oil and filter changes. It does not include insurance, registration, fees, or unexpected repairs.

Acceleration Rate (0-60 mph)

The amount of time, in seconds, it takes for your vehicle to accelerate from 0-60 mph. Acceleration time varies from a low of 4 seconds for sports cars to a high of 14 seconds for some larger vehicles and engines that use non-traditional fuel types. Acceleration is related to horsepower, vehicle weight, and engine performance.

APPENDIX K: Interviewer Training Manual

CC&G Research: Training Materials

Handout with Project Overview and FAQs

Pilot Study Overview

- **Study name**: California Vehicle Survey
- **Region**: Statewide (CA)
- **Pilot Study Dates**: Wednesday, June 1st (initial mailing) to Friday June 24th (last day to complete the survey)
- **Purpose:** Personal and commercial light-duty vehicle study to understand vehicle ownership, use, and preferences in CA
- **Time commitment:** Average household with 2 cars; 30 minutes to complete. Average commercial vehicle respondent; 30 minutes.
- **Study Process:**
    - **Send Invites:** RSG sends postcards to selected households and businesses in the mail.
        - 4,000 residential and 4,000 commercial postcards distributed June 1st
    - **Survey Completion:** One member of the household completes the survey, or one vehicle fleet owner/operator per business establishment.
        - Residential participants may complete the survey online or over the phone
        - Commercial participants complete the survey online only
        - We expect 3-4% of HHs and recruited businesses to complete survey
    - **Incentive:** Qualifying respondents who complete all questions are eligible to receive a gift card at an online retailer of their choice (Amazon.com or Walmart). Gift cards will be distributed electronically following the close of survey (after June 24th)
        - Residential incentive: $10.00

        - Commercial incentive $20.00

- **Project URL**: https://cavehiclesurvey.org
- **Project Email**: info@cavehiclesurvey.org
- **Project Phone**: (877) 258-6501
- **Phone Hours**: Mon-Fri 9am to 5pm (Pacific)
- **RSG Contacts**: Tristan Cherry (xxxxxxx.xxxxxx@rsginc.com / xxx-xxx-xxxx). Mark Fowler (xxxx.xxxxxx@rsginc.com / (xxx)-xxx-xxxx).
- **CEC Contact**: Aniss Bahreinian, (xxx) xxx-xxxx, xxxxx.xxxxxxxxxx@energy.ca.gov

Note: Anybody calling and asking to volunteer should send an email to info@cavehiclesurvey.org and include their name and address.

ITEM 2: FAQ

What is the California Vehicle Survey all about?

The study is collecting information about the driving and vehicle purchase behavior of residents and businesses in the state of California, including how and how much we drive, what vehicles we own, what vehicles we intend to purchase, and what impacts our driving and vehicle purchase decisions.

How was I selected to participate?

Invited participants (like yourself) were randomly selected from all the individuals and commercial entities with registered vehicles in the state. The random approach helps us understand the behaviors, current needs, and future needs of all types of households and businesses from different regions in the state.

Why should I participate?

Current data about the behavior and needs of residents and businesses help the California Energy Commission and the State to understand and plan for current and future related energy needs. Your responses have a large impact because yours is one of a small number of households invited to participate in the study.

How will the survey results be used?

Information collected in the study will help the California Energy Commission and the State of California to plan and prioritize future energy-related transportation investments.

Who is sponsoring this study?

This study is sponsored by the California Energy Commission.

How is my personal privacy protected?

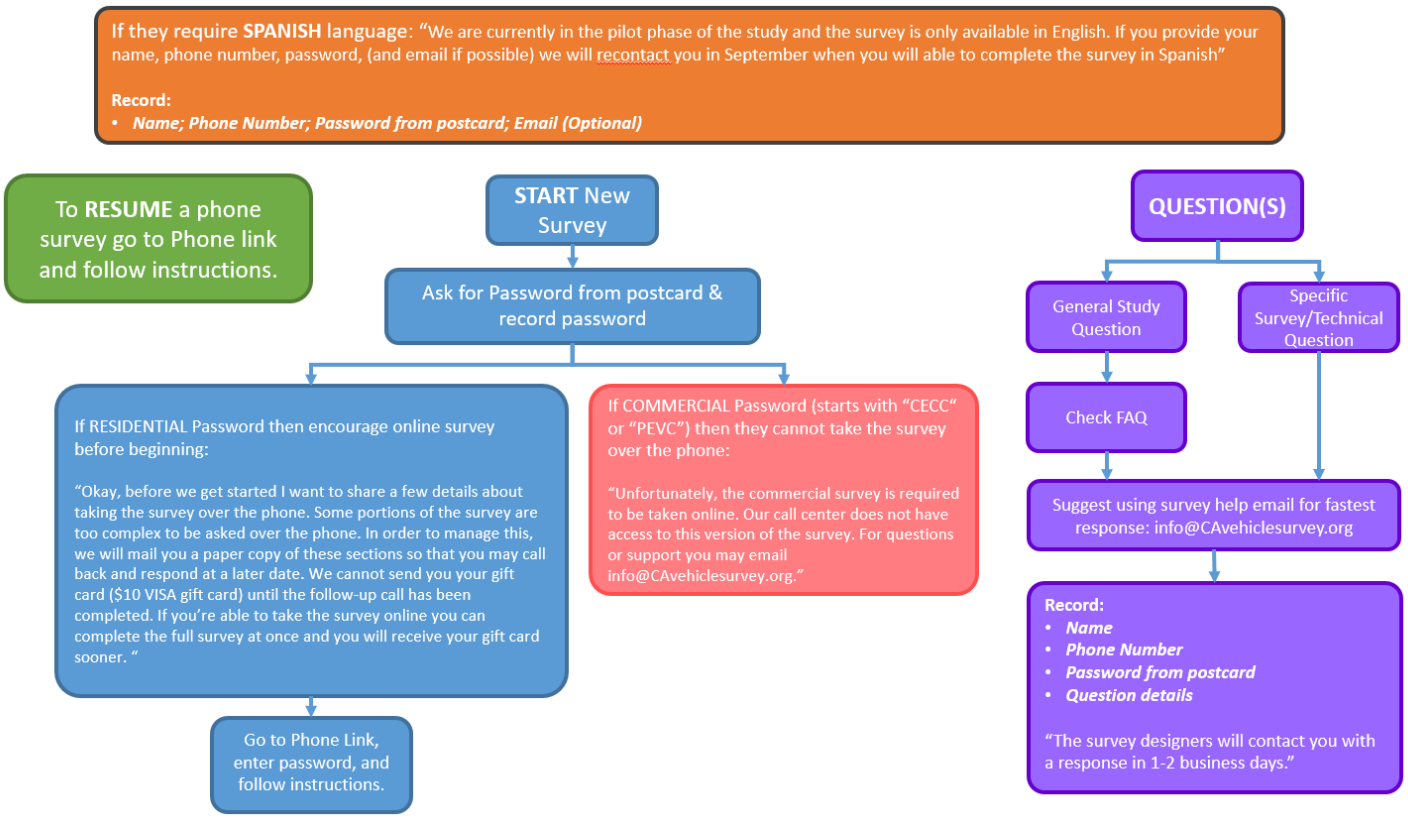
All your answers will be kept strictly confidential and will only be analyzed with responses from all other participating households. A copy of the privacy policy for this study is available here.

Phone Call Flowchart

[voicemail]

Hello, thank you for your interest in the California Vehicle Survey sponsored by the California Energy Commission. For immediate assistance or technical support please email info@CAvehiclesurvey.org.

If you do not have access to the internet and would like to complete the survey over the phone, or if you have already started to take the survey over the phone, please leave your name and phone number and an associate will contact you to assist.



APPENDIX L: Survey Outreach Material

Residential Survey Outreach Materials

Postcard Invitation

Front

Back

CALIFORNIA
VEHICLE SURVEY

RSG | 600 B Street, Suite 2202 | San Diego, CA 92101

Presorted
First Class Mail
U.S. Postage Paid
Sacramento, CA
Permit No. **5635**

Dear Resident / Estimado Residente,

The California Energy Commission (CEC) is conducting a survey of vehicle ownership, purchase, and use to forecast future vehicle and fuel use in California.

La Comisión de Energía de California (CEC) está realizando una encuesta sobre la propiedad de vehículos, compra y el uso de vehículos de predecir el futuro y el uso para combustible en California.

For more information or to begin the survey go here:

Para obtener más información o para comenzar la encuesta entra aquí:

www.CAvehiclesurvey.org

Survey password / Contraseña encuesta:

No internet? / ¿Sin internet? 1-877-258-6501

* **Complete the survey and receive a $10 gift card!**

¡Completa la encuesta y recibe una tarjeta de regalo de $10!

Questions? Contact us at / ¿Preguntas? Contactanos en:
info@CAvehiclesurvey.org

Paper SP Exercises Mailed to Phone Respondents

CALIFORNIA
VEHICLE SURVEY

December 12, 2016

[redacted]

Thank you again for agreeing to participate in the California Vehicle Survey we recently discussed with you over the telephone. Completing this survey will only take a few minutes of your time. This survey is being conducted on behalf of the California Energy Commission. Results from this survey will be used to help the Energy Commission forecast vehicle fleet composition and fuel consumption in the State of California.

Please complete the enclosed survey questions and then call **1-877-258-6501** to report your answers back to us. To help us assist you, please have your password ready, which is printed below.

Your password is: **cecrazcu**

Your responses will remain strictly confidential and will only be used for this study. Once we receive your vehicle choice survey answers, we will send you a $10 gift card to spend at Amazon.com or Walmart as a thank-you gift for your participation.

If you have any questions or want to verify the legitimacy of this survey, please call the survey helpline at **1-877-258-6501** or email **info@cavehiclesurvey.org**. We look forward to your response and once again, thank you for your participation.

Sincerely,

Mark Fowler
Project Manager
The California Vehicle Survey

1

cecrazcu

California Vehicle Survey: Instructions

It may be helpful to review the enclosed attribute definitions before answering any questions. These definitions can be found starting on page 13 of this survey packet.

Over the telephone, you indicated that the next vehicle your household is likely to buy would be a Midsize car and the fuel type will most likely be Hybrid (Gasoline). Based on that information, we developed eight vehicle choice games for you starting on the next page.

We understand that some of the combinations of features and fuel types may not currently exist. For these hypothetical scenarios, please assume the combinations of features do exist and you could buy any of the vehicles presented to you.

Some features that you may find important are not listed here, such as warranty, safety, technology and entertainment features, etc. Please assume that these features are identical across the four vehicles and only focus on the features that are listed when making your decision.

We also understand that the vehicles offered may not completely suit your needs. For the purpose of this study, please assume the four vehicles on each page are the only four available and you must buy one.

You must choose one vehicle on each page for ALL EIGHT questions.

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, **please select the ONE vehicle you would most likely purchase.**

Vehicle Choice 1	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Midsize car	Pick-up truck, small	Van, small	Midsize car
Fuel Type	Hybrid (Gasoline)	Full Electric Vehicle	Compressed Natural Gas (CNG) vehicle	Gasoline-ethanol Flex Fuel vehicle (E85 FFV)
Vehicle Models Available	19	4	2	21
Model Year	Used (2014)	New (2016)	New (2016)	Used (2012)
Vehicle Price	$12,300	$23,400	$17,400	$7,300
Purchase Incentive	None	HOV Access	None	None
MPG / Fuel Economy	34.2	76.2	26	26.8
Fuel Cost per 100 miles	$5.11	$11.00	$22.08	$7.95
Refueling Station (Time is takes to get to this type of station)	Refuel at station (10 min)	Plug-in at work (0 min)	Refuel at "fast fill" station (15 min)	Refuel at station (3 min)
Refueling Time	5 min	8 hours	3 min	8 min
Vehicle Range	487 miles	150 miles	150 miles	442 miles
Trunk/Cargo Space	16 cubic feet (4 suitcases)	9 cubic feet (2 suitcases)	20 cubic feet (5 suitcases)	15 cubic feet (3 suitcases)
Annual Maintenance Cost	$446	$468	$473	$387
Acceleration Rate (0-60 mph)	10.3 secs	9.5 secs	5.9 secs	9.5 secs
Select One:	○	○	○	○

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, **please select the ONE vehicle you would most likely purchase.**

Vehicle Choice 2	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Midsize car	Van, full-size/large	Midsize car	Cross over, midsize
Fuel Type	Hybrid (Gasoline)	Hybrid (CNG)	Compressed Natural Gas (CNG) vehicle	Plug-in Hybrid Electric vehicle (PHEV)
Vehicle Models Available	15	1	2	4
Model Year	Used (2014)	New (2016)	New (2016)	New (2016)
Vehicle Price	$9,200	$22,700	$21,100	$20,200
Purchase Incentive	None	$500 rebate	$2,500 rebate	HOV Access
MPG / Fuel Economy	28.5	28.4	30.5	43.2
Fuel Cost per 100 miles	$15.32	$10.11	$9.41	$18.43
Refueling Station (Time is takes to get to this type of station)	Refuel at station (7 min)	Refuel at "fast fill" station (20 min)	Refuel at "fast fill" station (5 min)	Plug-in at a charging station (15 min)
Refueling Time	8 min	8 min	3 min	3.5 hours charging time (5 min to refuel with gas)
Vehicle Range	470 miles	250 miles	300 miles	821 miles
Trunk/Cargo Space	12 cubic feet (3 suitcases)	59 cubic feet (14 suitcases)	8 cubic feet (2 suitcases)	20 cubic feet (5 suitcases)
Annual Maintenance Cost	$304	$616	$323	$600
Acceleration Rate (0-60 mph)	6.3 secs	13.7 secs	5.5 secs	5.4 secs
Select One:	○	○	○	○

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, **please select the ONE vehicle you would most likely purchase.**

Vehicle Choice 3	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Midsize car	Cross over, midsize	Midsize car	SUV full-size/large
Fuel Type	Hybrid (Gasoline)	Gasoline-ethanol Flex Fuel vehicle (E85 FFV)	Hybrid (Gasoline)	Plug-in Hybrid Electric vehicle (PHEV)
Vehicle Models Available	27	4	27	2
Model Year	Used (2014)	Used (2011)	Used (2014)	Used (2013)
Vehicle Price	$10,700	$11,100	$10,700	$20,800
Purchase Incentive	None	None	None	None
MPG / Fuel Economy	34.2	17.3	34.2	29.2
Fuel Cost per 100 miles	$17.02	$24.62	$17.02	$27.26
Refueling Station (Time is takes to get to this type of station)	Refuel at station (10 min)	Refuel at station (5 min)	Refuel at station (3 min)	Plug-in at a charging station (10 min)
Refueling Time	10 min	5 min	8 min	8 hours charging time (5 min to refuel with gas)
Vehicle Range	487 miles	381 miles	564 miles	767 miles
Trunk/Cargo Space	12 cubic feet (3 suitcases)	28 cubic feet (7 suitcases)	12 cubic feet (3 suitcases)	16 cubic feet (4 suitcases)
Annual Maintenance Cost	$506	$360	$304	$534
Acceleration Rate (0-60 mph)	6.3 secs	5.8 secs	6.3 secs	8.9 secs
Select One:	○	○	○	○

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, **please select the ONE vehicle you would most likely purchase.**

Vehicle Choice 4	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Midsize car	Subcompact car	Pick-up truck, small	Midsize car
Fuel Type	Hybrid (Gasoline)	Hybrid (Gasoline)	Full Electric Vehicle	Compressed Natural Gas (CNG) vehicle
Vehicle Models Available	19	6	1	1
Model Year	Used (2014)	New (2016)	Used (2014)	Used (2014)
Vehicle Price	$12,300	$12,000	$19,700	$12,800
Purchase Incentive	None	None	None	None
MPG / Fuel Economy	41.8	37.4	49.9	23.9
Fuel Cost per 100 miles	$10.44	$11.67	$16.80	$7.21
Refueling Station (Time is takes to get to this type of station)	Refuel at station (7 min)	Refuel at station (3 min)	Plug-in at work (0 min)	Refuel at "fast fill" station (15 min)
Refueling Time	3 min	5 min	30 min	5 min
Vehicle Range	690 miles	370 miles	300 miles	300 miles
Trunk/Cargo Space	12 cubic feet (3 suitcases)	8 cubic feet (2 suitcases)	9 cubic feet (2 suitcases)	11 cubic feet (2 suitcases)
Annual Maintenance Cost	$446	$506	$319	$473
Acceleration Rate (0-60 mph)	10.3 secs	12.5 secs	9.5 secs	9.5 secs
Select One:	○	○	○	○

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, **please select the ONE vehicle you would most likely purchase.**

Vehicle Choice 5	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Midsize car	SUV small/midsize	Cross over, midsize	Midsize car
Fuel Type	Hybrid (Gasoline)	Gasoline	Gasoline-ethanol Flex Fuel vehicle (E85 FFV)	Hybrid (Gasoline)
Vehicle Models Available	23	65	4	29
Model Year	Used (2014)	Used (2014)	New (2016)	New (2016)
Vehicle Price	$13,800	$15,500	$20,200	$15,700
Purchase Incentive	None	None	None	None
MPG / Fuel Economy	47.5	25.4	18.6	35.6
Fuel Cost per 100 miles	$12.25	$22.91	$17.18	$16.35
Refueling Station (Time is takes to get to this type of station)	Refuel at station (3 min)	Refuel at station (5 min)	Refuel at station (7 min)	Refuel at station (7 min)
Refueling Time	10 min	10 min	8 min	5 min
Vehicle Range	784 miles	411 miles	335 miles	507 miles
Trunk/Cargo Space	12 cubic feet (3 suitcases)	40 cubic feet (10 suitcases)	27 cubic feet (6 suitcases)	12 cubic feet (3 suitcases)
Annual Maintenance Cost	$365	$338	$600	$365
Acceleration Rate (0-60 mph)	6.3 secs	5.3 secs	9.8 secs	6.3 secs
Select One:	○	○	○	○

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, **please select the ONE vehicle you would most likely purchase.**

Vehicle Choice 6	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Midsize car	Pick-up truck, small	Midsize car	Van, full-size/large
Fuel Type	Hybrid (Gasoline)	Hybrid (CNG)	Compressed Natural Gas (CNG) vehicle	Plug-in Hybrid Electric vehicle (PHEV)
Vehicle Models Available	23	1	2	4
Model Year	Used (2014)	New (2016)	Used (2011)	Used (2014)
Vehicle Price	$10,700	$22,500	$5,000	$18,500
Purchase Incentive	None	Up to $1,000 tax credit	None	None
MPG / Fuel Economy	34.2	32	19.3	28.5
Fuel Cost per 100 miles	$12.76	$17.94	$29.74	$20.95
Refueling Station (Time is takes to get to this type of station)	Refuel at station (5 min)	Refuel at "fast fill" station (15 min)	Refuel at "fast fill" station (15 min)	Plug-in at work (0 min)
Refueling Time	10 min	5 min	3 min	30 min charging time (5 min to refuel with gas)
Vehicle Range	462 miles	250 miles	200 miles	677 miles
Trunk/Cargo Space	16 cubic feet (4 suitcases)	10 cubic feet (2 suitcases)	11 cubic feet (2 suitcases)	100 cubic feet (25 suitcases)
Annual Maintenance Cost	$506	$423	$323	$504
Acceleration Rate (0-60 mph)	10.3 secs	10.7 secs	5.5 secs	8.1 secs
Select One:	○	○	○	○

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, **please select the ONE vehicle you would most likely purchase.**

Vehicle Choice 7	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Midsize car	Midsize car	Sports car	SUV full-size/large
Fuel Type	Hybrid (Gasoline)	Gasoline	Diesel	Hybrid (Gasoline)
Vehicle Models Available	19	131	4	9
Model Year	Used (2014)	New (2016)	Used (2014)	New (2016)
Vehicle Price	$9,200	$14,400	$13,200	$32,400
Purchase Incentive	None	None	None	None
MPG / Fuel Economy	28.5	27.4	26.3	15.5
Fuel Cost per 100 miles	$6.13	$6.37	$8.64	$11.26
Refueling Station (Time is takes to get to this type of station)	Refuel at station (10 min)	Refuel at station (3 min)	Refuel at station (5 min)	Refuel at station (3 min)
Refueling Time	10 min	5 min	8 min	5 min
Vehicle Range	449 miles	432 miles	414 miles	349 miles
Trunk/Cargo Space	12 cubic feet (3 suitcases)	14 cubic feet (3 suitcases)	10 cubic feet (2 suitcases)	14 cubic feet (3 suitcases)
Annual Maintenance Cost	$304	$323	$781	$414
Acceleration Rate (0-60 mph)	6.3 secs	5.5 secs	7.5 secs	10 secs
Select One:	○	○	○	○

CALIFORNIA VEHICLE SURVEY

Please carefully review each vehicle and all its features below. Assuming these are the only vehicles available to you to purchase, **please select the ONE vehicle you would most likely purchase.**

Vehicle Choice 8	Vehicle A	Vehicle B	Vehicle C	Vehicle D
Vehicle Type	Midsize car	Cross-over, small	Sports car	Midsize car
Fuel Type	Hybrid (Gasoline)	Hybrid (Gasoline)	Full Electric Vehicle	Compressed Natural Gas (CNG) vehicle
Vehicle Models Available	27	2	2	1
Model Year	Used (2014)	Used (2011)	New (2016)	New (2016)
Vehicle Price	$10,700	$7,700	$32,100	$16,300
Purchase Incentive	None	None	$5,000 rebate	$1,500 rebate
MPG / Fuel Economy	28.5	25	99	20.8
Fuel Cost per 100 miles	$15.32	$17.46	$8.47	$13.80
Refueling Station (Time is takes to get to this type of station)	Refuel at station (7 min)	Refuel at station (7 min)	Plug-in at a charging station (5 min)	Refuel at "fast fill" station (5 min)
Refueling Time	8 min	10 min	3.5 hours	3 min
Vehicle Range	449 miles	360 miles	100 miles	300 miles
Trunk/Cargo Space	15 cubic feet (3 suitcases)	13 cubic feet (3 suitcases)	9 cubic feet (2 suitcases)	8 cubic feet (2 suitcases)
Annual Maintenance Cost	$304	$440	$704	$323
Acceleration Rate (0-60 mph)	10.3 secs	7.4 secs	3.3 secs	9.5 secs
Select One:	○	○	○	○

CALIFORNIA
VEHICLE SURVEY

Contact Information					
Please confirm your name and contact information, and choice of gift card that we will send in the mail to you. Your information will remain confidential and will only be used for communication regarding this survey. Your information will not be shared with any other organization. Fields marked with an asterisk (*) are required.					
Full Name:*					
Mailing Address:*					
City:*		State:*		Zip:*	
Email:					
Phone:					
Which online retailor would you like to have a $10 electronic gift card to spend at (check one)?					
Walmart ○		Amazon.com ○			

Thank You!

This concludes the survey. Please call **1-877-258-6501** to report your answers back to us. Don't forget to have your password ready which is printed on the bottom left hand corner of each page in this document. When you call, if someone is not available to assist you, please leave a name and number where they can get back to you.

CALIFORNIA
VEHICLE SURVEY

California Vehicle Survey: Definitions

Below are some brief definitions of the attributes, or features, of the vehicle choices that may appear in your survey.

Vehicle Type

There are 13 possible vehicle types in the survey. Possible vehicle types & examples include:

Vehicle Type	Example Vehicles
Subcompact Car	Ford Fiesta, Kia Rio, Fiat 500, Mitsubishi i-MiEV, Smart Fortwo
Compact Car	Hyundai Elantra, Honda Civic, Mazda3, Toyota Corolla
Midsize Car	Chevrolet Malibu, Chrysler 200, Ford Fusion, Subaru Legacy, Volkswagen Passat, Acura TLX, Audi A1, BMW 3 Series
Large Car	Chevrolet Impala, Ford Taurus, Toyota Avalon, Cadillac CTS, Chrysler 300, Jaguar XF, Lincoln MKZ, Volvo S80, BMW 7 Series, Lexus LS, Mercedes-Benz S-Class, Porsche Panamera
Sports Car	BMW Z1, Mazda MX-5, Lotus Elise, Porsche Boxster, Mercedes-Benz SLK, Aston Martin DB9, Bentley Continental GT, Ferrari FF, Jaguar XK
Cross-over, small	Ford EcoSport, Honda HR-V, Mini Countryman, Nissan Juke, BMW X1, Jeep Compass
Cross-over, midsize	Nissan Murano, Ford Edge, Volkswagen Touareg, Chevrolet Equinox
SUV, Small/Midsize	Ford Ecosport, Jeep Wrangler, Ford Escape, Honda CR-V, Jeep Compass, Kia Sportage, Audi Q5, Ford Edge, Hyundai Santa Fe,
SUV, Full-size/Large	Cadillac Escalade, Ford Explorer, Range Rover, Toyota Land Cruiser, Volvo XC90
Pick-up Truck, Small	Ford Ranger, Chevrolet Colorado, Nissan Navara, Toyta Tacoma
Pick-up Truck, Full-size/Large	Dodge Ram, Ford F-150, GMC Sierra, Nissan Titan, Toyota Tundra, Chevrolet Silverado HD, Ram Heavy Duty, Ford Super Duty
Van, Small	Chrysler Town and Country, Kia Carnival, Toyota Sienna
Van, Full-size/Large	Chevrolet Express 1500 Cargo, Ford Transit, Volkswagen Transporter, Chevrolet Express 1500 Passenger, Ford E350 Wagon

CALIFORNIA
VEHICLE SURVEY

Fuel Type

There are ten possible fuel types in the survey. Possible fuel types and examples include:

Fuel Type:	Description
Gasoline	A vehicle that operates on gasoline only.
Hybrid (Gasoline)	A gasoline vehicle with a small battery that is charged inside the car and does not plug in for charging the battery (e.g. Toyota Prius).
Plug-in Hybrid Electric vehicle (PHEV)	A gasoline vehicle with a larger battery that plugs into an electrical outlet to charge (e.g. Chevy Volt) which allows the vehicle to operate like a battery electric vehicle for a short distance (10-50 miles) and then operate on gasoline for a much longer distance (~300-100 miles)
Gasoline - ethanol Flex Fuel vehicle (E25 FFV)	A vehicle that will operate on gasoline and/or ethanol (E85 with 85% ethanol), or any blend of the two fuels.
Diesel	A vehicle that operates on diesel or biodiesel
Hybrid (Diesel)	A diesel vehicle with a small battery that is charged inside the car and does not plug in for charging the battery.
Compressed Natural Gas (CNG) vehicle	A vehicle that only operates on compressed natural gas (CNG). It can be filled up at home, with special equipment, or at a fast fill station.
Hybrid (CNG)	A CNG vehicle with a small battery that is charged inside the car and does not plug in for charging the battery.
Full Electric vehicle	A vehicle that operates only on electricity, with a battery that charges by plugging into an electrical outlet at home, at work, or at a fast charge station (e.g. Nissan Leaf, Tesla).
Hydrogen vehicle	A vehicle that uses hydrogen to generate its own electricity in a fuel cell (e.g. Toyota Mirai). Hydrogen is stored in a tank onboard the vehicle and can be filled up at a hydrogen station.

Vehicle Models Available

For each vehicle choice, this is the number of other vehicles you might be able to purchase that have similar features. For example, if Ford, Chevrolet, and Honda each make an electric powered midsize car, and those were the only electric powered mid-size cars on the market, the Number of Makes and Models Available for this vehicle would be 3. If Ford made two models just like this one, and Chevrolet and Honda each made one, the Number of Makes and Models Available would be 1.

CALIFORNIA
VEHICLE SURVEY

Model Year

This is the model year of the vehicle. A new vehicle would be a vehicle that has not been owned by anyone before. Vehicles in the choice sets range from 2016 to 1998.

Vehicle Price

This is the price you would pay to purchase this vehicle without tax, title, or tags. It represents the final retail price of the car after any dealer incentives or discounts. It does not include the trade-in value of your current vehicle, if you had one.

Purchase Incentive

There are four possible incentives in the survey for purchasing alternative fuel vehicles:

Incentive	Description
None	No incentive offered
HOV lane access	This allows you to travel in the HOV carpool lane as a single driver.
Tax credit	This allows you to receive a tax credit, which would directly reduce the amount of your annual income tax owed. This includes a $1,000 tax credit for compressed natural gas vehicles or a $2,500, $5,000, or $7,500 tax credit for battery electric, plug-in hybrid electric, or hydrogen vehicles.
Rebate	This allows you to receive a certain amount of money off of the price of the vehicle through a purchase rebate. You would receive the rebate approximately 6 months after purchasing the vehicle. For compressed natural gas, battery electric, plug-in hybrid electric, or hydrogen vehicles, this rebate may be $500, $1,000, $1,500 or $2,500 off the purchase price.

MPGe/Fuel Economy

This is the fuel economy you would expect to get while driving the vehicle. The stated figure assumes 55% city driving and 15% highway driving. Fuel economy for CNG, electric, and hydrogen vehicles takes into account the number of miles the vehicle can go using the energy equivalent of a gallon of gasoline (MPGe).

Annual Fuel Cost

The total amount you would pay in fuel costs over the course of a year. This cost is calculated based on an estimated 12,000 miles driven per year.

Cost per 100 Miles

This is how much you would expect to pay for fuel in order to drive 100 miles. This number is based on the MPG or MPGe of the vehicle as explained in the above feature and the price of fuel.

CALIFORNIA
VEHICLE SURVEY

Refueling Station Availability

This is how you would fuel the specific vehicle. This may be refueling at a traditional fueling station (e.g., at a gas or diesel station); or other options that are available for some of the alternative fuels. This includes:

Type of Vehicle	Type of Station	Explanation
Gasoline or Diesel only	Refuel at station	Refuel at a traditional gasoline or diesel refueling station
Compressed Natural Gas (CNG) vehicle	Refuel at "fast fill" station	Refuel at a CNG station using a fast fill system
Plug–in Hybrid Electric vehicle (PHEV)	Refuel at station	This is a traditional gasoline refueling station
Battery Electric vehicle only (BEV)	Plug in at work or charging station	This is the ability to charge your vehicle from various locations (e.g., work or charging station)
Hydrogen vehicle	Hydrogen fueling station	Refuel at a hydrogen station that provides high pressure, fast fill fueling.

Refueling Time

This is the amount of time it would take to refuel the vehicle at the location in "Refueling Station Availability." For some vehicles, this would be the amount of time it would take to fill the vehicle to a full tank of gasoline or diesel fuel. For other vehicles which use electric batteries (e.g., a battery electric only vehicle), this would be the amount of time it would take to fully charge the battery. For home refueling of compressed natural gas vehicles (CNG) or battery electric vehicles (BEVs), this could take hours compared to minutes at a station.

Vehicle Range

This is the maximum distance the vehicle can travel on a full tank or full charge without refueling.

Trunk/Cargo Space

This tells you how much room each vehicle has for trunk/cargo space. This is measured in cubic feet. To help understand this, one standard paper grocery bag is about 1 cubic foot and a standard suitcase is 1 cubic feet. So, for example, a trunk/cargo space of 3 cubic feet would allow enough room for about 3 standard paper grocery bags but would not fit one standard suitcase. Trunk/cargo space of 16 cubic feet would be able to fit 16 standard paper grocery bags or 1 standard suitcases.

Annual Maintenance Cost

This is the total annual maintenance cost for the vehicle considering how many miles you drive each year. Maintenance costs include all costs associated with normal routine maintenance during a year including oil and filter changes. It does not include insurance, registration, fees, or unexpected repairs.

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Acceleration Rate (0-60 mph)

The amount of time, in seconds, it takes for your vehicle to accelerate from 0-60 mph. Acceleration time varies from a low of 1 seconds for sports cars to a high of 11 seconds for some larger vehicles and engines that use non-traditional fuel types. Acceleration is related to horsepower, vehicle weight, and engine performance.

Reminder Email

CALIFORNIA
VEHICLE SURVEY

Dear California Resident,

Thank you for your interest in participating in the California Vehicle Survey we recently discussed with you over the telephone. We just wanted to remind you that completing this survey will only take a few minutes of your time. This survey is being conducted on behalf of the California Energy Commission. Results from this survey will be used to help the Energy Commission forecast vehicle fleet composition and fuel consumption in the State of California.

To complete the survey, go to www.CAvehiclesurvey.org and enter your password:

Password: **ceccacwm**

Your responses will remain strictly confidential and will only be used for this study. Once we receive your vehicle choice survey answers, we will send you a $20 gift card to spend at Amazon.com or Walmart as a thank-you gift for your participation.

If you have any questions or want to verify the legitimacy of this survey, please call the survey helpline at 1-877-258-6501 or email info@cavehiclesurvey.org. We look forward to your response and once again, thank you for your participation,

(Ctrl)

The California Vehicle Survey Team
www.cavehiclesurvey.org
info@CAvehiclesurvey.org
600 B Street, Suite 2202
San Diego, CA 92101

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Dear CA Commercial Establishment,

The California Energy Commission (CEC) is conducting a survey of vehicle ownership, purchase, and use to forecast future vehicle and fuel use in California.

For more information or to begin the survey go here:

www.CAvehiclesurvey.org

Survey password:

No internet? 1-877-258-6501

*** Complete the survey and receive a $20 gift card!**

Questions? Contact us at: info@CAvehiclesurvey.org

InfoGroup Invitation Email

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Dear California Commercial Establishment,

The California Energy Commission (CEC) is conducting a survey of vehicle ownership, purchase, and use to forecast future travel-related energy demand in California.

Your establishment has been randomly selected for participation in this important vehicle survey. Please have the person who is most knowledgeable about the types of vehicles used at your establishment complete the survey. Your input will help the CEC to improve transportation choices in California. The first 1,000 respondents who qualify for and complete the survey will receive a $20 gift card!

To begin the survey, please click on the link below, or copy and paste it into your browser's address bar:

https://cavehiclesurvey.org/commercial?password=cecp5wyynpq

Thanks for taking the time to participate in our research! If you have any questions, please contact us at info@CAvehiclesurvey.org.

All the best,

The California Vehicle Survey Team
www.cavehiclesurvey.org
info@CAvehiclesurvey.org
600 B Street, Suite 2202
San Diego, CA 92101

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APPENDIX M: Regional and Segmented Models

Introduction

This appendix presents the results of several different specification tests that were conducted for each model described in Chapter 9. The specification tests included the following:

1. Estimating region-specific variables
2. Estimating a proxy for population density, coded as an urban dummy variable
3. Estimating industry-specific variables and fleet-size variables in the commercial vehicle choice model.

Regional Variables

Six major regions of interest were identified by CEC at the onset of the CVS. The regions include the four major metropolitan areas of San Francisco, Los Angeles, San Diego, and Sacramento. A fifth region, added for the 2015-2017 CVS, includes the Central Valley region of California in the greater Fresno area. The rest of the State outside of these areas is included in the sixth region. The regions consist of one or more counties as described below in Table M-1.

Table 1: Region Definitions

Region Number	Region Name	Counties in Region
1	**San Francisco**	Alameda, Contra Costa, Marin, Napa, San Mateo, Santa Clara, Solano, Sonoma, and San Francisco
2	**Los Angeles**	Los Angeles, Orange, Imperial, Riverside, San Bernardino, and Ventura
3	**San Diego**	San Diego
4	**Sacramento**	El Dorado, Placer, Sacramento, Sutter, and Yolo, Yuba Counties
5	**Central Valley**	Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus Tulare
6	**Rest of State**	Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, Glenn, Humboldt, Inyo, Lake, Lassen, Mariposa, Mendocino Modoc, Mono, Monterey, Nevada, Plumas, San Benito, San San Luis Obispo, Santa Barbara, Santa Cruz, Shasta, Sierra, Siskiyou, Tehama, Trinity, and Tuolumne

In the residential vehicle choice model, certain coefficients were estimated separately by region. For example, if the large SUV coefficient was found to have a smaller magnitude in the San Francisco region than other regions, an additive interaction term was included the large SUV vehicle type for respondents in the San Francisco region.

In the remaining residential models, the effect of region was tested by including dummy variables for the five regions. Generally, the San Francisco regional dummy coefficient was constrained to zero, and the remaining five regional coefficients are estimated in relation to San Francisco.

Urban Variable

An urban dummy variable was created for each household based on the current zip code of the household at the time of the RP survey. The zip code was used to look identify a city or town of residence for each respondent. An urban household was defined as one located in the central city of a Census Metropolitan Statistical Area (MSA). The central city of an MSA was defined as one or more cities named in the MSA's title. For example, Los Angeles is one of the title cities of the Los Angeles-Long Beach-Santa Ana MSA. Table M-2 lists all of the MSA central cities in the State of California, along with the corresponding county.

Table 2: List of California MSA Central Cities

MSA Central City	County	MSA Central City	County
Arden-Arcade	Sacramento	Riverside	Riverside
Bakersfield	Kern	Roseville	Placer
Carlsbad	San Diego	Sacramento	Sacramento
Chico	Butte	Salinas	Monterey
Corcoran	Kings	San Bernardino	San Bernardino
El Centro	Imperial	San Diego	San Diego
Fairfield	Solano	San Francisco	San Francisco
Fremont	Alameda	San Jose	Santa Clara
Fresno	Fresno	San Luis Obispo	San Luis Obispo
Goleta	Santa Barbara	San Marcos	San Diego
Hanford	Kings	Santa Ana	Orange
Long Beach	Los Angeles	Santa Barbara	Santa Barbara
Los Angeles	Los Angeles	Santa Clara	Santa Clara
Madera	Madera	Santa Cruz	Santa Cruz
Merced	Merced	Santa Maria	Santa Barbara
Modesto	Stanislaus	Santa Rosa	Sonoma
Napa	Napa	Stockton	San Joaquin
Oakland	Alameda	Sunnyvale	Santa Clara
Ontario	San Bernardino	Thousand Oaks	Ventura
Oxnard	Ventura	Vallejo	Solano
Paso Robles	San Luis Obispo	Ventura	Ventura
Petaluma	Sonoma	Visalia	Tulare
Porterville	Tulare	Watsonville	Santa Cruz
Redding	Shasta	Yuba City	Sutter

Specification Summary

While the specifications described above present unique forecasting challenges in the current version of DynaSim, it is expected that future versions of the model implementation will be able to support these variables and segmentations.

To provide flexibility for future forecasting efforts, several combinations of these specifications were run as presented below in Table M-3. Results are not included in cases were the regional or dummy variables had a negligible or negative impact on model fit.

Table 3: Residential Model Specification Summary

Model	Regional Variables	Urban Variable	Table Number
Residential Vehicle Choice		N/A	Table 4
	X	N/A	Table 5
Residential Vehicle Transaction			Table 6
		X	Table 7
	X		Table 8
		X	Table 9
Residential New-Used			Table 10
		X	Table 11
	X		Table 12
		X	Table 13
Residential Vehicle Quantity			Table 14
		X	Table 15
	X		Table 16
		X	Table 17
Residential VMT			Table 18
		X	Table 19
	X		Table 20
		X	Table 21

Residential Vehicle Choice Model

Table 4: Residential Vehicle Choice Coefficients—Statewide

				1 Vehicle		2 Vehicles		3+ Vehicles	
Type	**Coef.**	**Description**	**Units**	***Value***	***T-Value***	***Value***	***T-Value***	***Value***	***T-Value***
Vehicle Type	α_1	Vehicle Type Inertia	0,1	0.859	20.72	0.714	21.91	0.605	12.4
	$\beta_{1,1}$	Subcompact, Fixed	0,1	0	--	0	--	0	--
	$\beta_{1,2}$	Compact	0,1	0.0512	0.59	0.272	3.68	0.101	0.97
	$\beta_{1,3}$	Midsize	0,1	0.112	1.21	0.522	6.66	0.246	2.2
	$\beta_{1,4}$	Large	0,1	-0.101	-0.8	0.165	1.59	-0.0243	-0.16
	$\beta_{1,5}$	Sports	0,1	0.137	1.05	0.579	5.52	0.0985	0.63
	$\beta_{1,6}$	Crossover, Small	0,1	0.468	4.38	0.594	6.69	0.357	2.82

				1 Vehicle		2 Vehicles		3+ Vehicles	
Type	**Coef.**	**Description**	**Units**	***Value***	***T-Value***	***Value***	***T-Value***	***Value***	***T-Value***
	$\beta_{1,7}$	Crossover, Midsize	0,1	0.532	3.8	0.985	8.55	0.642	3.82
	$\beta_{1,8}$	SUV, Small/Midsize	0,1	0.834	5.71	1.2	9.82	0.815	4.56
	$\beta_{1,9}$	SUV, Large	0,1	0.538	3.77	0.668	5.67	0.386	2.27
	$\beta_{1,10}$	Pickup Truck, Small	0,1	0.221	1.59	0.276	2.42	0.016	0.1
	$\beta_{1,11}$	Pickup Truck, Full-Size	0,1	0.128	0.89	0.517	4.62	0.423	2.65
	$\beta_{1,12}$	Van, Small	0,1	0.318	1.85	0.566	4	-0.0537	-0.25
	$\beta_{1,13}$	Van, Full-Size	0,1	0.241	0.62	0.43	1.36	0.418	0.9
Fuel Type	α_2	Fuel Type Inertia	0,1	0.477	9.87	0.552	13.63	0.563	9.64
	$\beta_{2,1}$	Gasoline, Fixed	0,1	0	--	0	--	0	--
	$\beta_{2,2}$	HEV	0,1	0.257	2.98	0.229	3.16	0.201	1.9
	$\beta_{2,3}$	PHEV	0,1	-0.05	-0.42	0.19	1.94	-0.00888	-0.06
	$\beta_{2,4}$	E85	0,1	0.142	1.41	0.168	1.94	0.256	2.07
	$\beta_{2,5}$	Diesel	0,1	-0.375	-3.53	-0.257	-3.01	-0.108	-0.89
	$\beta_{2,6}$	Diesel Hybrid	0,1	-0.243	-1.58	0.186	1.52	0.0173	0.1
	$\beta_{2,7}$	CNG	0,1	0.0431	0.33	0.082	0.74	-0.0288	-0.17
	$\beta_{2,8}$	CNG Hybrid	0,1	0.107	0.61	0.289	1.99	0.0373	0.16
	$\beta_{2,9}$	BEV	0,1	0.23	1.16	0.551	3.38	0.647	2.82
	$\beta_{2,10}$	Hydrogen	0,1	0.26	1.32	0.244	1.44	0.0372	0.14
Vehicle Age	$\beta_{3,1}$	New	0,1	0	--	0	--	0	--
	$\beta_{3,2}$	1–2 Years	0,1	-0.215	-4.66	-0.118	-3.07	-0.125	-2.21
	$\beta_{3,3}$	3+ Years	0,1	-0.212	-3.41	-0.196	-3.74	-0.127	-1.67
Purchase Incentive	$\beta_{4,1}$	No Incentive	0,1	0	--	0	--	0	--
	$\beta_{4,2}$	HOV Lane Access	0,1	0.128	1.15	0.0935	1.02	0.146	1.08
	$\beta_{4,3}$	Cash Rebate	$	4.25E-05	1.35	8.36E-05	3.29	9.58E-05	2.43
	$\beta_{4,4}$	Tax Credit	$	2.24E-05	1.52	4.22E-05	3.55	2.15E-05	1.2
Refueling Locations	β_5	Time to Station	Mins	0.000936	0.27	-0.00222	-0.78	0.00185	0.44
Range	β_6	Natural Log of Vehicle Range	Miles	0.509	7.75	0.572	10.71	0.763	9.83
Models	β_7	Available Makes/Models	--	0.00143	3.08	0.000558	1.4	0.00116	1.99
Maintenance	β_8	Annual Maintenance Cost	$ per year	-0.00108	-6.3	-0.000624	-4.47	-0.00091	-4.34
Fuel Cost	β_9	Fuel Cost	Cents per mile	-0.0137	-4.59	-0.00865	-3.58	-0.018	-4.89
MPGe	β_{10}	Miles per Gallon Equivalent	MPGe	0.0101	4.91	0.00808	4.76	0.00464	1.94
Acceleration	β_{11}	Acceleration	Secs.	-0.0426	-5.85	-0.0216	-3.56	-0.0454	-4.97
Refueling Time	β_{12}	Refueling Time	Mins.	-0.000694	-3.41	-0.00057	-3.54	-0.000231	-1
Cargo	β_{13}	Trunk/Cargo Space	Ft^3	-0.00125	-0.32	-0.00407	-1.26	-0.00488	-1.03
Vehicle Price	$\beta_{14,1}$	Vehicle Price	$000	-0.11	-4.37	-0.145	-6.39	-0.131	-3.62
	$\beta_{14,2}$	Price * Natural Log of Income	$000	0.0077	3.44	0.0104	5.34	0.00981	3.2

				1 Vehicle		2 Vehicles		3+ Vehicles	
Type	**Coef.**	**Description**	**Units**	***Value***	***T-Value***	***Value***	***T-Value***	***Value***	***T-Value***
		Price for income less than $20,000	$	-3.908E-05		-4.921E-05		-4.065E-05	
		Price for income $20,000 to $39,999	$	-3.062E-05		-3.779E-05		-2.987E-05	
		Price for income $40,000 to $59,999	$	-2.669E-05		-3.247E-05		-2.486E-05	
		Price for income $60,000 to $79,999	$	-2.410E-05		-2.897E-05		-2.156E-05	
		Price for income $80,000 to $99,999	$	-2.216E-05		-2.636E-05		-1.909E-05	
		Price for income $100,000 to $119,999	$	-2.062E-05		-2.427E-05		-1.712E-05	
		Price for income $120,000 or more	$	-1.933E-05		-2.254E-05		-1.548E-05	
Fuel Type/Vehicle Interaction	$\beta_{15,1}$	Alt Fuel, Small Vehicles	0,1	0	--	0	--	0	--
	$\beta_{15,2}$	Alt Fuel, Medium Vehicles	0,1	-0.309	-3.56	-0.24	-3.42	-0.122	-1.15
	$\beta_{15,3}$	Alt Fuel, Large Vehicles	0,1	-0.164	-1.74	0.00371	0.05	-0.0445	-0.42
Alternative-Specific Constants	α_3	Option A Constant	0,1	0.725	16.35	0.635	16.95	0.629	11.14
	α_4	Option B Constant	0,1	-0.0429	-0.9	0.00131	0.03	-0.074	-1.27
	α_5	Option C Constant	0,1	0.0588	1.36	0.0414	1.16	-0.00578	-0.11
Price/Income Interaction Control Variables	$\beta_{16,1}$	Price	$000	0.0591	2.11	0.08	2.65	0.198	4.37
	$\beta_{16,2}$	Price * Natural Log of Income	$000	-0.00334	-1.33	-0.00542	-2.08	-0.0161	-4.16
	$\beta_{16,3}$	Price * Natural Log of Income ($5k)	$000	0.00349	4.88	0	--	0	--

Fit Statistics	**1 Vehicle**	**2 Vehicles**	**3+ Vehicles**
Number of estimated parameters	47	46	46
Number of observations	9952	13088	5760
Number of individuals	1244	1636	720
Null log-likelihood	-13796.401	-18143.821	-7985.056
Final log-likelihood	-9061.155	-12945.524	-5749.29
Rho-square	0.343	0.287	0.28
Adjusted rho-square	0.34	0.284	0.274

Table 5: Residential Vehicle Choice Coefficients—Statewide with Regional Variables

Type	**Coef.**	**Name**	**Units**	**Value**	**T-Value**	**Value**	**T-Value**	**Value**	**T-Value**
Vehicle Type	α_1	Vehicle Type Inertia	0,1	0.861	20.76	0.713	21.88	0.609	12.44
	$\beta_{1,1}$	Subcompact - Fixed	0,1	0	--	0	--	0	--
	$\beta_{1,2}$	Compact	0,1	0.0479	0.55	0.271	3.98	0.101	0.96
	$\beta_{1,3}$	Midsize	0,1	0.109	1.18	0.52	7.35	0.242	2.15
	$\beta_{1,4}$	Large	0,1	-0.106	-0.84	0.163	1.8	-0.0455	-0.3

	$\beta_{1,5}$	Sports	0,1	0.134	1.03	0.578	5.83	0.0875	0.56
	$\beta_{1,6}$	Crossover, Small	0,1	0.467	4.37	0.592	7.49	0.359	2.83
	$\beta_{1,7}$	Crossover, Midsize	0,1	0.532	3.79	0.983	10.84	0.618	3.66
	$\beta_{1,8}$	SUV, Small/Midsize	0,1	0.834	5.71	1.19	14.45	0.799	4.45
	$\beta_{1,9}$	SUV, Large	0,1	0.539	3.63	0.657	6.34	0.522	2.99
	$\beta_{1,10}$	SUV, Large – San Francisco	0,1	-0.00455	-0.02	0.0333	0.23	-0.684	-3.45
	$\beta_{1,11}$	Pickup Truck, Small	0,1	0.219	1.59	0.275	2.7	0.00279	0.02
	$\beta_{1,12}$	Pickup Truck, Full-Size	0,1	0.153	1.01	0.593	5.71	0.429	2.57
	$\beta_{1,14}$	Pickup Truck, Full-Size – San Francisco	0,1	-0.151	-0.59	-0.49	-2.52	-0.142	-0.57
	$\beta_{1,15}$	Van, Small	0,1	0.321	1.87	0.563	5.56	-0.0663	-0.31
	$\beta_{1,13}$	Van, Full-Size	0,1	0.265	0.68	0.422	2.12	0.372	0.8
Fuel Type	α_2	Fuel Type Inertia	0,1	0.479	9.88	0.545	13.44	0.55	9.38
	$\beta_{2,1}$	Gasoline - Fixed	0,1	0	--	0	--	0	--
	$\beta_{2,2}$	Hybrid	0,1	0.257	2.98	0.232	3.19	0.208	1.96
	$\beta_{2,3}$	PHEV	0,1	-0.054	-0.45	0.217	2.19	0.038	0.26
	$\beta_{2,4}$	PHEV – Central Valley	0,1	0.094	0.48	-0.356	-2.25	-0.579	-2.46
	$\beta_{2,5}$	E85	0,1	0.143	1.41	0.166	1.93	0.247	2
	$\beta_{2,6}$	Diesel	0,1	-0.373	-3.51	-0.261	-3.08	-0.108	-0.89
	$\beta_{2,7}$	Diesel hybrid	0,1	-0.242	-1.58	0.185	1.51	0.0107	0.06
	$\beta_{2,8}$	CNG	0,1	0.0451	0.34	0.082	0.74	-0.0325	-0.2
	$\beta_{2,9}$	CNG hybrid	0,1	0.108	0.61	0.29	2	0.0278	0.12
	$\beta_{2,10}$	BEV	0,1	0.3	1.48	0.552	3.37	0.493	2.09
	$\beta_{2,11}$	BEV – San Francisco	0,1	-0.0951	-0.77	0.0935	0.92	0.624	4.45
	$\beta_{2,12}$	BEV – Central Valley	0,1	-0.614	-2.44	-0.227	-1.25	-0.349	-1.32
	$\beta_{2,13}$	Hydrogen	0,1	0.266	1.34	0.25	1.48	0.0311	0.12
Vehicle Age	$\beta_{3,1}$	New	0,1	0	--	0	--	0	--
	$\beta_{3,2}$	1–2 Years	0,1	-0.214	-4.64	-0.117	-3.07	-0.113	-2
	$\beta_{3,3}$	3+ Years	0,1	-0.211	-3.39	-0.196	-3.75	-0.116	-1.52
Purchase Incentive	$\beta_{4,1}$	No incentive	0,1	0	--	0	--	0	--
	$\beta_{4,2}$	HOV lane access	0,1	0.123	1.11	0.0955	1.04	0.145	1.06
	$\beta_{4,3}$	Cash rebate	$	4.17E-03	1.33	8.31E-03	3.26	9.20E-03	2.32
	$\beta_{4,4}$	Tax credit	$	2.21E-03	1.5	4.18E-03	3.51	2.11E-03	1.18
Refueling Locations	β_5	Time to Station	Mins	0.000955	0.27	-0.00222	-0.78	0.00175	0.41
Range	β_6	Natural Log of Vehicle Range	Miles	0.51	7.75	0.575	10.87	0.768	9.83
Models	β_7	Available Makes/Models	--	0.00143	3.08	0.000575	1.46	0.00118	2.01
Maintenance	β_8	Annual Maintenance Cost	$ per year	-0.00108	-6.3	-0.000628	-4.51	-0.00089	-4.24
Fuel Cost	β_9	Fuel Cost	Cents per mile	-1.38	-4.61	-0.872	-3.62	-1.82	-4.93

MPGE	β_{10}	Miles per Gallon Equivalent	MPGE	0.01	4.87	0.00795	4.76	0.00437	1.81
Acceleration	β_{11}	Acceleration	Secs	-0.0427	-5.85	-0.0216	-3.56	-0.0458	-5.02
Refueling Time	β_{12}	Refueling Time	Mins	-0.0007	-3.44	-0.000572	-3.55	-0.000222	-0.95
Cargo	β_{13}	Trunk/Cargo Space	Ft^3	-0.00145	-0.37	-0.004	-1.64	-0.00469	-0.99
Price	$\beta_{14,1}$	Vehicle Price	$000	-0.108	-4.25	-0.142	-6.24	-0.119	-3.28
	$\beta_{14,2}$	Price * Natural Log of Income	$000	0.00746	3.32	0.0101	5.18	0.00881	2.86
		Price for income less than $20,000	$	-3.929E-05		-4.898E-05		-3.786E-05	
		Price for income $20,000 to $39,999	$	-3.110E-05		-3.788E-05		-2.818E-05	
		Price for income $40,000 to $59,999	$	-2.728E-05		-3.272E-05		-2.368E-05	
		Price for income $60,000 to $79,999	$	-2.477E-05		-2.932E-05		-2.071E-05	
		Price for income $80,000 to $99,999	$	-2.290E-05		-2.678E-05		-1.850E-05	
		Price for income $100,000 to $119,999	$	-2.140E-05		-2.476E-05		-1.673E-05	
		Price for income $120,000 or more	$	-2.016E-05		-2.307E-05		-1.526E-05	
Fuel Type / Vehicle Interaction	$\beta_{15,1}$	Alt Fuel, Small Vehicles	0,1	0	--	0	--	0	--
	$\beta_{15,2}$	Alt Fuel, Medium Vehicles	0,1	-0.307	-3.54	-0.242	-3.52	-0.119	-1.12
	$\beta_{15,3}$	Alt Fuel, Large Vehicles	0,1	-0.162	-1.72	0.00291	0.04	-0.0214	-0.2
Alternative-Specific Constants	α_3	Option A constant	0,1	0.725	16.34	0.635	16.94	0.628	11.13
	α_4	Option B constant	0,1	-0.0431	-0.9	0.00171	0.04	-0.0726	-1.24
	α_5	Option C constant	0,1	0.0594	1.37	0.0417	1.17	-0.00998	-0.19
Price/Income Interaction Control Variables	$\beta_{16,1}$	Price	$000	0.0575	2.05	0.0792	2.62	0.196	4.3
	$\beta_{16,2}$	Price * Natural Log of Income	$000	-0.0032	-1.27	-0.00534	-2.05	-0.0159	-4.08
	$\beta_{16,3}$	Price * Natural Log of Income ($5k)	$000	0.00342	4.78	--	--	--	--

Fit Statistics	**1 Vehicle**	**2 Vehicles**	**3+ Vehicles**
Number of estimated parameters	52	51	51
Number of observations	9952	13088	5760
Number of individuals	1244	1636	720
Null log-likelihood	-13796.401	-18143.821	-7985.056
Final log-likelihood	-9057.386	-12938.185	-5728.109
Rho-square	0.343	0.287	0.283
Adjusted rho-square	0.34	0.284	0.276

Vehicle Transaction and Replacement

Table 6: Vehicle Transaction and Replacement Model Coefficients—Statewide

Alternative	Coef.	Name	Units	Value	T-test
No Replacement Alternative	α_1	No Replacement Constant	--	2.57	16.33
Vehicle Replacement Alternatives	β_1	Natural Log of Vehicle Age	Years	0.193	4.12
	β_2	Large Household (>= 4)	0,1	0.123	1.05
	β_3	Household Income	$	1.48E-06	2.15
	β_4	Full Time Employees	Persons	0.191	3.38
Nest Coefficient	θ_{rep}	Replacement Nest	--	0.256	3.92

Fit Statistics	Value
Number of estimated parameters	6
Number of observations	3557
Number of individuals	3557
Null log-likelihood	-3612.773
Final log-likelihood	-1871.183
Rho-square	0.482
Adjusted rho-square	0.48

Table 7: Vehicle Transaction and Replacement Model Coefficients—Statewide with Urban Variable

Alternative	Coef.	Name	Units	Value	T-test
No Replacement Alternative	α_1	No Replacement Constant	--	2.56	15.84
Vehicle Replacement Alternatives	β_1	Natural Log of Vehicle Age	Years	0.192	4.1
	β_2	Large Household (>= 4)	0,1	0.123	1.05
	β_3	Household Income	$	1.48E-06	2.14
	β_4	Full Time Employees	Persons	0.192	3.38
	β_5	Urban Dummy	0,1	-0.0207	-0.21
Nest Coefficient	θ_{rep}	Replacement Nest	--	0.255754	3.91

Fit Statistics	Value
Number of estimated parameters	7
Number of observations	3557
Number of individuals	3557
Null log-likelihood	-3612.773
Final log-likelihood	-1871.161
Rho-square	0.482
Adjusted rho-square	**0.48**

Table 8: Vehicle Transaction and Replacement Model Coefficients—Regional

Alternative	Coef.	Name	Units	Value	T-test
No Replacement Alternative	α_1	No Replacement Constant	--	2.56	15.84
Vehicle Replacement Alternatives	β_1	Natural Log of Vehicle Age	Years	0.192	4.1
	β_2	Large Household (>= 4)	0,1	0.123	1.05
	β_3	Household Income	$	1.48E-06	2.14
	β_4	Full Time Employees	Persons	0.192	3.38
	β_5	Los Angeles Region Dummy	0,1	0.105	0.89
	β_6	San Francisco Region Dummy	0,1	0	--
	β_7	San Diego Region Dummy	0,1	-0.0922	-0.5
	β_8	Sacramento Region Dummy	0,1	0.143	0.76
	β_9	Central Valley Region Dummy	0,1	0.0647	0.35
	β_{10}	Other Region Dummy	0,1	-0.069	-0.36
Nest Coefficient	θ_{rep}	Replacement Nest	--	0.260417	3.96

Fit Statistics	Value
Number of estimated parameters	11
Number of observations	3557
Number of individuals	3557
Null log-likelihood	-3612.773
Final log-likelihood	-1869.87
Rho-square	0.482
Adjusted rho-square	0.479

Table 9: Vehicle Transaction and Replacement Model Coefficients—Regional with Urban Variable

Alternative	Coef.	Name	Units	Value	T-test
No Replacement Alternative	α_1	No Replacement Constant	--	2.63	13.81
Vehicle Replacement Alternatives	β_1	Natural Log of Vehicle Age	Years	0.196	4.15
	β_2	Large Household (>= 4)	0,1	0.119	1.01
	β_3	Household Income	$	1.53E-06	2.17
	β_4	Full Time Employees	Persons	0.187	3.3
	β_5	Urban Dummy	0,1	0.00694	0.07
	β_6	Los Angeles Region Dummy	0,1	0.107	0.88
	β_7	San Francisco Region Dummy	0,1	0	
	β_8	San Diego Region Dummy	0,1	-0.0925	-0.5
	β_9	Sacramento Region Dummy	0,1	0.143	0.76
	β_{10}	Central Valley Region Dummy	0,1	0.0638	0.35
	β_{11}	Other Region Dummy	0,1	-0.0683	-0.36
Nest Coefficient	θ_{rep}	Replacement Nest	--	2.63	13.81

Fit Statistics	Value
Number of estimated parameters	12
Number of observations	3557
Number of individuals	3557
Null log-likelihood	-3612.773
Final log-likelihood	-1869.867
Rho-square	0.482
Adjusted rho-square	0.479

New/Used Vehicle Choice Model

Table 10: New/Used Vehicle Choice Model Coefficients—Statewide

Coef.	Description	Units	1 Vehicle		2 Vehicles		3 + Vehicles	
			Estimate	T-Stat	Estimate	T-Stat	Estimate	T-Stat
α_1	New Vehicle Constant	--	-6.08	-6.39	-6.32	-8.66	-6.17	-5.92
β_1	Natural Log of Income	$	0.608	7.18	0.637	10.22	0.605	6.94
β_2	Natural Log of Household Size	Persons	-0.406	-3.3	-0.363	-3.44	-0.396	-2.89

Fit Statistics	1 Vehicle	2 Vehicles	3+ Vehicles
Number of estimated parameters	4	4	4
Number of observations	1167	2842	1662
Number of individuals	1167	1571	667
Null log-likelihood	-808.903	-1969.92	-1152.01
Final log-likelihood	-746.916	-1762.89	-1097.53
Rho-square	0.077	0.105	0.047
Adjusted rho-square	0.072	0.103	0.044

Table 11: New/Used Vehicle Choice Model Coefficients—Statewide with Urban Variable

Coef.	Description	Units	1 Vehicle		2 Vehicles		3 + Vehicles	
			Estimate	T-Stat	Estimate	T-Stat	Estimate	T-Stat
α_1	New Vehicle Constant	--	-6.08	-6.39	-6.32	-8.66	-6.17	-5.92
β_1	Natural Log of Income	$	0.608	7.18	0.637	10.22	0.605	6.94
β_2	Natural Log of Household Size	Persons	-0.406	-3.3	-0.363	-3.44	-0.396	-2.89
β_3	Urban Dummy	0,1	-0.026	-0.19	0.0344	0.38	-0.0555	-0.45

Fit Statistics	1 Vehicle	2 Vehicles	3+ Vehicles
Number of estimated parameters	4	4	4
Number of observations	1167	2842	1662
Number of individuals	1167	1571	667
Null log-likelihood	-808.903	-1969.92	-1152.01
Final log-likelihood	-746.916	-1762.89	-1097.53
Rho-square	0.077	0.105	0.047
Adjusted rho-square	0.072	0.103	0.044

Table 12: New/Used Vehicle Choice Model Coefficients—Regional

Coef.	Description	Units	1 Vehicle		2 Vehicles		3 + Vehicles	
			Estimate	T-Stat	Estimate	T-Stat	Estimate	T-Stat
α_1	New Vehicle Constant	--	-6.09	-6.4	-6.3	-8.65	-6.16	-5.91
β_1	Natural Log of Income	$	0.607	7.18	0.636	10.22	0.602	6.93
β_2	Natural Log of Household Size	Persons	-0.406	-3.3	-0.362	-3.43	-0.399	-2.92
β_4	LA Region Dummy	0,1	0.3	1.85	0.259	2.41	-0.0128	-0.09
β_5	San Francisco Region Dummy	0,1	0		0		0	
β_6	San Diego Region Dummy	0,1	-0.157	-0.68	-0.105	-0.67	0.265	1.29
B_7	Sacramento Region Dummy	0,1	-0.116	-0.43	-0.307	-1.98	-0.417	-1.81
B_8	Central Valley Region Dummy	0,1	-0.181	-0.72	-0.261	-1.63	-0.457	-2.11
B_9	Other Region Dummy	0,1	-0.271	-1.01	-0.0639	-0.4	-0.585	-3.13

Fit Statistics	1 Vehicle	2 Vehicles	3+ Vehicles
Number of estimated parameters	8	8	8
Number of observations	1167	2842	1662
Number of individuals	1167	1571	667
Null log-likelihood	-808.903	-1969.92	-1152.01
Final log-likelihood	-741.535	-1750.44	-1085.99
Rho-square	0.083	0.111	0.057
Adjusted rho-square	0.073	0.107	0.05

Table 13: New/Used Vehicle Choice Model Coefficients—Regional with Urban Variable

Coef.	Description	Units	1 Vehicle		2 Vehicles		3 + Vehicles	
			Estimate	T-Stat	Estimate	T-Stat	Estimate	T-Stat

α_1	New Vehicle Constant	--	-6.08	-6.39	-6.32	-8.66	-6.17	-5.92
β_1	Natural Log of Income	$	0.608	7.18	0.637	10.22	0.605	6.94
β_2	Natural Log of Household Size	Persons	-0.406	-3.3	-0.363	-3.44	-0.396	-2.89
β_3	Urban Dummy	0,1	-0.026	-0.19	0.0344	0.38	-0.0555	-0.45
β_4	LA Region Dummy	0,1	0.294	1.78	0.268	2.43	-0.0262	-0.19
β_5	San Francisco Region Dummy	0,1	0	--	0	--	0	--
β_6	San Diego Region Dummy	0,1	-0.156	-0.67	-0.107	-0.68	0.267	1.3
B_7	Sacramento Region Dummy	0,1	-0.117	-0.44	-0.301	-1.93	-0.423	-1.83
B_8	Central Valley Region Dummy	0,1	-0.177	-0.71	-0.264	-1.65	-0.449	-2.07
B_9	Other Region Dummy	0,1	-0.274	-1.02	-0.0605	-0.37	-0.593	-3.16

Fit Statistics	**1 Vehicle**	**2 Vehicles**	**3+ Vehicles**
Number of estimated parameters	9	9	9
Number of observations	1167	2842	1662
Number of individuals	1167	1571	667
Null log-likelihood	-808.903	-1969.92	-1152.01
Final log-likelihood	-741.517	-1750.36	-1085.89
Rho-square	0.083	0.111	0.057
Adjusted rho-square	0.072	0.107	0.05

Vehicle Quantity Model

Table 14: Vehicle Quantity Model Coefficients—Statewide

Coef.	**Description**	**Units**	**Estimate**	**T-stat**
α_1	Constant—1 Vehicle	0,1	-1.55	-0.55
α_2	Constant—2 Vehicles	0,1	-9.73	-3.39
α_3	Constant—3+ Vehicles	0,1	-17.1	-5.8
$\beta_{1,1}$	LN (income)—1 Vehicle	$	0.586	2.17
$\beta_{1,2}$	LN (income)—2 Vehicles	$	1.23	4.5
$\beta_{1,3}$	LN (income)—3+ Vehicles	$	1.71	6.13
$\beta_{2,1}$	LN (household size)—1 Vehicle	Persons	-0.31	-0.55
$\beta_{2,2}$	LN (household size)—2 Vehicles	Persons	1.62	2.86
$\beta_{2,3}$	LN (household size)—3+ Vehicles	Persons	2.68	4.67
$\beta_{3,1}$	Transit Trips/person—1 Vehicle	Trips	-0.0355	-1.95
$\beta_{3,2}$	Transit Trips/person—2 Vehicles	Trips	-0.074	-3.64
$\beta_{3,3}$	Transit Trips/person—3+ Vehicles	Trips	-0.0825	-3.77

Fit Statistics	Value
Number of estimated parameters	12
Number of observations	3614
Number of individuals	3614
Null log-likelihood	-5010.07
Final log-likelihood	-3274.63
Rho-square	0.346
Adjusted rho-square	0.344

Table 15: Vehicle Quantity Model Coefficients—Statewide with Urban Variable

Coef.	Description	Units	Estimate	T-stat
α_1	Constant—1 Vehicle	0,1	-1.52	-0.53
α_2	Constant—2 Vehicles	0,1	-9.64	-3.35
α_3	Constant—3+ Vehicles	0,1	-17	-5.74
$\beta_{1,1}$	LN (income)—1 Vehicle	$	0.594	2.19
$\beta_{1,2}$	LN (income)—2 Vehicles	$	1.24	4.52
$\beta_{1,3}$	LN (income)—3+ Vehicles	$	1.73	6.16
$\beta_{2,1}$	LN (household size)—1 Vehicle	Persons	-0.29	-0.52
$\beta_{2,2}$	LN (household size)—2 Vehicles	Persons	1.65	2.91
$\beta_{2,3}$	LN (household size)—3+ Vehicles	Persons	2.72	4.76
$\beta_{3,1}$	Transit Trips/person—1 Vehicle	Trips	-0.0366	-2
$\beta_{3,2}$	Transit Trips/person—2 Vehicles	Trips	-0.0743	-3.65
$\beta_{3,3}$	Transit Trips/person—3+ Vehicles	Trips	-0.0816	-3.72
$\beta_{4,1}$	Urban Dummy—1 Vehicle	0,1	-0.337	-0.61
$\beta_{4,2}$	Urban Dummy—2 Vehicles	0,1	-0.537	-0.97
$\beta_{4,3}$	Urban Dummy—3+ Vehicles	0,1	-0.903	-1.62

Fit Statistics	Value
Number of estimated parameters	12
Number of observations	3614
Number of individuals	3614
Null log-likelihood	-5010.07
Final log-likelihood	-3262.341
Rho-square	0.349
Adjusted rho-square	0.346

Table 16: Vehicle Quantity Model Coefficients—Regional

Coef.	Description	Units	Estimate	T-stat
α_1	Constant—1 Vehicle	0,1	-2.22	-0.79
α_2	Constant—2 Vehicles	0,1	-10.3	-3.61
α_3	Constant—3+ Vehicles	0,1	-17.7	-6.02
$\beta_{1,1}$	LN (income)—1 Vehicle	$	0.607	2.26
$\beta_{1,2}$	LN (income)—2 Vehicles	$	1.25	4.6
$\beta_{1,3}$	LN (income)—3+ Vehicles	$	1.73	6.24
$\beta_{2,1}$	LN (household size)—1 Vehicle	Persons	-0.3	-0.53
$\beta_{2,2}$	LN (household size)—2 Vehicles	Persons	1.63	2.89
$\beta_{2,3}$	LN (household size)—3+ Vehicles	Persons	2.69	4.69
$\beta_{3,1}$	Transit Trips/person—1 Vehicle	Trips	-0.0429	-2.27
$\beta_{3,2}$	Transit Trips/person—2 Vehicles	Trips	-0.0811	-3.95
$\beta_{3,3}$	Transit Trips/person—3+ Vehicles	Trips	-0.0896	-4.06
$\beta_{4,1}$	LA Region Dummy—1 Vehicle	0,1	1.68	2.12
$\beta_{4,2}$	LA Region Dummy—2 Vehicles	0,1	1.56	1.96
$\beta_{4,3}$	LA Region Dummy—3+ Vehicles	0,1	1.57	1.98

Fit Statistics	Value
Number of estimated parameters	15
Number of observations	3614
Number of individuals	3614
Null log-likelihood	-5010.068
Final log-likelihood	-3270.631
Rho-square	0.347
Adjusted rho-square	0.344

Table 17: Vehicle Quantity Model Coefficients—Regional with Urban Variable

Coef.	Description	Units	Estimate	T-stat
α_1	Constant—1 Vehicle	0,1	-2.22	-0.79
α_2	Constant—2 Vehicles	0,1	-10.2	-3.57
α_3	Constant—3+ Vehicles	0,1	-17.5	-5.95
$\beta_{1,1}$	LN (income)—1 Vehicle	$	0.607	2.26
$\beta_{1,2}$	LN (income)—2 Vehicles	$	1.25	4.59
$\beta_{1,3}$	LN (income)—3+ Vehicles	$	1.73	6.24
$\beta_{2,1}$	LN (household size)—1 Vehicle	Persons	-0.302	-0.53
$\beta_{2,2}$	LN (household size)—2 Vehicles	Persons	1.64	2.89
$\beta_{2,3}$	LN (household size)—3+ Vehicles	Persons	2.72	4.73
$\beta_{3,1}$	Transit Trips/person—1 Vehicle	Trips	-0.0429	-2.27
$\beta_{3,2}$	Transit Trips/person—2 Vehicles	Trips	-0.0805	-3.91
$\beta_{3,3}$	Transit Trips/person—3+ Vehicles	Trips	-0.0879	-3.98
$\beta_{4,1}$	Urban Dummy—1 Vehicle	0,1	0.0184	0.03
$\beta_{4,2}$	Urban Dummy—2 Vehicles	0,1	-0.233	-0.41
$\beta_{4,3}$	Urban Dummy—3+ Vehicles	0,1	-0.616	-1.09
$\beta_{5,1}$	LA Region Dummy—1 Vehicle	0,1	1.69	2.09
$\beta_{6,2}$	LA Region Dummy—2 Vehicles	0,1	1.5	1.86
$\beta_{7,3}$	LA Region Dummy—3+ Vehicles	0,1	1.43	1.76

Fit Statistics	Value
Number of estimated parameters	18
Number of observations	3614
Number of individuals	3614
Null log-likelihood	-5010.068
Final log-likelihood	-3256.681
Rho-square	0.350
Adjusted rho-square	0.346

Vehicle Miles Traveled Model

Table 18: VMT Model Coefficients—Statewide

Coef.	Description	Units	1 Vehicle		2 Vehicles		3 + Vehicles	
			Estimate	T-stat	Estimate	T-stat	Estimate	T-stat

α_1	Intercept	--	8.583	26.0	8.569	35.7	8.980	29.1
β_1	Natural Log of Household Size	Persons	0.056	1.2	0.093	2.7	0.142	3.1
β_2	Natural Log of Full-Time Equivalent Workers + 1	Persons	0.349	5.7	0.308	9.7	0.257	6.4
β_3	Number of Vehicles Greater Than 3	Vehicles	--	--	--	--	-0.036	-2.0
β_4	Natural Log of Income	$	0.020	0.7	0.017	0.9	-0.025	-1.0
β_5	Vehicle Age	Years	0.004	0.4	-0.005	-1.1	-0.018	-4.5
β_6	Vehicle Age^2	Years^2	-0.0008	-1.8	-0.0004	-2.5	0.000	0.0
β_7	Natural Log of Fuel Cost Per Mile*	$/mile	-0.024	NA	-0.024	-0.6	-0.065	-1.4

**Cost per mile for 1-vehicle households is constrained.*

Fit Statistics	**1 Vehicle**	**2 Vehicles**	**3 + Vehicles**
Number of observations	1105	2882	2027
Number of parameters	7	7	8
R-squared	0.063	0.078	0.106
Adjusted R-squared	0.058	0.076	0.103

Table 19: VMT Model Coefficients—Statewide with Urban Variable

Coef.	**Description**	**Units**	**1 Vehicle**		**2 Vehicles**		**3 + Vehicles**	
			Estimate	**T-stat**	**Estimate**	**T-stat**	**Estimate**	**T-stat**
α_1	Intercept	--	8.580	26.1	8.569	35.7	9.000	29.1
β_1	Natural Log of Household Size	Persons	0.055	1.2	0.092	2.7	0.142	3.1
β_2	Natural Log of Full-Time Equivalent Workers + 1	Persons	0.370	6.0	0.311	9.8	0.263	6.6
β_3	Number of Vehicles Greater Than 3	Vehicles	--	--	--	--	-0.036	-2.0
β_4	Natural Log of Income	$	0.023	0.8	0.018	0.9	-0.026	-1.1
β_5	Vehicle Age	Years	0.005	0.5	-0.005	-1.1	-0.018	-4.5
β_6	Vehicle Age^2	Years^2	-0.0008	-1.8	-0.0004	-2.4	0.000	-0.1
β_7	Natural Log of Fuel Cost Per Mile*	$/mile	-0.027		-0.027	-0.7	-0.068	-1.4
β_8	Urban Dummy	0,1	-0.149	-3.3	-0.038	-1.5	-0.078	-2.3

**Cost per mile for 1-vehicle households is constrained.*

Fit Statistics	**1 Vehicle**	**2 Vehicles**	**3 + Vehicles**
Number of observations	1105	2882	2027
Number of parameters	8	8	9
R-squared	0.079	0.109	0.072
Adjusted R-squared	0.073	0.107	0.068

Table 20: VMT Model Coefficients—Regional

Coef.	**Description**	**Units**	**1 Vehicle**		**2 Vehicles**		**3 + Vehicles**	
			Estimate	**T-stat**	**Estimate**	**T-stat**	**Estimate**	**T-stat**

α_1	Intercept	--	8.303	23.9	8.210	32.6	8.669	27.0
β_1	Natural Log of Household Size	Persons	0.063	1.3	0.086	2.5	0.136	2.9
β_2	Natural Log of Full-Time Equivalent Workers + 1	Persons	0.349	5.7	0.313	9.9	0.261	6.5
β_3	Number of Vehicles Greater Than 3	Vehicles	--	--	--	--	-0.037	-2.0
β_4	Natural Log of Income	$	0.032	1.0	0.035	1.8	-0.006	-0.2
β_5	Vehicle Age	Years	0.004	0.5	-0.004	-1.0	-0.018	-4.5
β_6	Vehicle Age^2	Years^2	-0.0008	-1.8	-0.0005	-2.5	0.000	0.0
β_7	Natural Log of Fuel Cost Per Mile*	$/mile	-0.050		-0.050	-1.2	-0.078	-1.7
β_8	LA Region Dummy	0,1	0.102	1.9	0.123	3.9	0.066	1.6
β_9	San Diego Region Dummy	0,1	0.167	2.1	0.052	1.1	-0.029	-0.5
β_{10}	Sacramento Region Dummy	0,1	0.195	2.1	0.163	3.5	0.060	0.9
β_{11}	Central Valley Region Dummy	0,1	0.024	0.3	0.240	4.9	0.242	3.9
β_{12}	Rest of State Region Dummy	0,1	0.162	1.7	0.117	2.4	0.133	2.3

**Cost per mile for 1-vehicle households is constrained.*

Fit Statistics	**1 Vehicle**	**2 Vehicles**	**3 + Vehicles**
Number of observations	1105	2882	2027
Number of parameters	12	12	13
R-squared	0.070	0.088	0.116
Adjusted R-squared	0.061	0.085	0.111

Table 21: VMT Model Coefficients—Regional with Urban Variable

Coef.	**Description**	**Units**	**1 Vehicle**		**2 Vehicles**		**3 + Vehicles**	
			Estimate	**T-stat**	**Estimate**	**T-stat**	**Estimate**	**T-stat**
α_1	Intercept	--	8.318	24.0	8.217	32.7	8.698	27.1
β_1	Natural Log of Household Size	Persons	0.059	1.3	0.085	2.5	0.135	2.9
β_2	Natural Log of Full-Time Equivalent Workers + 1	Persons	0.370	6.0	0.316	10.0	0.270	6.7
β_3	Number of Vehicles Greater Than 3	Vehicles	--	--	--	--	-0.036	-2.0
β_4	Natural Log of Income	$	0.035	1.1	0.035	1.8	-0.006	-0.3
β_5	Vehicle Age	Years	0.005	0.5	-0.004	-1.0	-0.018	-4.6
β_6	Vehicle Age^2	Years^2	-0.0008	-1.8	-0.0004	-2.5	0.000	0.0
β_7	Natural Log of Fuel Cost Per Mile*	$/mile	-0.053		-0.053	-1.3	-0.080	-1.7
β_8	Urban Flag	0,1	-0.151	-3.2	-0.033	-1.2	-0.086	-2.4
β_9	LA Region Dummy	0,1	0.071	1.3	0.115	3.6	0.046	1.1
β_{10}	San Diego Region Dummy	0,1	0.177	2.2	0.055	1.1	-0.024	-0.4
β_{11}	Sacramento Region Dummy	0,1	0.195	2.1	0.159	3.4	0.054	0.8
β_{12}	Central Valley Region Dummy	0,1	0.051	0.6	0.245	5.0	0.251	4.1
β_{13}	Rest of State Region Dummy	0,1	0.146	1.5	0.114	2.3	0.122	2.1

**Cost per mile for 1-vehicle households is constrained.*

Fit Statistics	1 Vehicle	2 Vehicles	3 + Vehicles
Number of observations	1105	2882	2027
Number of parameters	13	13	14
R-squared	0.078	0.089	0.118
Adjusted R-squared	0.068	0.085	0.112

Commercial Vehicle Choice Model

Industry Type

The primary commercial demographic variable examined was industry type. There are, in many cases, differences in preferences among industry types for attributes such as vehicle type and fuel type. Several different specifications were tested to account for this taste heterogeneity among industries, including using industry interaction terms with various stated preference variables and estimating separate model segments for several different groups of industries.

Table M-22 lists the industry classifications based on the NAICS sector. The detailed NAICS classifications were reassigned to three broad industry groups. Table M-23 summarizes the number of companies and available choice sets from each industry group.

Table 24: Industry Classifications

Industry Group	Industries Included
Industry Group 1	Agriculture, Forestry, Fishing, and Hunting
	Mining, Quarrying, and Oil and Gas Extraction
	Utilities (i.e., Electric, Gas, Water)
	Construction
	Manufacturing
Industry Group 2	Wholesale Trade
	Retail Trade
	Transportation and Warehousing
Industry Group 3	Information (i.e., Communications, Information Services, Publishers, Telecommunications)
	Finance and Insurance
	Real Estate and Rental and Leasing
	Professional, Scientific, and Technical Services (i.e., Lawyers, Engineering, Marketing)
	Management of Companies and Enterprises
	Administrative and Support and Waste Management and Remediation Services
	Educational Services (i.e., Schools, Colleges, Universities)
	Health Care and Social Assistance
	Arts, Entertainment, and Recreation
	Accommodations and Food Services
	Public Administration
	Repair Service
	A/O Professional, Scientific, and Technical Services Mentions

Table 25: Industry Distribution of the Sample

Industry Group	Number of Companies	Number of Observations
Industry Group 1	325	2,600
Industry Group 2	281	2,248
Industry Group 3	1,106	8,848
Total	1,712	13,696

Industry Group and Vehicle Group Interaction

This term represents the interaction between the industry group and the vehicle group. Industry group 1 was treated as the reference case. The vehicles were grouped into the following categories:

- SUV: Small SUV, midsize SUV, and large SUV.
- Truck: Small pickup truck and full-size pickup truck.
- Van: Full-size van.
- Other (reference case): Small car, midsize car, full-size car, and small van.

The coefficients for the interactions with industry group 1 or with vehicle group "other" were constrained to be zero.

Industry Group and Fuel Group Interaction

This term represents the interaction between the industry group and the vehicle group. The industry group 1 was treated as the reference case. The fuel types were grouped into the following categories:

- Gasoline: Gasoline-only.
- Alt fuel: Not gasoline-only.

The coefficients for the interactions with industry group 1 or with fuel group gasoline were constrained to be zero.

Number of Vehicles in Fleet

An additional set of variables was included in the commercial model to capture the likelihood of a respondent to choose vehicles of a similar body type to the vehicles in his or her existing fleet. Vehicles were grouped into four types: cars, SUVs, pickup trucks, and vans:

- Number of cars in fleet: Subcompact car, compact car, midsize car, large car, sports car
- Number of SUVs in fleet: Small crossover, midsize crossover, small SUV, midsize SUV, large SUV
- Number of trucks in fleet: Standard pick-up truck, Full-size pick-up truck
- Number of vans in fleet: Small van, full-size van

The number of fleet vehicles in each of these groups was included as a variable in the model. The interpretation of this is that respondents with a large number of one type of vehicle in their existing fleets are more likely to replace or add a vehicle of the same type in the future.

Commercial Vehicle Choice Model Coefficients

Table M-24 presents the base commercial vehicle choice model coefficients, while Table M-25 presents the coefficients including fleet size interactions, and Table M-26 presents the coefficients including industry interactions and fleet size interactions.

Table 26: Commercial Vehicle Choice Model

Type	Coef.	Description	Units	Value	T-Value
Vehicle Type	α_1	Vehicle Type Inertia	0,1	1	30.01
	$\beta_{1,1}$	Subcompact, Fixed	0,1	0	--
	$\beta_{1,2}$	Compact	0,1	0.0435	0.48
	$\beta_{1,3}$	Midsize	0,1	0.307	3.28
	$\beta_{1,4}$	Large	0,1	0.741	5.35
	$\beta_{1,5}$	Sports	0,1	0.686	5.44
	$\beta_{1,6}$	Crossover, Small	0,1	0.682	6.39
	$\beta_{1,7}$	Crossover, Midsize	0,1	0.977	6.77
	$\beta_{1,8}$	SUV, Small/Midsize	0,1	0.963	6.77
	$\beta_{1,9}$	SUV, Large	0,1	1.07	6.99
	$\beta_{1,10}$	Pickup Truck, Std.	0,1	0.771	5.64
	$\beta_{1,11}$	Pickup Truck, Full-Size	0,1	1.48	10.8
	$\beta_{1,12}$	Van, Small	0,1	0.936	6.21
	$\beta_{1,13}$	Van, Full-Size	0,1	1.17	4.61
Fuel Type	α_2	Fuel Type Inertia	0,1	0.581	15.61
	$\beta_{2,1}$	Gasoline, Fixed	0,1	0	--
	$\beta_{2,2}$	HEV	0,1	0.0964	0.84
	$\beta_{2,3}$	PHEV	0,1	0.167	1.25
	$\beta_{2,4}$	E85	0,1	0.202	1.74
	$\beta_{2,5}$	Diesel	0,1	0.01	0.08
	$\beta_{2,6}$	Diesel Hybrid	0,1	-0.039	-0.25
	$\beta_{2,7}$	CNG	0,1	0.105	0.76
	$\beta_{2,8}$	CNG Hybrid	0,1	0.419	2.47
	$\beta_{2,9}$	BEV	0,1	0.575	3.23
	$\beta_{2,10}$	Hydrogen	0,1	0.185	0.94
Vehicle Age	$\beta_{3,1}$	New	0,1	0	--
	$\beta_{3,2}$	1–2 Years	0,1	-0.317	-7.84
	$\beta_{3,3}$	3+ Years	0,1	-0.455	-7.78
Purchase Incentive	$\beta_{4,1}$	No Incentive, Fixed	0,1	0	--
	$\beta_{4,2}$	HOV Lane Access	0,1	0.244	3.04

Type	Coef.	Description	Units	Value	T-Value
	$\beta_{4,3}$	Cash Rebate	$	0.0000317	1.71
	$\beta_{4,4}$	Tax Credit	$	0.000047	4.24
Refueling Locations	β_5	Time to Station	Mins.	-0.00327	-1.18
Range	β_6	Vehicle Range	Log (miles)	0.687	13.59
Models	β_7	Available Makes/Models	--	0.000049	0.08
Maintenance	β_8	Annual Maintenance Cost	$ per year	-0.000785	-5.68
Fuel Cost	β_9	Fuel Cost	Cents per mile	-0.019	-8.16
MPGe	β_{10}	Miles per Gallon Equivalent	MPGe	0.00964	6.07
Acceleration	β_{11}	Acceleration to 60 mph	Seconds	-0.0437	-7.08
Refueling Time	β_{12}	Refueling Time	Minutes	-0.000485	-3.21
Cargo	β_{13}	Trunk/Cargo Space	Cubic feet	0.0016	0.72
Vehicle Price	β_{14}	Vehicle Price	Log ($)	-0.933	-15.51
Fuel Type/Vehicle Interaction	$\beta_{15,1}$	Alt Fuel, Small Vehicles, Fixed	0,1	0	--
	$\beta_{15,2}$	Alt Fuel, Midsize Vehicles	0,1	-0.123	-1.18
	$\beta_{15,3}$	Alt Fuel, Large Vehicles	0,1	-0.225	-2.09
Alternative-Specific Constants	α_3	Option A Constant	0,1	0.665	17.66
	α_4	Option B Constant	0,1	-0.0213	-0.56
	α_5	Option C Constant	0,1	-0.0253	-0.69

Fit Statistics	Value
Number of Estimated Parameters	43
Number of Observations	13,696
Number of Individuals	1,712
Null Log-Likelihood	-18986.688
Final Log-Likelihood	-12601.992
Rho-Square	0.336
Adjusted Rho-Square	0.334

Table M-25: Commercial Vehicle Choice Model with Number of Vehicles in Fleet

Type	Coef.	Description	Units	Value	T-Value
Vehicle Type	α_1	Vehicle Type Inertia	0,1	0.969	28.22
	$\beta_{1,1}$	Subcompact, Fixed	0,1	0	--
	$\beta_{1,2}$	Compact	0,1	0.0385	0.43
	$\beta_{1,3}$	Midsize	0,1	0.313	3.36
	$\beta_{1,4}$	Large	0,1	0.754	5.45
	$\beta_{1,5}$	Sports	0,1	0.685	5.45
	$\beta_{1,6}$	Crossover, Small	0,1	0.697	6.52

Type	Coef.	Description	Units	Value	T-Value
	$\beta_{1,7}$	Crossover, Midsize	0,1	0.989	6.86
	$\beta_{1,8}$	SUV, Small/Midsize	0,1	0.975	6.85
	$\beta_{1,9}$	SUV, Large	0,1	1.09	7.07
	$\beta_{1,10}$	Pickup Truck, Std.	0,1	0.803	5.87
	$\beta_{1,11}$	Pickup Truck, Full-Size	0,1	1.51	10.98
	$\beta_{1,12}$	Van, Small	0,1	0.944	6.26
	$\beta_{1,13}$	Van, Full-Size	0,1	1.18	4.6
Fuel Type	α_2	Fuel Type Inertia	0,1	0.582	15.65
	$\beta_{2,1}$	Gasoline, Fixed	0,1	0	--
	$\beta_{2,2}$	HEV	0,1	0.0963	0.84
	$\beta_{2,3}$	PHEV	0,1	0.165	1.24
	$\beta_{2,4}$	E85	0,1	0.199	1.72
	$\beta_{2,5}$	Diesel	0,1	0.00837	0.07
	$\beta_{2,6}$	Diesel Hybrid	0,1	-0.04	-0.26
	$\beta_{2,7}$	CNG	0,1	0.101	0.73
	$\beta_{2,8}$	CNG Hybrid	0,1	0.417	2.47
	$\beta_{2,9}$	BEV	0,1	0.573	3.21
	$\beta_{2,10}$	Hydrogen	0,1	0.186	0.95
Vehicle Age	$\beta_{3,1}$	New	0,1	0	--
	$\beta_{3,2}$	1–2 Years	0,1	-0.315	-7.77
	$\beta_{3,3}$	3+ Years	0,1	-0.455	-7.76
Purchase Incentive	$\beta_{4,1}$	No Incentive, Fixed	0,1	0	
	$\beta_{4,2}$	HOV Lane Access	0,1	0.244	3.05
	$\beta_{4,3}$	Cash Rebate	$	0.0000326	1.76
	$\beta_{4,4}$	Tax Credit	$	0.0000474	4.28
Refueling Locations	β_5	Time to Station	Mins.	-0.00316	-1.14
Range	β_6	Vehicle Range	Log (miles)	0.687	13.59
Models	β_7	Available Makes/Models	--	0.0000645	0.1
Maintenance	β_8	Annual Maintenance Cost	$ per year	-0.000792	-5.73
Fuel Cost	β_9	Fuel Cost	Cents per mile	-0.019	-8.17
MPGe	β_{10}	Miles per Gallon Equivalent	MPGe	0.00963	6.07
Acceleration	β_{11}	Acceleration to 60 mph	Seconds	-0.0435	-7.05
Refueling Time	β_{12}	Refueling Time	Minutes	-0.000486	-3.22
Cargo	β_{13}	Trunk/Cargo Space	Cubic feet	0.00161	0.72
Vehicle Price	β_{14}	Vehicle Price	Log ($)	-0.932	-15.51
Fuel Type/Vehicle Interaction	$\beta_{15,1}$	Alt Fuel, Small Vehicles, Fixed	0,1	0	--
	$\beta_{15,2}$	Alt Fuel, Midsize Vehicles	0,1	-0.115	-1.1
	$\beta_{15,3}$	Alt Fuel, Large Vehicles	0,1	-0.22	-2.05
Vehicles in Fleet	$\beta_{16,1}$	Number of cars in fleet	Vehicles	0.0486	3.54

Type	Coef.	Description	Units	Value	T-Value
	$\beta_{16,2}$	Number of SUVs in fleet	Vehicles	0.0609	4.35
	$\beta_{16,3}$	Number of trucks in fleet	Vehicles	0.0155	3.15
	$\beta_{16,4}$	Number of vans in fleet	Vehicles	0.0546	3.82
Alternative-Specific Constants	α_3	Option A Constant	0,1	0.664	17.63
	α_4	Option B Constant	0,1	-0.0221	-0.58
	α_5	Option C Constant	0,1	-0.0248	-0.68

Fit Statistics	Value
Number of Estimated Parameters	47
Number of Observations	13696
Number of Individuals	1712
Null Log-Likelihood	-18986.688
Final Log-Likelihood	-12586.559
Rho-Square	0.337
Adjusted Rho-Square	0.335

Table M-26: Commercial Vehicle Choice Model with Industry Interactions and Number of Vehicles in Fleet

Type	Coef.	Description	Units	Value	T-Value
Vehicle Type	α_1	Vehicle Type Inertia	0,1	0.933	27.08
	$\beta_{1,1}$	Subcompact, Fixed	0,1	0	--
	$\beta_{1,2}$	Compact	0,1	0.0523	0.58
	$\beta_{1,3}$	Midsize	0,1	0.319	3.43
	$\beta_{1,4}$	Large	0,1	0.742	5.36
	$\beta_{1,5}$	Sports	0,1	0.684	5.44
	$\beta_{1,6}$	Crossover, Small	0,1	0.696	6.51
	$\beta_{1,7}$	Crossover, Midsize	0,1	0.988	6.86
	$\beta_{1,8}$	SUV, Small/Midsize	0,1	1.17	6.21
	$\beta_{1,9}$	SUV, Large	0,1	1.27	6.54
	$\beta_{1,10}$	Pickup Truck, Std.	0,1	1.55	9.25
	$\beta_{1,11}$	Pickup Truck, Full-Size	0,1	2.16	13.07
	$\beta_{1,12}$	Van, Small	0,1	0.959	6.36
	$\beta_{1,13}$	Van, Full-Size	0,1	1.77	6.11
Industry Group / Vehicle Group Interaction	$\beta_{2,1}$	Group 2–Other	0,1	0	--
	$\beta_{2,2}$	Group 2–SUV	0,1	-0.291	-1.75
	$\beta_{2,3}$	Group 2–Truck	0,1	-0.753	-5
	$\beta_{2,4}$	Group 2–Van	0,1	-0.262	-1.32
	$\beta_{2,5}$	Group 3–Other	0,1	0	--
	$\beta_{2,6}$	Group 3–SUV	0,1	-0.181	-1.29
	$\beta_{2,7}$	Group 3–Truck	0,1	-0.953	-7.93

Type	Coef.	Description	Units	Value	T-Value
	$\beta_{2,8}$	Group 3–Van	0,1	-0.894	-5.35
Fuel Type	α_2	Fuel Type Inertia	0,1	0.583	15.64
	$\beta_{3,1}$	Gasoline, Fixed	0,1	0	--
	$\beta_{3,2}$	HEV	0,1	-0.01	-0.08
	$\beta_{3,3}$	PHEV	0,1	0.0541	0.36
	$\beta_{3,4}$	E85	0,1	0.095	0.71
	$\beta_{3,5}$	Diesel	0,1	-0.101	-0.74
	$\beta_{3,6}$	Diesel Hybrid	0,1	-0.151	-0.9
	$\beta_{3,7}$	CNG	0,1	-0.00723	-0.05
	$\beta_{3,8}$	CNG Hybrid	0,1	0.312	1.72
	$\beta_{3,9}$	BEV	0,1	0.472	2.48
	$\beta_{3,10}$	Hydrogen	0,1	0.0757	0.37
Industry Group / Fuel Type Interaction	$\beta_{4,1}$	Group 1–Alt Fuel	0,1	0	--
	$\beta_{4,2}$	Group 2–Alt Fuel	0,1	0.0687	0.74
	$\beta_{4,3}$	Group 3–Alt Fuel	0,1	0.133	1.73
Vehicle Age	$\beta_{5,1}$	New	0,1	0	--
	$\beta_{5,2}$	1–2 Years	0,1	-0.308	-7.57
	$\beta_{5,3}$	3+ Years	0,1	-0.457	-7.77
Purchase Incentive	$\beta_{6,1}$	No Incentive, Fixed	0,1	0	--
	$\beta_{6,2}$	HOV Lane Access	0,1	0.252	3.14
	$\beta_{6,3}$	Cash Rebate	$	0.0000336	1.81
	$\beta_{6,4}$	Tax Credit	$	0.0000484	4.36
Refueling Locations	β_7	Time to Station	Mins.	-0.00324	-1.17
Range	β_8	Vehicle Range	Log (miles)	0.692	13.68
Models	β_9	Available Makes/Models	--	0.00011	0.17
Maintenance	β_{10}	Annual Maintenance Cost	$ per year	-0.000802	-5.79
Fuel Cost	β_{11}	Fuel Cost	Cents per mile	-0.0191	-8.19
MPGe	β_{12}	Miles per Gallon Equivalent	MPGe	0.00958	6.04
Acceleration	β_{13}	Acceleration to 60 mph	Seconds	-0.0433	-7.02
Refueling Time	β_{14}	Refueling Time	Minutes	-0.000492	-3.25
Cargo	β_{15}	Trunk/Cargo Space	Cubic feet	0.0016	0.71
Vehicle Price	β_{16}	Vehicle Price	Log ($)	-0.933	-15.44
Fuel Type/Vehicle Interaction	$\beta_{17,1}$	Alt Fuel, Small Vehicles, Fixed	0,1	0	--
	$\beta_{17,2}$	Alt Fuel, Midsize Vehicles	0,1	-0.114	-1.09
	$\beta_{17,3}$	Alt Fuel, Large Vehicles	0,1	-0.187	-1.73
Vehicles in Fleet	$\beta_{18,1}$	Number of cars in fleet	Vehicles	0.0449	3.35
	$\beta_{18,2}$	Number of SUVs in fleet	Vehicles	0.0571	4.17
	$\beta_{18,3}$	Number of trucks in fleet	Vehicles	0.0141	2.8
	$\beta_{18,4}$	Number of vans in fleet	Vehicles	0.0499	3.58

Type	Coef.	Description	Units	Value	T-Value
Alternative-Specific Constants	α_3	Option A Constant	0,1	0.663	17.58
	α_4	Option B Constant	0,1	-0.0207	-0.54
	α_5	Option C Constant	0,1	-0.0233	-0.64

Fit Statistics	Value
Number of Estimated Parameters	55
Number of Observations	13696
Number of Individuals	1712
Null Log-Likelihood	-18986.688
Final Log-Likelihood	-12537.888
Rho-Square	0.34
Adjusted Rho-Square	0.337