Internet Survey Results on the Effects of Fuel Economy Labels on Understanding and Selection

EPA United States Environmental Protection Agency

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Transportation and Climate Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

Prepared for EPA by
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United States Environmental Protection Agency

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Internet Survey Results on the Effects of Fuel Economy Labels on Understanding and Selection

Summary

This report presents the results of a survey conducted on three fuel economy label designs proposed by the U.S. Environmental Protection Agency and the National Highway Traffic Safety Administration.[1] Each respondent saw only one label design and was asked to compare conventional and advanced technology vehicles based on the information in the presented labels.

The "understanding" questions asked respondents to identify the "better" vehicle for specified trips. Overall, the differences between the three label designs with respect to understandability are small.

The "selection" questions asked respondents to identify which vehicle s/he preferred to buy, if vehicles were identical except for the information on the labels. Overall, the vehicle selection differences between the three label designs are small.

Methodology

Survey question development and pretesting

The survey questions were developed by PRR, Inc. and the EPA, with input from NHTSA (National Highway Traffic Safety Administration) and OMB (Office of Management and Budget).[2] The survey questions were pretested in seven cognitive interviews.

A total of six different versions of the survey were used. These six versions differed only in regard to:

- Which of the three label designs was presented in the survey
- The order in which the labels were presented in the survey questions (to control for stimulus order effects)

Sampling and survey implementation

Two sources of new vehicle buyers were used:

- those who requested a price quote from a dealer (Autobytel, http://www.autobytel.com) and who indicated that they had purchased a new vehicle (120,000 contacted; response rate < 1%))

[1] Environmental Protection Agency and Department of Transportation, "Revisions and Additions to Motor Vehicle Fuel Economy Labe; Proposed Rule," Federal Register 75(184) (September 23, 2010): 58078-58202.

[2] Drafts of the survey were reviewed by Dr. Clay Voorhees of Michigan State University and Dr. Randall Pozdena of ECONorthwest, former vice president of the Federal Reserve Bank of San Francisco.

- the *e-Rewards*™ panel[3] of new vehicle buyers (12,025 contacted; response rate about 25%)

The survey was conducted September 8-22, 2010.

Data Management and Analysis

The data from all versions of the survey were merged into one database for analysis purposes. Those who indicated that they had not purchased a vehicle were dropped from the final database. In addition, the time that it took respondents to complete the survey was calculated. Any respondent who completed the survey in less than five minutes was considered to have "blown through" the survey (i.e., could not have read/considered the questions carefully enough to provide valid information) and was dropped. Finally, response range and logic checks were performed in order to identify any miscoded variables. The final data set for this analysis (n = 3,169) consists of respondents overwhelmingly from the e-Rewards panel, but it includes some respondents from Autobytel.[4] PRR, Inc., conducted the data analysis, with assistance from ECONorthwest.

A comparison of respondent demographics across the six versions of the survey indicated no statistically significant differences, except that age for those who viewed the Label 3 design was slightly older than those who viewed the other two label designs. Respondents came from all fifty states and the District of Columbia.

The key questions on the survey examined people's "understanding" of the labels and the variation in "selection" between vehicles when people saw different label designs. For both these kinds of questions, respondents were shown labels of the same design but for different hypothetical vehicles (different technology, fuel economy, costs, etc.). In the "understanding" questions, respondents were asked which vehicle was "better" for a specified distance. The "selection" questions asked which vehicle the respondent would prefer to buy if all vehicle characteristics other than those on the label were the same. This memo provides the results of these questions.

[3] The e-Rewards panel (part of *ResearchNow*™ http://www.researchnow.com/) is among the most highly rated of such online survey panels, and has a global automotive panel of over 1.5 million panelists. Respondents are paid a small fee ($1.25) for completing surveys. A number of government projects have used e-Rewards panelists, including but not limited to surveys conducted for the United States Department of Homeland Security and the United States Department of Defense.

[4] The responses include 191 people who self-identified as intending to buy a new vehicle, rather than having bought a new vehicle. These people came from the Autobytel database, as there were no "intenders" in the e-Rewards panel. Because intenders were found to be demographically different from buyers (e.g., more male, older, less wealthy), the intenders were excluded from the analyses presented here. Including intenders might affect the results, without sufficient numbers of them to identify what effects are associated with intenders vs. buyers, or to separate the demographic effects from differences in preference between intenders and buyers. The results presented here thus reflect the preferences only of buyers. Due to omission of an identifier in the e-Rewards panel responses, the buyers from the Autobytel panel cannot be distinguished from the e-Rewards panelists. They are likely to be a small enough number that they will not significantly affect the results.

The labels presented in the survey are based on hypothetical vehicles and are not intended to reflect the performance of any specific vehicles. The results of these surveys are not intended to be representative of any larger group of new vehicle buyers and reflect only the experiences of those who completed the survey.

Topline 'Understanding' Question Results

Respondents' *understanding* of the labels was tested by showing them a series of label pairs for hypothetical vehicles (see Appendix 1, Understanding Questions (UQ) 1-6). In each pair, respondents were asked to identify which vehicle was better to use for trips of specified distances. "Better" was chosen as the comparison word, rather than "more fuel-efficient" or "less costly," to allow respondents to decide on their own what information on the label they would use. Answers may therefore reflect individuals' idiosyncratic attitudes and assumptions; as a result, "incorrect" answers may result for reasons other than the information on the labels. Because those idiosyncrasies are expected to be distributed randomly across the label designs, differences in responses across label designs are expected to be due to the label designs. EPA has chosen to define the objectively "better" answers to these questions based on fuel cost, fuel economy, GHG emissions, and vehicle range and will identify this as the "correct" answer for purposes of the discussion below. Responses of "Both are equally good" are included in the "incorrect" answers.

Below we have presented the results from each label pair, preceded by a brief description of some of the key metrics shown on each label. Two questions were asked for each label pair: which was "better" for a short distance (20-30 miles), and which was "better" for a long distance (120 miles).

The results indicate large differences in the proportion of "correct" answers from question to question, as either the driving distance or the vehicle technologies changed. Limited understanding of advanced technology vehicles may contribute to incorrect responses to these questions. The differences in "correct" answers across label designs in response to any individual question are much smaller than the differences from question to question.

Pair #1
Key Metrics:

- **Vehicle A: Gasoline, 30 mpg, $1400 annual fuel cost**
- **Vehicle B: Electric, range 100 miles, 98 mpge, $616 annual fuel cost**

Understanding Q. 1: Which vehicle is better for a round-trip of 30 miles?

Q: Which vehicle is better for a round-trip of 30 miles? * Label Type Crosstabulation

			Label Type			
			Label 1	Label 2	Label 3	Total
Which vehicle is better for a round-trip of 30 miles?	Vehicle A	Count	177	89	96	362
		% within Label Type	20.0%	11.6%	9.1%	13.4%
	Vehicle B	Count	622	602	873	2097
		% within Label Type	70.1%	78.4%	83.1%	77.5%
	Both are equally good	Count	88	77	81	246
		% within Label Type	9.9%	10.0%	7.7%	9.1%
Total		Count	887	768	1050	2705
		% within Label Type	100.0%	100.0%	100.0%	100.0%

The "correct" answer is B, due to the higher efficiency and lower operating costs of the electric vehicle.

In this comparison, regardless of label design, respondents gave a high proportion of "correct " answers. Average "correct" response was 77.5%, with the proportion of "correct" responses across label designs varying from 70% to 83%.[5]

Understanding Q. 2: Which vehicle is better for a round-trip of 120 miles?

Q: Which vehicle is better for a round-trip of 120 miles? * Label Type Crosstabulation

			Label Type			Total
			Label 1	Label 2	Label 3	
Which vehicle is better for a round-trip of 120 miles?	Vehicle A	Count	468	402	512	1382
		% within Label Type	51.5%	52.4%	48.2%	50.5%
	Vehicle B	Count	378	308	483	1169
		% within Label Type	41.6%	40.2%	45.5%	42.7%
	Both are equally good	Count	62	57	67	186
		% within Label Type	6.8%	7.4%	6.3%	6.8%
Total		Count	908	767	1062	2737
		% within Label Type	100.0%	100.0%	100.0%	100.0%

The "correct " answer is A, because the range for the electric vehicle is less than the trip distance.

In this comparison, all three labels produced a large proportion of "incorrect " answers compared to the answers for the 30-mile range. Average "correct" response is 50.5%, with the proportion of "correct" responses across label designs varying from 48% to 52%.[6]

Pair #2
Key Metrics:

- **Vehicle A: Extended-range electric (EREV):**
  - **All-electric: range 30 miles, 90 mpge, $672 annual fuel cost**
  - **Extended range: 32 mpg, $1,313 annual fuel cost**
- **Vehicle B: Plug-in hybrid electric (PHEV):**
  - **Blended: range 30 miles, 65 mpge, $734 annual fuel cost**
  - **Extended range: 54 mpg, $778 annual fuel cost**

Understanding Q. 3: Which vehicle is better for a round-trip of 20 miles?

[5] Statistically significant: Cramer's V = .132, p = .000
[6] Statistically not significant: Cramer's V = .037, p = .154

Q: Which vehicle is better for a round-trip of 20 miles? * Label Type Crosstabulation

			Label Type			
			Label 1	Label 2	Label 3	Total
Which vehicle is better for a round-trip of 20 miles?	Vehicle A	Count	354	395	488	1237
		% within Label Type	38.9%	52.1%	46.3%	45.5%
	Vehicle B	Count	322	202	290	814
		% within Label Type	35.4%	26.6%	27.5%	29.9%
	Both are equally good	Count	233	161	275	669
		% within Label Type	25.6%	21.2%	26.1%	24.6%
Total		Count	909	758	1053	2720
		% within Label Type	100.0%	100.0%	100.0%	100.0%

The agencies identified the "correct" answer as A since both vehicles will operate in the mode using electricity, and the EREV is more fuel-efficient and less costly to operate in that range.

In this comparison, all three labels produced a large proportion of "incorrect" answers. Average "correct" response is 45.5%, with the proportion of "correct" responses across label designs varying from 39% to 52%.[7]

Understanding Q. 4: Which vehicle is better for a round-trip of 120 miles?

Q: Which vehicle is better for a round-trip of 120 miles? * Label Type Crosstabulation

			Label Type			
			Label 1	Label 2	Label 3	Total
Which vehicle is better for a round-trip of 120 miles?	Vehicle A	Count	223	176	314	713
		% within Label Type	25.0%	23.2%	30.0%	26.4%
	Vehicle B	Count	470	457	570	1497
		% within Label Type	52.6%	60.3%	54.4%	55.5%
	Both are equally good	Count	200	125	164	489
		% within Label Type	22.4%	16.5%	15.6%	18.1%
Total		Count	893	758	1048	2699
		% within Label Type	100.0%	100.0%	100.0%	100.0%

The "correct" answer is B, based on a weighted average of fuel costs for the two modes that would be used over the distance. The PHEV's gasoline mode is sufficiently more efficient than that for the EREV to outweigh the higher efficiency of the EREV for the mode using electricity.

In this comparison, all three labels produced a majority of "correct" answers. Average "correct" response is 55.5%, with the proportion of "correct" responses across label designs varying from 53% to 60%.[8]

Pair #3
Key Metrics

- **Vehicle A: Extended-range electric (EREV):**

[7] Statistically significant: Cramer's V = .104, p = .000
[8] Statistically significant: Cramer's V = .062, p = .005

- **All-electric: range 40 miles, 90 mpge, $672 annual fuel cost**
- **Extended range: 54 mpg, $778 annual fuel cost**

- **Vehicle B: Electric, range 90 miles, 119 mpge, $508 annual fuel cost**

Understanding Q. 5: Which vehicle is better for a round-trip of 30 miles?

Q: Which vehicle is better for a round-trip of 30 miles? * Label Type Crosstabulation

			Label Type			
			Label 1	Label 2	Label 3	Total
Which vehicle is better for a round-trip of 30 miles?	Vehicle A	Count	190	125	206	521
		% within Label Type	20.9%	16.4%	19.8%	19.2%
	Vehicle B	Count	521	497	623	1641
		% within Label Type	57.4%	65.3%	59.8%	60.6%
	Both are equally good	Count	196	139	213	548
		% within Label Type	21.6%	18.3%	20.4%	20.2%
Total		Count	907	761	1042	2710
		% within Label Type	100.0%	100.0%	100.0%	100.0%

The "correct " answer is B, due to the greater efficiency and lower operating cost for the electric vehicle.

In this comparison, all three labels produced a solid majority of "correct " answers. Average "correct" response is 61%, with the proportion of "correct" responses across label designs varying from 57% to 65%.[9]

Understanding Q. 6: Which vehicle is better for a round-trip of 120 miles?

Q: Which vehicle is better for a round-trip of 120 miles? * Label Type Crosstabulation

			Label Type			
			Label 1	Label 2	Label 3	Total
Which vehicle is better for a round-trip of 120 miles?	Vehicle A	Count	429	411	469	1309
		% within Label Type	48.2%	54.2%	45.1%	48.7%
	Vehicle B	Count	329	272	477	1078
		% within Label Type	37.0%	35.9%	45.9%	40.1%
	Both are equally good	Count	132	75	94	301
		% within Label Type	14.8%	9.9%	9.0%	11.2%
Total		Count	890	758	1040	2688
		% within Label Type	100.0%	100.0%	100.0%	100.0%

The "correct " answer is A, because the range for the electric vehicle is shorter than the trip length.

In this comparison, all three labels produced a large proportion of "incorrect " answers. Average "correct" response is 49%, with the proportion of "correct" responses across label designs varying from 45% to 54%.[10]

[9] Statistically significant: Cramer's V = .064, p = .004
[10] Statistically significant: Cramer's V = .074, p = .001

What parts of the label did respondents use?

Respondents were then asked what parts of the label they had used in making their choices. Based on the table below, the following three metrics were used most often:

- Fuel economy (especially on labels 3 and 2)
- Vehicle range (especially on labels 2 and 3)
- Gasoline and/or electricity consumption (similarly on all labels)

Q: What label information did you use in deciding which vehicle you would purchase in the previous questions? (Multiple responses allowed; Percents add up to more than 100%)

	Label Type 1		Label Type 2		Label Type 3	
	Count	%	Count	%	Count	%
Gasoline and/or electricity consumption	416	38.6%	338	38.7%	481	42.7%
Gasoline and/or electricity cost	220	20.4%	291	33.3%	307	27.2%
Environmental impact	88	8.2%	86	9.8%	144	12.8%
Vehicle range	464	43.0%	490	56.1%	651	57.8%
Rating information	172	16.0%	144	16.5%	176	15.6%
Fuel economy	553	53.1%	551	63.0%	769	68.2%

Regression results (presented in Appendix 2) provide these additional observations.

Explanatory variables that tended to *increase* the likelihood of identifying the "correct" answer include:

Fewer than 5 licensed drivers in the household
Being male
Not being the fastest adopter of new technology
More education
Having 5 or more household vehicles

These results, with the exception of "Male," are inconsistent across the regression results: that is, they are not statistically significantly different from zero for all the questions.

The classes of vehicles people considered buying appear to have some explanatory power as well. For instance, people who considered purchasing compact cars appear to have a higher likelihood of answering "correctly." These vehicle class variables may be serving as proxies for some personal characteristics not picked up in the other demographic variables.

Topline 'Selection' Question Results

To test whether the labels produced variation in people's *selections* of vehicle purchases, respondents saw pairs of labels for hypothetical vehicles (see Appendix 1, Selection Questions (SQ) 1-4). They were asked:

> Assuming the same make and model of vehicle for both labels above and assuming that both vehicles met all your other requirements (including size, reliability, comfort, performance, appearance, and safety) and are identical in purchase price, which vehicle would you purchase when you consider your typical travel pattern?

Because driving patterns of respondents were distributed randomly across the label designs, differences in responses across label designs are expected to be due to the label designs. In these questions there is no correct answer. Respondents identify their preferred vehicles based on their own decision factors.

In all four comparisons, the majority of respondents selected the vehicle with projected higher fuel cost savings or lower fuel costs. Those who saw either Label 1 or (in 2 of the 4 regressions) Label 3 chose the vehicle with lower projected fuel costs and higher fuel savings more often than those who saw Label 2.

Regression results in Appendix 2 show that, in 3 of the 4 comparisons, respondents who drove fewer miles per day had a greater tendency to select the vehicle with a lower-cost short range. This result suggests that people did think about daily driving patterns when making their choices.

Below we have presented the results from each label pair, preceded by a brief description of some of the key metrics shown on each label.

Pair #1

- **Vehicle A: Gasoline, 46 mpg, $913 annual fuel cost**
- **Vehicle B: Extended-range electric:**
  - **All-electric: range 20 miles, 98 mpge, $618 annual fuel cost**
  - **Extended range: 28 mpg, $1,500 annual fuel cost**

Selection Q. 1:

Q: Assuming the same make and model of vehicle for both labels above and assuming that both vehicles met all your other requirements (including size, reliability, comfort, performance, appearance, and safety) and are identical in purchase price, which vehicle would you purchase when you consider your typical travel pattern? * Label Type Crosstabulation

			Label Type			
			Label 1	Label 2	Label 3	Total
Which vehicle would you purchase when you consider your typical travel pattern?	Vehicle A	Count	631	434	637	1702
		% within Label Type	69.8%	57.9%	61.8%	63.4%
	Vehicle B	Count	157	224	258	639
		% within Label Type	17.4%	29.9%	25.0%	23.8%
	Equally likely to purchase either vehicle	Count	116	91	135	342
		% within Label Type	12.8%	12.1%	13.1%	12.7%
Total		Count	904	749	1030	2683
		% within Label Type	100.0%	100.0%	100.0%	100.0%

In this comparison, regardless of label design, most respondents chose the conventional gasoline engine vehicle. Average proportion choosing the gasoline vehicle is 63%, with the proportion choosing the gasoline vehicle across label designs varying from 58% to 70%.[11]

Regression results for this comparison (see Appendix 2) suggest the following factors tend to increase the likelihood of choosing the gasoline vehicle:

A larger share of highway driving

Being slow to adopt new technologies

Pair #2

- **Vehicle A: Gasoline, 28 mpg, $1,500 annual fuel cost**
- **Vehicle B: Electric, range 85 miles, 123 mpge, $490 annual fuel cost**

Selection Q. 2:

Q Assuming the same make and model of vehicle for both labels above and assuming that both vehicles met all your other requirements (including size, reliability, comfort, performance, appearance, and safety) and are identical in purchase price, which vehicle would you purchase when you consider your typical travel pattern? * Label Type Crosstabulation

			Label Type			
			Label 1	Label 2	Label 3	Total
Which vehicle would you purchase when you consider your typical travel pattern?	Vehicle A	Count	229	234	267	730
		% within Label Type	25.3%	31.4%	25.9%	27.2%
	Vehicle B	Count	612	446	690	1748
		% within Label Type	67.7%	59.8%	67.0%	65.2%
	Equally likely to purchase either vehicle	Count	63	66	73	202
		% within Label Type	7.0%	8.8%	7.1%	7.5%
Total		Count	904	746	1030	2680
		% within Label Type	100.0%	100.0%	100.0%	100.0%

In this comparison, regardless of label design, most respondents chose the electric vehicle. Average proportion choosing the electric vehicle is 65%, with the proportion choosing the electric vehicle across label designs varying from 60% to 68%.[12]

Regression results for this comparison (see Appendix 2) suggest the following factors tend to increase the likelihood of choosing the electric vehicle:

Being under age 65

Driving less than 70 miles on a daily basis

Ranking the fuel economy label very highly in the decision process

Pair #3

- **Vehicle A: Extended-range electric (EREV):**
  - **All-electric: range 32 miles, 89 mpge, $679 annual fuel cost**
  - **Extended range: 31 mpg, $1,355 annual fuel cost**
- **Vehicle B: Electric, range 80 miles, 121 mpge, $501 annual fuel cost**

[11] Statistically significant: Cramer's V = .084, p = .000

[12] Statistically significant: Cramer's V = .050, p = .009

Selection Q. 3:

Q: Assuming the same make and model of vehicle for both labels above and assuming that both vehicles met all your other requirements (including size, reliability, comfort, performance, appearance, and safety) and are identical in purchase price, which vehicle would you purchase when you consider your typical travel pattern? * Label Type Crosstabulation

			Label Type			Total
			Label 1	Label 2	Label 3	
Which vehicle would you purchase when you consider your typical travel pattern?	Vehicle A	Count	353	334	359	1046
		% within Label Type	39.0%	45.0%	35.0%	39.1%
	Vehicle B	Count	475	324	548	1347
		% within Label Type	52.5%	43.7%	53.4%	50.4%
	Equally likely to purchase either vehicle	Count	77	84	120	281
		% within Label Type	8.5%	11.3%	11.7%	10.5%
Total		Count	905	742	1027	2674
		% within Label Type	100.0%	100.0%	100.0%	100.0%

In this comparison, there is more of an even split between the two vehicle types, with half overall choosing the Electric Vehicle (50%) and another 11% indicating that they would be equally likely to purchase either vehicle. Average proportion choosing the electric vehicle is 50%, with the proportion choosing the electric vehicle across label designs varying from 44% to 53%.[13]

Regression results for this comparison (see Appendix 2) suggest the following factors tend to increase the likelihood of choosing the electric vehicle:

Having 1 vehicle in their household

Driving less than 70 miles on a typical day

Pair #4

- **Vehicle A: Extended-range electric:**
  - **All-electric: range 30 miles, 90 mpge, $672 annual fuel cost**
  - **Extended range: 32 mpg, $1,313 annual fuel cost**
- **Vehicle B: Plug-in hybrid electric:**
  - **Blended: range 30 miles, 65 mpge, $734 annual fuel cost**
  - **Extended range: 54 mpg, $778 annual fuel cost**

Selection Q. 4:

Q: Assuming the same make and model of vehicle for both labels above and assuming that both vehicles met all your ther requirements (including size, reliability, comfort, performance, appearance, and safety) and are identical in purchase price, which vehicle would you purchase when you consider your typical travel pattern? * Label Type Crosstabulation

			Label Type			Total
			Label 1	Label 2	Label 3	
Which vehicle would you purchase when you consider your typical travel pattern?	Vehicle A	Count	210	164	262	636
		% within Label Type	23.3%	22.0%	25.4%	23.7%
	Vehicle B	Count	532	450	593	1575
		% within Label Type	59.0%	60.5%	57.5%	58.8%
	Equally likely to purchase either vehicle	Count	160	130	177	467
		% within Label Type	17.7%	17.5%	17.2%	17.4%
Total		Count	902	744	1032	2678
		% within Label Type	100.0%	100.0%	100.0%	100.0%

[13] Statistically significant: Cramer's V = .069, p = .000

In this comparison, regardless of label design, most respondents chose the Plug-in Hybrid Electric Vehicle (PHEV). Average proportion choosing the PHEV is 59%, with the proportion choosing the PHEV across label designs varying from 58% to 61%.[14]

Regression results for this comparison (see Appendix 2) suggest the following factor tends to increase the likelihood of choosing the PHEV:

Higher proportion of highway miles

What parts of the label did respondents use?

Respondents were then asked what parts of the label they had used in making their purchase selections. Based on the table below, the following four metrics were used most often:

- Fuel economy (especially on labels 3 and 2)
- Vehicle range (especially on labels 2 and 3)
- Gasoline and/or electricity cost (especially for label 3 and 2)
- Gasoline and/or electricity consumption (especially for label 3)

Q: What label information did you use in deciding which vehicle you would purchase in the previous questions? (Multiple responses allowed; Percents add up to more than 100%)

	Label Type 1		Label Type 2		Label Type 3	
	Count	%	Count	%	Count	%
Gasoline and/or electricity consumption	418	38.8%	359	41.1%	539	47.8%
Gasoline and/or electricity cost	362	33.6%	411	47.0%	552	49.0%
Environmental impact	113	10.5%	131	15.0%	238	21.1%
Vehicle range	439	40.7%	460	52.6%	594	52.7%
Rating information	210	19.5%	202	23.1%	278	24.7%
Fuel economy	571	53.0%	563	64.4%	742	65.8%

[14] Statistically not significant: Cramer's V = .023, p = .569

Appendix 1 -

Labels Used in the Surveys -

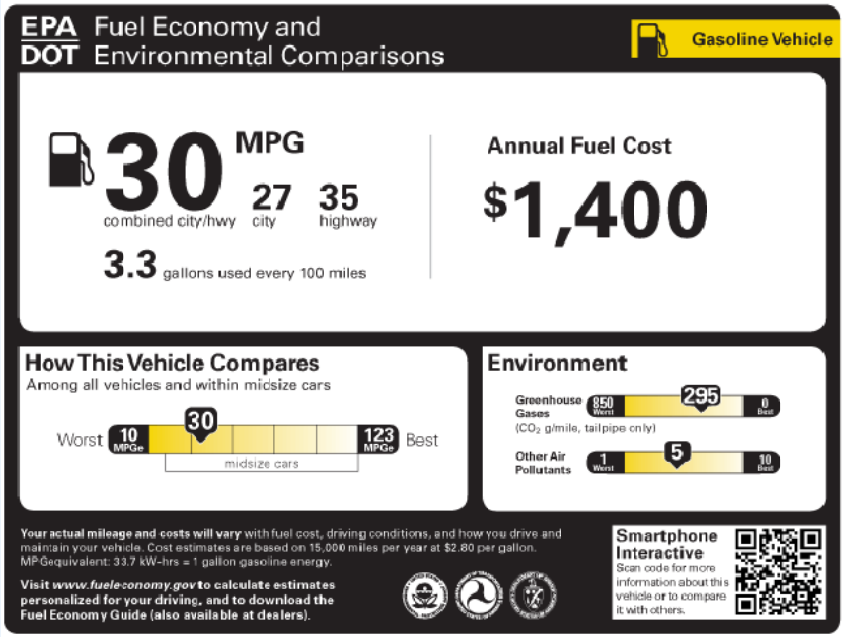
UQ1 & UQ2: -

Label Type 1 -

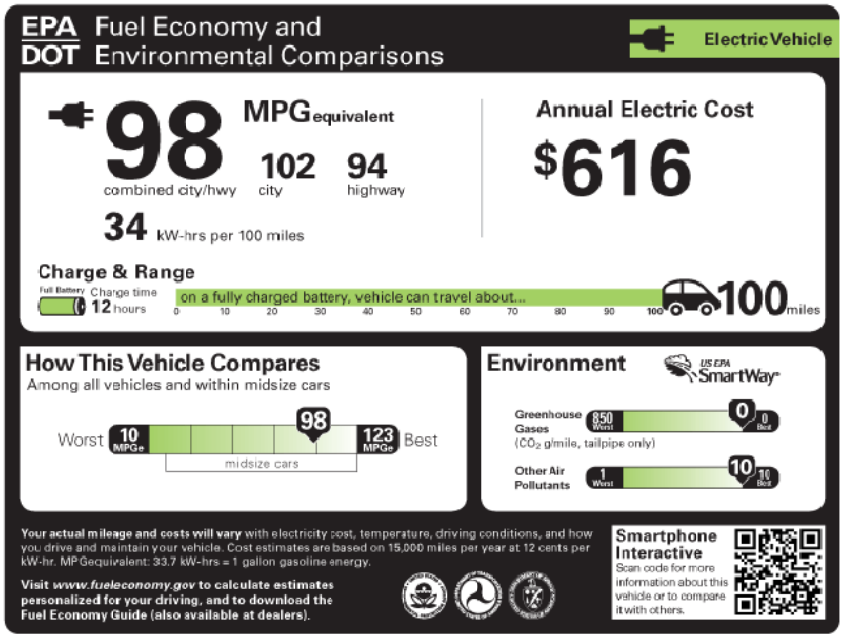
Vehicle A:

Vehicle B:

Vehicle A:



Vehicle B:



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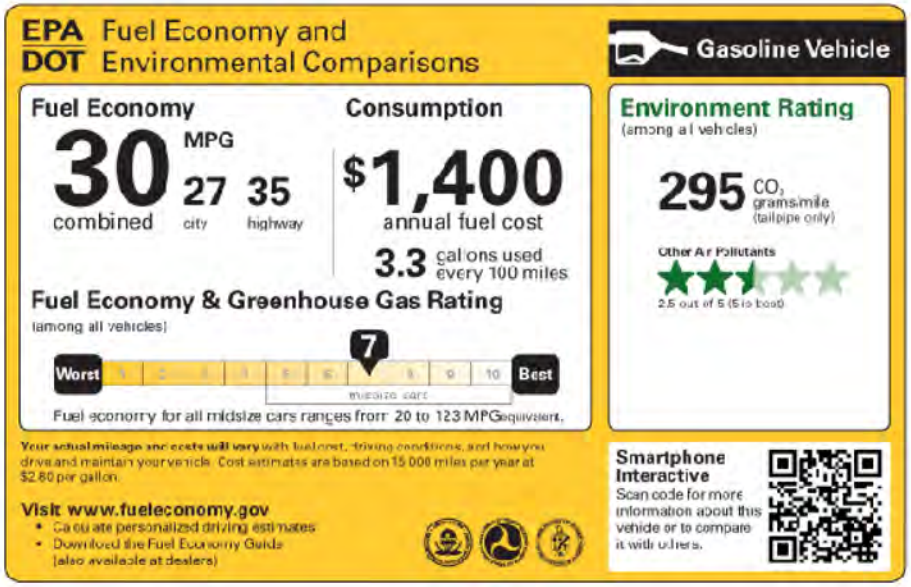

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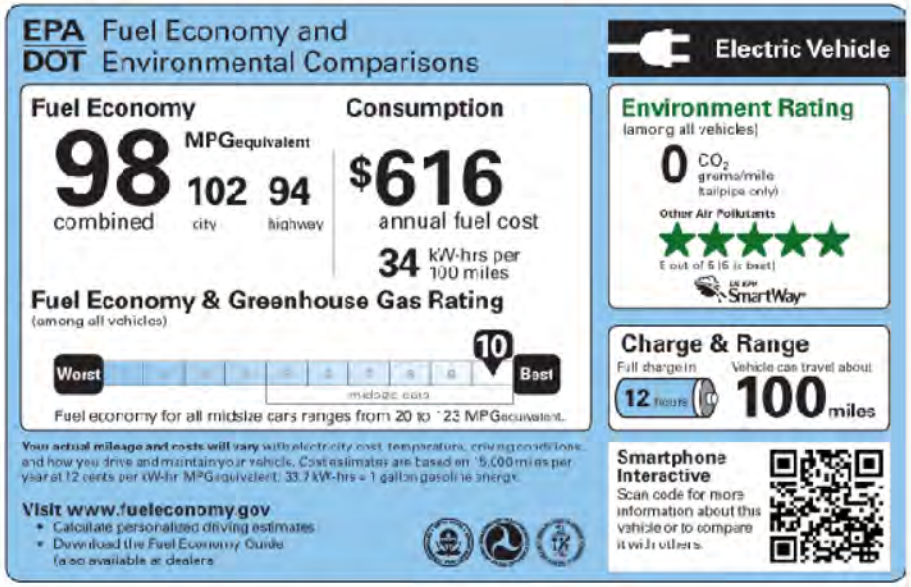


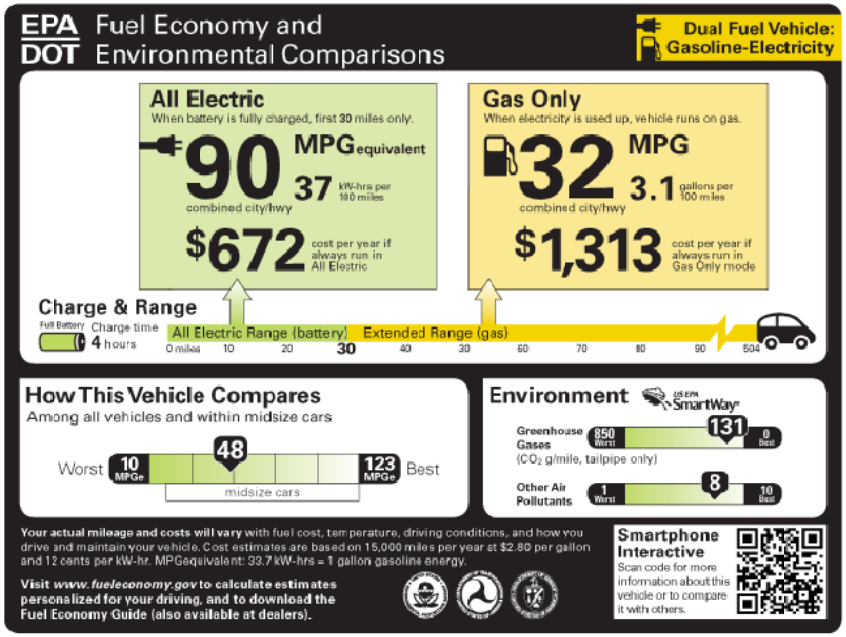
UQ3 & UQ4: -

Label Type 1 -

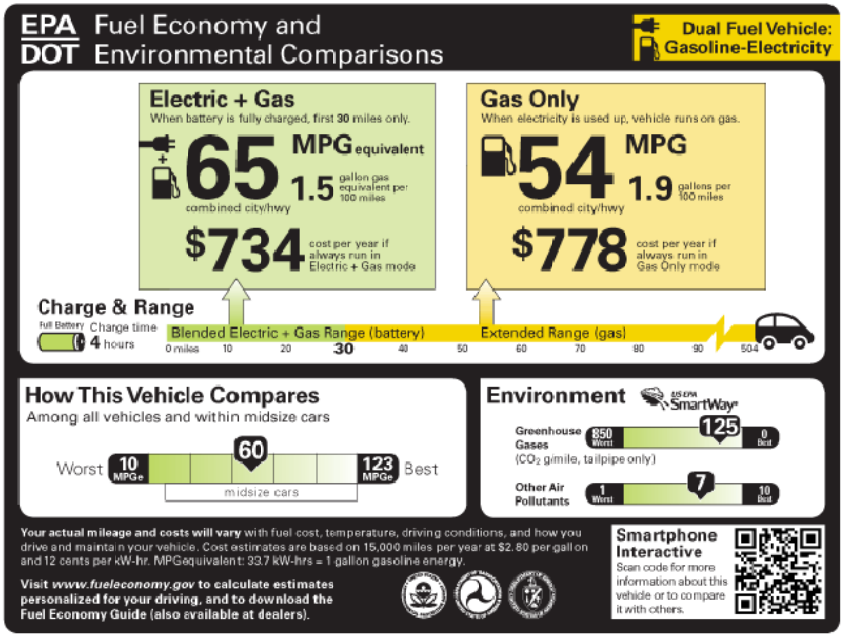
Vehicle A:

Vehicle B:

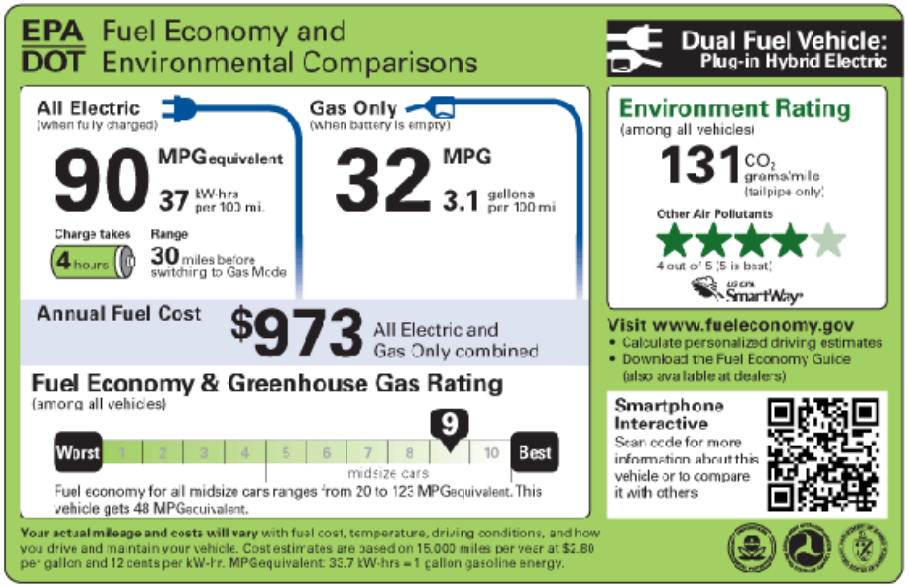
Vehicle A:



Vehicle B:



Vehicle A:



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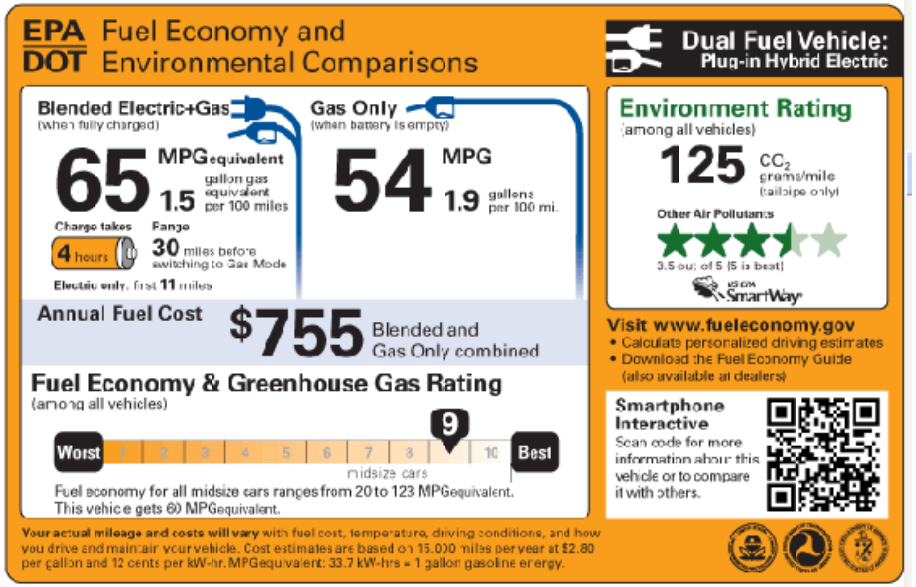


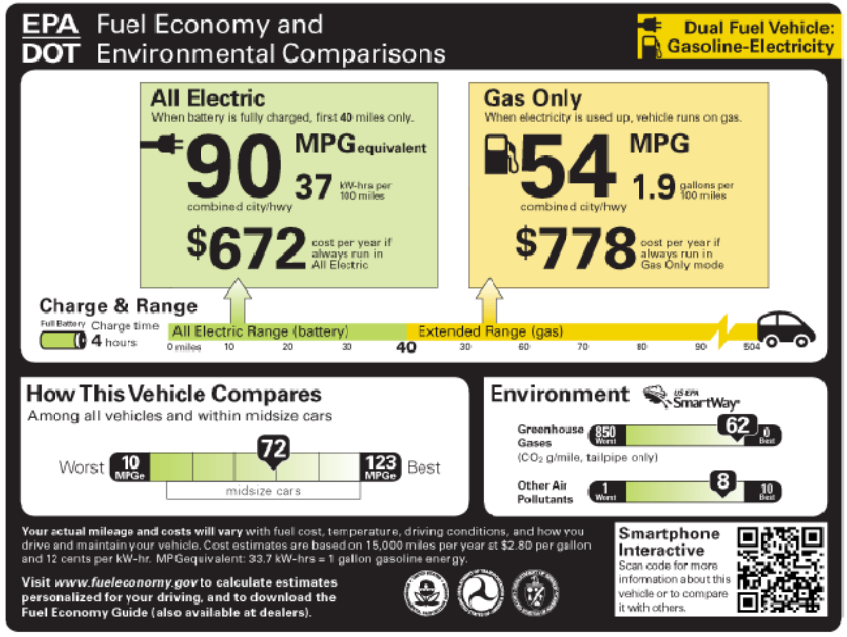
UQ5 & UQ6: -

Label Type 1 -

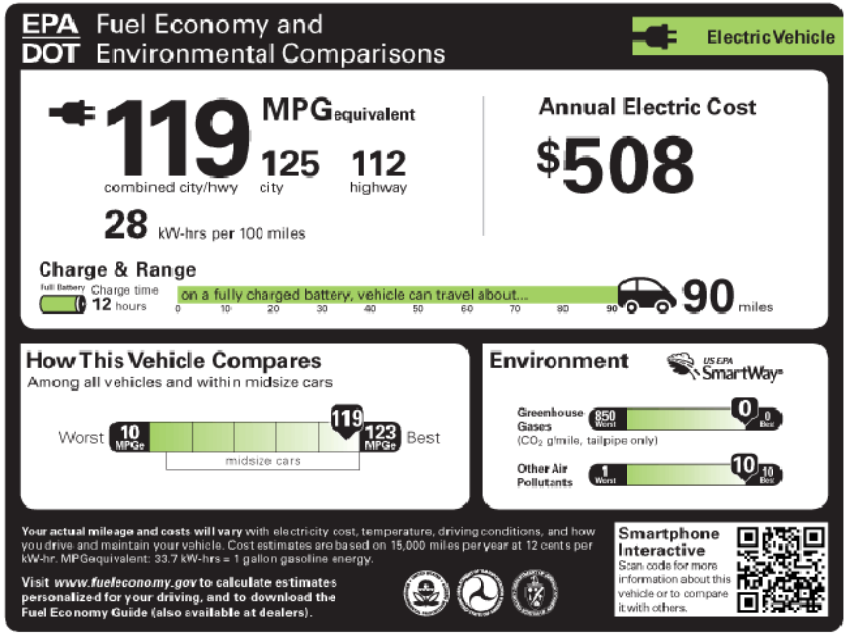
Vehicle A:

Vehicle B:

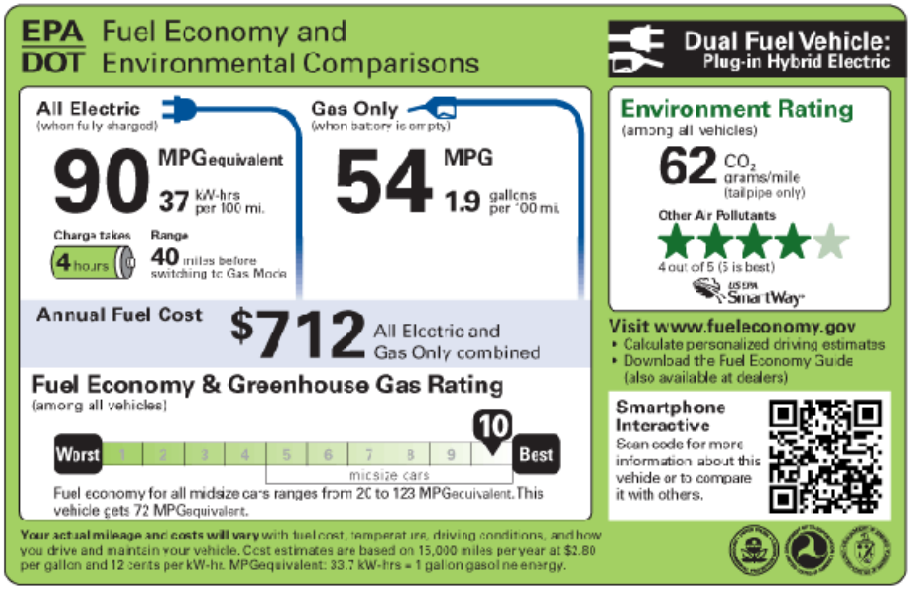
Vehicle A:



Vehicle B:



Vehicle A:



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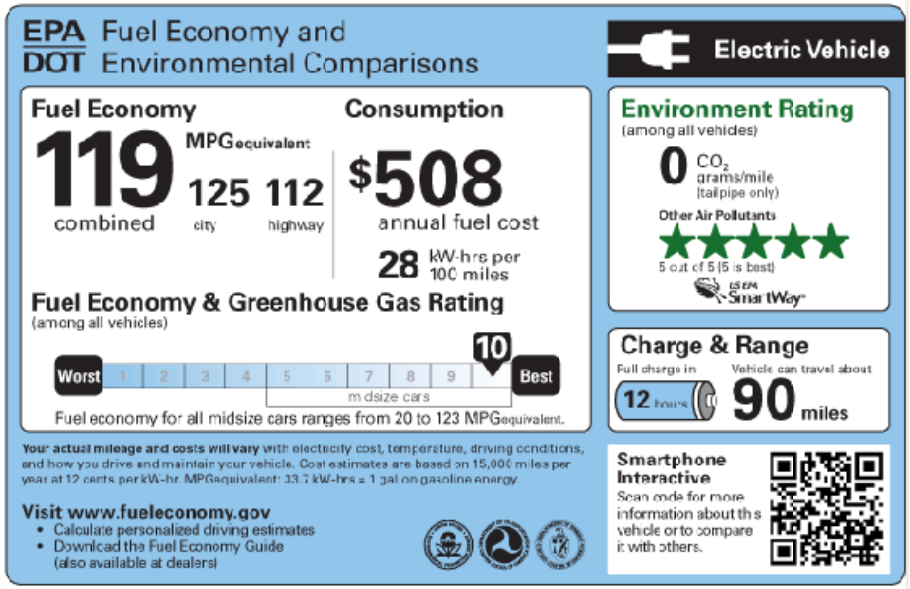


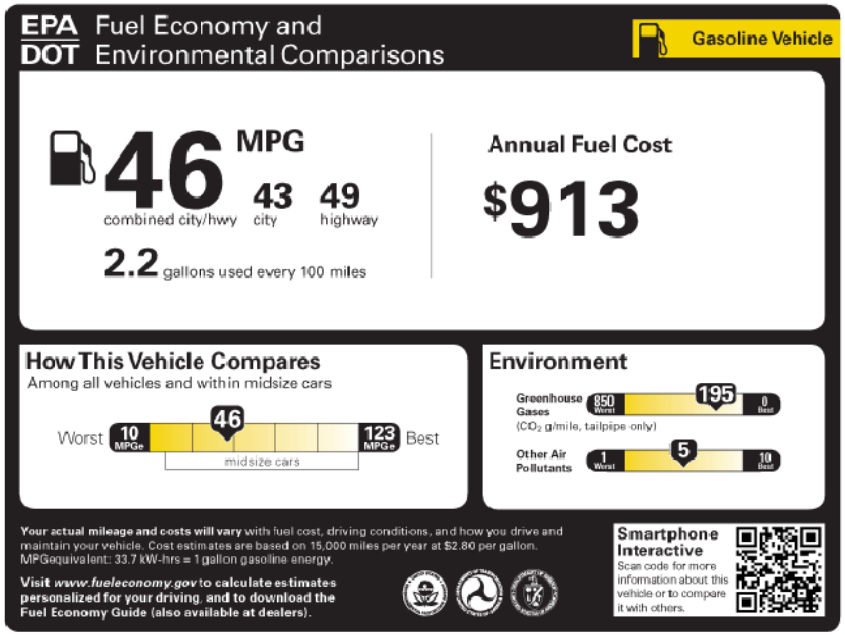
SQ1: -

Label Type 1 -

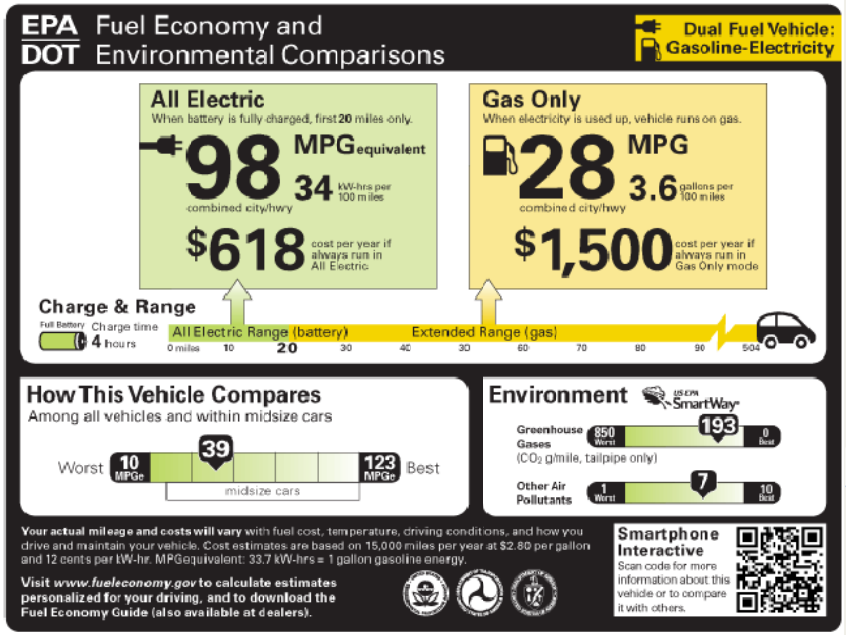
Vehicle A:

Vehicle B:

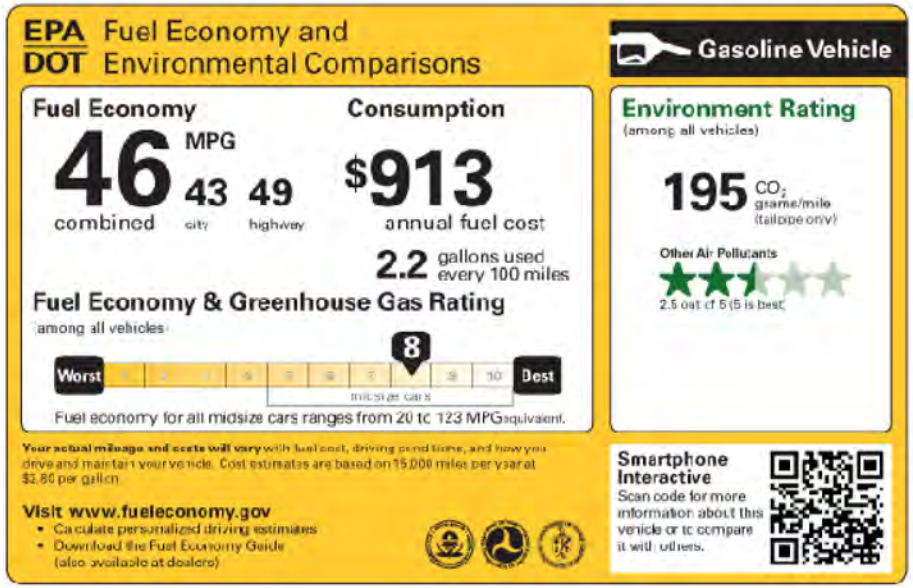
Vehicle A:



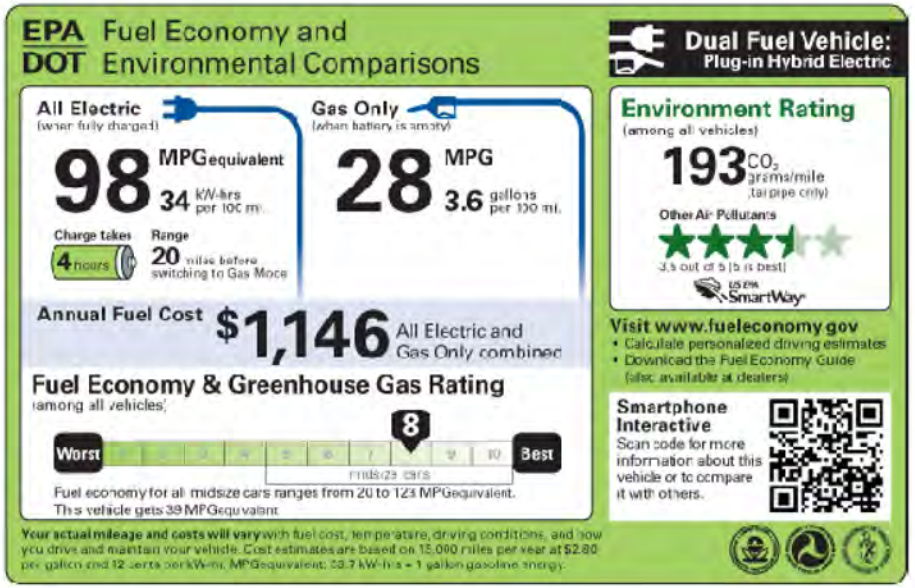
Vehicle B:



Vehicle A:



Vehicle B:



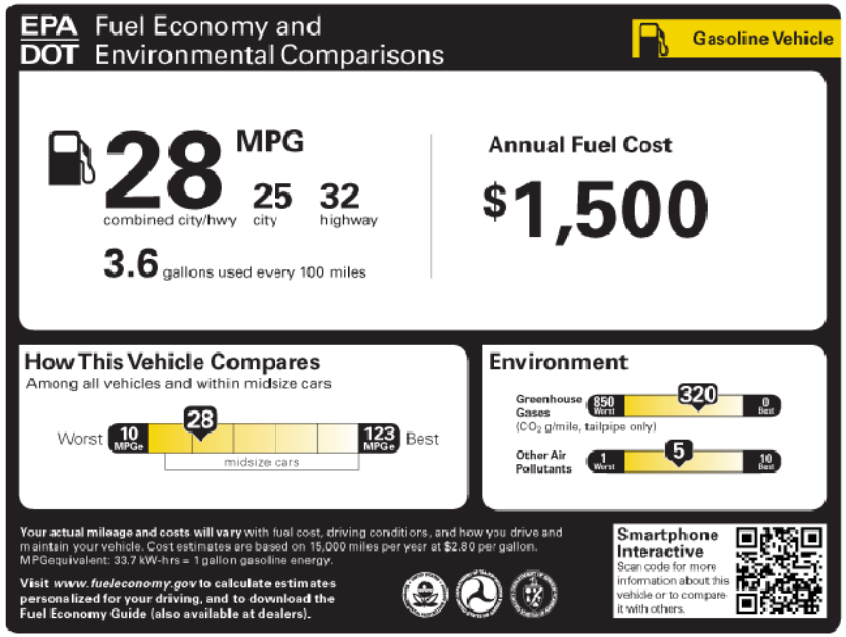
SQ2: -

Label Type 1 -

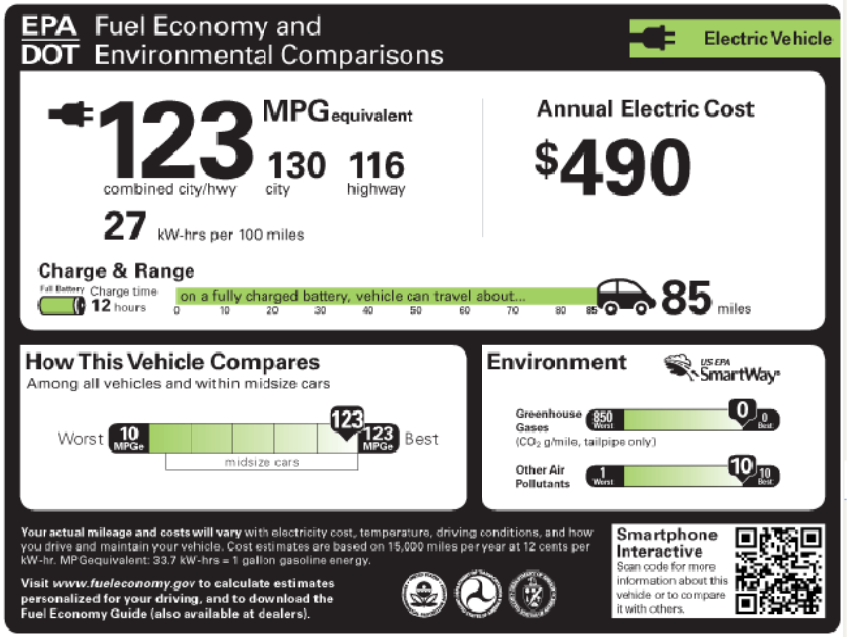
Vehicle A:

Vehicle B:

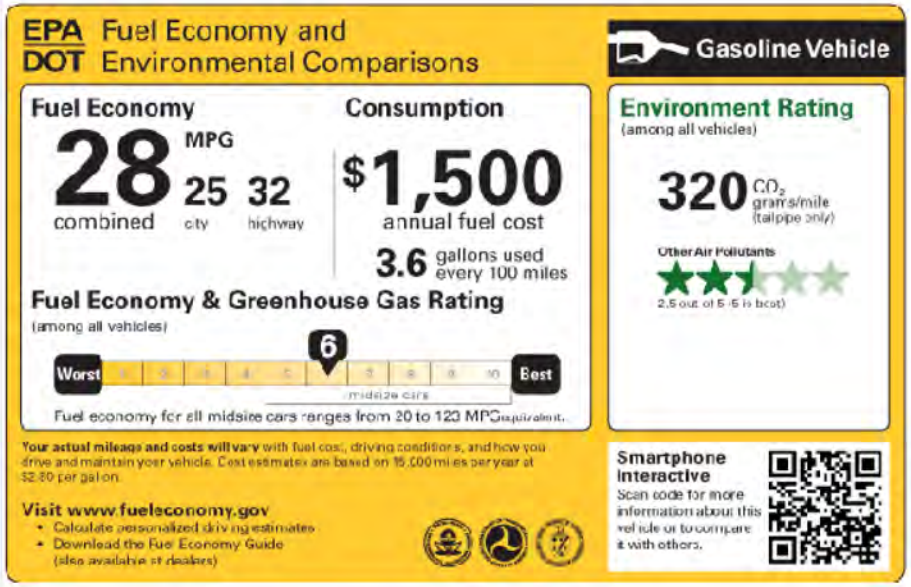
Vehicle A:



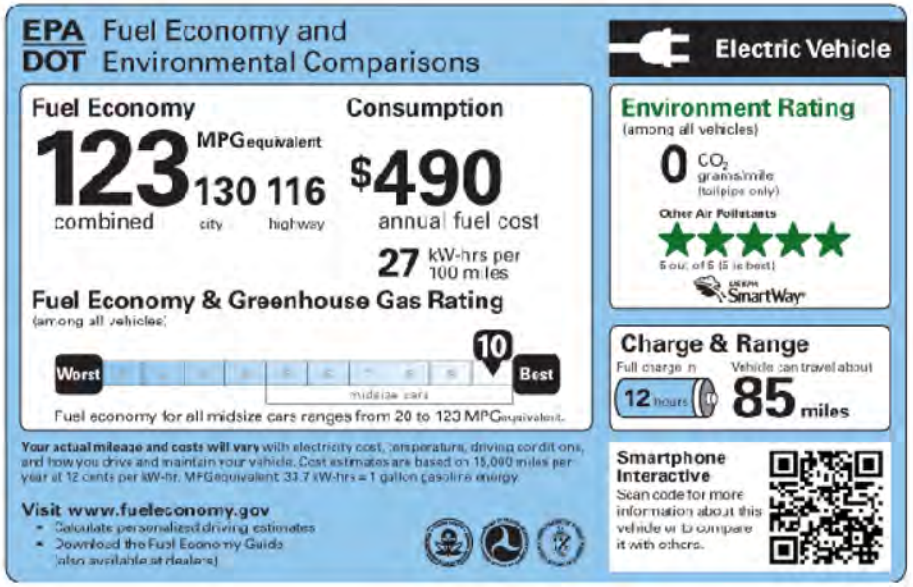
Vehicle B:



Vehicle A:



Vehicle B:



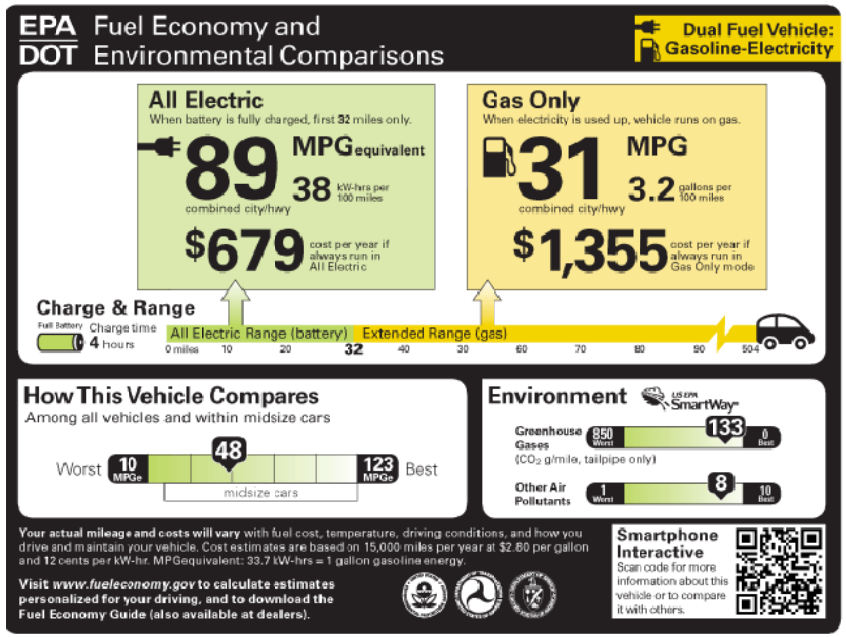
SQ3: -

Label Type 1 -

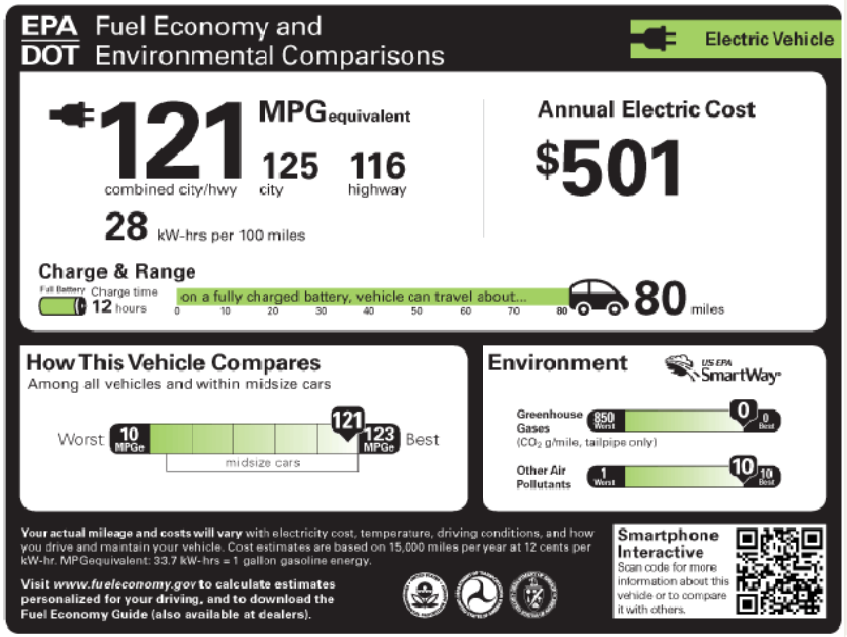
Vehicle A:

Vehicle B:

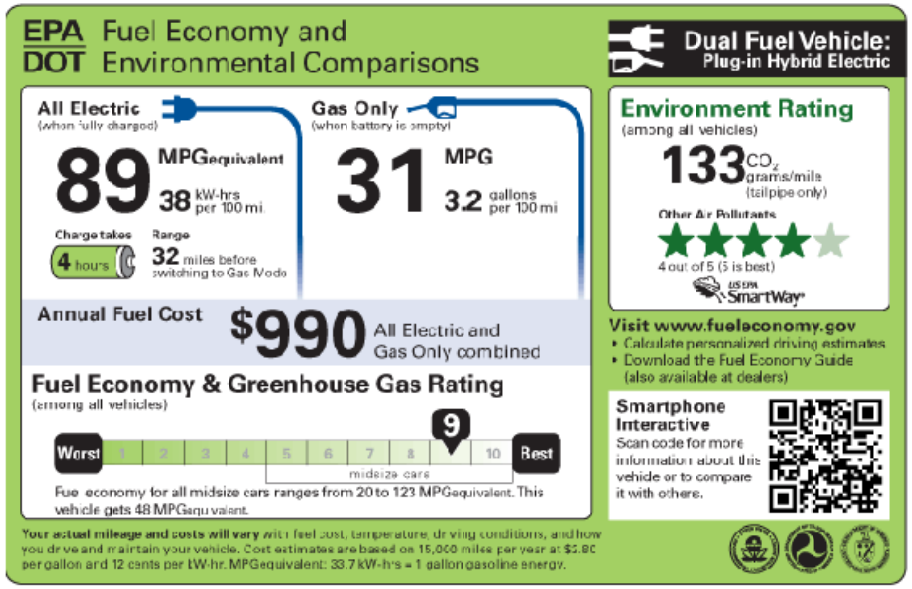
Vehicle A:



Vehicle B:



Vehicle A:



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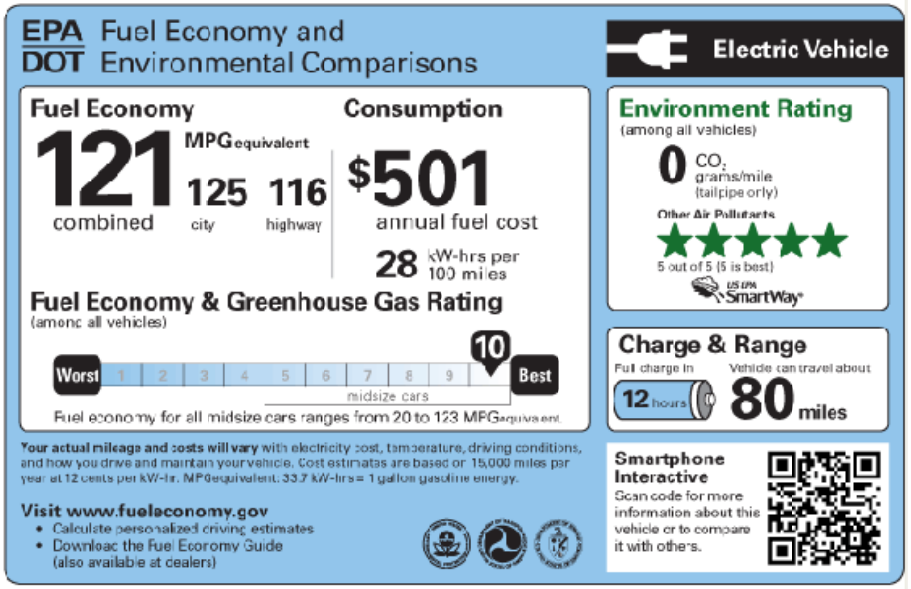


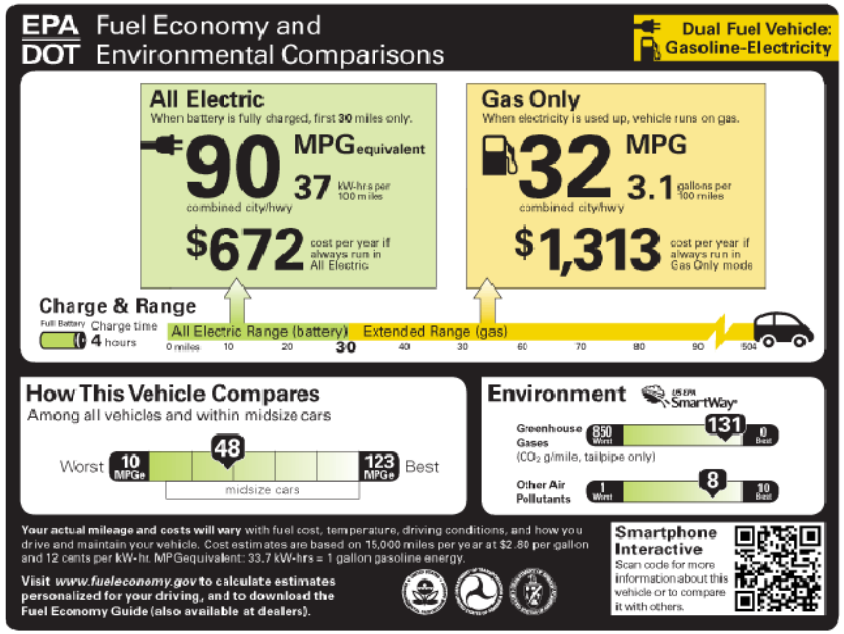
SQ4: -

Label Type 1 -

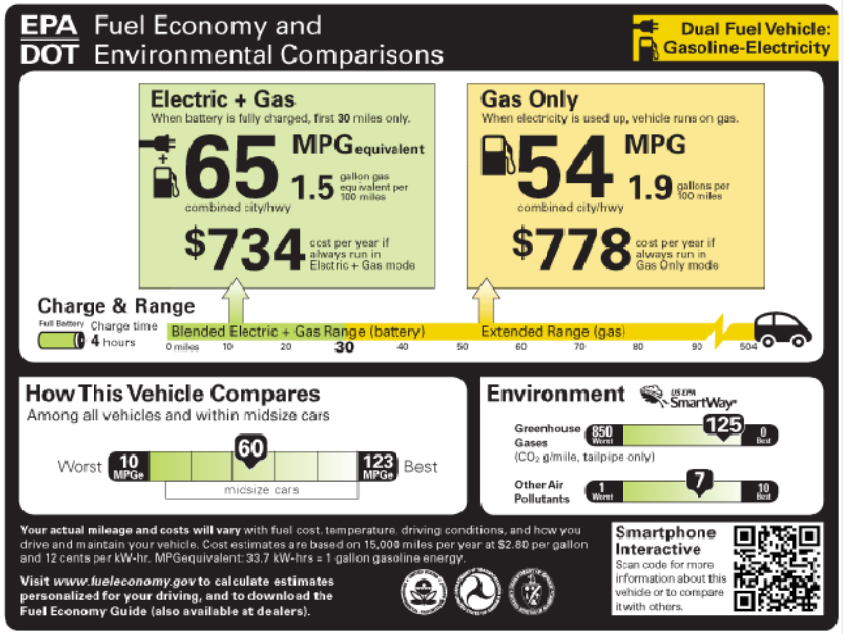
Vehicle A:

Vehicle B:

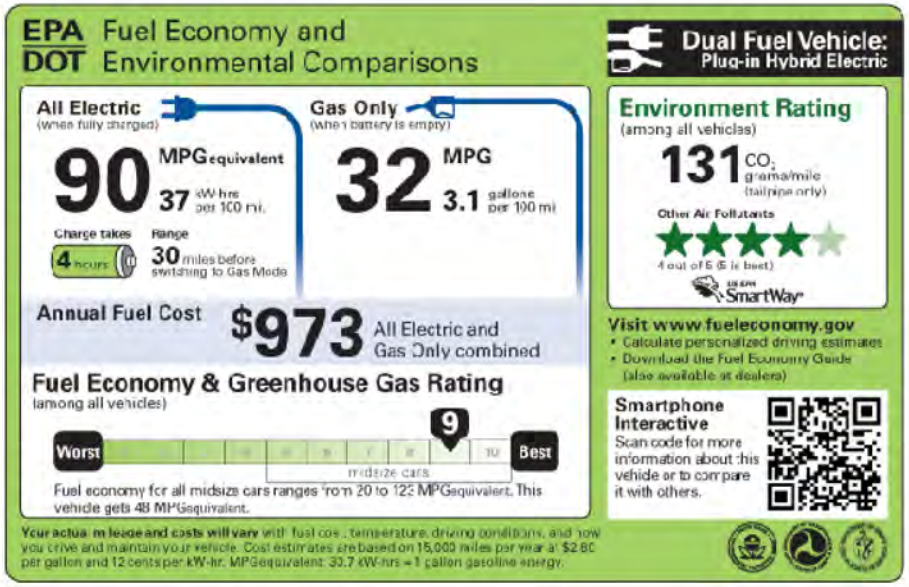
Vehicle A:



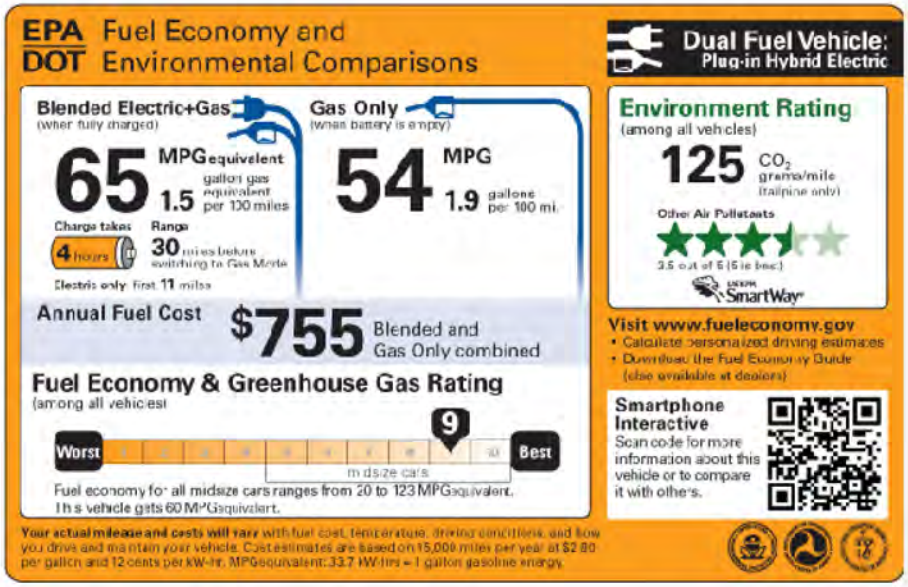
Vehicle B:



Vehicle A:



Vehicle B:



Appendix 2 -

Regression Results -

Fuel Economy Label Survey Choice Models

Technical Memorandum
Label Understanding and Vehicle Selection Models

Interpretation of the Coefficients and Odds Ratios from Logistic Regressions

This technical memorandum presents the preliminary results of the modeling for the EPA/NHTSA Fuel Economy Label Design survey. From the Fuel Economy Label survey data, the presented results are from the discrete choice modeling of the following:

1. Respondent label understanding responses (Understanding Questions 1-6)
2. Respondent vehicle preference/likely to purchase (Selection Questions 1-4)

Logit (choice) models are estimated with the binary (e.g., 0 or 1) choice variable (the answer to either the understanding or vehicle choice questions) on the left-hand side of the model. The label design indicator variables and a series of demographic and other respondent survey responses are on the right-hand side (RHS), as either the control or predictor variables.

The logit model is the appropriate model when the variable of interest is a binary variable (e.g., the variable takes on values of 0 or 1). The logit model predicts the probability of the dependent variable taking on a value equal to 1, given the predictor and control variables of the model.

The probability of the outcome, and the odds ratio of the outcome are key concepts for correctly interpreting the results from these models.

For the *label understanding* choice models:

- Probability is defined as the probability that the respondent selects the correct answer. E.g., p is the probability that the respondent answers correctly, or p(correct=1)
- The 'odds' of a correct answer is the ratio of the probability of a correct answer (p), over the probability of the incorrect answer (1-p), or: p/(1-p).
- And the log odds ratio, or "logit" is then: LN(p/(1-p))
- The "Both are equally good" responses to Understanding Questions 1-6 were categorized as "incorrect" for the label understanding modeling.

For the *vehicle likely to purchase (selection)* choice models:

- Probability is defined as the probability that the respondent selects the first vehicle (i.e., Vehicle A). To interpret the results from the vehicle preference models, it is important to consider the model results with respect to the two vehicles being compared and the vehicle that corresponds to Vehicle A (e.g., p(vehicle A=1)).
- The "Equally likely to purchase either vehicle" responses were randomly assigned to Vehicle A or Vehicle B, using a uniform distribution.

Simple Numerical Example of an Odds Ratio

Prior to Understanding Questions 1 and 2 in the survey, respondents are shown fuel economy labels for a gasoline vehicle and a dual fuel electric vehicle. Understanding

Question 1 then asks respondents which vehicle is better for a 30-mile round-trip (*the correct answer is the dual fuel electric*).

The frequency tabulation for the answers to Understanding Question 1 is shown in Table 1.

Table 1 'Correct' and 'Incorrect' Frequency Tabulation for Understanding Question 1

Understanding Question 1	Frequency
Correct	2,097
Incorrect	608
Total	2,705

From this frequency tabulation of the answers to Understanding Question 1, we can calculate the following:

- The probability of the respondent selecting the correct answer is: p = prob(correct=1)= 2097/2705 = 0.775
- The odds of a correct answer are: 0.775/(1-0.775) = 3.449
- The log odds is: log(3.45) = 1.238

The calculated log odds is the same as the estimated coefficient on the constant term in a model without any other predictor variables:

Table 2 Logistic Regression Results for Understanding Question 1, Constant Term Only

```
Logistic regression                             Number of obs     =       2705
------------------------------------------------------------------------------
  Question 1 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       Constant |   1.238088   .0460609    26.88   0.000     1.14781    1.328366
------------------------------------------------------------------------------
```

This simple numerical example of the calculation of the odds ratio and the presentation of the logistic regression results for a model with only a constant term are intended to illustrate the basic interpretation of the odds ratio.[1] As predictor variables are introduced to the model, the interpretation of the coefficients and odds ratio does not change in any fundamental way.

[1] This exposition is based on the explanation provided at: UCLA, Academic Technology Services, Statistical Consulting Group. *FAQ: How do I interpret odds ratios in logistic regression?* http://www.ats.ucla.edu/stat/mult_pkg/faq/general/odds_ratio.htm (accessed October 9, 2010).

Notably, we can make the following statements about the correct interpretation of the logistic regression results:

- The estimated coefficients from the models represent the rate of change in the log odds ratio for the change in the predictor (RHS) variable.
- These changes are interpreted relative to the default case for dichotomous RHS variables; and are interpreted for a one-unit change in the RHS variable in the case of continuous RHS variables.
- From the above example, we can see that the odds ratio is an easy mathematical transformation and more intuitive way to interpret the model results.
- For a given right-hand side variable, the odds ratio is the estimated effect on the odds ratio for the event for that predictor variable. Based on this explanation, we can make the following interpretations and conclusions about the coefficients and odds ratios:
  - An odds ratio of 1.5 is interpreted as the predictor variable being associated with the odds of a correct answer being 1 and 1/2 times more likely than the odds of the incorrect answer.
  - Negative coefficients from the model produce odds ratios of less than one, so a change in the right-hand side variable makes the outcome <u>less</u> likely to occur.

Again, the coefficients from the logistic regression for dichotomous right-hand side variables are always interpreted relative to the default case. For example, if the coefficient on Male (gender) is 0.391 then using the odds ratio transformation of the coefficient, the odds ratio is 1.478. This indicates that the odds for a correct answer are 147.8 percent for males than the odds for females.

For a continuous right-hand side variable, the coefficient represented as the odds ratio is the effect of a 1-unit change in the variable on the *difference* in log odds. For example: for a one-unit increase in the share of miles in the city, we see a 100.7 percent increase in the odds of selecting the correct answer in the understanding choice models (or, of selecting vehicle A, in the case of the selection models). (Note than interpretation of negative odds ratios are conceptually slightly more complex.)

Thus, each exponentiated coefficient is either the ratio of two odds (e.g., for dichotomous RHS variables); or the change in odds (continuous) for a unit increase in the corresponding RHS variable holding other variables at constant value(s).

The following pages present the model estimation results for the choice models. The results contain both the estimated coefficient and the odds ratio. The z-statistic is displayed in parentheses underneath the estimated coefficient. The z-statistic indicates whether the estimated coefficient is statistically different from zero.

EPA Fuel Economy Label Choice Models

Understanding Questions 1 & 2

Gasoline Vehicle Label Compared With Electric Vehicle Label
(Correct Answer=1, Incorrect Answer=0)

Independent Variables	Correctly identified vehicle B, an electric vehicle as the better vehicle for a 30-mile round-trip, compared to vehicle A, a gasoline vehicle.		Correctly identified vehicle A, a gasoline vehicle, as better for 120-mile round-trip, compared to vehicle B, an electric vehicle.	
	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Constant	-0.048	0.953	0.247	1.280
	(0.060)		(0.340)	
Label 1 Dummy Variable	-0.709	0.492	0.183	1.201
	(5.65)**		(1.770)	
Label 2 Dummy Variable	-0.311	0.733	0.316	1.372
	(2.30)*		(2.91)**	
City Miles Share of Miles (e.g., 1-100)	-0.002	0.998	-0.004	0.996
	(0.630)		(1.830)	
Age 18-24	-0.258	0.773	-0.610	0.543
	(0.690)		(1.880)	
Age 25-34	-0.189	0.828	-0.238	0.788
	(0.730)		(1.150)	
Age 35-44	-0.237	0.789	-0.090	0.914
	(0.910)		(0.440)	
Age 45-54	-0.369	0.691	0.218	1.244
	(1.500)		(1.110)	
Age 55-64	0.103	1.108	0.049	1.050
	(0.420)		(0.260)	
Less than High School	-0.822	0.440	-1.016	0.362
	(1.030)		(1.320)	
High School	-0.490	0.613	-0.653	0.520
	(2.30)*		(3.51)**	
Some College	-0.339	0.712	-0.219	0.803
	(2.23)*		(1.780)	
College	-0.236	0.790	0.029	1.029
	(1.690)		(0.260)	
Household Income Less Than $15k	0.150	1.162	-0.316	0.729
	(0.300)		(0.680)	
Household Income $15-$25k	-0.714	0.490	-0.634	0.530
	(1.610)		(1.370)	
Household Income $25-$50k	0.010	1.010	0.042	1.043
	(0.040)		(0.210)	
Household Income $50-$75k	0.345	1.412	0.142	1.153
	(1.770)		(0.890)	
Household Income $75-$100k	0.179	1.196	0.255	1.290
	(1.090)		(1.840)	
Household Income $100-$125k	0.356	1.428	0.066	1.068
	(2.12)*		(0.480)	
Household Income $125-$150k	0.393	1.481	0.195	1.215
	(2.04)*		(1.250)	
Household Size=1	0.677	1.968	-0.458	0.633
	(1.000)		(0.780)	
Household Size=2	-0.045	0.956	-0.357	0.700
	(0.090)		(0.770)	
Household Size=3	0.341	1.406	-0.155	0.856
	(0.720)		(0.340)	
Household Size=4	0.279	1.322	-0.342	0.710
	(0.590)		(0.750)	
Household Size=5	0.356	1.428	-0.306	0.736
	(0.740)		(0.660)	
Household Size=6	0.967	2.630	-0.410	0.664
	(1.650)		(0.790)	

EPA Fuel Economy Label Choice Models

Understanding Questions 1 & 2

Gasoline Vehicle Label Compared With Electric Vehicle Label
(Correct Answer=1, Incorrect Answer=0)

Independent Variables	Correctly identified vehicle B, an electric vehicle as the better vehicle for a 30-mile round-trip, compared to vehicle A, a gasoline vehicle.		Correctly identified vehicle A, a gasoline vehicle, as better for 120-mile round-trip, compared to vehicle B, an electric vehicle.	
	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Household Vehicles=1	-0.614	0.541	-0.279	0.757
	(1.270)		(0.700)	
Household Vehicles=2	-0.144	0.866	-0.507	0.602
	(0.540)		(2.23)*	
Household Vehicles=3	-0.126	0.882	-0.457	0.633
	(0.480)		(2.05)*	
Household Vehicles=4	-0.233	0.792	-0.397	0.672
	(0.840)		(1.630)	
Licensed Drivers in Household=1	1.512	4.536	1.423	4.150
	(2.32)*		(2.64)**	
Licensed Drivers in Household=2	1.033	2.809	1.160	3.190
	(2.57)*		(3.10)**	
Licensed Drivers in Household=3	0.957	2.604	1.239	3.452
	(2.43)*		(3.36)**	
Licensed Drivers in Household=4	0.828	2.289	1.209	3.350
	(2.07)*		(3.21)**	
Male	0.446	1.562	0.393	1.481
	(3.89)**		(4.24)**	
Daily Miles Driven, Less than 20	0.187	1.206	-0.264	0.768
	(0.520)		(0.860)	
Daily Miles Driven, 20-30	0.123	1.131	-0.293	0.746
	(0.340)		(0.950)	
Daily Miles Driven, 31-40	0.099	1.104	-0.490	0.613
	(0.270)		(1.570)	
Daily Miles Driven, 41-50	0.216	1.241	-0.092	0.912
	(0.570)		(0.280)	
Daily Miles Driven, 51-60	0.378	1.459	-0.278	0.757
	(0.960)		(0.850)	
Daily Miles Driven, 61-70	-0.244	0.783	-0.637	0.529
	(0.590)		(1.760)	
Daily Miles Driven, 71-80	0.297	1.346	-0.630	0.533
	(0.640)		(1.660)	
Daily Miles Driven, 81-90	-1.001	0.368	-0.420	0.657
	(2.10)*		(0.960)	
Daily Miles Driven, 91-100	0.294	1.342	-0.173	0.841
	(0.590)		(0.430)	
Importance of Fuel Economy rated 2 (7 =very important)	0.425	1.530	-0.268	0.765
	(0.830)		(0.580)	
Importance of Fuel Economy rated 3 (7 =very important)	0.066	1.068	-0.730	0.482
	(0.140)		(1.680)	
Importance of Fuel Economy rated 4 (7 =very important)	0.445	1.560	-0.574	0.563
	(0.980)		(1.400)	
Importance of Fuel Economy rated 5 (7 =very important)	0.488	1.629	-0.426	0.653
	(1.070)		(1.040)	
Importance of Fuel Economy rated 6 (7 =very important)	0.509	1.664	-0.644	0.525
	(1.100)		(1.540)	
Importance of Fuel Economy rated 7 (7 =very important)	0.233	1.262	-0.848	0.428
	(0.490)		(1.98)*	

EPA Fuel Economy Label Choice Models

Understanding Questions 1 & 2

Gasoline Vehicle Label Compared With Electric Vehicle Label
(Correct Answer=1, Incorrect Answer=0)

Independent Variables	Correctly identified vehicle B, an electric vehicle as the better vehicle for a 30-mile round-trip, compared to vehicle A, a gasoline vehicle.		Correctly identified vehicle A, a gasoline vehicle, as better for 120-mile round-trip, compared to vehicle B, an electric vehicle.	
	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Importance of Fuel Economy Label=2	0.144	1.155	0.213	1.237
	(0.410)		(0.730)	
Importance of Fuel Economy Label=3	-0.072	0.931	0.142	1.153
	(0.220)		(0.520)	
Importance of Fuel Economy Label=4	-0.232	0.793	-0.055	0.946
	(0.760)		(0.210)	
Importance of Fuel Economy Label=5	-0.020	0.980	0.045	1.046
	(0.060)		(0.170)	
Importance of Fuel Economy Label=6	0.209	1.232	0.124	1.132
	(0.650)		(0.460)	
Importance of Fuel Economy Label=7	0.277	1.319	-0.047	0.954
	(0.810)		(0.170)	
Vehicles considered=Sports Car	-0.066	0.936	-0.321	0.725
	(0.400)		(2.29)*	
Vehicles considered=Subcompact Car	-0.052	0.949	0.423	1.527
	(0.220)		(2.24)*	
Vehicles considered=Compact Car	0.330	1.391	0.271	1.311
	(2.13)*		(2.20)*	
Vehicles considered=Midsized Car	0.161	1.175	0.093	1.097
	(1.400)		(1.000)	
Vehicles considered=Large Car	-0.010	0.990	0.162	1.176
	(0.060)		(1.080)	
Vehicles considered=Station Wagon	-0.385	0.680	-0.274	0.760
	(1.600)		(1.310)	
Vehicles considered=SUV	0.108	1.114	-0.078	0.925
	(0.930)		(0.810)	
Vehicles considered=Crossover	0.038	1.039	0.417	1.517
	(0.300)		(3.99)**	
Vehicles considered=Pickup Truck	0.004	1.004	-0.063	0.939
	(0.020)		(0.440)	
Vehicles considered=Mini-Van	0.157	1.170	0.187	1.206
	(0.800)		(1.170)	
Vehicles considered=Van	-1.067	0.344	-0.820	0.440
	(2.39)*		(1.890)	
Vehicles considered=Other	0.707	2.028	0.841	2.319
	(1.750)		(2.86)**	
Early Adopter=2 (1 is first to adopt)	0.077	1.080	-0.274	0.760
	(0.310)		(1.310)	
Early Adopter=3 (1 is first to adopt)	0.260	1.297	0.073	1.076
	(1.080)		(0.370)	
Early Adopter=4 (1 is first to adopt)	-0.062	0.940	0.120	1.127
	(0.270)		(0.610)	
Early Adopter=5 (1 is first to adopt)	-0.035	0.966	-0.012	0.988
	(0.150)		(0.060)	
Early Adopter=6 (1 is first to adopt)	0.007	1.007	0.020	1.020
	(0.030)		(0.090)	
Early Adopter=7 (1 is first to adopt)	-0.585	0.557	-0.306	0.736
	(1.820)		(1.040)	
Observations	2358		2382	

Absolute value o statistics i parentheses
significant at 5% * significant at 1%
significant at 10% * significant at 5% significant at 1%

EPA Fuel Economy Label Choice Models

Understanding Questions 3 & 4

Comparison of the Labels for two Dual Fuel Plug-in Hybrid Electric Vehicles
(Correct Answer=1, Incorrect Answer=0)

	Correctly identified vehicle A, a Dual Fuel PHEV as the better vehicle for a 20 mile round-trip compared to vehicle B, also a Dual Fuel PHEV.		Correctly identified vehicle B, a Dual Fuel PHEV as the better vehicle for a 120-mile round-trip compared to vehicle B, also a Dual Fuel PHEV.	
Independent Variables	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Constant	-0.840	0.432	-1.132	0.322
	(1.210)		(1.620)	
Label 1 Dummy Variable	-0.326	0.722	-0.050	0.951
	(3.21)**		(0.500)	
Label 2 Dummy Variable	0.256	1.292	0.273	1.314
	(2.42)*		(2.53)*	
City Miles Share of Miles (e.g., 1-100)	0.001	1.001	-0.001	0.999
	(0.350)		(0.610)	
Age 18-24	0.032	1.033	0.421	1.523
	(0.100)		(1.340)	
Age 25-34	0.205	1.228	0.325	1.384
	(1.000)		(1.570)	
Age 35-44	0.004	1.004	0.114	1.121
	(0.020)		(0.550)	
Age 45-54	0.004	1.004	0.139	1.149
	(0.020)		(0.710)	
Age 55-64	0.077	1.080	0.369	1.446
	(0.410)		(1.950)	
Less than High School	-0.110	0.896	-0.526	0.591
	(0.140)		(0.690)	
High School	-0.190	0.827	0.143	1.154
	(1.050)		(0.790)	
Some College	-0.112	0.894	0.097	1.102
	(0.920)		(0.790)	
College	-0.060	0.942	0.031	1.031
	(0.550)		(0.280)	
Household Income Less Than $15k	0.191	1.210	-0.404	0.668
	(0.450)		(0.900)	
Household Income $15-$25k	-1.310	0.270	-0.088	0.916
	(2.68)**		(0.210)	
Household Income $25-$50k	-0.163	0.850	-0.023	0.977
	(0.810)		(0.110)	
Household Income $50-$75k	0.044	1.045	-0.021	0.979
	(0.280)		(0.130)	
Household Income $75-$100k	-0.074	0.929	0.032	1.033
	(0.550)		(0.230)	
Household Income $100-$125k	0.099	1.104	0.192	1.212
	(0.720)		(1.390)	
Household Income $125-$150k	0.164	1.178	0.042	1.043
	(1.080)		(0.270)	
Household Size=1	0.469	1.598	-0.421	0.656
	(0.820)		(0.730)	
Household Size=2	0.187	1.206	-0.057	0.945
	(0.410)		(0.130)	
Household Size=3	0.330	1.391	-0.045	0.956
	(0.730)		(0.100)	
Household Size=4	0.308	1.361	0.071	1.074
	(0.680)		(0.160)	
Household Size=5	0.354	1.425	0.142	1.153
	(0.780)		(0.320)	
Household Size=6	0.449	1.567	-0.107	0.899
	(0.880)		(0.210)	

Understanding Questions 3 & 4

Comparison of the Labels for two Dual Fuel Plug-in Hybrid Electric Vehicles
(Correct Answer=1, Incorrect Answer=0)

Independent Variables	Correctly identified vehicle A, a Dual Fuel PHEV as the better vehicle for a 20 mile round-trip compared to vehicle B, also a Dual Fuel PHEV.		Correctly identified vehicle B, a Dual Fuel PHEV as the better vehicle for a 120-mile round-trip compared to vehicle B, also a Dual Fuel PHEV.	
	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Household Vehicles=1	-0.328	0.720	-0.082	0.921
	(0.840)		(0.210)	
Household Vehicles=2	-0.213	0.808	-0.243	0.784
	(0.970)		(1.090)	
Household Vehicles=3	-0.264	0.768	-0.237	0.789
	(1.230)		(1.090)	
Household Vehicles=4	-0.351	0.704	-0.118	0.889
	(1.500)		(0.500)	
Licensed Drivers in Household=1	0.131	1.140	0.535	1.707
	(0.250)		(1.010)	
Licensed Drivers in Household=2	-0.203	0.816	0.279	1.322
	(0.570)		(0.770)	
Licensed Drivers in Household=3	-0.360	0.698	0.216	1.241
	(1.030)		(0.610)	
Licensed Drivers in Household=4	-0.269	0.764	-0.172	0.842
	(0.750)		(0.470)	
Male	0.281	1.324	0.513	1.670
	(3.11)**		(5.58)**	
Daily Miles Driven, Less than 20	0.169	1.184	0.036	1.037
	(0.570)		(0.120)	
Daily Miles Driven, 20-30	0.221	1.247	-0.064	0.938
	(0.740)		(0.210)	
Daily Miles Driven, 31-40	0.150	1.162	-0.100	0.905
	(0.500)		(0.330)	
Daily Miles Driven, 41-50	0.073	1.076	-0.250	0.779
	(0.230)		(0.800)	
Daily Miles Driven, 51-60	0.188	1.207	-0.206	0.814
	(0.600)		(0.650)	
Daily Miles Driven, 61-70	0.295	1.343	-0.085	0.919
	(0.840)		(0.240)	
Daily Miles Driven, 71-80	0.046	1.047	-0.314	0.731
	(0.120)		(0.850)	
Daily Miles Driven, 81-90	0.202	1.224	0.248	1.281
	(0.480)		(0.570)	
Daily Miles Driven, 91-100	-0.030	0.970	-0.357	0.700
	(0.080)		(0.900)	
Importance of Fuel Economy rated 2 (7 =very important)	0.453	1.573	0.668	1.950
	(1.000)		(1.460)	
Importance of Fuel Economy rated 3 (7 =very important)	0.352	1.422	0.453	1.573
	(0.820)		(1.050)	
Importance of Fuel Economy rated 4 (7 =very important)	0.383	1.467	0.495	1.640
	(0.950)		(1.220)	
Importance of Fuel Economy rated 5 (7 =very important)	0.315	1.370	0.686	1.986
	(0.780)		(1.680)	
Importance of Fuel Economy rated 6 (7 =very important)	0.481	1.618	0.582	1.790
	(1.170)		(1.400)	
Importance of Fuel Economy rated 7 (7 =very important)	0.306	1.358	0.573	1.774
	(0.720)		(1.350)	

EPA Fuel Economy Label Choice Models

Understanding Questions 3 & 4

Comparison of the Labels for two Dual Fuel Plug-in Hybrid Electric Vehicles
(Correct Answer=1, Incorrect Answer=0)

Independent Variables	Correctly identified vehicle A, a Dual Fuel PHEV as the better vehicle for a 20 mile round-trip compared to vehicle B, also a Dual Fuel PHEV.		Correctly identified vehicle B, a Dual Fuel PHEV as the better vehicle for a 120-mile round-trip compared to vehicle B, also a Dual Fuel PHEV.	
	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Importance of Fuel Economy Label=2	0.311	1.365	-0.143	0.867
	(1.090)		(0.490)	
Importance of Fuel Economy Label=3	-0.071	0.931	-0.163	0.850
	(0.270)		(0.600)	
Importance of Fuel Economy Label=4	-0.149	0.862	-0.253	0.776
	(0.590)		(0.980)	
Importance of Fuel Economy Label=5	-0.107	0.899	-0.266	0.766
	(0.420)		(1.030)	
Importance of Fuel Economy Label=6	-0.046	0.955	-0.152	0.859
	(0.170)		(0.570)	
Importance of Fuel Economy Label=7	0.013	1.013	-0.284	0.753
	(0.050)		(1.000)	
Vehicles considered=Sports Car	-0.186	0.830	-0.153	0.858
	(1.340)		(1.110)	
Vehicles considered=Subcompact Car	0.022	1.022	-0.067	0.935
	(0.120)		(0.360)	
Vehicles considered=Compact Car	0.206	1.229	0.213	1.237
	(1.720)		(1.750)	
Vehicles considered=Midsized Car	0.048	1.049	-0.002	0.998
	(0.520)		(0.020)	
Vehicles considered=Large Car	0.133	1.142	0.115	1.122
	(0.910)		(0.770)	
Vehicles considered=Station Wagon	0.265	1.303	0.674	1.962
	(1.290)		(2.96)**	
Vehicles considered=SUV	0.049	1.050	0.112	1.119
	(0.520)		(1.170)	
Vehicles considered=Crossover	0.043	1.044	0.031	1.031
	(0.420)		(0.300)	
Vehicles considered=Pickup Truck	0.042	1.043	-0.035	0.966
	(0.300)		(0.240)	
Vehicles considered=Mini-Van	0.068	1.070	0.057	1.059
	(0.440)		(0.350)	
Vehicles considered=Van	-0.120	0.887	0.795	2.214
	(0.290)		(1.730)	
Vehicles considered=Other	-0.277	0.758	-0.136	0.873
	(0.980)		(0.490)	
Early Adopter=2 (1 is first to adopt)	0.125	1.133	0.349	1.418
	(0.610)		(1.700)	
Early Adopter=3 (1 is first to adopt)	0.302	1.353	0.638	1.893
	(1.540)		(3.22)**	
Early Adopter=4 (1 is first to adopt)	0.124	1.132	0.424	1.528
	(0.640)		(2.19)*	
Early Adopter=5 (1 is first to adopt)	0.178	1.195	0.462	1.587
	(0.890)		(2.32)*	
Early Adopter=6 (1 is first to adopt)	0.054	1.055	0.376	1.456
	(0.240)		(1.680)	
Early Adopter=7 (1 is first to adopt)	-0.181	0.834	0.002	1.002
	(0.620)		(0.010)	
Observations	2389		2376	

Absolute value o statistics i parentheses
significant at 5% * significant at 1%
significant at 10% * significant at 5% si

EPA Fuel Economy Label Choice Models

Understanding Questions 5 & 6

Dual Fuel PHEV Vehicle Label Compared With an Electric Vehicle Label
(Correct Answer=1, Incorrect Answer=0)

Independent Variables	Correctly identified vehicle B, an Electric Vehicle as better for 30-mile round-trip compared to vehicle A, a Dual Fuel Extended Range Electric Vehicle.		Correctly identified vehicle A, a Dual Fuel Extended Range Electric Vehicle as better for 120-mile round-trip compared to vehicle B, an Electric Vehicle.	
	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Constant	0.087	1.091	-0.555	0.574
	(0.120)		(0.800)	
Label 1 Dummy Variable	-0.120	0.887	0.091	1.095
	(1.180)		(0.880)	
Label 2 Dummy Variable	0.282	1.326	0.471	1.602
	(2.56)*		(4.35)**	
City Miles Share of Miles (e.g., 1-100)	0.001	1.001	-0.003	0.997
	(0.650)		(1.320)	
Age 18-24	-0.289	0.749	-0.391	0.676
	(0.900)		(1.220)	
Age 25-34	-0.206	0.814	-0.377	0.686
	(0.960)		(1.810)	
Age 35-44	-0.171	0.843	-0.291	0.748
	(0.800)		(1.400)	
Age 45-54	-0.361	0.697	-0.130	0.878
	(1.780)		(0.660)	
Age 55-64	-0.152	0.859	-0.140	0.869
	(0.770)		(0.740)	
Less than High School	-0.757	0.469	-0.746	0.474
	(0.970)		(0.970)	
High School	0.055	1.057	-0.593	0.553
	(0.300)		(3.19)**	
Some College	-0.122	0.885	-0.231	0.794
	(0.990)		(1.890)	
College	0.041	1.042	-0.022	0.978
	(0.360)		(0.200)	
Household Income Less Than $15k	-1.050	0.350	-0.390	0.677
	(2.40)*		(0.880)	
Household Income $15-$25k	-0.863	0.422	-0.310	0.733
	(2.12)*		(0.740)	
Household Income $25-$50k	-0.186	0.830	-0.317	0.728
	(0.910)		(1.530)	
Household Income $50-$75k	0.093	1.097	-0.126	0.882
	(0.570)		(0.790)	
Household Income $75-$100k	-0.046	0.955	0.050	1.051
	(0.330)		(0.360)	
Household Income $100-$125k	-0.046	0.955	0.001	1.001
	(0.330)		0.000	
Household Income $125-$150k	0.047	1.048	-0.020	0.980
	(0.300)		(0.130)	
Household Size=1	-0.159	0.853	-0.385	0.680
	(0.270)		(0.660)	
Household Size=2	-0.386	0.680	-0.540	0.583
	(0.820)		(1.190)	
Household Size=3	-0.294	0.745	-0.373	0.689
	(0.630)		(0.830)	
Household Size=4	-0.267	0.766	-0.303	0.739
	(0.570)		(0.680)	
Household Size=5	-0.474	0.623	-0.403	0.668
	(1.010)		(0.890)	
Household Size=6	0.119	1.126	-0.550	0.577
	(0.220)		(1.080)	

EPA Fuel Economy Label Choice Models

Understanding Questions 5 & 6

Dual Fuel PHEV Vehicle Label Compared With an Electric Vehicle Label
(Correct Answer=1, Incorrect Answer=0)

Independent Variables	Correctly identified vehicle B, an Electric Vehicle as better for 30-mile round-trip compared to vehicle A, a Dual Fuel Extended Range Electric Vehicle.		Correctly identified vehicle A, a Dual Fuel Extended Range Electric Vehicle as better for 120-mile round-trip compared to vehicle B, an Electric Vehicle.	
	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Household Vehicles=1	-0.161	0.851	-0.386	0.680
	(0.400)		(0.980)	
Household Vehicles=2	-0.438	0.645	-0.252	0.777
	(1.890)		(1.140)	
Household Vehicles=3	-0.332	0.717	-0.273	0.761
	(1.460)		(1.250)	
Household Vehicles=4	-0.136	0.873	-0.280	0.756
	(0.550)		(1.180)	
Licensed Drivers in Household=1	-0.026	0.974	1.316	3.728
	(0.050)		(2.46)*	
Licensed Drivers in Household=2	0.328	1.388	0.959	2.609
	(0.880)		(2.57)*	
Licensed Drivers in Household=3	0.474	1.606	1.000	2.718
	(1.290)		(2.73)**	
Licensed Drivers in Household=4	0.014	1.014	0.714	2.042
	(0.040)		(1.910)	
Male	0.484	1.623	0.415	1.514
	(5.17)**		(4.51)**	
Daily Miles Driven, Less than 20	-0.134	0.875	-0.067	0.935
	(0.440)		(0.230)	
Daily Miles Driven, 20-30	-0.209	0.811	-0.170	0.844
	(0.670)		(0.570)	
Daily Miles Driven, 31-40	-0.177	0.838	-0.299	0.742
	(0.570)		(0.980)	
Daily Miles Driven, 41-50	-0.121	0.886	-0.219	0.803
	(0.380)		(0.700)	
Daily Miles Driven, 51-60	-0.179	0.836	-0.173	0.841
	(0.540)		(0.540)	
Daily Miles Driven, 61-70	-0.277	0.758	-0.341	0.711
	(0.770)		(0.960)	
Daily Miles Driven, 71-80	-0.224	0.799	0.032	1.033
	(0.590)		(0.080)	
Daily Miles Driven, 81-90	-0.290	0.748	-0.216	0.806
	(0.670)		(0.500)	
Daily Miles Driven, 91-100	-0.570	0.566	-0.809	0.445
	(1.420)		(1.99)*	
Importance of Fuel Economy rated 2 (7 =very important)	0.611	1.842	-0.180	0.835
	(1.350)		(0.400)	
Importance of Fuel Economy rated 3 (7 =very important)	0.066	1.068	-0.364	0.695
	(0.160)		(0.860)	
Importance of Fuel Economy rated 4 (7 =very important)	0.189	1.208	-0.278	0.757
	(0.480)		(0.710)	
Importance of Fuel Economy rated 5 (7 =very important)	0.329	1.390	-0.036	0.965
	(0.830)		(0.090)	
Importance of Fuel Economy rated 6 (7 =very important)	0.561	1.752	-0.156	0.856
	(1.380)		(0.390)	
Importance of Fuel Economy rated 7 (7 =very important)	0.375	1.455	-0.205	0.815
	(0.900)		(0.500)	

EPA Fuel Economy Label Choice Models

Understanding Questions 5 & 6

Dual Fuel PHEV Vehicle Label Compared With an Electric Vehicle Label
(Correct Answer=1, Incorrect Answer=0)

Independent Variables	Correctly identified vehicle B, an Electric Vehicle as better for 30-mile round-trip compared to vehicle A, a Dual Fuel Extended Range Electric Vehicle.		Correctly identified vehicle A, a Dual Fuel Extended Range Electric Vehicle as better for 120-mile round-trip compared to vehicle B, an Electric Vehicle.	
	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Importance of Fuel Economy Label=2	0.215	1.240	0.036	1.037
	(0.750)		(0.130)	
Importance of Fuel Economy Label=3	0.453	1.573	0.114	1.121
	(1.690)		(0.430)	
Importance of Fuel Economy Label=4	0.360	1.433	0.076	1.079
	(1.420)		(0.300)	
Importance of Fuel Economy Label=5	0.262	1.300	-0.139	0.870
	(1.030)		(0.540)	
Importance of Fuel Economy Label=6	0.188	1.207	-0.156	0.856
	(0.710)		(0.590)	
Importance of Fuel Economy Label=7	0.371	1.449	-0.229	0.795
	(1.320)		(0.810)	
Vehicles considered=Sports Car	-0.020	0.980	-0.101	0.904
	(0.140)		(0.730)	
Vehicles considered=Subcompact Car	0.045	1.046	0.390	1.477
	(0.230)		(2.08)*	
Vehicles considered=Compact Car	0.248	1.281	0.308	1.361
	(1.99)*		(2.51)*	
Vehicles considered=Midsized Car	0.164	1.178	0.256	1.292
	(1.740)		(2.74)**	
Vehicles considered=Large Car	-0.207	0.813	-0.023	0.977
	(1.400)		(0.160)	
Vehicles considered=Station Wagon	0.368	1.445	0.060	1.062
	(1.660)		(0.280)	
Vehicles considered=SUV	0.027	1.027	0.176	1.192
	(0.280)		(1.830)	
Vehicles considered=Crossover	0.027	1.027	0.385	1.470
	(0.260)		(3.70)**	
Vehicles considered=Pickup Truck	0.275	1.317	0.159	1.172
	(1.860)		(1.110)	
Vehicles considered=Mini-Van	0.038	1.039	0.381	1.464
	(0.240)		(2.36)*	
Vehicles considered=Van	-0.013	0.987	-1.060	0.346
	(0.030)		(2.32)*	
Vehicles considered=Other	0.548	1.730	0.230	1.259
	(1.830)		(0.820)	
Early Adopter=2 (1 is first to adopt)	0.060	1.062	0.461	1.586
	(0.280)		(2.19)*	
Early Adopter=3 (1 is first to adopt)	0.081	1.084	0.569	1.766
	(0.400)		(2.82)**	
Early Adopter=4 (1 is first to adopt)	0.073	1.076	0.529	1.697
	(0.370)		(2.67)**	
Early Adopter=5 (1 is first to adopt)	0.024	1.024	0.514	1.672
	(0.120)		(2.52)*	
Early Adopter=6 (1 is first to adopt)	-0.102	0.903	0.390	1.477
	(0.450)		(1.700)	
Early Adopter=7 (1 is first to adopt)	-0.107	0.899	0.331	1.392
	(0.370)		(1.130)	
Observations	2398		2378	

Absolute value o statistics i parentheses
significant at 5% * significant at 1%
significant at 10% * significant at 5% si

EPA Fuel Economy Label Choice Models

Selection Questions 1 & 2

Advanced Technology Vehicle Choice Models
(Vehicle A Selected=1, Vehicle B Selected=0)

Independent Variables	Selected Gasoline Vehicle over Dual Fuel Extended Range Electric Vehicle: Coefficient (z-statistic)	Odds Ratio	Selected Gasoline Vehicle over Electric Vehicle: Coefficient (z-statistic)	Odds Ratio
Constant	0.192	1.212	1.106	3.022
	(0.260)		(1.540)	
Label 1 Dummy Variable	0.470	1.600	0.003	1.003
	(4.12)**		(0.030)	
Label 2 Dummy Variable	-0.120	0.887	0.362	1.436
	(1.060)		(3.17)**	
City Miles Share of Miles (e.g., 1-100)	-0.007	0.993	-0.004	0.996
	(3.01)**		(1.660)	
Age 18-24	-0.488	0.614	-0.590	0.554
	(1.450)		(1.740)	
Age 25-34	-0.515	0.598	-0.947	0.388
	(2.27)*		(4.36)**	
Age 35-44	-0.213	0.808	-0.547	0.579
	(0.930)		(2.58)*	
Age 45-54	0.020	1.020	-0.506	0.603
	(0.090)		(2.52)*	
Age 55-64	0.014	1.014	-0.511	0.600
	(0.070)		(2.65)**	
Less than High School	0.120	1.127	0.838	2.312
	(0.140)		(1.080)	
High School	-0.077	0.926	0.022	1.022
	(0.390)		(0.110)	
Some College	-0.103	0.902	0.092	1.096
	(0.770)		(0.700)	
College	-0.122	0.885	0.056	1.058
	(1.020)		(0.470)	
Household Income Less Than $15k	0.340	1.405	-0.174	0.840
	(0.680)		(0.370)	
Household Income $15-$25k	-0.007	0.993	-0.144	0.866
	(0.020)		(0.320)	
Household Income $25-$50k	0.286	1.331	-0.263	0.769
	(1.300)		(1.170)	
Household Income $50-$75k	0.238	1.269	-0.167	0.846
	(1.390)		(0.970)	
Household Income $75-$100k	0.080	1.083	0.029	1.029
	(0.550)		(0.200)	
Household Income $100-$125k	0.252	1.287	0.059	1.061
	(1.670)		(0.400)	
Household Income $125-$150k	0.043	1.044	0.019	1.019
	(0.260)		(0.110)	
Household Size=1	0.053	1.054	0.387	1.473
	(0.090)		(0.630)	
Household Size=2	-0.012	0.988	0.134	1.143
	(0.030)		(0.280)	
Household Size=3	0.025	1.025	0.392	1.480
	(0.050)		(0.810)	
Household Size=4	-0.073	0.930	0.073	1.076
	(0.160)		(0.150)	
Household Size=5	0.356	1.428	0.229	1.257
	(0.750)		(0.470)	
Household Size=6	-0.185	0.831	-0.344	0.709
	(0.350)		(0.600)	

EPA Fuel Economy Label Choice Models

Selection Questions 1 & 2

Advanced Technology Vehicle Choice Models
(Vehicle A Selected=1, Vehicle B Selected=0)

Independent Variables	Selected Gasoline Vehicle over Dual Fuel Extended Range Electric Vehicle: Coefficient (z-statistic)	Odds Ratio	Selected Gasoline Vehicle over Electric Vehicle: Coefficient (z-statistic)	Odds Ratio
Household Vehicles=1	0.648	1.912	0.536	1.709
	(1.510)		(1.350)	
Household Vehicles=2	0.356	1.428	-0.266	0.766
	(1.490)		(1.170)	
Household Vehicles=3	0.127	1.135	-0.347	0.707
	(0.550)		(1.550)	
Household Vehicles=4	0.203	1.225	-0.363	0.696
	(0.800)		(1.480)	
Licensed Drivers in Household=1	0.504	1.655	-0.256	0.774
	(0.910)		(0.460)	
Licensed Drivers in Household=2	0.609	1.839	0.057	1.059
	(1.620)		(0.150)	
Licensed Drivers in Household=3	0.799	2.223	0.051	1.052
	(2.16)*		(0.130)	
Licensed Drivers in Household=4	0.686	1.986	0.302	1.353
	(1.820)		(0.780)	
Male	0.135	1.145	0.190	1.209
	(1.350)		(1.940)	
Daily Miles Driven, Less than 20	-0.470	0.625	-1.099	0.333
	(1.350)		(3.69)**	
Daily Miles Driven, 20-30	-0.228	0.796	-0.812	0.444
	(0.650)		(2.70)**	
Daily Miles Driven, 31-40	-0.286	0.751	-1.034	0.356
	(0.800)		(3.38)**	
Daily Miles Driven, 41-50	-0.169	0.845	-1.050	0.350
	(0.460)		(3.31)**	
Daily Miles Driven, 51-60	-0.154	0.857	-0.977	0.376
	(0.410)		(3.03)**	
Daily Miles Driven, 61-70	0.150	1.162	-1.317	0.268
	(0.360)		(3.55)**	
Daily Miles Driven, 71-80	-0.219	0.803	-0.686	0.504
	(0.510)		(1.840)	
Daily Miles Driven, 81-90	0.303	1.354	-0.311	0.733
	(0.580)		(0.740)	
Daily Miles Driven, 91-100	0.568	1.765	-0.373	0.689
	(1.110)		(0.950)	
Importance of Fuel Economy rated 2 (7 =very important)	-0.411	0.663	-0.460	0.631
	(0.870)		(1.010)	
Importance of Fuel Economy rated 3 (7 =very important)	0.253	1.288	-0.155	0.856
	(0.560)		(0.360)	
Importance of Fuel Economy rated 4 (7 =very important)	0.487	1.627	-0.343	0.710
	(1.150)		(0.860)	
Importance of Fuel Economy rated 5 (7 =very important)	0.358	1.430	-0.490	0.613
	(0.840)		(1.220)	
Importance of Fuel Economy rated 6 (7 =very important)	0.711	2.036	-0.611	0.543
	(1.630)		(1.490)	
Importance of Fuel Economy rated 7 (7 =very important)	0.443	1.557	-0.562	0.570
	(0.990)		(1.330)	

EPA Fuel Economy Label Choice Models

Selection Questions 1 & 2

Advanced Technology Vehicle Choice Models
(Vehicle A Selected=1, Vehicle B Selected=0)

Independent Variables	Selected Gasoline Vehicle over Dual Fuel Extended Range Electric Vehicle: Coefficient (z-statistic)	Odds Ratio	Selected Gasoline Vehicle over Electric Vehicle: Coefficient (z-statistic)	Odds Ratio
Importance of Fuel Economy Label=2	-0.046	0.955	-0.432	0.649
	(0.150)		(1.460)	
Importance of Fuel Economy Label=3	0.013	1.013	-0.348	0.706
	(0.040)		(1.280)	
Importance of Fuel Economy Label=4	-0.481	0.618	-0.355	0.701
	(1.690)		(1.370)	
Importance of Fuel Economy Label=5	-0.485	0.616	-0.307	0.736
	(1.690)		(1.180)	
Importance of Fuel Economy Label=6	-0.453	0.636	-0.394	0.674
	(1.510)		(1.450)	
Importance of Fuel Economy Label=7	-0.589	0.555	-0.660	0.517
	(1.880)		(2.25)*	
Vehicles considered=Sports Car	-0.014	0.986	0.051	1.052
	(0.090)		(0.340)	
Vehicles considered=Subcompact Car	0.145	1.156	0.152	1.164
	(0.710)		(0.770)	
Vehicles considered=Compact Car	-0.024	0.976	0.032	1.033
	(0.180)		(0.240)	
Vehicles considered=Midsized Car	-0.107	0.899	0.098	1.103
	(1.070)		(0.990)	
Vehicles considered=Large Car	0.052	1.053	0.055	1.057
	(0.320)		(0.350)	
Vehicles considered=Station Wagon	0.330	1.391	-0.019	0.981
	(1.380)		(0.080)	
Vehicles considered=SUV	-0.110	0.896	0.085	1.089
	(1.060)		(0.830)	
Vehicles considered=Crossover	0.081	1.084	0.206	1.229
	(0.720)		(1.870)	
Vehicles considered=Pickup Truck	0.129	1.138	0.160	1.174
	(0.820)		(1.060)	
Vehicles considered=Mini-Van	-0.189	0.828	0.199	1.220
	(1.110)		(1.180)	
Vehicles considered=Van	-0.219	0.803	-0.358	0.699
	(0.510)		(0.760)	
Vehicles considered=Other	-0.193	0.824	-0.246	0.782
	(0.660)		(0.770)	
Early Adopter=2 (1 is first to adopt)	0.280	1.323	0.373	1.452
	(1.300)		(1.630)	
Early Adopter=3 (1 is first to adopt)	0.068	1.070	0.137	1.147
	(0.330)		(0.620)	
Early Adopter=4 (1 is first to adopt)	0.597	1.817	0.389	1.476
	(2.92)**		(1.790)	
Early Adopter=5 (1 is first to adopt)	0.360	1.433	0.209	1.232
	(1.720)		(0.940)	
Early Adopter=6 (1 is first to adopt)	0.710	2.034	0.233	1.262
	(2.90)**		(0.930)	
Early Adopter=7 (1 is first to adopt)	0.034	1.035	0.642	1.900
	(0.110)		(2.09)*	
Observations	2404		2404	

Absolute value o statistics i parentheses
significant at 5% * significant at 1%
significant at 10% * significant at 5% si

EPA Fuel Economy Label Choice Models

Selection Questions 3 & 4

Advanced Technology Vehicle Choice Models
(Vehicle A Selected=1, Vehicle B Selected=0)

Independent Variables	Selected Dual Fuel Extended Range Electric Vehicle over Electric Vehicle: Coefficient (z-statistic)	Odds Ratio	Selected Dual Fuel Extended Range Electric Vehicle over Electric Vehicle: Coefficient (z-statistic)	Odds Ratio
Constant	0.839	2.314	-1.669	0.188
	(1.220)		(2.21)*	
Label 1 Dummy Variable	0.088	1.092	-0.056	0.946
	(0.870)		(0.530)	
Label 2 Dummy Variable	0.377	1.458	-0.055	0.946
	(3.52)**		(0.490)	
City Miles Share of Miles (e.g., 1-100)	-0.001	0.999	0.007	1.007
	(0.310)		(3.27)**	
Age 18-24	-0.145	0.865	0.224	1.251
	(0.460)		(0.700)	
Age 25-34	-0.350	0.705	0.098	1.103
	(1.700)		(0.460)	
Age 35-44	-0.396	0.673	0.113	1.120
	(1.930)		(0.530)	
Age 45-54	-0.094	0.910	0.036	1.037
	(0.490)		(0.180)	
Age 55-64	-0.198	0.820	-0.317	0.728
	(1.060)		(1.590)	
Less than High School	-0.231	0.794	-0.142	0.868
	(0.320)		(0.170)	
High School	-0.055	0.946	0.253	1.288
	(0.300)		(1.340)	
Some College	-0.077	0.926	0.092	1.096
	(0.630)		(0.710)	
College	0.111	1.117	0.249	1.283
	(1.010)		(2.14)*	
Household Income Less Than $15k	-0.605	0.546	0.177	1.194
	(1.360)		(0.400)	
Household Income $15-$25k	-0.002	0.998	-0.210	0.811
	0.000		(0.510)	
Household Income $25-$50k	-0.186	0.830	-0.097	0.908
	(0.910)		(0.460)	
Household Income $50-$75k	-0.124	0.883	-0.123	0.884
	(0.790)		(0.750)	
Household Income $75-$100k	-0.058	0.944	-0.176	0.839
	(0.430)		(1.220)	
Household Income $100-$125k	0.001	1.001	-0.095	0.909
	0.000		(0.660)	
Household Income $125-$150k	-0.043	0.958	0.081	1.084
	(0.280)		(0.510)	
Household Size=1	0.190	1.209	0.866	2.377
	(0.340)		(1.440)	
Household Size=2	0.128	1.137	0.506	1.659
	(0.290)		(1.040)	
Household Size=3	0.274	1.315	0.415	1.514
	(0.630)		(0.860)	
Household Size=4	0.132	1.141	0.238	1.269
	(0.300)		(0.490)	
Household Size=5	0.225	1.252	0.173	1.189
	(0.510)		(0.350)	
Household Size=6	0.110	1.116	0.481	1.618
	(0.220)		(0.890)	

EPA Fuel Economy Label Choice Models

Selection Questions 3 & 4

Advanced Technology Vehicle Choice Models
(Vehicle A Selected=1, Vehicle B Selected=0)

Independent Variables	Selected Dual Fuel Extended Range Electric Vehicle over Electric Vehicle: Coefficient (z-statistic)	Odds Ratio	Selected Dual Fuel Extended Range Electric Vehicle over Electric Vehicle: Coefficient (z-statistic)	Odds Ratio
Household Vehicles=1	-0.845	0.430	-0.032	0.969
	(2.09)*		(0.080)	
Household Vehicles=2	-0.391	0.676	0.241	1.273
	(1.780)		(1.010)	
Household Vehicles=3	-0.358	0.699	0.355	1.426
	(1.660)		(1.520)	
Household Vehicles=4	-0.399	0.671	-0.103	0.902
	(1.700)		(0.400)	
Licensed Drivers in Household=1	0.826	2.284	-0.622	0.537
	(1.580)		(1.150)	
Licensed Drivers in Household=2	0.072	1.075	-0.607	0.545
	(0.200)		(1.620)	
Licensed Drivers in Household=3	0.156	1.169	-0.455	0.634
	(0.440)		(1.240)	
Licensed Drivers in Household=4	-0.028	0.972	-0.367	0.693
	(0.080)		(0.970)	
Male	0.164	1.178	-0.089	0.915
	(1.800)		(0.930)	
Daily Miles Driven, Less than 20	-1.025	0.359	0.296	1.344
	(3.35)**		(0.860)	
Daily Miles Driven, 20-30	-0.761	0.467	0.360	1.433
	(2.46)*		(1.040)	
Daily Miles Driven, 31-40	-1.023	0.360	0.242	1.274
	(3.27)**		(0.690)	
Daily Miles Driven, 41-50	-1.298	0.273	0.523	1.687
	(4.02)**		(1.460)	
Daily Miles Driven, 51-60	-0.865	0.421	0.430	1.537
	(2.64)**		(1.180)	
Daily Miles Driven, 61-70	-1.106	0.331	0.199	1.220
	(3.05)**		(0.490)	
Daily Miles Driven, 71-80	-0.573	0.564	0.223	1.250
	(1.520)		(0.530)	
Daily Miles Driven, 81-90	-0.795	0.452	0.342	1.408
	(1.850)		(0.710)	
Daily Miles Driven, 91-100	-0.275	0.760	0.096	1.101
	(0.680)		(0.210)	
Importance of Fuel Economy rated 2 (7 =very important)	-0.428	0.652	0.723	2.061
	(0.960)		(1.540)	
Importance of Fuel Economy rated 3 (7 =very important)	0.014	1.014	0.077	1.080
	(0.030)		(0.170)	
Importance of Fuel Economy rated 4 (7 =very important)	-0.204	0.815	0.303	1.354
	(0.520)		(0.720)	
Importance of Fuel Economy rated 5 (7 =very important)	-0.321	0.725	0.254	1.289
	(0.810)		(0.600)	
Importance of Fuel Economy rated 6 (7 =very important)	-0.161	0.851	0.030	1.030
	(0.400)		(0.070)	
Importance of Fuel Economy rated 7 (7 =very important)	-0.442	0.643	0.233	1.262
	(1.070)		(0.520)	

EPA Fuel Economy Label Choice Models

Selection Questions 3 & 4

Advanced Technology Vehicle Choice Models
(Vehicle A Selected=1, Vehicle B Selected=0)

Independent Variables	Selected Dual Fuel Extended Range Electric Vehicle over Electric Vehicle		Selected Dual Fuel Extended Range Electric Vehicle over Electric Vehicle	
	Coefficient (z-statistic)	Odds Ratio	Coefficient (z-statistic)	Odds Ratio
Importance of Fuel Economy Label=2	-0.132	0.876	-0.052	0.949
	(0.460)		(0.180)	
Importance of Fuel Economy Label=3	-0.273	0.761	-0.139	0.870
	(1.030)		(0.500)	
Importance of Fuel Economy Label=4	-0.022	0.978	-0.118	0.889
	(0.090)		(0.440)	
Importance of Fuel Economy Label=5	-0.135	0.874	-0.039	0.962
	(0.530)		(0.150)	
Importance of Fuel Economy Label=6	-0.276	0.759	-0.043	0.958
	(1.040)		(0.160)	
Importance of Fuel Economy Label=7	-0.270	0.763	-0.062	0.940
	(0.960)		(0.210)	
Vehicles considered=Sports Car	-0.118	0.889	0.072	1.075
	(0.850)		(0.510)	
Vehicles considered=Subcompact Car	0.155	1.168	-0.131	0.877
	(0.850)		(0.680)	
Vehicles considered=Compact Car	0.138	1.148	0.099	1.104
	(1.150)		(0.790)	
Vehicles considered=Midsized Car	0.041	1.042	0.169	1.184
	(0.450)		(1.760)	
Vehicles considered=Large Car	-0.039	0.962	-0.220	0.803
	(0.270)		(1.380)	
Vehicles considered=Station Wagon	-0.029	0.971	-0.242	0.785
	(0.140)		(1.050)	
Vehicles considered=SUV	0.003	1.003	-0.040	0.961
	(0.030)		(0.400)	
Vehicles considered=Crossover	0.411	1.508	-0.221	0.802
	(4.02)**		(2.00)*	
Vehicles considered=Pickup Truck	0.068	1.070	-0.087	0.917
	(0.480)		(0.580)	
Vehicles considered=Mini-Van	0.093	1.097	-0.111	0.895
	(0.590)		(0.650)	
Vehicles considered=Van	-0.116	0.890	0.350	1.419
	(0.280)		(0.850)	
Vehicles considered=Other	0.208	1.231	0.284	1.328
	(0.760)		(1.010)	
Early Adopter=2 (1 is first to adopt)	0.375	1.455	0.200	1.221
	(1.780)		(0.920)	
Early Adopter=3 (1 is first to adopt)	0.323	1.381	0.125	1.133
	(1.610)		(0.600)	
Early Adopter=4 (1 is first to adopt)	0.517	1.677	-0.048	0.953
	(2.61)**		(0.230)	
Early Adopter=5 (1 is first to adopt)	0.242	1.274	0.068	1.070
	(1.180)		(0.320)	
Early Adopter=6 (1 is first to adopt)	0.327	1.387	0.100	1.105
	(1.430)		(0.420)	
Early Adopter=7 (1 is first to adopt)	0.451	1.570	0.194	1.214
	(1.560)		(0.650)	
Observations	2400		2404	

Absolute value o statistics i parentheses
significant at 5% * significant at 1%
significant at 10% * significant at 5% si

EPA Fuel Economy Label Choice Models

Understanding Questions (1-6)

Pooled Understanding Questions

Independent Variables	Coefficient (z-statistic)	Odds Ratio
Constant	-0.324	0.723
	(1.160)	
Label 1 Dummy Variable	-0.119	0.888
	(2.89)**	
Label 2 Dummy Variable	0.232	1.261
	(5.30)**	
City Miles Share of Miles (e.g., 1-100)	-0.001	0.999
	(1.330)	
Age 18-24	-0.161	0.851
	(1.270)	
Age 25-34	-0.069	0.933
	(0.820)	
Age 35-44	-0.099	0.906
	(1.180)	
Age 45-54	-0.065	0.937
	(0.820)	
Age 55-64	0.038	1.039
	(0.490)	
Less than High School	-0.621	0.537
	(2.04)*	
High School	-0.252	0.777
	(3.46)**	
Some College	-0.136	0.873
	(2.74)**	
College	-0.025	0.975
	(0.550)	
Household Income Less Than $15k	-0.294	0.745
	(1.680)	
Household Income $15-$25k	-0.573	0.564
	(3.43)**	
Household Income $25-$50k	-0.109	0.897
	(1.330)	
Household Income $50-$75k	0.057	1.059
	(0.890)	
Household Income $75-$100k	0.053	1.054
	(0.960)	
Household Income $100-$125k	0.091	1.095
	(1.620)	
Household Income $125-$150k	0.115	1.122
	(1.830)	
Household Size=1	-0.073	0.930
	(0.320)	
Household Size=2	-0.183	0.833
	(1.020)	
Household Size=3	-0.038	0.963
	(0.210)	
Household Size=4	-0.046	0.955
	(0.260)	
Household Size=5	-0.062	0.940
	(0.340)	
Household Size=6	0.020	1.020
	(0.100)	

EPA Fuel Economy Label Choice Models

Understanding Questions (1-6)

Pooled Understanding Questions

Independent Variables	Coefficient (z-statistic)	Odds Ratio
Household Vehicles=1	-0.269	0.764
	(1.680)	
Household Vehicles=2	-0.286	0.751
	(3.16)**	
Household Vehicles=3	-0.270	0.763
	(3.04)**	
Household Vehicles=4	-0.240	0.787
	(2.49)*	
Licensed Drivers in Household=1	0.708	2.030
	(3.33)**	
Licensed Drivers in Household=2	0.531	1.701
	(3.64)**	
Licensed Drivers in Household=3	0.526	1.692
	(3.68)**	
Licensed Drivers in Household=4	0.343	1.409
	(2.35)*	
Male	0.390	1.477
	(10.46)**	
Daily Miles Driven, Less than 20	-0.025	0.975
	(0.210)	
Daily Miles Driven, 20-30	-0.072	0.931
	(0.590)	
Daily Miles Driven, 31-40	-0.146	0.864
	(1.180)	
Daily Miles Driven, 41-50	-0.079	0.924
	(0.620)	
Daily Miles Driven, 51-60	-0.069	0.933
	(0.530)	
Daily Miles Driven, 61-70	-0.210	0.811
	(1.460)	
Daily Miles Driven, 71-80	-0.152	0.859
	(1.000)	
Daily Miles Driven, 81-90	-0.221	0.802
	(1.280)	
Daily Miles Driven, 91-100	-0.286	0.751
	(1.780)	
Importance of Fuel Economy rated 2 (7 =very important)	0.254	1.289
	(1.400)	
Importance of Fuel Economy rated 3 (7 =very important)	-0.036	0.965
	(0.210)	
Importance of Fuel Economy rated 4 (7 =very important)	0.083	1.087
	(0.520)	
Importance of Fuel Economy rated 5 (7 =very important)	0.192	1.212
	(1.190)	
Importance of Fuel Economy rated 6 (7 =very important)	0.189	1.208
	(1.150)	
Importance of Fuel Economy rated 7 (7 =very important)	0.059	1.061
	(0.350)	

EPA Fuel Economy Label Choice Models

Understanding Questions (1-6)

Pooled Understanding Questions

Independent Variables	Coefficient (z-statistic)	Odds Ratio
Importance of Fuel Economy Label=2	0.123	1.131
	(1.050)	
Importance of Fuel Economy Label=3	0.067	1.069
	(0.620)	
Importance of Fuel Economy Label=4	-0.028	0.972
	(0.270)	
Importance of Fuel Economy Label=5	-0.035	0.966
	(0.340)	
Importance of Fuel Economy Label=6	0.018	1.018
	(0.160)	
Importance of Fuel Economy Label=7	0.003	1.003
	(0.030)	
Vehicles considered=Sports Car	-0.133	0.875
	(2.39)*	
Vehicles considered=Subcompact Car	0.121	1.129
	(1.590)	
Vehicles considered=Compact Car	0.240	1.271
	(4.85)**	
Vehicles considered=Midsized Car	0.109	1.115
	(2.91)**	
Vehicles considered=Large Car	0.032	1.033
	(0.540)	
Vehicles considered=Station Wagon	0.118	1.125
	(1.370)	
Vehicles considered=SUV	0.059	1.061
	(1.530)	
Vehicles considered=Crossover	0.154	1.166
	(3.65)**	
Vehicles considered=Pickup Truck	0.059	1.061
	(1.020)	
Vehicles considered=Mini-Van	0.136	1.146
	(2.11)*	
Vehicles considered=Van	-0.342	0.710
	(2.05)*	
Vehicles considered=Other	0.254	1.289
	(2.23)*	
Early Adopter=2 (1 is first to adopt)	0.122	1.130
	(1.460)	
Early Adopter=3 (1 is first to adopt)	0.297	1.346
	(3.72)**	
Early Adopter=4 (1 is first to adopt)	0.196	1.217
	(2.50)*	
Early Adopter=5 (1 is first to adopt)	0.183	1.201
	(2.27)*	
Early Adopter=6 (1 is first to adopt)	0.121	1.129
	(1.330)	
Early Adopter=7 (1 is first to adopt)	-0.116	0.890
	(1.000)	
Observations	14,281	

Absolute value o statistics in parentheses
significant at 5% ** significant at 1%
significant at 10% * significant at 5% si