Comparison of Metro Vancouver respondents in 2017 and 2013 consumer surveys of plug-in electric vehicles

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Disclaimer

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We take an interdisciplinary approach to low-carbon transportation solutions, integrating relevant insights from quantitative and qualitative research methods, such as statistical analyses, energy-economy modeling, consumer and citizen surveys, stakeholder interviews, media analysis and policy analysis. Our current research focus centers around four main themes:

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Glossary

Vehicle technologies

- CNGV – Compressed natural gas vehicle (fueled by natural gas)
- CV – Conventional vehicle (fueled by gasoline)
- BEV – Battery electric vehicle (fueled by only electricity)
- FFV – Flex-fuel vehicle (fueled by gasoline or E-85)
- HEV – Hybrid electric vehicle (fueled by gasoline)
- HFCV – Hydrogen fuel cell vehicle (fueled by hydrogen)
- PEV – Plug-in electric vehicle (includes both BEVs and PHEVs)
- PHEV – Plug-in hybrid electric vehicle (fueled by electricity and gasoline)
- ZEV – Zero emissions vehicle (includes BEVs, PHEVs and HFCVs)

Other terms

- Mainstream consumers – those who have not purchased a PEV
- Pioneers – consumers who have already purchased a PEV
- CZEVS – Our 2017 Canadian Zero Emissions Vehicle Survey, which surveyed 2,123 new vehicle buying Mainstream consumers, of which 353 are from Metro Vancouver
- CPEVS – Our 2013 Canadian Plug-in Electric Vehicle Survey, which surveyed 1,754 number of new vehicle buying Mainstream consumers, of which 271 are from Metro Vancouver and as well as 97 Pioneers from Metro Vancouver

Contents

Introduction

In this report, we explore how Metro Vancouver consumer awareness, interest in, and preferences for plug-in electric vehicles (PEVs) have changed between 2017 and 2013. Using two cross-sectional surveys, we identify differences over time to help inform Metro Vancouver's PEV policy and program efforts. This report serves as an addendum to our *Canadian Zero-Emissions Vehicle Survey Metro Vancouver Analysis* report.

Our repeated observations are drawn from two consumer surveys of the Canadian electrified vehicle market implemented by START in 2013 (the Canadian Plug-in Electric Vehicle Survey, CPEVS) and in 2017 (the Canadian Zero Emissions Vehicle Survey, CZEVS)[1]. Both surveys examine factors underlying consumer preferences for PEVs, and assess consumers' social and technical "readiness" for a range of vehicle types. CPEVS asked consumers to consider **battery electric (BEV), plug-in hybrid (PHEV), and hybrid (HEV) vehicles**, and CZEVS asked consumers to consider these same technologies, as well as **hydrogen fuel cell (HFCV) vehicles**. While both surveys contain similar components and questions, there are some aspects of CZEVS and CPEVS that are not directly comparable. In this report, we compare survey results only from questions that are identical (or nearly identical) in terms of phrasing and response options. Additionally, the target samples of the surveys were slightly different, where CZEVS surveyed new vehicle buyers only and CPEVS surveyed new vehicle buyers as well as PEV owners. We compare findings from CZEVS and CPEVS to explore how consumers' awareness of, interest in, and preferences for PEVs, as well as their infrastructure, have shifted between 2013 and 2017.

We compare our Metro Vancouver survey samples in eight key areas:

1. Respondent **interest** in PEVs
2. Respondent **familiarity** with PEV technologies and models
3. Respondent **understanding** of PEV refueling methods
4. Respondent **awareness** of PEVs
5. **Sources of information** shaping respondent opinions of PEVs
6. Respondent **awareness of public chargers**
7. Respondent opinions regarding **climate change**
8. Respondent **demographics** (age, income, dwelling type, home ownership, and urban or rural residence)

Because consumers can vary widely in their perceptions, preferences, and motivations, we find it helpful to divide potential PEV buyers into segments based on their interest in PEVs to understand the unique characteristics of each segment. As in our *Canadian Zero-Emissions Vehicle Survey Metro Vancouver Analysis* report, we identify three distinct consumer groups:

1. **Pioneers** – these respondents already own a BEV or PHEV. Research shows that these consumers are distinct, typically having higher income and education,

[1] Please refer to our *Canadian Zero-Emissions Vehicle Survey Metro Vancouver Analysis* report for a detailed explanation of our survey methods.

greater pro-environmental values, interest in new technology, and willingness to explore and experiment (Axsen & Kurani, 2013; Axsen et al., 2015; Axsen et al., 2016).

2. **Potential Early Mainstream PEV buyers** – these are respondents who are interested in PEVs, as assessed through their designs of a BEV, PHEV or HFCV in the design game[2]. PEVs must be accepted by these consumers to ultimately become a widely accepted technology.
3. **Potential Late Mainstream buyers** – these respondents are not currently interested in PEVs, as assessed through their designs of a conventional vehicle (CV) or HEV in the design game. Changes in policy, costs, technology or cultural norms are likely required before these consumers purchase PEVs.

We compare these consumer segments specifically in their demographics to identify key distinctions between the groups, noting any differences (and consistencies) between 2013 and 2017 Early and Late Mainstream respondents. We also compare the general Mainstream (i.e., non-PEV owners) samples to Pioneers in the seven other key areas (i.e., PEV interest, familiarity, public charger awareness, etc.) to identify differences between Mainstream and Pioneer respondents.

Summary of key trends

- **Mainstream respondent interest in PEVs is largely unchanged** between 2013 and 2017, with about one third of respondents expressing interest in owning a PEV (or HFCV) in 2017), as indicated by their responses to the vehicle design exercises. PEV Pioneers (owners) in 2013[3] stated greater interest in PEVs than Mainstream respondents in both samples (Tables 1-3).
- **Mainstream respondent familiarity with PEV technologies and popular models is similar** in 2013 and 2017. Pioneers are more familiar with PEV technologies and models than Mainstream respondents (Tables 4-6).
- **Mainstream respondents' understanding of how to fuel popular PEV models is largely unchanged** in 2017 compared to 2013. Similar proportions of respondents correctly identify that the Toyota Prius (an HEV) is fueled by only gasoline, the Chevrolet Volt (a PHEV) is fueled by gasoline and electricity, and the Nissan Leaf (a BEV) is fueled by electricity only. Pioneers have greater understanding of how to fuel popular PEV models than Mainstream respondents (Tables 7-9).
- **Respondents are aware of more PEV models in 2017** compared to 2013. More respondents have heard of the Toyota Prius (an HEV), Chevrolet Volt (a PHEV) and Nissan Leaf (a BEV) in 2017 than in 2013. While most respondents in 2017 and 2013 have heard of various PEV models, only a minority of respondents have further experience. One explanation is there are more PEV models available for sale in 2017 compared to 2013.

[2] Please refer to our *Canadian Zero-Emissions Vehicle Survey Metro Vancouver Analysis* report for a detailed explanation of our survey methods, including the design game methodology.
[3] As a reminder, Pioneer buyers were only surveyed in 2013.

Pioneers have greater awareness of PEV models than Mainstream respondents (Tables 10-12).

- **The news, TV commercials, conversations with family and friends, and personal research remain the most important sources of information** that shape respondent opinions of PEVs from 2013-2017 (Tables 13-15).
- **Public charger awareness among Mainstream respondents has increased** substantially in 2017 compared to 2013, with three quarters of respondents being aware of at least one charger in 2017, compared to about one third of respondents in 2013. This increase is likely at least partially explained by the substantial increase in public charger installations during that time. Pioneers are more aware of public chargers than Mainstream respondents' awareness (Tables 16-18).
- **Mainstream respondents' opinions about climate change are largely unchanged** in 2017 compared to 2013. Pioneers have stronger opinions about climate change being a serious problem than Mainstream respondents (Tables 19-21).

We also identify some key differences between Pioneer, Early Mainstream, Late Mainstream respondents (that seem to hold across time);

- **Early Mainstream respondents tend to be younger** than both Late Mainstream respondents and Pioneers (Tables 22-23).
- **Early Mainstream respondents tend to have higher incomes** than Late Mainstream respondents, but lower incomes than Pioneers (Tables 22-23).
- **Early Mainstream respondents are more likely to live in detached homes** than Late Mainstream respondents, although Pioneers have the highest rates of attached home occupancy (Tables 22-23).
- **Early and Late Mainstream respondents have similar rates of home ownership**, with about three quarters of respondents owning their home. In contrast, almost all Pioneers own their homes (Tables 22-23).
- **Mainstream respondents and Pioneers have similar patterns of geographic dispersion in urban and rural areas** (Tables 22-23).

Data Tables

Here we present data from eight key areas in our 2017 and 2013 surveys:

1. Respondent **interest** in PEVs
2. Respondent **familiarity** with PEV technologies and models
3. Respondent **understanding** of PEV refueling methods
4. Respondent **awareness** of PEVs
5. **Sources of information** shaping respondent opinions of PEVs
6. Respondent **awareness of public chargers**
7. Respondent opinions regarding **climate change**
8. Respondent **demographics** (age, income, dwelling type, home ownership, and urban or rural residence)

For each key area, we present the phrasing of the associated question from the surveys and observed responses from our Metro Vancouver samples, including the number (n) and percentage (%) of respondents who answered each response option.

For our 2017 CZEVS sample, we show unweighted and weighted data for each question. The weighted data account for the oversample of respondents in the City of Vancouver (relative to respondents in the rest of Metro Vancouver) in our survey sample to be more reflective of the population of residents in Metro Vancouver. We show weighted percentages of respondents who answered each response option only in separate tables from the unweighted data.

For our 2013 CPEVS sample, we show data from the sample of new vehicle owners in Metro Vancouver and data from the sample of PEV Pioneers in Metro Vancouver. Both samples' data are unweighted because respondents from the City of Vancouver and the rest of Metro Vancouver were sampled proportionally.

1. PEV interest

How has respondent interest in PEVs changed between 2013 and 2017?

Key trends: Overall, mainstream respondent interest in PEVs is largely unchanged between 2017 and 2013 (as assessed by our design game results) with about one third of respondents designing a PEV. Pioneers have greater interest in PEVs than Mainstream consumers.

CZEVS (2017) We assess vehicle interest by asking respondents to design a version of their next anticipated vehicle purchase in one five drivetrains: a CV, HEV, PHEV, BEV, or HFCV. We ask them to complete these designs under higher price and lower price conditions (see *Canadian Zero-Emissions Vehicle Survey Metro Vancouver Analysis* report for details).

Table 1: CZEVS (2017) vehicle designs in the higher and lower price scenarios (n=353,)

Unweighted

	Higher price scenario		Lower price scenario	
	n	%	n	%
CV	166	47%	140	40%
HEV	126	36%	128	36%
PHEV	48	14%	53	15%
BEV	7	2.0%	21	5.9%
HFCV	6	1.7%	11	3.1%

Weighted

	Higher price scenario	Lower price scenario
	%	%
CV	49%	41%
HEV	33%	35%
PHEV	14%	15%
BEV	2.0%	5.8%
HFCV	2.2%	3.4%

CPEVS (2013) We assess vehicle interest by asking respondents to design a version of their next anticipated vehicle purchase (i.e., their ideal vehicle) in one five drivetrains: a CV, HEV, PHEV, or BEV. We ask them to complete these designs under higher price and lower price conditions.

Table 2: CPEVS (Mainstream consumers, 2013) vehicle designs in the higher and lower price scenarios (n=271, unweighted)

	Higher price design		Lower price design	
	n	%	n	%
CV	57	21%	40	15%
HEV	135	50%	121	45%
PHEV	74	27%	99	36%
BEV	5	1.8%	11	4.1%

Table 3: CPEVS (Pioneers, 2013) vehicle designs in the higher and lower prices scenarios (n=63, unweighted) [4]

	Higher price design		Lower price design	
	n	%	n	%
CV	1	1.6%	0	0.0%
HEV	1	1.6%	0	0.0%
PHEV	28	44%	17	27%
BEV	33	52%	46	73%

[4] Note: not all Pioneers completed the design games, so the sample size is slightly smaller for this metric.

2. PEV familiarity

How has respondent familiarity with PEV technologies and popular models changed between 2013 and 2017?

Key trends: Mainstream respondent familiarity with PEV technologies and popular models is similar between 2013 and 2017. Mainstream respondents tend to be more familiar with vehicle technologies rather than specific vehicle models. Pioneers' familiarity with PEV technologies and popular models is higher than Mainstream respondents' familiarity.

CZEVS (2017) How familiar are you with the following vehicles and vehicle technologies? For example, do you know how you would drive and recharge/refuel them, and what makes them different from each other?

Table 4: CZEVS (2017) stated familiarity with PEV technologies and models (n=353)

Unweighted

	Vehicle technologies										Vehicle models									
	HEVs		PHEVs		BEVs		HFCVs		FFVs		Toyota Prius (HEV)		Chevrolet Volt (PHEV)		Tesla Model S (BEV)		Nissan Leaf (BEV)		Hyundai Tucson Fuel Cell (HFCV)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Not familiar	81	23%	125	35%	127	36%	246	70%	195	55%	103	29%	150	42%	131	37%	197	56%	269	76%
Somewhat familiar	173	49%	150	42%	152	43%	74	21%	111	31%	133	38%	119	34%	130	37%	92	26%	52	15%
Moderately familiar	77	22%	63	18%	51	14%	21	6%	31	9%	87	25%	62	18%	62	18%	43	12%	18	5%
Very familiar	22	6%	15	4%	23	7%	12	3%	16	5%	30	8%	22	6%	30	8%	21	6%	15	4%

Weighted

	Vehicle technologies					Vehicle models				
	HEVs	PHEVs	BEVs	HFCVs	FFVs	Toyota Prius (HEV)	Chevrolet Volt (PHEV)	Tesla Model S (BEV)	Nissan Leaf (BEV)	Hyundai Tucson Fuel Cell (HFCV)
	%	%	%	%	%	%	%	%	%	%
Not familiar	23%	35%	36%	70%	53%	31%	43%	38%	56%	75%
Somewhat familiar	50%	44%	43%	21%	33%	38%	33%	36%	26%	16%
Moderately familiar	22%	17%	14%	6%	8%	24%	18%	17%	13%	5%
Very familiar	5%	4%	7%	4%	5%	8%	6%	9%	6%	4%

CPEVS (2013) How familiar are you with the following vehicles or technologies? For example, do you know how you would drive and refuel them?

Table 5: CPEVS (Mainstream consumers, 2013) stated familiarity with ZEV technologies and models (n=271, unweighted)

	Vehicle technologies										Vehicle models					
	HEVs		PHEVs		BEVs		HFCVs		CNGVs		Toyota Prius (HEV)		Chevrolet Volt (PHEV)		Nissan Leaf (BEV)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Not familiar	38	14%	72	27%	78	29%	136	50%	157	58%	56	21%	117	43%	159	59%
Somewhat familiar	133	49%	119	44%	119	44%	86	32%	59	22%	119	44%	94	35%	60	22%
Moderately familiar	77	28%	66	24%	55	20%	33	12%	40	15%	66	24%	41	15%	39	14%
Very familiar	23	8%	14	5%	18	7%	12	4%	12	4%	30	11%	18	7%	12	4%

Table 6: CPEVS (Pioneers, 2013) stated familiarity with ZEV technologies and models (n=97, unweighted)

	Vehicle technologies										Vehicle models					
	HEVs		PHEVs		BEVs		HFCVs		CNGVs		Toyota Prius (HEV)		Chevrolet Volt (PHEV)		Nissan Leaf (BEV)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Own/lease	6	6%	10	10%	32	33%	0	0%	0	0%	6	6%	15	15%	34	35%
Not familiar	3	3%	2	2%	0	0%	45	46%	52	54%	4	4%	5	5%	2	2%
Somewhat familiar	18	19%	23	24%	3	3%	26	27%	25	26%	15	15%	15	15%	9	9%
Moderately familiar	33	34%	31	32%	16	16%	14	14%	11	11%	34	35%	26	27%	18	19%
Very familiar	37	38%	31	32%	46	47%	12	12%	9	9%	38	39%	36	37%	34	35%

3. PEV understanding

How has respondent understanding of PEVs changed between 2013 and 2017? For example, how has understanding of popular PEV model refueling methods changed?

Key trends: Mainstream respondents' understanding of how to fuel popular PEV models is largely unchanged in 2017 compared to 2013, where similar proportions of respondents correctly identify that the Toyota Prius (an HEV) is fueled by only gasoline, the Chevrolet Volt (a PHEV) is fueled by gasoline and electricity, and the Nissan Leaf (a BEV) is fueled by electricity only. Pioneers have greater understanding of correct PEV model refueling methods than Mainstream respondents. Notably (although only assessed in 2017), Mainstream respondents in 2017 recognize the Tesla Model S (a BEV) as fueled by electricity only more than they recognize that the Nissan Leaf is fueled by electricity only.

CZEVS (2017) Some of these vehicles and vehicle technologies only use gasoline, some only use electricity from an electrical outlet, some can use both gasoline and electricity, and some use hydrogen. How do you think that each of the following vehicles can be fueled?

Table 7: CZEVS (2017) stated understanding of vehicle technology and model refueling methods, by fueling type (n=353)

Unweighted

	Vehicle technologies										Vehicle models									
	HEV		PHEV		BEV		HFCV		FFV		Toyota Prius (HEV)		Chevrolet Volt (PHEV)		Nissan Leaf (BEV)		Tesla Model S (BEV)		Hyundai Tucson (HFCV)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Gas	60	17%	6	2%	4	1%	3	1%	13	4%	58	16%	9	3%	11	3%	7	2%	5	1%
Electricity	13	4%	88	25%	241	68%	11	3%	5	1%	25	7%	114	32%	103	29%	178	50%	14	4%
Gas and electricity	187	53%	181	51%	29	8%	23	7%	52	15%	158	45%	74	21%	35	10%	35	10%	17	5%
Hydrogen	6	2%	3	1%	5	1%	190	54%	11	3%	5	1%	5	1%	9	3%	7	2%	84	24%
E85	2	1%	4	1%	2	1%	3	1%	9	3%	5	1%	4	1%	2	1%	8	2%	6	2%
Gas or E85	9	3%	2	1%	1	0%	3	1%	95	27%	5	1%	4	1%	4	1%	2	1%	3	1%
I don't know	76	22%	69	20%	71	20%	120	34%	168	48%	97	27%	143	41%	189	54%	116	33%	224	63%

Note: shading indicates correct fueling method.

Weighted

	Vehicle technologies					Vehicle models				
	HEV	PHEV	BEV	HFCV	FFV	Toyota Prius (HEV)	Chevrolet Volt (PHEV)	Nissan Leaf (BEV)	Tesla Model S (BEV)	Hyundai Tucson (HFCV)
	%	%	%	%	%	%	%	%	%	%
Gas	15%	2%	1%	1%	4%	15%	2%	3%	2%	1%
Electricity	3%	27%	69%	4%	2%	7%	32%	29%	48%	4%
Gas and electricity	55%	50%	9%	6%	14%	46%	22%	11%	11%	6%
Hydrogen	2%	1%	1%	52%	3%	1%	1%	3%	2%	24%
E85	0%	1%	1%	0%	3%	1%	2%	1%	2%	2%
Gas or E85	3%	1%	0%	1%	28%	2%	2%	1%	1%	1%
I don't know	22%	19%	19%	36%	47%	28%	40%	53%	35%	63%

Note: shading indicates correct fueling method.

CPEVS (2013) Some of these vehicles only use **gasoline**, some only use **electricity** from an electrical outlet, and some can use **both**. How do you think that each of the following vehicles can be fueled?

Table 8: CPEVS (Mainstream consumers, 2013) Stated understanding of vehicle model refueling methods, by fueling type (n=271, unweighted)

	Toyota Prius (HEV)		Chevrolet Volt (PHEV)		Nissan Leaf (BEV)	
	n	%	n	%	n	%
Gas	56	21%	7	2.6%	7	2.6%
Electricity	9	3.3%	81	30%	99	37%
Gas and electricity	159	59%	93	34%	39	14%
I don't know	47	17%	90	33%	126	47%

Note: shading indicates correct fueling method.

Table 9: CPEVS (Pioneers, 2013) stated understanding of vehicle model refueling methods, by fueling type (n=97, unweighted)

	Toyota Prius (HEV)		Chevrolet Volt (PHEV)		Nissan Leaf (BEV)	
	n	%	n	%	n	%
Gas	67	69%	0	0%	0	0%
Electricity	1	1.0%	6	6.2%	95	98%
Gas and electricity	27	28%	89	92%	1	1.0%
I don't know	2	2.1%	2	2.1%	1	1.0%

Note: shading indicates correct fueling method.

4. PEV model awareness

How has respondent awareness of specific PEV models changed between 2017 and 2013?

Key trends: Mainstream respondents are more aware of popular PEV models in 2017 compared to 2013, specifically having heard of the Toyota Prius (an HEV), Chevrolet Volt (a PHEV) and Nissan Leaf (a BEV). Most respondents have heard of each PEV model, but a minority of consumers have further experience with them. Pioneers have greater awareness of and experience with PEV models than Mainstream respondents.

CZEVS (2017) Please indicate your experience with each of the following vehicle models. Select all that apply for each vehicle model.

Table 10: CZEVS (2017) awareness of HEV and PEV models (n=353)

Unweighted

	I have heard of this		I have seen/heard/read information on this (e.g., via YouTube or the news)		I have seen one		I have spoken with an owner of one		I have driven or been a passenger in one		I want to buy/lease one		I own/lease (or owned/leased) one	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Toyota Prius (HEV)	343	97%	74	21%	99	28%	45	13%	75	21%	19	5.4%	7	2.0%
Chevrolet Volt (PHEV)	308	87%	73	21%	67	19%	12	3.4%	7	2.0%	7	2.0%	5	1.4%
Nissan Leaf (BEV)	282	80%	64	18%	50	14%	11	3.1%	10	2.8%	10	2.8%	5	1.4%
Tesla Model S (BEV)	316	90%	75	21%	95	27%	31	8.8%	16	4.5%	31	8.8%	3	0.8%
Hyundai Tucson F-cell (HFCV)	214	61%	34	10%	12	3.4%	4	1.1%	4	1.1%	6	1.7%	4	1.1%

Weighted

	I have heard of this	I have seen/heard/read information on this (e.g., via YouTube or the news)	I have seen one	I have spoken with an owner of one	I have driven or been a passenger in one	I want to buy/lease one	I own/lease (or owned/leased) one
	%	%	%	%	%	%	%
Toyota Prius (HEV)	97%	21%	29%	12%	19%	5.3%	2.0%
Chevrolet Volt (PHEV)	88%	20%	20%	4.0%	2.3%	1.8%	2.0%
Nissan Leaf (BEV)	81%	18%	15%	4.0%	3.2%	3.2%	2.0%
Tesla Model S (BEV)	89%	21%	28%	10%	5.1%	10%	1.2%
Hyundai Tucson F-cell (HFCV)	63%	11%	3.8%	1.3%	1.6%	1.9%	1.6%

CPEVS (2013) Please indicate your experience with each of the following vehicle models (select all that apply for each vehicle model).

Table 11: CPEVS (Mainstream consumers, 2013) awareness of HEV and PEV models (n=271, unweighted)

	I have not heard of this		I have heard of this		I have researched this		I have spoken with an owner of one		I have driven or been a passenger in one		I want to buy one		I own (or owned) one	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Toyota Prius (HEV)	16	5.9%	217	80%	46	17%	49	18%	65	24%	29	11%	9	3.3%
Chevrolet Volt (PHEV)	76	28%	186	69%	28	10%	14	5.2%	17	6.3%	15	5.5%	5	1.8%
Nissan Leaf (BEV)	128	47%	133	49%	16	5.9%	6	2.2%	4	1.5%	4	1.5%	2	0.7%

Table 12: CPEVS (Pioneers, 2013) awareness of HEV and PEV models (n=97, unweighted)

	I have not heard of this		I have heard of this		I have researched this		I have spoken with an owner of one		I have driven or been a passenger in one		I want to buy one		I own (or owned) one	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Toyota Prius (HEV)	1	1.0%	72	74%	43	44%	41	42%	61	63%	1	1.0%	10	10%
Chevrolet Volt (PHEV)	0	0%	70	72%	66	68%	34	35%	29	30%	6	6.2%	23	24%
Nissan Leaf (BEV)	0	0%	68	70%	69	71%	47	48%	49	51%	15	15%	44	45%

5. Sources of information

How have the sources of information that shape respondents' opinions or understanding of PEVs changed between 2013 and 2017?

Key trends: The news, TV commercials, conversations with family and friends, and personal research remain the most important sources of information for shaping respondent opinions of PEVs. Although only assessed in 2017, social media may be an increasingly important source of information.

CZEVS (2017) What sources of information have shaped your opinion of electric and hydrogen powered vehicles, and how important have those sources been in shaping your opinion?

Table 13: CZEVS (2017) sources of information and their importance to respondents' opinions of PEVs (n=353)

Unweighted

	Car magazines (e.g. Car and Driver)		The news (e.g. TV or newspaper)		Information from car dealers		TV commercials		Social media		Conversations with family and friends		Personal research (internet, books, movies, talks)		Government (ads, brochures, etc.)		Press releases from automakers	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Have used source	159	45%	267	76%	228	65%	253	72%	209	59%	267	76%	271	77%	229	65%	225	64%
Not important	24	14%	32	12%	77	29%	77	29%	62	27%	24	8.8%	9	3.2%	57	24%	54	23%
Somewhat important	80	46%	132	48%	107	41%	107	41%	84	37%	91	33%	69	25%	95	39%	104	44%
Important	40	23%	75	27%	55	21%	55	21%	44	19%	95	35%	86	31%	62	26%	49	21%
Very important	15	8.6%	28	10%	14	5.3%	14	5.3%	19	8.4%	57	21%	107	38%	15	6.2%	18	7.7%
I don't know	16	9.1%	9	3.3%	11	4.2%	11	4.2%	17	7.5%	7.0	2.6%	10	3.6%	13	5.4%	9	3.8%

Weighted

	Car magazines (e.g. Car and Driver)	The news (e.g. TV or newspaper)	Information from car dealers	TV commercials	Social media	Conversations with family and friends	Personal research (internet, books, movies, talks)	Government (ads, brochures, etc.)	Press releases from automakers
	%	%	%	%	%	%	%	%	%
Have used source	46%	75%	65%	71%	61%	76%	76%	65%	65%
Not important	11%	10%	14%	28%	29%	7.7%	3.6%	23%	24%
Somewhat important	46%	48%	42%	39%	38%	34%	26%	39%	45%
Important	26%	27%	26%	23%	18%	36%	28%	27%	20%
Very important	9.4%	12%	13%	5.1%	8.5%	20%	38%	6.6%	8.0%
I don't know	8.6%	3.7%	4.2%	4.2%	6.9%	2.6%	3.5%	4.6%	3.4%

CPEVS (2013) What sources of information have been important in shaping your opinion of electric vehicles?

Table 14: CPEVS (Mainstream consumers, 2013) sources of information and their importance to respondents' opinions of PEVs (n=271, unweighted)

	Car magazines (e.g. Car and Driver)		The news (e.g. TV or newspaper)		Information from car dealers		TV commercials		Family and friends		Personal research (internet, books, movies, talks)		Government (ads, brochures, etc.)	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Have used source	242	89%	256	95%	246	91%	253	94%	250	93%	251	93%	242	90%
Not important	102	38%	24	8.9%	60	22%	60	22%	29	11%	27	10%	72	27%
Somewhat important	70	26%	84	31%	94	35%	93	34%	71	26%	54	20%	81	30%
Important	55	20%	104	38%	65	24%	78	29%	87	32%	78	29%	67	25%
Very important	15	5.5%	44	16%	27	10%	22	8.1%	63	23%	92	34%	22	8.1%

CPEVS (2013) What sources of information helped you decide to purchase or lease your plug-in vehicle?

Table 15: CPEVS (Pioneers, 2013) sources of information used in shaping respondents' opinions of PEVs (n=97, unweighted)

	Car magazines (e.g. Car and Driver)		The news (e.g. TV or newspaper)		Information from car dealers		TV commercials		Family and friends		Personal research (internet, books, movies, talks)		Government (ads, brochures, etc.)		Other	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Have used source	24	25%	15	15%	21	22%	2	2%	18	19%	87	90%	11	11%	17	18%

6. Public charger awareness

How has respondent public charger awareness changed between 2013 and 2017?

Key trends: Public charger awareness among Mainstream respondents has substantially increased in 2017 compared to 2013, with three quarters of respondents being aware of at least one charger in 2017, compared to about one third in 2013. Pioneers' awareness of public chargers is higher than Mainstream respondents.

CZEVS (2017) Have you SEEN any electric vehicle recharge stations at the parking spots or spaces that you use? I have SEEN an electric vehicle recharge station at… Please select all that apply.

Table 16: CZEVS (2017) public charger awareness (n=353)

Unweighted

	n	%
Workplace	54	15%
Grocery store	66	19%
Retail store	64	18%
Mall	159	45%
Gym or recreation centre	54	15%
Religious or spiritual building	4	1.1%
Restaurant	23	6.5%
Other	54	15%
Has never seen any chargers	91	26%
Has seen at least one charger	262	74%
Has seen at least two chargers	119	34%

Weighted

	%
Workplace	15%
Grocery store	17%
Retail store	18%
Mall	46%
Gym or recreation centre	17%
Religious or spiritual building	0.8%
Restaurant	6%
Other	15%
Has never seen any chargers	25%
Has seen at least one charger	75%
Has seen at least two chargers	33%

CPEVS (2013) Have you **seen** any electric vehicle recharge stations at the following parking spots or spaces you use? Please select all that apply. I have seen an electric vehicle recharge station at…

Table 17: CPEVS (Mainstream consumers, 2013) public charger awareness (n=271, unweighted)

	n	%
Workplace	13	4.8%
Grocery store	22	8.1%
Retail store	19	7.0%
Mall	37	14%
Gym or recreation centre	15	5.5%
Religious or spiritual building	2	0.7%
Other	34	13%
Has never seen any chargers	172	64%
Has seen at least one charger	98	36%
Has seen at least two chargers	24	8.9%

CPEVS (2013) When you bought or leased your [plug-in electric vehicle], were you aware of charging opportunities at any of the following locations? (Select all that apply).

Table 18: CPEVS (Pioneers, 2013) public charger awareness (n=97, unweighted)

	n	%
Workplace	30	30%
Grocery store	14	14%
Retail store	27	28%
Mall	57	59%
Gym or recreation centre	38	39%
Religious or spiritual building	0	0%
Restaurant	16	17%
Pay parking lot	39	40%
Government building	46	47%
Other	18	19%
Has never seen any chargers	13	13%
Has seen at least one charger	84	87%
Has seen at least two chargers	68	70%

7. Opinions of climate change

How have respondents' opinions regarding climate change changed between 2013 and 2017?

Key trends: Mainstream respondents' opinions about climate change are largely unchanged in 2017 compared to 2013. Pioneers have stronger opinions that climate change is a serious problem than Mainstream respondents.

CZEVS (2017) Which of the following statements is closest to your opinion on global warming (climate change)?

Table 19: CZEVS (2017) opinions regarding climate change (n=353)

Unweighted

	n	%
It is a serious problem, and immediate action is necessary	155	44%
It could be a serious problem, and we should take some action now	134	38%
More research is needed before deciding if action should be taken	45	13%
It is not a problem and does not require any action	11	3.1%
I don't know enough about this issue	8	1.7%

Weighted

	%
It is a serious problem, and immediate action is necessary	44%
It could be a serious problem, and we should take some action now	37%
More research is needed before deciding if action should be taken	15%
It is not a problem and does not require any action	3.1%
I don't know enough about this issue	2.3%

CPEVS (2013). Which of the following statements is closest to your **opinion** on: **global warming (climate change)**?

Table 20: CPEVS (Mainstream consumers, 2013) respondent opinions regarding climate change (n=271, unweighted)

	n	%
It is a serious problem, and immediate action is necessary	98	36%
It could be a serious problem, and we should take some action now	92	34%
More research is needed before deciding if action should be taken	58	22%
It is not a problem and does not require any action	10	3.7%
I don't know enough about this issue	13	4.8%

Table 21: CPEVS (Pioneers, 2013) respondent opinions regarding climate change (n=97, unweighted)

	n	%
It is a serious problem, and immediate action is necessary	64	66%
It could be a serious problem, and we should take some action now	26	27%
More research is needed before deciding if action should be taken	4	4.1%
It is not a problem and does not require any action	1	1.0%
I don't know enough about this issue	2	2.1%

8. Demographics

How do Early and Late Mainstream consumers compare in their demographics? How do Mainstream consumers compare to Pioneers in their demographics?

Key trends

- **Age:** Early Mainstream respondents tend to be younger than both Late Mainstream respondents and Pioneers. Mean age for Early Mainstream respondents is lower than Late Mainstream respondents and Pioneers in 2017 and 2013.
- **Income:** Early Mainstream respondents tend to have higher incomes than Late Mainstream respondents, but less income than Pioneers. Mean and median income for Early Mainstream respondents is higher than Late Mainstream respondents, and lower than Pioneers in 2017 and 2013.
- **Dwelling type:** Early Mainstream respondents are more likely to live in detached homes than Late Mainstream respondents, although Pioneers have the highest rates of attached home occupancy.
- **Home ownership:** Early and Late Mainstream respondents have similar rates of home ownership, with about three quarters of respondents owning their home. In contrast, almost all Pioneers own their homes.
- **Urban vs. rural residence:** Mainstream respondents and Pioneers have similar patterns of geographic dispersion in urban and rural areas.

Table 22: Key demographic characteristics of Early and Late Mainstream consumers from CZEVS (2017, n=353)

Unweighted

	Early Mainstream		Late Mainstream	
	n	%	n	%
Segment size	85	24%	268	76%
Age				
<35	27	31%	43	13%
35-44	13	17%	53	20%
45-54	9	11%	43	16%
55-64	22	27%	73	29%
65+	14	15%	56	22%
Mean		46		50
Median		45-54		45-54
Income				
<$40,000	15	17%	42	17%
$40,000-$59,999	11	14%	51	21%
$60,000-$89,999	11	16%	69	29%
$90,000-$124,999	15	17%	41	16%
$125,000+	27	36%	40	16%
Mean		$89,000		$77,000
Median		$90,000-$124,999		$60,000-$89,999
Dwelling type				
Detached house	47	61%	126	50%
Attached house (e.g., townhouse, duplex)	7	9%	40	18%
Apartment	31	30%	96	31%
Mobile home	0	0%	3	1%
Home ownership				
Own	61	77%	187	72%
Rent	24	23%	81	28%
Urban vs. rural residence				
Urban	85	100%	268	100%
Rural	0	0%	0	0%

Note: Because respondents provided categorical responses for age and income, we show categorical medians because we cannot “back-calculate” medians accurately.

Weighted

	Early Mainstream	Late Mainstream
	%	%
Segment size	24%	76%
Age		
<35	31%	13%
35-44	17%	20%
45-54	11%	16%
55-64	27%	29%
65+	15%	22%
Mean	46	51
Median	45-54	55-64
Income		
<$40,000	17%	17%
$40,000-$59,999	14%	21%
$60,000-$89,999	16%	29%
$90,000-$124,999	17%	16%
$125,000+	36%	16%
Mean	$91,000	$76,000
Median	$90,000-$124,999	$60,000-$89,999
Dwelling type		
Detached house	61%	50%
Attached house (e.g., townhouse, duplex)	9.5%	18%
Apartment	30%	31%
Mobile home	0%	1.3%
Home ownership		
Own	77%	72%
Rent	23%	28%
Urban vs. rural residence		
Urban	100%	100%
Rural	0%	0%

Note: Because respondents provided categorical responses for age and income, we show categorical medians because we cannot “back-calculate” medians accurately.

Table 23: Key Demographic characteristics of Early and Late Mainstream consumers (from CPEVS 2013, n=271, unweighted) and Pioneers (from CPEVS 2013, n=97, unweighted)

	Early Mainstream		Late Mainstream		Pioneers	
	n	%	n	%	n	%
Segment size	110	41%	161	59%	97	
Age						
<35	45	41%	45	28%	12	12%
35-44	26	24%	38	24%	25	26%
45-54	21	19%	34	21%	27	28%
55-64	10	9.1%	27	17%	27	28%
65+	8	7.3%	17	11%	6	6.2%
Mean		40		44		48
Median		35-44		35-44		45-54
Income						
<$40,000	12	12%	24	17%	2	2.4%
$40,000-$59,999	22	22%	28	19%	3	3.5%
$60,000-$89,999	24	24%	40	28%	10	12%
$90,000-$124,999	31	31%	39	27%	21	25%
$125,000+	10	10%	14	10%	49	58%
Mean		$80,000		$76,000		$117,000
Median		$60,000-$89,999		$60,000-$89,999		$125,000+
Dwelling type						
Detached house	61	56%	76	48%	73	76%
Attached house (e.g., townhouse, duplex)	21	19%	25	16%	13	14%
Apartment	27	25%	58	36%	10	10%
Mobile home	0	0%	1	0.6%	0	0%
Home ownership						
Own	85	77%	116	72%	88	91%
Rent	25	23%	45	28%	9	9.3%
Urban vs. rural residence						
Urban	261	96%	267	99%%	89	92%
Rural	10	3.7%	4	1.5%	8	8.2%

Note: Because respondents provided categorical responses for age and income, we show categorical medians because we cannot “back-calculate” medians accurately.

Appendix

We also provide the following data table from our CZEVS (2017) sample only, regarding respondent willingness to plug in a PEV at home.

CZEVS (2017) Imagine that your vehicle is a plug-in hybrid or battery electric vehicle. Realistically, would you consider regularly plugging in your vehicle at home?

Table 24: Respondent willingness to plug in a PEV at home (CZEVS 2017 weighted and unweighted data, n=353)

	Unweighted data		Weighted data
	n	%	%
Yes	280	79%	81%
No	73	21%	19%

References

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