



The Voice of the Canadian Electric Vehicle Driver

November 2024



METHODOLOGY

A survey was conducted among Canadian residents to understand their preferences and experiences with their electric vehicles. A total of 16,041 EV drivers were sampled across all provinces and territories (see distribution on the right).

To better understand driver behavior, data was analyzed by vehicle type – comparing battery-electric vehicles (BEVs) that operate solely on battery charge with plug-in hybrid electric vehicles (PHEVs) that operate using both plug-in battery power and internal combustion.

Data that combined PHEV and BEV drivers was weighted to reflect the composition of the installed base using EV vehicle sales data.

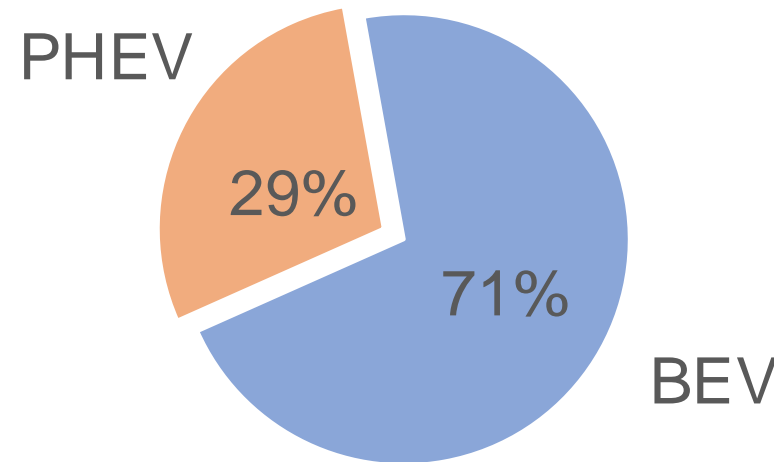
Province/Territory	2024 Sample size (n)	2022 Sample size (n)
Alberta	1,127	1,010
British Columbia	5,136	5,620
Manitoba	340	330
New Brunswick	254	214
Newfoundland & Labrador	103	82
Nova Scotia	506	416
Ontario	4,944	4,911
Prince Edward Island	93	108
Québec	3,334	3,313
Saskatchewan	191	220
Northwest Territory	3	4
Yukon	10	4
Total	16,041	16,232

EVS IN CANADA

Vehicle type	Sales 2011-2024 (units through 10/22/24)
PHEV	219,062
BEV	541,027
Total	760,089

Source: EV-Volumes.com

EV New Vehicle Sales by Vehicle Type









Source: EV-Volumes.com

Electric vehicle (EV) and plug-in hybrid electric vehicle (PHEV) sales in Canada have seen significant growth since 2011. This trend continued into 2024, with EVs and PHEVs accounting for 12.9%* of all new vehicle registrations in the second quarter. *Source: Statistics Canada.com

Battery electric vehicles (BEVs) make up the majority of these sales, but PHEVs are also gaining traction. Overall, the Canadian market is steadily moving towards greater adoption of battery electric and plug-in hybrid electric vehicles, reflecting a shift towards more sustainable transportation options.

CHARGING BEHAVIOR

SOURCE OF BATTERY-DRIVEN KILOMETERS: PREVIOUS 30 DAYS

Charging method		PHEV (n=1,710)	BEV (n=14,305)
	Level 1 at home	46%	15% ↓ (-4%)
	Level 2 at home	39% ↑ (5%)	66% ↑ (13%)
	Workplace (any type)	5% ↓ (-2%)	4% ↓ (-1%)
	Fast charging	----	10% ↓ (-6%)
	Public Level 2 (not at work)	9% ↓ (-2%)	5% ↓ (-2%)
	Other	2%	0%







The top source monthly of e-kilometers for PHEV drivers is Level 1 (110-120V) home charging (46%). However, Level 2 shows an increase since 2022 for both PHEV (39%) and BEV (66%) owners with BEV increasing their home L2 utilization 13 percentage points over 2022.

This difference is about battery size, L2 options and convenience. The move to larger battery capacities, more widely available L2 home charger options and the “convenience factor” have contributed to a higher L2 utilization rates for both PHEV and BEV drivers.

PHEVs get more e-kilometers from Level 2 public charging (9%) than BEVs (5%). BEVs have are drawing less (10%) from fast charging in 2024; a 6 percentage-point decrease from 2022.

↑↓ Increase/decrease since 2022 study.

SOURCE OF BATTERY-DRIVEN KILOMETERS: PREVIOUS 30 DAYS

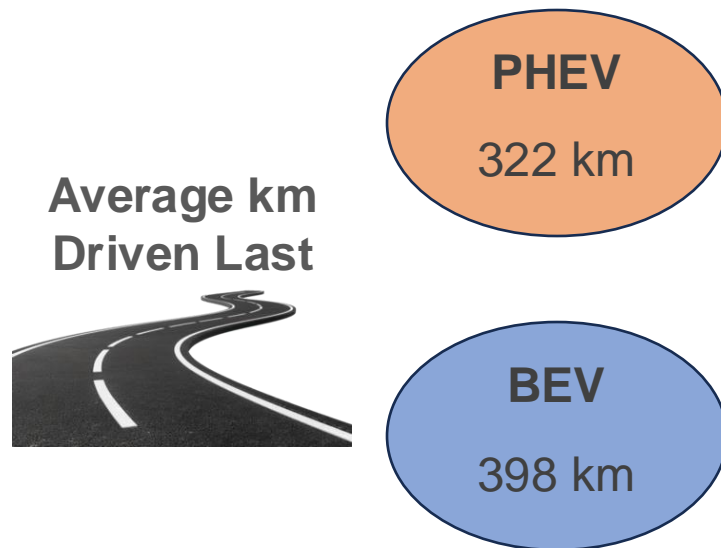
PHEV Charging method		PHEV		BEV	
		Single-Family Home (n=1,291)	Multi-Unit Dwelling (n=387)	Single-Family Home (n=11,481)	Multi-Unit Dwelling (n=2,665)
	Level 1 at home	47%	41%	14%	17%
	Level 2 at home	43%	25%	71%	45%
	Workplace (any type)	4%	8%	4%	7%
	Fast charging	----	----	8%	18%
	Public Level 2 (not at work)	5%	23%	9%	5%
	Other	1%	4%	2%	0%

Among PHEV drivers, those with single-family homes (SFH) and those residing in multi-unit dwellings (MUD) are similar in their average use of Level 1 home charging. However, PHEV drivers in SFHs tend to get more of their e-kilometers from Home Level 2 home charging (43%) compared to their MUD counterparts (25%), with MUD drivers making up the difference with more average utilization of Public Level 2 and workplace charging.

A similar pattern is found among BEV drivers, with the disparity in Home Level 2 charging being made up by MUD drivers in the form of higher fast charging utilization.

DRIVING BEHAVIORS

Kilometers Driven in Last 7 Days



PHEV n=1,710
BEV n=14,331

% of Kilometers Driven in Each Scenario Over the Last 4 Weeks

	PHEV	BEV
Commuting to and from work	30%	31%
Travel that was less 100 km from my home*	54%	48%
Travel that was between than 100 to 200 km from my home*	9%	11%
Travel that was more than 200 km from my home*	7%	10%

*Not including to/from work

While BEV drivers, on average, drive their vehicles 76 km more on a weekly basis, the breakdown of their driving is quite similar, with the majority of both PHEV and BEV travel taking owners less than 100 km from their home. Furthermore, this may contribute to the increased adoption of L2 home chargers to meet that need.

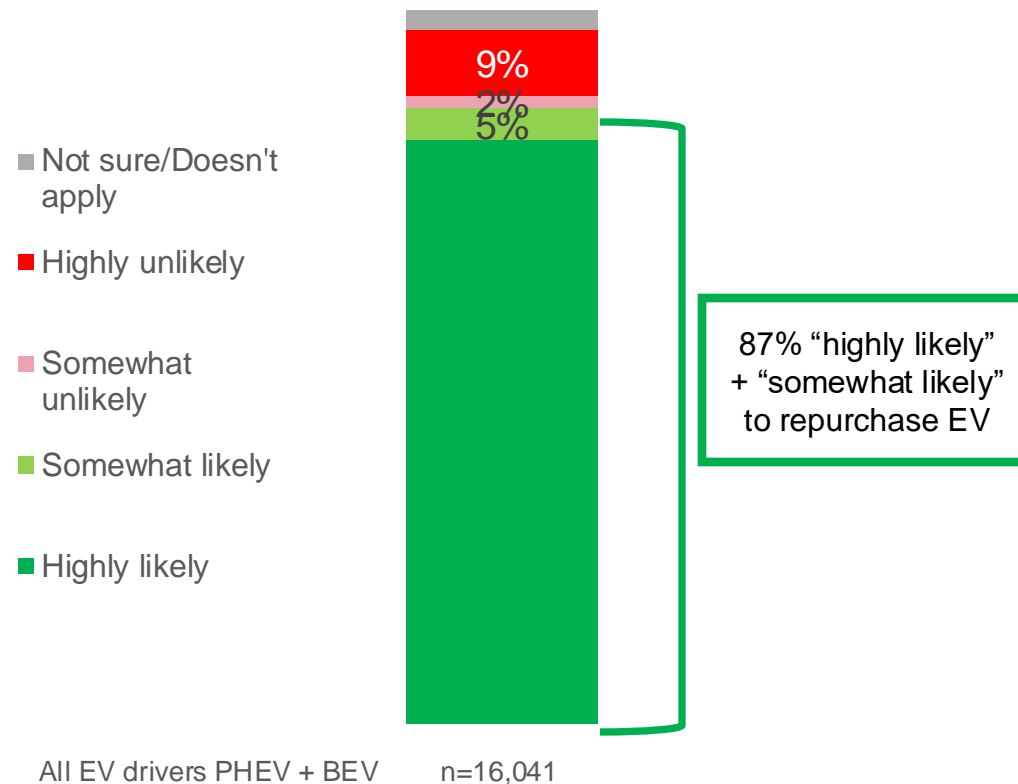
Q9. In the last 7 days, please estimate how many kilometers you drove in your [INSERT EV]?

Q10. Over the last 4 weeks, what percentage of your total kilometers driven in your [INSERT EV] were for each of the scenarios below.

EV CONSIDERATION

EV REPURCHASE INTENT: A ONE-WAY STREET

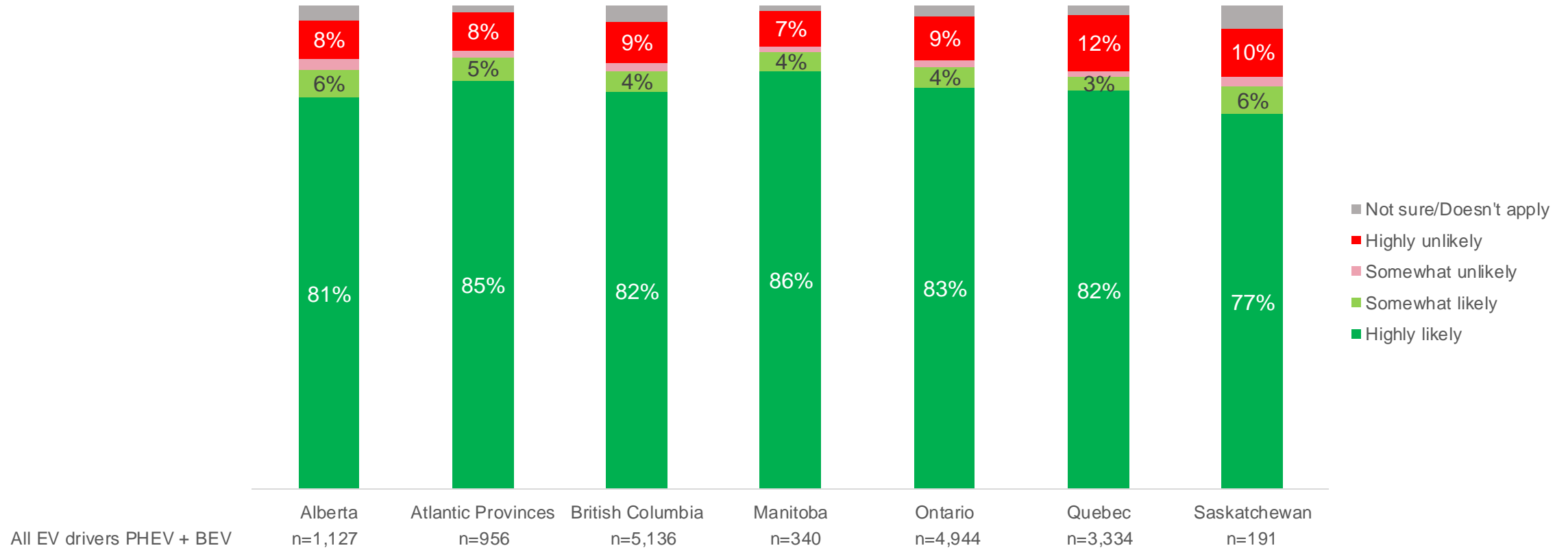
Likelihood of Purchasing Another EV



Although EV adoption continues to grow, repurchase intent has declined since 2022 for existing EV drivers with 9% indicating they were "highly unlikely" to replace their vehicle with another EV.

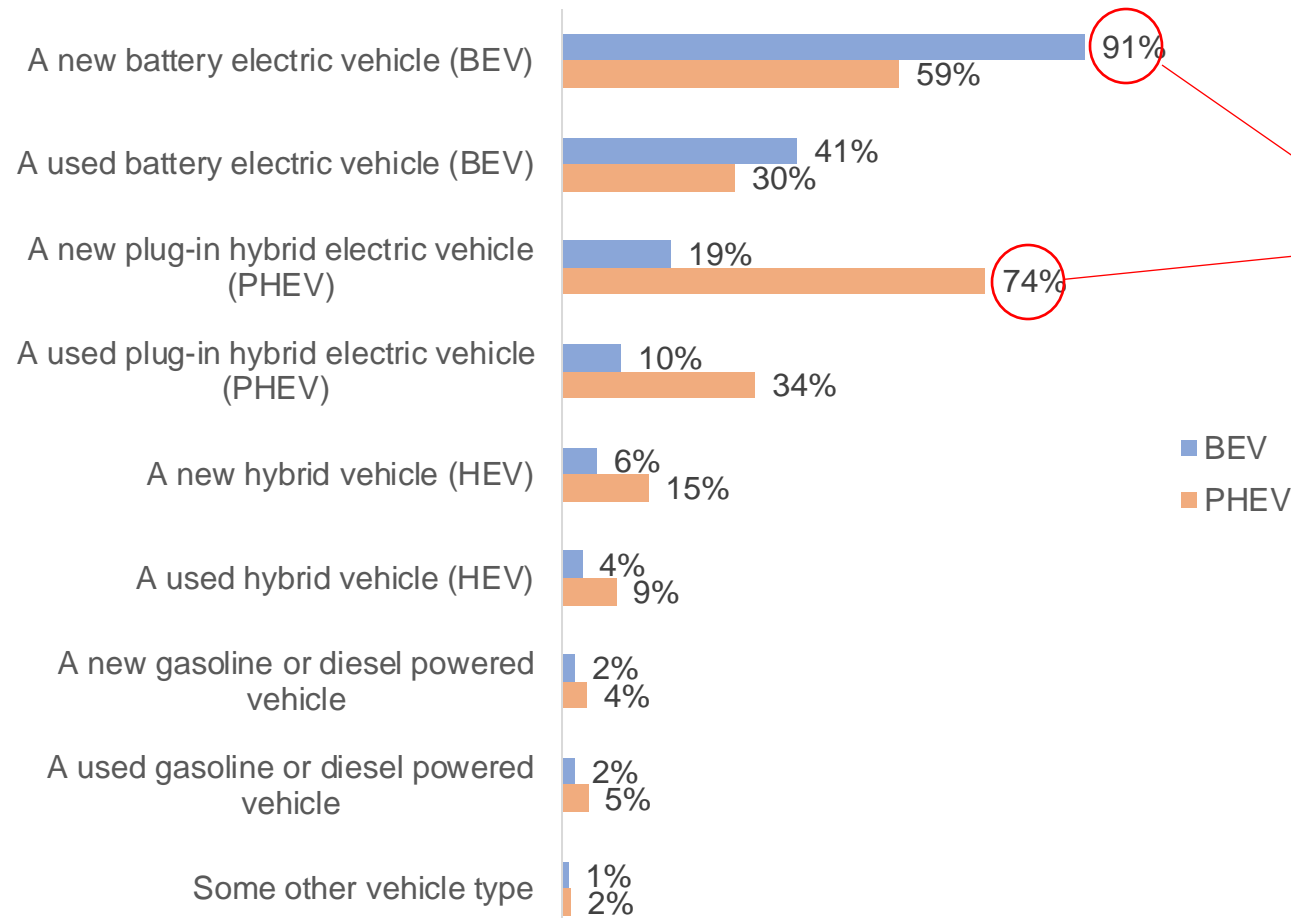
EV REPURCHASE INTENT BY REGION

Likelihood of Purchasing Another EV By Region



REPLACING YOUR EV BY VEHICLE TYPE

Vehicle Type for EV Replacement



Owners of EVs tend to express more loyalty toward their current vehicle type with 91% of BEV owners Highly or Somewhat likely to replace with another new BEV. PHEV owners show a similar story with 74% Highly or Somewhat likely to repurchase another new PHEV.

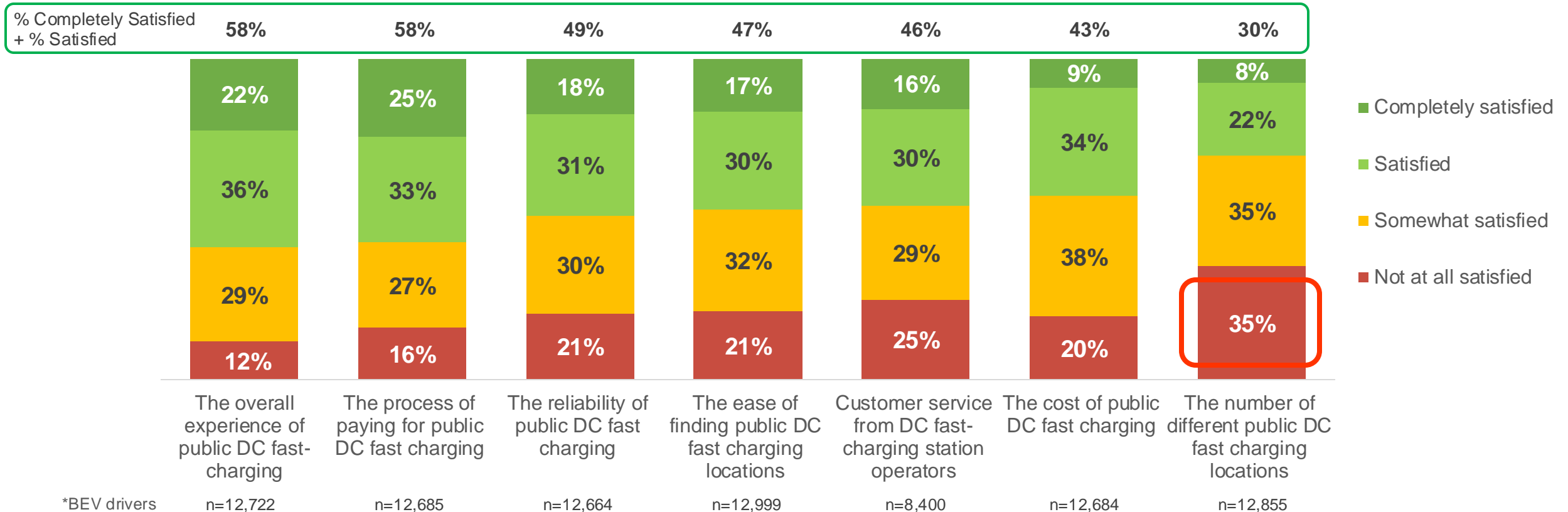
Drivers “highly” or “somewhat” likely to replace with another EV in the future PHEV + BEV n=13,897

Q12. If you were to replace your [INSERT EV] at some time in the future, which of these vehicle types would you consider? Please select ALL that apply.

PUBLIC CHARGING

PUBLIC DC FAST CHARGING SATISFACTION

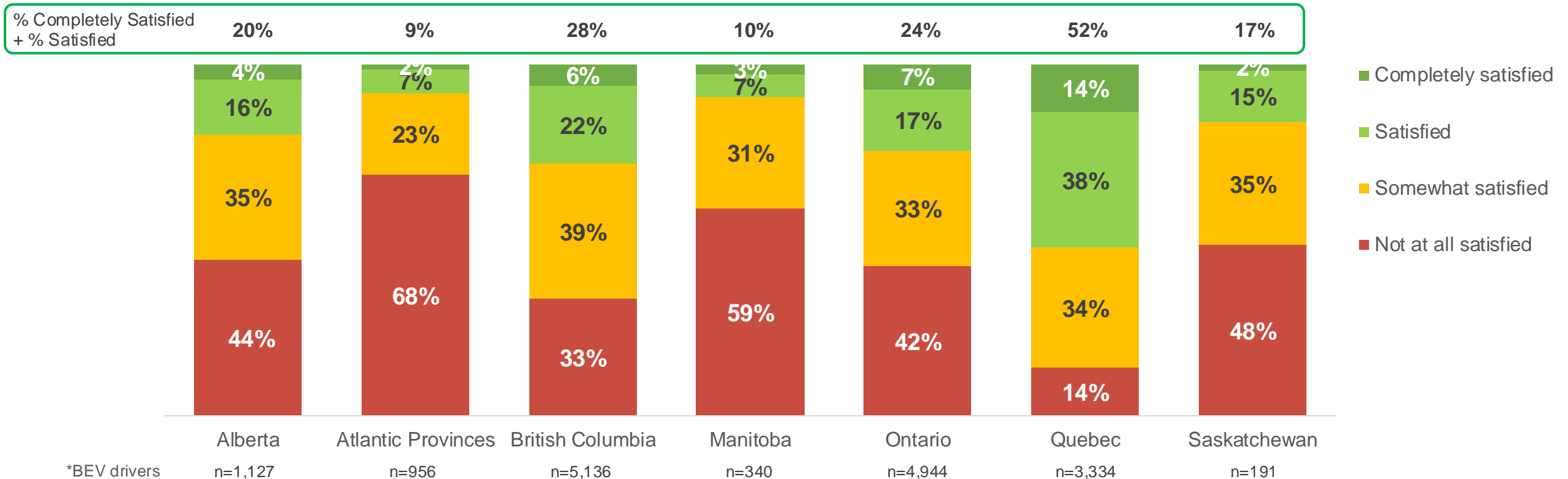
Satisfaction with Public DC Fast Charging (BEV Only)



BEV owners are significantly dissatisfied with the number of public DC fast charging locations available.

PUBLIC DC FAST CHARGING SATISFACTION

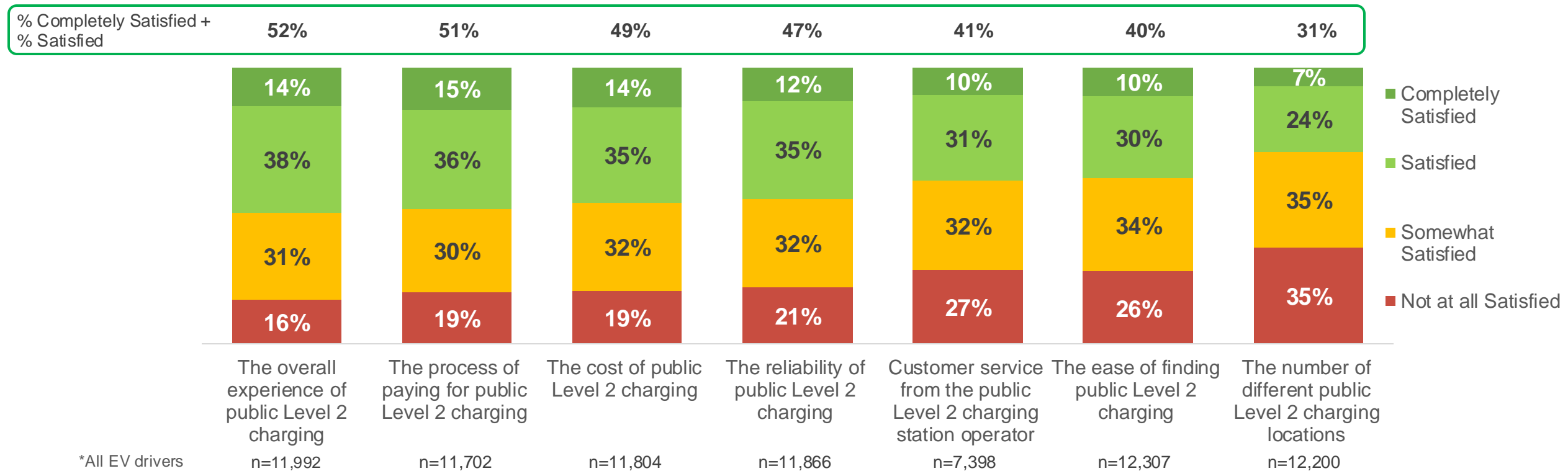
Satisfaction with Public DC Fast Charging:
The number of different public DC fast charging locations



The dissatisfaction with the number of DC fast charging locations is driven by the less urban based provinces.

PUBLIC LEVEL 2 CHARGING SATISFACTION

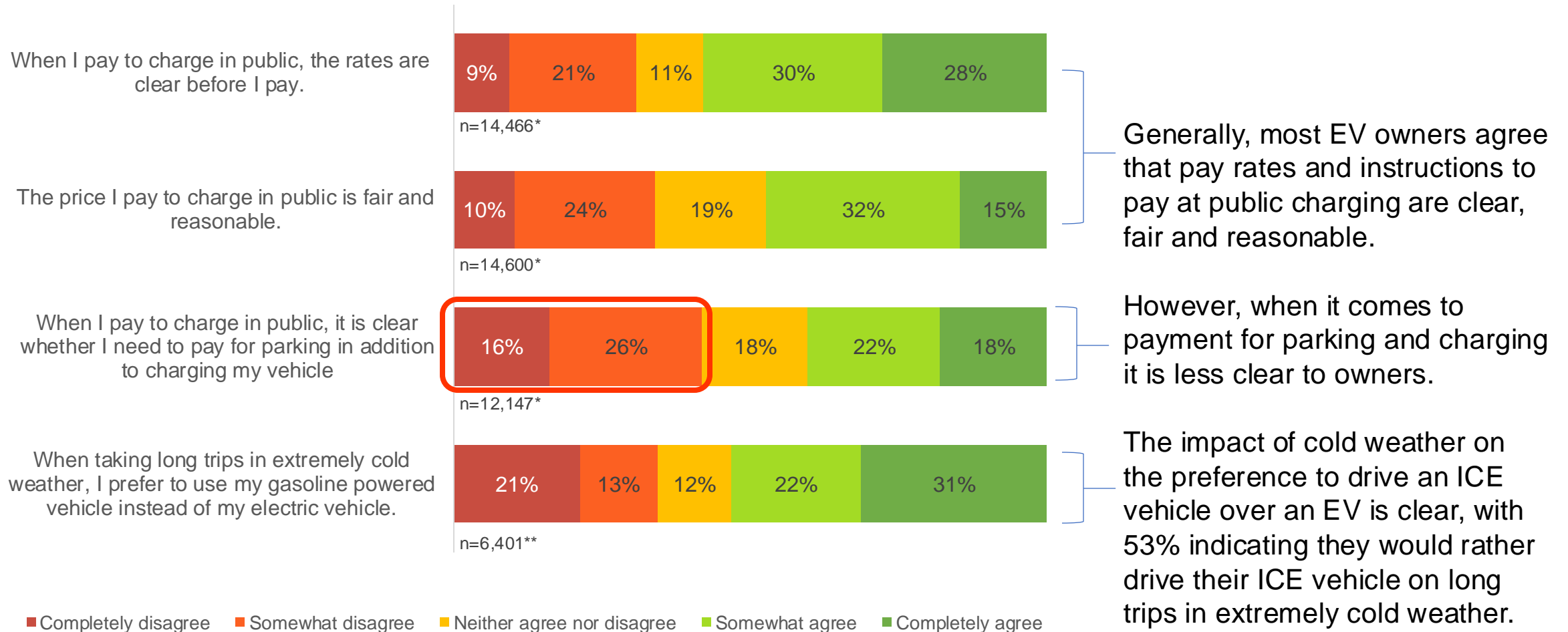
Satisfaction with Public Level 2 Charging (BEV + PHEV)



Regardless of the type of vehicle, EV owners also express a higher level of dissatisfaction with the number of Level 2 charging locations. This suggests that owners will continue to want more options/locations for charging, especially as this segment continues to grow.

PUBLIC CHARGING

Agreement on Public Charging



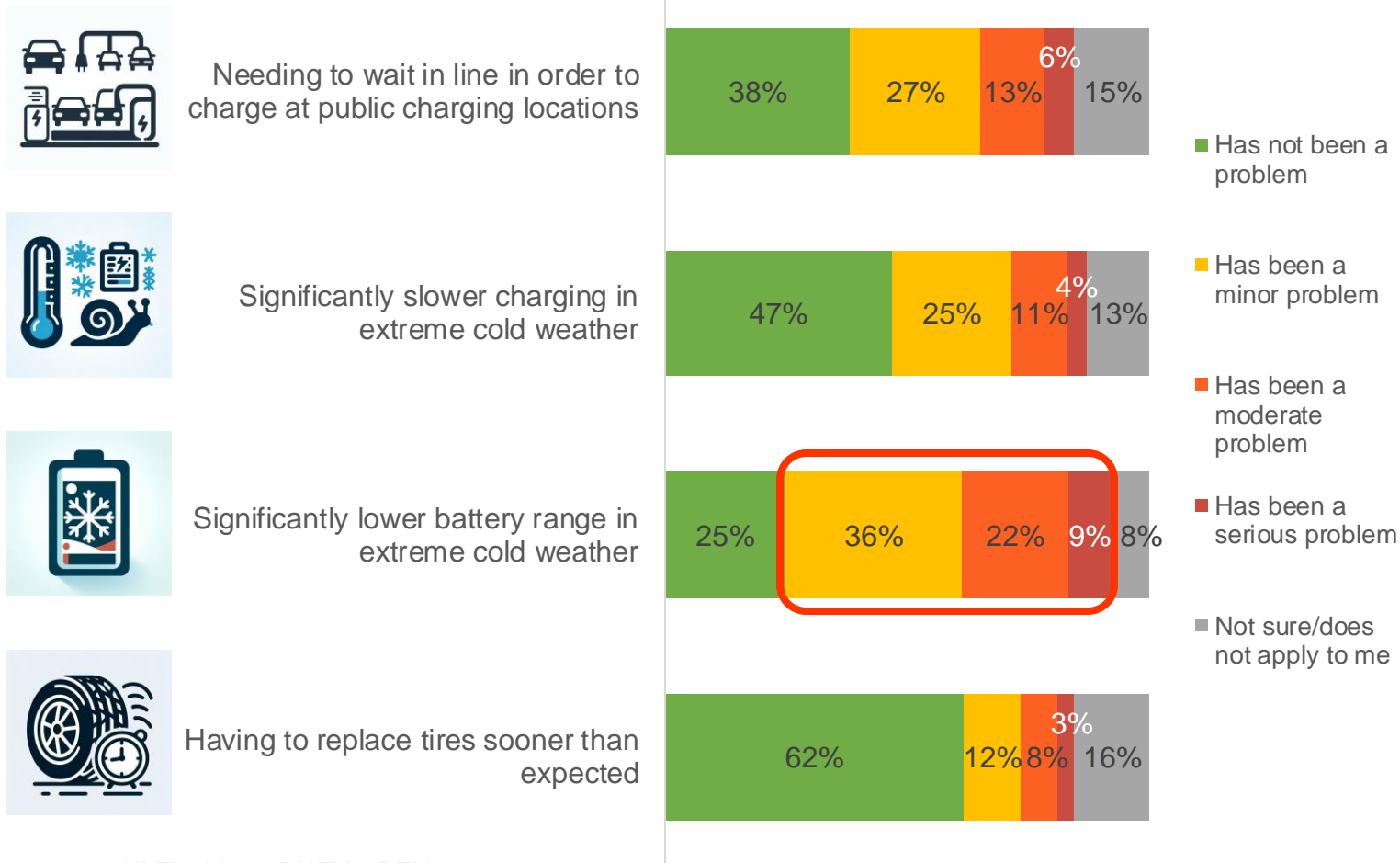
*Excludes "Not sure/does not apply to me"; **Only posed to BEV drivers

Q28. Please agree or disagree with the following statements.

CONCERNS

EV CONCERNS

Issues Since Owning an EV



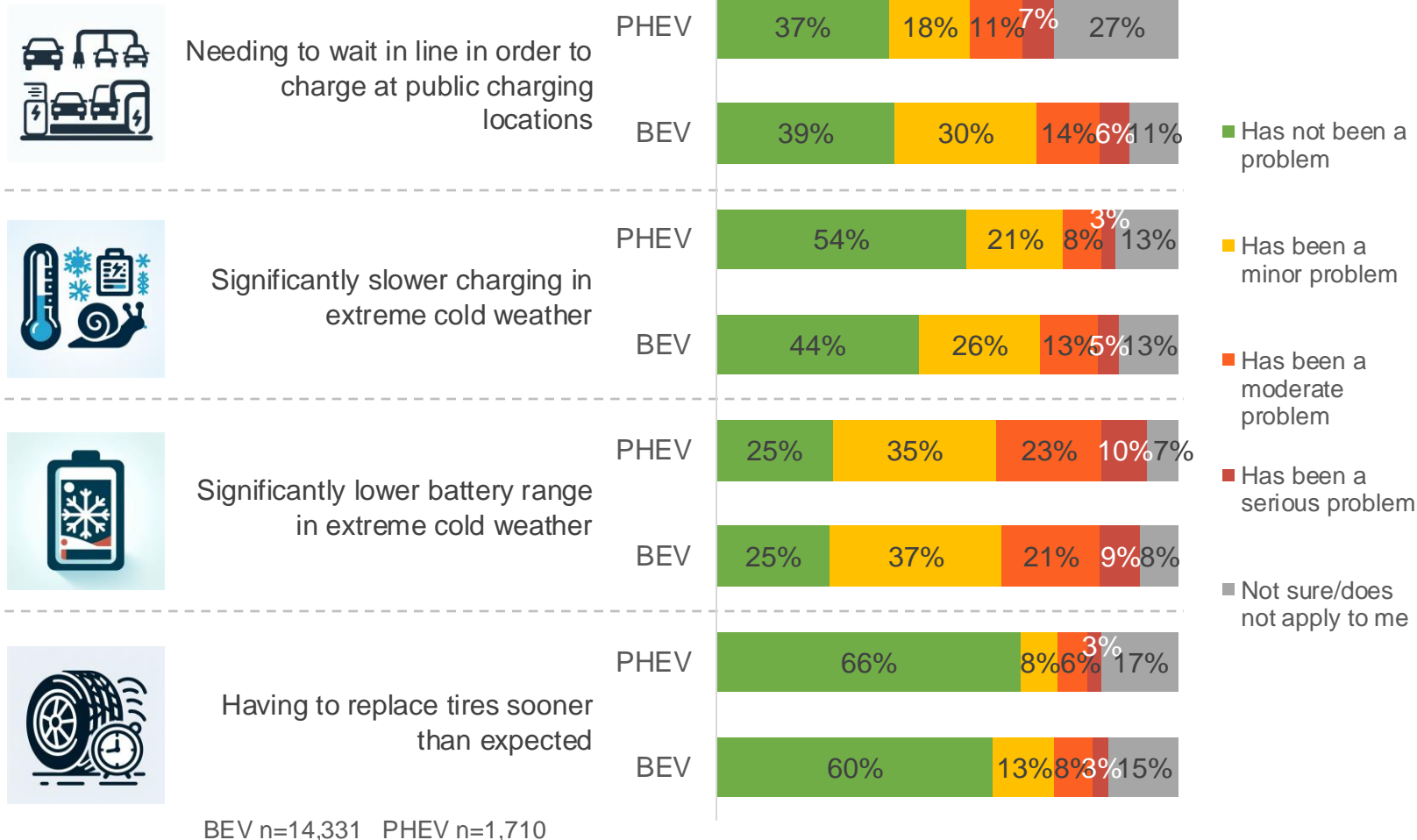
Problems with battery range in extreme cold weather tops the list of concerns for both BEV and PHEV owners, with 67% saying it has been a minor to serious problem.

All EV drivers PHEV + BEV n=16,041

Q15. Since owning your EV, have you encountered any of these problems/issues with your INSERT VEHICLE?

EV CONCERNS BY VEHICLE TYPE

Issues Since Owning an EV by Vehicle Type



Both BEV and PHEV owners report similar rates of problems.

Not surprising, BEV owners indicate slightly higher problems with waiting in line to charge compared to PHEV owners.

BATTERY CONCERNS

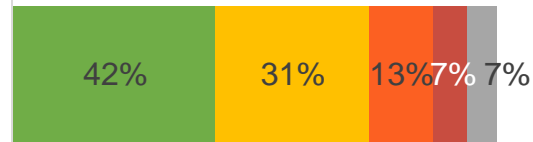
Battery-Related Issues Since Owning an EV



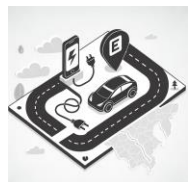
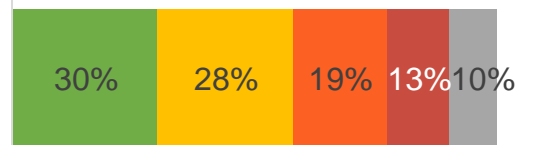
Battery degradation over time



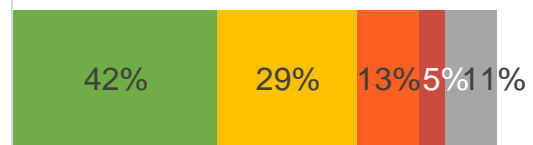
Range anxiety: fear or concern of not making it to your destination or a charger before your battery runs out.



Ability to find public charging when on a long-distance road trip*
*Only posed to BEV drivers



Having to change my route to ensure charging was available



- Has not been a problem
- Has been a minor problem
- Has been a moderate problem
- Has been a serious problem
- Not sure/does not apply to me

Nearly two-thirds (60%) of BEV owners have problems in the ability to find public charging on long distance trips.

This finding reiterates the necessity for more robust charging infrastructure that is easily and readily accessible.

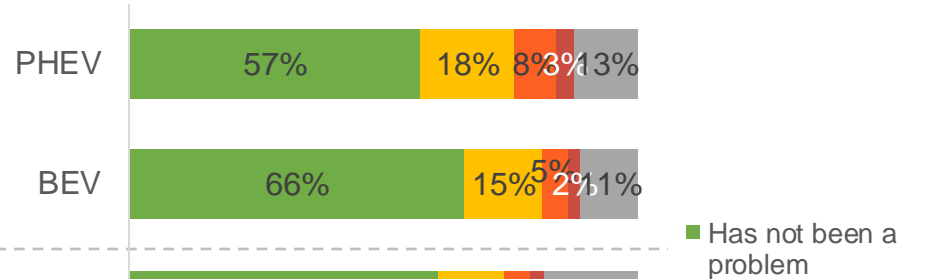
All EV drivers PHEV + BEV n=16,041

BATTERY CONCERNS BY VEHICLE TYPE

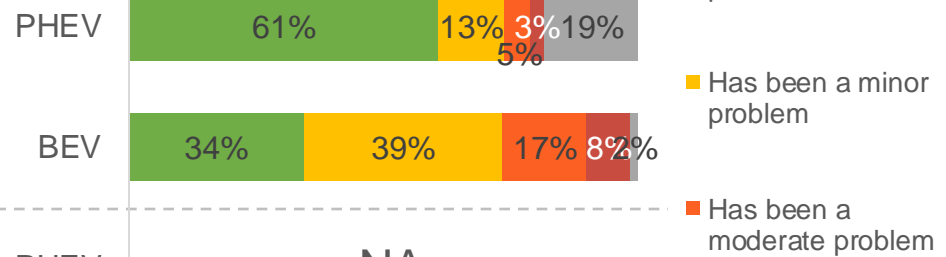
Battery-Related Issues Since Owning an EV by Vehicle Type



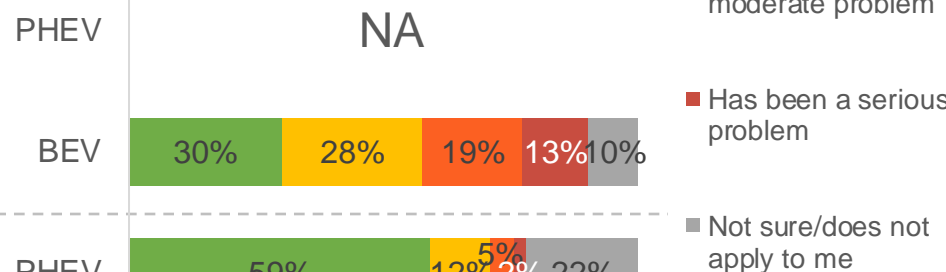
Battery degradation over time



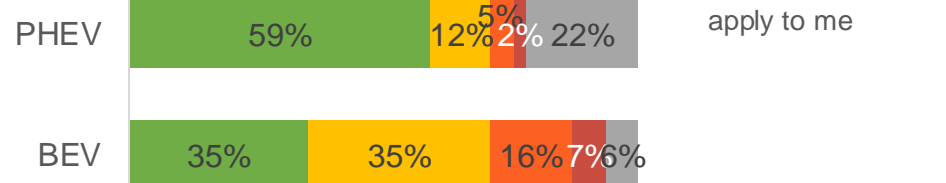
Range anxiety: fear or concern of not making it to your destination or a charger before your battery runs out.



Ability to find public charging when on a long-distance road trip



Having to change my route to ensure charging was available

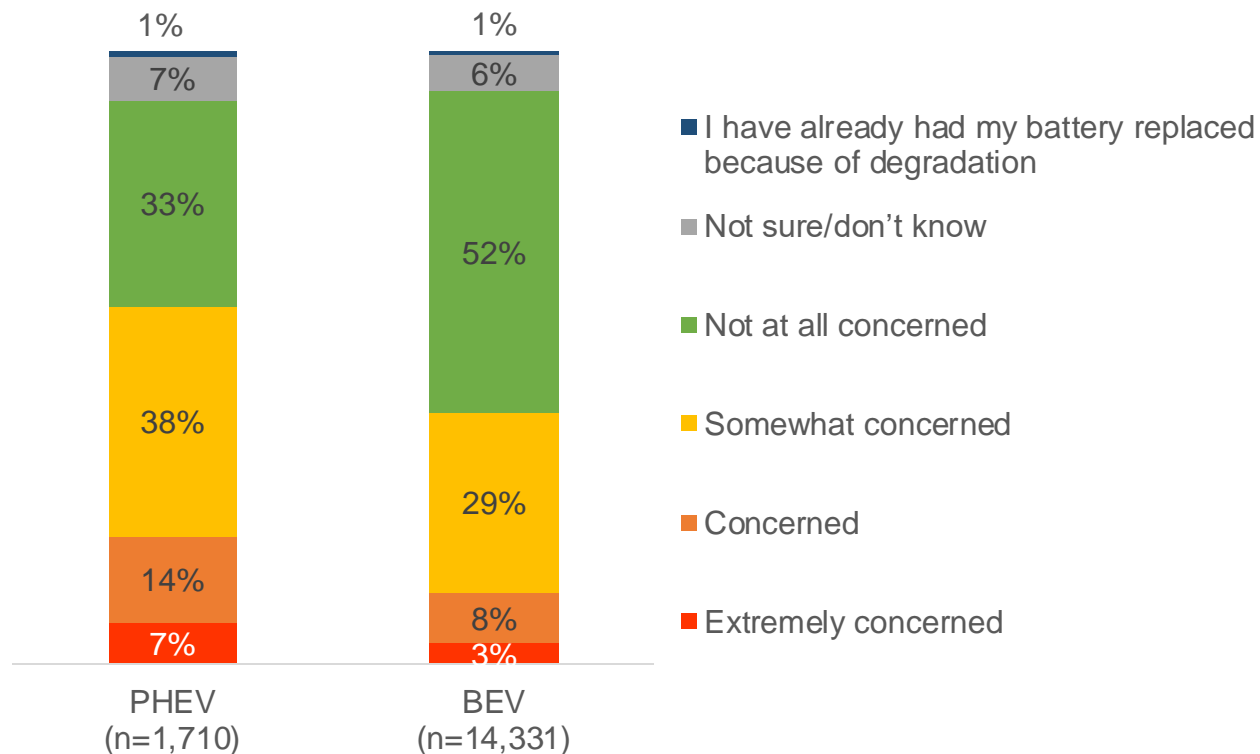


BEV n=14,331 PHEV n=1,710

When looking at the differences between BEV and PHEV owners, range anxiety and changing routes to ensure charging availability are hallmarks of the BEV owner experience, with 64% indicating problems with range anxiety and 58% with changing their route.

BATTERY DEGRADATION

Level of Concern of Battery Degradation

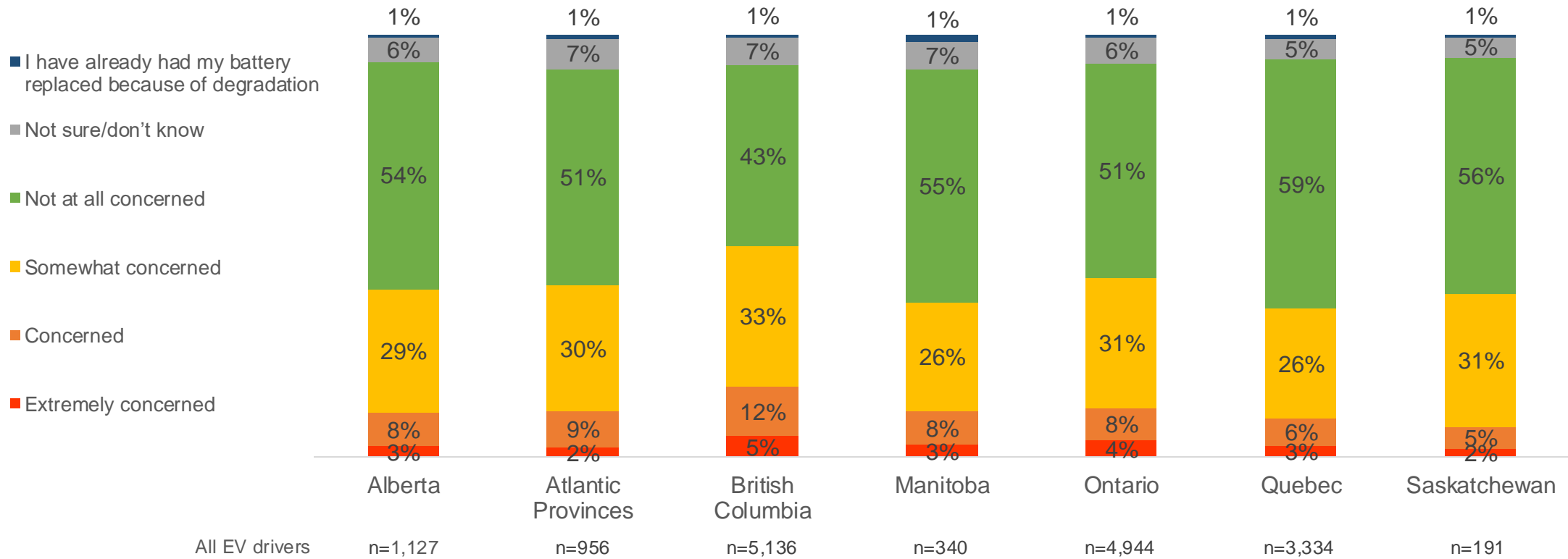


Interestingly, PHEV owners appear to express more concern with battery degradation, with 1 in 5 indicating they are extremely to somewhat concerned.

This may, in part, be related to vehicle age, smaller PHEV battery capacity and more noticeable range drops over time or may be an artifact of publicly shared stories/media coverage around high battery replacement costs for early HEVs.

BATTERY DEGRADATION BY REGION

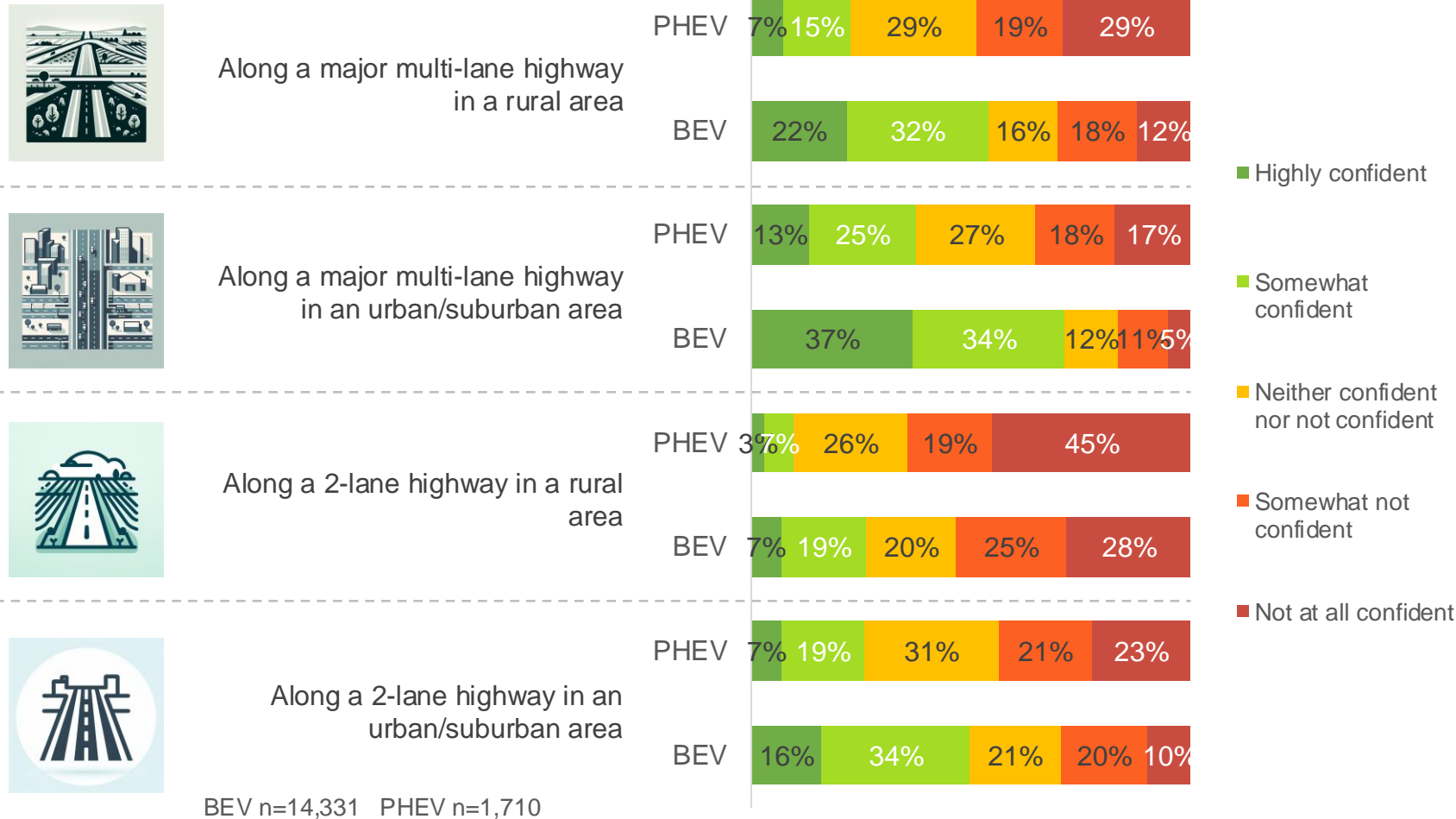
Level of Concern of Battery Degradation By Region



British Columbia EV owners indicate slightly more concern with battery degradation as compared to other regions.

TRIP CONCERNS

Level of Confidence Finding Public Charging



Both BEV and PHEV owners demonstrate low confidence in finding public charging in rural areas. This is especially true in finding stations along 2-lane highways in rural areas.

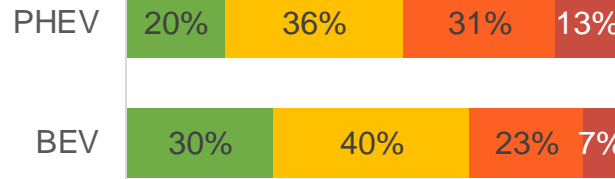
Generally, PHEV owners tend to have lower confidence across all highway types and areas as compared to BEV owners.

ENVIRONMENTAL CONCERNS

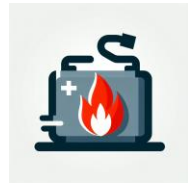
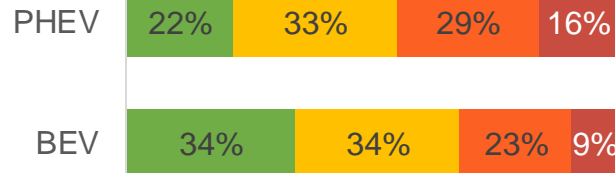
Environmental Impact of EVs Concerns



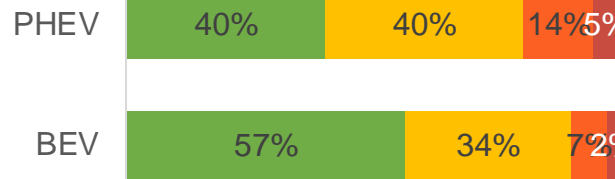
The environmental impact of the battery manufacturing process



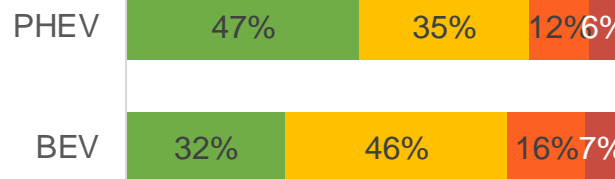
The environmental impact of battery disposal once an EV reaches end-of-life



The potential for EV battery fires



The potential for being unable to charge an EV battery during a grid outage



PHEV owners show slightly more environmental concern overall as compared to BEV owners.

Expectedly, the exception is seen with BEV owners who indicated more concern with not being able to charge during a grid outage, since this is their only option for mobility.

All EV drivers PHEV + BEV n=16,041

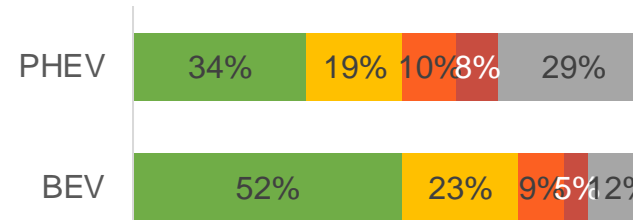
Q21. Do you have any of the following concerns about the environmental impact or safety aspects of EVs?

COST CONCERNS

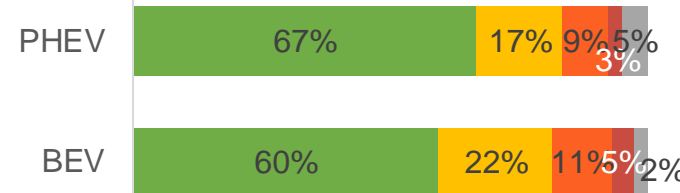
EV Ownership Cost Concerns



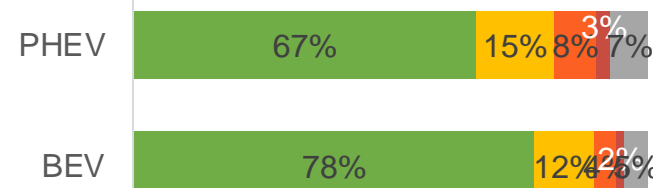
The cost of installing a home charging station



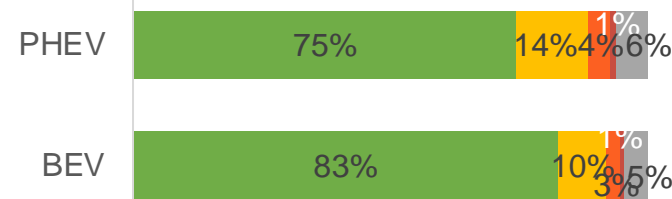
Cost of insurance



Cost of EV maintenance or repair



Home electricity cost from charging



- Has not been a problem
- Has been a minor problem
- Has been a moderate problem
- Has been a serious problem
- Not sure/NA

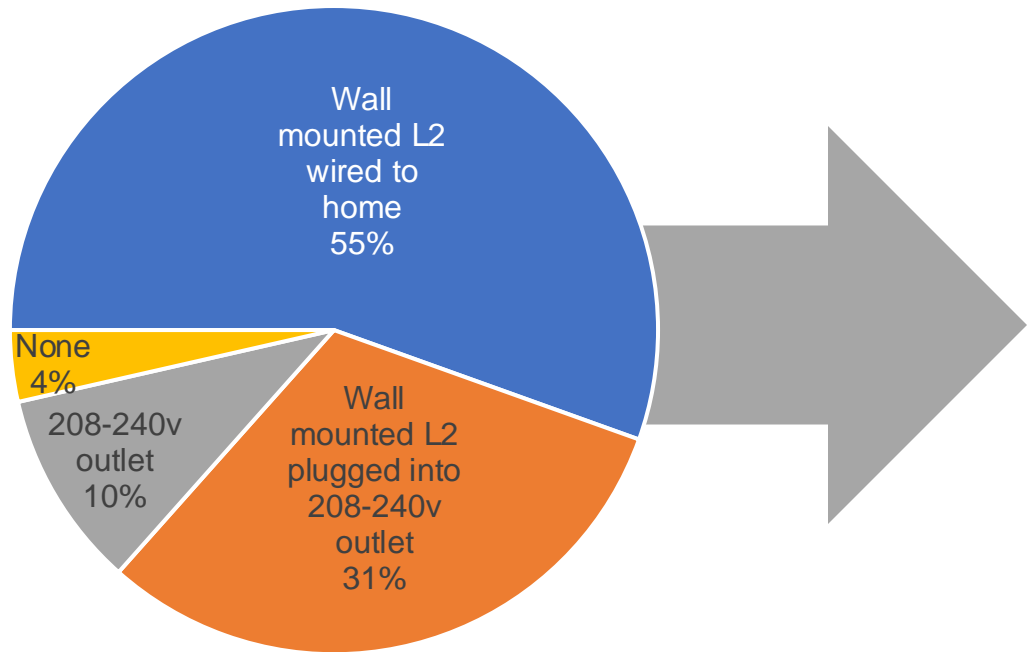
Both types of vehicle owners show similar concerns with cost of EV ownership.

Encouragingly, the least problematic ownership cost EV drivers report is home electricity. This is especially true among BEV drivers, 83% of whom say it hasn't been a problem at all.

HOME CHARGING

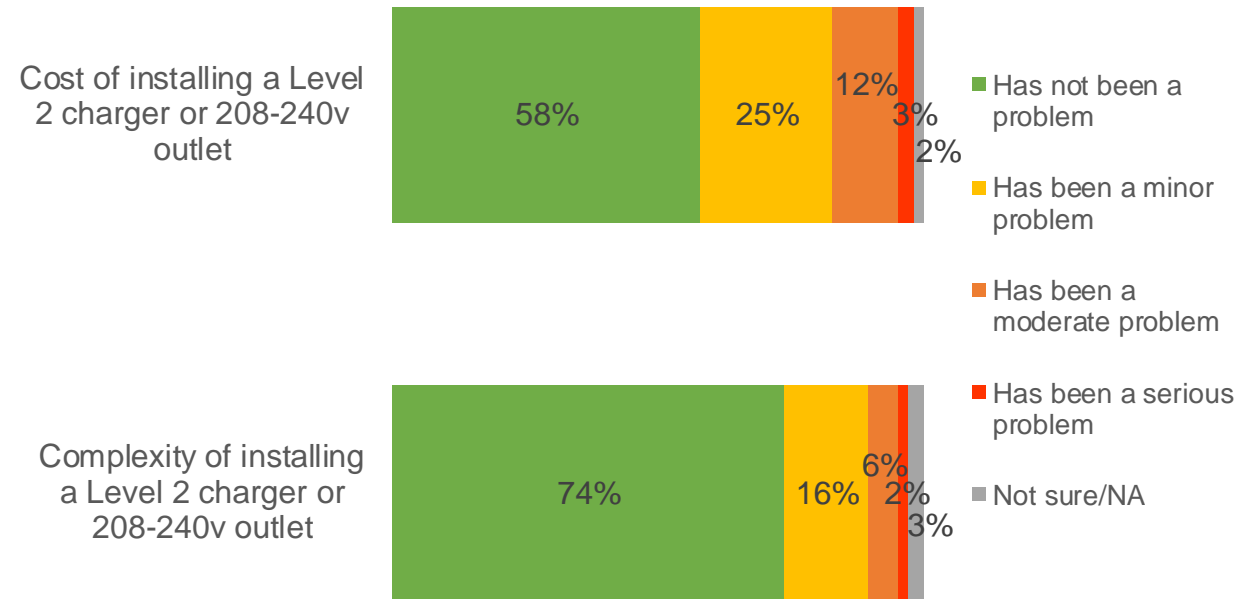
L2 INSTALL

Level 2 Home Charging Installation



All EV drivers w/Level 2 Home Charging PHEV + BEV n=11,916

Problems with Level 2 Charger Installation



All EV drivers who installed Level 2 Home Charging PHEV + BEV n=11,541

Among drivers who use Level 2 charging at home, most (55%) installed a wall-mounted charger that is wired directly to their home. Nearly a third (31%) installed a mounted charger that plugs into an outlet, while another 10% had an outlet installed (presumably for applications like the Tesla Mobile Connector).

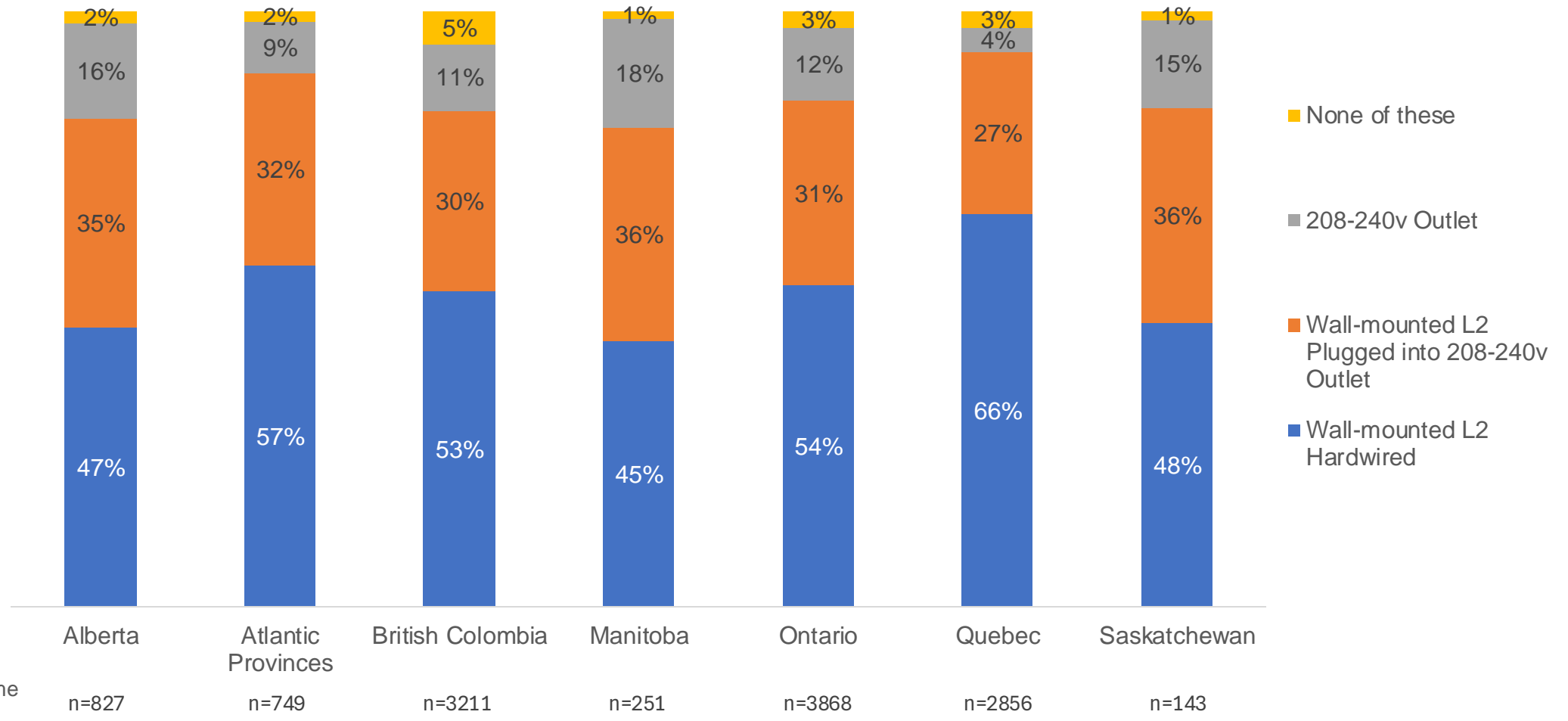
Installation cost is a more common problem than complexity (though most had no problems with either).

Q17. Did you install any of the following at home for the purpose of charging your EV?

Q18. Thinking back, please tell us how you feel about these aspects of installing Level 2 charging at home.

L2 INSTALL BY REGION

Level 2 Home Charger Installation



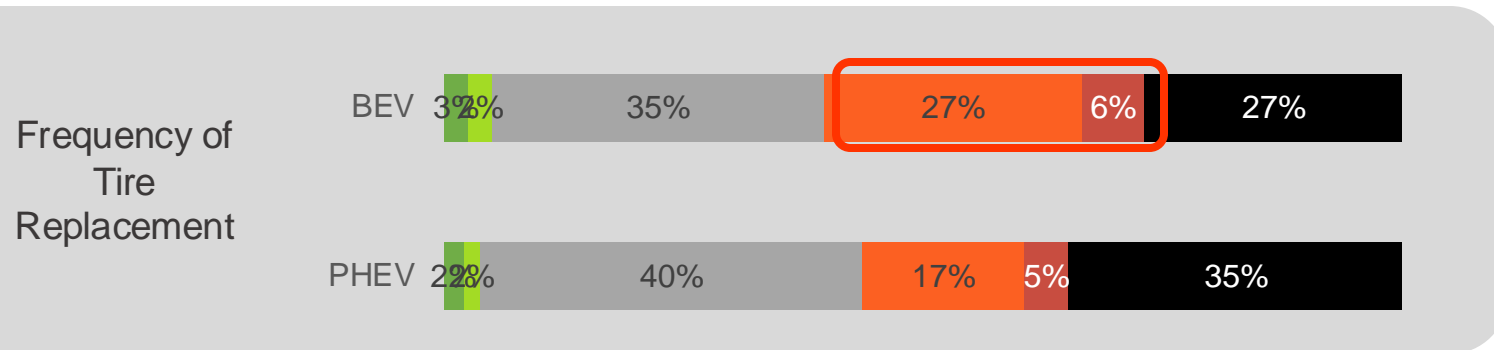
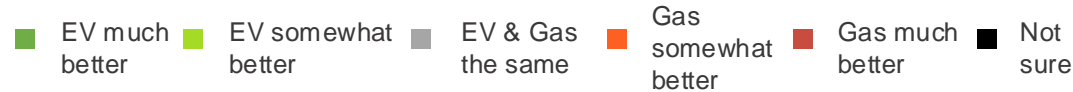
All EV drivers w/Level 2 Home Charging PHEV + BEV

Q17. Did you install any of the following at home for the purpose of charging your EV?

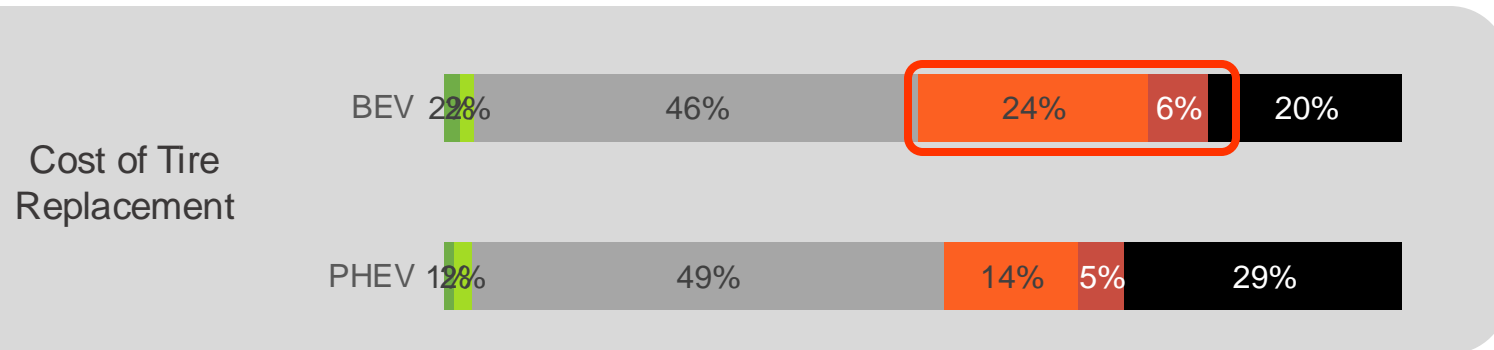
EV vs. GAS

GAS VS EV COMPARISONS

Gas vs. EV: Tires



Most EV drivers are on the fence when it comes to a head-to-head matchup between EVs and gas vehicles on frequency and cost of tire replacement.

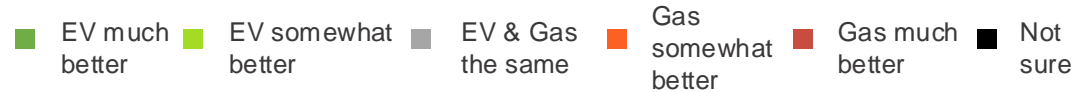


However, 33% of BEV owners indicate that gas vehicles are better when it comes to the frequency and 30% say gas vehicles are better when it comes to the cost of tire replacement.

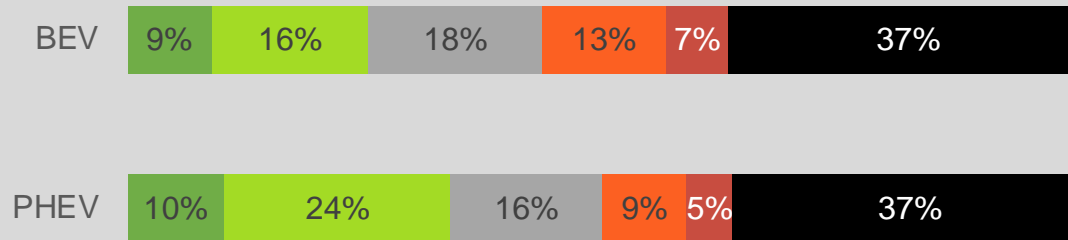
BEV n=14,331 PHEV n=1,710

GAS VS EV COMPARISONS

Gas vs. EV: Resale Value and Fuel Costs

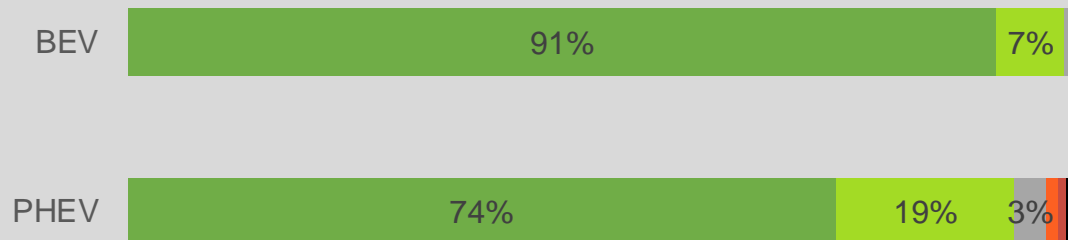


Vehicle Resale Value



Owners of EVs are unsure of resale value as it may still be too early in the ownership lifecycle (i.e., owners have not sold their vehicles yet).

Overall Cost of Fueling/Charging

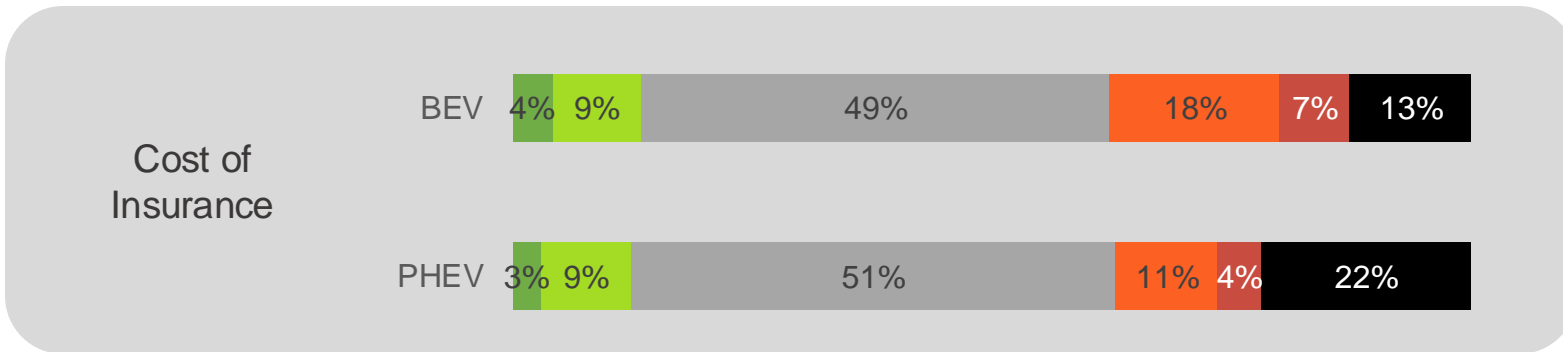
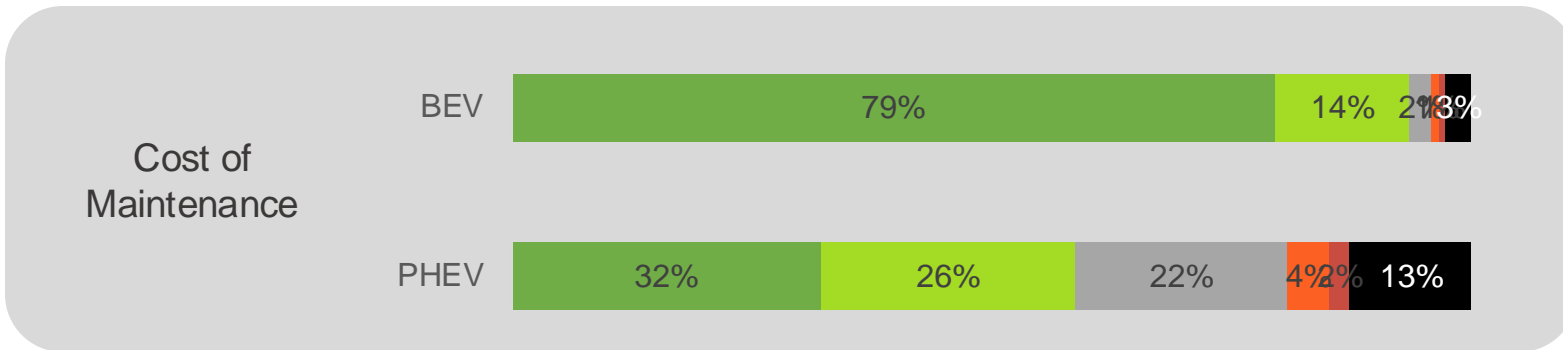
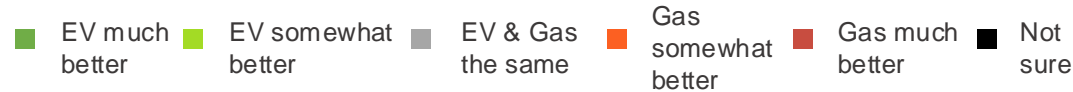


The lower fueling/charging costs are valued by both BEV and PHEV owners who cite EVs are much better when compared to gas vehicles. This is especially evident with BEV owners at 91%.

BEV n=14,331 PHEV n=1,710

GAS VS EV COMPARISONS

Gas vs. EV: Maintenance and Insurance Costs



BEV n=14,331 PHEV n=1,710

The majority of EV owners, especially BEV drivers, see EVs as having the lower cost of maintenance vis-à-vis gas vehicles.

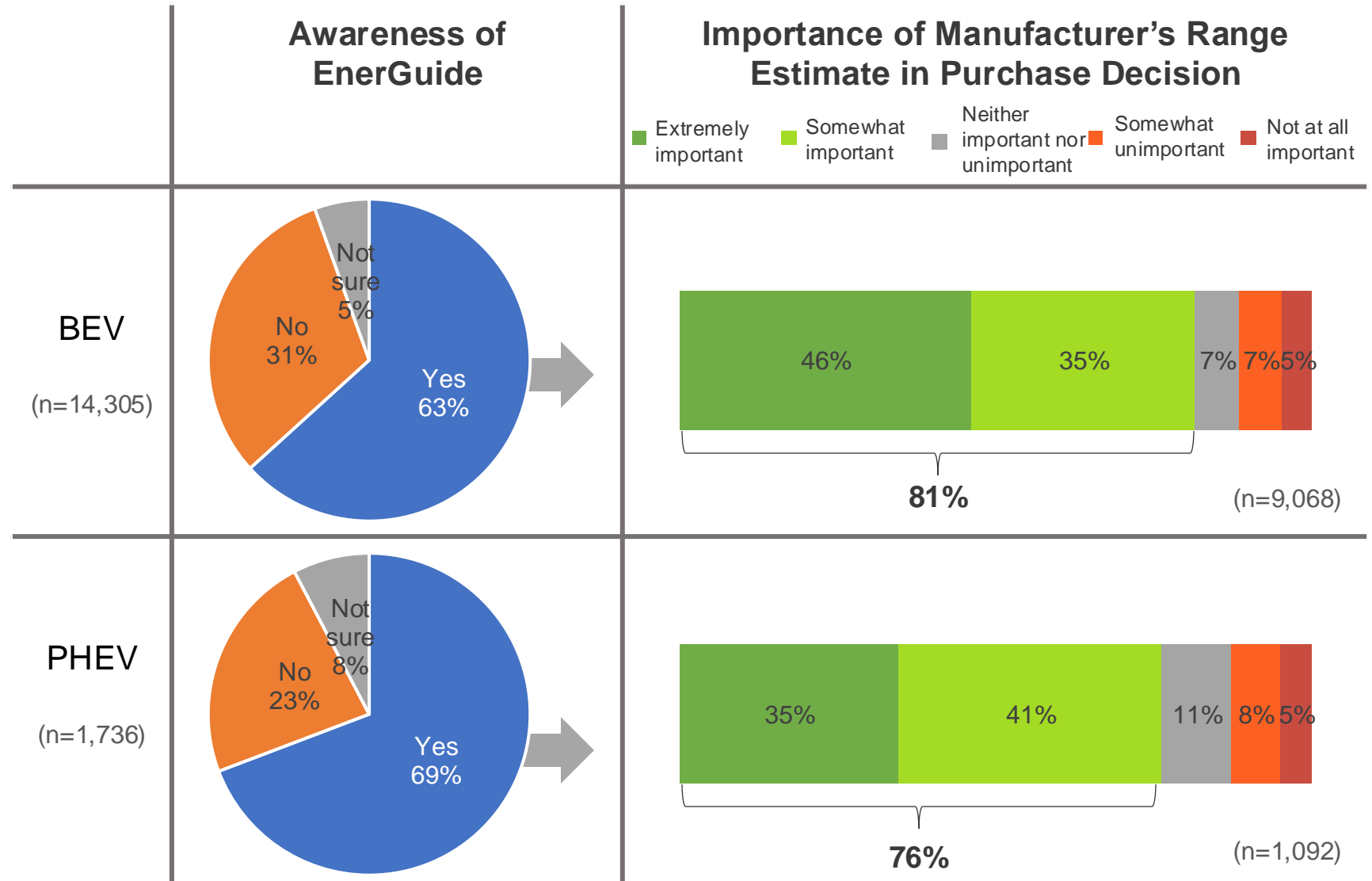
The longer owners have their EVs the more substantial the ownership cost benefit is realized.

EV Range

MANUFACTURER'S ESTIMATED RANGE

The majority of EV owners feel the manufacturer's range estimates are extremely to somewhat important.

This stresses the importance of stating accurate range to help alleviate range anxiety.

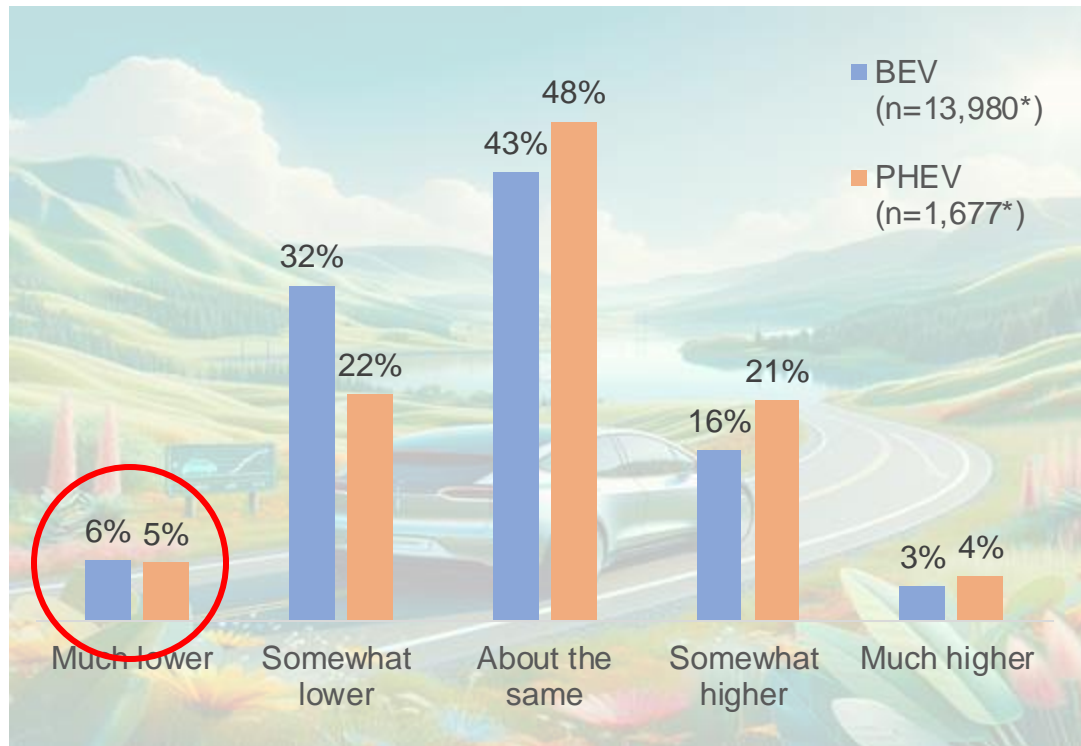


Q23. By law, manufacturers publish an electric vehicle's official battery range estimate on a new car window sticker called an EnerGuide. Were you aware of this official range estimate before purchasing your [EV]? Q24. How important was the manufacturer's official electric range estimate to your decision to purchase your [EV]?

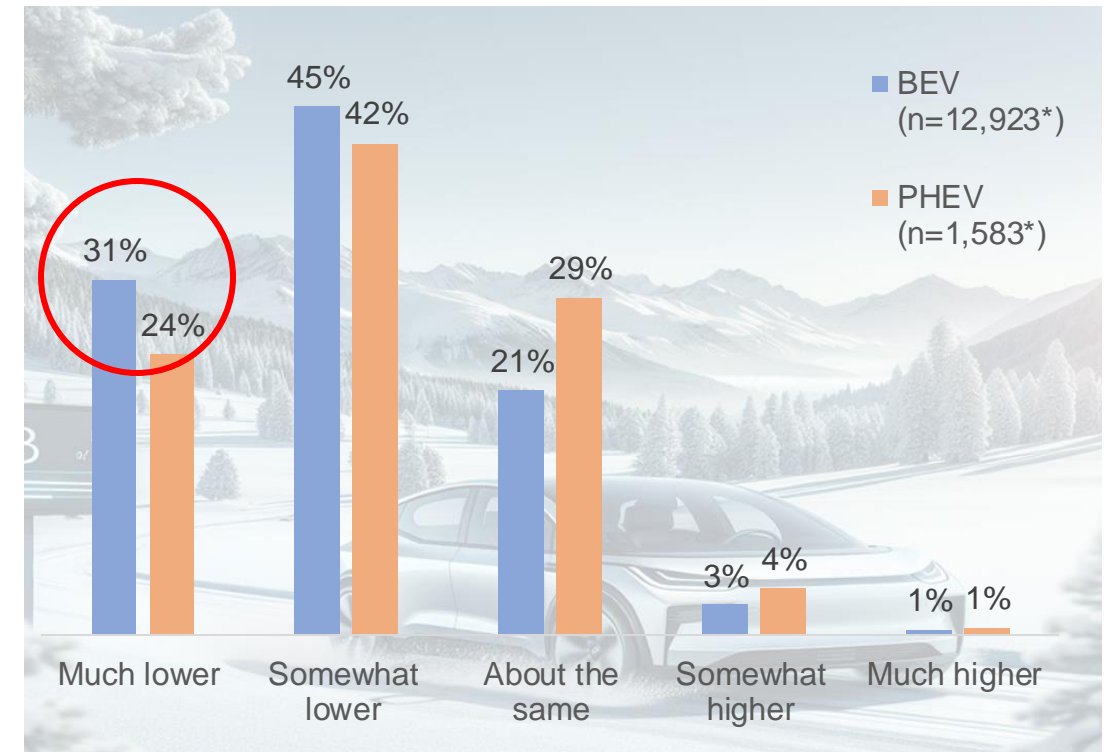
RANGE – A Story of Two Tales

Range estimates drop significantly during cold weather compared to warmer weather.

Accuracy of Range Estimate in Warm Weather



Accuracy of Range Estimate in Cold Weather

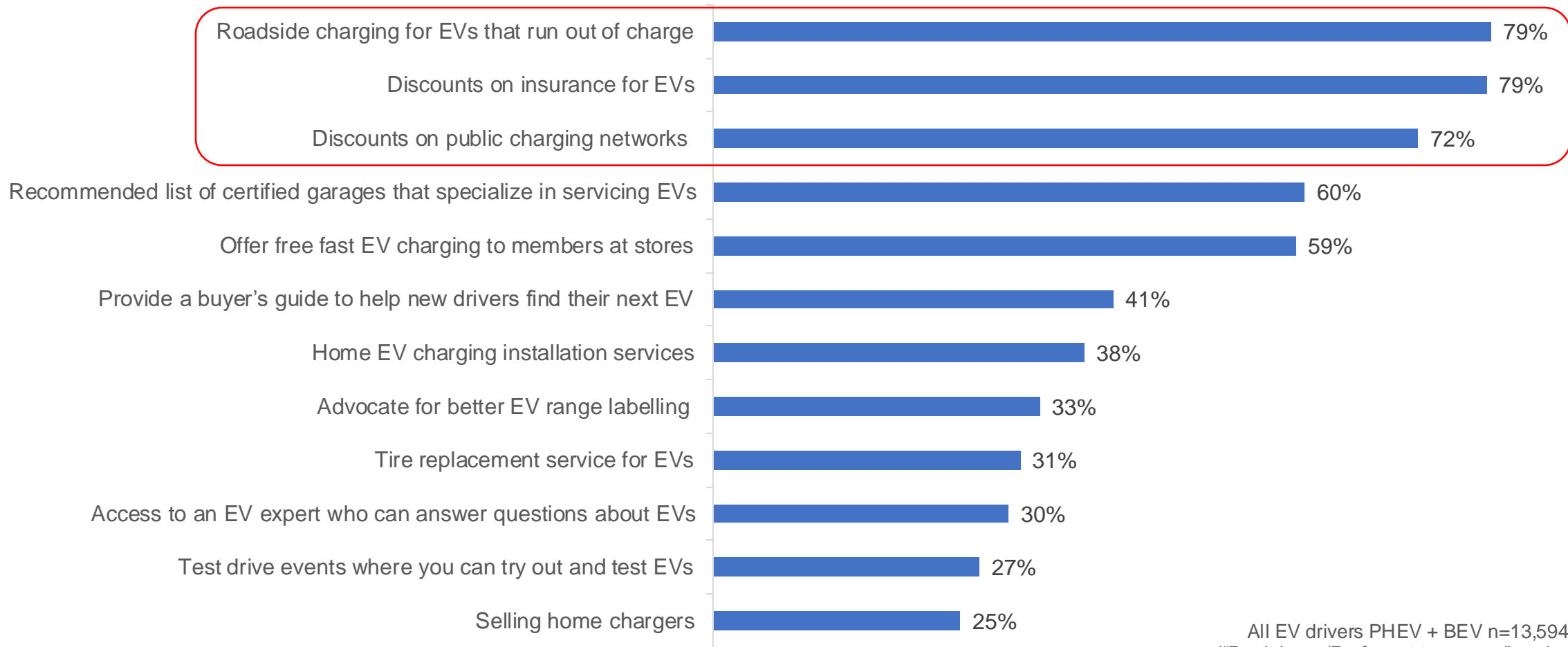


*Excludes "Not sure/don't know"

CAA

CAA HELP EV DRIVERS

Access to roadside charging help or discounts specific toward EVs are top of mind for consumers.



All EV drivers PHEV + BEV n=13,594
("Don't know/Prefer not to answer" excluded)

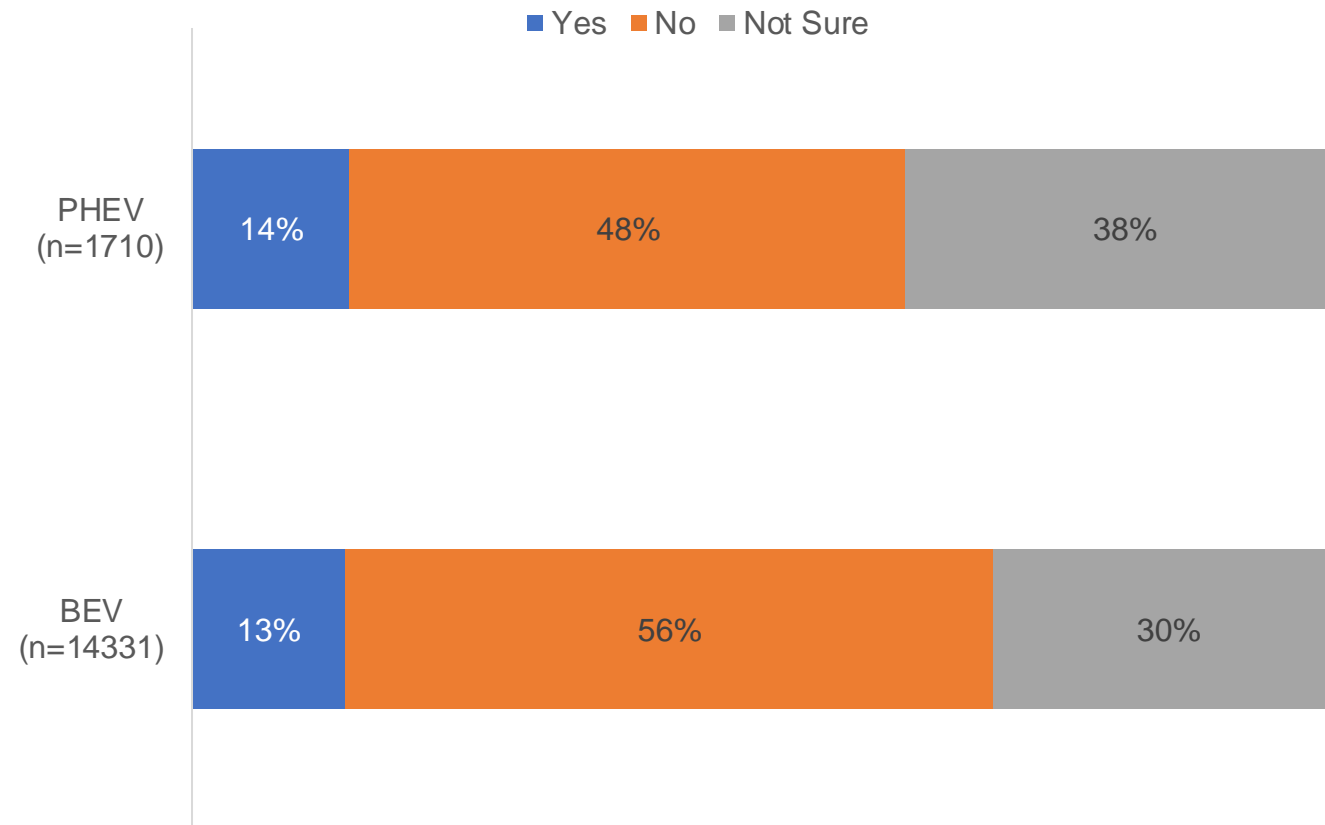
CAA HELP EV DRIVERS BY REGION

	Alberta (n=1,028)	Atlantic Provinces (n=808)	British Columbia (n=4,390)	Manitoba (n=308)	Ontario (n=4,259)	Quebec (n=2,633)	Saskatchewan (n=159)
Roadside charging for EVs that run out of charge	82%	78%	81%	59%	79%	77%	69%
Discounts on insurance for EVs	79%	82%	80%	80%	80%	77%	76%
Discounts on public charging networks	75%	77%	71%	73%	75%	65%	74%
Recommended list of certified garages that specialize in servicing EVs	68%	63%	59%	65%	61%	51%	61%
Offer free fast EV charging to members at stores	58%	64%	57%	56%	57%	72%	56%
Provide a buyer's guide to help new drivers find their next EV	38%	39%	41%	40%	38%	46%	37%
Home EV charging installation services	42%	38%	42%	41%	39%	27%	36%
Advocate for better EV range labelling	36%	36%	32%	35%	33%	33%	40%
Tire replacement service for EVs	28%	30%	29%	29%	27%	39%	24%
Access to an EV expert who can answer questions about EVs	30%	31%	32%	33%	34%	26%	28%
Test drive events where you can try out and test EVs	32%	31%	25%	31%	30%	23%	20%
Selling home chargers	25%	25%	28%	30%	26%	20%	27%

Q33. How can the Canadian Automobile Association (CAA) help the EV driver of today? Please select all that apply.

DISCOUNT ON INSURANCE

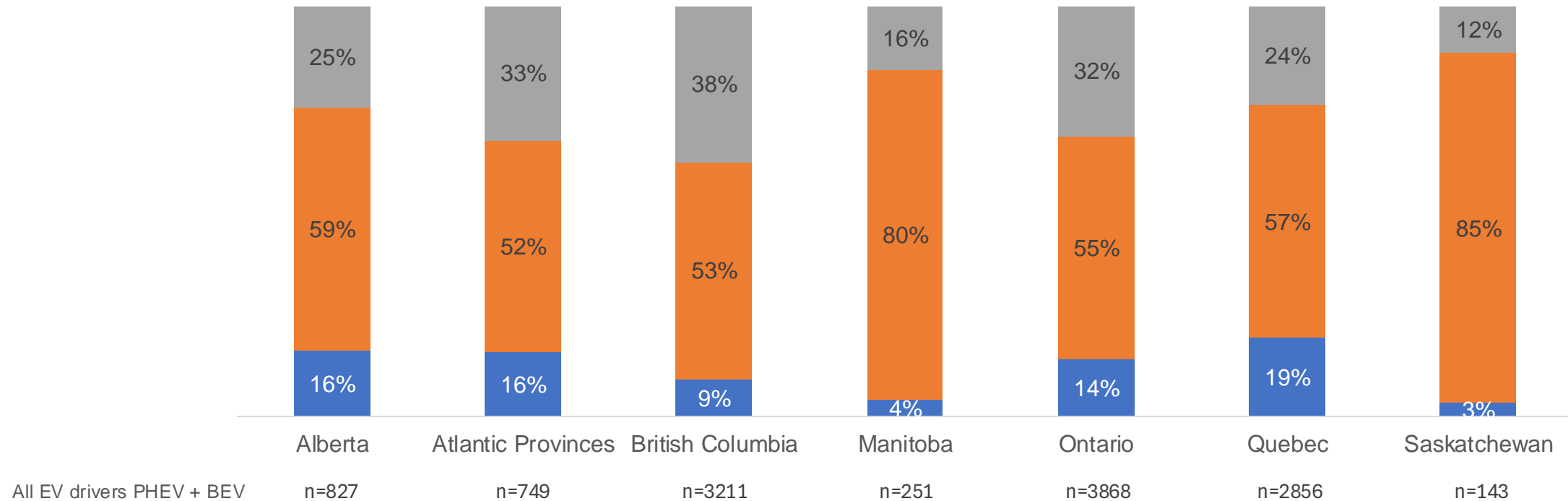
Receives Discount on Insurance



DISCOUNT ON INSURANCE

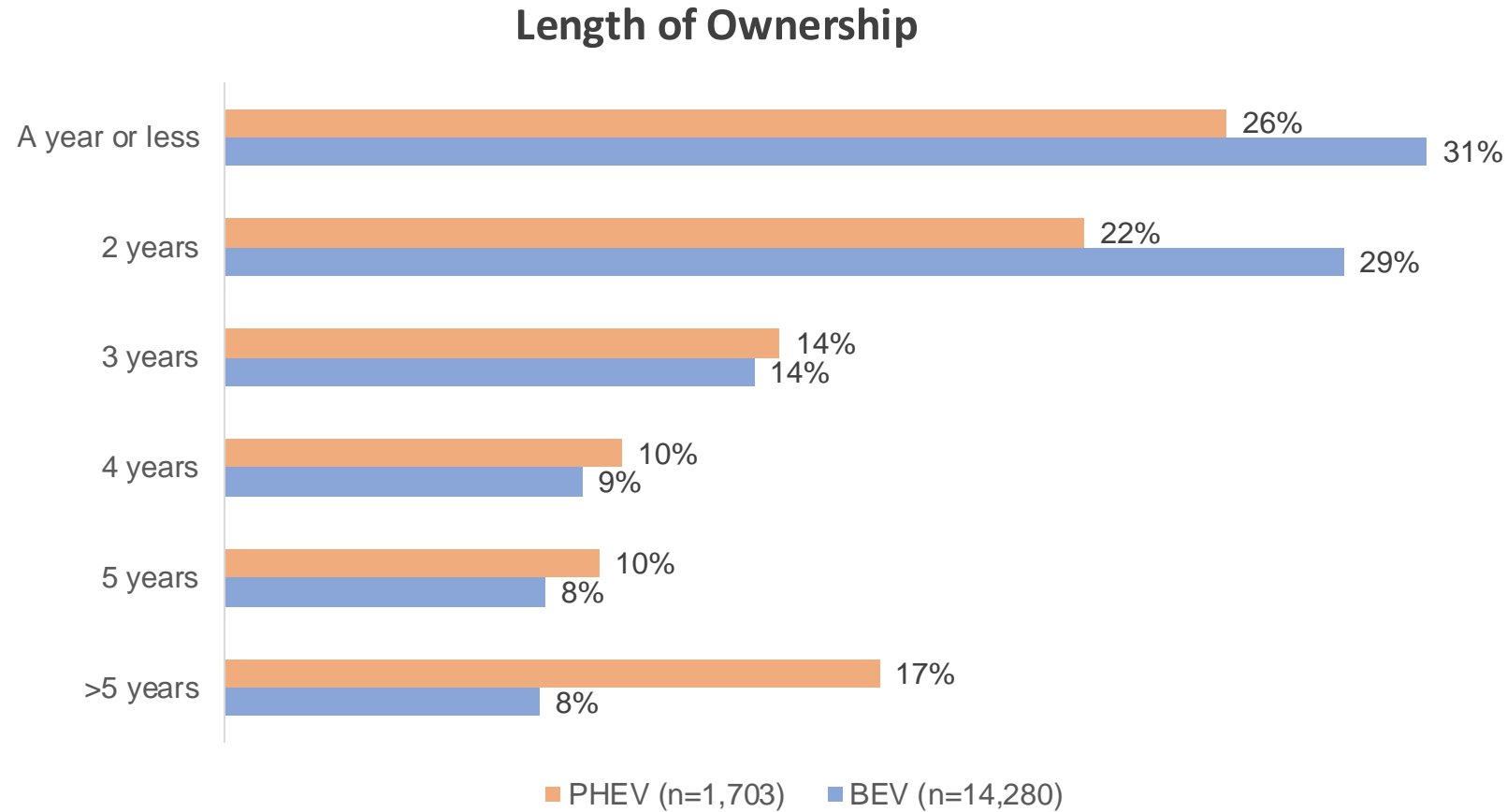
Receives Discount on Insurance

■ Yes ■ No ■ Not Sure

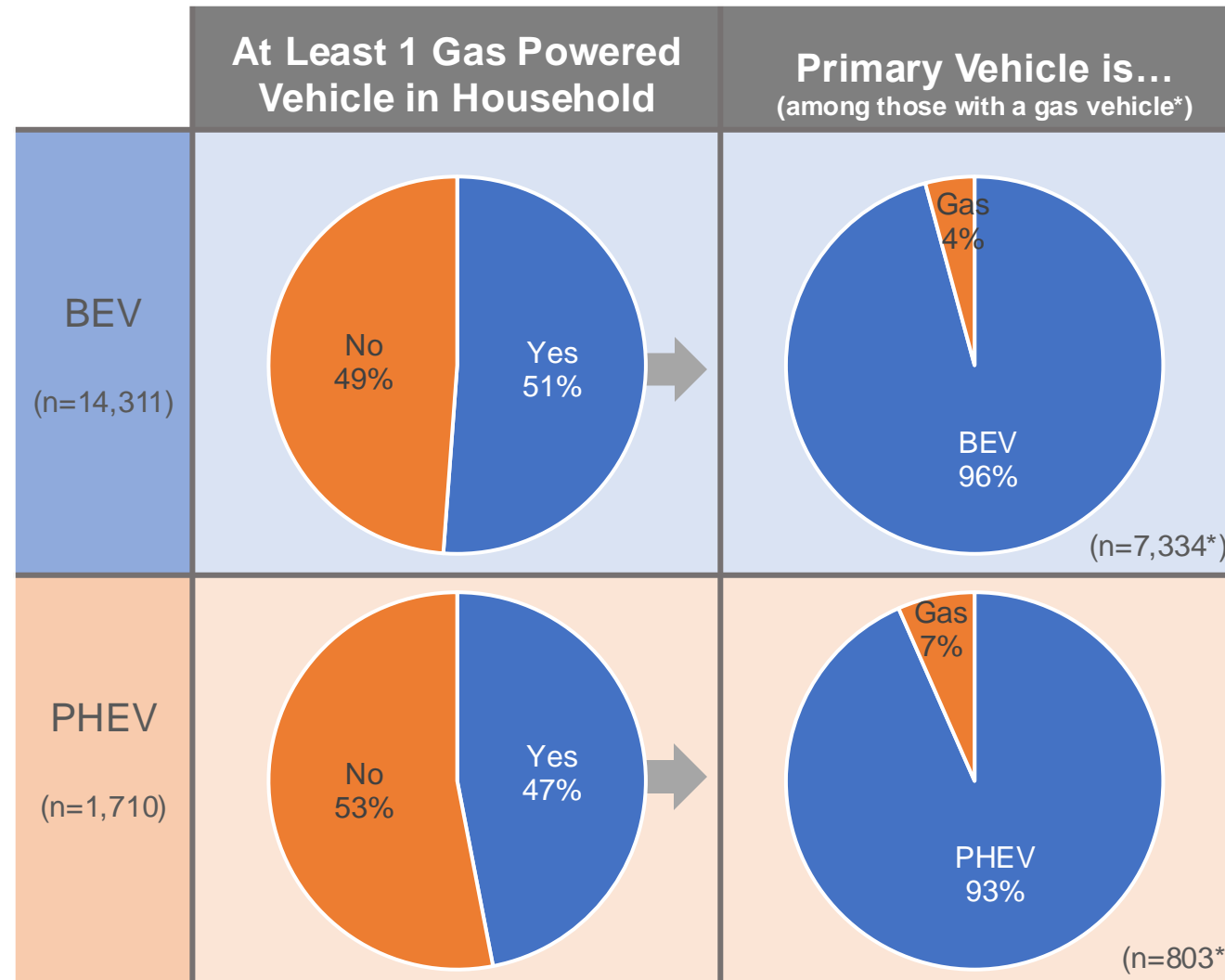


RESPONDENT DETAILS

LENGTH OF OWNERSHIP



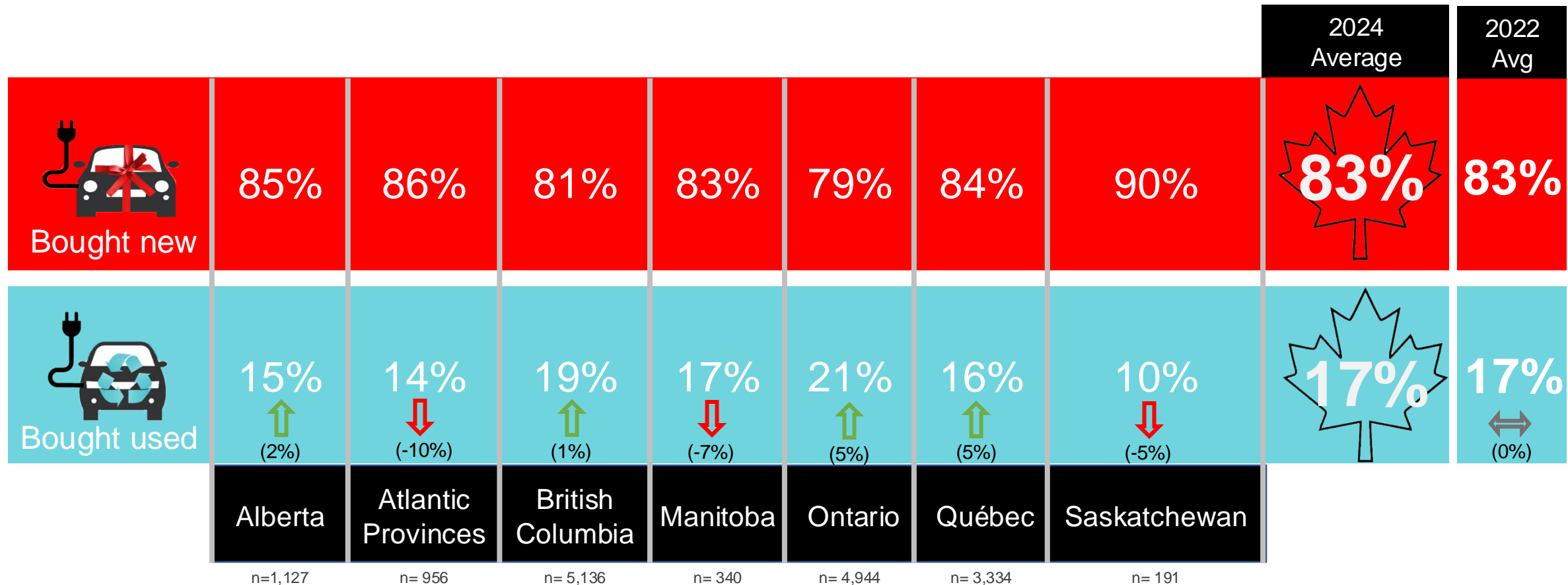
NON-ELECTRIC VEHICLE OWNERSHIP



Q5. In addition to your [EV], do you also own or lease at least one vehicle that is either: 1) powered EXCLUSIVELY by gasoline, or 2) is a hybrid vehicle that is NOT a plug-in hybrid?

Q6. Which is the primary vehicle you drive, your [EV], or a gas or hybrid vehicle (NOT A PLUG-IN HYBRID)?





EVS IN CANADA: NEW VS. USED



While 83% of Canadian EV drivers bought their EV new, 17% bought used. Drivers in the British Columbia and Ontario were most likely to acquire a used EV.





HOUSING DETAILS

2024

VEHICLE TYPE	2024		2022	
	 MULTI-UNIT DWELLING	 SINGLE-FAMILY DWELLING	 RENT HOME	 OWN HOME
BEV (n=14,331)	19%	81%	8%	92%
PHEV (n=1,710)	23%	77%	10%	90%

Percentages omit those responding "other".

2022

VEHICLE TYPE	2024		2022	
	 MULTI-UNIT DWELLING	 SINGLE-FAMILY DWELLING	 RENT HOME	 OWN HOME
BEV	18%	77%	11%	88%
PHEV	21%	73%	13%	86%

All EV drivers (BEV + PHEV) PlugShare panel profiling questionnaire: n=12,550

DEMOGRAPHICS – AGE & GENDER

AGE GROUP	BEV n=14,331	PHEV n=1,710
18-34	4%	4%
35-44	15%	14%
45-54	22%	20%
55-64	25%	24%
65-74	23%	26%
75+	9%	9%

1% (BEV) and 2% (PHEV) preferred not to answer

GENDER	BEV n=14,331	PHEV n=1,710
Male	75%	72%
Female	22%	26%
Other	3%	3%

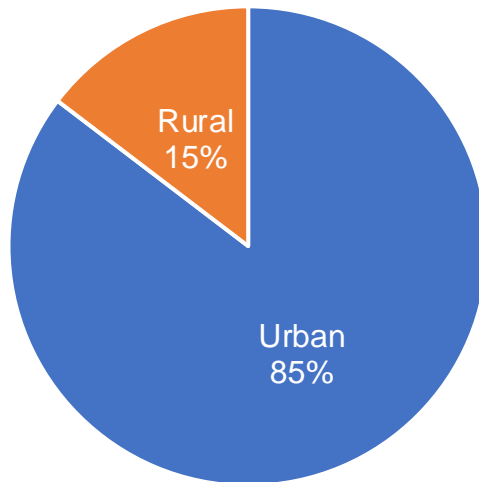
3% (BEV) and 3% (PHEV) preferred not to answer

Canadian EV drivers skew older, where ~58% are aged 55+.

As we saw earlier, people that own single-family homes represent the dominant group of EV owners in Canada, likely because installing home charging has far fewer barriers than it does for people living in multi-unit dwellings and those who rent. This effect is likely driving up the average age of EV acquisition.

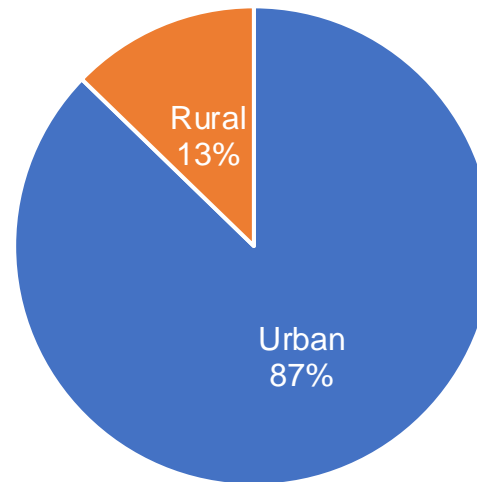
DEMOGRAPHICS – POPULATION DENSITY

BEV Population Density



BEV DRIVERS
n=14,331

PHEV Population Density



PHEV DRIVERS
n=1,710

Like the general population (82% urban*), Canadian EV drivers skew heavily to urban population centers.

This is true of both BEV drivers and PHEV drivers.

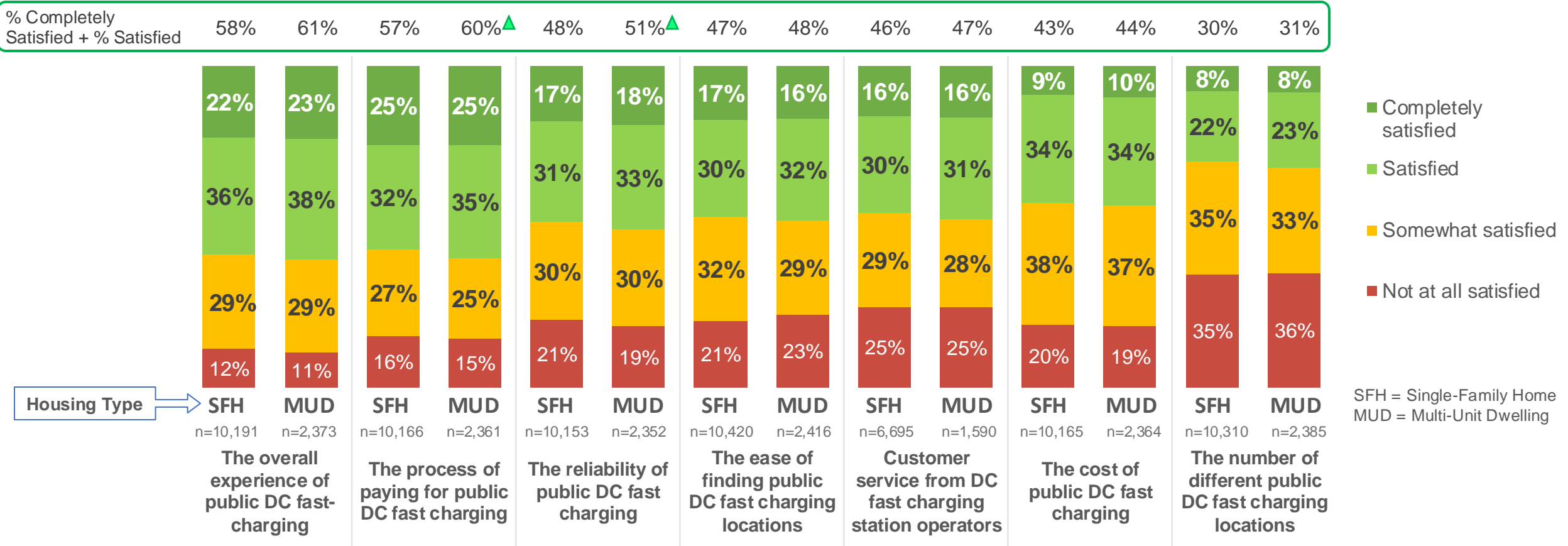
POSTAL_CODE. What is your postal code?

*Source: <https://www12.statcan.gc.ca/census-recensement/index-eng.cfm>

APPENDIX

PUBLIC DC FAST CHARGING SATISFACTION

Satisfaction with Public DC Fast Charging (BEV Only)



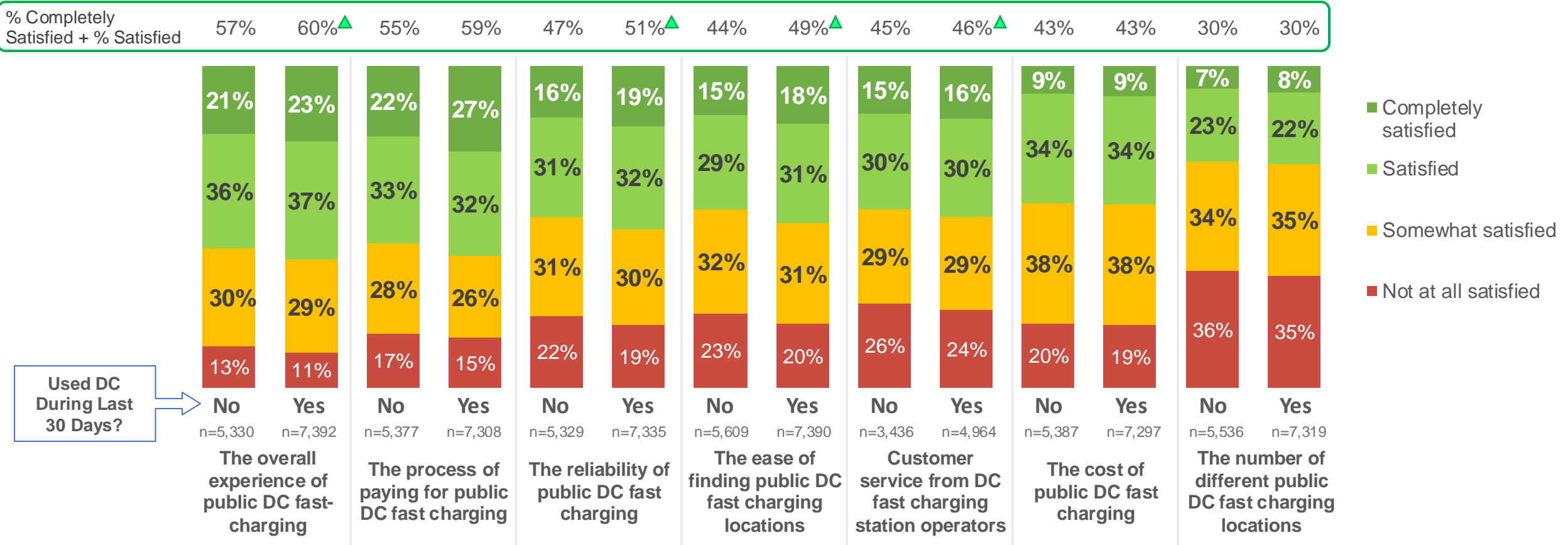
Q13. Please tell us how satisfied you are with these different aspects of public DC FAST CHARGING your [DRIVER'S EV MAKE MODEL]?

▲ Significantly higher pairwise comparison at 95% confidence level.

*Excludes "Not sure/does not apply to me"

PUBLIC DC FAST CHARGING SATISFACTION

Satisfaction with Public DC Fast Charging (BEV Only)



Used DC During Last 30 Days?

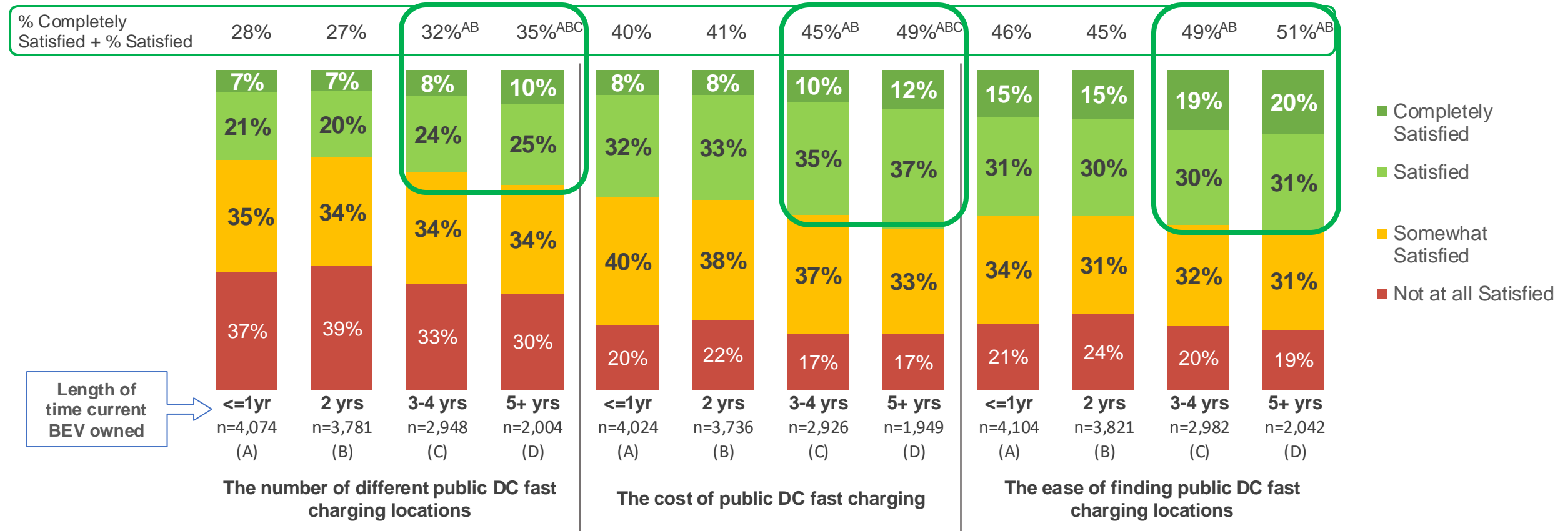
Q13. Please tell us how satisfied you are with these different aspects of public DC FAST CHARGING your [DRIVER'S EV MAKE MODEL]?

▲ Significantly higher pairwise comparison at 95% confidence level.

*Excludes "Not sure/does not apply to me"

PUBLIC DC FAST CHARGING SATISFACTION

Satisfaction with Public DC Fast Charging (BEV Only)

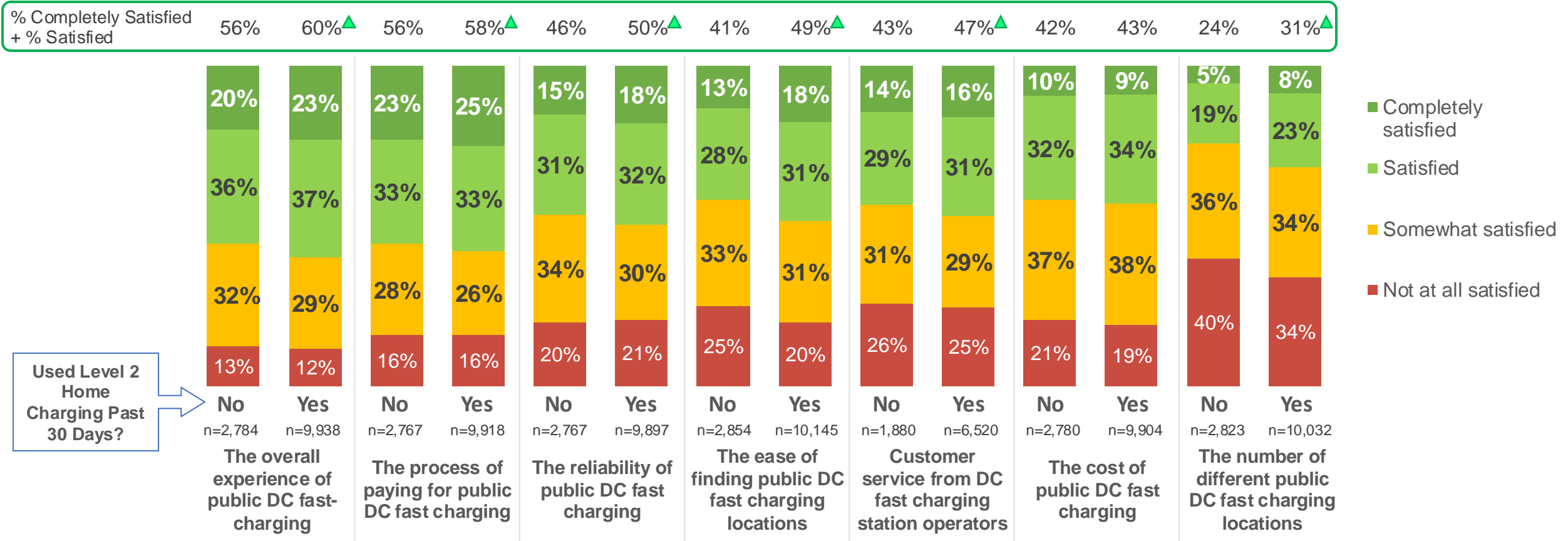


Q13. Please tell us how satisfied you are with these different aspects of public DC FAST CHARGING your [DRIVER'S EV MAKE MODEL]?
Significant pairwise difference(s) at 95% confidence level denoted with capital letter(s).

*Excludes "Not sure/does not apply to me"

PUBLIC DC FAST CHARGING SATISFACTION

Satisfaction with Public DC Fast Charging (BEV Only)



Used Level 2 Home Charging Past 30 Days?

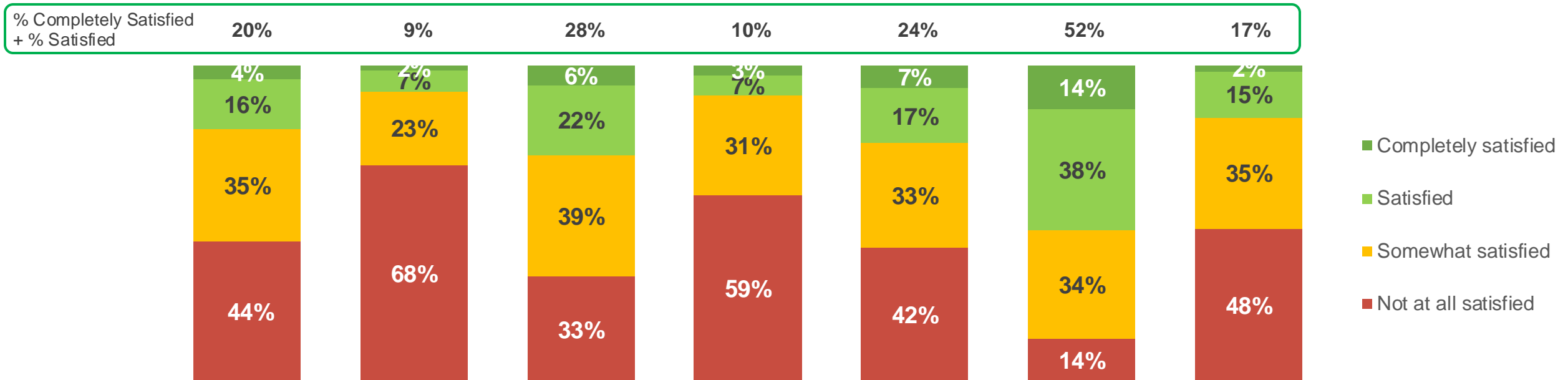
Q13. Please tell us how satisfied you are with these different aspects of public DC FAST CHARGING your [DRIVER'S EV MAKE MODEL]?

▲ Significantly higher pairwise comparison at 95% confidence level.

*Excludes "Not sure/does not apply to me"

PUBLIC DC FAST CHARGING SATISFACTION

Satisfaction with Public DC Fast Charging:
The number of different public DC fast charging locations



	Alberta	Atlantic Provinces	British Columbia	Manitoba	Ontario	Quebec	Saskatchewan
BEV driver sample ^A	n=1,127	n=956	n=5,136	n=340	n=4,944	n=3,334	n=191
DCFC Locations ^B	202	210	601	80	730	798	78
Sales '17 – Q2 '24 ^C	NA ^D	NA ^D	126,911	3,173	131,263	204,134	2,035
Approx. Vehicles Per DCFC Location	NA ^D	NA ^D	211	40	180	256	26
Land Area (sq km)	642,317	504,320	925,186	553,556	917,741	1,365,128	591,670
Approx. DCFC Locations Per sq km	3,180	2,402	1,539	6,919	1,257	1,711	7,586

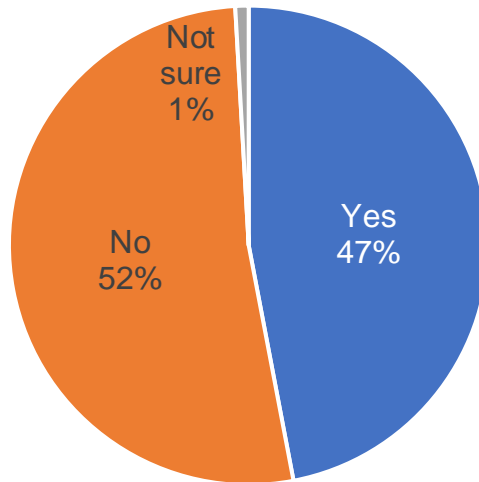
Q13. Please tell us how satisfied you are with these different aspects of public DC FAST CHARGING your [DRIVER'S EV MAKE MODEL]?

(A) Excludes "Not sure/does not apply to me"; (B) Source: PlugShare Infrastructure DataTool as of February 1, 2023

(C) Source: Statistics Canada. Table 20-10-0025-01 New zero-emission vehicle registrations, quarterly; (D) Data are currently not available due to contractual limitations of the existing data sharing agreement.

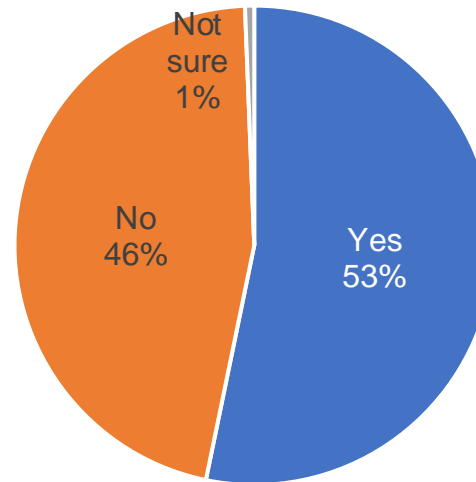
AUTOMOBILE ASSOCIATION MEMBERSHIP

Canadian
Automobile Association



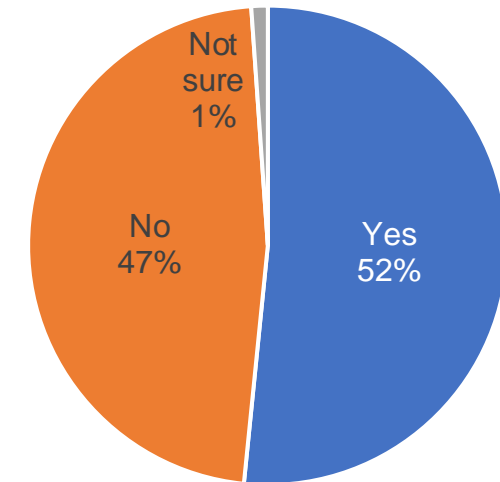
All EV drivers PHEV + BEV
Not in Alberta or BC
n=9,778

Alberta
Motor Association



All EV drivers PHEV + BEV
in Alberta
n=1,127

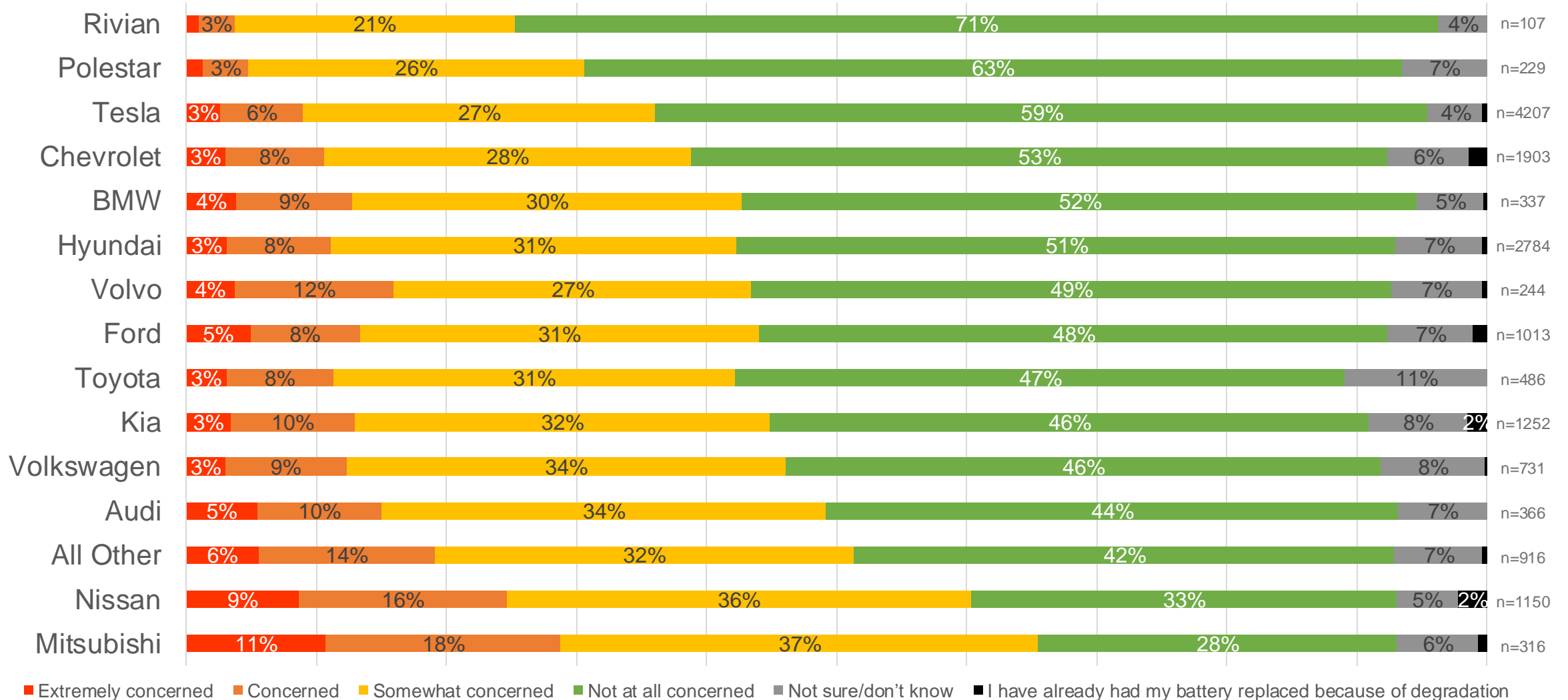
British Columbia
Automotive Association



All EV drivers PHEV + BEV
in BC
n=5,136

BATTERY DEGRADATION BY MAKE

Level of Concern of Battery Degradation



Q20. How concerned are you about the battery of your [VEHICLE] degrading to the point where it will need to be replaced in the future?