

The Evolution of Canadian Consumer Attitudes on Electric Vehicles (2015-2018)

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Table of Contents

1.0 Introduction & Background	5
2.0 Perceptions about the Environment and the Role of Social Pressure	9
2.1. Key Graphics	10
2.2. Summary of Results	19
3.0 Themes of Personal Conviction	21
3.1. Key Graphics	22
3.1.1. Attitudinal Statements (2015-2018)	22
3.1.2. 2018 Perceived Urgency to Adopt so that next vehicle will be electric.....	31
3.2. Summary of Results	33
4.0 Aspects of Electric Vehicle Knowledge	35
4.1. Key Graphics	36
4.2. Summary of Results	48
5.0 Barriers to Electric Vehicle Adoption	50
5.1. By Province	52
5.2. By Census Metropolitan Area	58
5.3. By Urban-Rural Index	64
5.4. By Age Groups	68
5.5. Summary of Results	72
6.0 Conclusions	78
7.0 Appendix	81
7.1. Importance Ratings for Vehicle Attributes	81
7.2. My province offers a substantial cash incentive towards purchasing an EV	97
7.3. The federal government offers a substantial cash incentive towards purchasing an EV	98
7.4. Summary of Results	100

Table of Figures

Figure 1-1: Provincial distribution of survey respondents 7

Figure 1-2: Age distribution of survey respondents 7

Figure 2-1: I am very concerned about human behaviour and its influence on climate change and the environment (by Province) 10

Figure 2-2: I am very concerned about human behaviour and its influence on climate change and the environment (by Census Metropolitan Area) 11

Figure 2-3: I am very concerned about human behaviour and its influence on climate change and the environment (by Urban-Rural Index) 12

Figure 2-4: I am very concerned about human behaviour and its influence on climate change and the environment (by Age) 12

Figure 2-5: People who are close to me think that it is important to consider the environment when I purchase a vehicle (by Province) 13

Figure 2-6: People who are close to me think that it is important to consider the environment when I purchase a vehicle (by Census Metropolitan Area) 14

Figure 2-7: People who are close to me think that it is important to consider the environment when I purchase a vehicle (by Urban-Rural Index) 15

Figure 2-8: People who are close to me think that it is important to consider the environment when I purchase a vehicle (by Age) 15

Figure 2-9: I feel some social pressure to purchase an EV (by Province) 16

Figure 2-10: I feel some social pressure to purchase an EV (by Census Metropolitan Area) 17

Figure 2-11: I feel some social pressure to purchase an EV (by Urban-Rural Index) 18

Figure 2-12: I feel some social pressure to buy an EV (by Age) 18

Figure 3-1: I feel morally committed to buy an EV (by Province) 22

Figure 3-2 I feel morally committed to buy an EV (by Census Metropolitan Area) 23

Figure 3-3 I feel morally committed to buy an EV (by Urban-Rural Index) 24

Figure 3-4 I feel morally committed to buy an EV (by Age) 24

Figure 3-5: I am willing to spend more money to buy an EV (by Province) 25

Figure 3-6: I am willing to spend more money to buy an EV (by Census Metropolitan Area) 26

Figure 3-7: I am willing to spend more money to buy an EV (Urban-Rural Index) 27

Figure 3-8: I am willing to spend more money to buy an EV (by Age) 27

Figure 3-9: I am willing to tolerate some periodic battery charging inconvenience for the benefits of driving an EV (by Province) 28

Figure 3-10: I am willing to tolerate some periodic battery charging inconvenience for the benefits of driving an EV (by Census Metropolitan Area) 29

Figure 3-11: I am willing to tolerate some periodic battery charging inconvenience for the benefits of driving an EV (by Urban-Rural Index) 30

Figure 3-12: I am willing to tolerate some periodic battery charging inconvenience for the benefits of driving an EV (by Age) 30

Figure 3-13 Urgency (by Province) 31

Figure 3-14 Urgency (by Census Metropolitan Area) 31

Figure 3-15 Urgency (by Urban-Rural Index) 32

Figure 3-16 Urgency (by Age) 32

Figure 4-1: Driving range would not concern me if I owned an EV (by Province) 36

Figure 4-2: Driving range would not concern me if I owned an EV (by Census Metropolitan Area) 37

Figure 4-3: Driving range would not concern me if I owned an EV (by Urban-Rural Index) 38

Figure 4-4: Driving range would not concern me if I owned an EV (by Age) 38

Figure 4-5: I know where I could buy an EV (by Province)..... 39

Figure 4-6: I know where I could buy an EV (by Census Metropolitan Area) 40

Figure 4-7: I know where I could buy an EV (Urban-Rural Index)..... 41

Figure 4-8: I know where I could buy an EV (by Age) 41

Figure 4-9: I already know several locations where I could plug in if I had an EV (by Province) 42

Figure 4-10: I already know several locations where I could plug in if I had an EV (by Census Metropolitan Area) 43

Figure 4-11: I already know several locations where I could plug in if I had an EV (by Urban-Rural Index) 44

Figure 4-12: I already know several locations where I could plug in if I had an EV (by Age) 44

Figure 4-13: Plugging in an EV at my home is not practical (by Province)..... 45

Figure 4-14: Plugging in an EV at my home is not practical (by Census Metropolitan Area)..... 46

Figure 4-15: Plugging in an EV at my home is not practical (by Urban-Rural Index) 47

Figure 4-16: Plugging in an EV at my home is not practical (by Age)..... 47

Figure 5-1 - Overview of Barriers to EV Adoption..... 51

Figure 5-2: There is a lack of marketing on EVs (by Province) 52

Figure 5-3: I am worried about EV resale value (by Province)..... 52

Figure 5-4: I find that dealers steer me away from EVs (by Province)..... 53

Figure 5-5: The purchase experience for an EV (initial inquiry to delivery) is more difficult (by Province)..... 53

Figure 5-6: I am content with conventional ICE vehicles (by Province)..... 54

Figure 5-7: EVs just cost too much to buy (by Province) 54

Figure 5-8: I prefer larger vehicles that do not come as EVs (by Province) 55

Figure 5-9: I am concerned about EV technology (e.g. battery durability, safety; by Province) 55

Figure 5-10: I am concerned about the time required for an EV to pay off (by Province) 56

Figure 5-11: A charging station may not be nearby when I really need to charge (by Province) 56

Figure 5-12: Public charging is much slower than filling my tank (by Province)..... 57

Figure 5-13: There is a lack of marketing on EVs (by Census Metropolitan Area)..... 58

Figure 5-14: I am worried about EV resale value (by Census Metropolitan Area)..... 58

Figure 5-15: I find that dealers steer me away from EVs (by Census Metropolitan Area) 59

Figure 5-16: The purchase experience for an EV (initial inquiry to delivery) is more difficult (by Census Metropolitan Area)..... 59

Figure 5-17: I am content with conventional ICE vehicles (by Census Metropolitan Area)..... 60

Figure 5-18: EVs just cost too much to buy (by Census Metropolitan Area) 60

Figure 5-19: I prefer larger vehicles that do not come as EVs (by Census Metropolitan Area) 61

Figure 5-20: I am concerned about EV technology (e.g. battery durability, safety; by Census Metropolitan Area) 61

Figure 5-21: I am concerned about the time required for an EV to pay off (by Census Metropolitan Area) 62

Figure 5-22: A charging station may not be nearby when I really need to charge (by Census Metropolitan Area) 62

Figure 5-23: Public charging is much slower than filling my tank (by Census Metropolitan Area)..... 63

Figure 5-24: There is a lack of marketing on EVs (by Urban-Rural Index)..... 64

Figure 5-25: I am worried about EV resale value (by Urban-Rural Index) 64

Figure 5-26: I find that dealers steer me away from EVs (by Urban-Rural Index) 64

Figure 5-27: The purchase experience for an EV (initial inquiry to delivery) is more difficult (by Urban-Rural Index)..... 65

Figure 5-28: I am content with conventional ICE vehicles (by Urban-Rural Index) 65

Figure 5-29: EVs just cost too much to buy (by Urban-Rural Index)..... 65

Figure 5-30: I prefer larger vehicles that do not come as EVs (by Urban-Rural Index)..... 66

Figure 5-31: I am concerned about EV technology (e.g. battery durability, safety; by Urban-Rural Index) 66

Figure 5-32: I am concerned about the time required for an EV to pay off (by Urban-Rural Index) 66

Figure 5-33: A charging station may not be nearby when I really need to charge (by Urban-Rural Index)67

Figure 5-34: Public charging is much slower than filling my tank (by Urban-Rural Index) 67

Figure: 5-35 There is a lack of marketing on EVs (by Age)..... 68

Figure 5-36: I am worried about EV resale value (by Age)..... 68

Figure 5-37: I find that dealers steer me away from EVs (by Age) 68

Figure 5-38: The purchase experience for an EV (initial inquiry to delivery) is more difficult (by Age) 69

Figure 5-39 : I am content with conventional ICE vehicles (by Age)..... 69

Figure 5-40: EVs just cost too much to buy (by Age) 69

Figure 5-41: I prefer larger vehicles that do not come as EVs (by Age) 70

Figure 5-42: I am concerned about EV technology (e.g. battery durability, safety; by Age) 70

Figure 5-43: I am concerned about the time required for an EV to pay off (by Age) 70

Figure 5-44: A charging station may not be nearby when I really need to charge (by Age)..... 71

Figure 5-45: Public charging is much slower than filling my tank (by Age)..... 71

Figure 7-1 Excellent fuel economy (by Province)..... 82

Figure 7-2 Excellent fuel economy (by Census Metropolitan Area) 83

Figure 7-3 Excellent fuel economy (by Urban-Rural Index) 84

Figure 7-4 Excellent fuel economy (by Age) 84

Figure 7-5 No tailpipe emissions (by Province)..... 85

Figure 7-6 No tailpipe emissions (by Census Metropolitan Area) 86

Figure 7-7 No tailpipe emissions (by Urban-Rural Index) 87

Figure 7-8 No tailpipe emissions (by Age) 87

Figure 7-9 Reduced tailpipe emissions (by Province) 88

Figure 7-10 Reduced tailpipe emissions (by Census Metropolitan Area) 89

Figure 7-11 Reduced tailpipe emissions (by Urban-Rural Index)..... 90

Figure 7-12 Reduced tailpipe emissions (by Age) 90

Figure 7-13 High performance/fast acceleration (by Province)..... 91

Figure 7-14 High performance/fast acceleration (by Census Metropolitan Area) 92

Figure 7-15 High performance/fast acceleration (by Urban-Rural Index) 93

Figure 7-16 High performance/fast acceleration (by Age) 93

Figure 7-17 Technology (e.g. advanced navigation, parking assist) (by Province)..... 94

Figure 7-18 Technology (e.g. advanced navigation, parking assist) (by Census Metropolitan Area) 95

Figure 7-19 Technology (e.g. advanced navigation, parking assist) (by Urban-Rural Index) 96

Figure 7-20 Technology (e.g. advanced navigation, parking assist) (by Age) 96

Figure 7-21 My province offers a substantial cash incentive towards purchasing an EV (by Province) 97

Figure 7-22 The federal government offers a substantial cash incentive towards purchasing an EV (by Province)..... 98

Figure 7-23 The federal government offers a substantial cash incentive towards purchasing an EV (by Census Metropolitan Area)..... 99

Introduction & Background

This brief, graphically oriented report focuses on understanding the shifts that have taken place in Canadian consumer attitudes towards electric vehicles (EVs). The time period of interest is the spring of 2015 to the spring of 2018. At each of the two endpoints defined by this time span, the McMaster Institute for Transportation and Logistics carried out a large national survey, each with approximately 20,000 respondents.

While there were some differences between the two surveys, there were essential core aspects that were maintained and these facilitate a sound basis for comparison. In addition to the focus on changing attitudes, some data collected only for 2018 is communicated as well. The most significant element in this regard is a review of perceptions on the barriers that non-EV owners see in 2018 and that explain why they do not yet own an EV.

The results reported here for 2018 are specifically for non-repeat respondents. The 2018 respondents captured in this report did not participate in the 2015 survey. Of the approximately 20,000 respondents who participated in the 2018 survey, about 3,000 of them also responded to the 2015 survey. While these records will undoubtedly be useful for analysis, it quickly became

clear that the 3,000 repeats developed as a skewed sample. For whatever reason (busy lifestyle for younger households etc.) our sample of repeat respondents is disproportionately composed of older respondents. These records will be studied carefully at a later date, but their analysis is considered beyond the scope of this study. In short, this study is a comparison of fresh 2015 respondents with fresh 2018 respondents. As this report will demonstrate, the results are interesting.

Figures 1-1 and 1-2 below offers some particulars on the nature of the 2015 and 2018 samples for these “fresh respondents”. For 2018 we see that Ontario and Quebec are more heavily represented in the 2018 sample. Partly this is due to the 2018 sample being collected in a more compressed time frame with records for the most populated provinces coming in quite rapidly. Nevertheless, with the possible exception of Prince Edward Island, we have good sized and representative 2018 samples in all provinces. In Figure 1-2 we see that the 2018 sample is a little older than the 2015 sample. This outcome may reflect that Canada’s population has aged a little in the three years between the two surveys, it could also indicate that other factors of sampling variability are at play.

While there are a lot useful results in this report, there is much that remains to be done with the two samples, particularly in the case of the 2018 sample. For example, the 2018 survey featured a choice experiment where vehicle attributes were systematically varied according to an experimental design. Respondents were given repeated scenarios and in each case chose a vehicle with powertrain and other characteristics that suited them best. By including this choice experiment in the 2018 survey, data was collected on a large scale across Canada and will doubtlessly yield interesting results when properly analyzed.

Some points about the nature of the report are as follows:

- The report features extensive use of horizontally-oriented stacked bar charts to communicate a fairly large amount of information efficiently. The charts relate either to five-level agreement scales (Strongly Disagree to Strongly Agree) or five-level importance scales (Not at all Important to Extremely Important). In many cases, sorting is employed to order the bars and provide additional insight. Often the sorting is done based on the summation of the two “top” agreement categories or importance ratings.
- Both the 2018 and 2015 samples are collected via a large national online survey panel that is maintained by Research Now.
- Neither the 2018 or 2015 results cover the Yukon, the Northwest Territories or Nunavut which are too sparsely populated to be adequately represented in the survey panel that was employed.

Evolution of Canadian Attitudes on Electric Vehicles

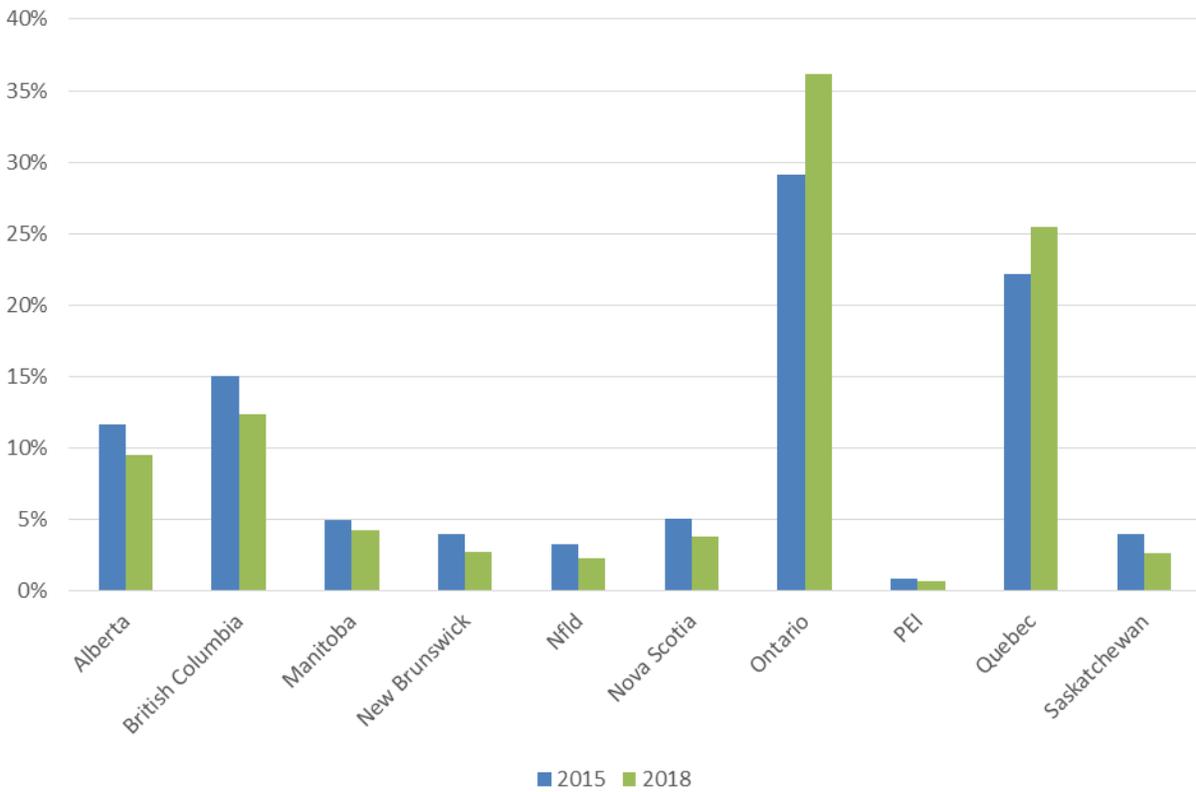


Figure 1-1: Provincial distribution of survey respondents

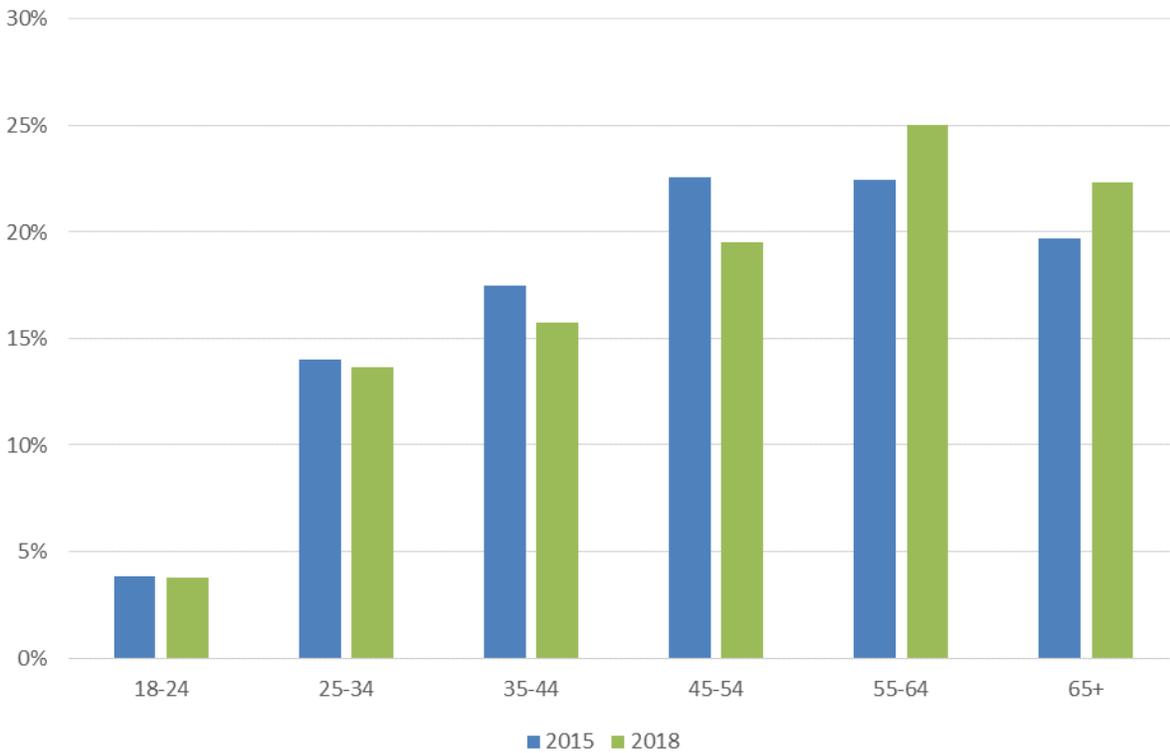


Figure 1-2: Age distribution of survey respondents

- Results are seen through the lens of the household head. Those who reported that they could not identify as the household head (e.g. adult children of household head) exited the survey at that point. It does reduce the share of young people in the survey, but it adds realism to the decision context since decisions weigh more heavily on household maintainers, especially as it relates to large decisions such as the purchase of an EV.
- Those who identified that they were “not at all likely” to acquire another vehicle in the future were required to exit the survey. As such, the data analyzed here reflects households that are at least somewhat likely to be in the market for another vehicle sometime in the future.
- Survey data as presented here for 2015 and 2018 is not weighted in any way.
- Results presented here for 2015 and 2018 have been cleansed, to the best of our ability, of cases where respondents offer repetitive answers for an entire suite of attitudinal statements (“straightlining”).
- Of all the provinces, the samples in Prince Edward Island are small (an average of about 150 in each year). Results are shown for this province with the understanding that there is very likely more volatility simply due to the smaller sample size.
- Note that most of the figures in this report are not specifically referred to in the text. However, a comprehensive List of Figures with page reference is provided and the basic ordering and structuring of Figures is consistent across the chapters.
- In Figures, short forms are used for Newfoundland and Labrador (Nfld) and Prince Edward Island (PEI).
- To conclude this section, it is useful to outline how the various graphical displays in this report are being segmented. The national set of respondents for 2015 and 2018 are segmented: by province, by Census Metropolitan Areas, by an Urban-Rural Index and by the age of the respondent.
- Of the four items, the urban-rural index is derived as a score from 0 to 10 where the highest value represents the most intense of urban areas and the lowest value represents the most remote of rural areas. Outlying towns and small cities would typically rate as approximately 5.0 on the scale. The respondent’s postal code information is instrumental in assigning this score.



Perceptions about the Environment and the Role of Social Pressure

2.1. Key Graphics

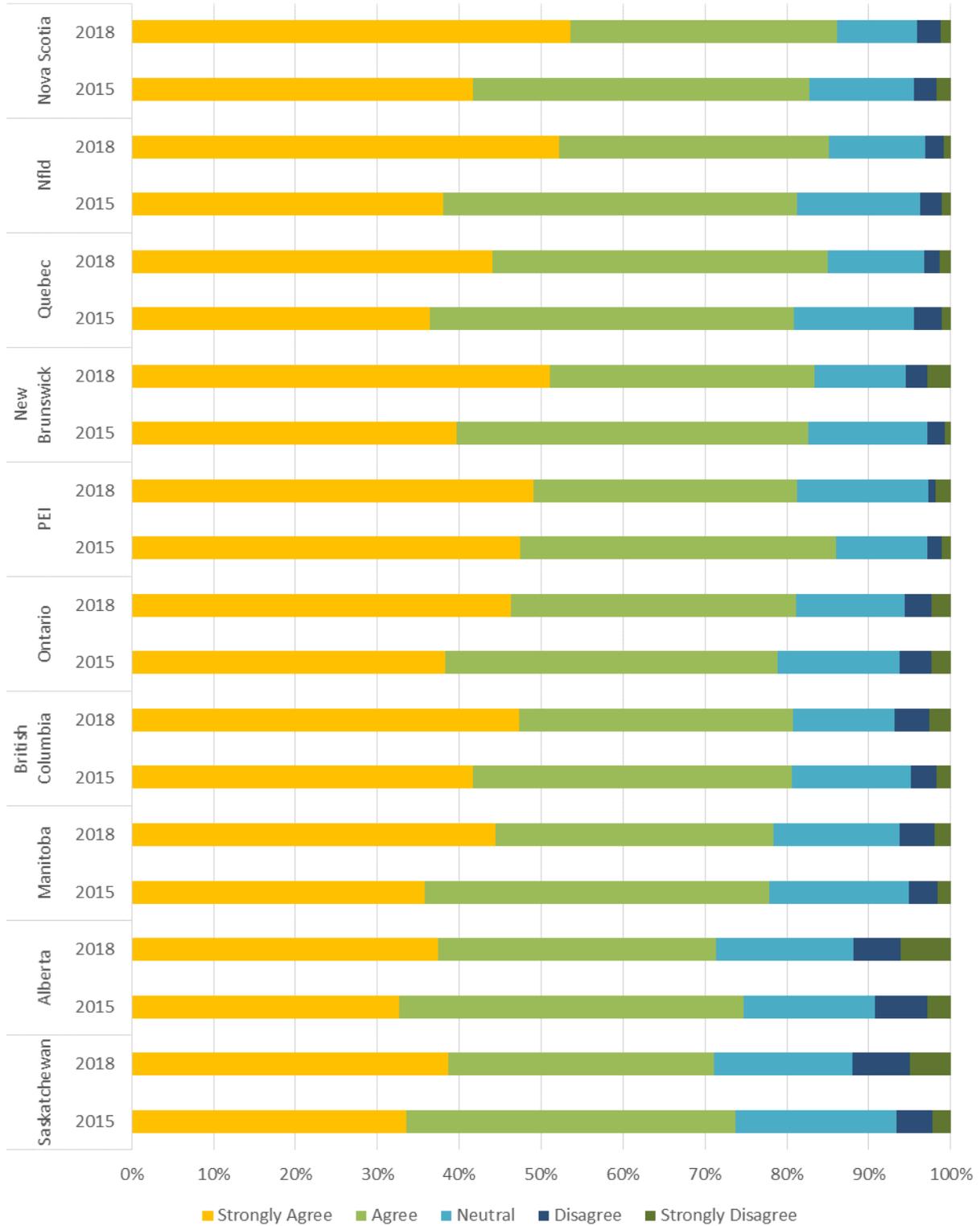


Figure 2-1: I am very concerned about human behaviour and its influence on climate change and the environment (by Province)

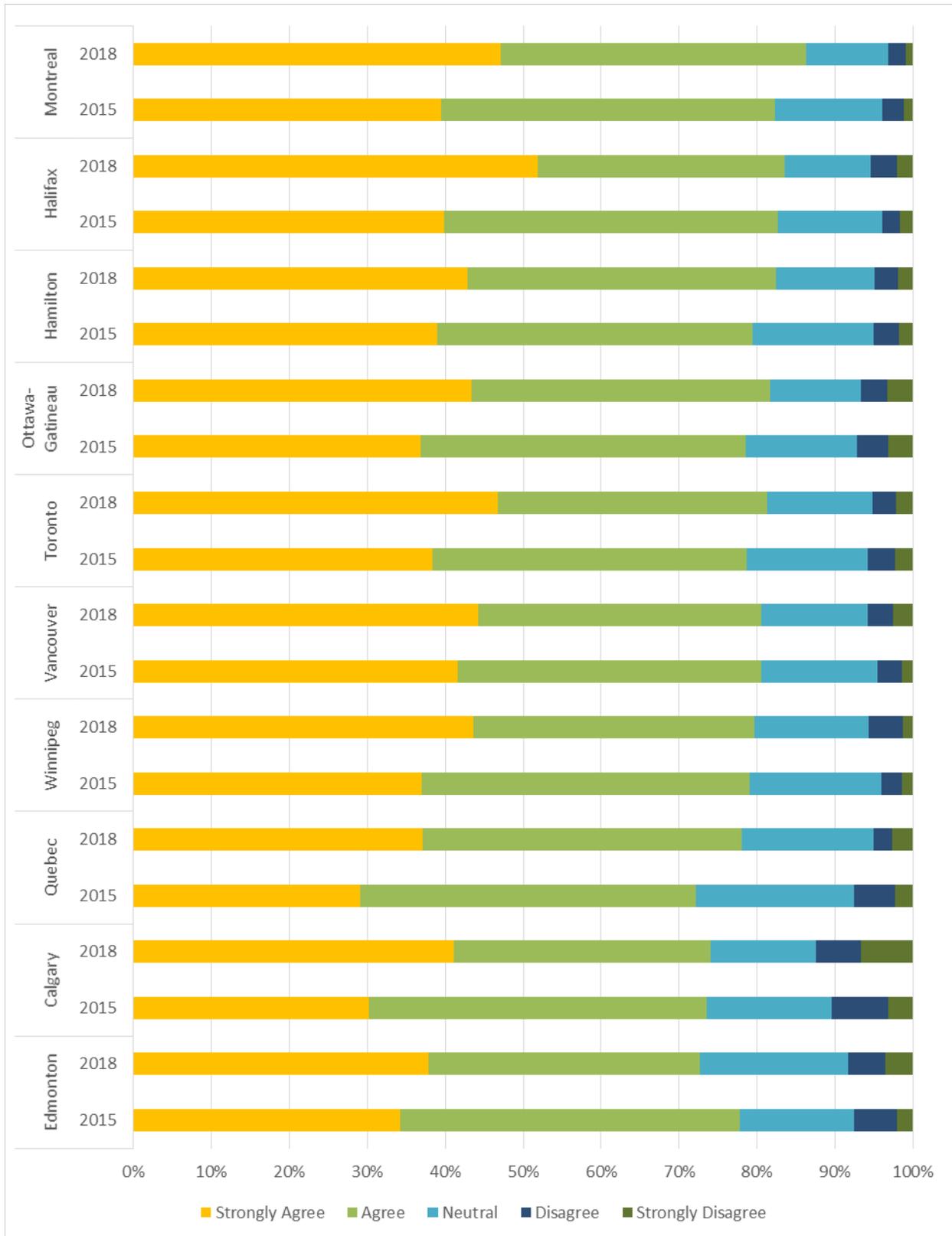


Figure 2-2: I am very concerned about human behaviour and its influence on climate change and the environment (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

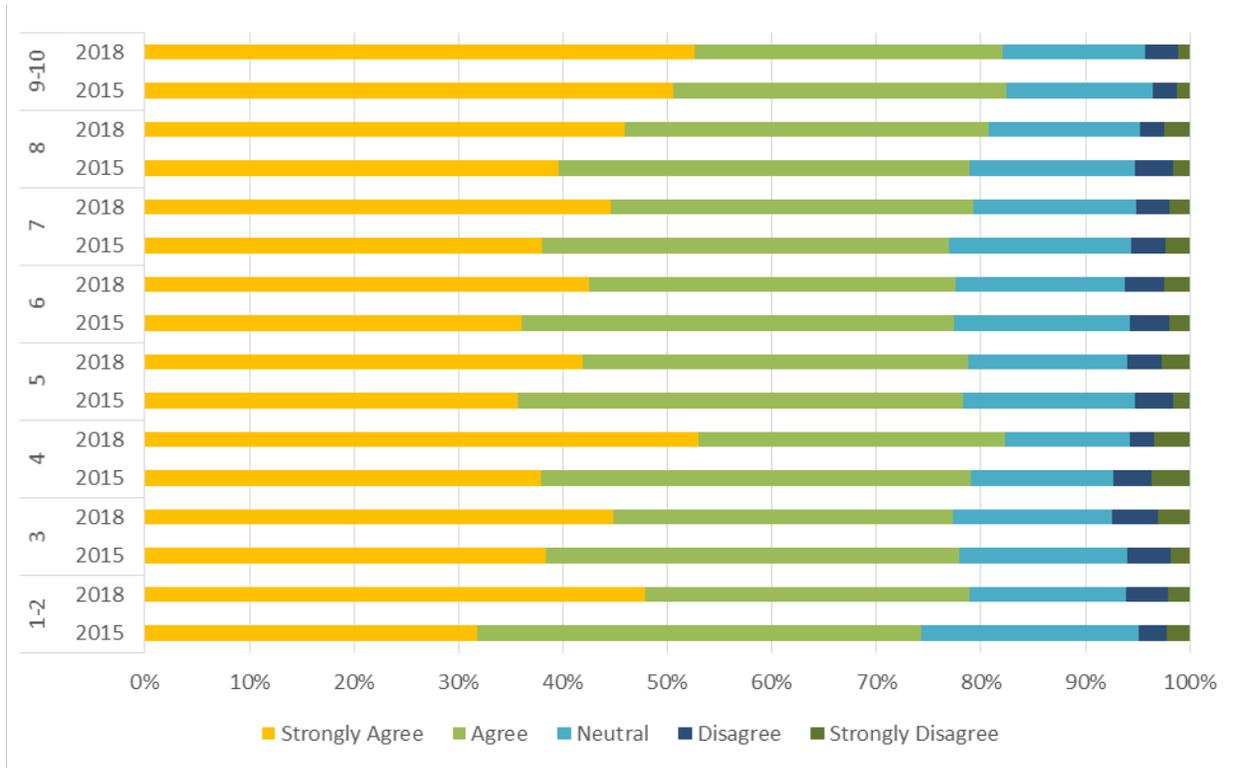


Figure 2-3: I am very concerned about human behaviour and its influence on climate change and the environment (by Urban-Rural Index)

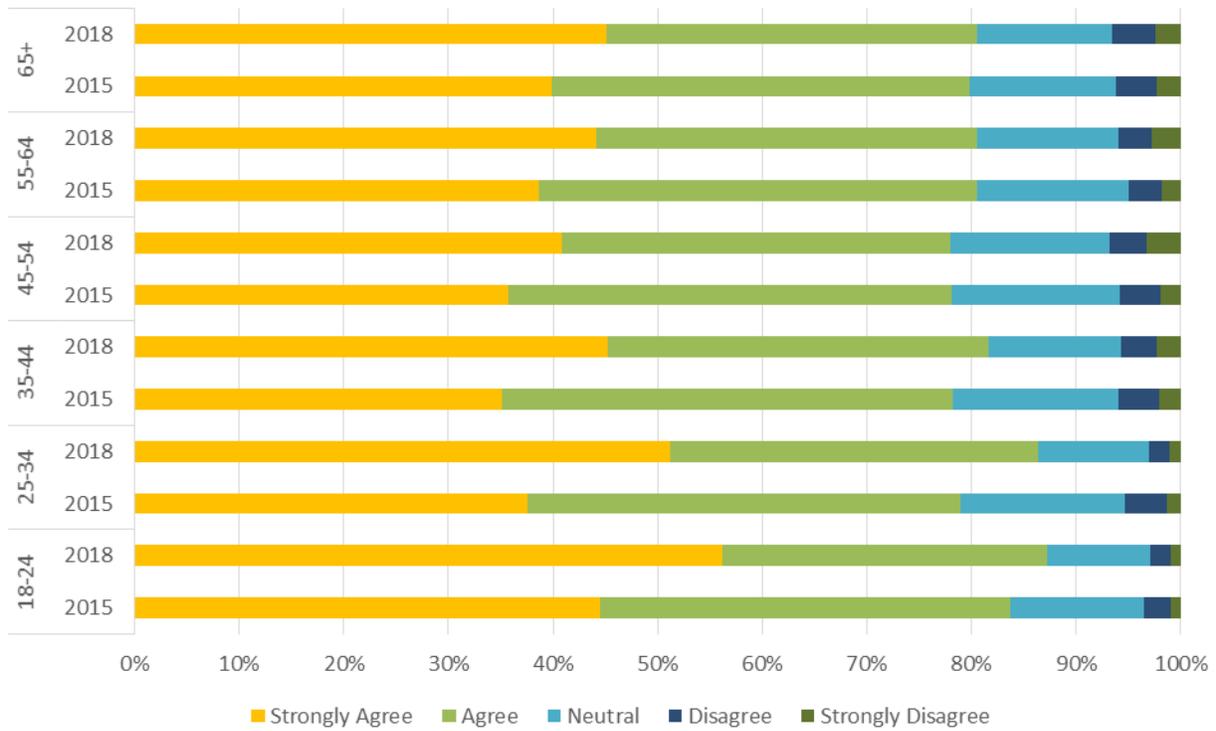


Figure 2-4: I am very concerned about human behaviour and its influence on climate change and the environment (by Age)

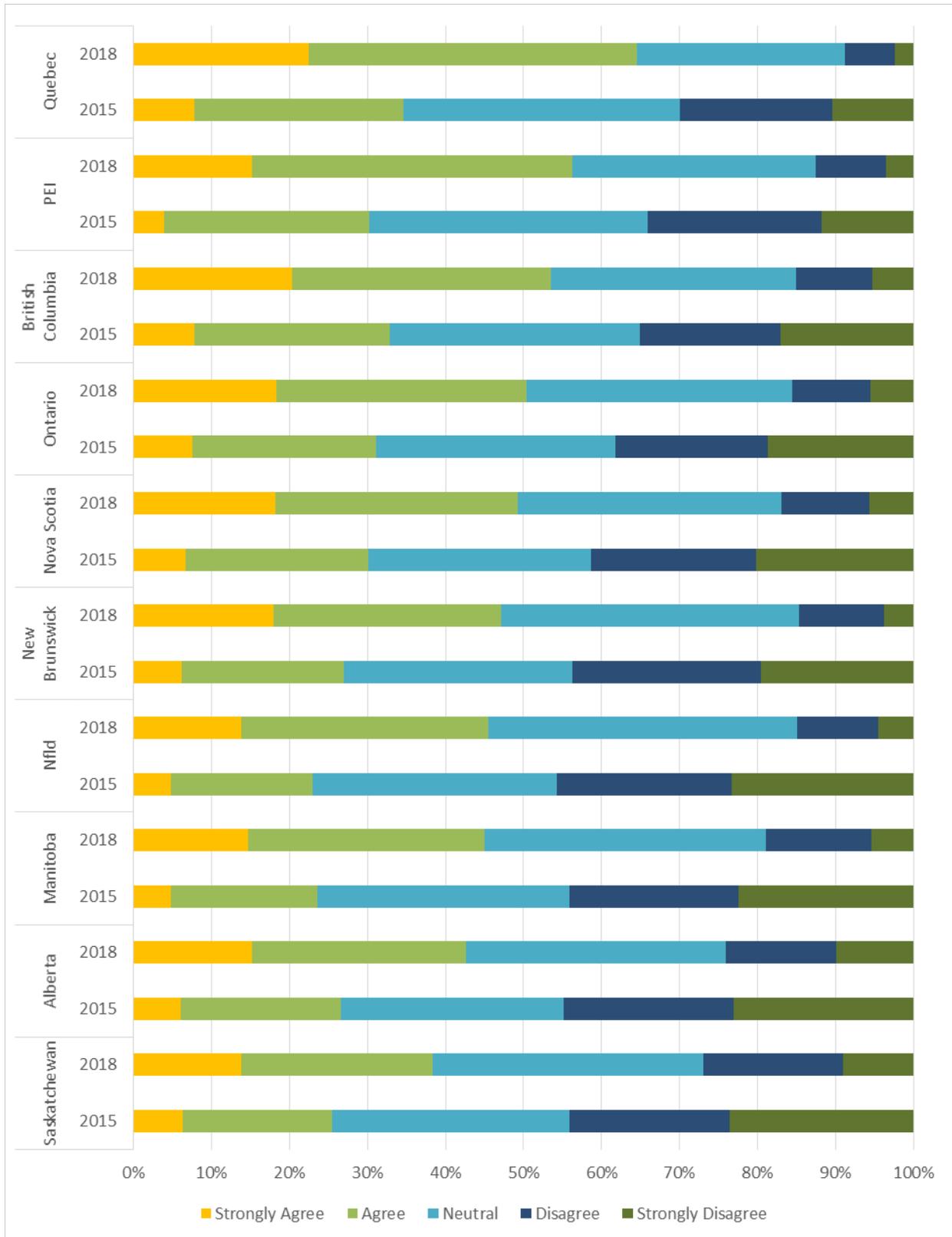


Figure 2-5: People who are close to me think that it is important to consider the environment when I purchase a vehicle (by Province)

Evolution of Canadian Attitudes on Electric Vehicles

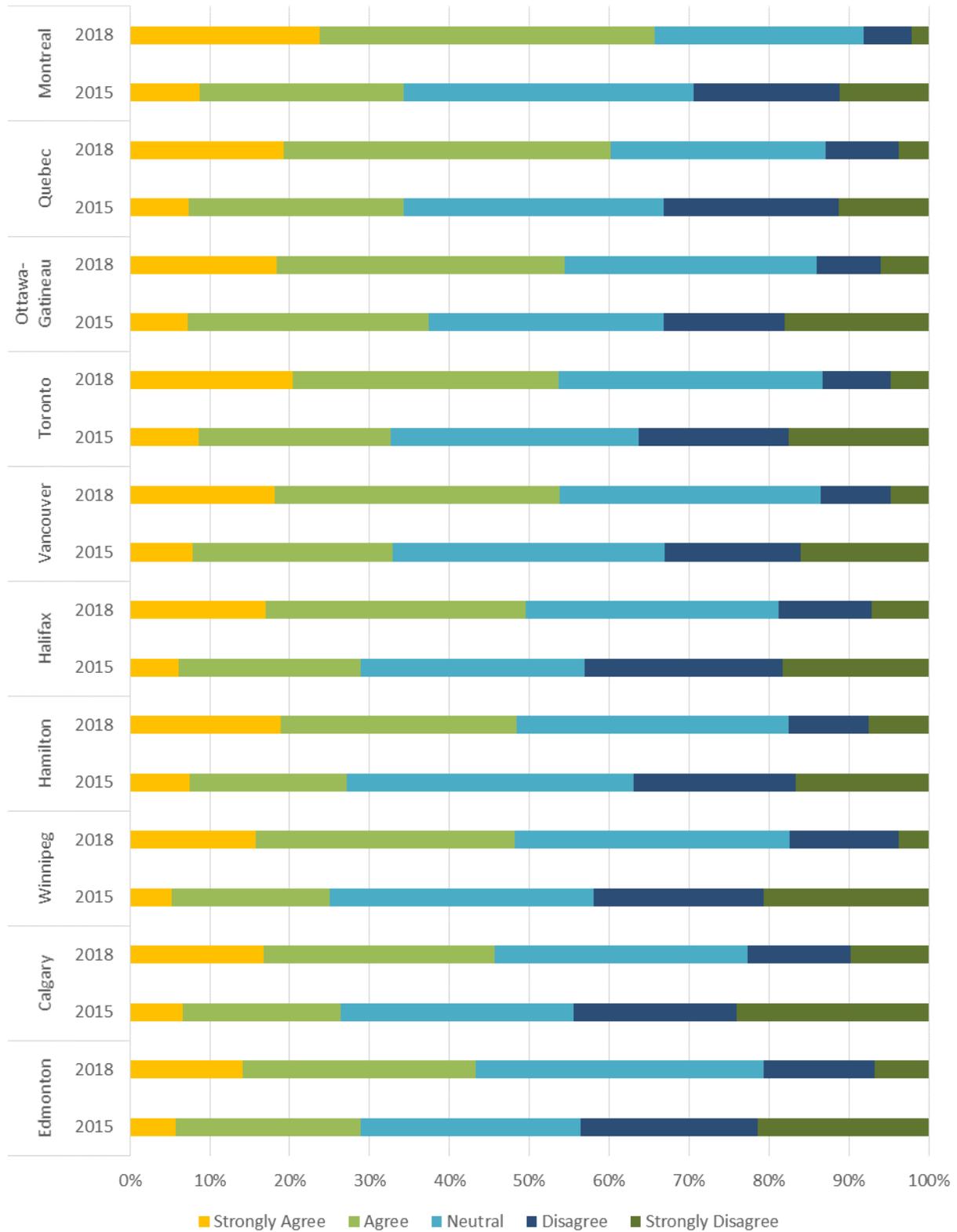


Figure 2-6: People who are close to me think that it is important to consider the environment when I purchase a vehicle (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

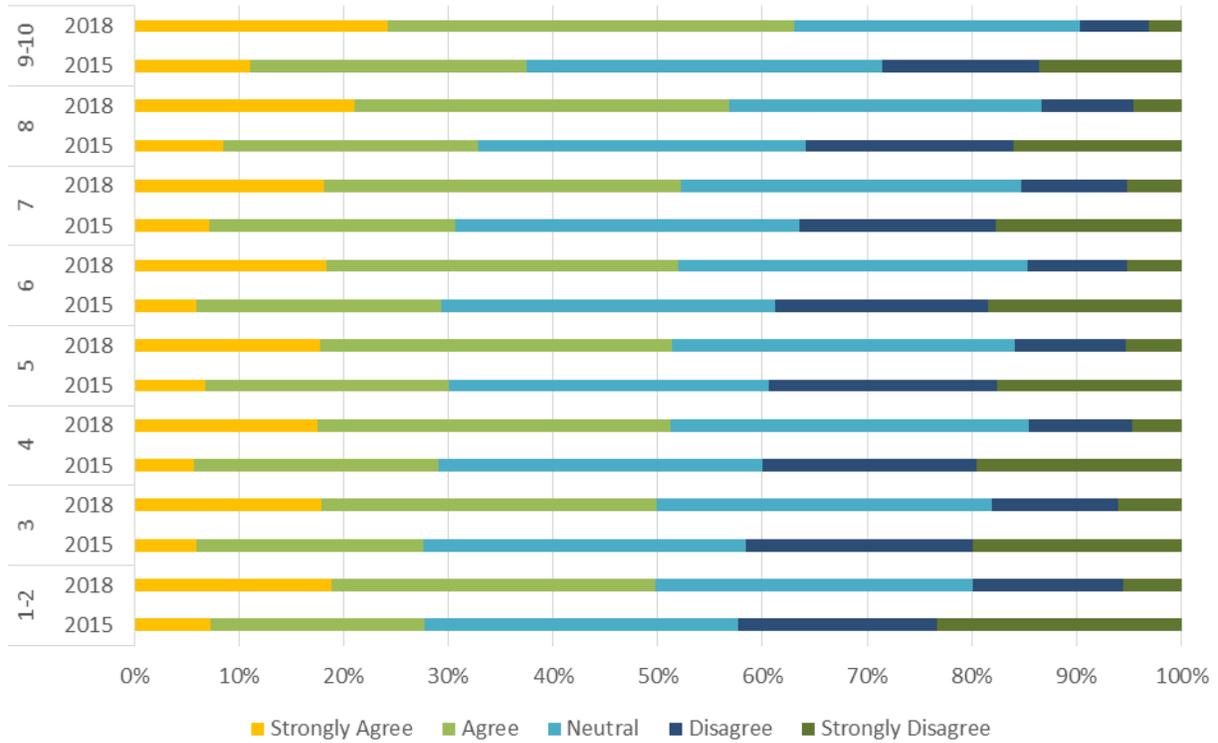


Figure 2-7: People who are close to me think that it is important to consider the environment when I purchase a vehicle (by Urban-Rural Index)

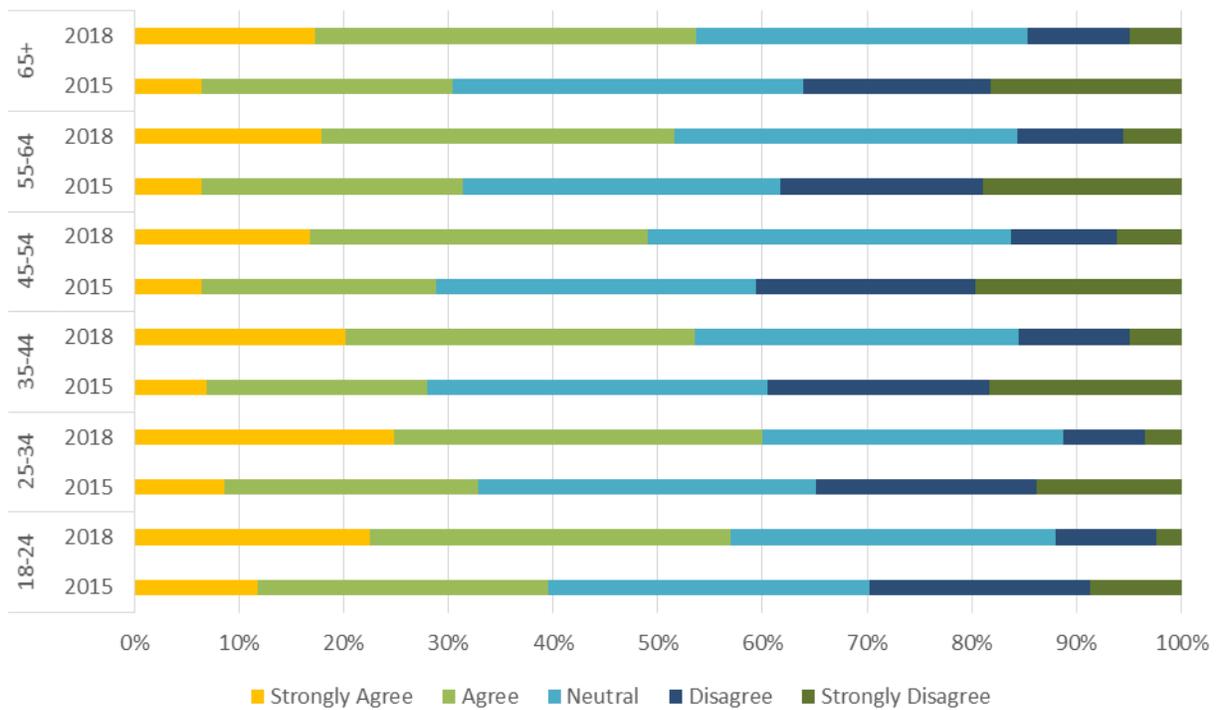


Figure 2-8: People who are close to me think that it is important to consider the environment when I purchase a vehicle (by Age)

Evolution of Canadian Attitudes on Electric Vehicles

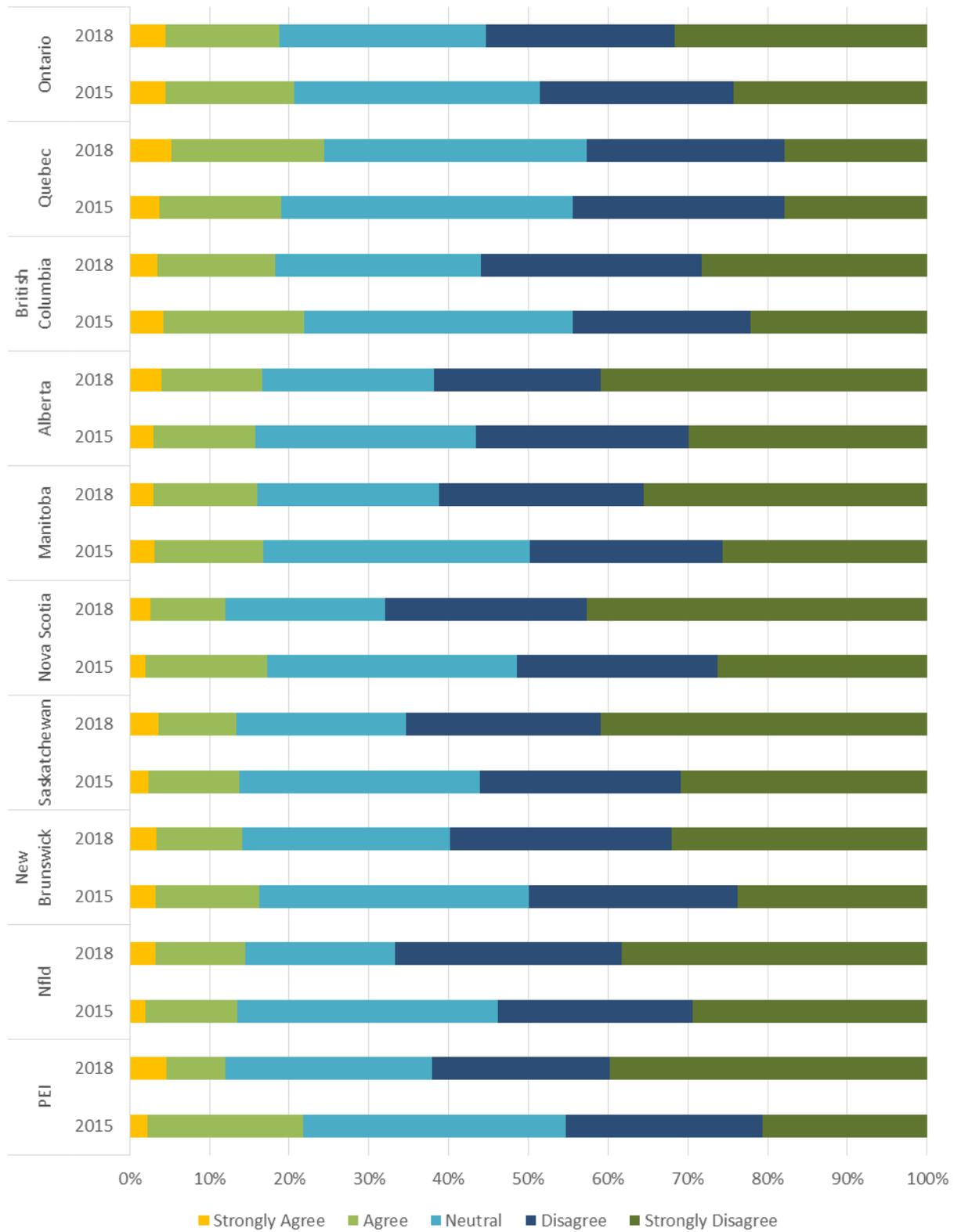


Figure 2-9: I feel some social pressure to purchase an EV (by Province)

Evolution of Canadian Attitudes on Electric Vehicles

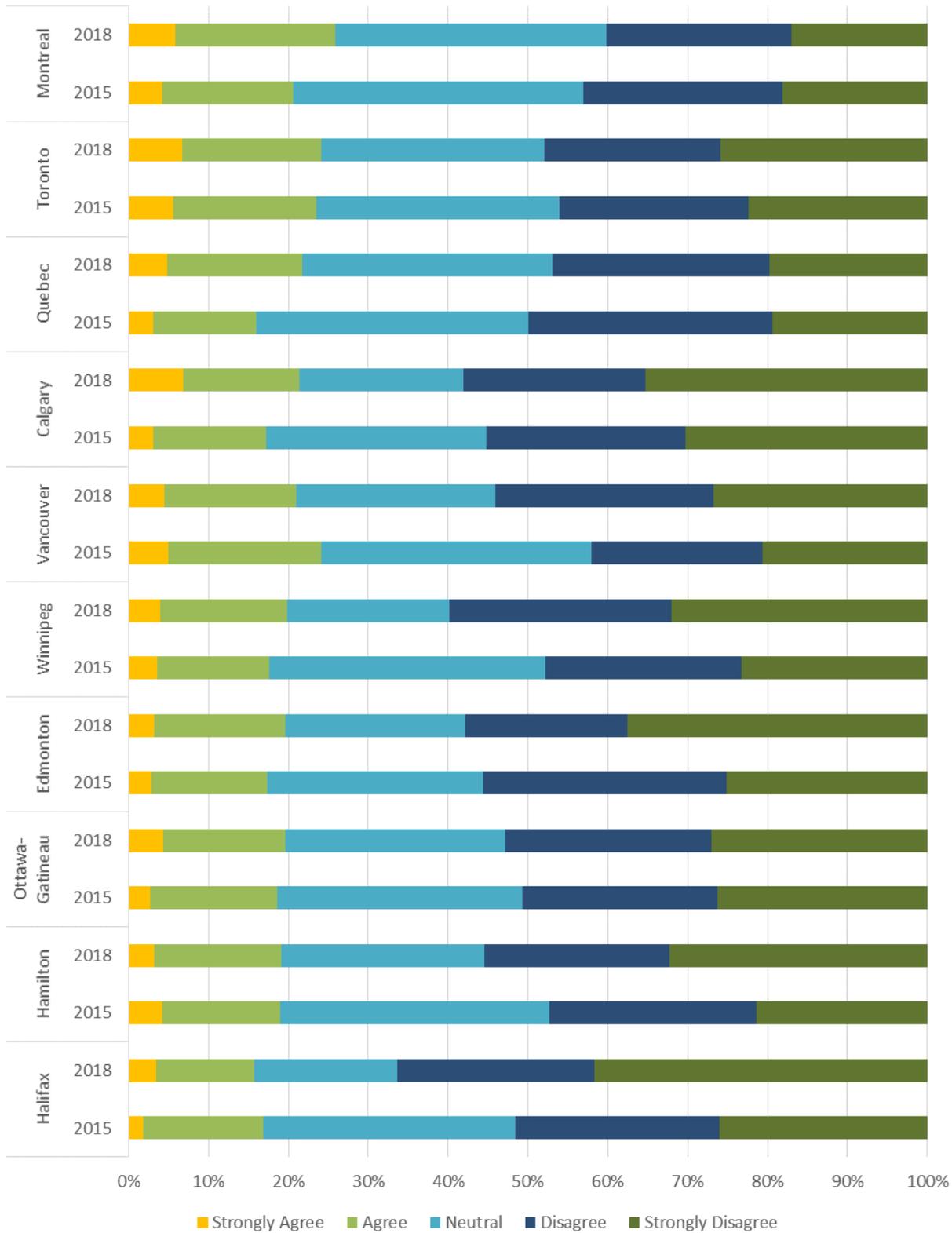


Figure 2-10: I feel some social pressure to purchase an EV (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

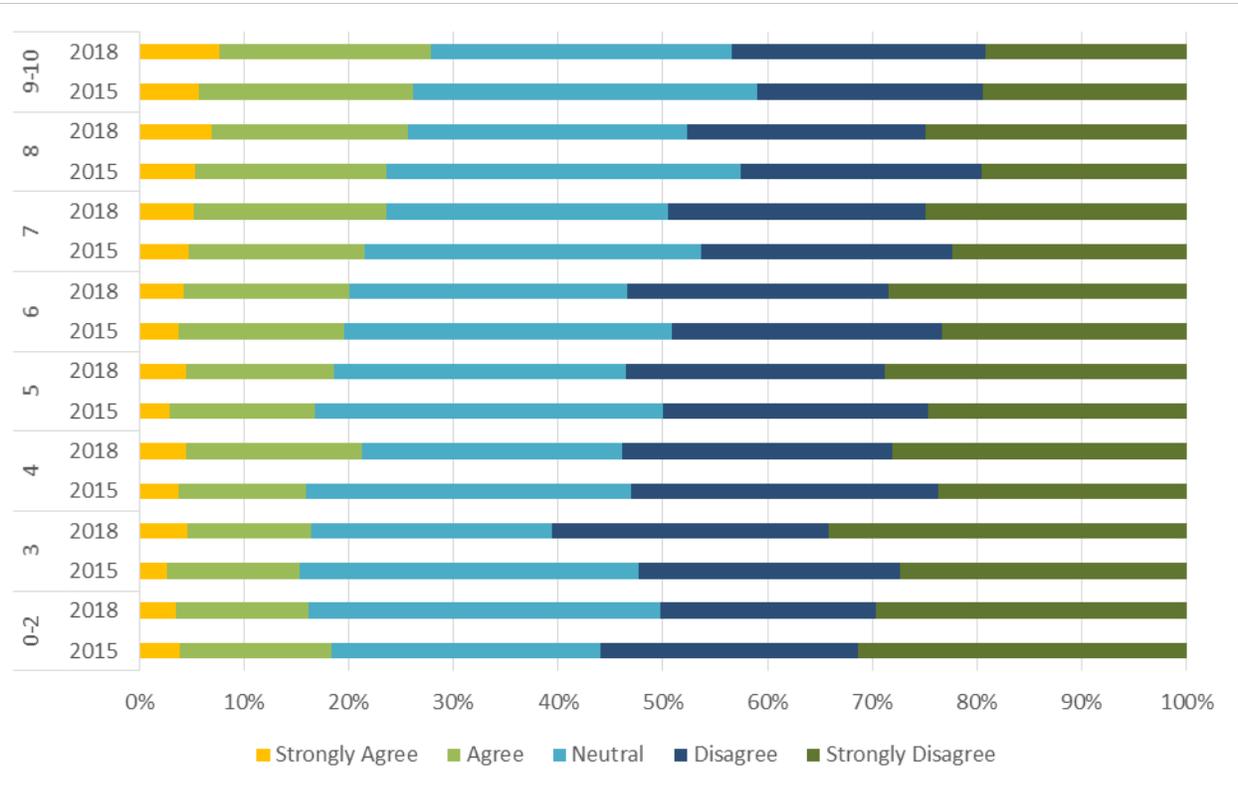


Figure 2-11: I feel some social pressure to purchase an EV (by Urban-Rural Index)

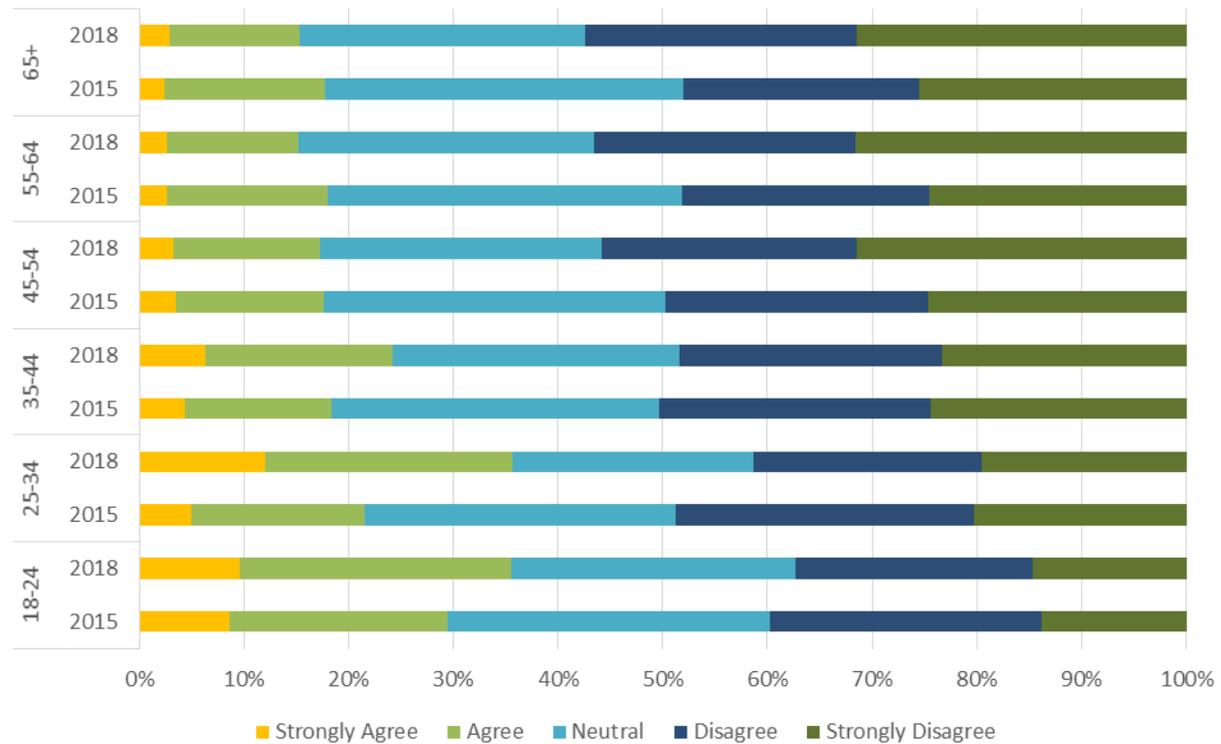


Figure 2-12: I feel some social pressure to buy an EV (by Age)

2.2. Summary of Results

Research on EVs typically explores the link between adoption and concern about the environment and climate change. For the most part, results in the past have tended to show that having this concern is an important but not sufficient condition to adopt. The results here indicate that levels of concern about climate change and the environment are quite high. Stronger feelings are displayed for this than for any aspect that deals specifically with EVs.

On the statement **“I am very concerned about human behaviour and its influence on climate change and the environment”**:

- Very high levels of agreement are seen for this statement (in excess of 80% for most provinces).
- More positive changes are seen in the levels of “strong agreement” than in overall/general agreement. There are more and more people who have this concern and are feeling strongly about it.
- All metropolitan areas show increased strong agreement.
- While levels of agreement are increasing, it is interesting to note that Calgary, Edmonton and Halifax are also showing increased levels of disagreement (less neutrality) as if some people are “digging in their heels” because of hearing too much about climate change.
- Alberta and Saskatchewan come across as the provinces with the least agreement.

On the statement **“People who are close to me think it is important to consider the environment when I purchase a vehicle”**:

- There are dynamic and positive changes in agreement in most provinces and positive change in all provinces. There are corresponding dynamic reductions in the level of disagreement.
- By metropolitan area there are large absolute and relative changes in many. Over 100% increases in the level of strong agreement is not unusual.
- By urban-rural index, large absolute and relative changes are consistently seen including in outlying areas (though lower levels of agreement are achieved in outlying areas).
- Large absolute and relative changes by age group with highest levels of agreement achieved by those 25-34 and strong evidence of change even with the older.

- Overall, this statement is probably the biggest “change” variable in the analysis. Canadians are acknowledging more and more that there is a link between the environment and the vehicle they choose and this aspect is being discussed in their peer groups.

On the statement **“I feel some social pressure to purchase an electric vehicle”**:

- Respondents predominantly denied that they feel social pressure with results by province generally being between 15-20% in agreement and much fewer strongly in agreement.
- The most notable provincial increase in agreement is in Quebec with corresponding strong increases in Montreal and Quebec City.
- Generally, there was minor variation across provinces and cities -- some increase and some decrease from 2015 to 2018.
- Most metropolitan areas are showing an increase in perceived social pressure.
- There is a notable increase in social pressure in the 25-34 age group and to a lesser extent in the two other younger age groups. There is no change or even a decline for older cohorts.
- Social pressure is being felt more at the top of the urban-rural hierarchy at about 25% agreement.



Themes of Personal Conviction

3.1. Key Graphics

3.1.1. Attitudinal Statements (2015-2018)

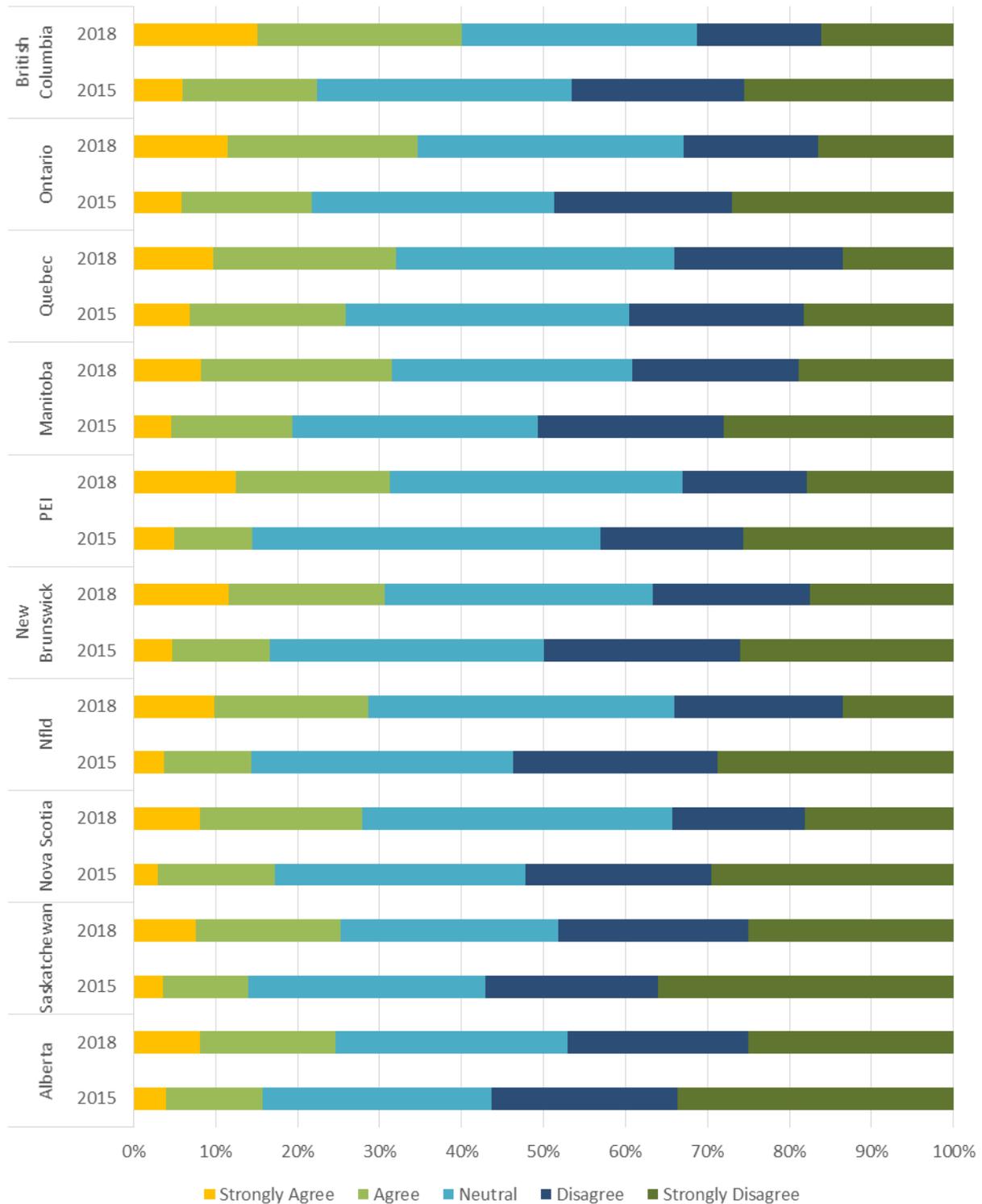


Figure 3-1: I feel morally committed to buy an EV (by Province)

Evolution of Canadian Attitudes on Electric Vehicles

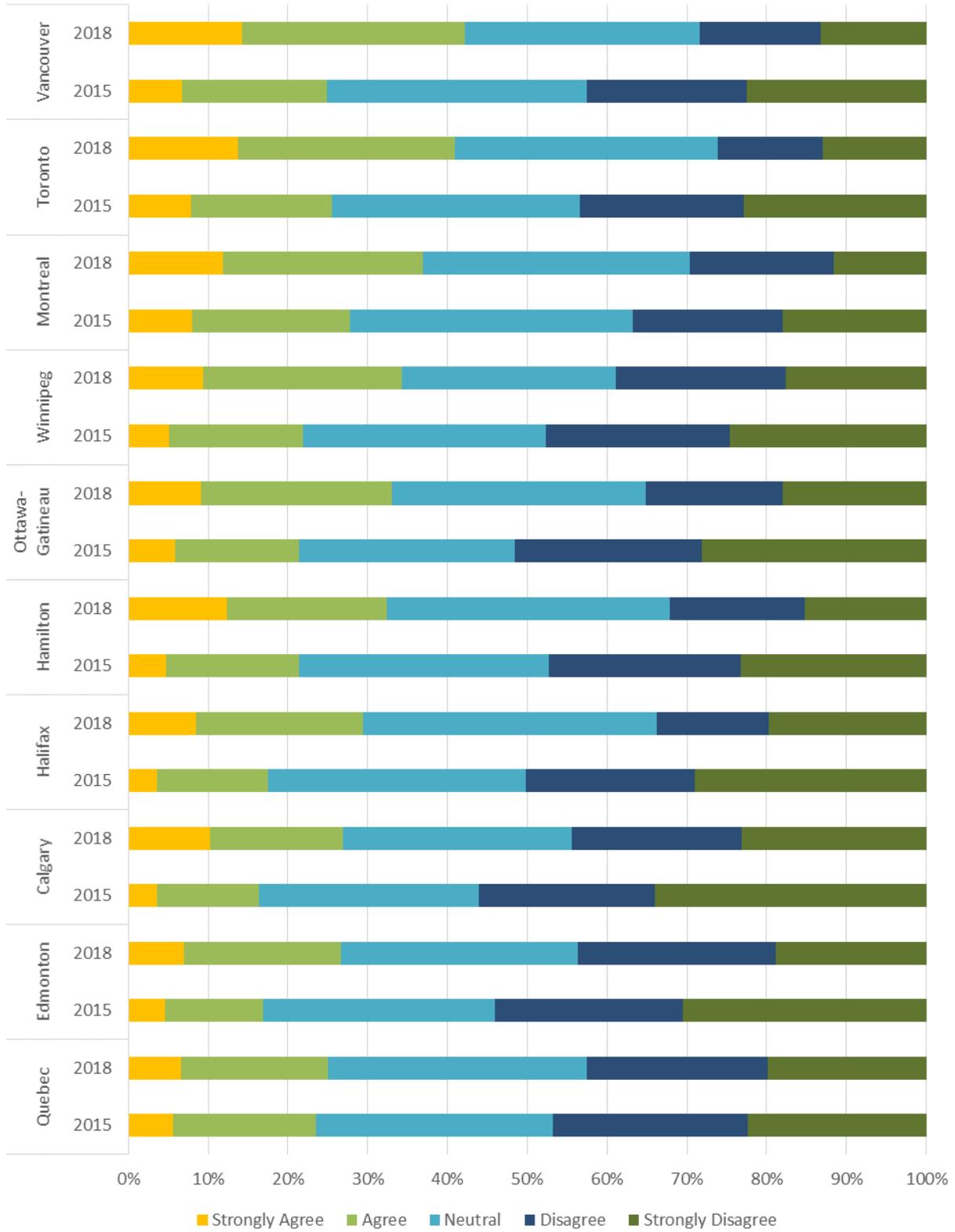


Figure 3-2 I feel morally committed to buy an EV (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

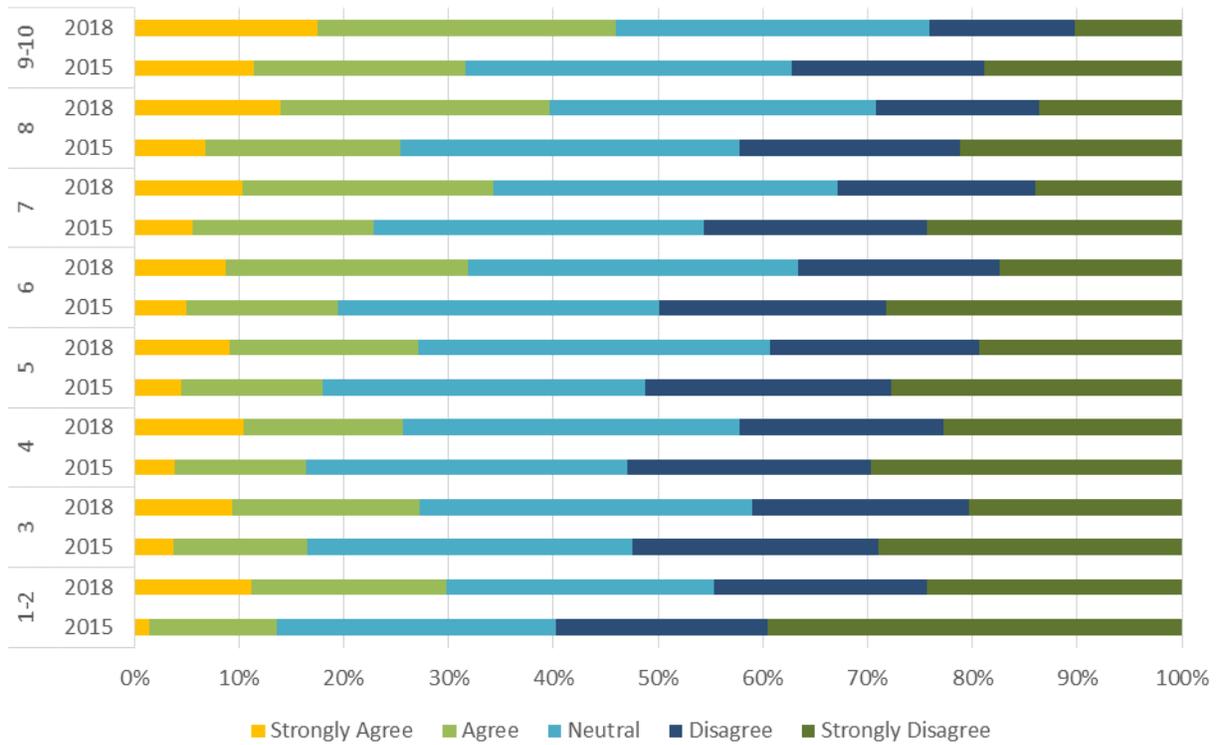


Figure 3-3 I feel morally committed to buy an EV (by Urban-Rural Index)

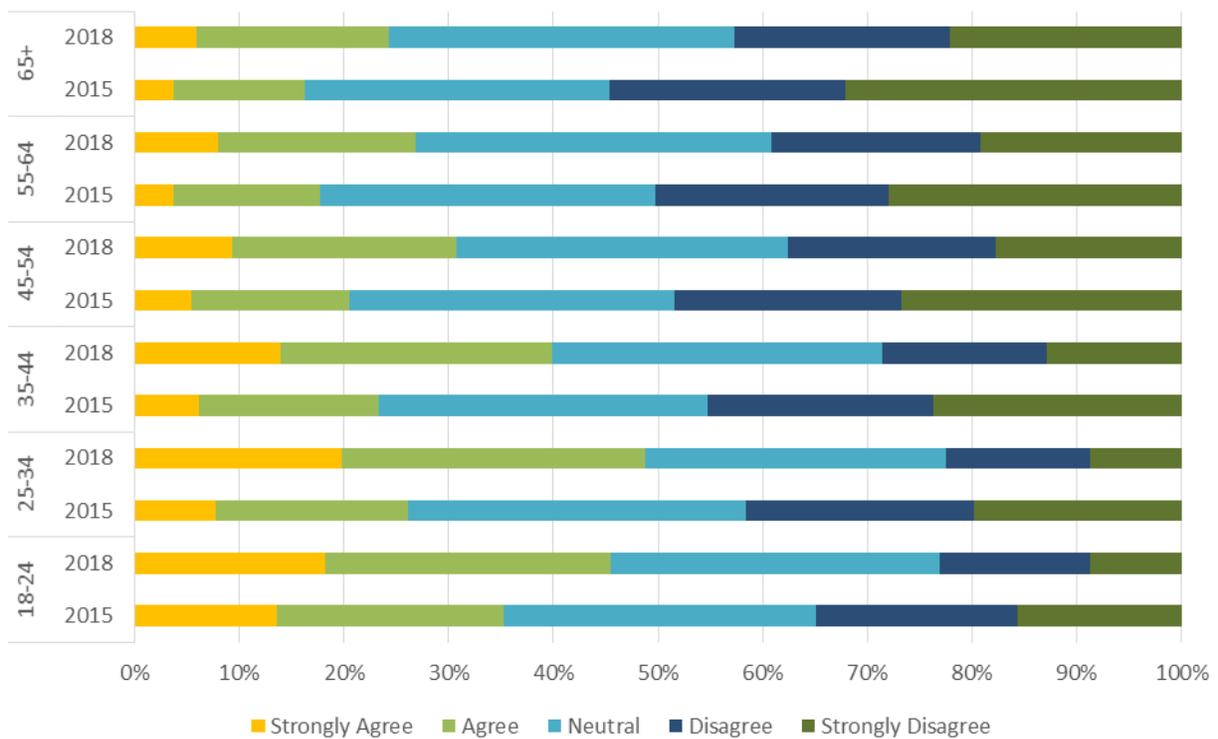


Figure 3-4 I feel morally committed to buy an EV (by Age)

Evolution of Canadian Attitudes on Electric Vehicles

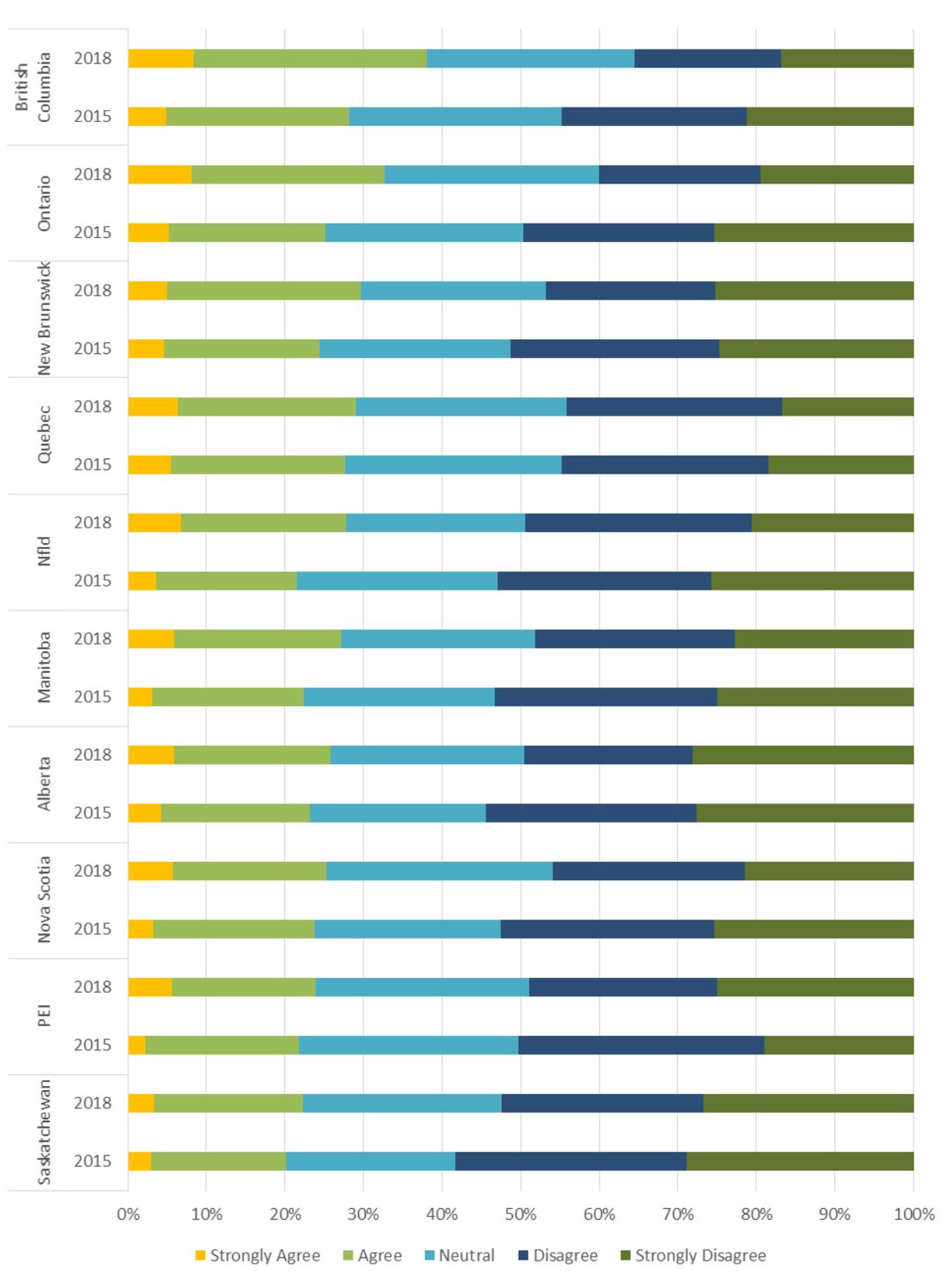


Figure 3-5: I am willing to spend more money to buy an EV (by Province)

Evolution of Canadian Attitudes on Electric Vehicles

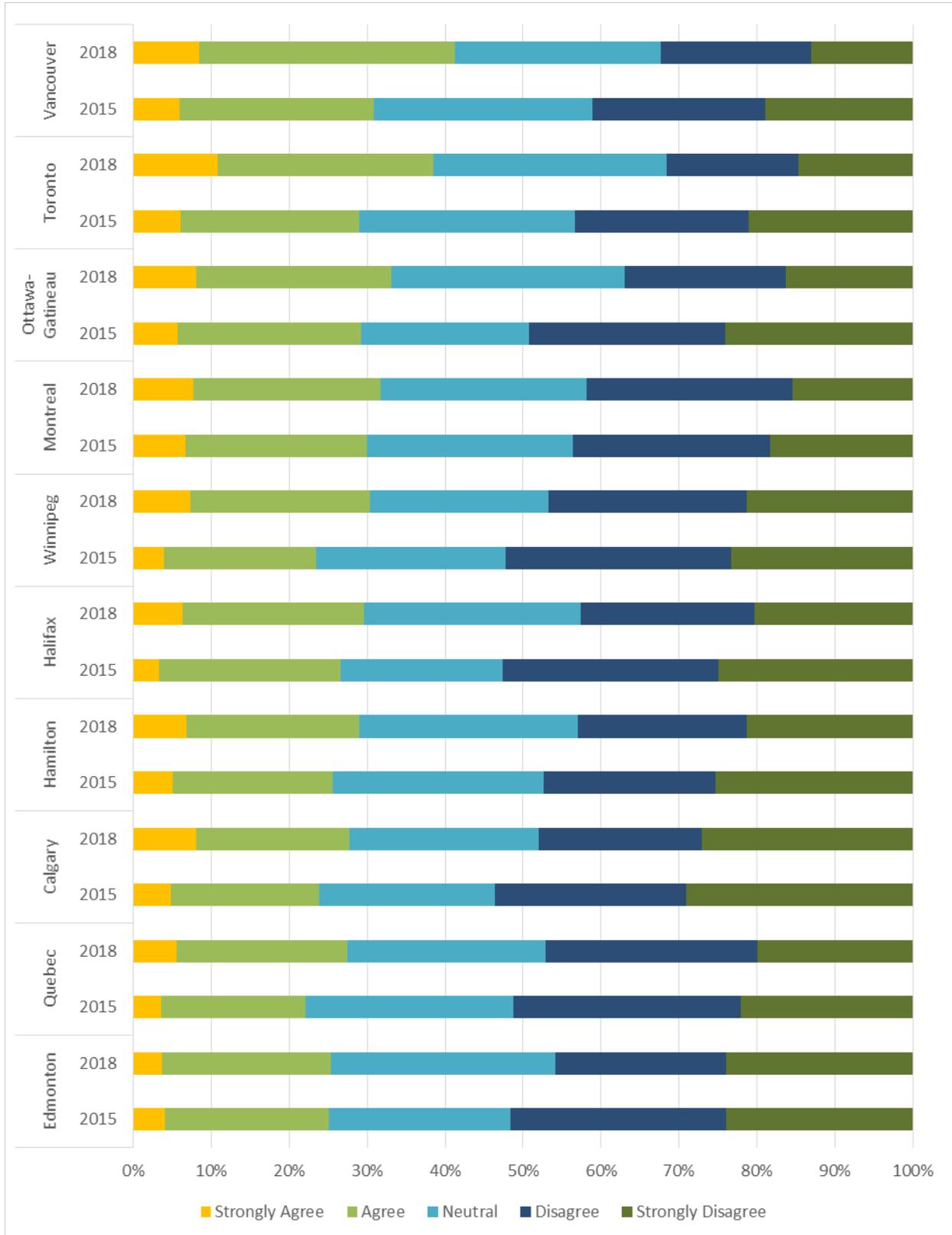


Figure 3-6: I am willing to spend more money to buy an EV (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

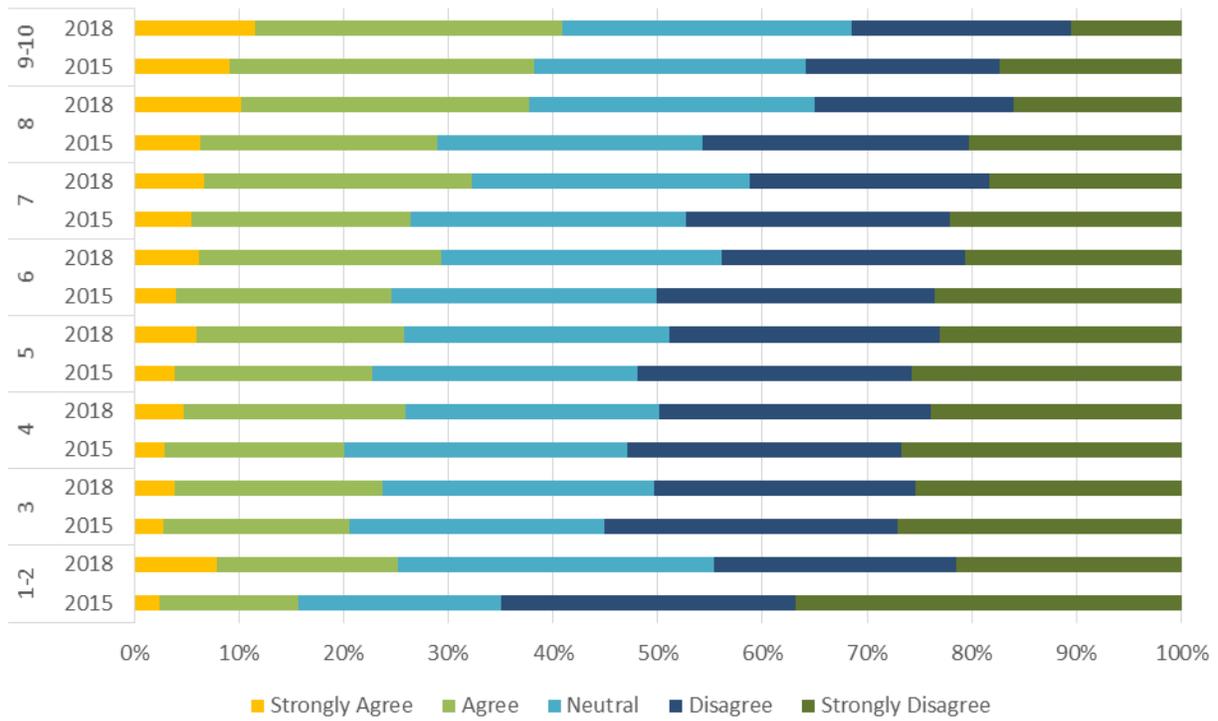


Figure 3-7: I am willing to spend more money to buy an EV (Urban-Rural Index)

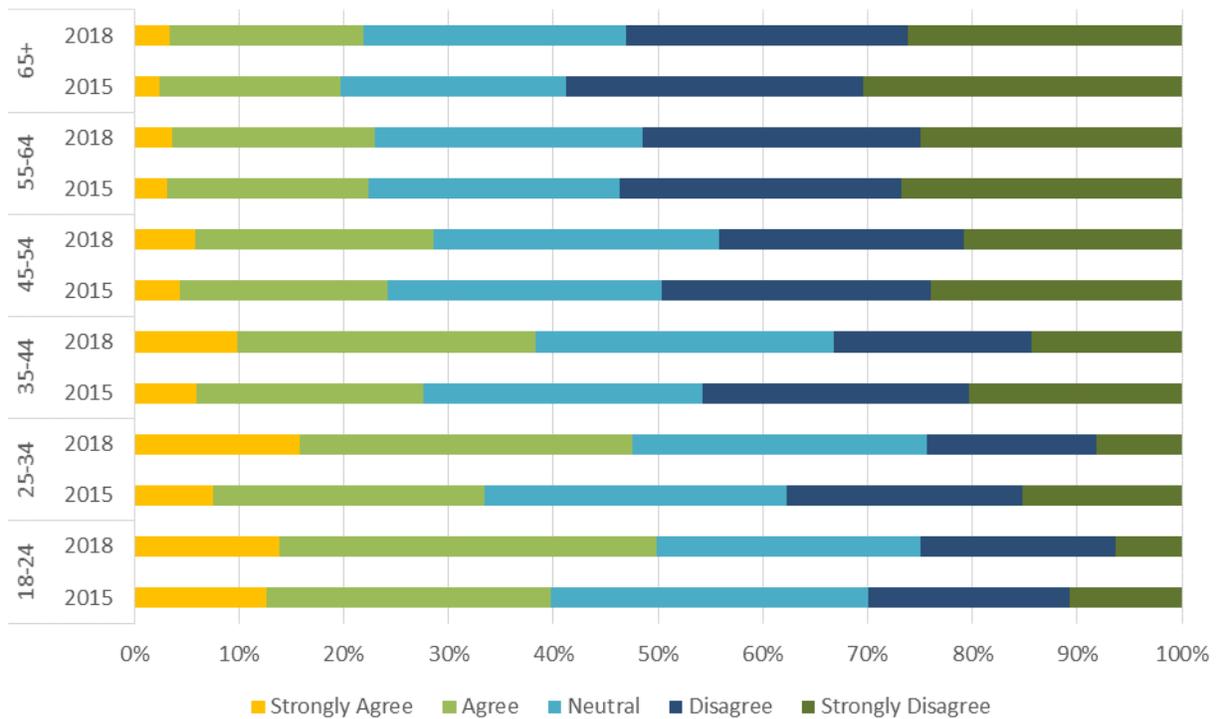


Figure 3-8: I am willing to spend more money to buy an EV (by Age)

Evolution of Canadian Attitudes on Electric Vehicles

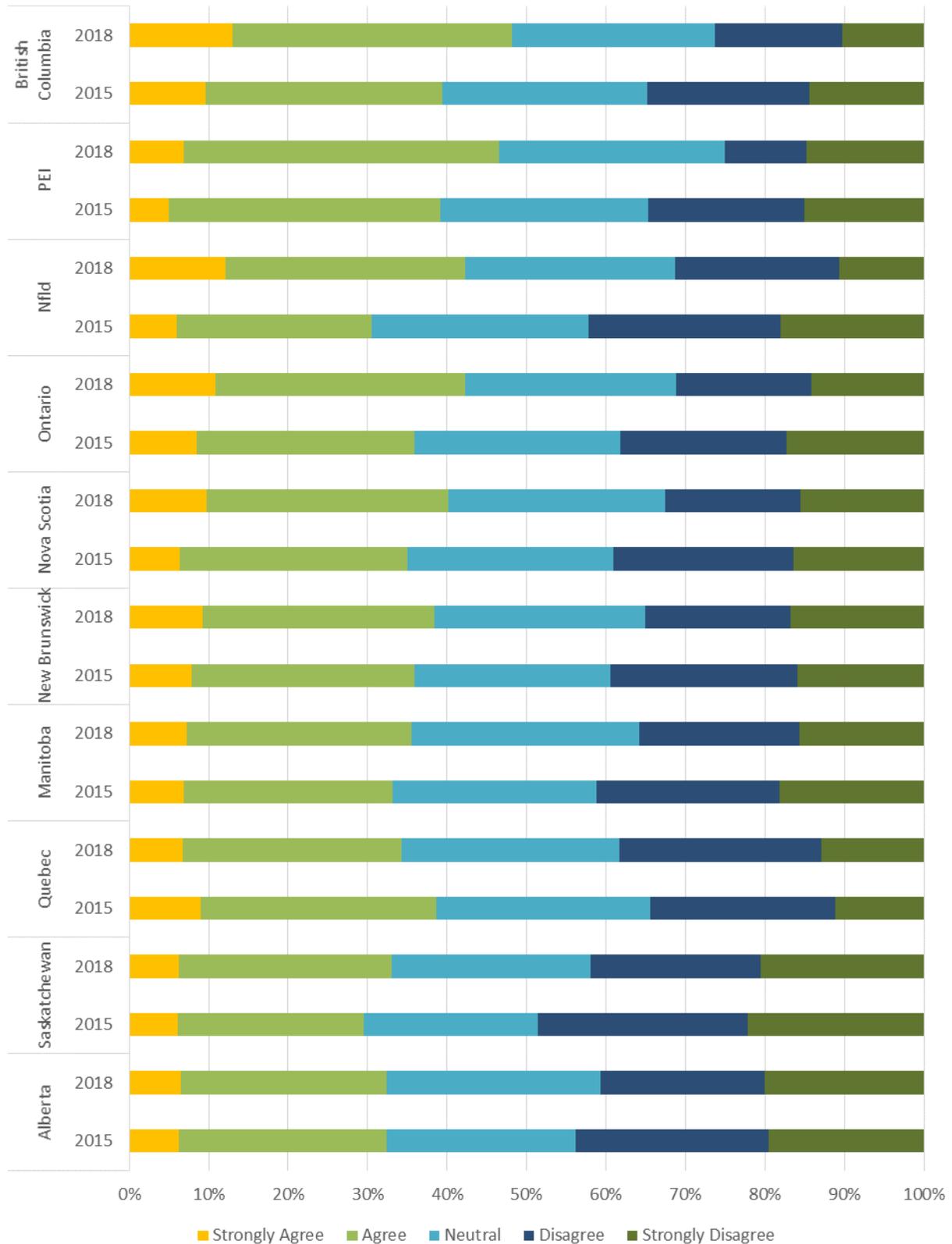


Figure 3-9: I am willing to tolerate some periodic battery charging inconvenience for the benefits of driving an EV (by Province)

Evolution of Canadian Attitudes on Electric Vehicles

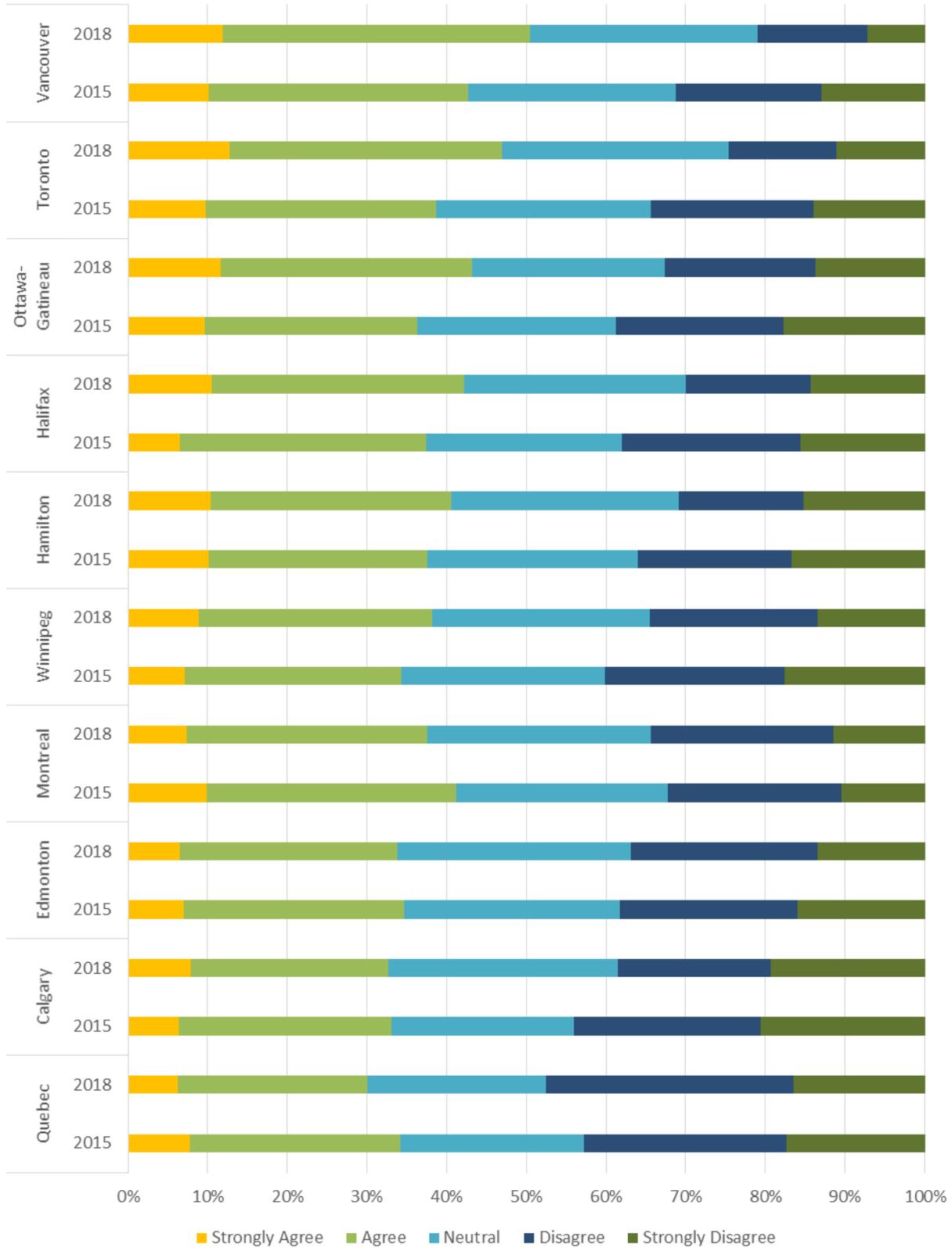


Figure 3-10: I am willing to tolerate some periodic battery charging inconvenience for the benefits of driving an EV (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

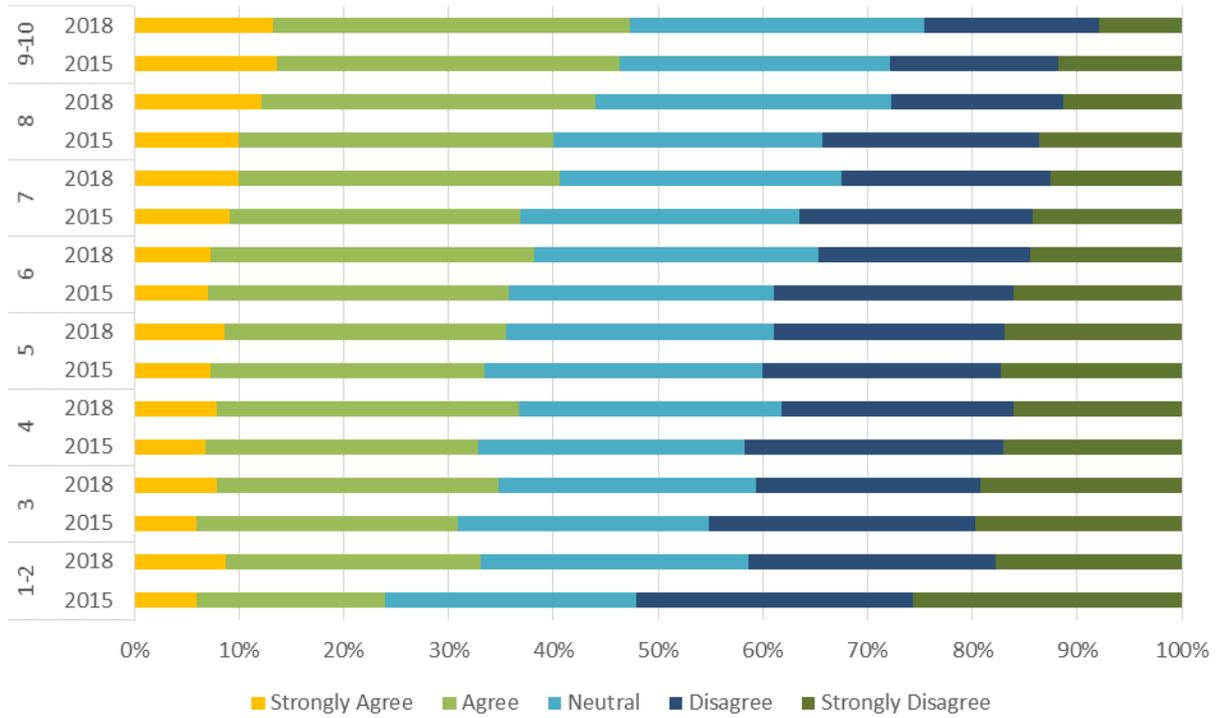


Figure 3-11: I am willing to tolerate some periodic battery charging inconvenience for the benefits of driving an EV (by Urban-Rural Index)

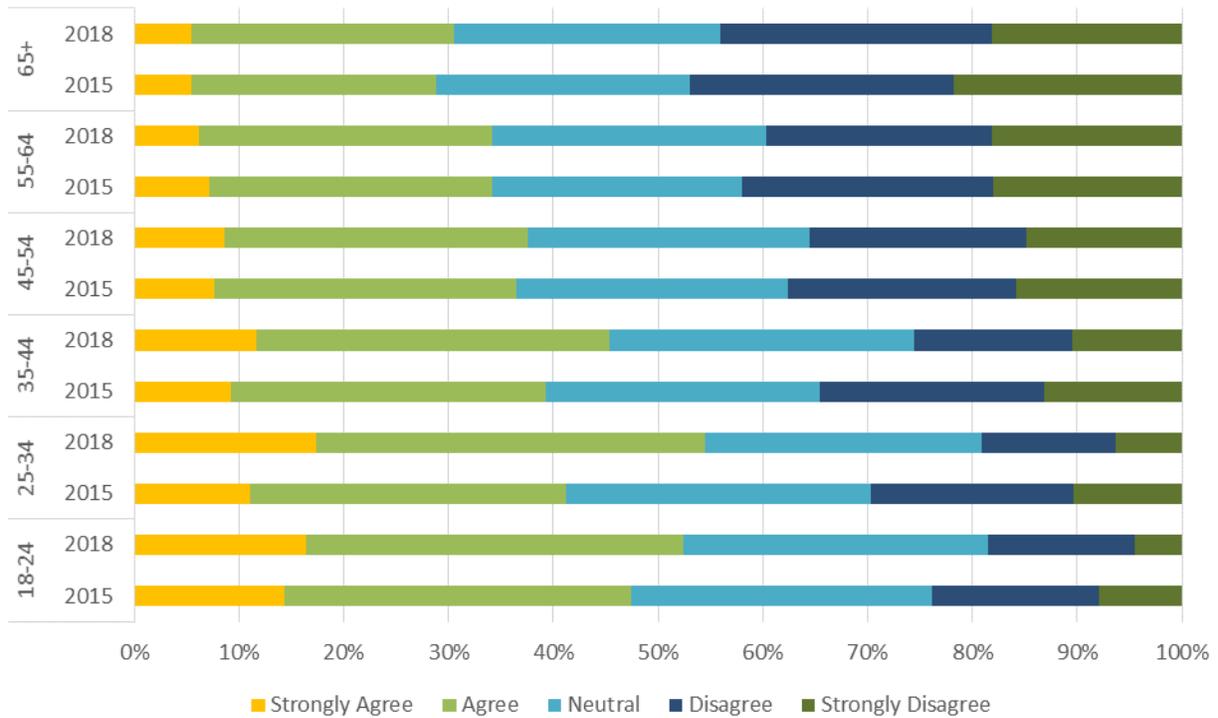


Figure 3-12: I am willing to tolerate some periodic battery charging inconvenience for the benefits of driving an EV (by Age)

3.1.2. 2018 Perceived Urgency to Adopt so that next vehicle will be electric

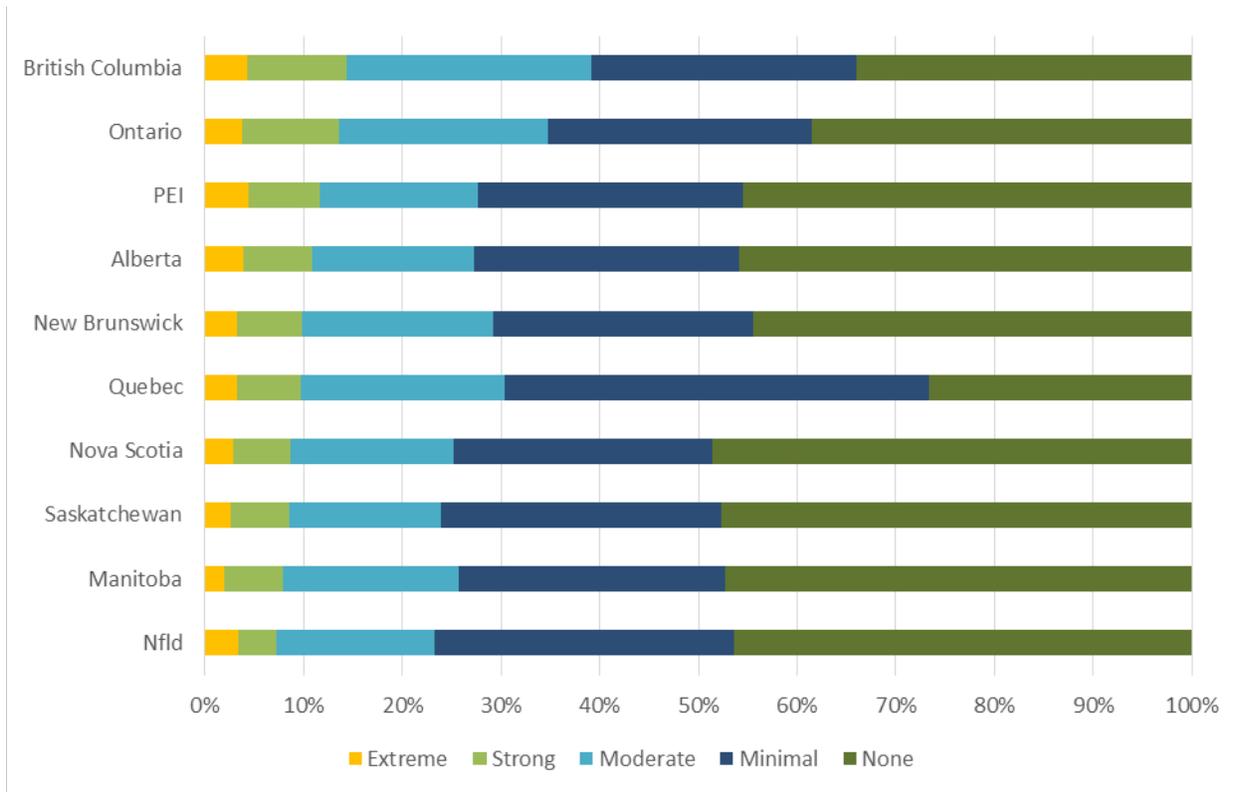


Figure 3-13 Urgency (by Province)

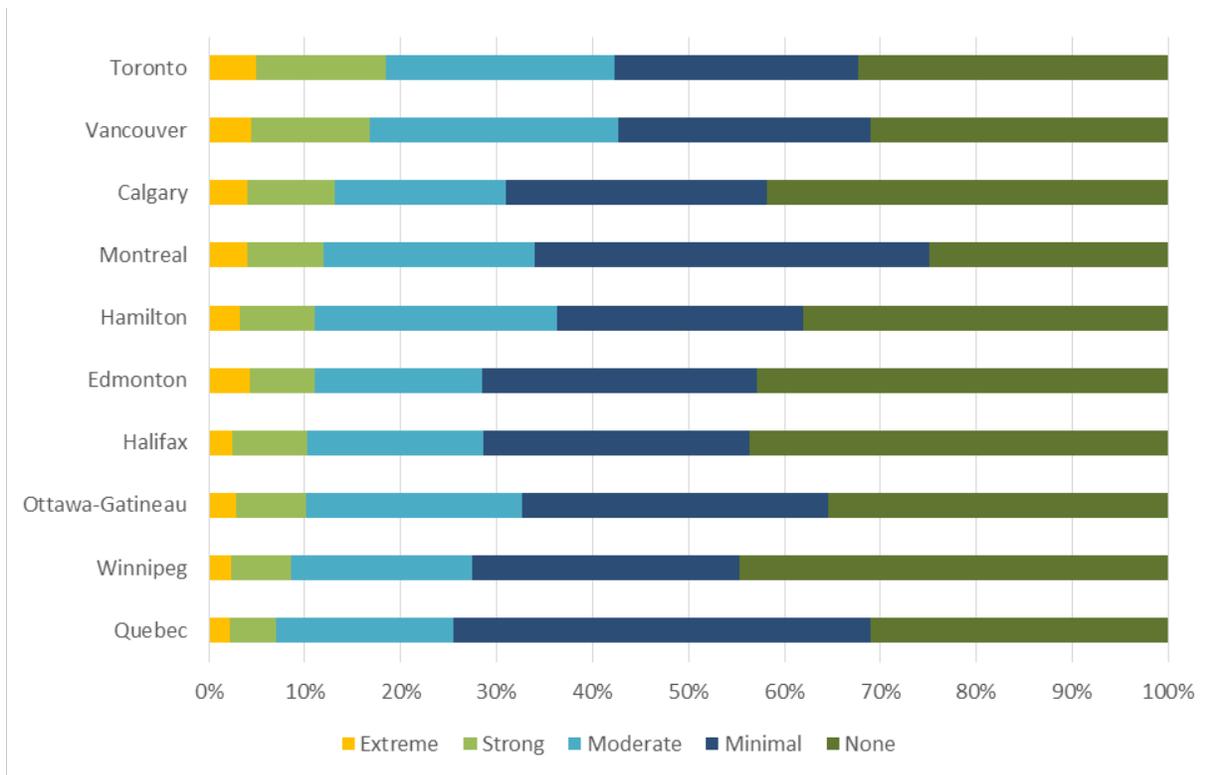


Figure 3-14 Urgency (by Census Metropolitan Area)

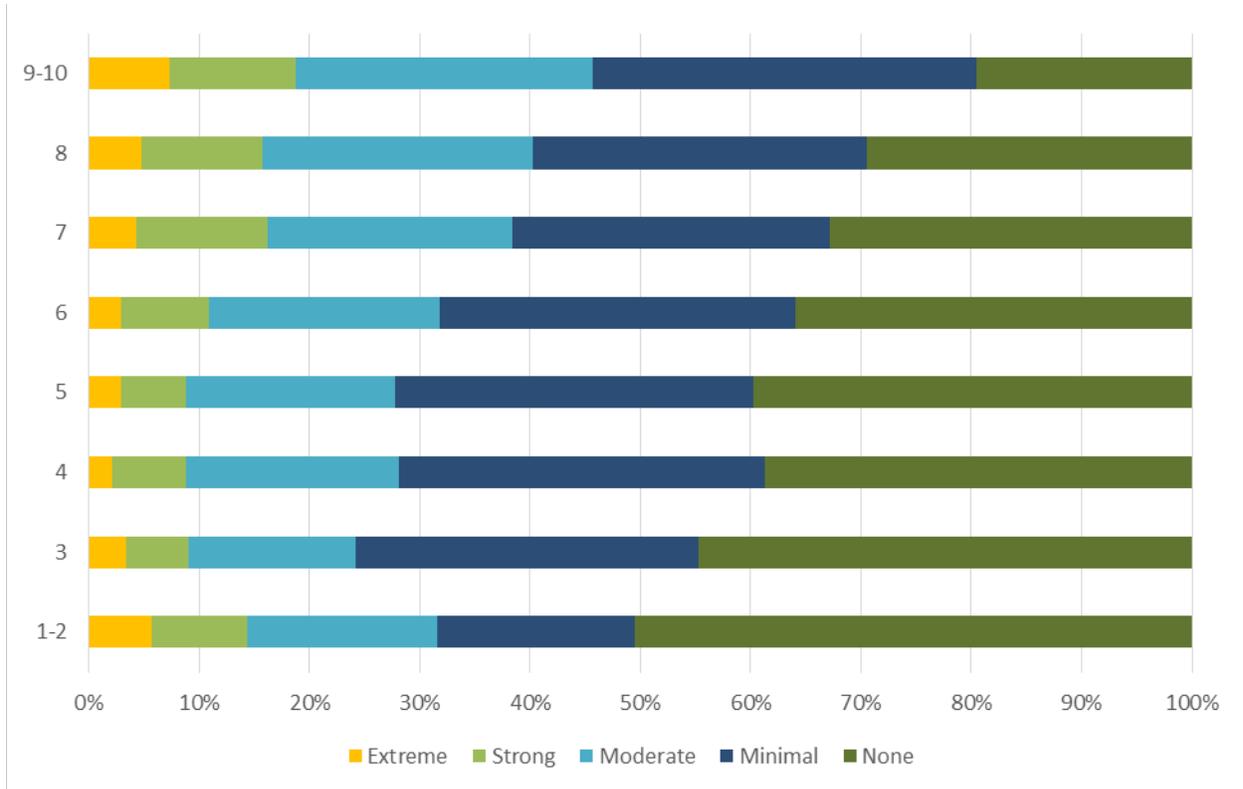


Figure 3-15 Urgency (by Urban-Rural Index)

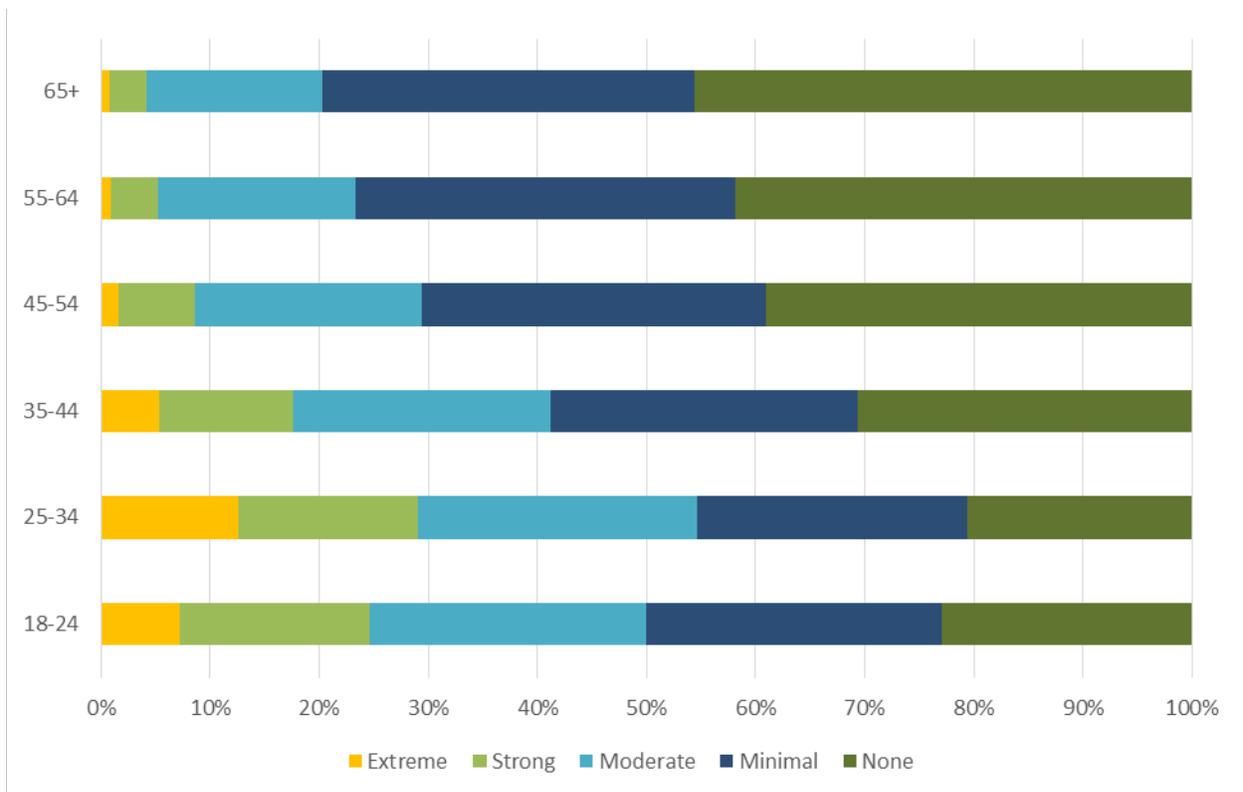


Figure 3-16 Urgency (by Age)

3.2. Summary of Results

Several attitudinal statements were applied in the two surveys that seek to get a good sense of how strongly consumers feel about electric vehicles (EVs). Apart from asking directly about moral commitment, a good approach to assess this is whether consumers would consider altering their behaviours in terms of spending more on a vehicle or putting up with some charging inconvenience.

This section also includes a measure of personal conviction that was included only in the 2018 survey. It deals specifically with stated “urgency” to adopt.

On the statement **“I feel morally committed to buy an electric vehicle”**:

- By province the overall levels of agreement average about 30% and have increased since 2015. Respondents from British Columbia show the most conviction in this regard and have reached 40% agreement.
- Significant increases in all provinces but levels of commitment are lower in Saskatchewan and Alberta.
- Within the Province of Quebec, it is very interesting to note that Quebec City respondents are showing much less commitment than residents of Montreal and only a minor increase since 2015.
- Substantial relative increases in commitment are being made in the more rural areas of the country though outlying areas lag the more urbanized areas (in absolute terms).
- With regard to age groups there are big absolute and relative changes among those aged 25-34 with some increases across all age groups including those that are older.

On the statement **“I am willing to spend more to buy an electric vehicle”**:

- Agreement levels average out at about 25% across provinces but strong agreement is much more modest at 5-7%.
- The main aspect is a fairly strong urban-rural divide on this topic with urban areas being much more inclined to spend more to obtain an EV. The pattern manifests itself also through more urbanized and economically prosperous provinces.
- The strongest positive metropolitan shift is in Toronto (i.e. strongly agree) but Vancouver has the highest level of general agreement. The biggest relative increase, in this regard, is in Halifax.

- The younger (especially 25-34) are much more willing to spend more and this has increased while those 55+ have not budged much in the past three years.

On the statement: **“I am willing to tolerate some periodic battery charging inconvenience for the benefits of driving an electric vehicle”**:

- Agreement levels for this statement by province are just less than 40%.
- There are slight increases in agreement to this statement in all provinces except Quebec where there has been a slight decrease, this goes for both Montreal and Quebec City.
- The biggest relative increase in agreement is in Newfoundland and Labrador.
- There are slight increases in agreement by all urban-rural classes and more so for the most rural one but generally there is more tolerance for inconvenience in the urbanized areas. Possibly there is more fear/concern about inconvenience in outlying areas.

On the statement (for 2018 only) where each respondent is asked to **assess the urgency they feel for their next acquired vehicle to be electric**:

- The big story for this question is the massive divergence between age groups where 25 to 30% of younger people are expressing strong or extreme urgency while older cohorts are expressing less than 5% and only a tiny minority express extreme urgency.
- The average province is at about 10% in terms of strong urgency or above.
- In relation to the “Big 3” provinces, there is much more stated urgency in British Columbia and Ontario compared to Quebec.
- As a province, Quebec also diverges from the others in having a large share of people stating minimal urgency as opposed to “no urgency at all.” The latter is much more likely in other provinces.
- While Toronto and Vancouver residents express the most urgency, it is interesting to see Calgary high on the list of metro areas and higher than Montreal.
- Generally, there is the most urgency in the most highly urbanized areas.



Aspects of Electric Vehicle Knowledge

4.1. Key Graphics

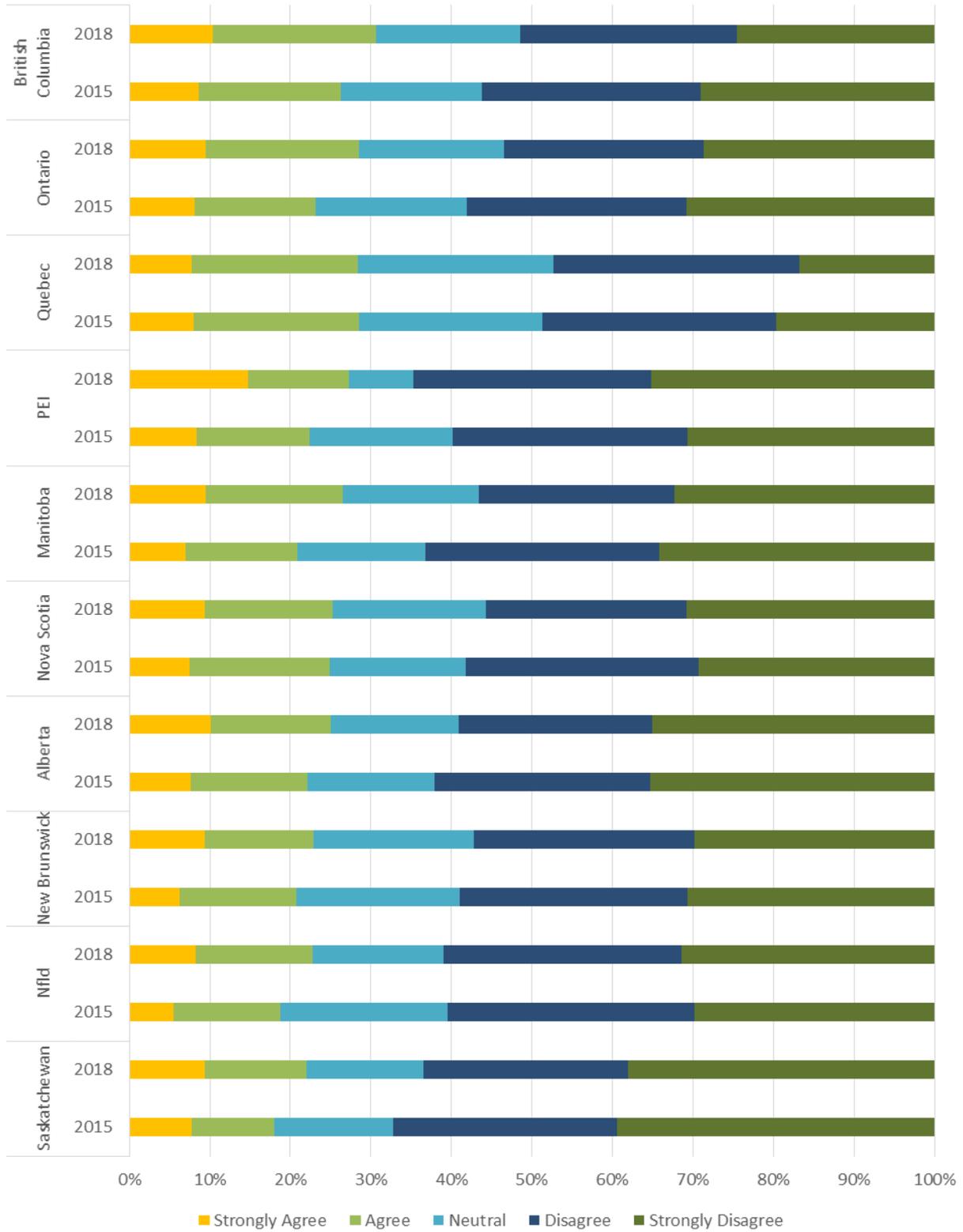


Figure 4-1: Driving range would not concern me if I owned an EV (by Province)

Evolution of Canadian Attitudes on Electric Vehicles

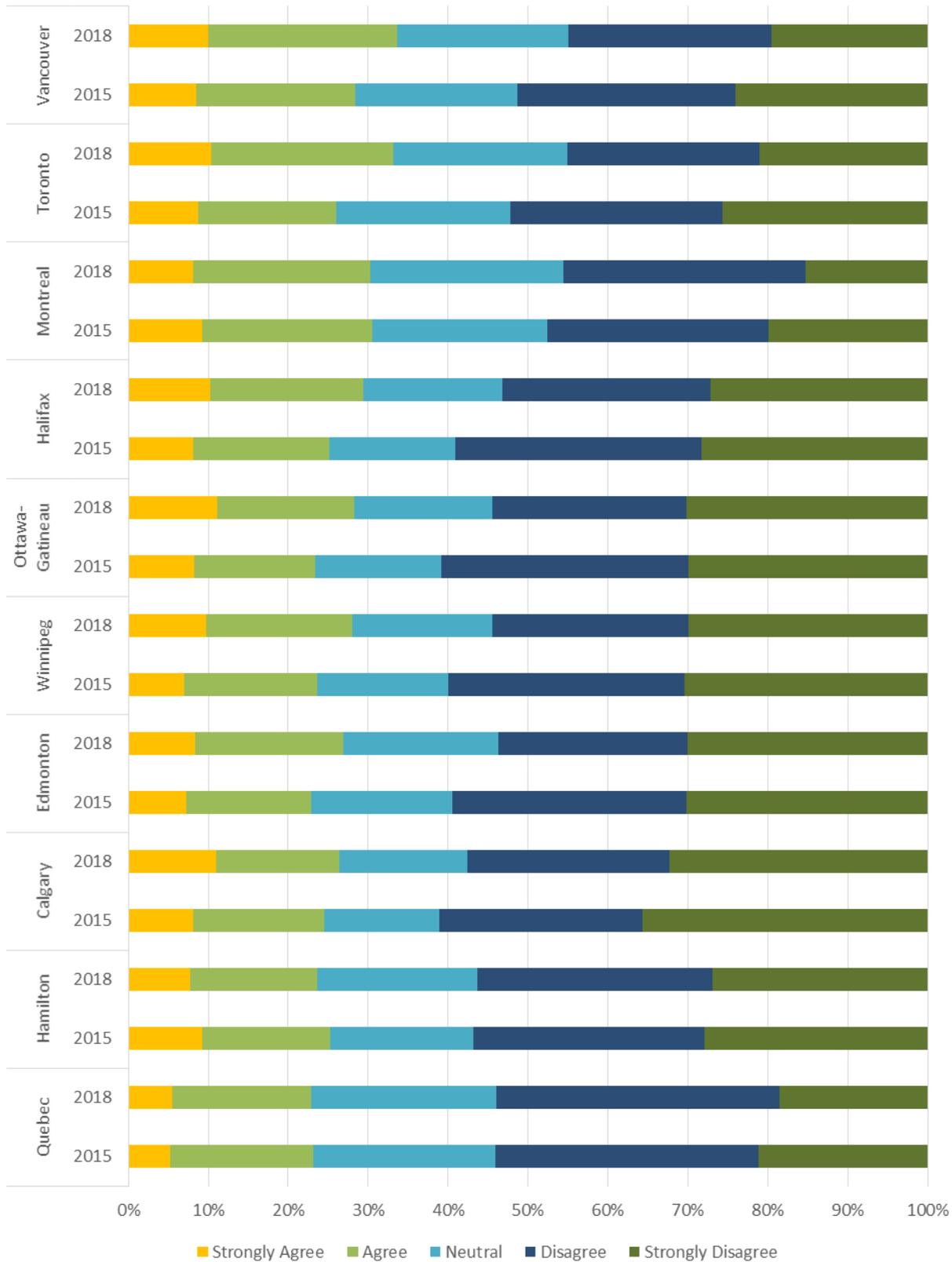


Figure 4-2: Driving range would not concern me if I owned an EV (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

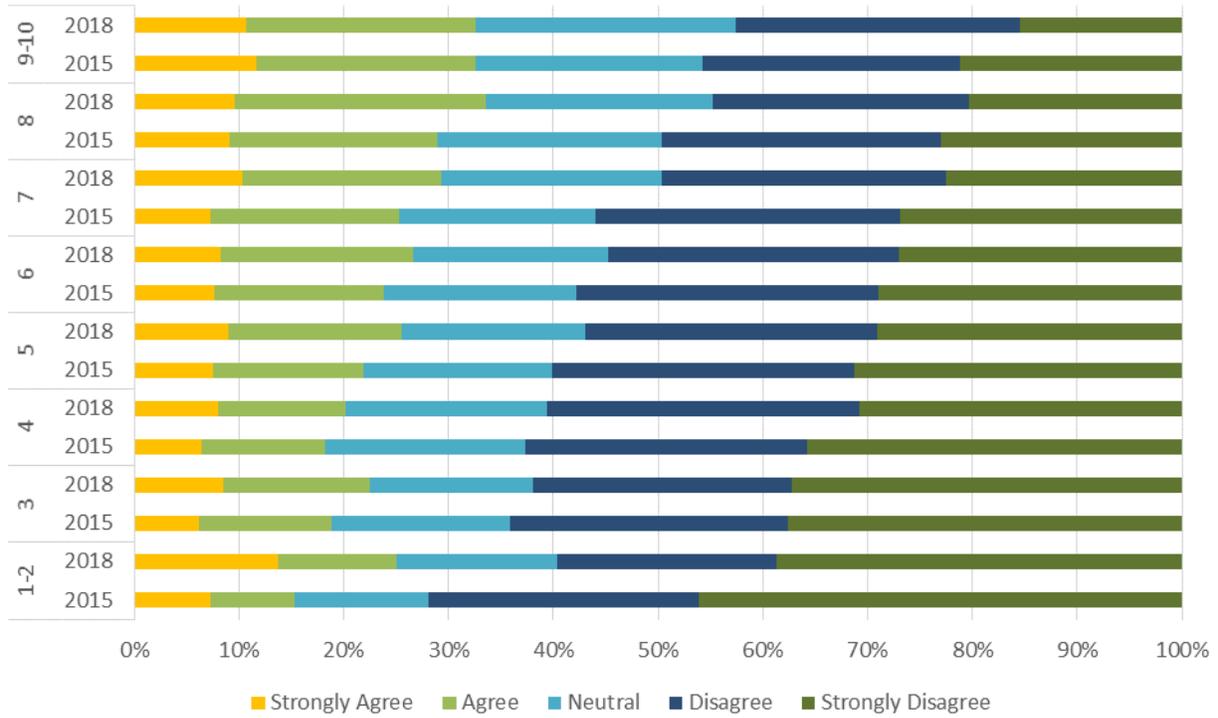


Figure 4-3: Driving range would not concern me if I owned an EV (by Urban-Rural Index)

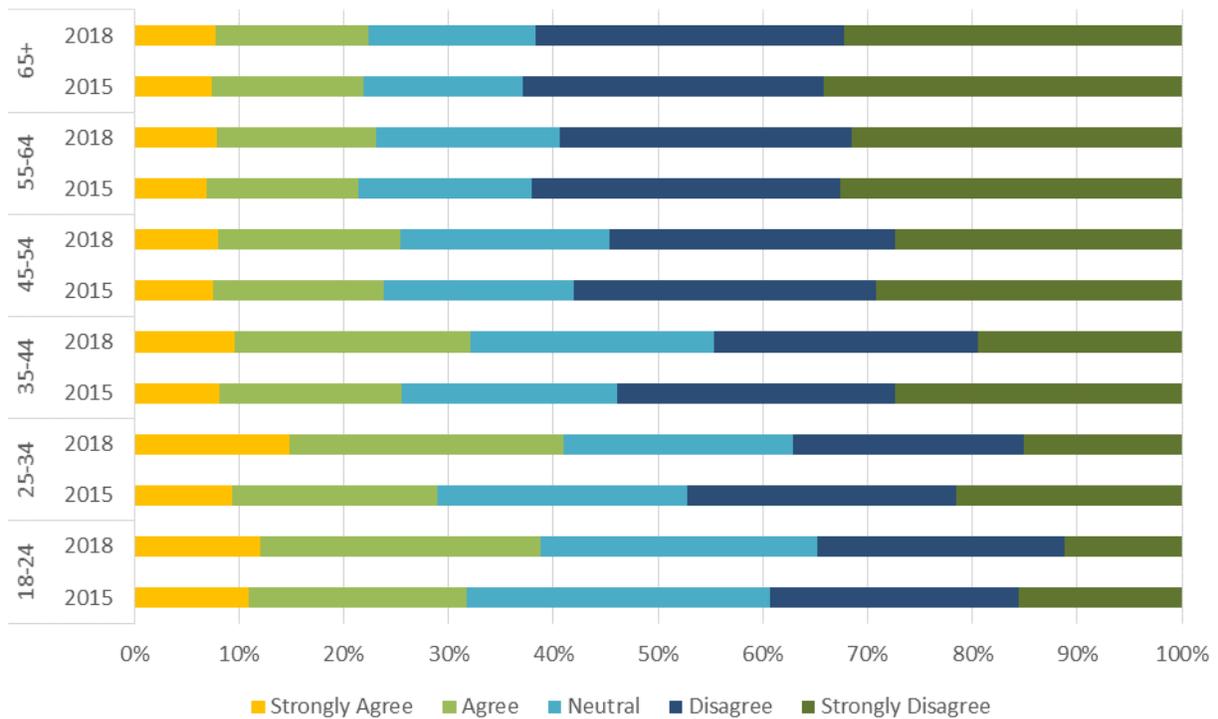


Figure 4-4: Driving range would not concern me if I owned an EV (by Age)

Evolution of Canadian Attitudes on Electric Vehicles

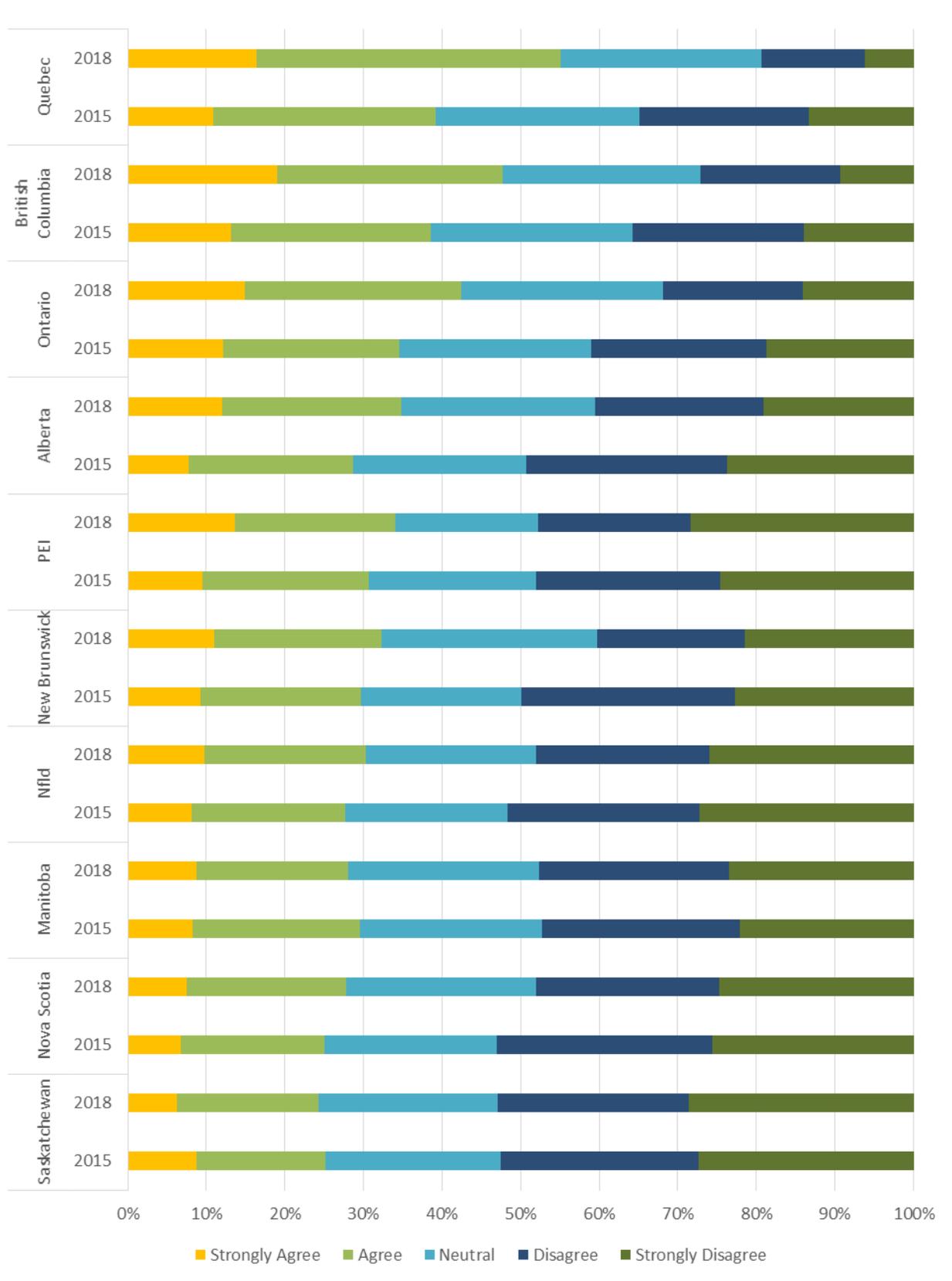


Figure 4-5: I know where I could buy an EV (by Province)

Evolution of Canadian Attitudes on Electric Vehicles

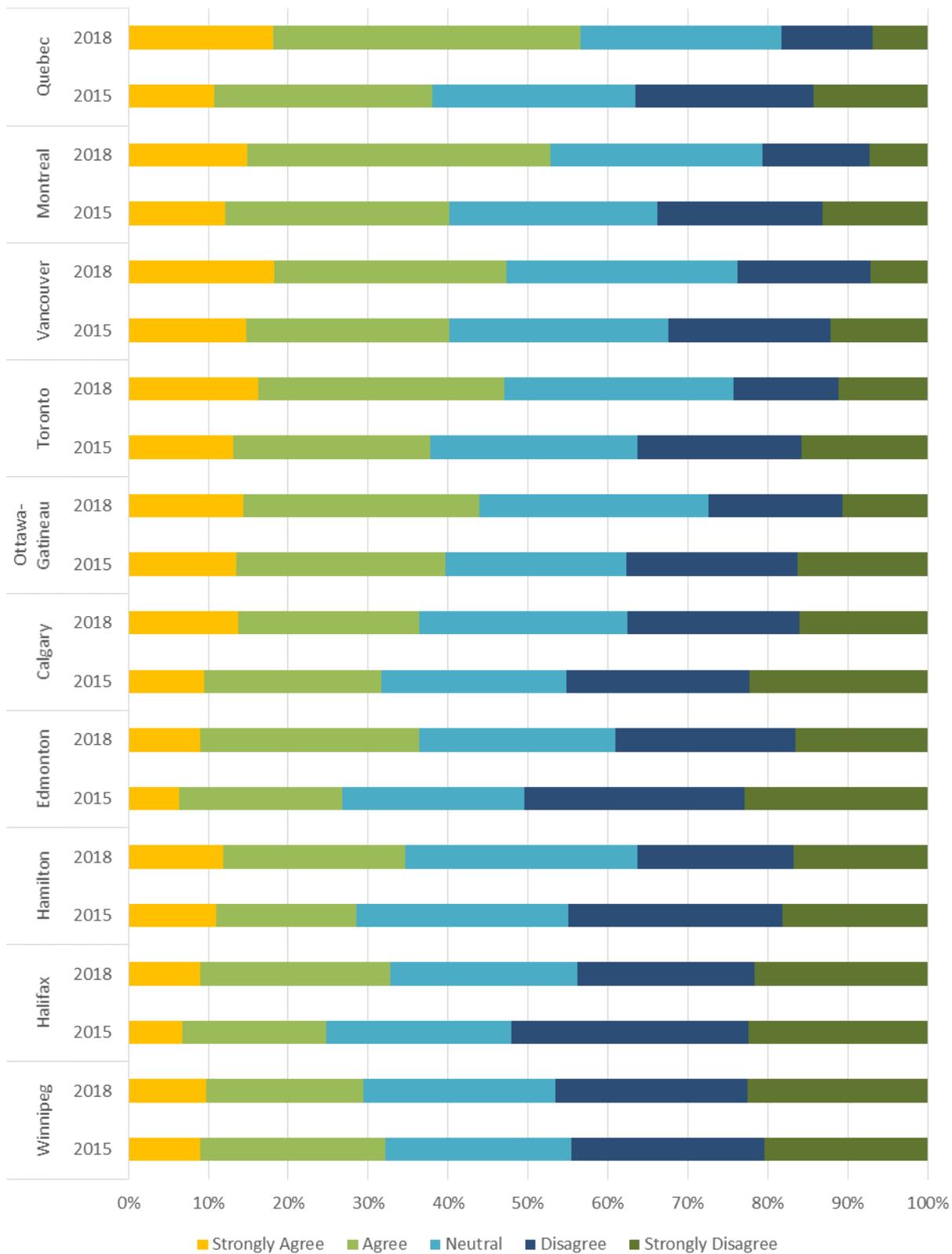


Figure 4-6: I know where I could buy an EV (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

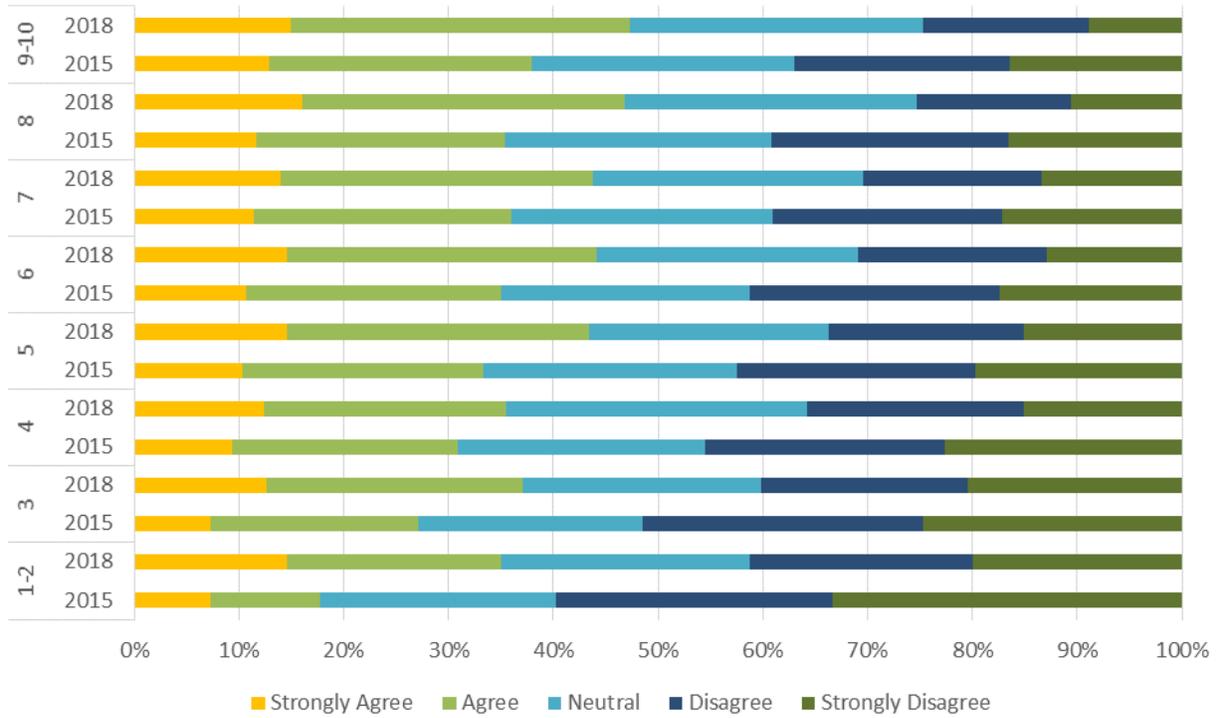


Figure 4-7: I know where I could buy an EV (Urban-Rural Index)

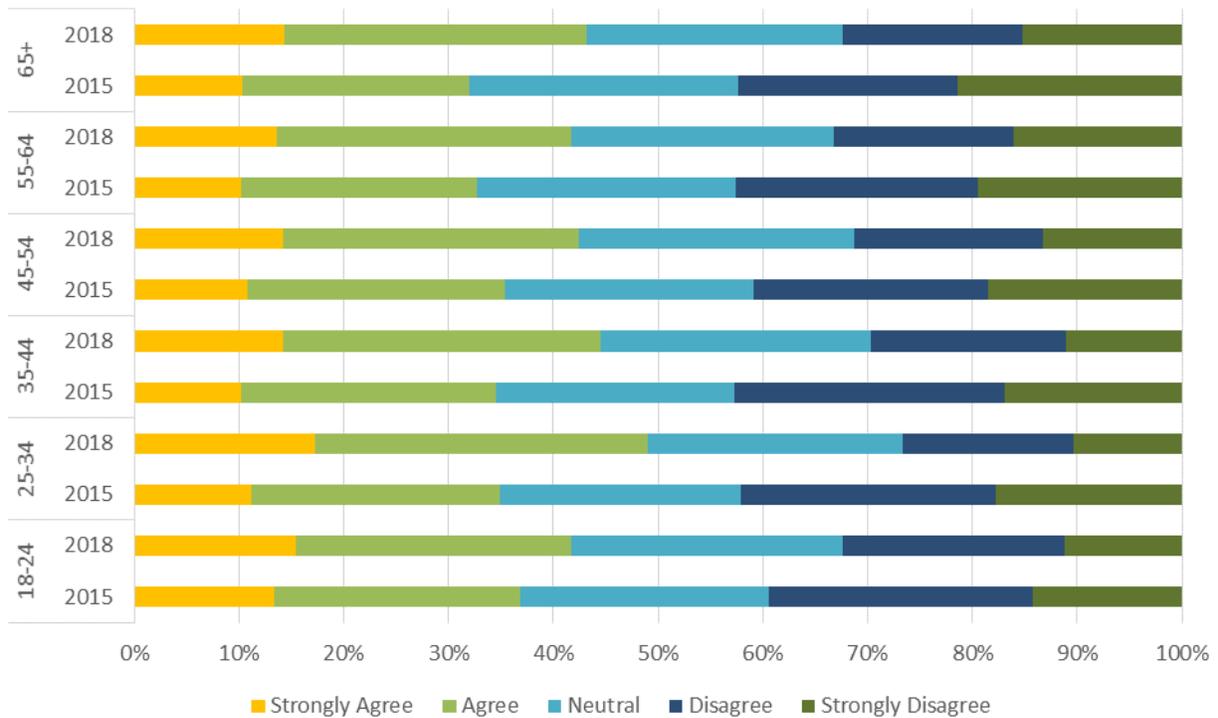


Figure 4-8: I know where I could buy an EV (by Age)

Evolution of Canadian Attitudes on Electric Vehicles

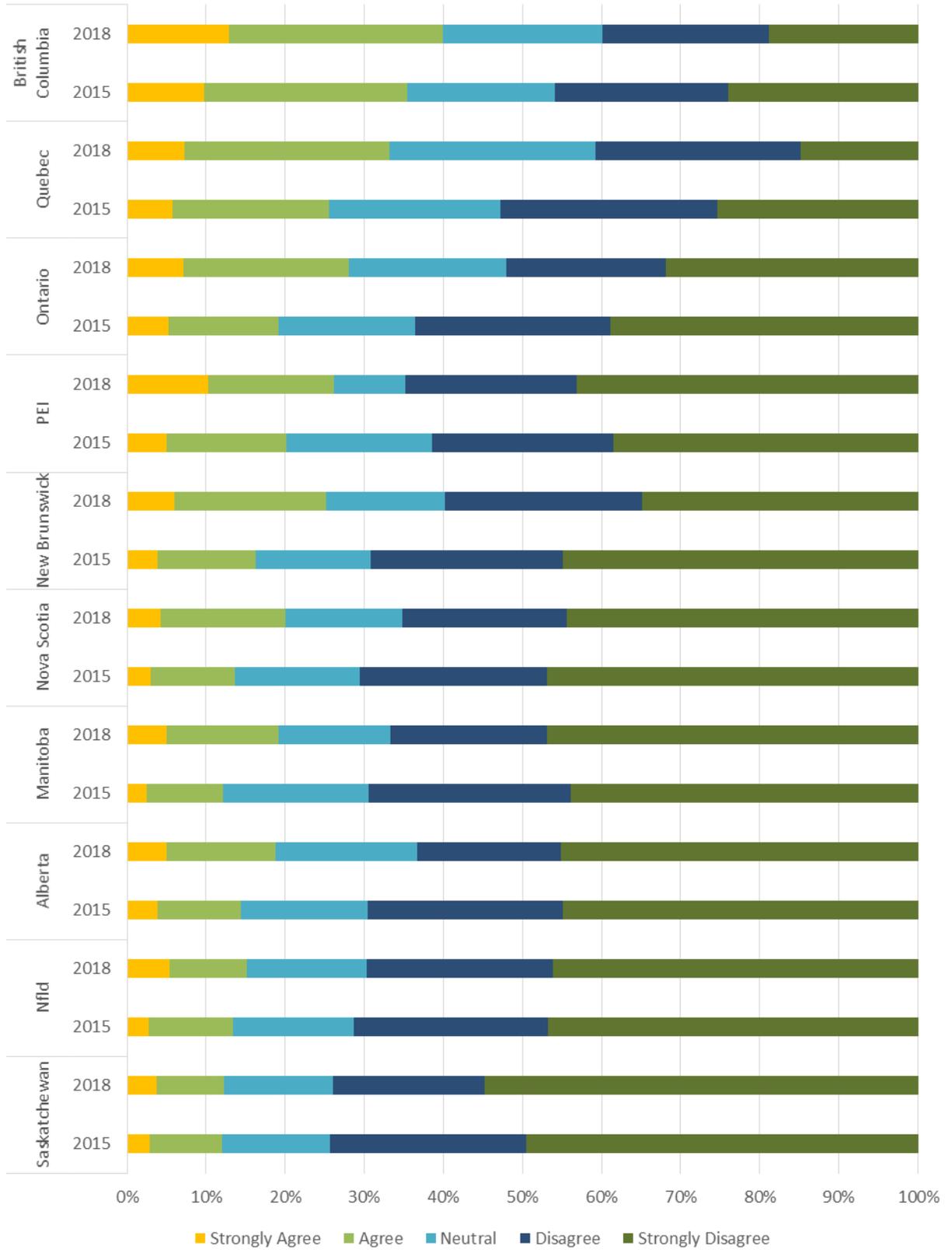


Figure 4-9: I already know several locations where I could plug in if I had an EV (by Province)

Evolution of Canadian Attitudes on Electric Vehicles

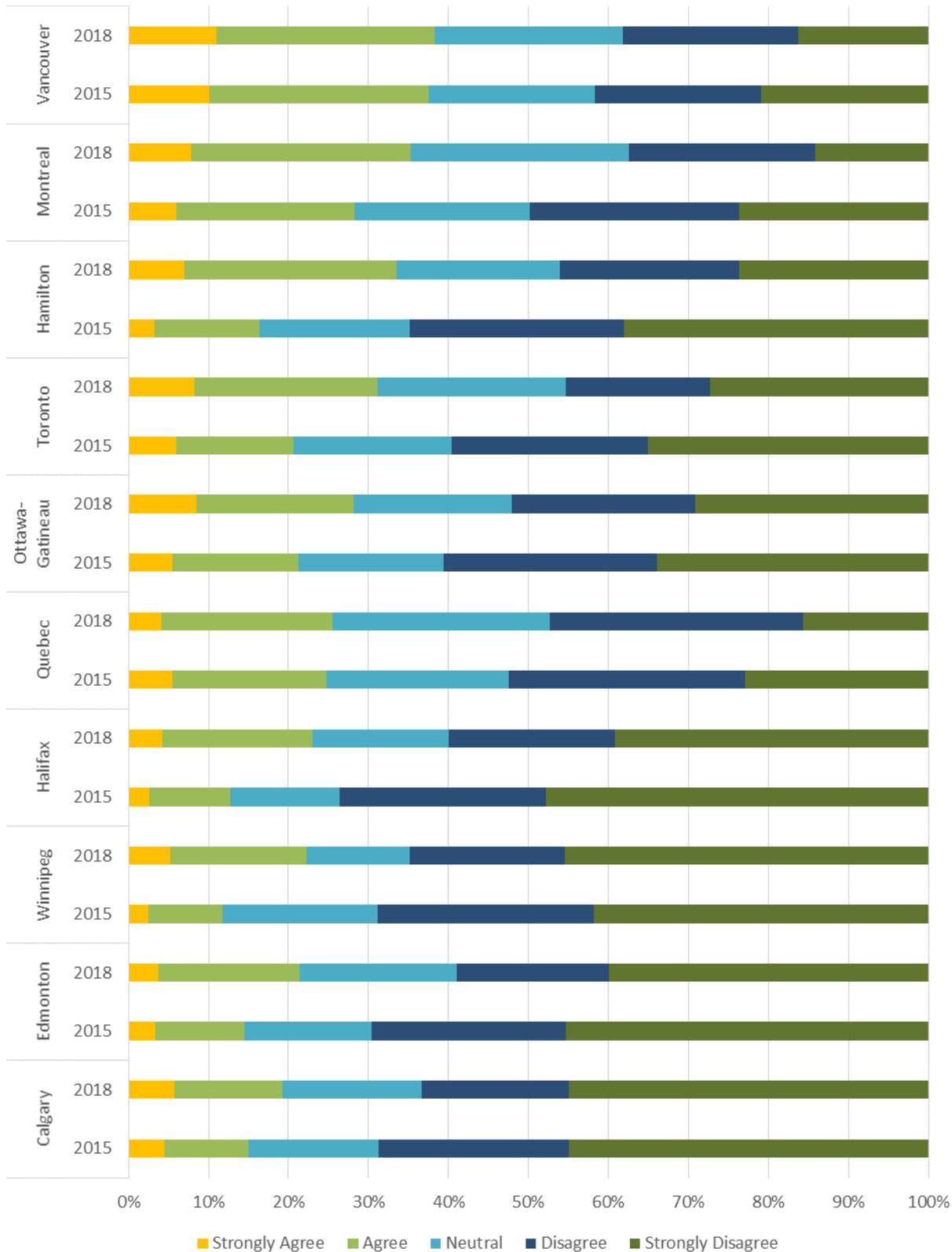


Figure 4-10: I already know several locations where I could plug in if I had an EV (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

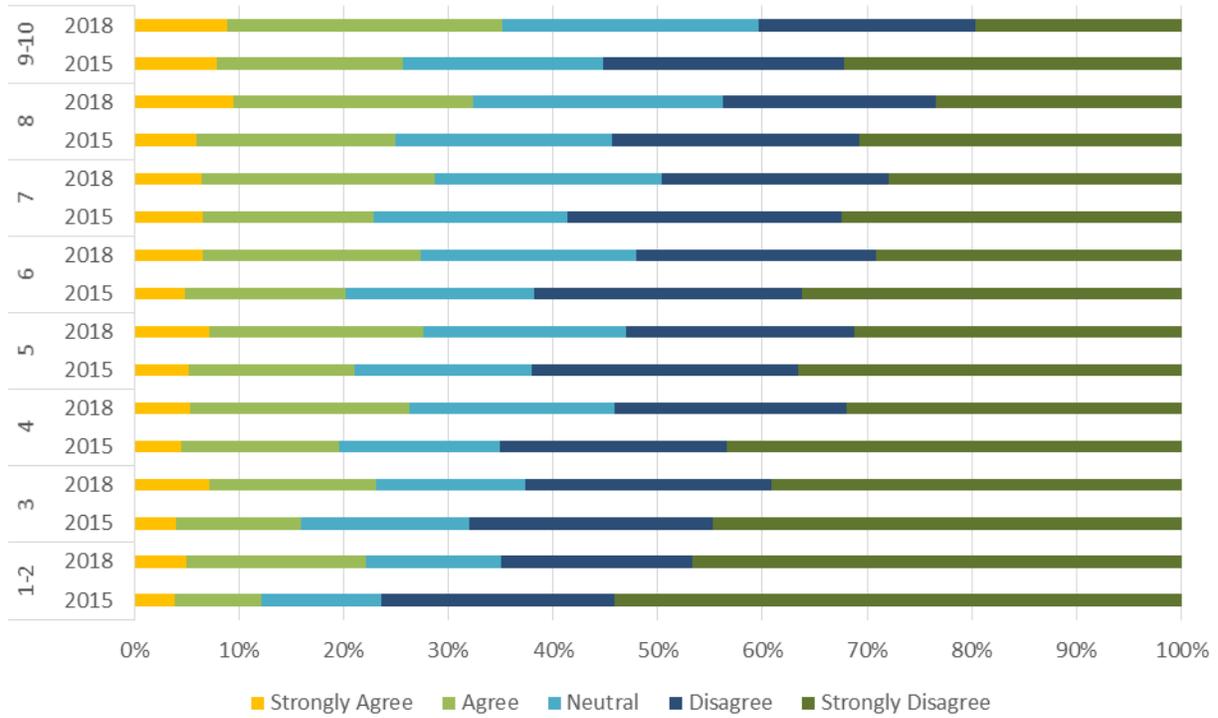


Figure 4-11: I already know several locations where I could plug in if I had an EV (by Urban-Rural Index)

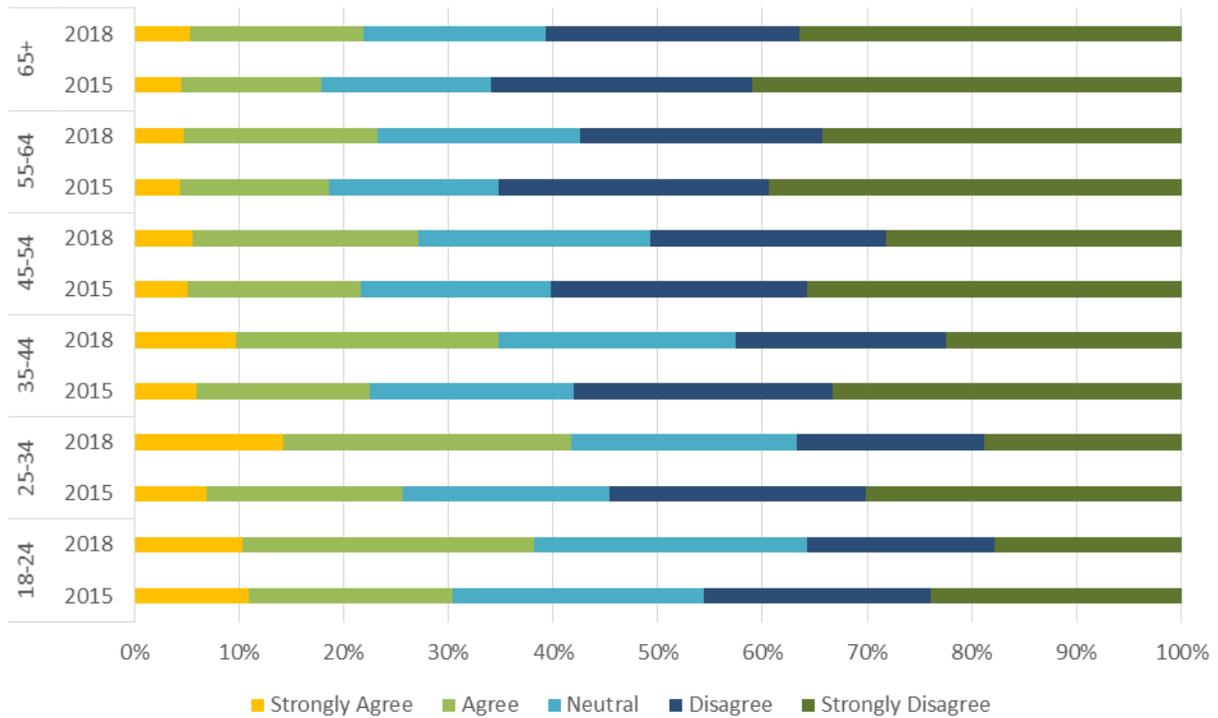


Figure 4-12: I already know several locations where I could plug in if I had an EV (by Age)

Evolution of Canadian Attitudes on Electric Vehicles

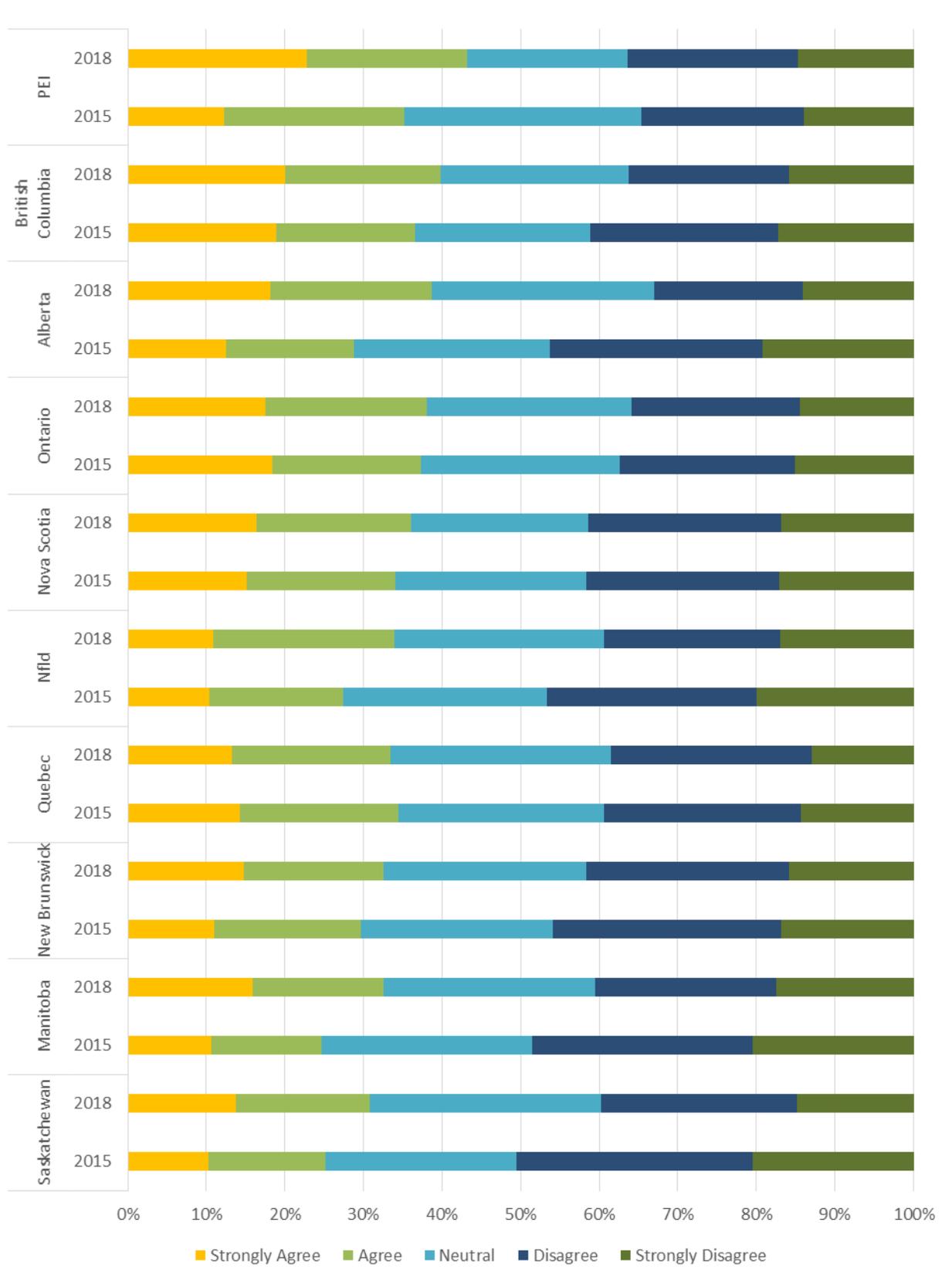


Figure 4-13: Plugging in an EV at my home is not practical (by Province)

Evolution of Canadian Attitudes on Electric Vehicles

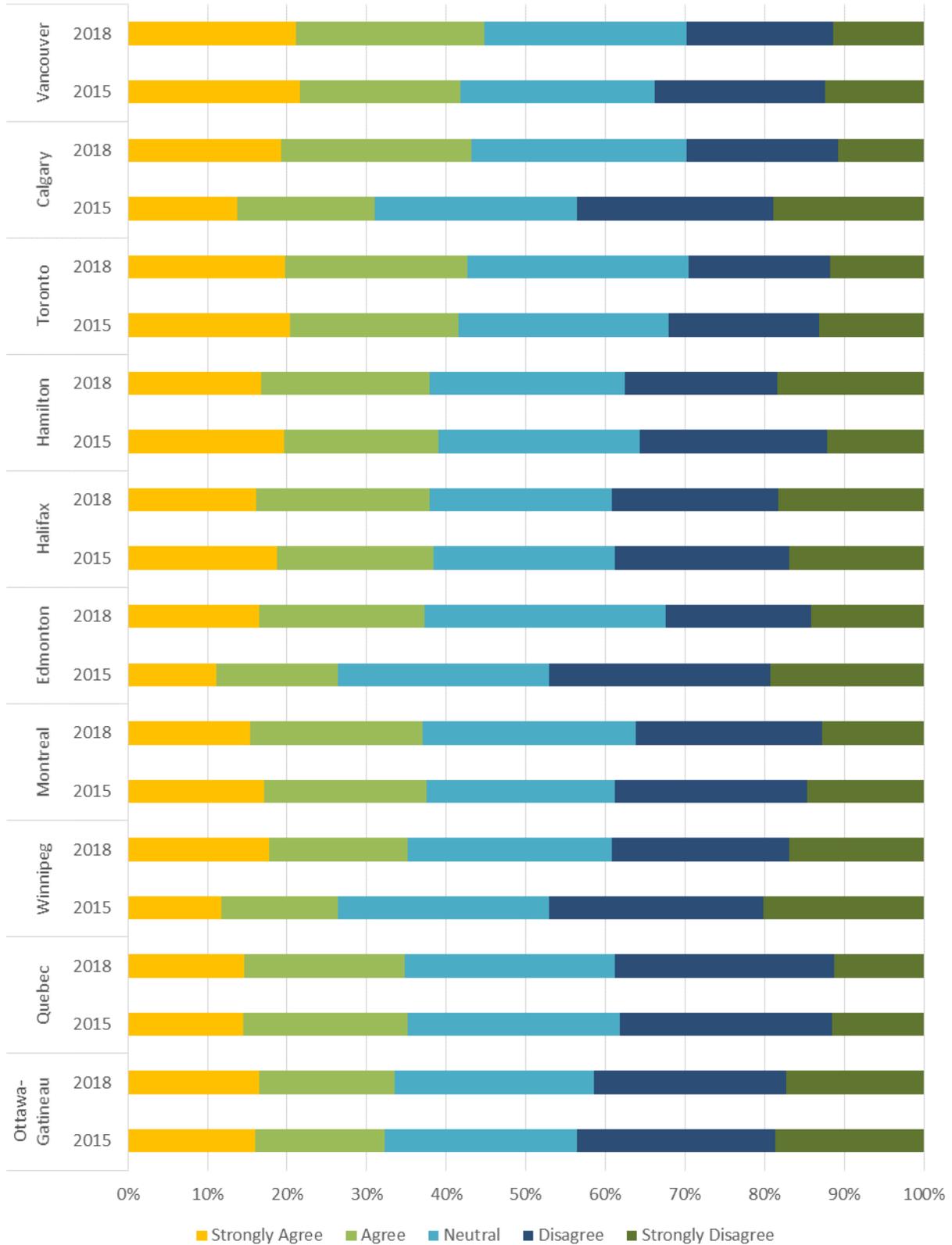


Figure 4-14: Plugging in an EV at my home is not practical (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

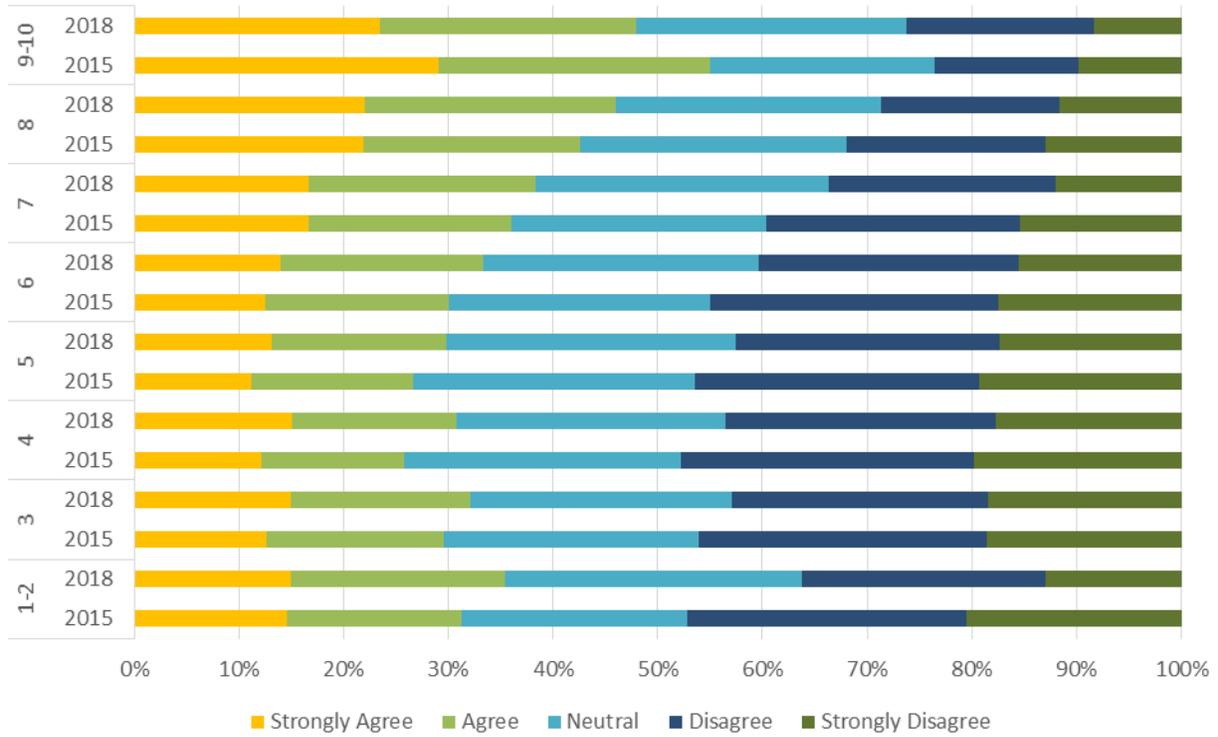


Figure 4-15: Plugging in an EV at my home is not practical (by Urban-Rural Index)

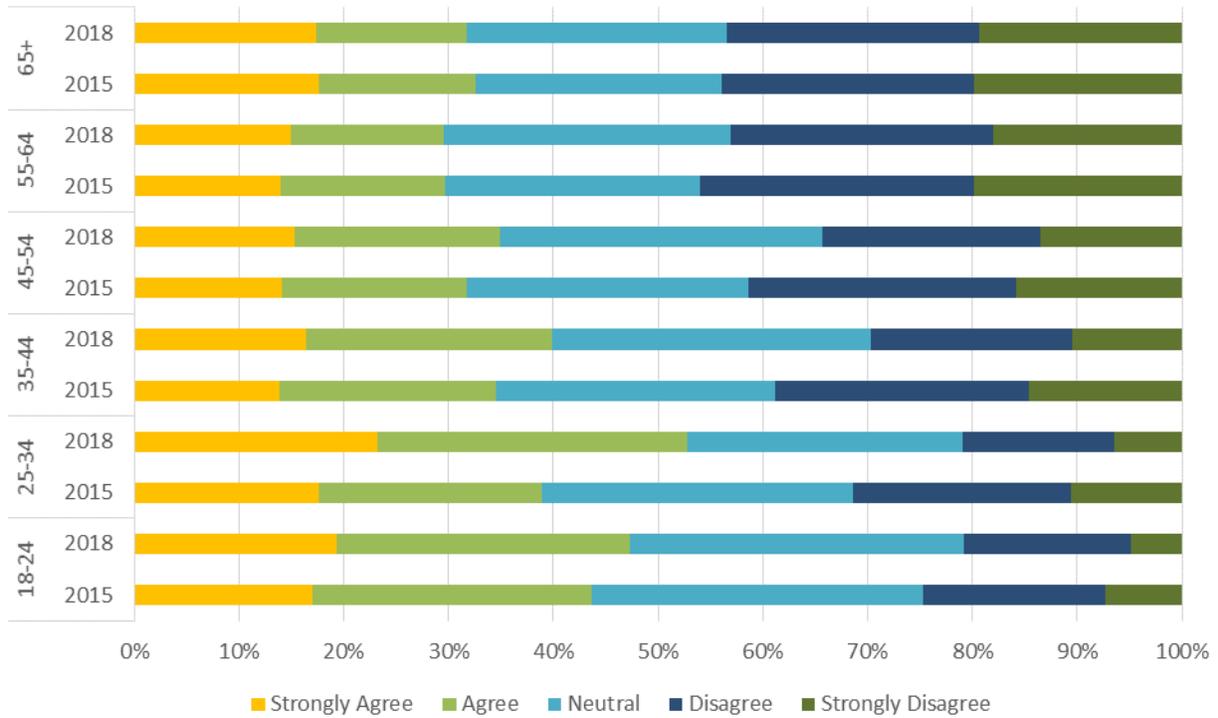


Figure 4-16: Plugging in an EV at my home is not practical (by Age)

4.2. Summary of Results

While the 2015 survey did not probe deeply into the question of awareness and knowledge levels of Canadian consumers on electric vehicles (EVs) and related matters, a few attitudinal statements are available that give us a sense of some interesting factors.

On the statement **“Driving Range would not concern me if I owned an EV”**:

- There have been modest increases in agreement with this across most provinces with the level of agreement averaging out at about 25% implying that most people remain worried.
- The “Big 3” provinces show the highest levels of agreement but have not experienced big relative changes since 2015.
- Toronto, Montreal and Vancouver are all over 30% agreement in 2018 though Montreal may have declined in terms of agreement since 2015.
- There is fairly strong differentiation by the urban-rural index with 60% disagreement in some of the rural classes where people appear to worry the most about driving range.
- Younger age groups are showing substantial increases from already high levels (of comfort) while older cohorts who are showing only tiny increases in their level of agreement.
- Nearly 40% of younger people are agreeing that driving range will not concern them, over 20% of those 65+ are saying the same.

On the statement **“I know where I could buy an EV”**:

- Most of the provinces (including non-incentive provinces) are around 30% agreement or a bit less but Quebec and British Columbia stand out as being at 50% agreement or above.
- There has been an increase in knowledge in this regard by province.
- Agreement in Montreal and Quebec City is well over 50%.
- Hamilton is notably lower than Toronto in agreement which is noteworthy considering their close spatial proximity.
- Winnipeg is around 30% agreement which is actually a decline.
- There is some gradient with regard to the urban-rural index but not a large one. All levels in the hierarchy are showing improvement.

- All age groups show more agreement but there is only a slight gradient by age with the younger agreeing a bit more.

On the statement **“I already know several locations where I could plug in if I had an EV”**:

- There is a large divergence across provinces in that British Columbia has reached 40% agreement whereas Saskatchewan is about 12% agreement. Saskatchewan also stands out as a province where there has been no noticeable increase.
- The incentive provinces are at the top of the list with strong agreement.
- There is a divergence across metropolitan areas but not a particularly strong one.
- It is interesting to note that Hamilton is near the top of this agreement list that relates to charging infrastructure but has a much lower ranking in knowing where to purchase an EV.
- In terms of agreement with the statement, Calgary and Edmonton are at the bottom of the list with Edmonton showing particularly low levels of strong agreement.
- Certainty about charging infrastructure locations increases with urbanization but all classes show improvement since 2015.
- By age groups, the younger people are showing the most positive change and from already higher levels in 2015. There is little change among the older cohorts.

On the statement **“Plugging in an EV at my home is not practical”**:

- By province, agreement levels generally range from 30 to 40%.
- This theme is the one that is least consistent from province to province in terms of the level of strong agreement.
- More so than in 2015, respondents in most provinces are agreeing that plugging in at home would be problematic.
- The most urbanized areas have the highest share of respondents who see the issue as a problem and a larger share of respondents in most density classes are seeing it as a problem in 2018.
- A greater share of respondents from most age groups in 2018 are perceiving home charging as a problem and this is especially true for those aged 25-34.



Barriers to Electric Vehicle Adoption

Based on the evidence provided by respondents on the makes and models of their household vehicles, it was possible to determine whether or not their household operated an electric vehicle (EV). In the vast proportion of cases, this proved not to be the case as expected. Those that were identified as not operating an EV were asked to rate the importance of a series of 11 potential barriers in explaining why. These are outlined below. The graphical displays are broken into four sub-sections based on the segmentations that have become familiar by this point: by province, by Census Metropolitan Areas, by an Urban-Rural Index and by the age of the respondent. In Figure 6-1 below an overall sense is given of how important these barriers are seen by Canadians in 2018 in explaining why an EV is not already owned.

Evolution of Canadian Attitudes on Electric Vehicles

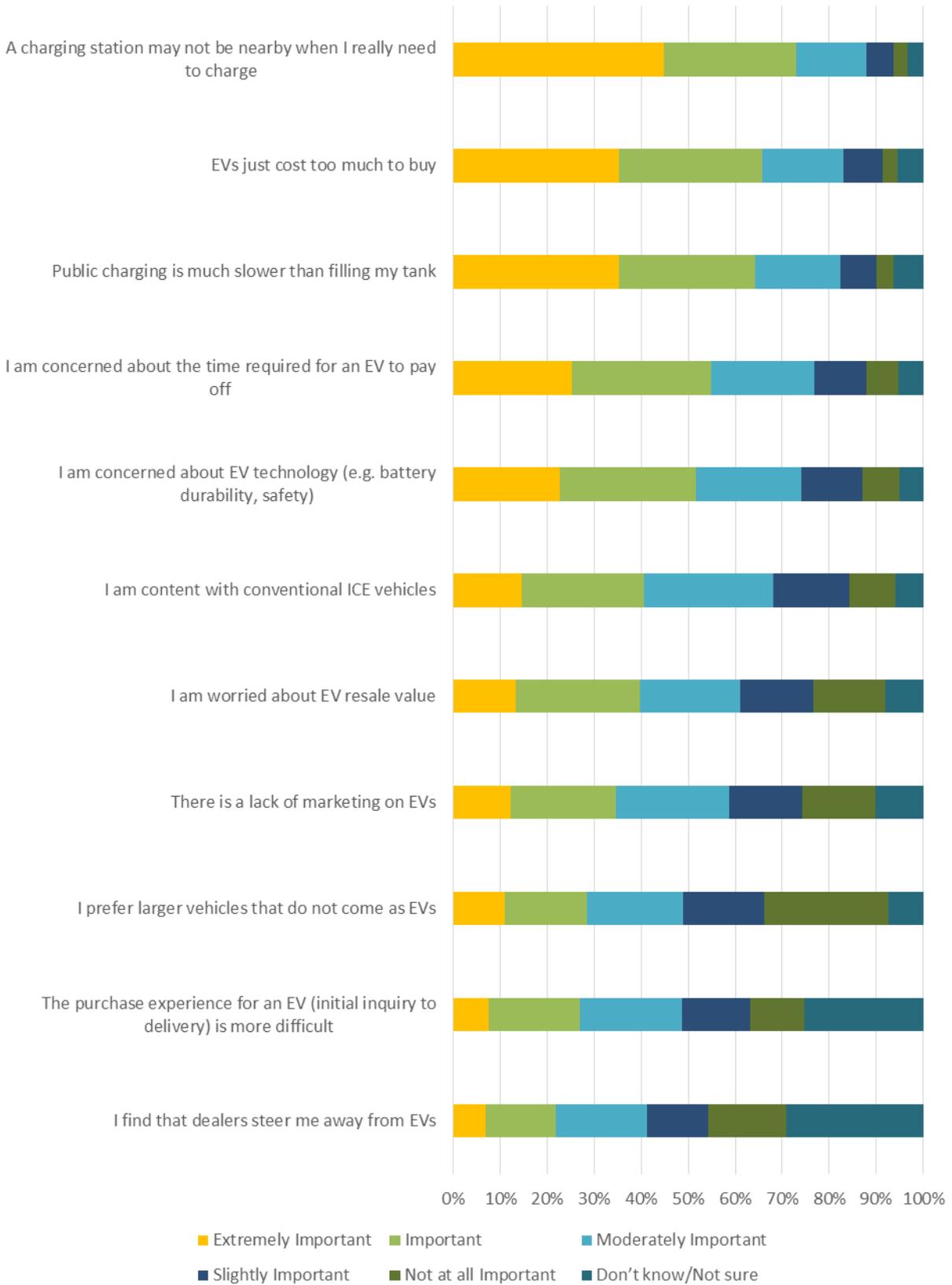


Figure 5-1 - Overview of Barriers to EV Adoption

5.1. By Province

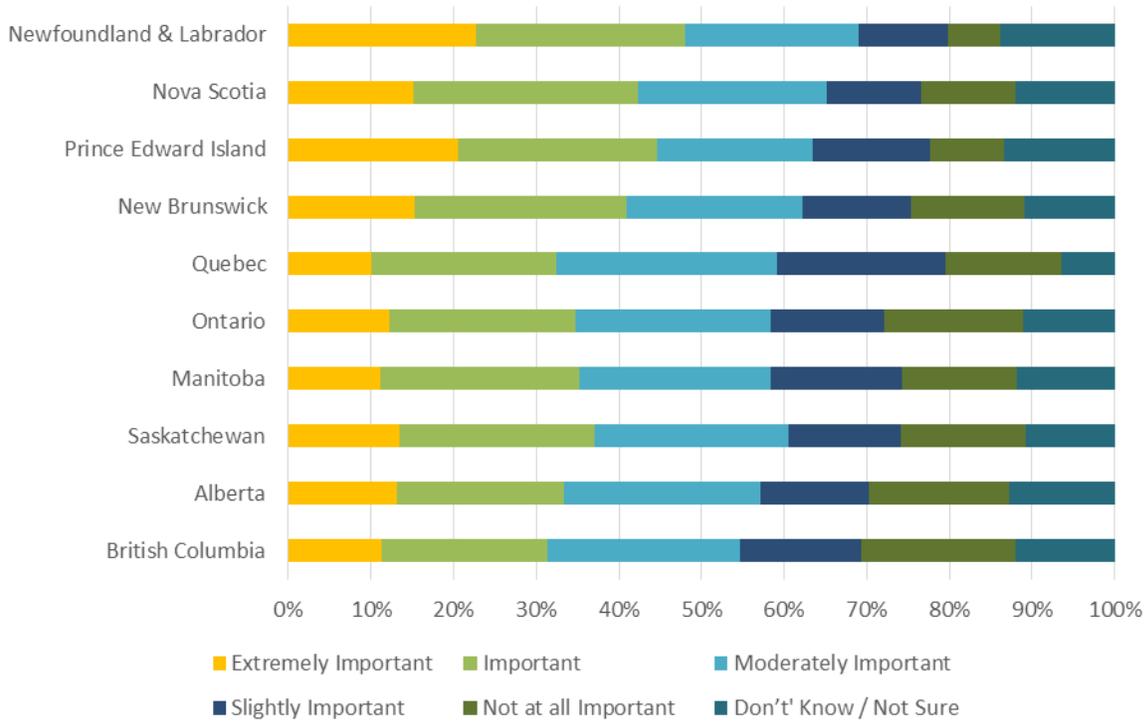


Figure 5-2: There is a lack of marketing on EVs (by Province)

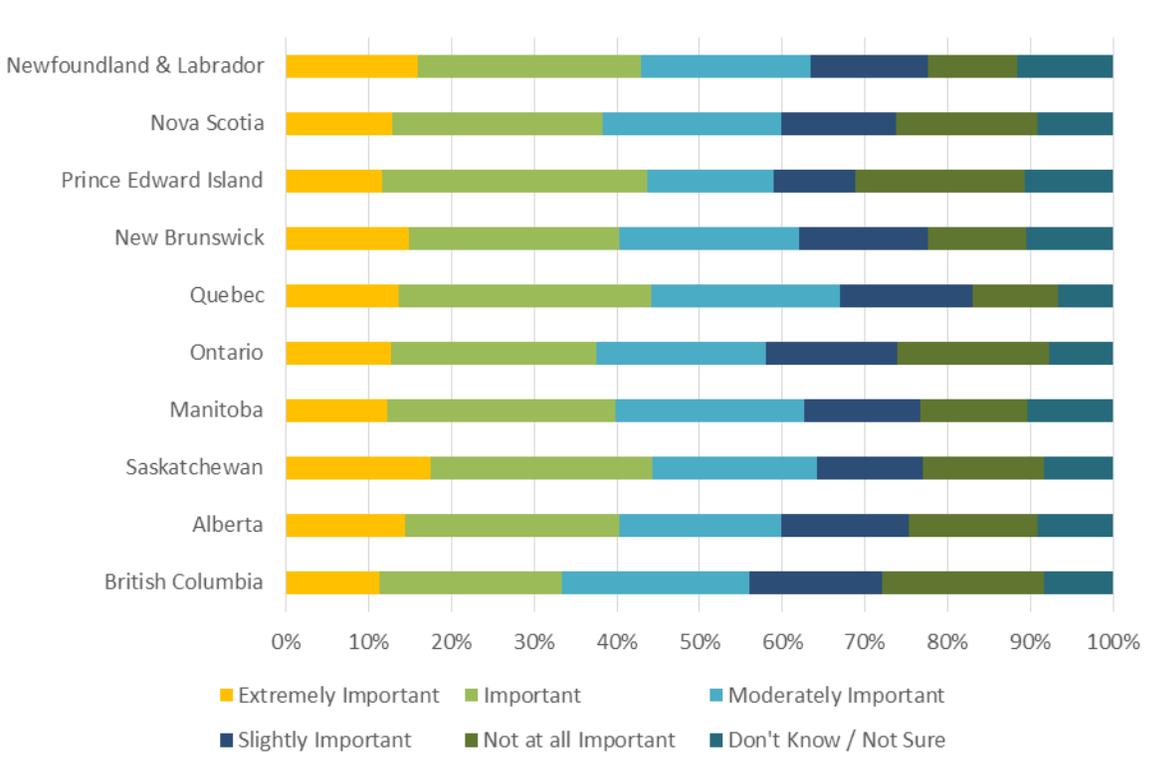


Figure 5-3: I am worried about EV resale value (by Province)

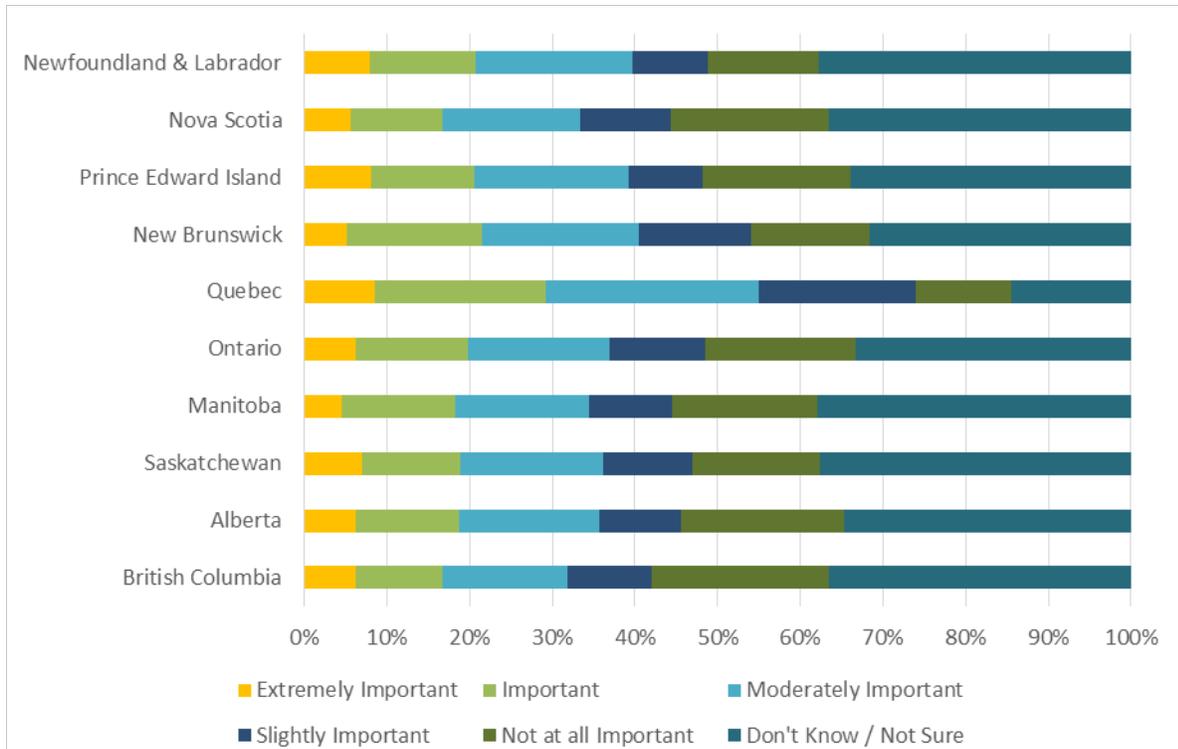


Figure 5-4: I find that dealers steer me away from EVs (by Province)

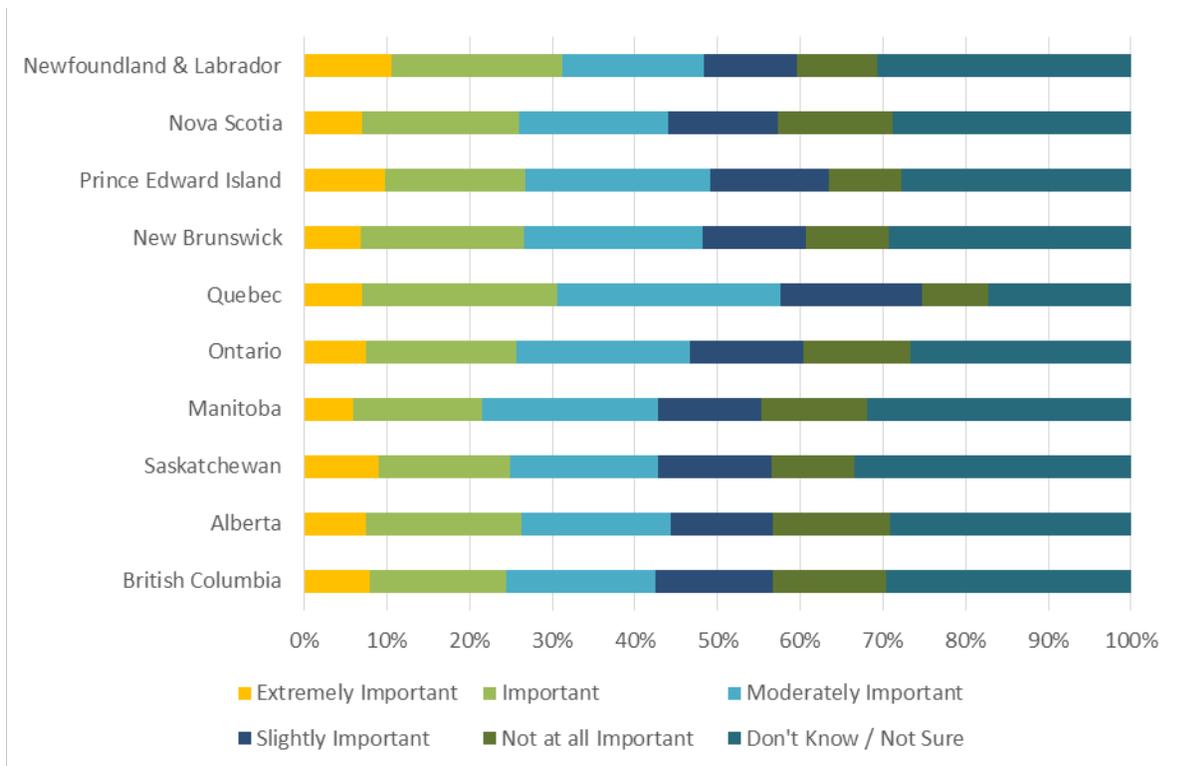


Figure 5-5: The purchase experience for an EV (initial inquiry to delivery) is more difficult (by Province)

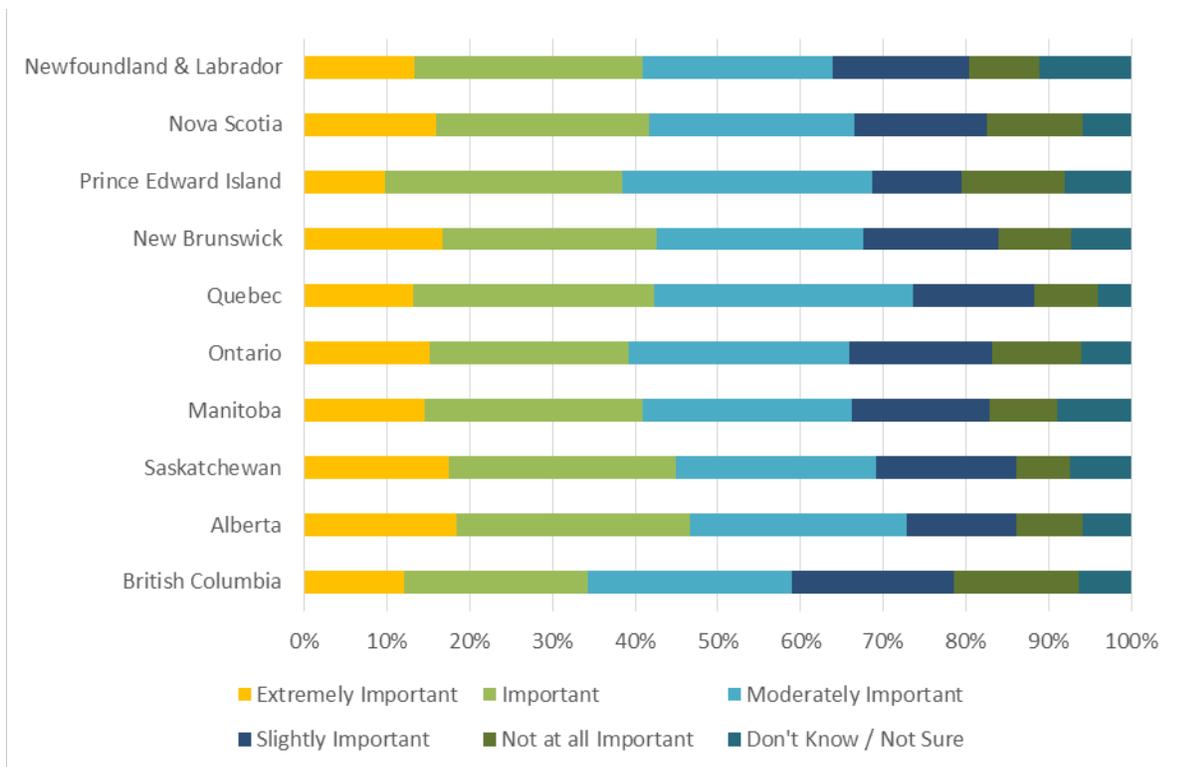


Figure 5-6: I am content with conventional ICE vehicles (by Province)

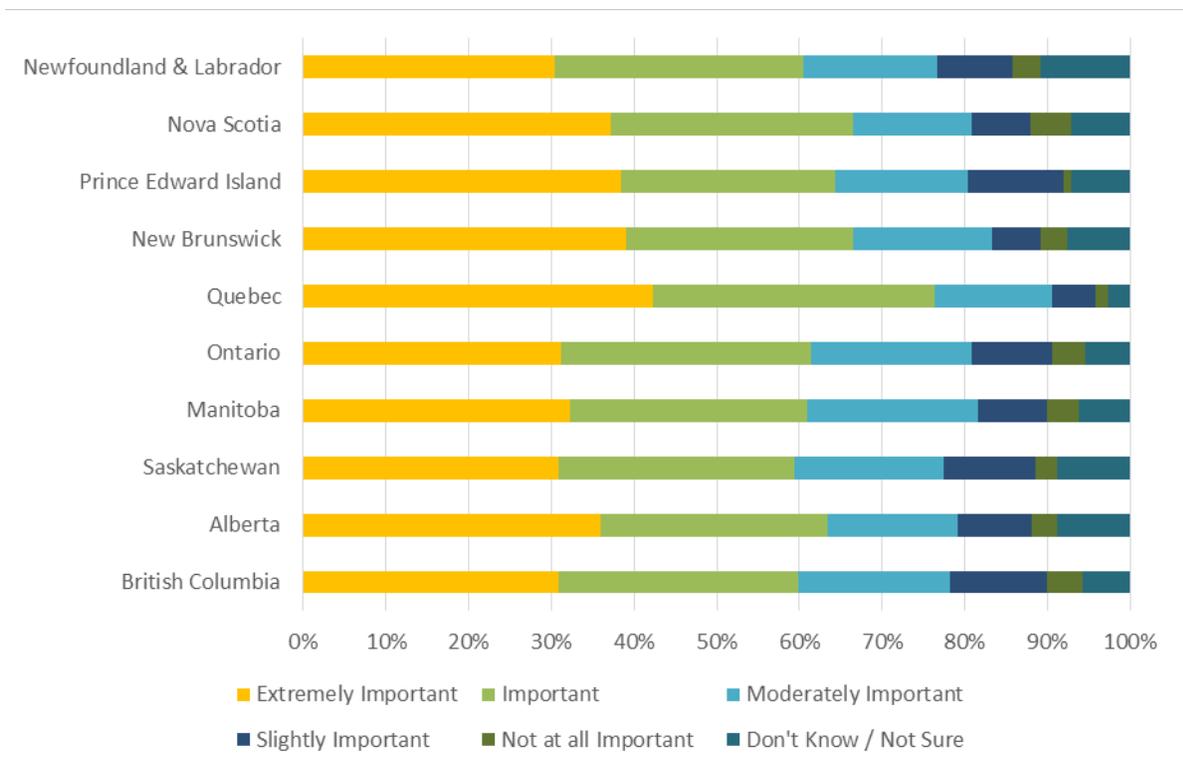


Figure 5-7: EVs just cost too much to buy (by Province)

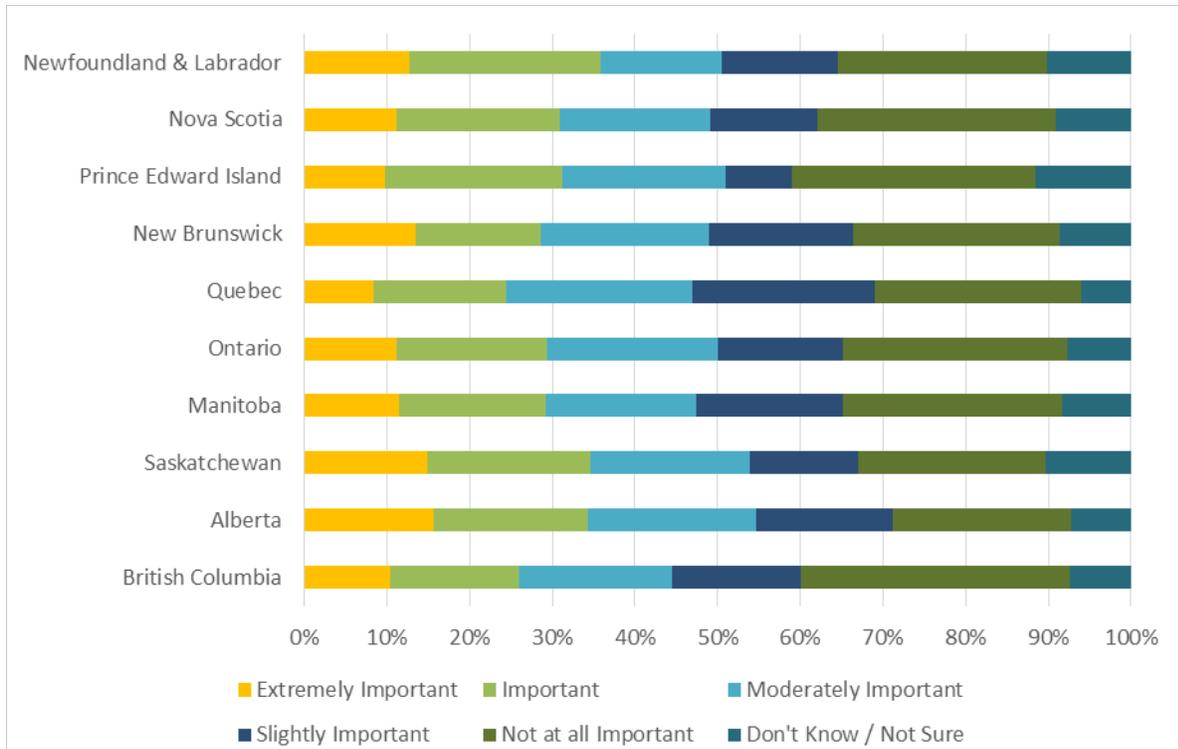


Figure 5-8: I prefer larger vehicles that do not come as EVs (by Province)

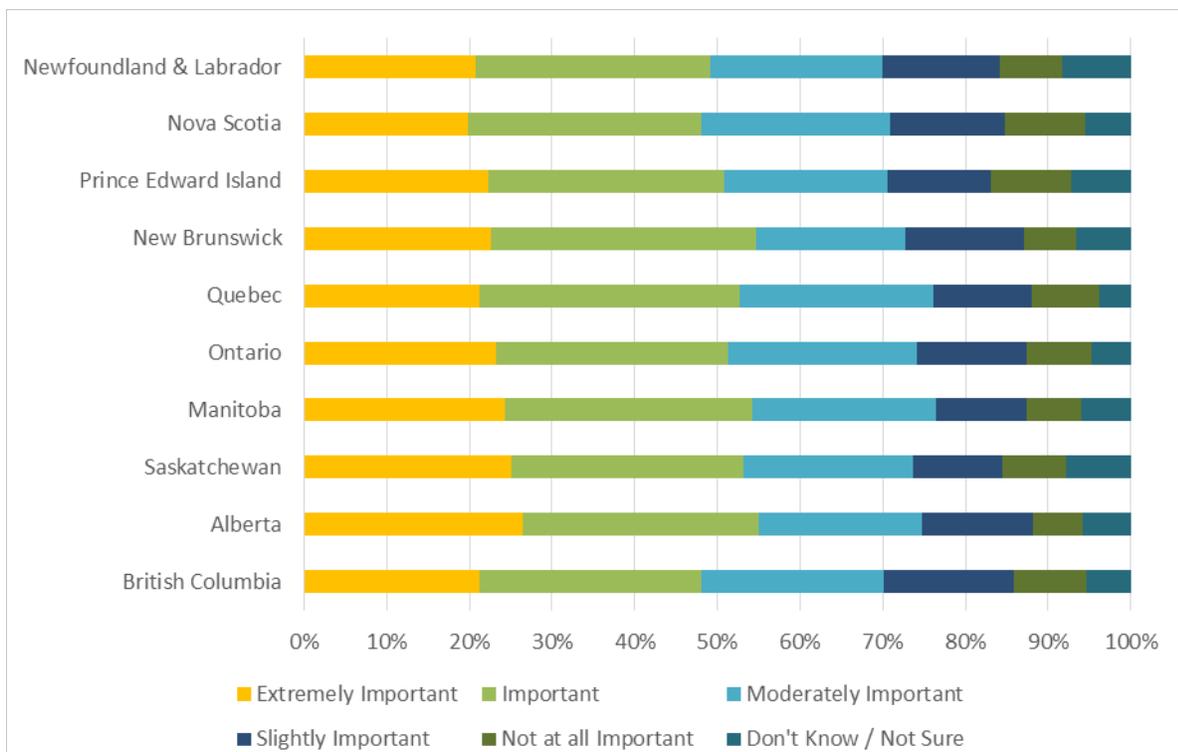


Figure 5-9: I am concerned about EV technology (e.g. battery durability, safety; by Province)

Evolution of Canadian Attitudes on Electric Vehicles

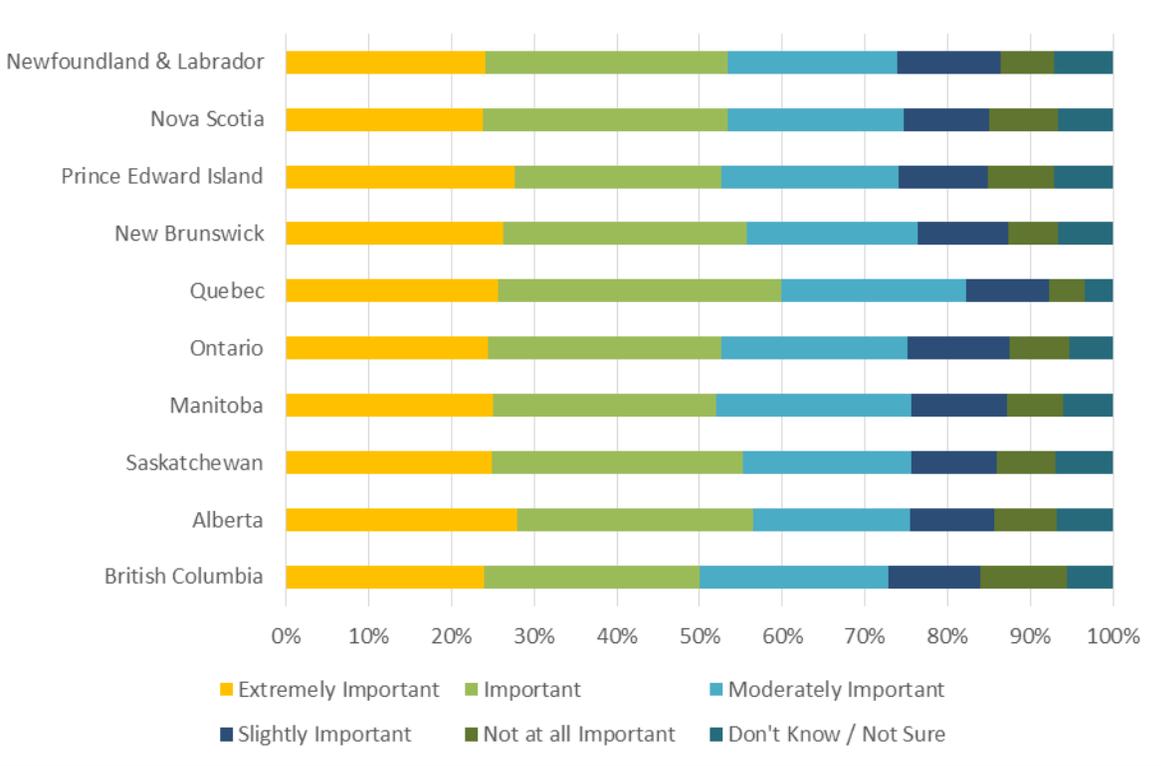


Figure 5-10: I am concerned about the time required for an EV to pay off (by Province)

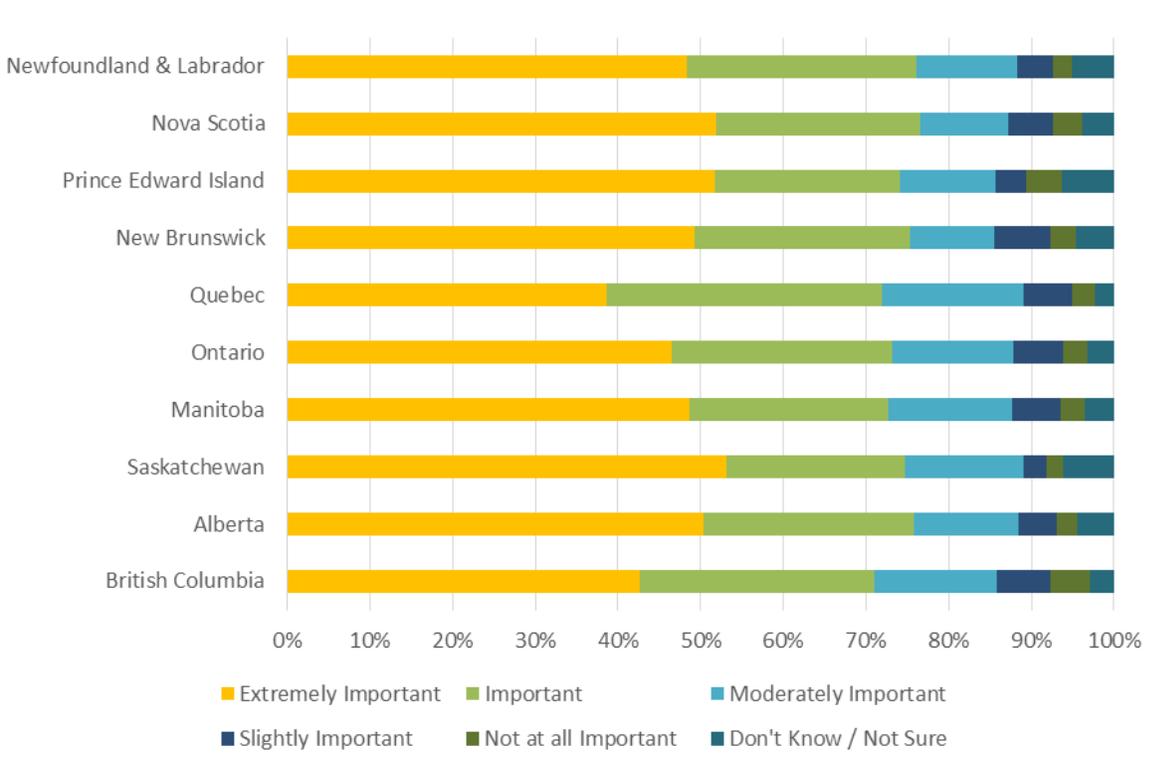


Figure 5-11: A charging station may not be nearby when I really need to charge (by Province)

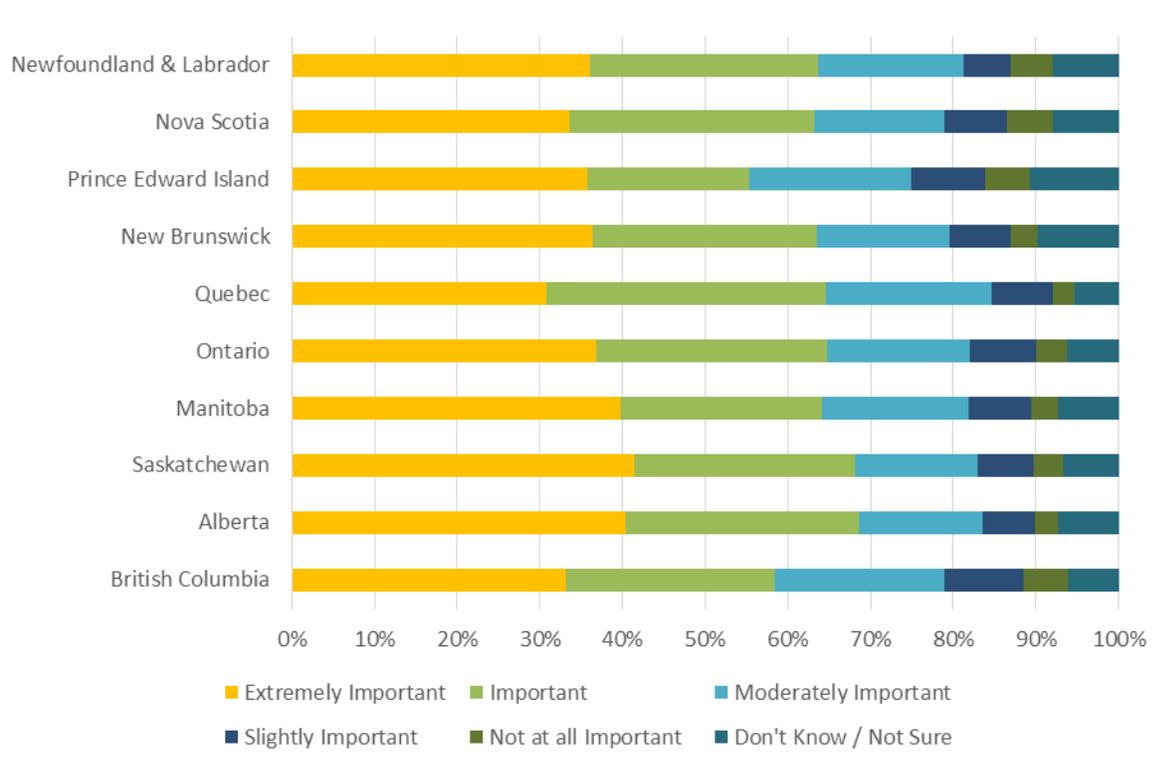


Figure 5-12: Public charging is much slower than filling my tank (by Province)

5.2. By Census Metropolitan Area

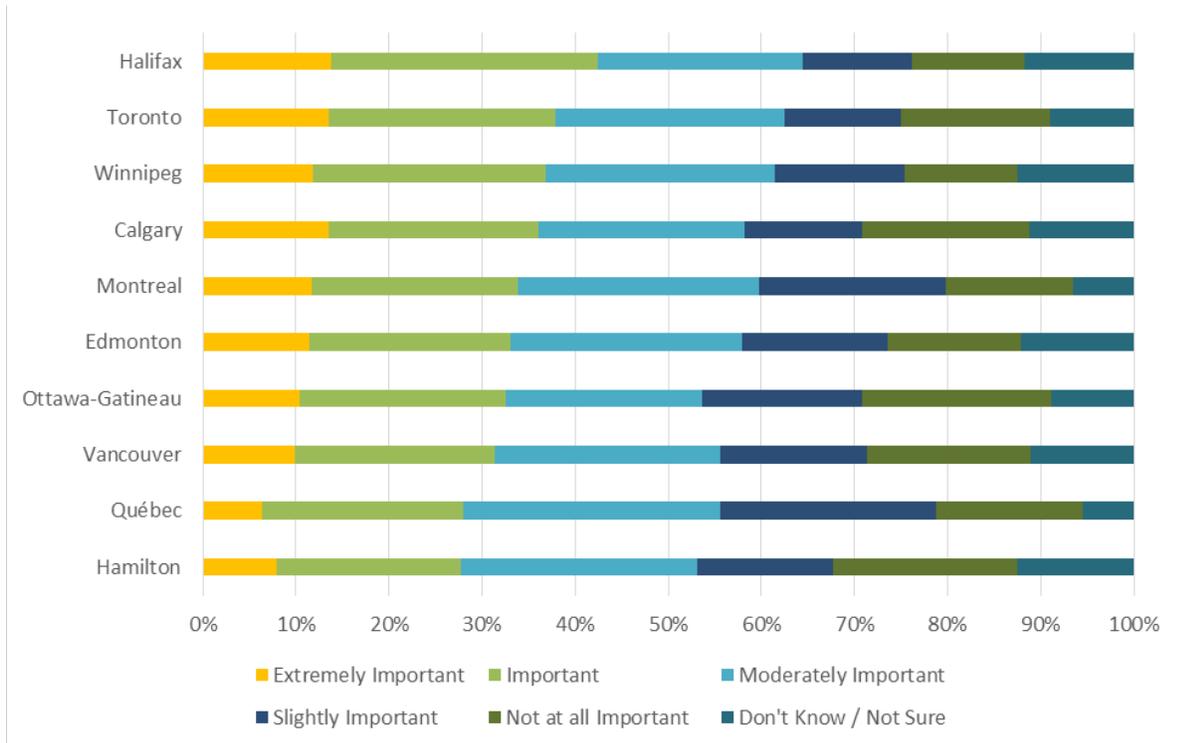


Figure 5-13: There is a lack of marketing on EVs (by Census Metropolitan Area)

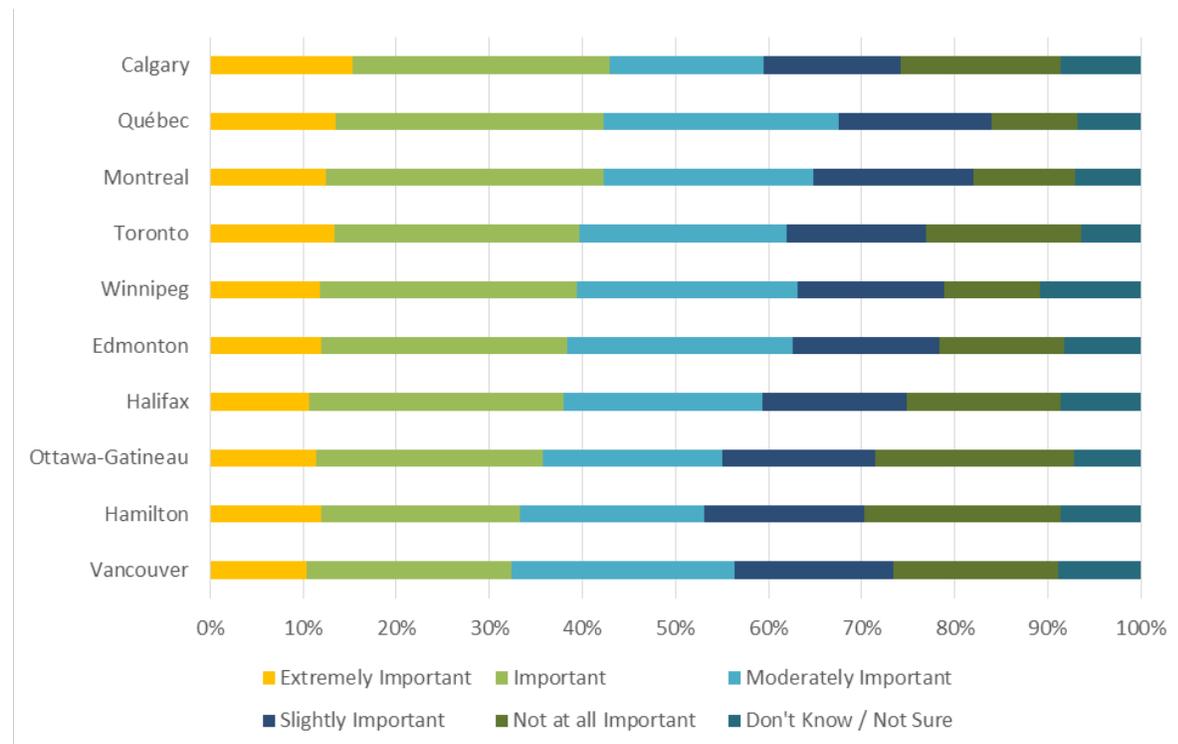


Figure 5-14: I am worried about EV resale value (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

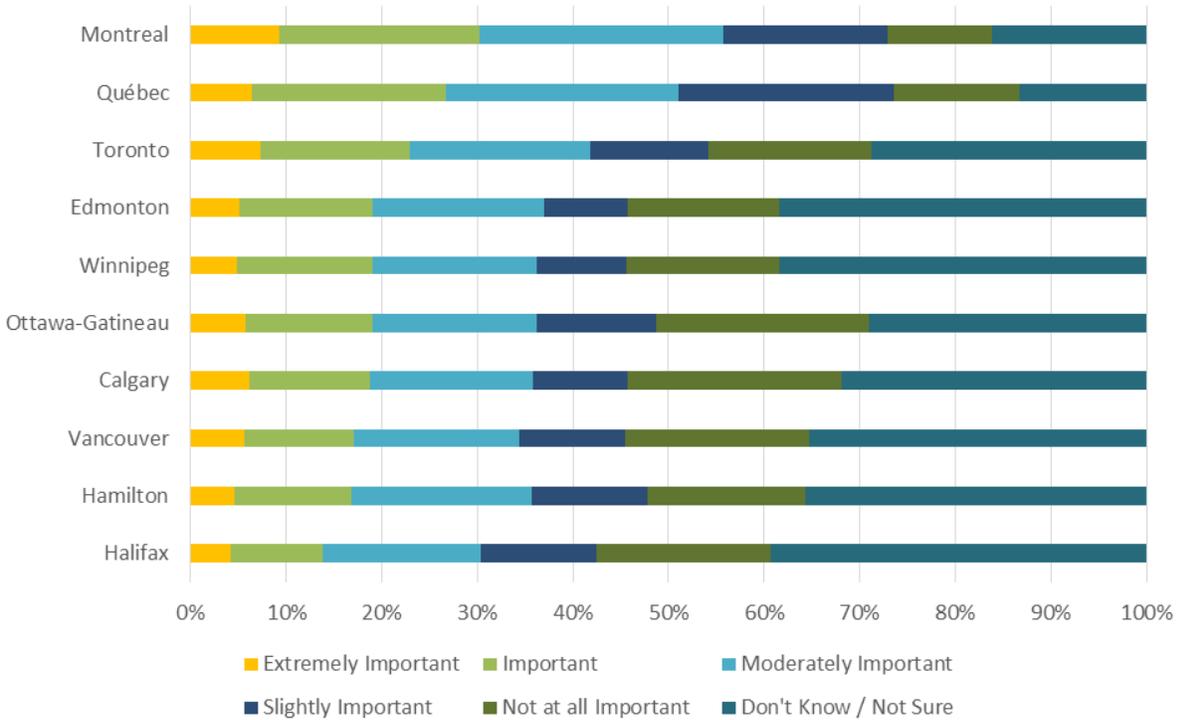


Figure 5-15: I find that dealers steer me away from EVs (by Census Metropolitan Area)

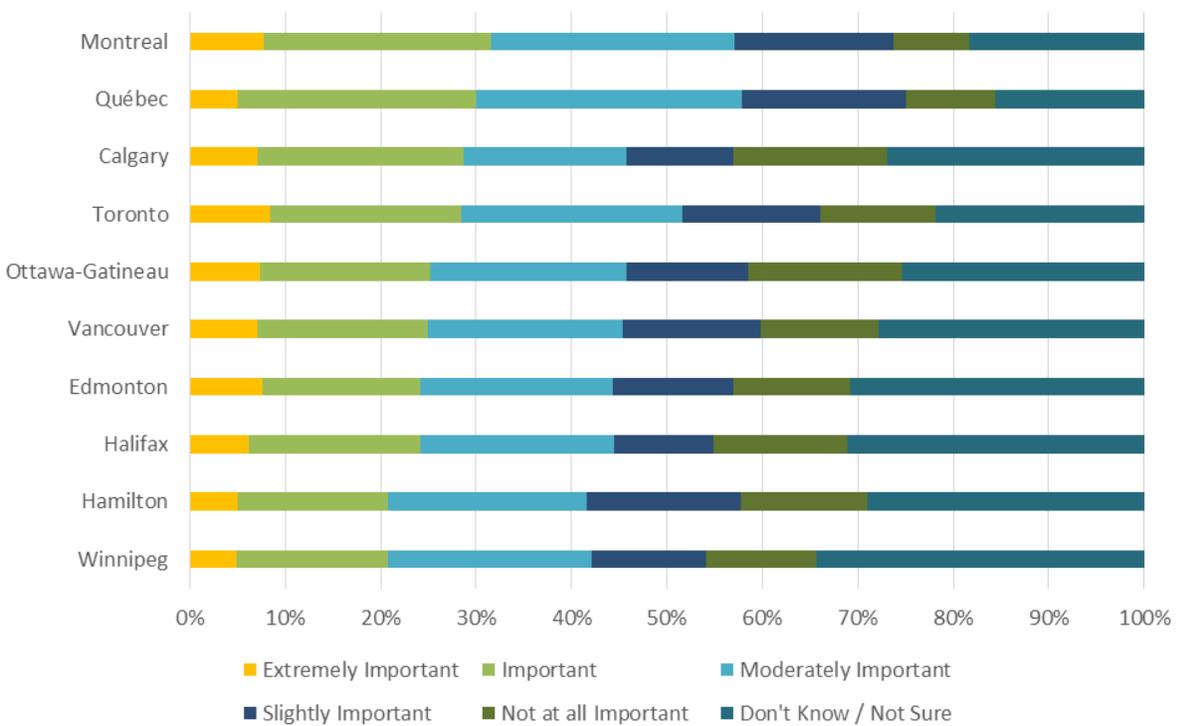


Figure 5-16: The purchase experience for an EV (initial inquiry to delivery) is more difficult (by Census Metropolitan Area)

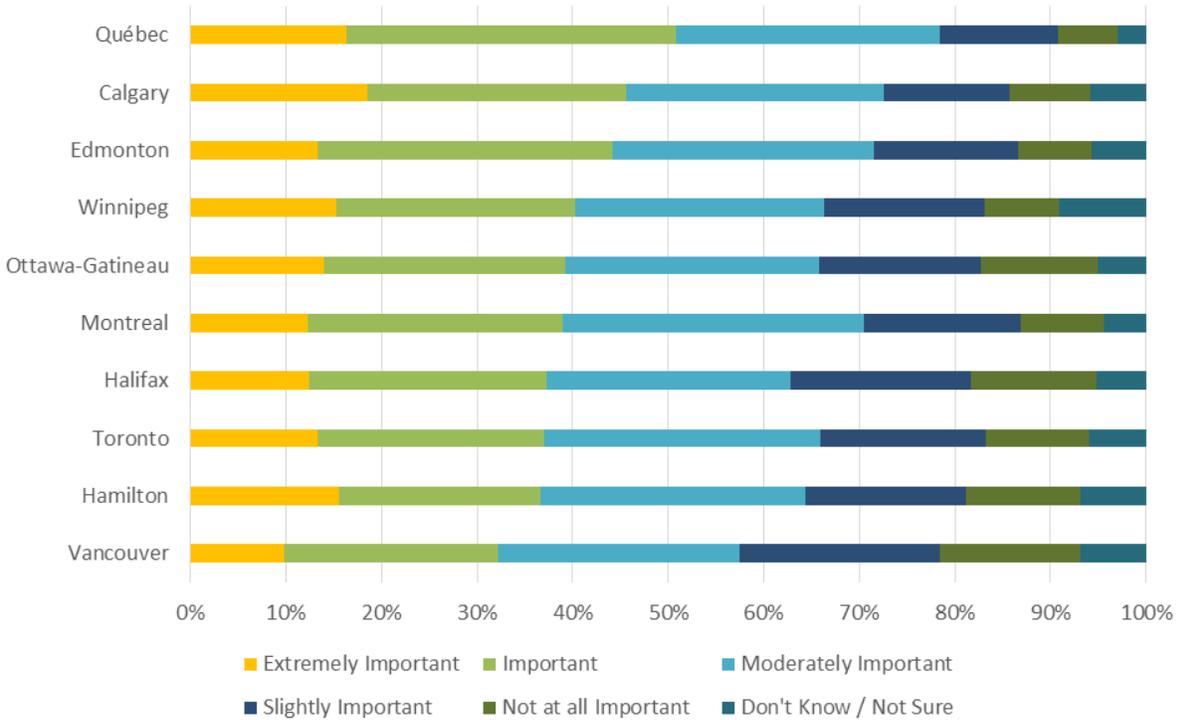


Figure 5-17: I am content with conventional ICE vehicles (by Census Metropolitan Area)

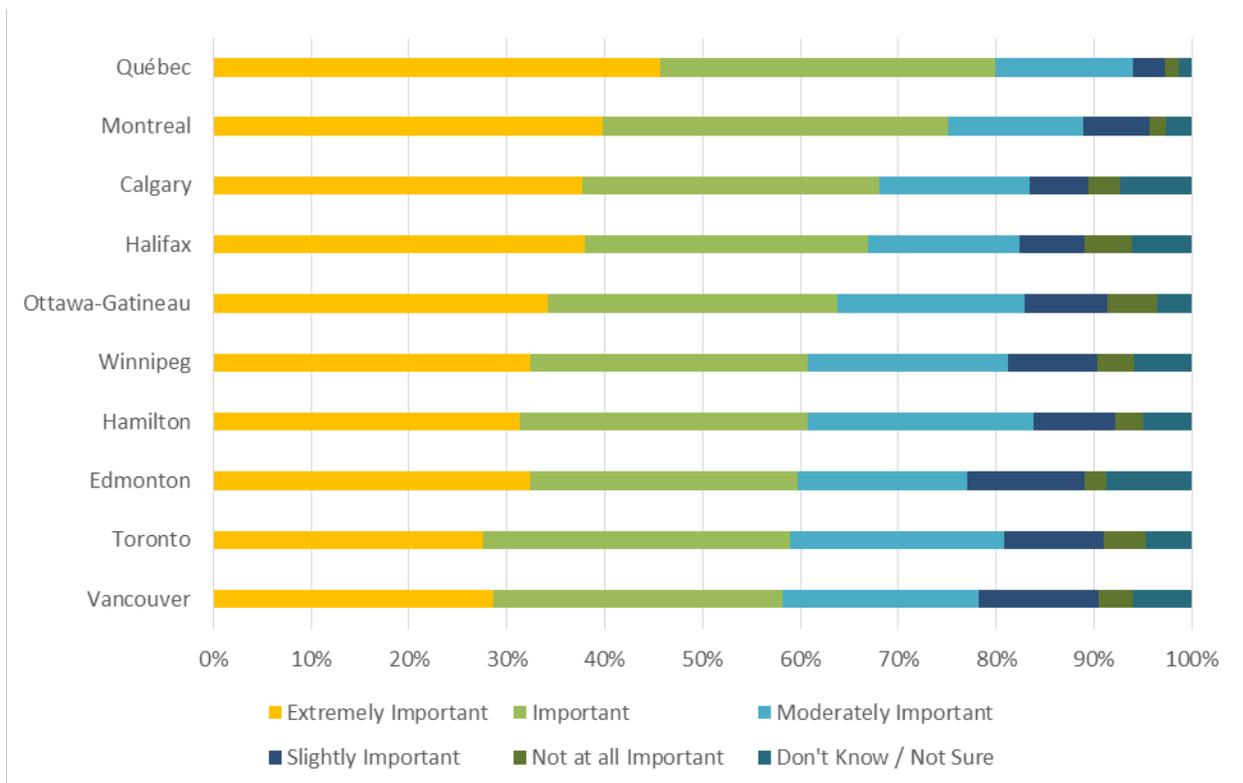


Figure 5-18: EVs just cost too much to buy (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

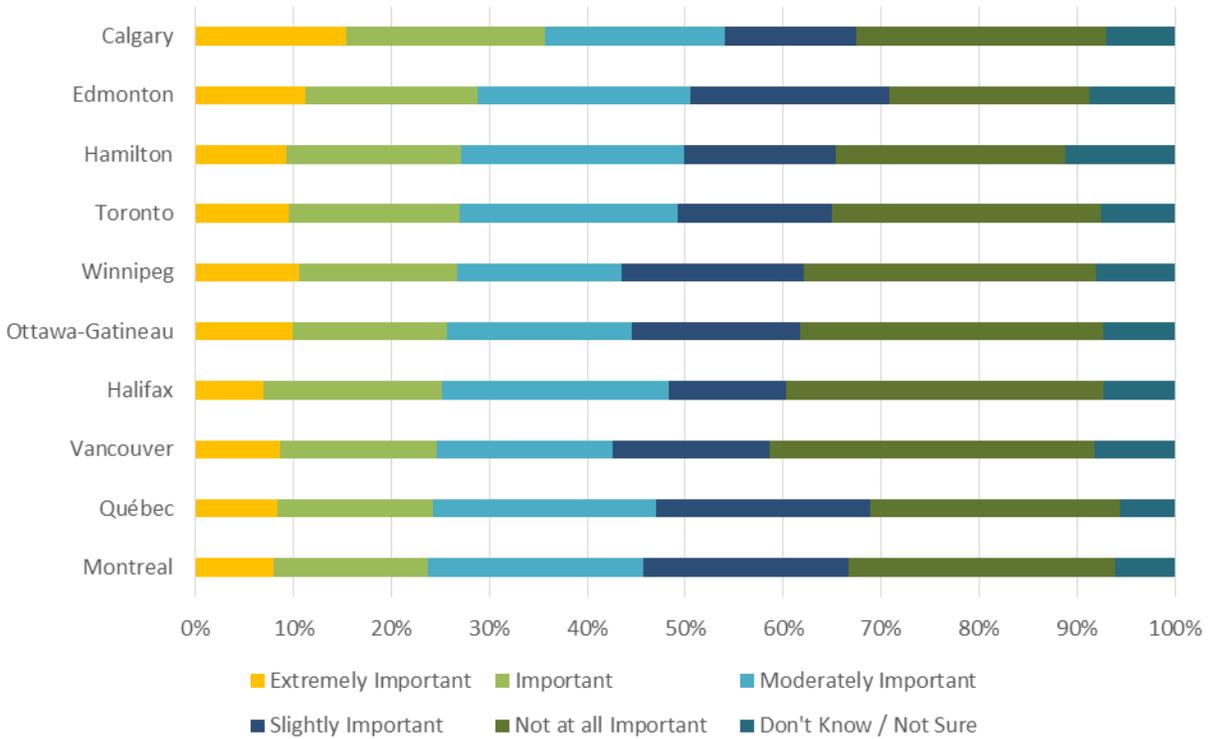


Figure 5-19: I prefer larger vehicles that do not come as EVs (by Census Metropolitan Area)

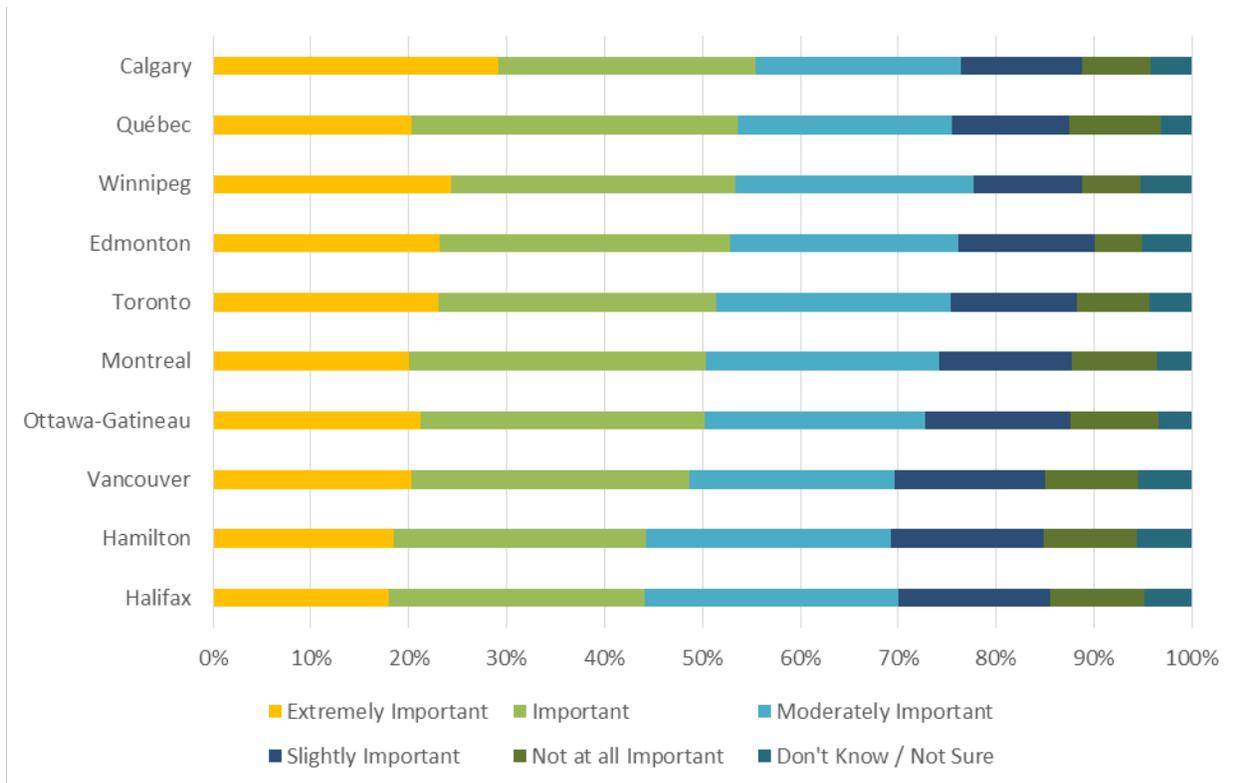


Figure 5-20: I am concerned about EV technology (e.g. battery durability, safety; by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

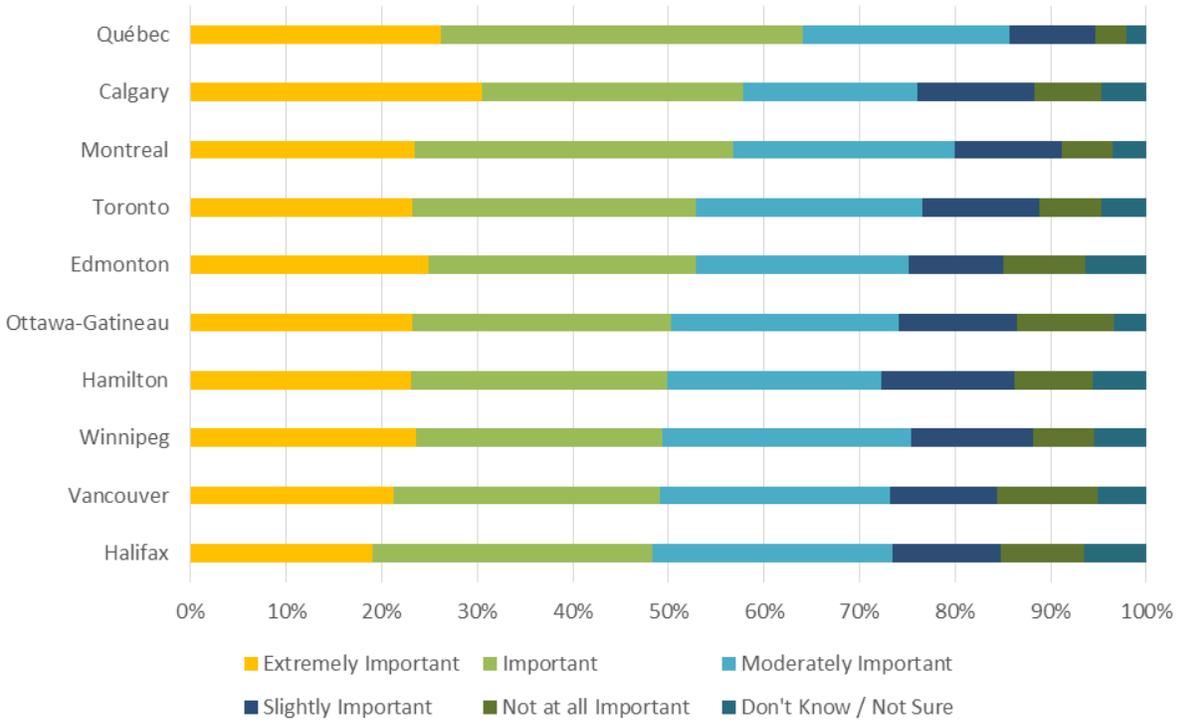


Figure 5-21: I am concerned about the time required for an EV to pay off (by Census Metropolitan Area)

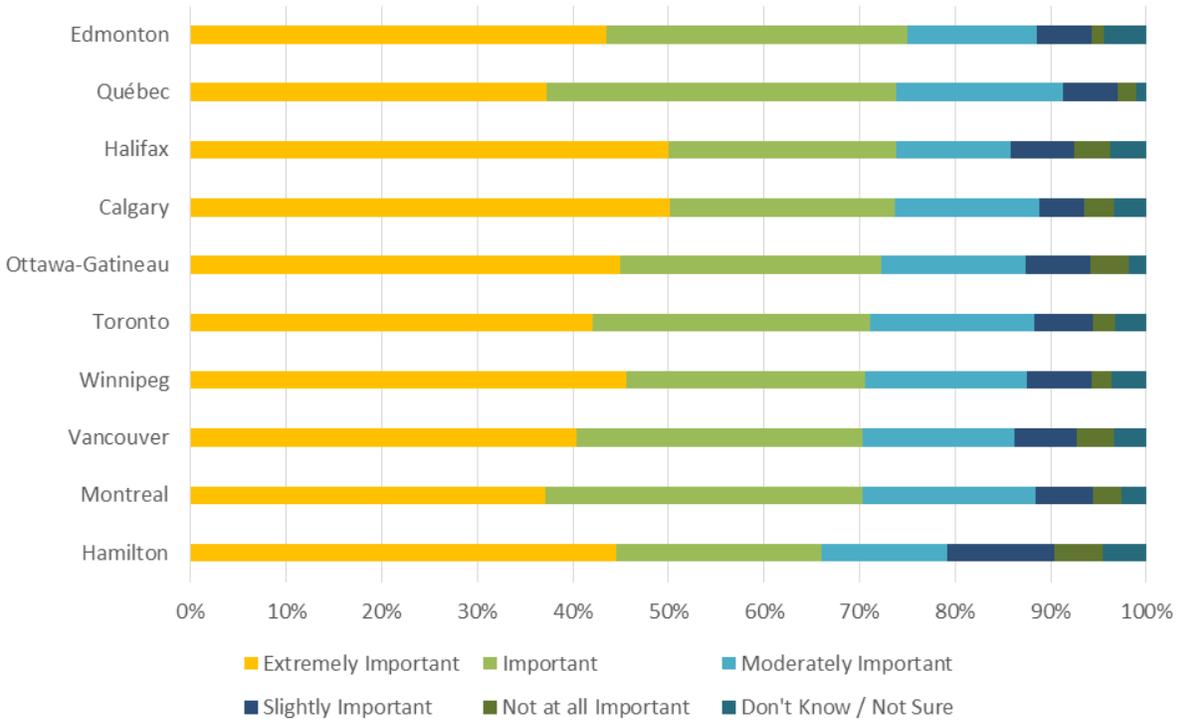


Figure 5-22: A charging station may not be nearby when I really need to charge (by Census Metropolitan Area)

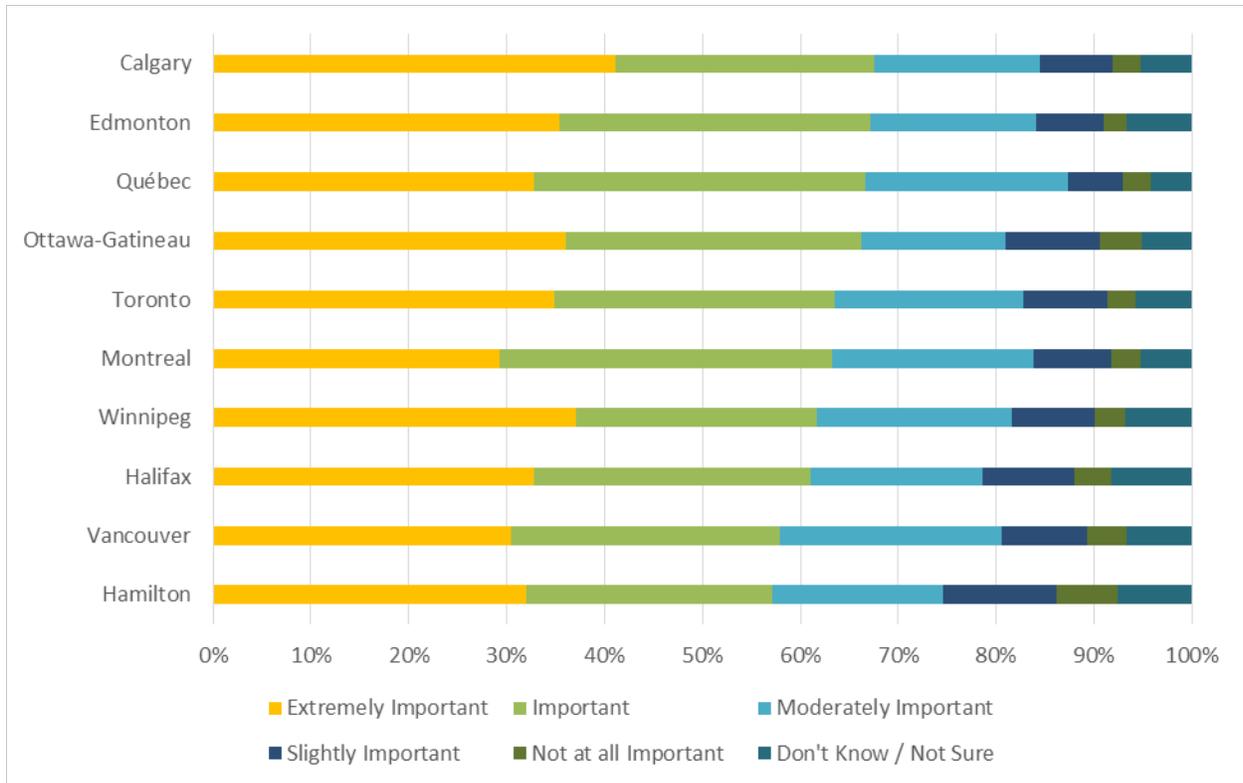


Figure 5-23: Public charging is much slower than filling my tank (by Census Metropolitan Area)

5.3. By Urban-Rural Index

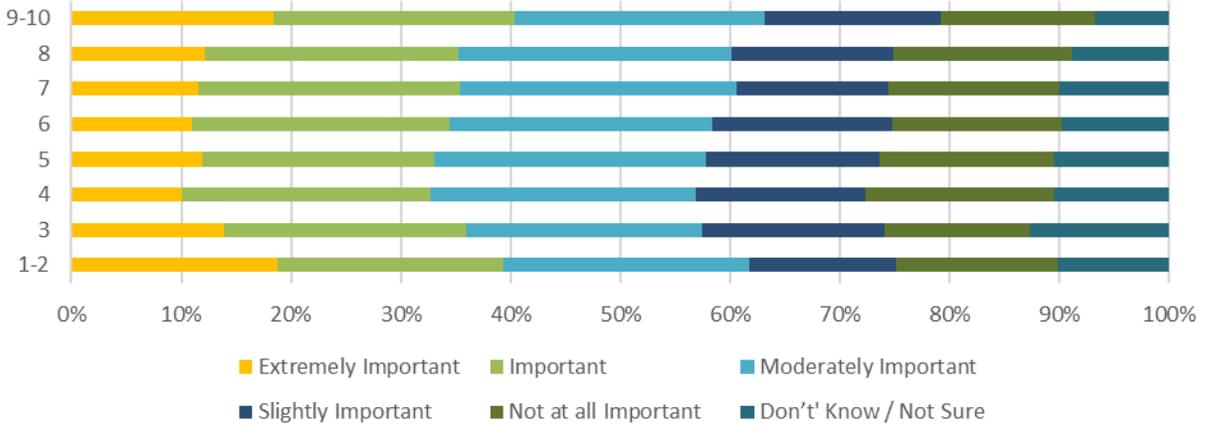


Figure 5-24: There is a lack of marketing on EVs (by Urban-Rural Index)

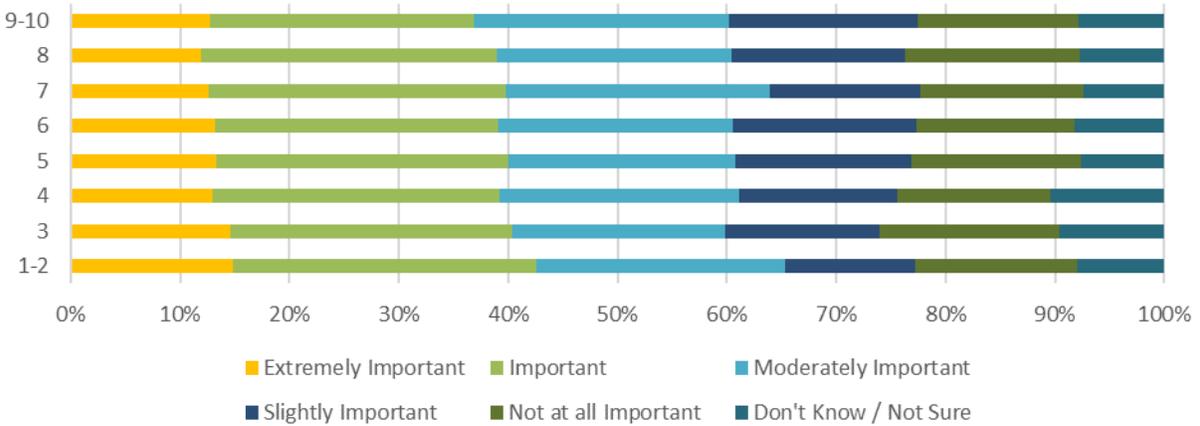


Figure 5-25: I am worried about EV resale value (by Urban-Rural Index)

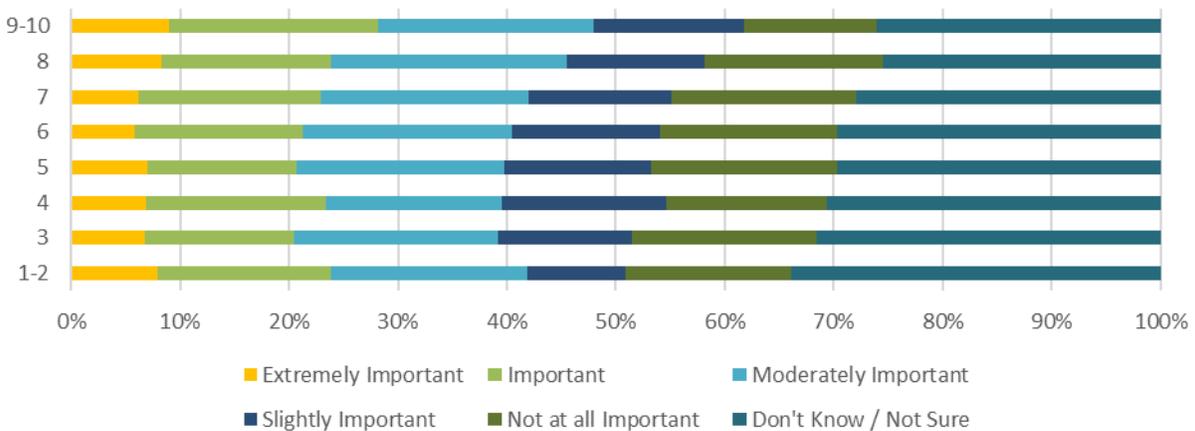


Figure 5-26: I find that dealers steer me away from EVs (by Urban-Rural Index)

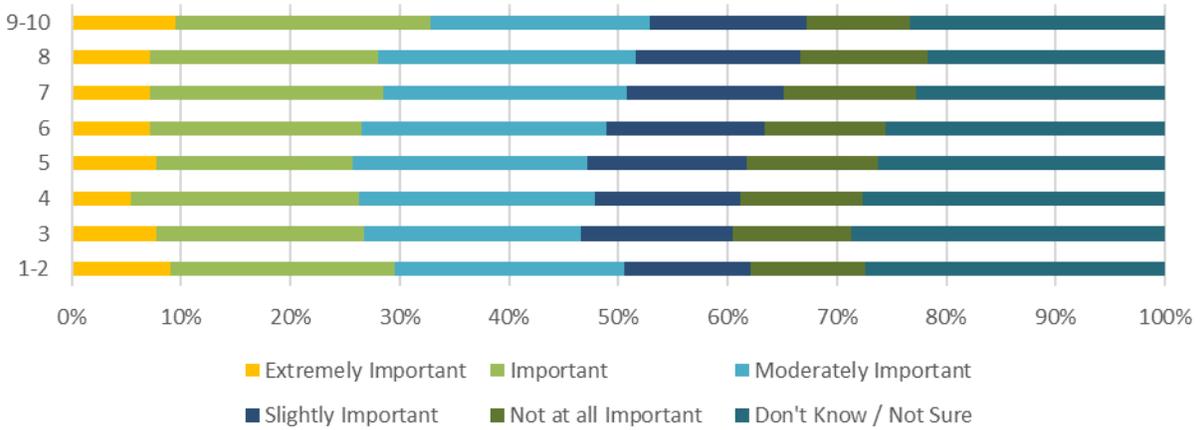


Figure 5-27: The purchase experience for an EV (initial inquiry to delivery) is more difficult (by Urban-Rural Index)

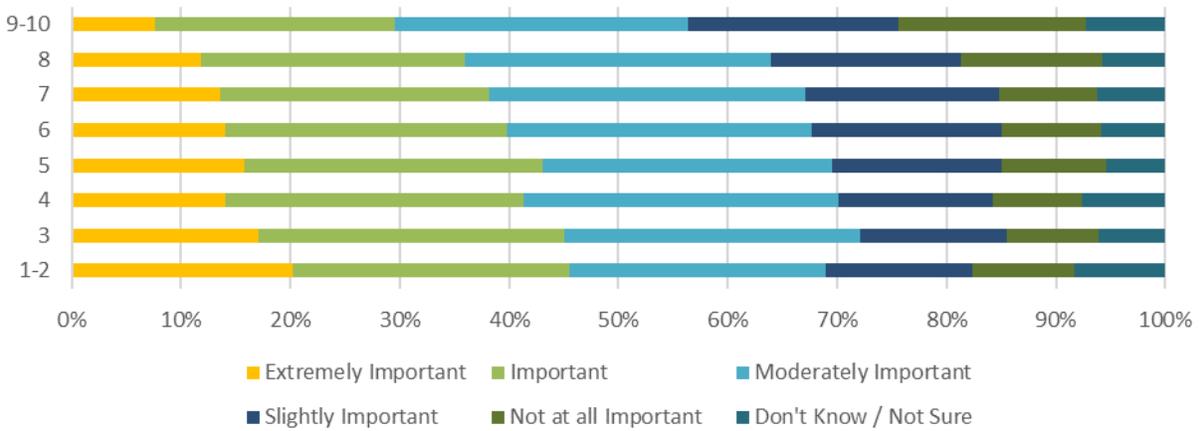


Figure 5-28: I am content with conventional ICE vehicles (by Urban-Rural Index)

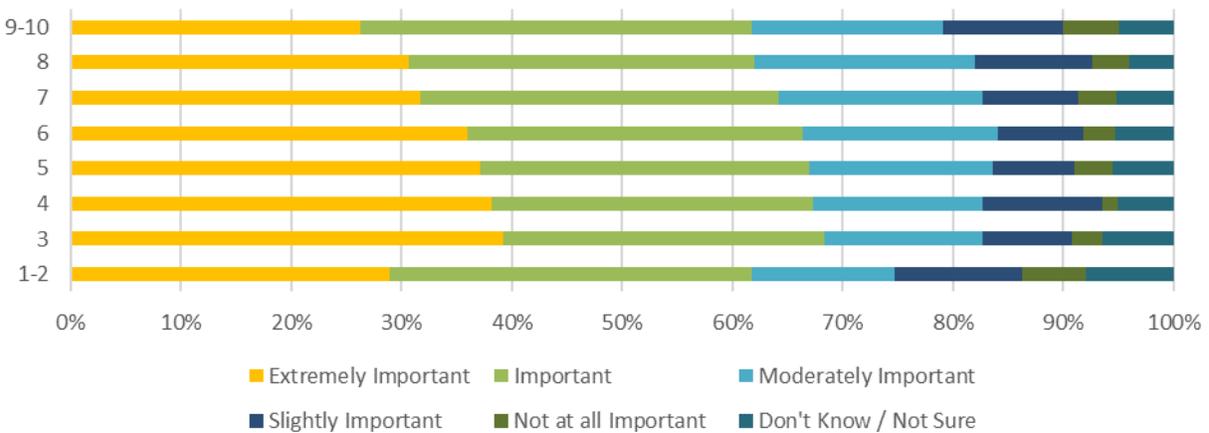


Figure 5-29: EVs just cost too much to buy (by Urban-Rural Index)

Evolution of Canadian Attitudes on Electric Vehicles

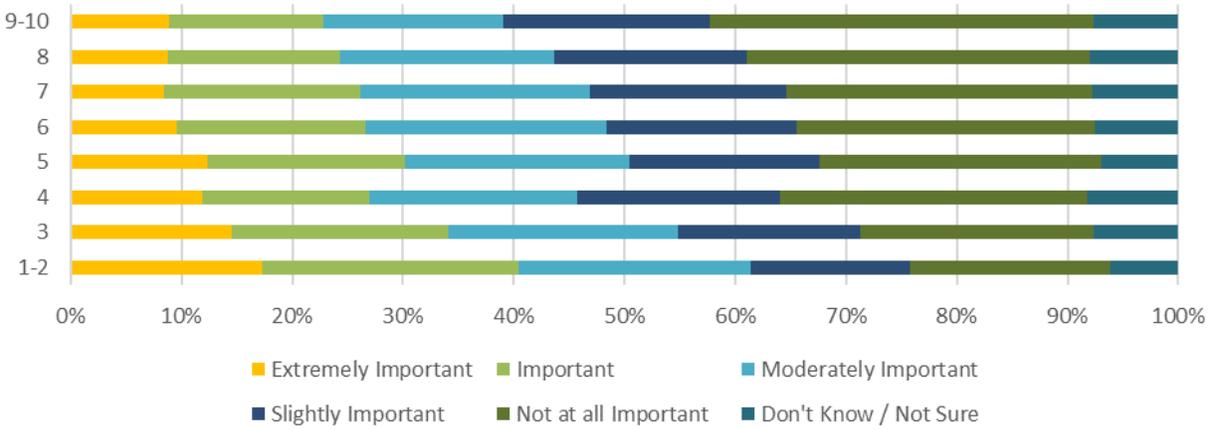


Figure 5-30: I prefer larger vehicles that do not come as EVs (by Urban-Rural Index)

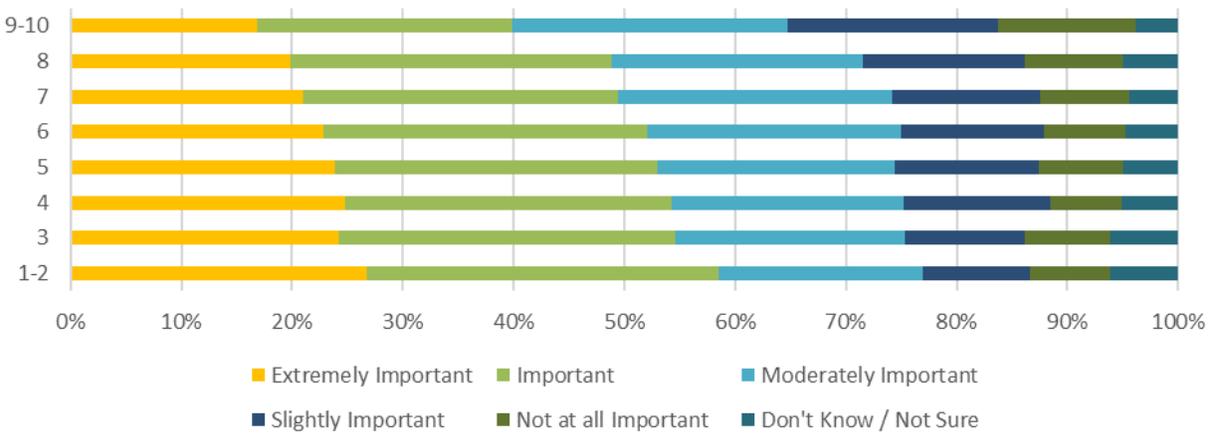


Figure 5-31: I am concerned about EV technology (e.g. battery durability, safety; by Urban-Rural Index)

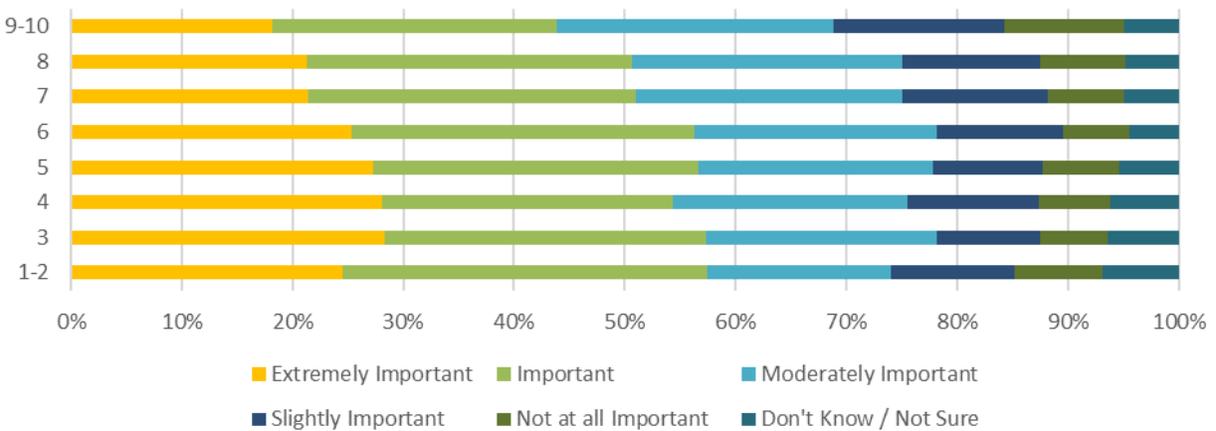


Figure 5-32: I am concerned about the time required for an EV to pay off (by Urban-Rural Index)

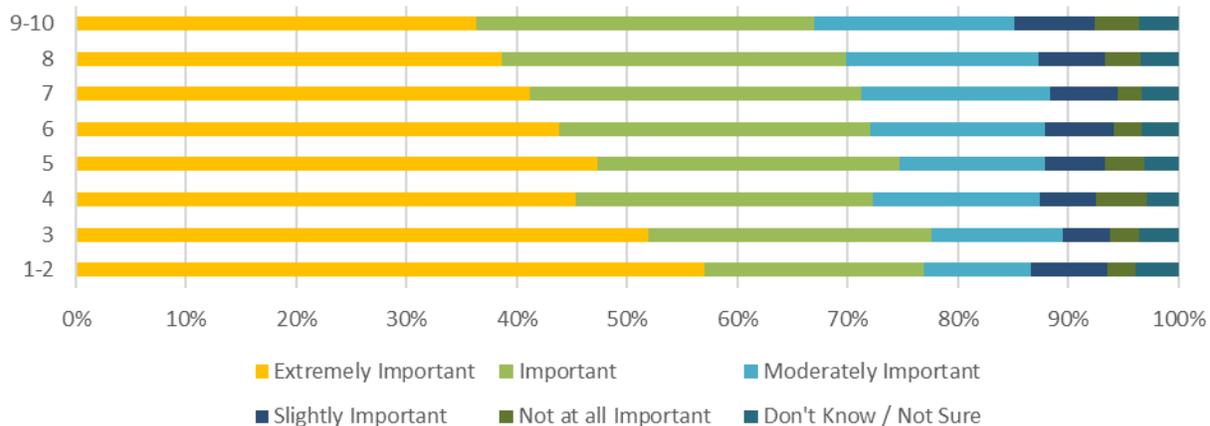


Figure 5-33: A charging station may not be nearby when I really need to charge (by Urban-Rural Index)

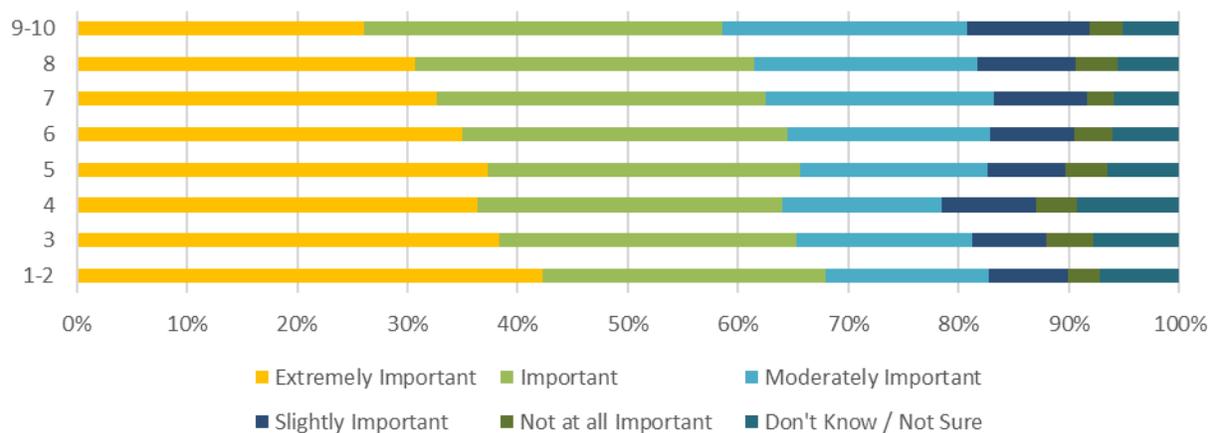


Figure 5-34: Public charging is much slower than filling my tank (by Urban-Rural Index)

5.4. By Age Groups

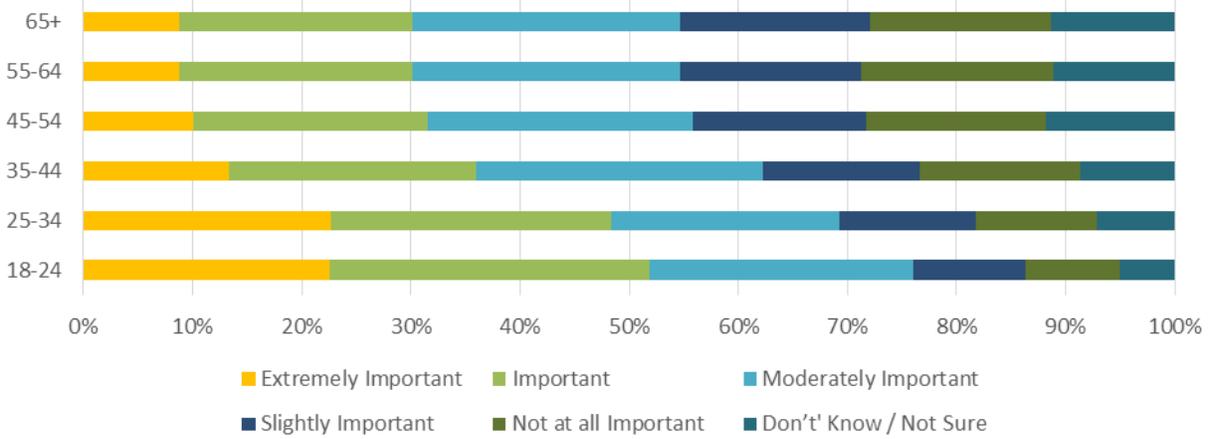


Figure: 5-35 There is a lack of marketing on EVs (by Age)

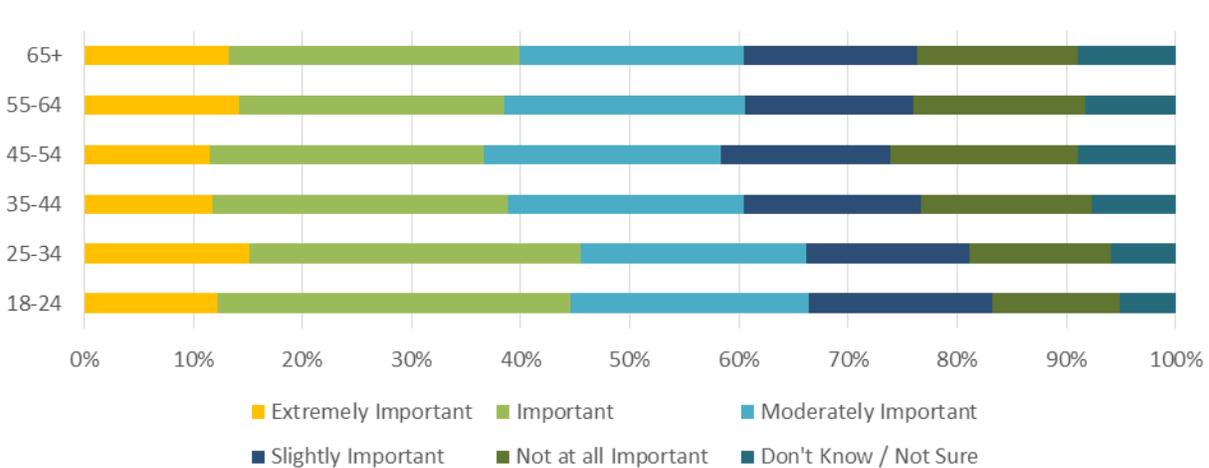


Figure 5-36: I am worried about EV resale value (by Age)

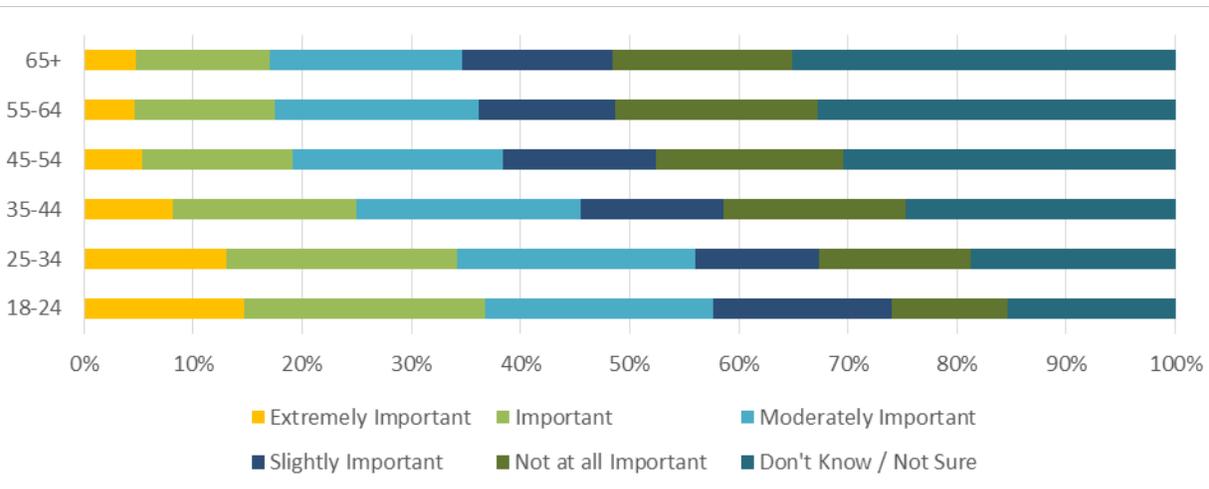


Figure 5-37: I find that dealers steer me away from EVs (by Age)

Evolution of Canadian Attitudes on Electric Vehicles

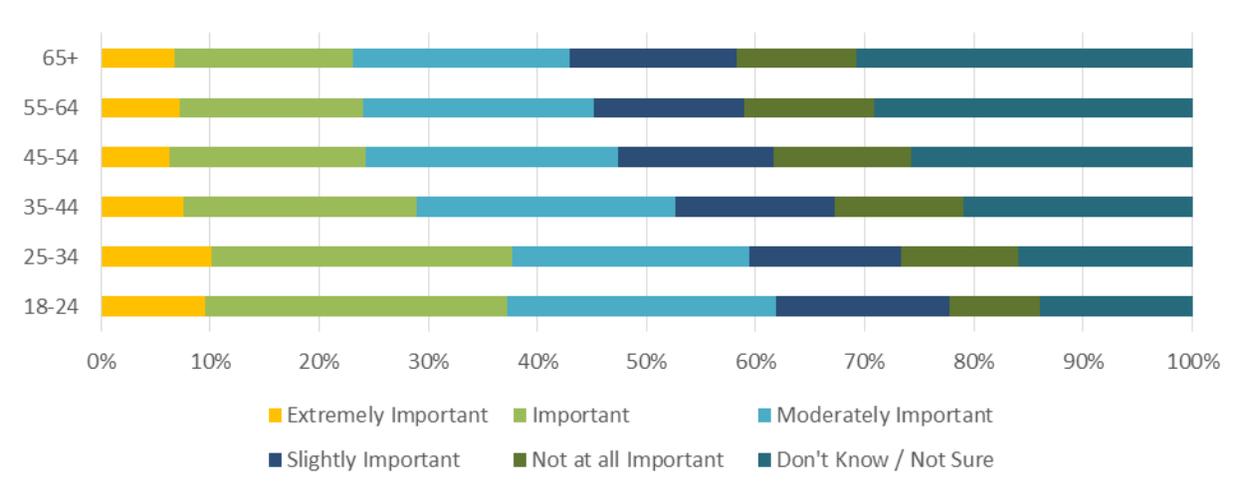


Figure 5-38: The purchase experience for an EV (initial inquiry to delivery) is more difficult (by Age)

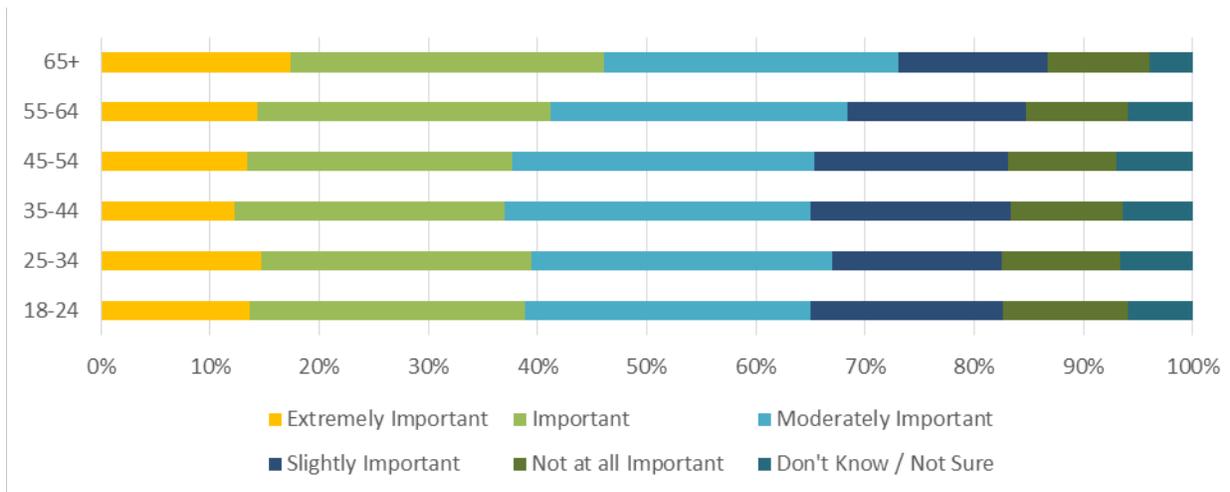


Figure 5-39 : I am content with conventional ICE vehicles (by Age)

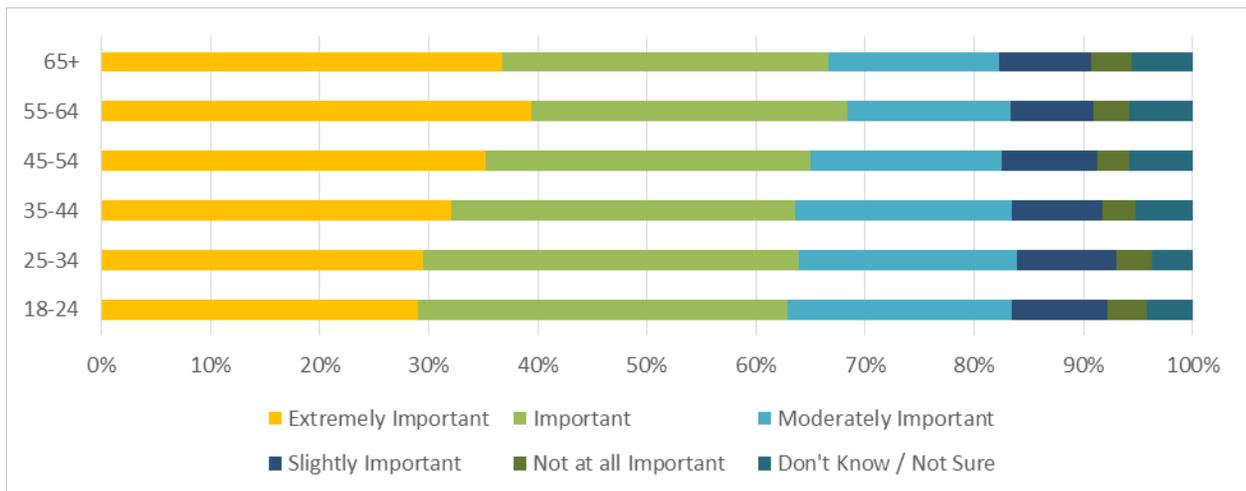


Figure 5-40: EVs just cost too much to buy (by Age)

Evolution of Canadian Attitudes on Electric Vehicles

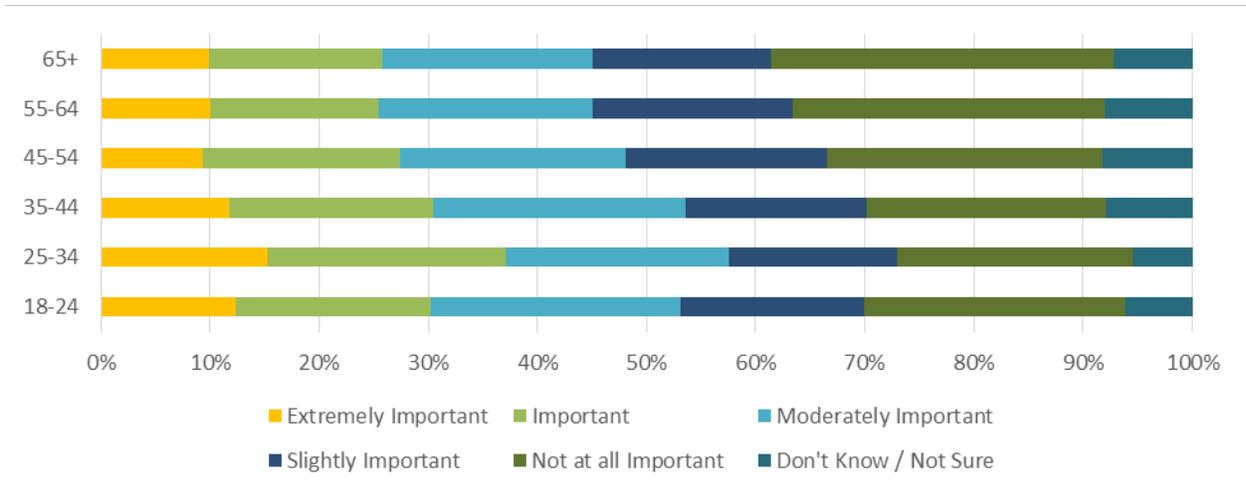


Figure 5-41: I prefer larger vehicles that do not come as EVs (by Age)

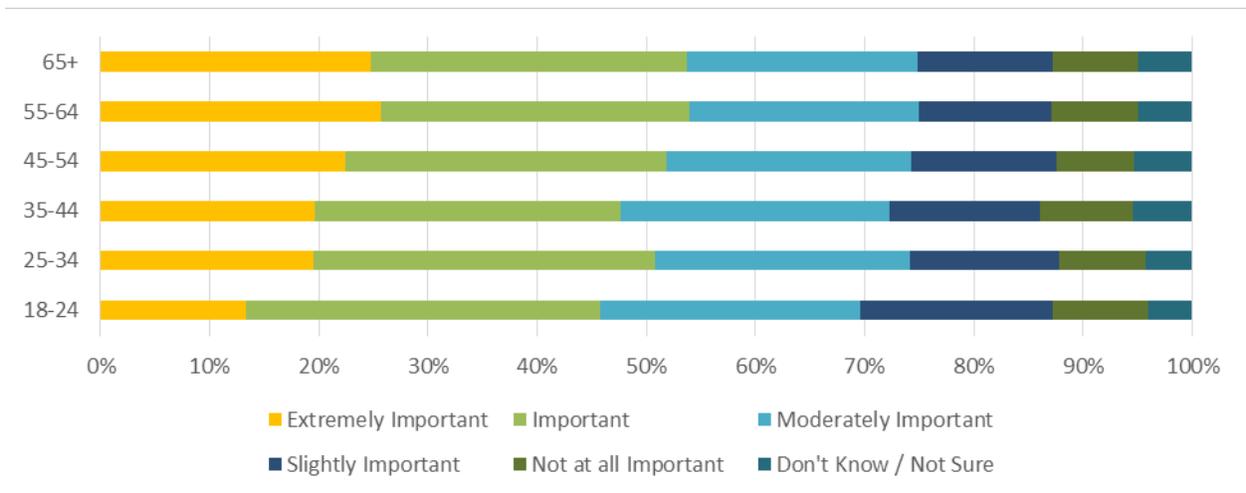


Figure 5-42: I am concerned about EV technology (e.g. battery durability, safety; by Age)

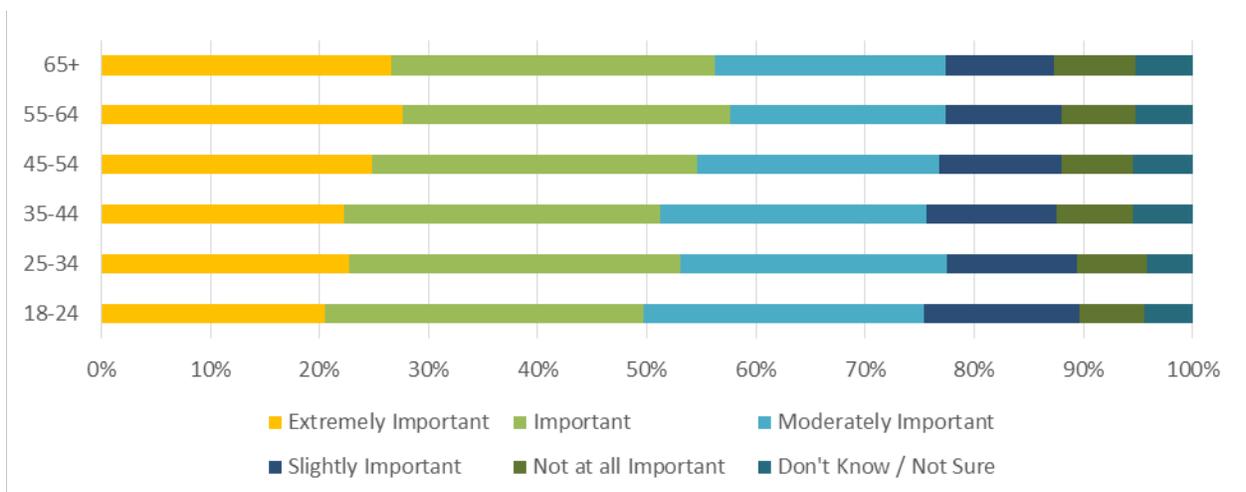


Figure 5-43: I am concerned about the time required for an EV to pay off (by Age)

Evolution of Canadian Attitudes on Electric Vehicles

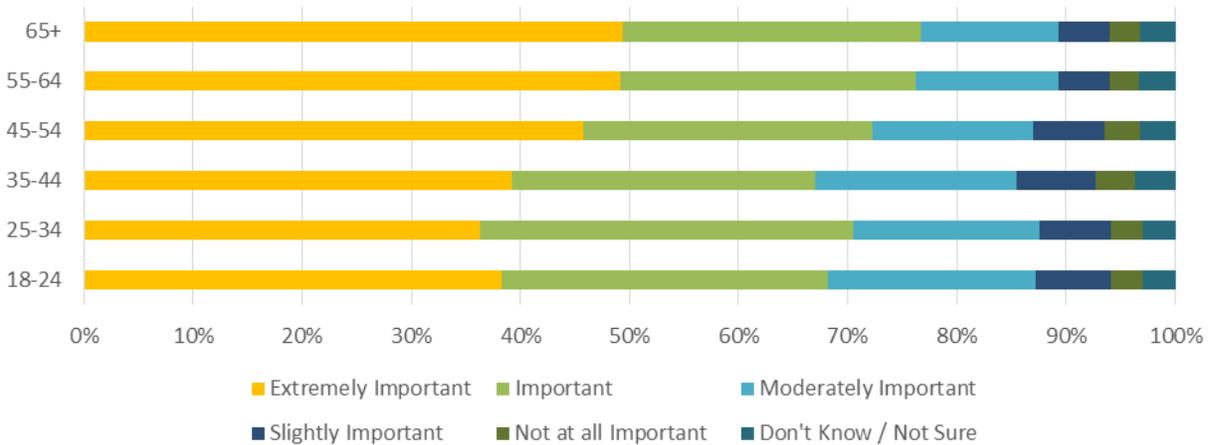


Figure 5-44: A charging station may not be nearby when I really need to charge (by Age)

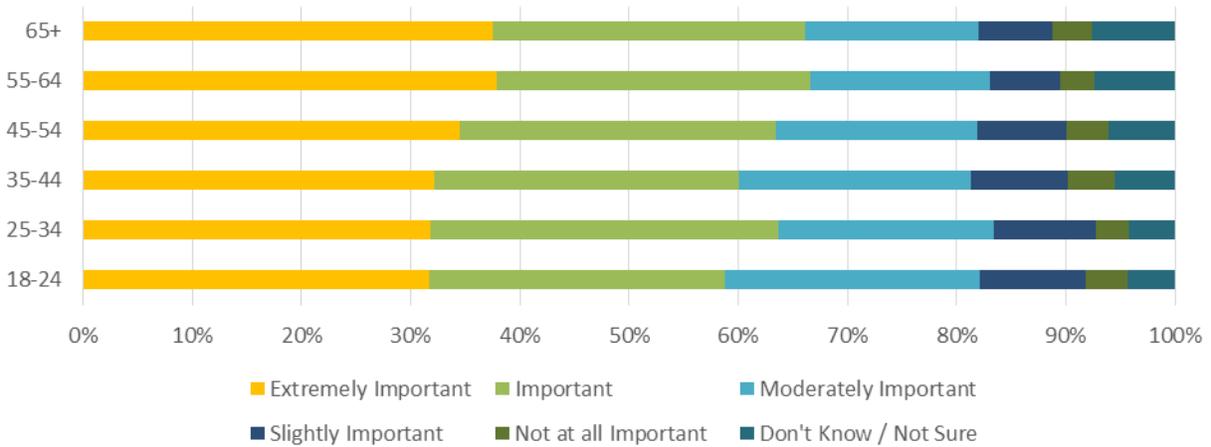


Figure 5-45: Public charging is much slower than filling my tank (by Age)

5.5. Summary of Results

The most commonly discussed barriers to EV adoption in the academic literature relate to their higher initial purchase price, limited driving range, as well as the lack of accessible public charging infrastructure. These barriers may be the most important, but they are by no means the only barriers facing potential EV adopters. Each of the 11 potential barriers respondents were asked to rate in terms of importance are explored in further detail below.

For the barrier **“A charging station may not be nearby when I really need to charge”**:

- The perceived lack of public charging infrastructure was the most significant barrier when categorized by census metropolitan areas, urban-rural index and age of the respondent.
- Provincially, this barrier is most important to respondents from Atlantic Canada (Newfoundland and Labrador, PEI, Nova Scotia, and New Brunswick, respectively) where existing public charging infrastructure is limited.
- Respondents lower on the urban-rural hierarchy saw worry about charging stations being a more significant barrier than their more urbanized counterparts.
- Similarly, the importance of charging infrastructure was significant across all age cohorts however, there was a correlation between increasing importance of nearby charging and increasing age of the respondent.

For the barrier **“EVs just cost too much”**:

- The purchase price of EVs was one of the most significant barriers among all segmentations and was the most important provincially, with Quebec, Nova Scotia, New Brunswick, and PEI rating the importance of cost the highest.
- Interestingly, despite the existence of purchase incentives for EVs in Quebec, purchase price was seen by the largest share as a barrier relative to other provinces. Ontario, Manitoba, Newfoundland and Labrador, and Saskatchewan, all ranked the importance of cost fairly equally despite Ontario having the highest EV subsidies in the country.
- The cost of EVs tends to be a more important barrier for rural respondents when compared to urban respondents however, the most remote respondents showed a significant decrease in their perceived level of importance of EV purchase price, possibly indicating a lower price sensitivity for vehicle purchases.

- The price premium of EVs was more important to older respondents than younger ones however, the 65+ age cohort showed a reduction in importance compared to the previous age cohort, potentially due to an increase in disposable income at retirement age.

For the barrier **“Public charging is much slower than filling my tank”**:

- The speed at which an EV can charge relative to an ICE vehicle was among the most important barriers when categorized by census metropolitan areas and by urban-rural index.
- Calgary, Edmonton, and Winnipeg had the greatest number of respondents rate the importance of charging time as “extremely important”, while Hamilton and Vancouver had comparatively fewer of those responses.
- Rural respondents comparatively rated the importance of longer charging times for EVs higher than more urban respondents.
- When categorized by province or by age, recharging time is relatively less important than cost or proximity to charging infrastructure, however, it was comparatively more important in Newfoundland and Labrador and PEI than in Quebec and British Columbia, while no clear pattern emerged with respect to age.

For the barrier **“I am concerned about the time required for an EV to pay off”**:

- Provincially, payback period was perceived as being moderately important relative to the other barriers with the greatest level of importance being assigned in Quebec and Alberta and the least in Manitoba and British Columbia.
- Similarly, payback period was comparatively more important to respondents in Quebec City and Calgary than those in Vancouver and Halifax.
- Rural and suburban respondents were much more concerned than urban residents and slightly more concerned than the most remote respondents with the time required for an EV to pay off.
- With respect to age, older respondents generally rated the importance of payback period higher than younger respondents.

For the barrier **“I am concerned about EV technology (e.g., battery durability, safety)”**:

- Provinces with relatively low levels of EV adoption including, Newfoundland and Labrador, Saskatchewan, Alberta, and PEI, rated concerns about EV technology

comparatively higher than provinces with greater levels of adoption, including Ontario, British Columbia, and Quebec.

- The level of importance assigned to concerns about EV technology were comparatively similar to payback period when categorized by census metropolitan areas, urban-rural index, and age of the respondent.
- Edmonton, Winnipeg and Quebec City, had similar levels of concern about EV technology (above 50%) when combining the top two categories of importance while Calgary had the highest levels of concern. Interestingly, the proportion of “extremely important” responses in Quebec City was the same as Vancouver which was among the lowest, only above Hamilton and Halifax.
- Older and more rural residents rate concerns about EV technology higher than younger and more urban respondents.

For the barrier **“I am content with ICE vehicles”**:

- Contentment with conventional ICE vehicle technology was rated as either “important” or “extremely important” by about 45% of respondents in Alberta and Saskatchewan while about 35% of respondents in the neighbouring province of British Columbia felt the same.
- British Columbia and PEI had the largest proportion of “not at all important” responses.
- Interestingly, more than 50% of respondents from Quebec City rated their contentment with ICE vehicles as either “extremely important” or “important”, followed by Calgary and Edmonton respectively.
- Metropolitan areas in Ontario and British Columbia on the other hand had the fewest number of respondents rank their contentment with ICE vehicles as “extremely important” or “important”.
- Generally, older and more rural respondents were more content with ICE technology than younger and more urban respondents.

For the barrier **“There is a lack of marketing on EVs”**:

- Atlantic Canada (where EV adoption is generally quite low) appears to be the most concerned about the lack of EV marketing with at least 40% of respondents in those provinces ranking it as either important or extremely important.

- Limited EV marketing appears to be a barrier in metropolitan areas across Canada, with about 13% of respondents from Halifax, Toronto, and Calgary, all ranking the issue as extremely important. Interestingly, the issue was perceived as being far less important in Hamilton than in Toronto despite their close proximity.
- The lack of EV marketing is most important in both highly remote and strongly urban areas
- There is strong gradient by the age of the respondent. Younger respondents rank EV marketing as being either “important” or “extremely important” far more than the older age cohorts.

For the barrier **“I am worried about EV resale value”**:

- Respondents from British Columbia and Ontario were the least concerned about the resale value of EVs, whereas Quebec was among the highest despite all three provinces providing financial incentives for EVs. Saskatchewan and PEI both assigned similar levels of importance to resale value as Quebec.
- Comparatively, a larger number of respondents in Nova Scotia, PEI, Ontario, and British Columbia rated resale value as “not at all important” than as “extremely important”.
- Differences between metropolitan areas were less pronounced with the highest, and relatively equal, degree of importance being assigned to resale value in Calgary, Quebec City, and Montreal and the least in Vancouver and Hamilton respectively.
- Resale value appears to be a greater concern in more rural areas as compared to more urban areas in Canada.
- A proportionate number of younger and older respondents’ ranked resale value as important, while fewer middle aged respondents perceived this barrier to be an important one.

For the barrier **“I find that dealers steer me away from EVs”**:

- The importance of EV deterrence by salespeople was most pronounced in Quebec, with just under 30% of respondents ranking it as “important” or “extremely important”.
- Respondents in all other provinces rank this issue much lower in importance, but as many as 30-40% of them report that they either “do not know” or are “not sure” of its importance. This suggests that many respondents have likely never undergone the experience of buying an EV and are unaware of this barrier and its potential impacts on vehicle purchasing decisions.

- Montreal and Quebec City rated salespeople steering them away from EVs much higher in importance than other metropolitan areas; while Halifax, Hamilton and Vancouver had the highest uncertainty about this potential barrier.
- Deterrence from salespeople appears to affect both rural and urban residence, with urban respondents rating its importance the highest and suburban respondents the least.
- Younger respondents rated this barrier significantly higher in importance than the older respondents, with level of importance decreasing significantly with increasing age.

For the barrier **“The purchase experience for an EV (initial inquiry to delivery) is more difficult”**:

- In terms of the proportion of “extremely important” or “important” ratings, this barrier is comparatively less important.
- What is perhaps most significant is the relatively large number of respondents who report not knowing or being unsure of its importance, reflecting the relatively low number of respondents who have likely previously undergone the purchasing process with an EV.
- Urban and rural respondents ranked this barrier with similar levels of importance with suburban respondents the least concerned with EV purchase experience, however, younger respondents were far more concerned about this than their older counterparts.

For the barrier **“I prefer larger vehicles that do not come as EVs”**:

- Respondents in the Prairie Provinces along with New Brunswick ranked the importance of larger vehicles that do not come as EVs higher relative to respondents in the other provinces.
- The metropolitan areas valuing larger vehicle types the most are Calgary, Edmonton, Hamilton, and Toronto, respectively.
- The availability of larger body styles was most important to respondents between the age of 25 and 44 who are most likely to have young children and require a larger vehicle.
- As one would expect, rural residents were more concerned about the lack of EVs with larger body styles (e.g., SUVs and pickup-trucks) than more urban residents who may benefit from driving smaller vehicles.

In line with what was expected, respondents to the 2018 Electric Vehicle Survey placed a great deal of importance on the likely availability of public charging infrastructure when needed, the higher initial purchase price of EVs and the longer time required to recharge an EV as compared to filling a tank with gasoline. However, to a lesser extent, several other barriers rated as

important. When it is considered that many of these barriers may operate concurrently with one another, the overall barrier to adoption for some people to adopt EVs could be seen as very imposing indeed.

Conclusions

There is clear evidence in this report that Canadian consumer attitudes towards electric vehicles (EVs) have been undergoing a positive shift since 2015. The shift appears to be a general one that cuts across age groups, provinces, metropolitan areas, and the levels of the urban-rural hierarchy. Certainly, there are differences in the magnitudes of change when segmented as above, but there is little difference in the directionality of the change, with almost all of it being positive for EVs.

Some of the important findings from the analytics of this reports are as follows:

- It is worth noting at the outset that the demographics of general consumers may differ significantly from those people who have already adopted EVs. So, it is useful to consider the results of this report with “fresh eyes” and without being influenced by pre-conceived notions of how future EV consumers may look.
- As in 2015, there is strong consensus that people are worried about human behaviour and its influence on climate change and those feelings are only growing stronger. There

is some evidence of polarization in that more people disagree in some cases as if they are “digging in their heels” in opposition.

- There have been some strong changes from 2015 in terms of social dynamics relating to clean vehicles. There is evidence that the close peers of respondents are increasingly emphasizing the link between the vehicle purchase decision and the environment. In many metropolitan areas there are strong absolute and relative changes and more than a doubling of some relevant indices. The changes extend to rural areas though not at the same high levels and the changes are particularly prominent among those aged 25-34. Even so, there is change with the older as well.
- While respondents acknowledge that there is more talk of the link between vehicle purchase and the environment, they tend to deny that they feel social pressure to purchase an EV (only 15 - 20% strongly agree with feeling social pressure). Increases in feelings of social pressure about EVs is being felt most strongly in Quebec and its two major metropolitan areas, in younger age groups and near the top of the urban-rural hierarchy (i.e. more urban in nature).
- For many of the attitudes considered, there is a sense that bigger shifts are occurring in younger age cohorts which is all the more impressive considering certain attitudes for this age group were already at stronger levels in 2015. Generally, there is less change in attitudes with older age cohorts and in some cases, there is little change at all from 2015.
- A question about urgency to acquire an EV was specifically posed in 2018 with the level of urgency being classified in five ways. The big story in this regard is that there is a massive divergence in expressed urgency with the younger age cohorts expressing much more that their next vehicle will be electric.
- There are interesting divergences within the Province of Quebec. For example, Quebec City respondents state much less moral commitment (and little changed since 2015) to acquire an EV than residents of Montreal.
- An interesting divergence within the Golden Horseshoe (southcentral Ontario) is the proportion of residents who report knowing where to buy an EV versus knowing public places to plug in an EV. While more Toronto residents are aware of the former, a greater number of Hamilton residents are aware of the latter.
- One of the few aspects where there was a general negative shift in perception was an increasing share of respondents who worried that home charging was not practical for them. Even this could be viewed in a positive light if it is considered that the outcome reflects more thought being given to the topic.

- With regard to barriers as perceived in the 2018 survey, it is fair to say that many of the key barriers are perceived as “bigger stumbling blocks” in outlying non-urban areas (e.g. will a charging station be near when I need it?) and by age segments of the population that are older (e.g. I have concerns about EV technology) and by lagging EV adoption regions that typically have never offered purchase incentives (e.g. Atlantic Canada strongly identifies with the barrier stating a perceived lack of marketing on EVs).
- Vehicle supply-oriented barriers relating to expected problems with the EV purchase process or relating to potential actions of dealers to steer buyers away from EVs are not perceived by the typical respondent as being the most important barriers. More research is required to look into these issues as they may have an indirect effect. Since these types of barriers may slow the diffusion of EVs, it can create a cyclical effect wherein fewer consumers see or are exposed to EVs which can dampen interest in them.

Appendix

This Appendix contains a series of figures relating to three main topics that were not discussed in the main body of the report. The figures and their associated segmentations will appear familiar as they follow the same structure as those found in the chapters of the report. The first element, depicted in section 7.1 of the Appendix (figures 7-1 through 7-19), relates to the importance that survey respondents assigned to various vehicle attributes in 2018 and 2015 such as emissions, performance, and fuel economy. The second and third element, depicted in Appendix 7.2 and 7.3, are based on attitudinal statements found only in 2018 that assessed whether people perceived the availability of cash incentives for the purchase of an electric vehicle (EV) from the provincial or federal government depending on the province where they live. The results from all three of these elements are interesting and worth reviewing. The final section of the Appendix (7.4) contains a brief written summary of these results.

7.1. Importance Ratings for Vehicle Attributes

Evolution of Canadian Attitudes on Electric Vehicles

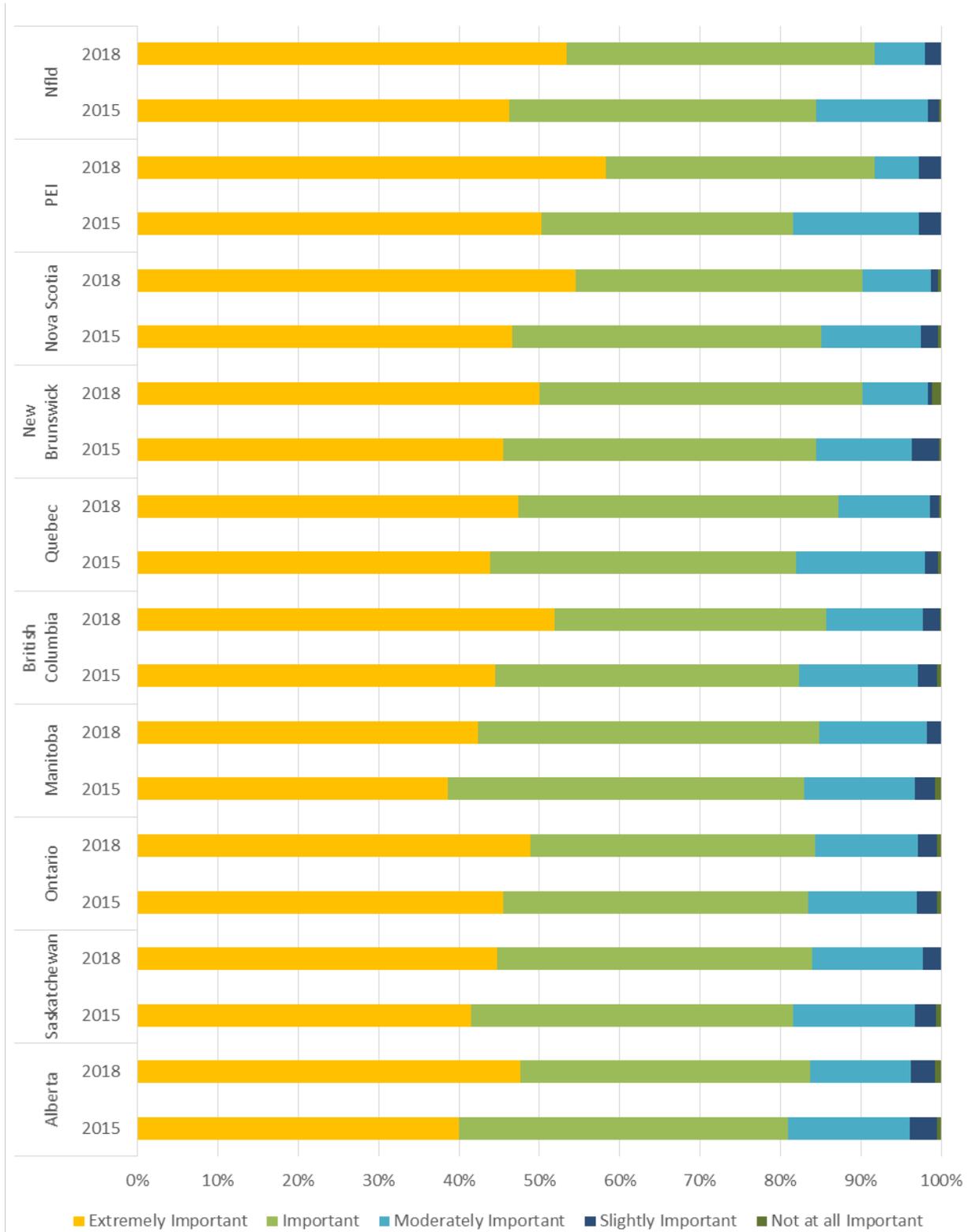


Figure 7-1 Excellent fuel economy (by Province)

Evolution of Canadian Attitudes on Electric Vehicles

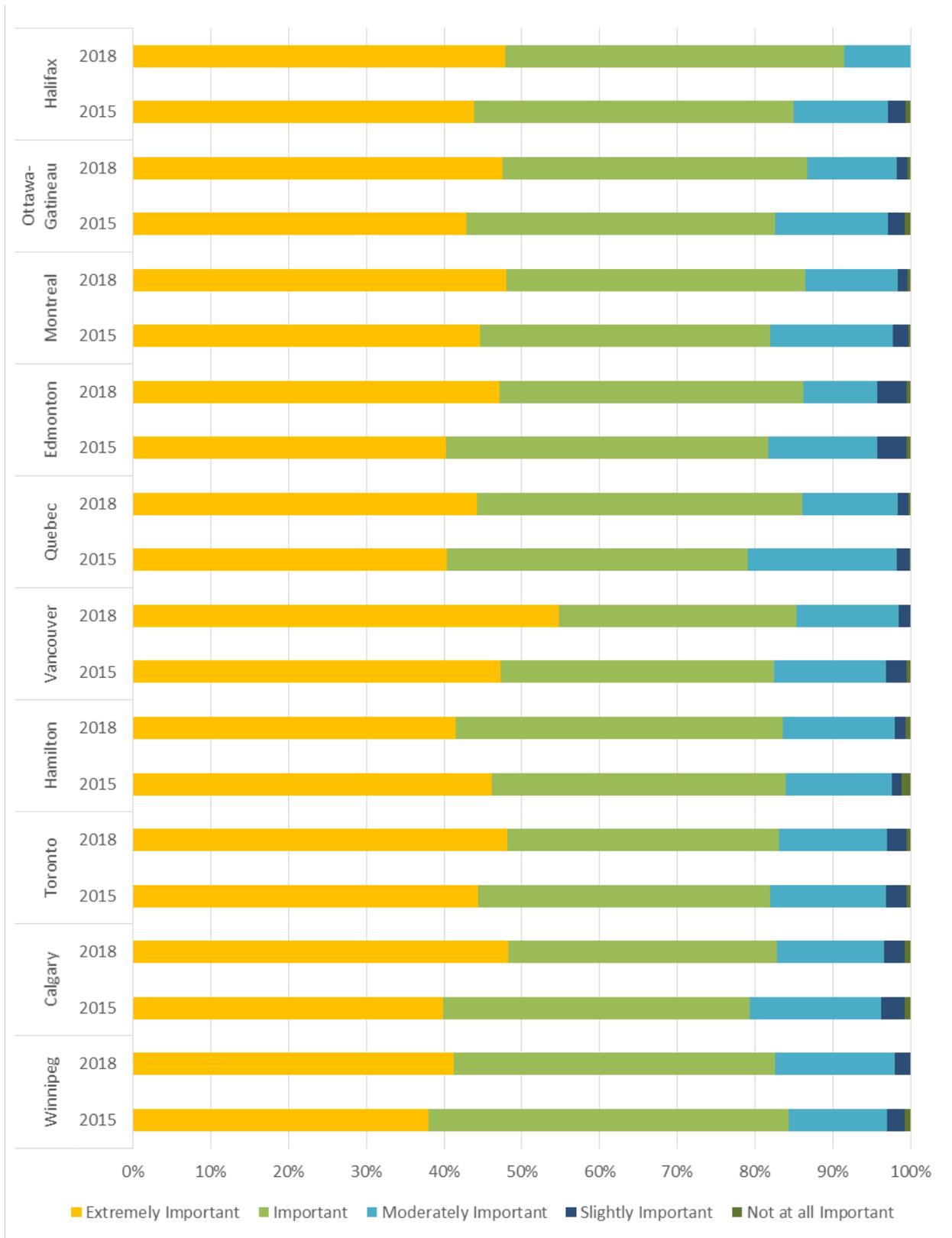


Figure 7-2 Excellent fuel economy (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

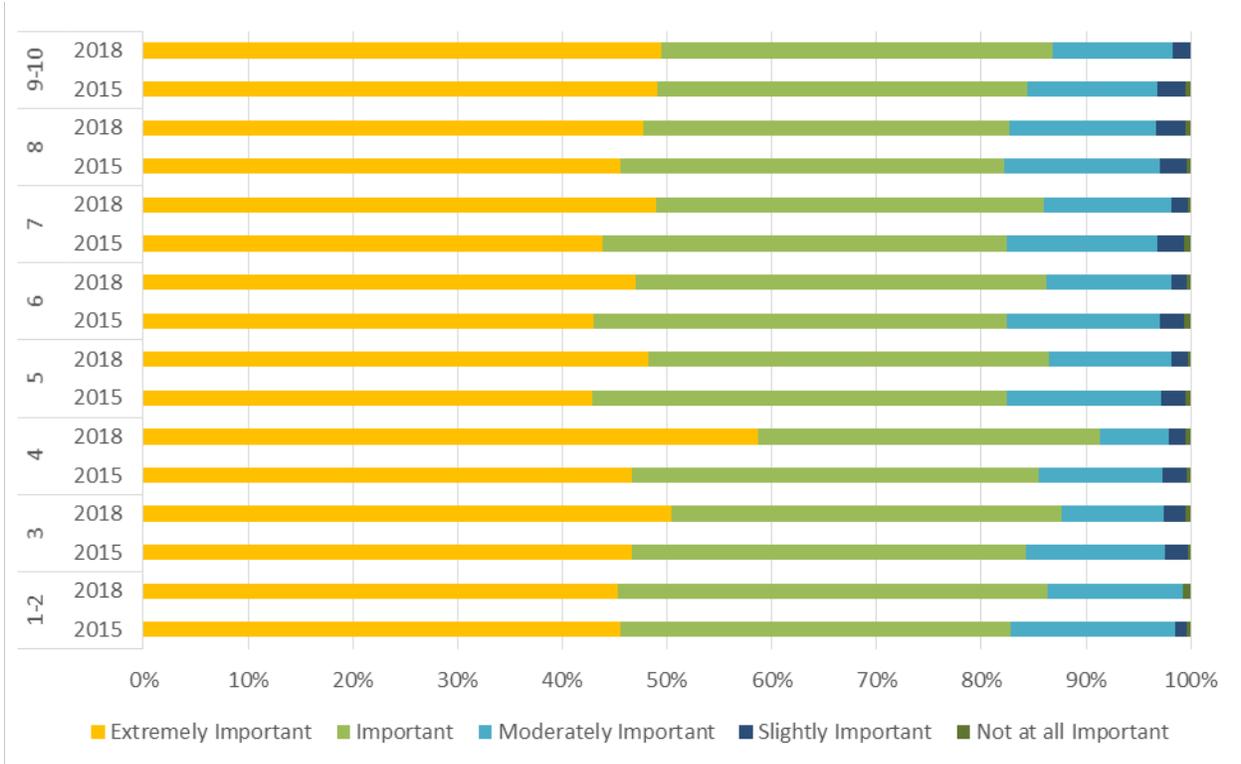


Figure 7-3 Excellent fuel economy (by Urban-Rural Index)

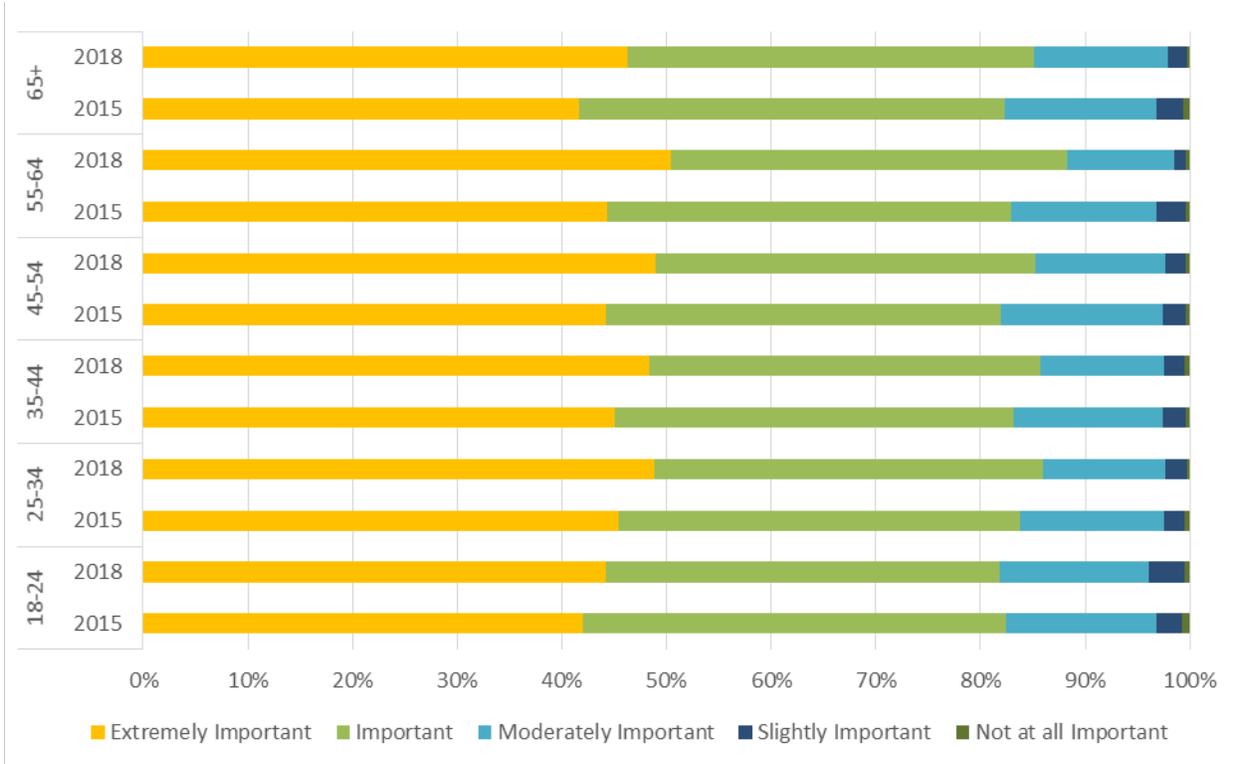


Figure 7-4 Excellent fuel economy (by Age)

Evolution of Canadian Attitudes on Electric Vehicles

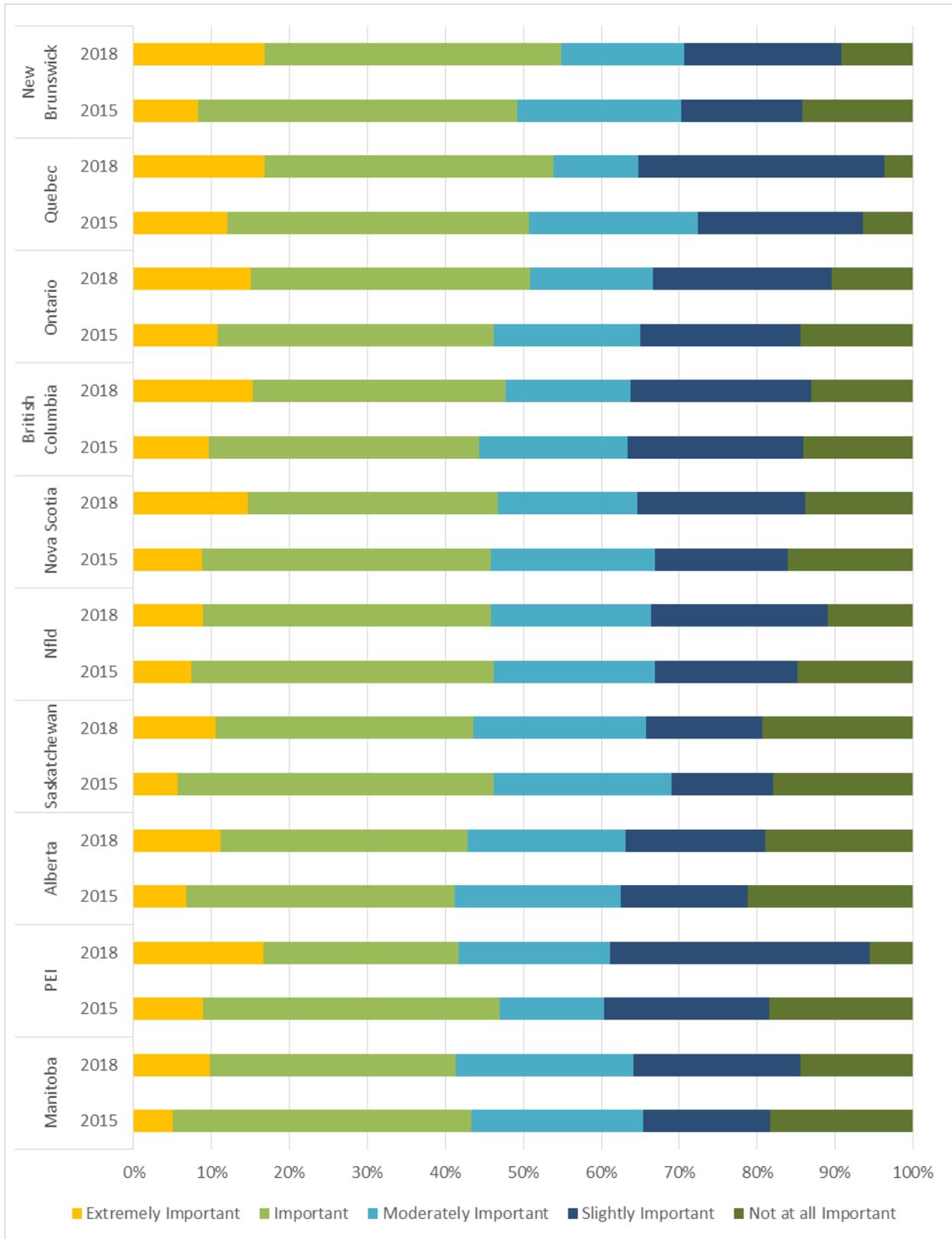


Figure 7-5 No tailpipe emissions (by Province)

Evolution of Canadian Attitudes on Electric Vehicles

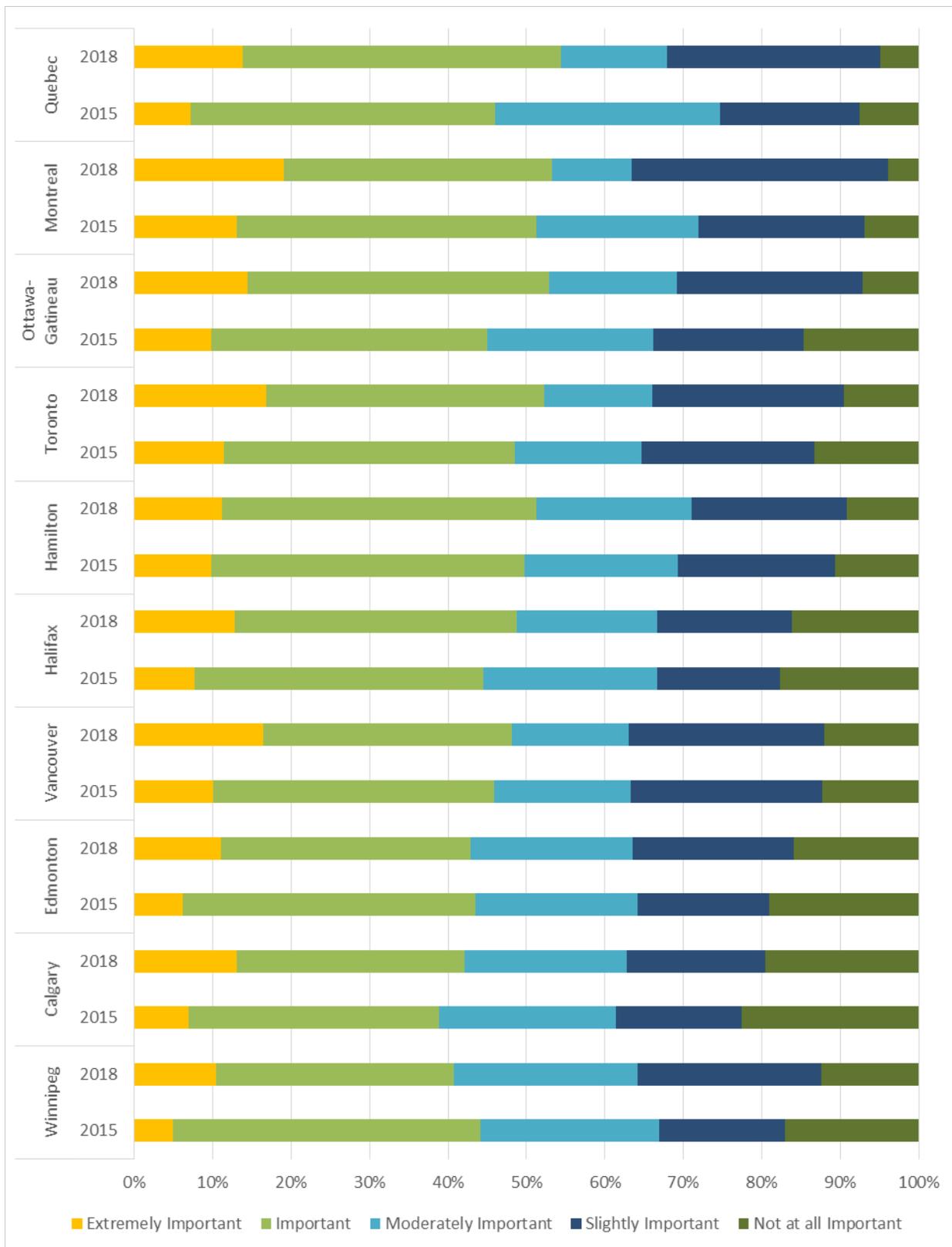


Figure 7-6 No tailpipe emissions (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

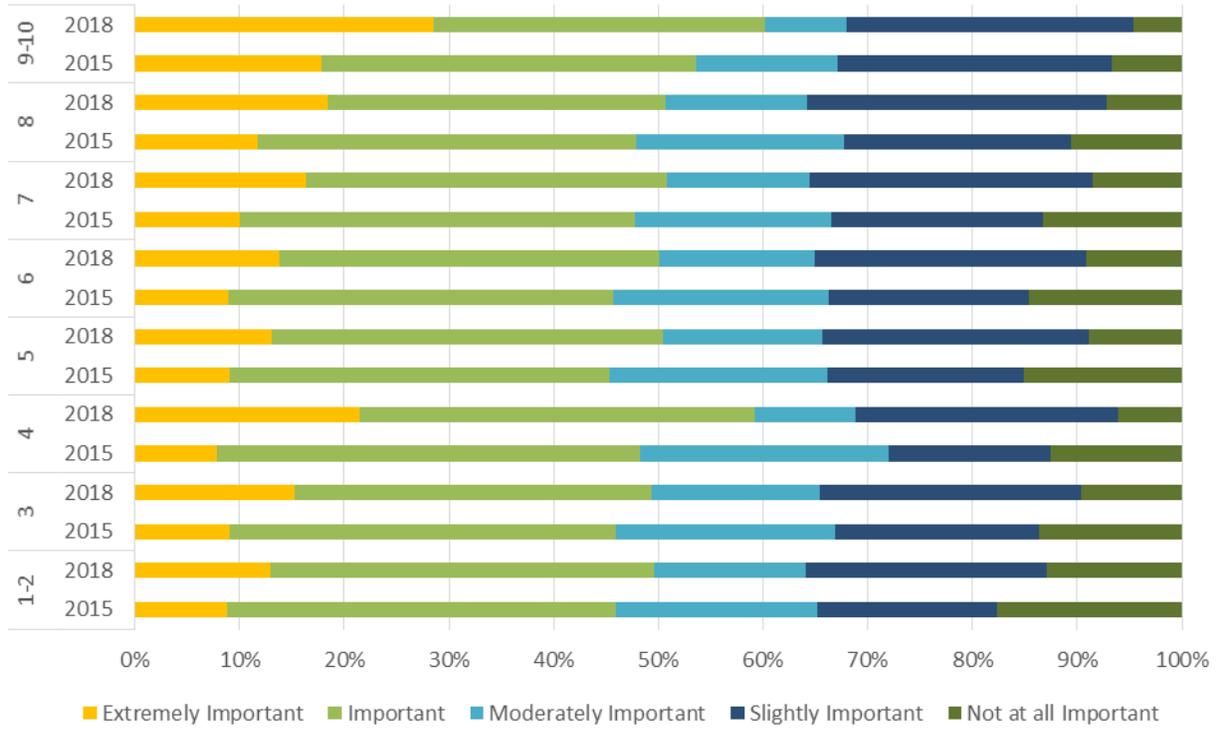


Figure 7-7 No tailpipe emissions (by Urban-Rural Index)

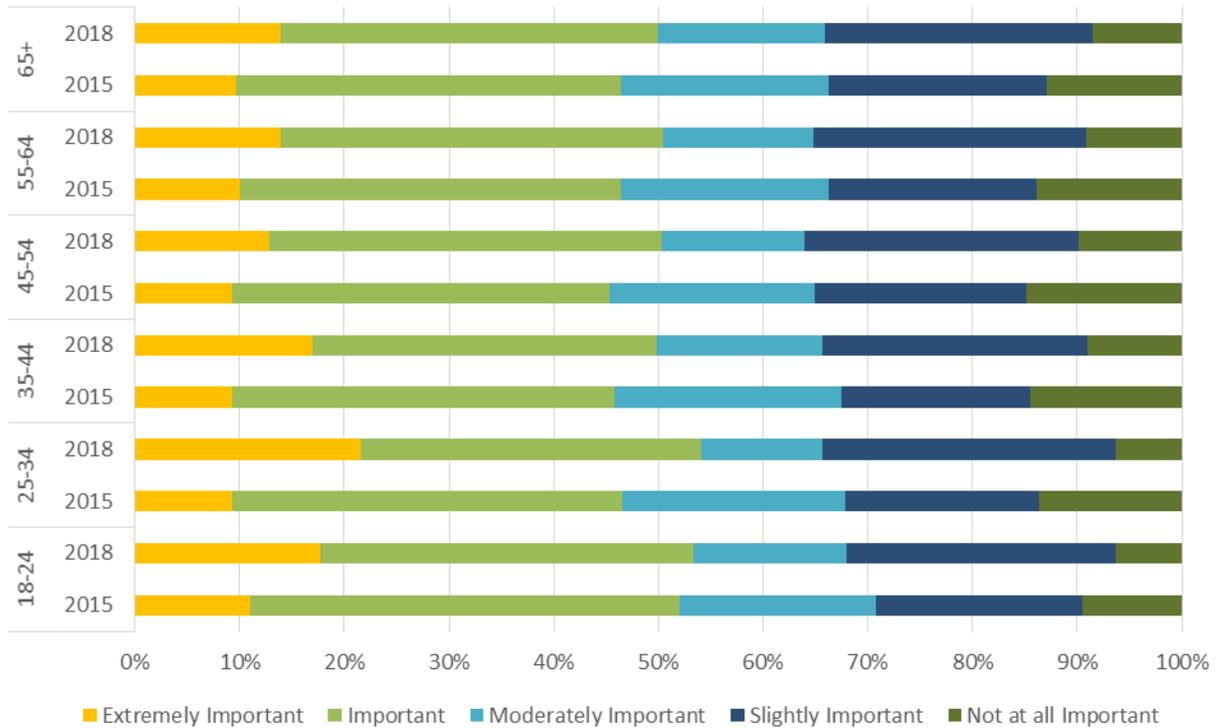


Figure 7-8 No tailpipe emissions (by Age)

Evolution of Canadian Attitudes on Electric Vehicles

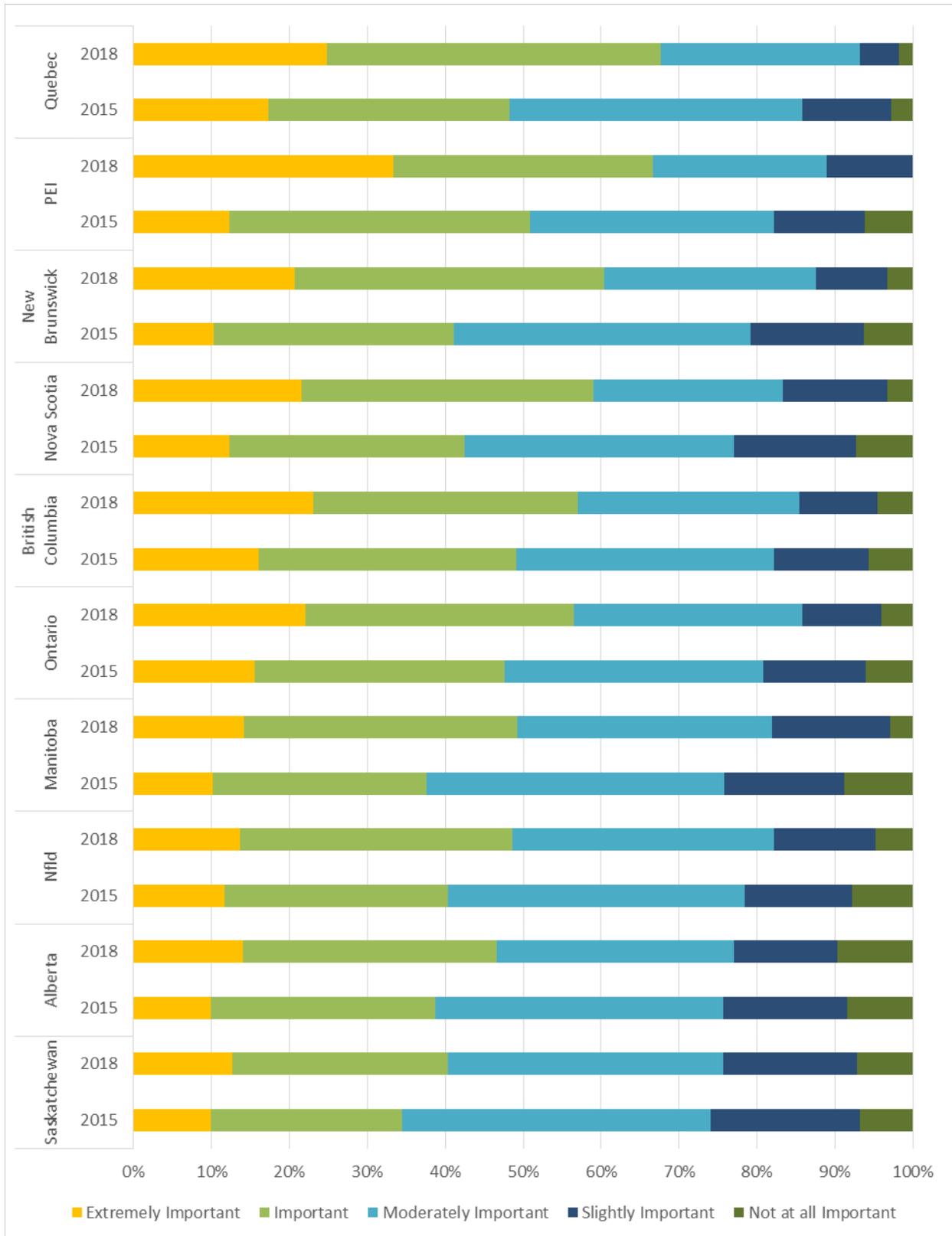


Figure 7-9 Reduced tailpipe emissions (by Province)

Evolution of Canadian Attitudes on Electric Vehicles

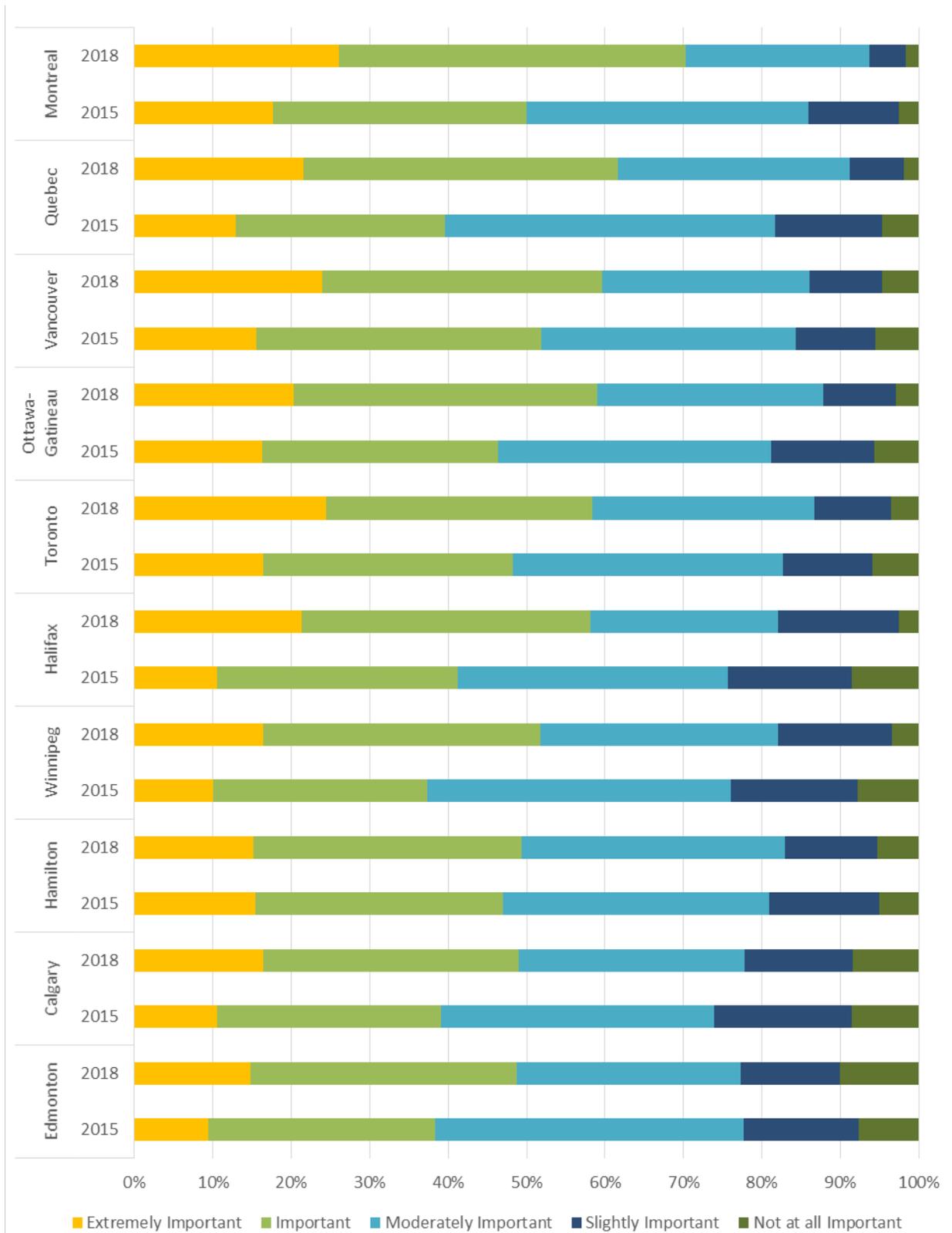


Figure 7-10 Reduced tailpipe emissions (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

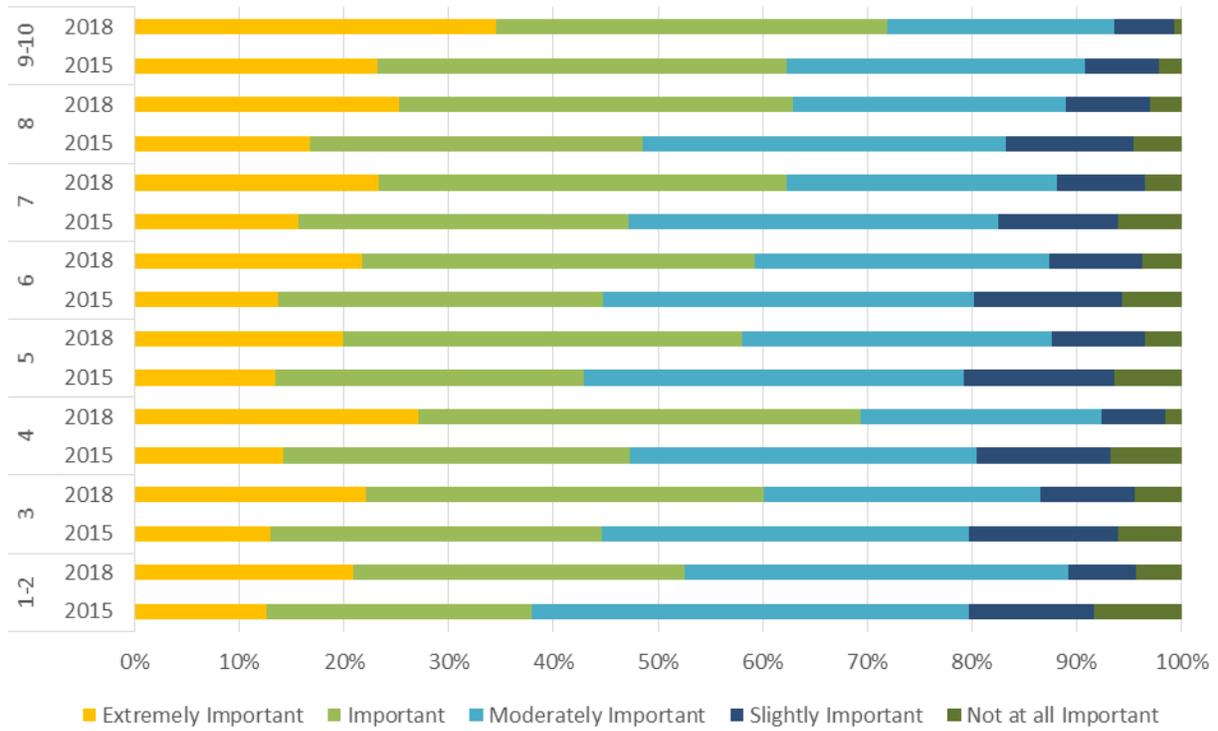


Figure 7-11 Reduced tailpipe emissions (by Urban-Rural Index)

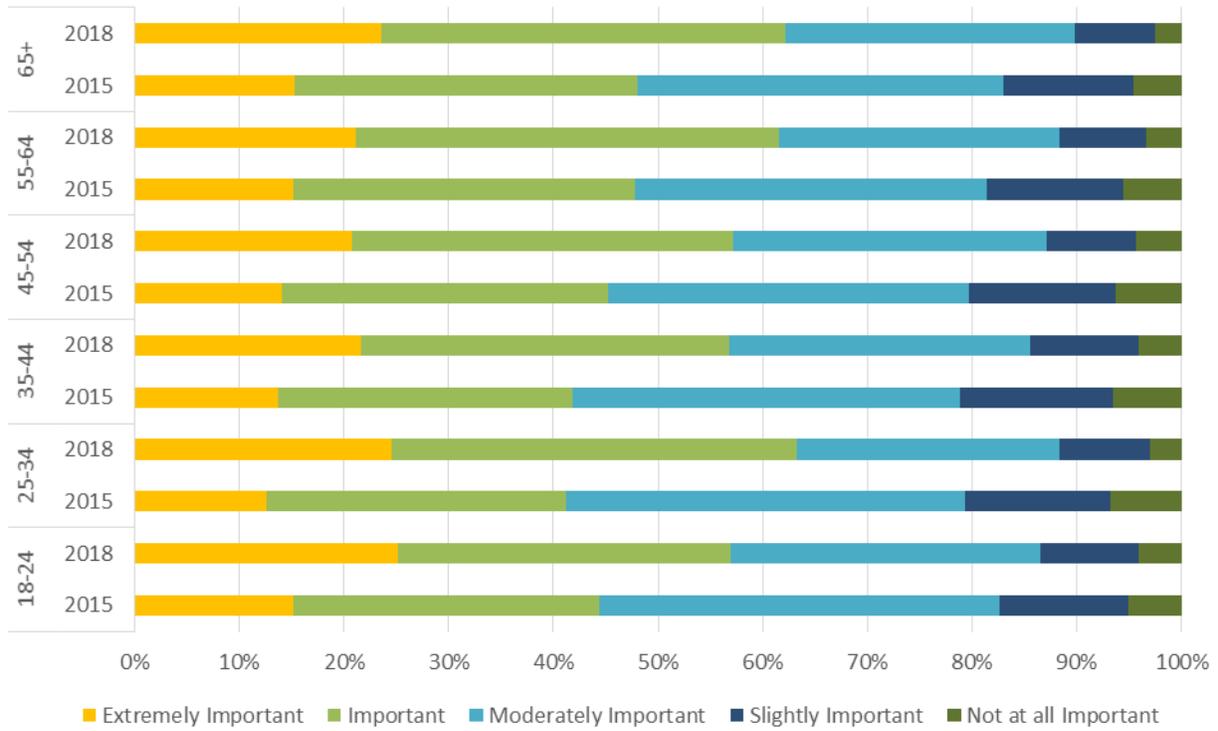


Figure 7-12 Reduced tailpipe emissions (by Age)

Evolution of Canadian Attitudes on Electric Vehicles

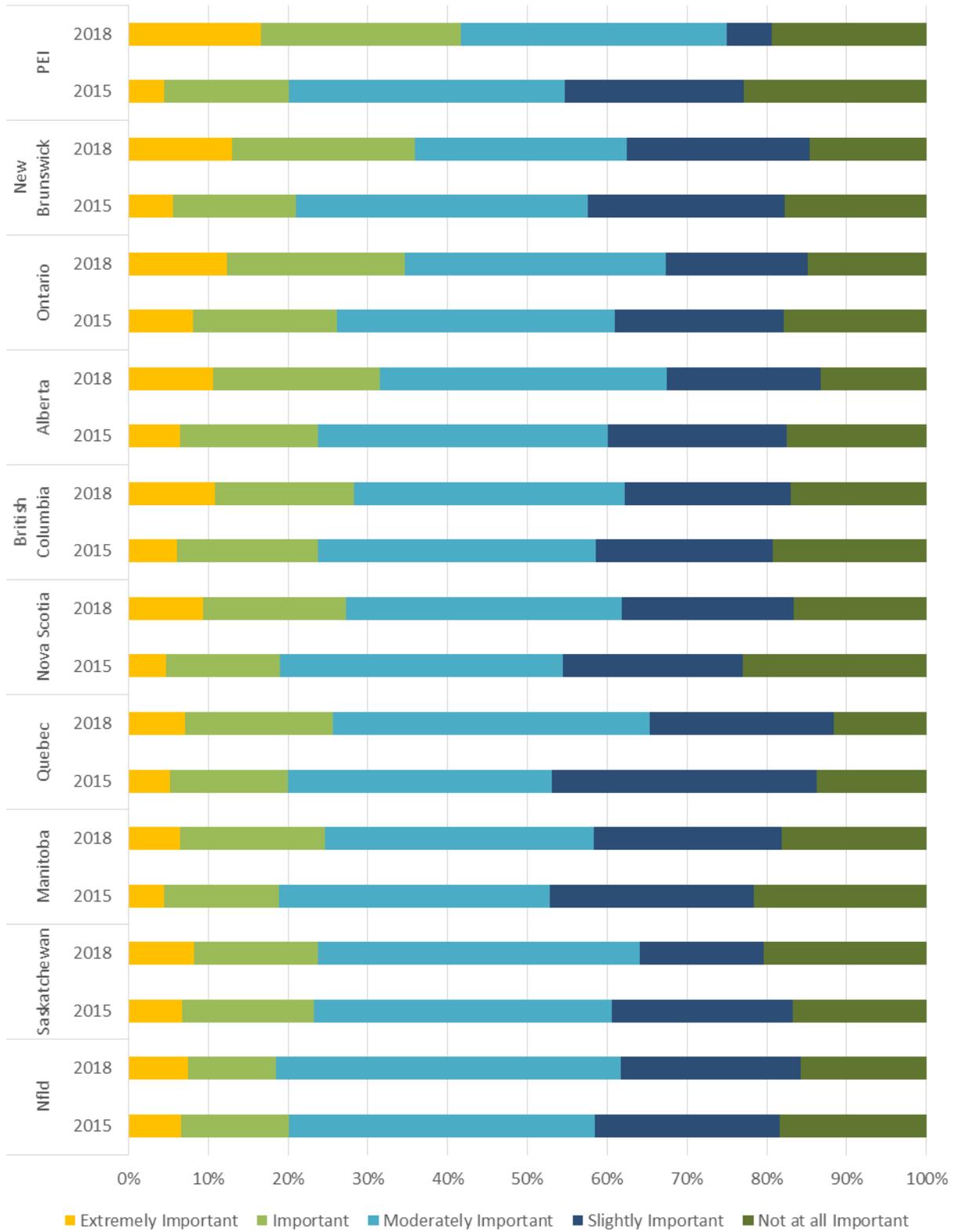


Figure 7-13 High performance/fast acceleration (by Province)

Evolution of Canadian Attitudes on Electric Vehicles

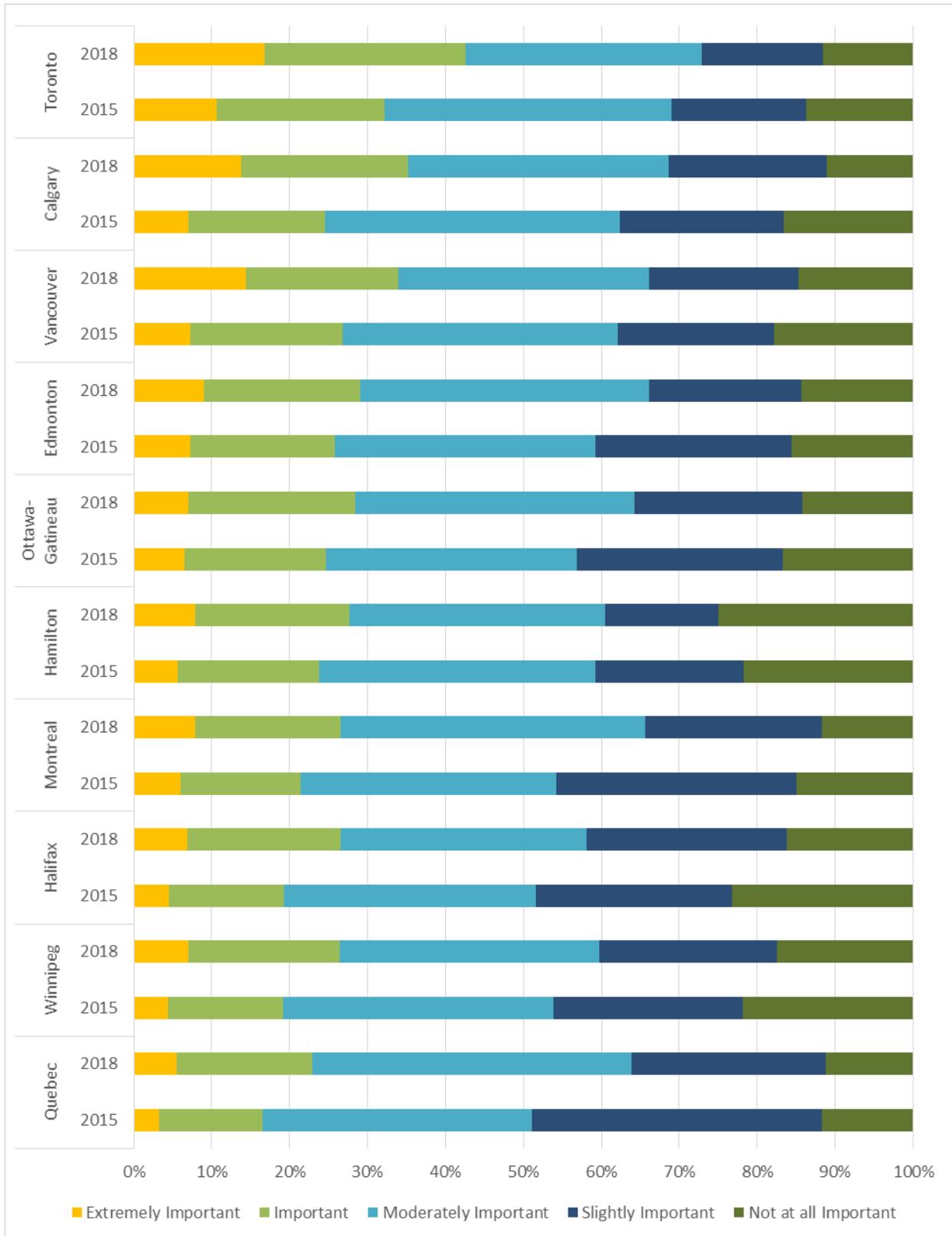


Figure 7-14 High performance/fast acceleration (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

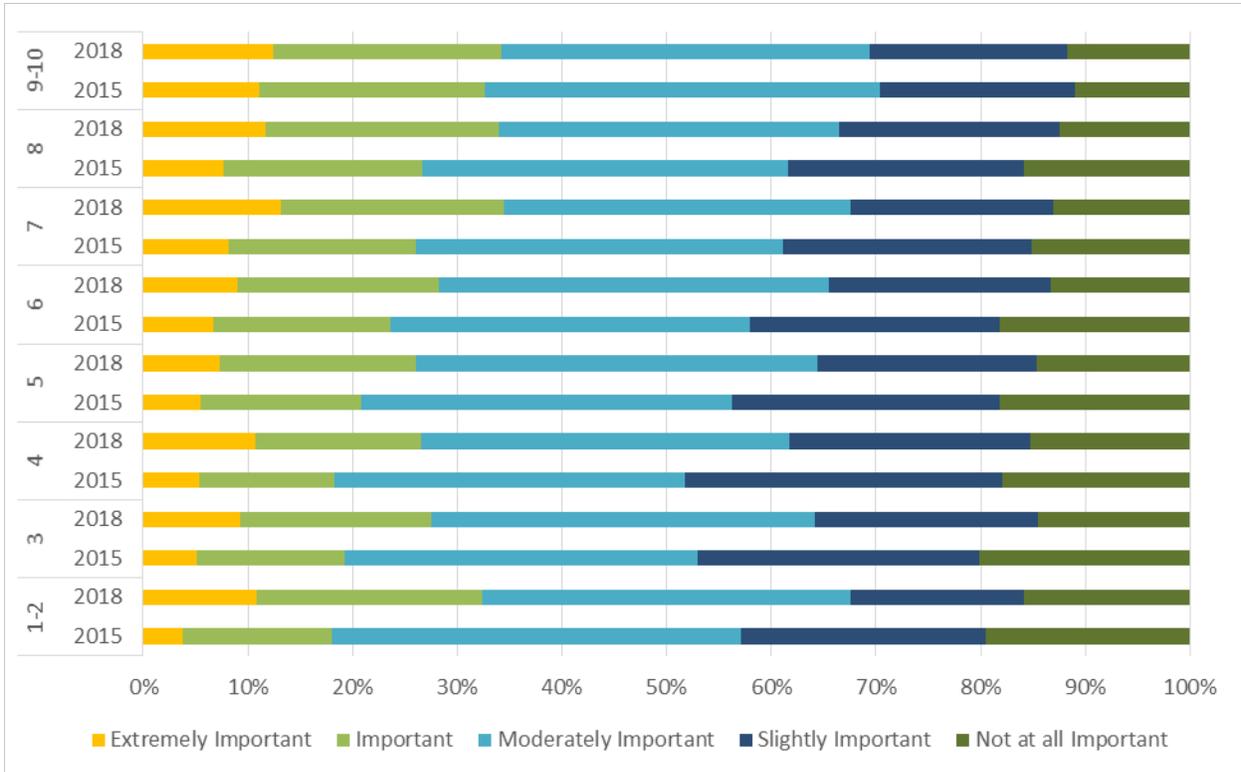


Figure 7-15 High performance/fast acceleration (by Urban-Rural Index)

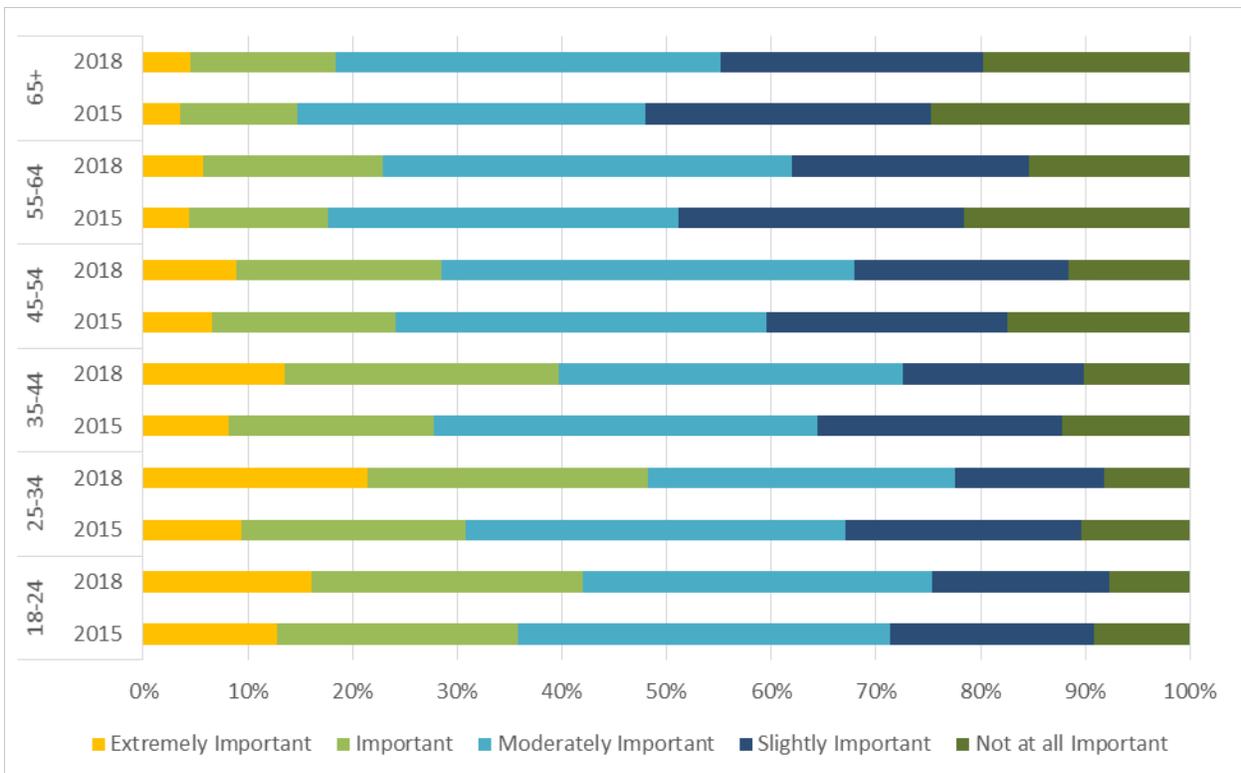


Figure 7-16 High performance/fast acceleration (by Age)

Evolution of Canadian Attitudes on Electric Vehicles

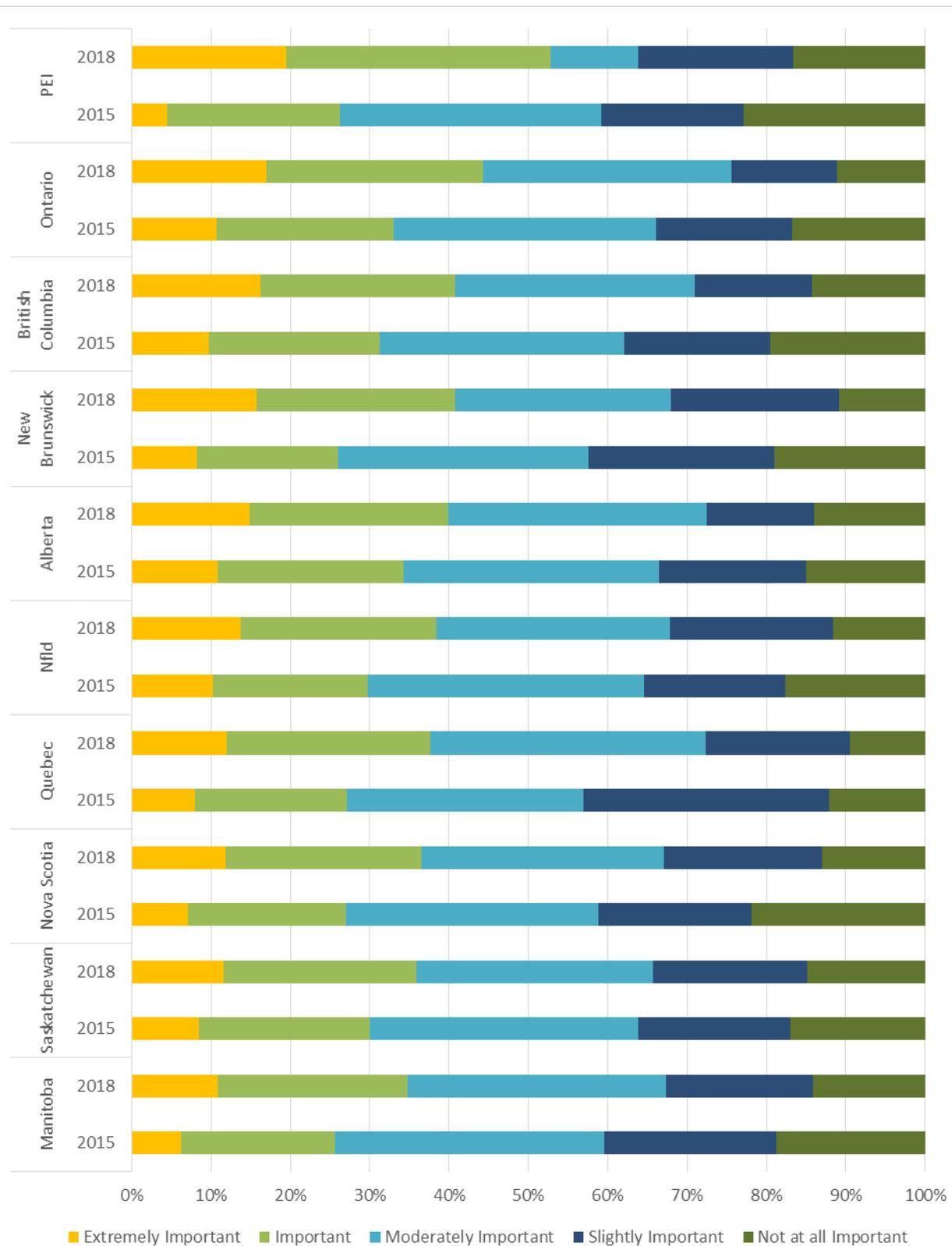


Figure 7-17 Technology (e.g. advanced navigation, parking assist) (by Province)

Evolution of Canadian Attitudes on Electric Vehicles

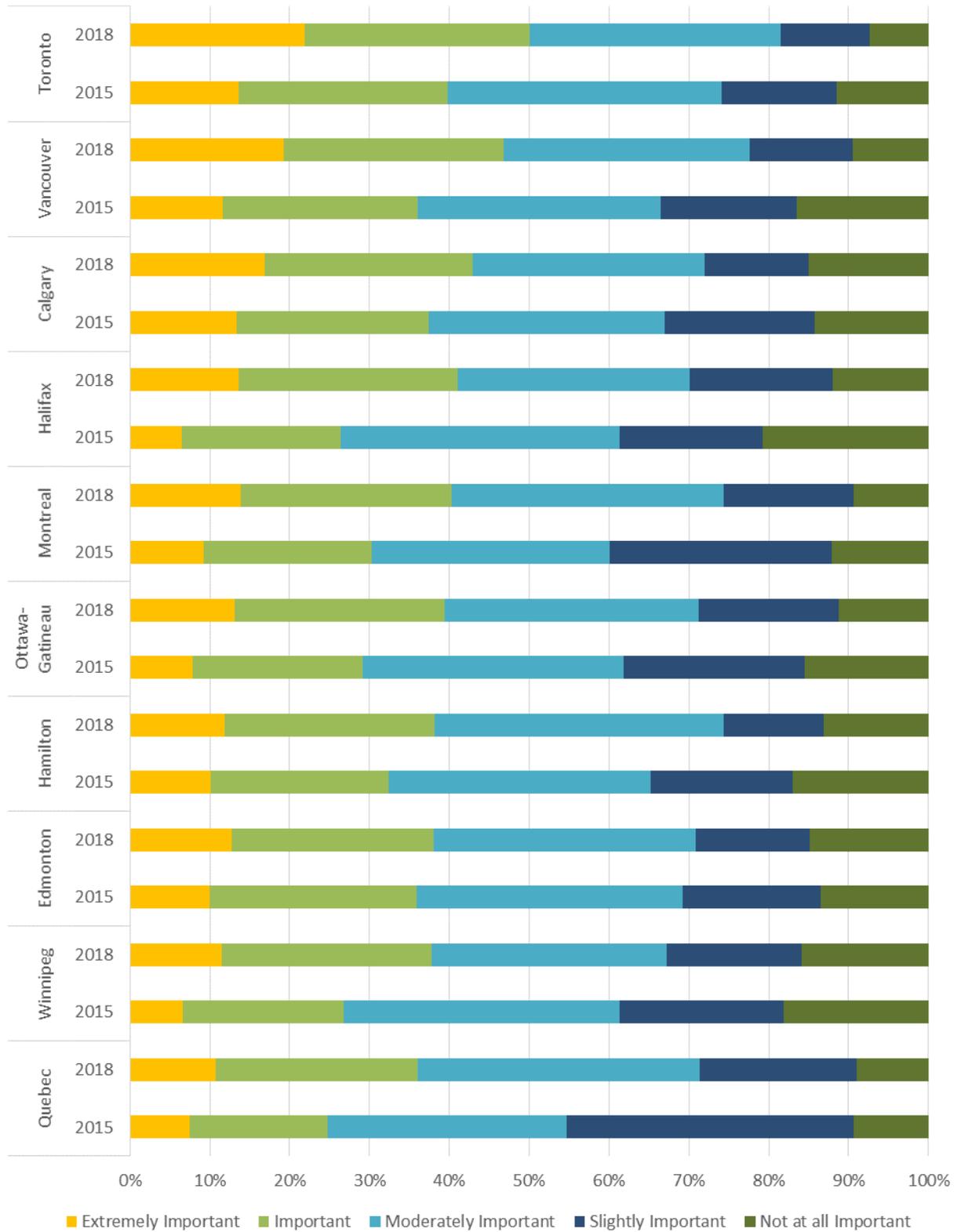


Figure 7-18 Technology (e.g. advanced navigation, parking assist) (by Census Metropolitan Area)

Evolution of Canadian Attitudes on Electric Vehicles

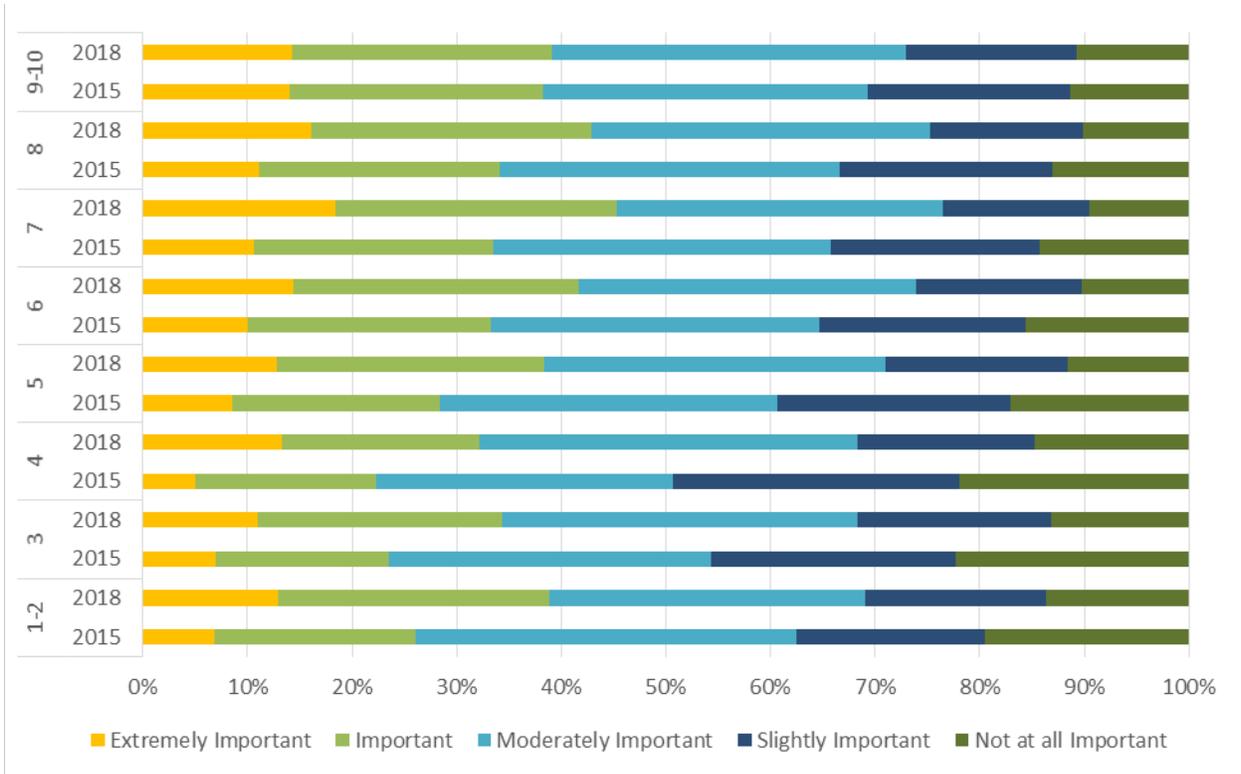


Figure 7-19 Technology (e.g. advanced navigation, parking assist) (by Urban-Rural Index)

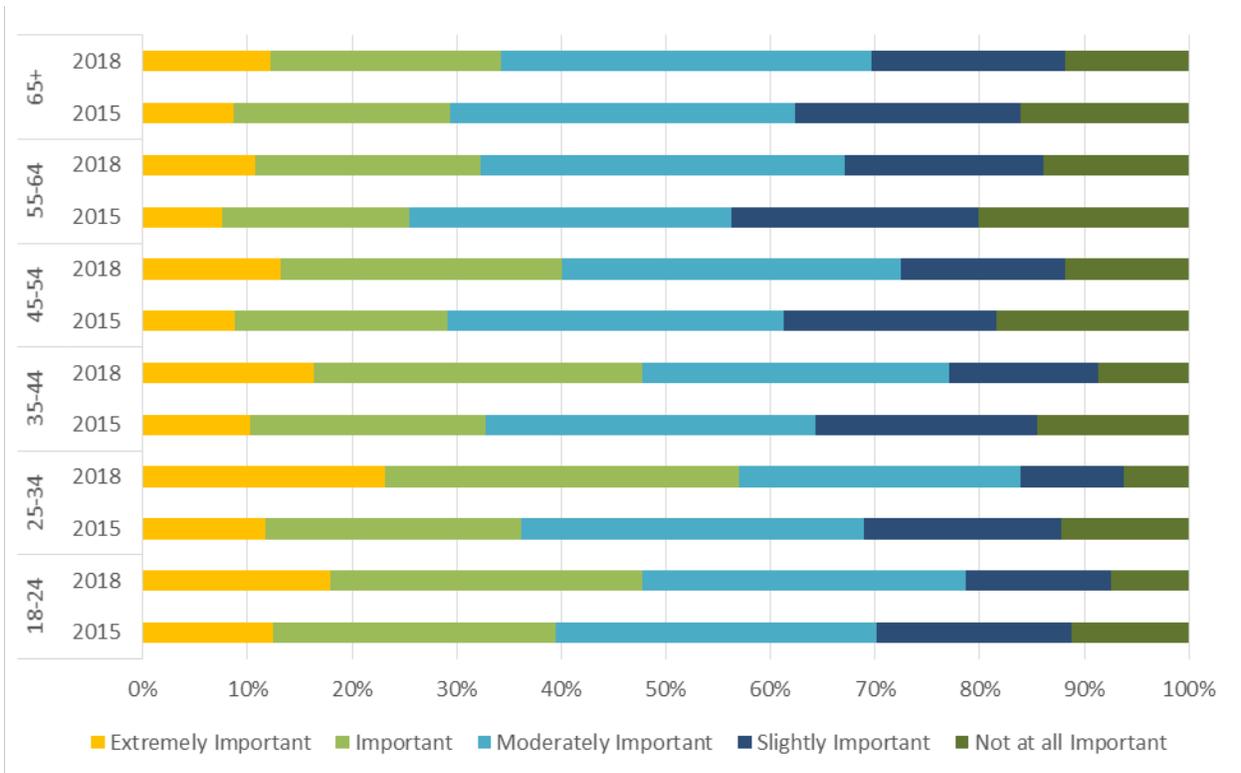


Figure 7-20 Technology (e.g. advanced navigation, parking assist) (by Age)

7.2. My province offers a substantial cash incentive towards purchasing an EV

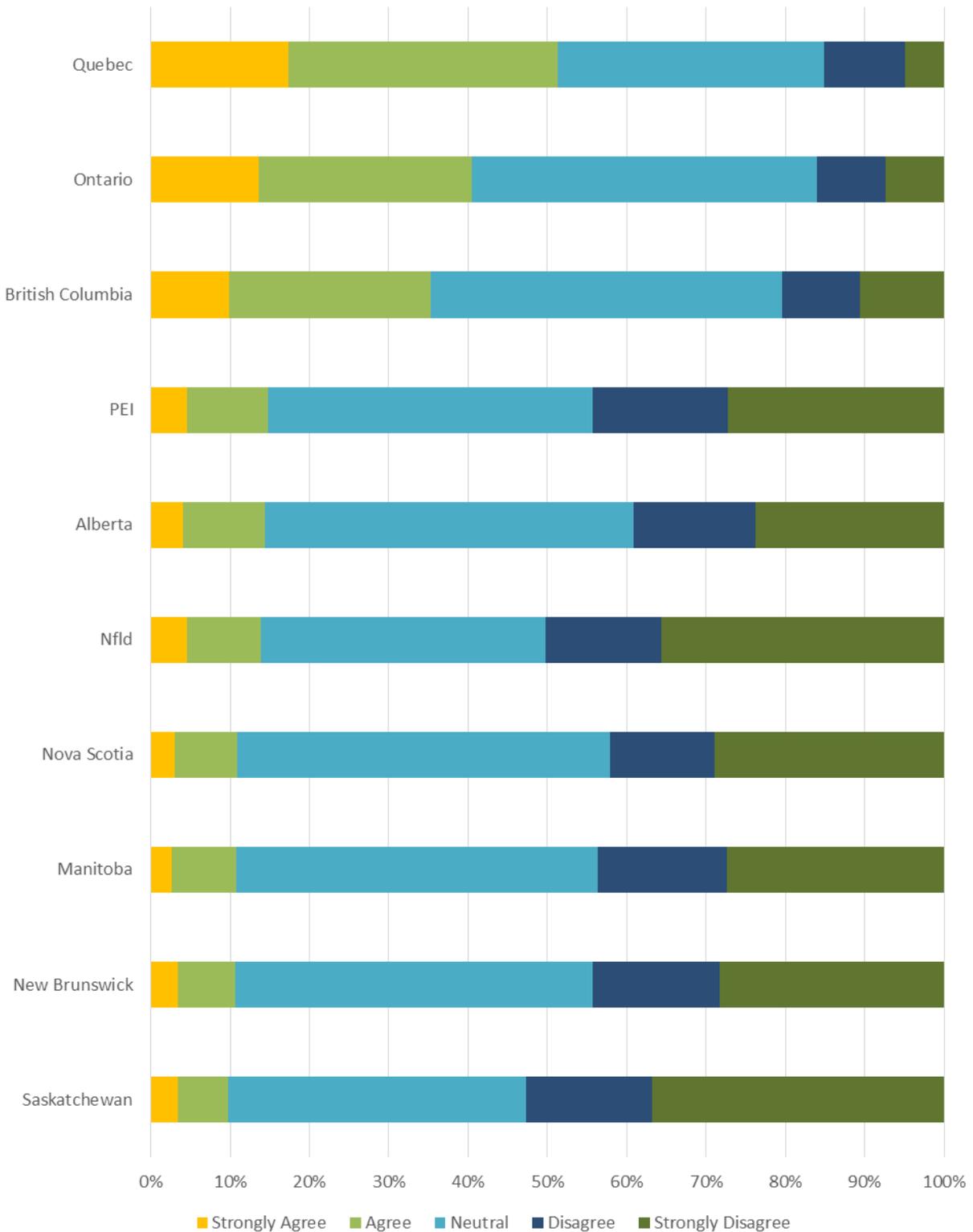


Figure 7-21 My province offers a substantial cash incentive towards purchasing an EV (by Province)

7.3. The federal government offers a substantial cash incentive towards purchasing an EV

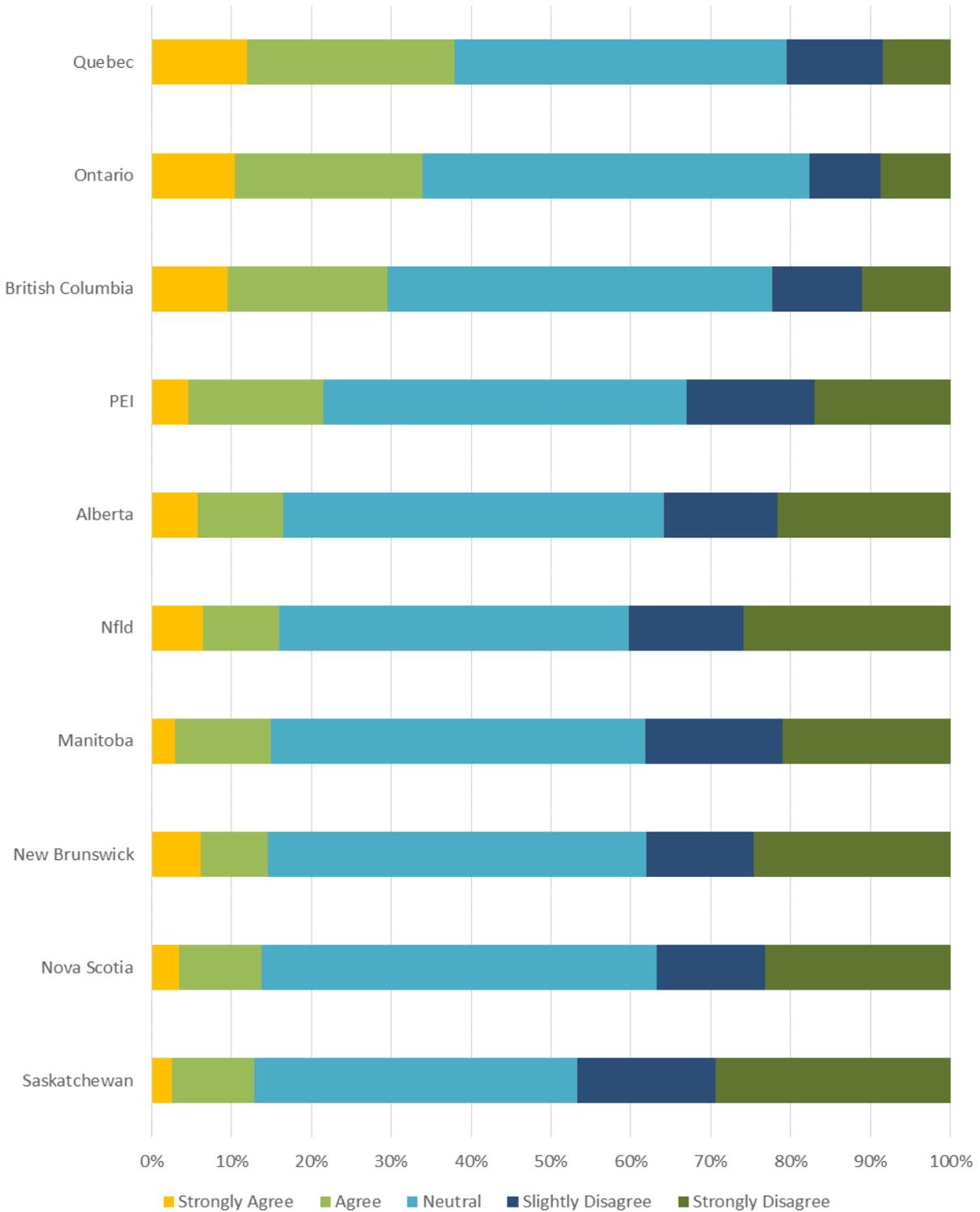


Figure 7-22 The federal government offers a substantial cash incentive towards purchasing an EV (by Province)

Evolution of Canadian Attitudes on Electric Vehicles

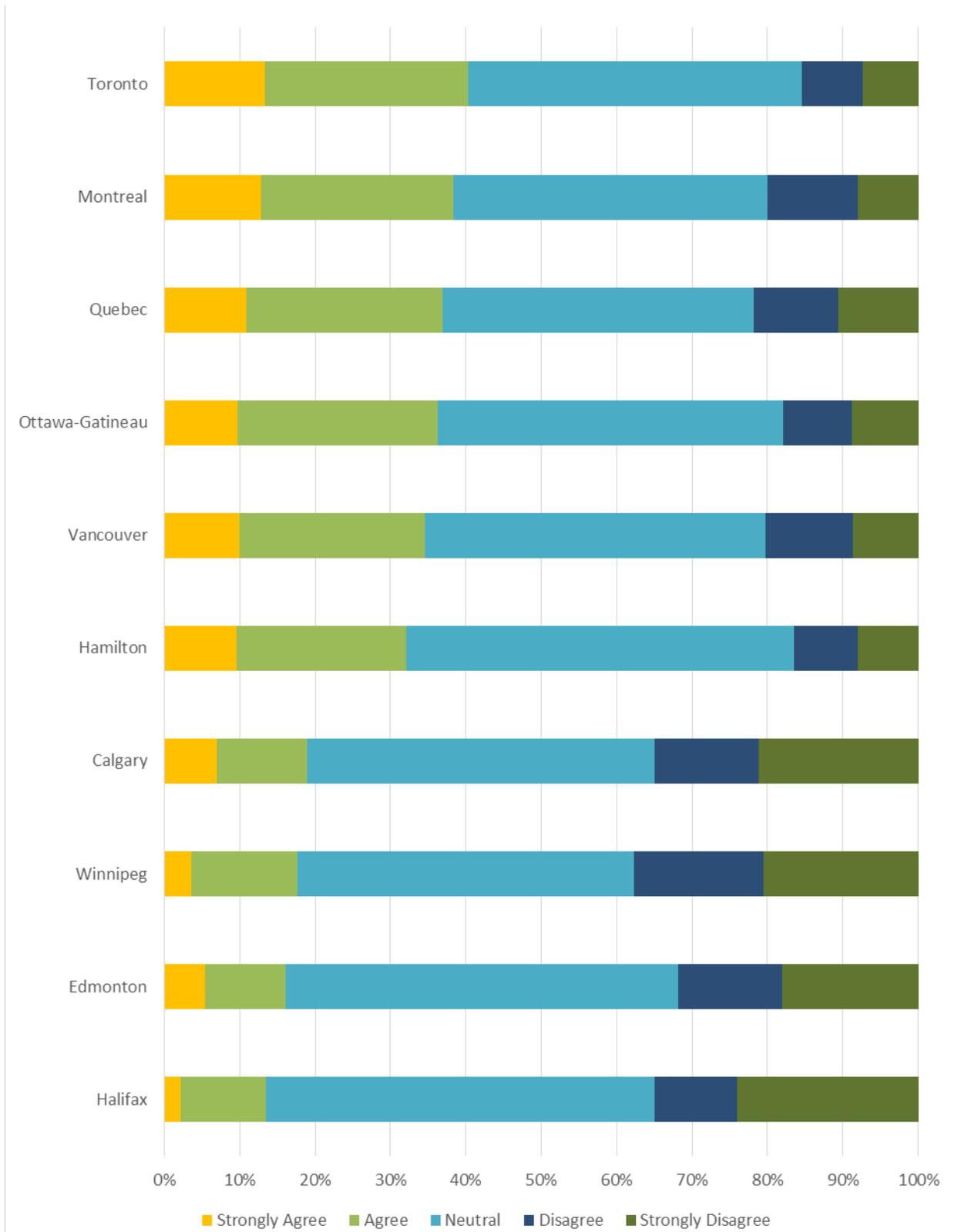


Figure 7-23 The federal government offers a substantial cash incentive towards purchasing an EV (by Census Metropolitan Area)

7.4. Summary of Results

For the vehicle attribute “**Excellent fuel economy**”:

- Vehicle fuel economy was the most significant attribute when characterized by Province, metropolitan area, urban-rural index, and age. The importance of fuel economy has increased from 2015 with the noted exception of Hamilton.
- Provincially, fuel economy is most important to respondents from Atlantic Canada (Newfoundland and Labrador, PEI, Nova Scotia, and New Brunswick respectively) where fuel prices can be quite high. While respondents from the Prairies (Alberta and Saskatchewan respectively) felt less strongly about fuel economy.
- Respondents across the urban-rural spectrum consistently identify fuel economy as important. Rural and highly urban respondents felt that fuel economy was slightly more important than more suburban respondents.
- Generally, the youngest and the oldest respondents showed the least concern for fuel economy, while more middle aged respondents showed modestly higher levels of concern.

For the vehicle attribute “**No tailpipe emissions**”:

- Provincially, “no tailpipe emissions” were more important in 2018 than 2015 for the Eastern and Western provinces, while for the central provinces (Alberta, Saskatchewan, and Manitoba) and PEI it was less important than in 2015.
- Similarly, the major metros of Quebec and Ontario had the highest importance rankings while Winnipeg, Calgary, and Edmonton had the lowest.
- Interestingly, responses were stable around 40-50% importance across the urban-rural index, though the most intensely urban respondents stated the highest levels of importance.
- Generally, younger respondents were the most concerned about having no tailpipe emissions.

For the vehicle attribute “**Reduced tailpipe emissions**”:

- Interestingly, respondents across all provinces felt that “reduced tailpipe emissions” were more important than having “no tailpipe emissions”, with concern being the greatest in Quebec.

- All metropolitan areas showed an increase in concern about reduced tailpipe emissions in 2018 over 2015 responses.
- Rural responses about reduced tailpipe emissions grew over 2015 responses with rural areas having similar levels of concern as suburban areas.
- Respondents 55 and older along with those 25-34 assigned the greatest importance for reduced tailpipe emissions. All age groups responded with higher importance levels for reduced tailpipe emissions than from no tailpipe emissions.

For the vehicle attribute **“High performance / fast acceleration”**:

- Respondents in PEI, New Brunswick, and Ontario were respectively the most concerned about vehicle performance, whereas Newfoundland and Labrador and Saskatchewan were the least concerned.
- Toronto, Calgary, and Vancouver showed the highest importance for high vehicle performance / fast acceleration.
- Both highly urban and rural respondents were the most concerned about vehicle performance and acceleration. Though interestingly, 10-15% of all respondents across urban indices felt that performance was not at all important.
- Perhaps unsurprisingly, younger respondents were far more concerned about performance and acceleration than those 45 and older.

For the vehicle attribute **“Technology (e.g. advanced navigation, parking assist)”**:

- Importance of advanced vehicle technologies was relatively stable across provinces with all provinces seeing similar increases in importance over 2015 with the exception of PEI. The substantial increase in PEI may be attributable to the small sample size of respondents in this province.
- The highly populated metros of Toronto and Vancouver held the highest importance for vehicle technology, while being moderately less important in the smaller metros of Winnipeg and Quebec.
- The importance of vehicle technologies has grown most strongly in rural respondents from 2015.
- Younger adults, 25-44, were the most concerned about vehicle technologies, while older respondents felt more ambivalent.

On the statement “**My province offers a substantial cash incentive towards purchasing an EV**”:

- In the provinces of Ontario and Quebec, 40% to 50% of respondents respectively agree or strongly agree that their province offers cash incentives. In British Columbia 35% of respondents agree or strongly agree.
- In Quebec, Ontario, and British Columbia between 35% and slightly over 40% of respondents are seemingly ambivalent or unaware to the provision of government incentives towards the purchase of an electrified vehicle.
- Among the remaining provinces, the majority of respondents correctly identified that their government does not provide EV incentives, with less than 15% incorrectly agreeing or strongly agreeing that their province does provide a subsidy.

On the statement “**The federal government offers a substantial cash incentive towards purchasing an EV**”:

- Similarly to the provincial version of this statement, respondents in Quebec, Ontario, and British Columbia most strongly agree that there are government incentives available to them; though, it appears, there is uncertainty or apathy over whom is actually providing the EV subsidy.
- In all provinces, the largest percentage of respondents were neutral on the statement, indicating a widespread uncertainty about the provision of federal incentives towards EVs.
- Unsurprisingly, CMAs in provinces with EV subsidies had respondents with higher levels of agreement, whereas those in provinces without subsidies had largely neutral or disagreeing respondents.