



EV PUBLIC CHARGING PERCEPTIONS SURVEY RESEARCH

Customer Insights

April 2022



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BACKGROUND



Background

Research Questions

- What are EV public charging preferences in terms of payment models, willingness to pay, preferred charge time, preferred locations, brand affinity, etc.?
- What are the current perceptions of EV public charging options among people who own or lease a vehicle or people who are likely to own or lease?

Survey Outline

- Driving & Automotive Behaviors
- EV Consideration & Familiarity
- Public Charging Stations Preferences
- Demographics



EXECUTIVE SUMMARY



Key Takeaways

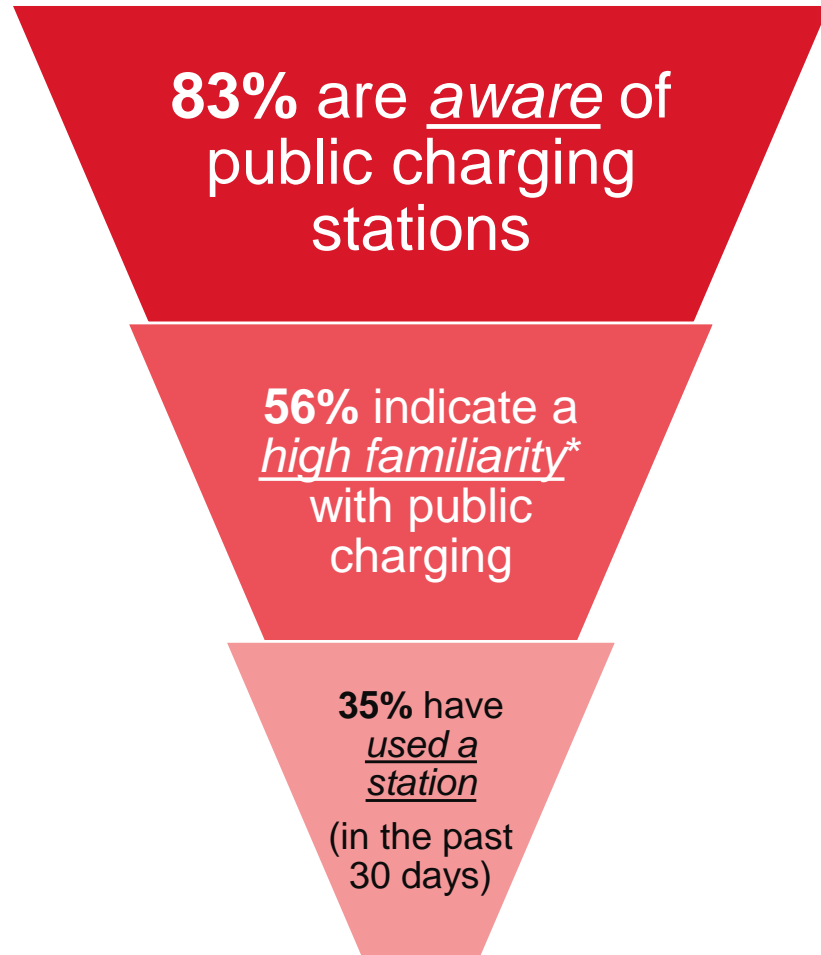
- **There is opportunity to further acquaint EV drivers with public charging.**
 - 83% of EV drivers are aware of stations in their community, but only about half indicate high familiarity. Just 1 out of 3 current EV drivers have used public charging within the past month.
 - Among current EV drivers the preferred payment methods for public charging are by credit/debit card, digital wallet and mobile app. The general preference is to pay by usage (kWh), rather than by time or flat-fee (including subscription).
 - Among EV drivers, there is a considerable gap between the *expected* price and time to charge versus the amount of time and price people may be *willing* to spend at a public charging station.
 - While both important features, charging speed appears to be more meaningful than cost when choosing a public charging station. Having a safe and convenient location are also very important to consumers, including those who would consider getting an EV in the future.

Key Takeaways (cont.)

- **Familiarity with EVs and public charging is low among non-EV drivers.**
 - This is particularly reflected in their uncertainty in expected time and cost to charge an EV. They expect charging costs to be higher compared to EV drivers.
- **Current EV drivers are predominately homeowners who live in the suburbs.**
 - They are more commonly men, between 55 and 74 years old and have high income (>150k annually).
 - Most EV drivers have charged at home in the last 30 days and about half have a Level 2 home charger.
- **About 1 of 3 of non-EV drivers would consider getting an EV.**
 - People who would consider an EV the next time they buy an automobile are more likely to be between 25 and 44 years old, live in an urban and suburban area and have annual income over \$75k.
 - These EV considerers have a higher awareness of public charging stations in their community, but their familiarity is lower around public charging and EVs in general compared to current EV drivers.

Key Metrics

Current EV Drivers Public Charging Preferences



- Most EV drivers would like to be able to pay for public charging with a credit/debit card (**72%**) or by mobile app (**46%**).
- **79%** prefer the price to be determined by the kWh/amount of electricity used.
- The most important public charging features include charging speed (**80%**), convenient location (**77%**), cost (**64%**), safe location (**63%**) and nearby amenities (**61%**).
- **77%** are willing to charge at grocery stores, **74%** at hotels, **73%** at retail stores/malls, **71%** at rest areas, **65%** at restaurants and **62%** at parks.
- **Over half** of EV drivers expect a typical "fill-up" charge to cost **less than \$9** and for it to take **45 minutes or less**.

*High familiarity score = 8 or more out of 10

Key Metrics (cont.)

- **55%** of EV drivers have a Level 2 charger at home.
- **1 out of 3** non-EV drivers say they would consider getting an EV for their next vehicle.

EV Considerers Public Charging Perceptions

- **66%** of EV considerers are aware of public charging stations in their community.
- Only **14%** have high familiarity* with public charging.
- **83%** want the ability to pay by credit/debit card and **40%** by mobile app.
- **54%** want price to be determined by the kWh/amount of electricity used while **28%** are unsure.
- The most important features for EV considerers include charging speed (**78%**), safe location (**76%**), convenient location (**74%**) and cost of charging (**70%**).
- **70%** are open to charging at grocery stores, **69%** at rest stops, **68%** at retail stores/malls, **62%** at hotels, **59%** at gas stations.

*High familiarity score = 8 or more out of 10



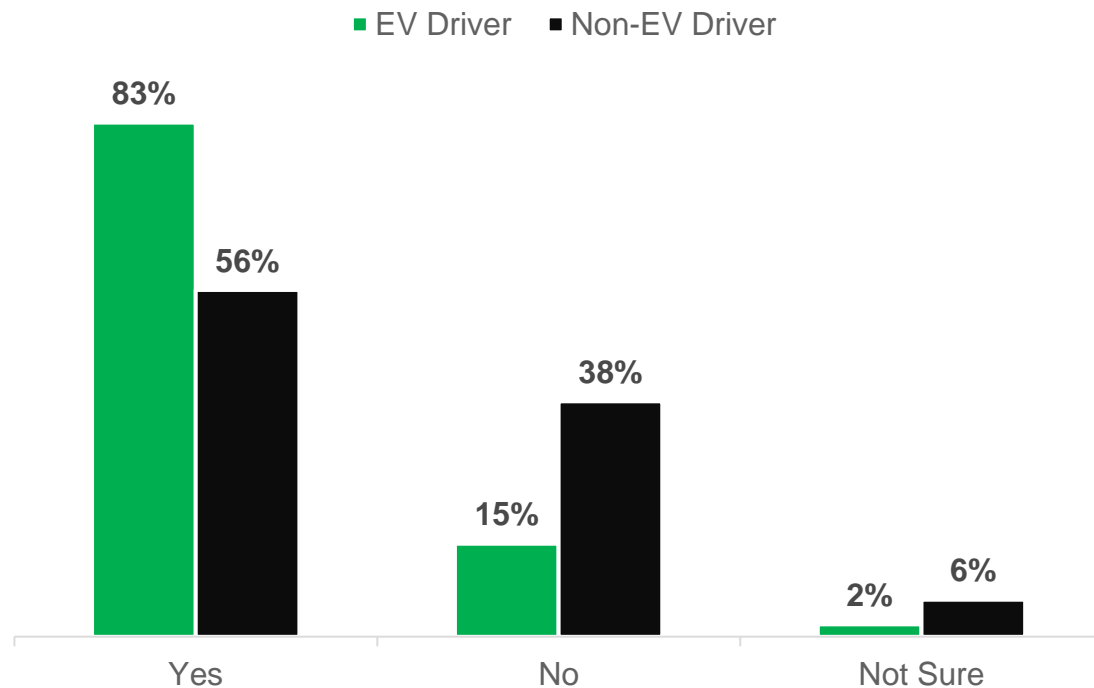
PUBLIC CHARGING PERCEPTIONS



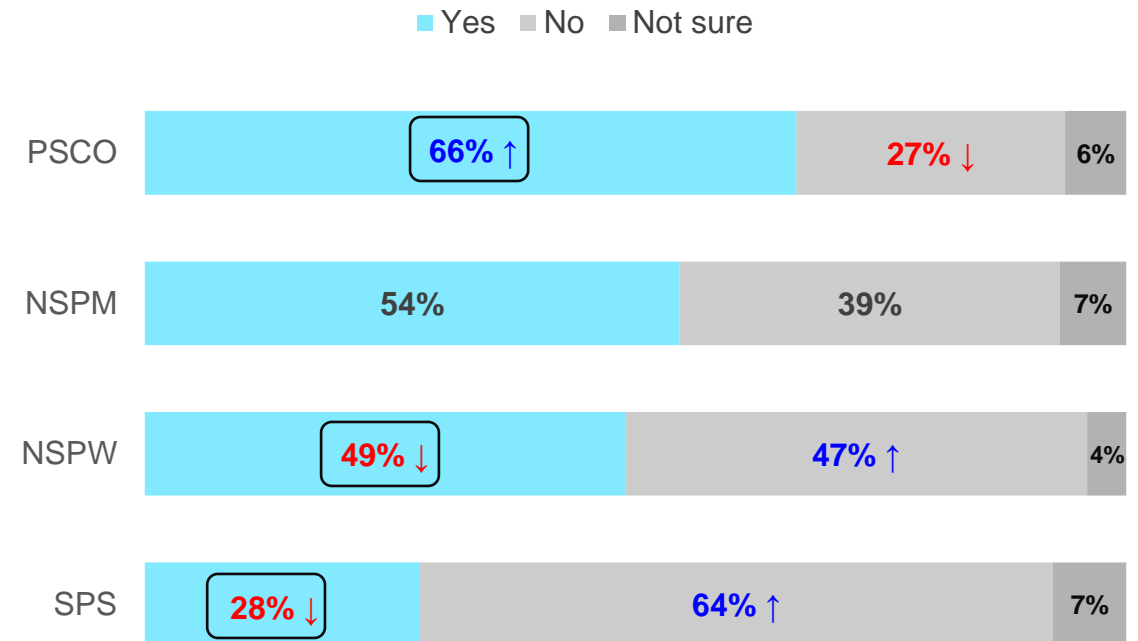
Over half of drivers are aware of public charging stations in their community regardless of whether they drive an EV.

Customers in PSCo are more likely to be *aware of public charging stations* while SPS and NSPW customers are less likely.

Aware of Public Charging Stations



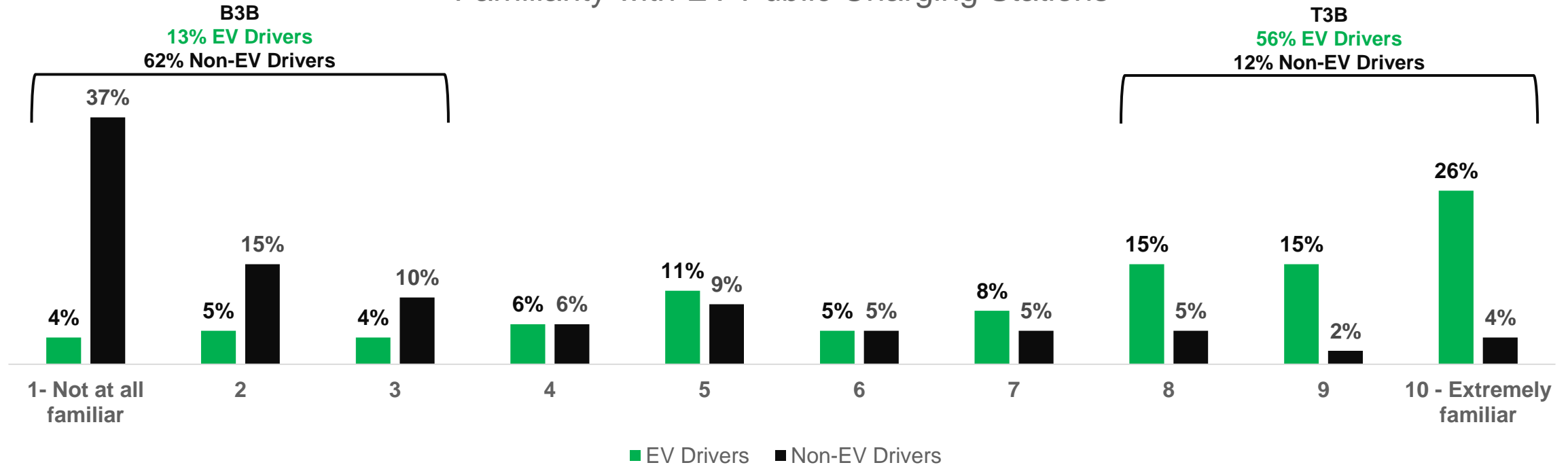
Awareness by OpCo



Are you aware of, or have you seen, any EV public charging stations in your community? Base: EV Drivers (n=110); Non-EV Drivers (n=2,784)

About half of EV Drivers indicate a very high familiarity with public charging stations.

Familiarity with EV Public Charging Stations



People who have low familiarity (1-3) with public charging stations are more likely to be renters, apartment dwellers, rurally-based, women, over 74 years old, drive <5,000 miles a year, have household income <\$50k and live in NSPW and SPS.

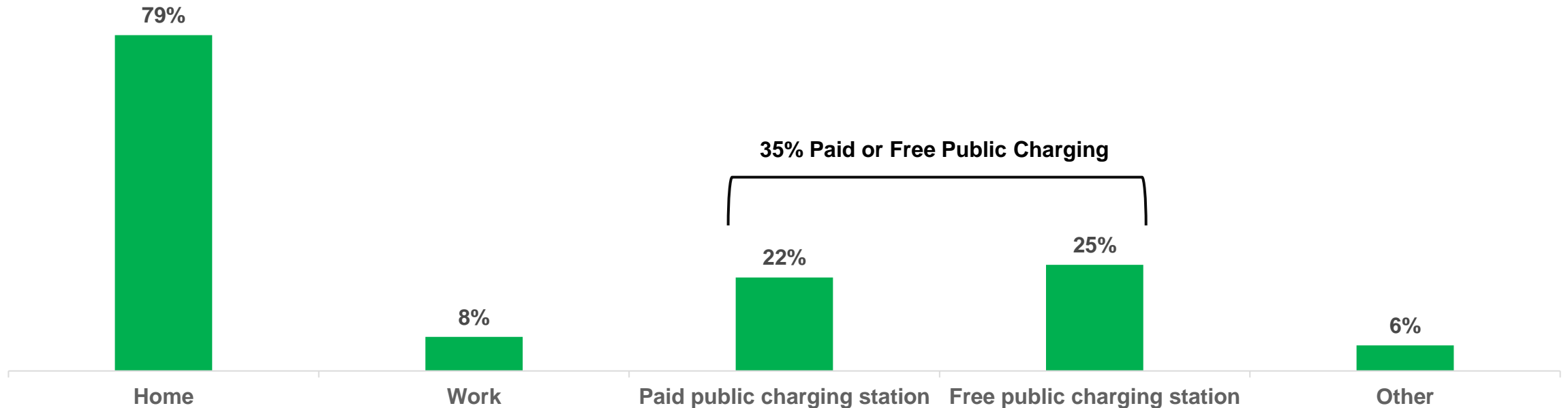
Average Familiarity: EV Drivers = 7.1, Non-EV Drivers = 3.4

How familiar are you with EV public charging stations? 1-10 scale (Not at all familiar-Extremely familiar) Base: EV Drivers (n=110); Non-EV Drivers (n=2,784)

4 of 5 EV drivers charged at home and about a third (35%) have used public charging within the past 30 days.

About half indicated charging at home only and nowhere else.

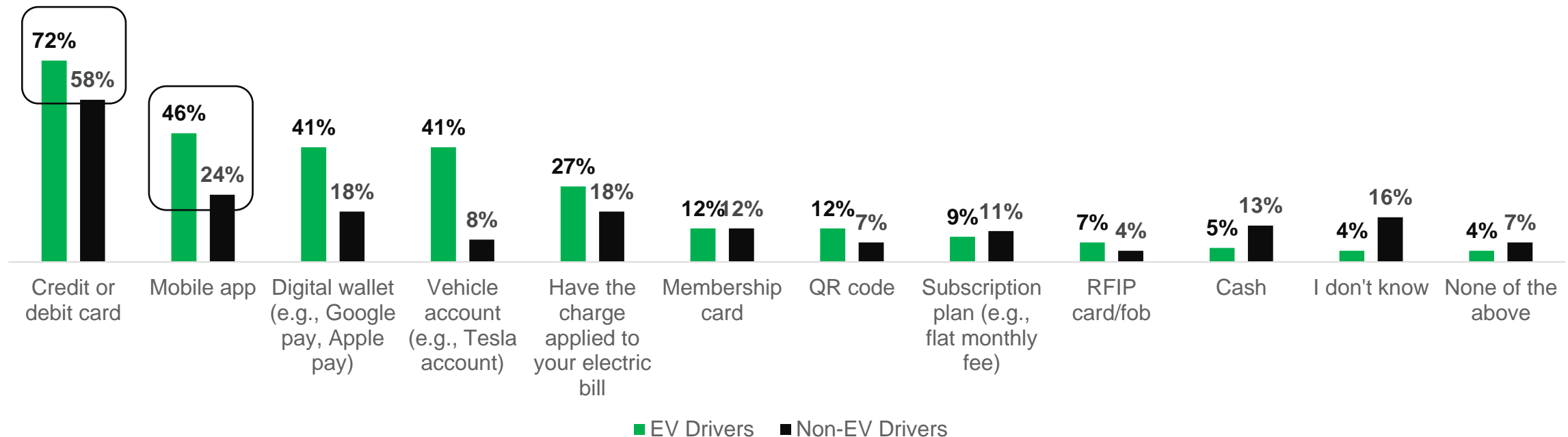
EV Charging



In the last 30 days, where have you charged your EV? (Select all that apply) Base: EV Drivers (n=110)

People most commonly want to pay for public charging by credit/debit card. EV drivers have greater preference for digital methods as well.

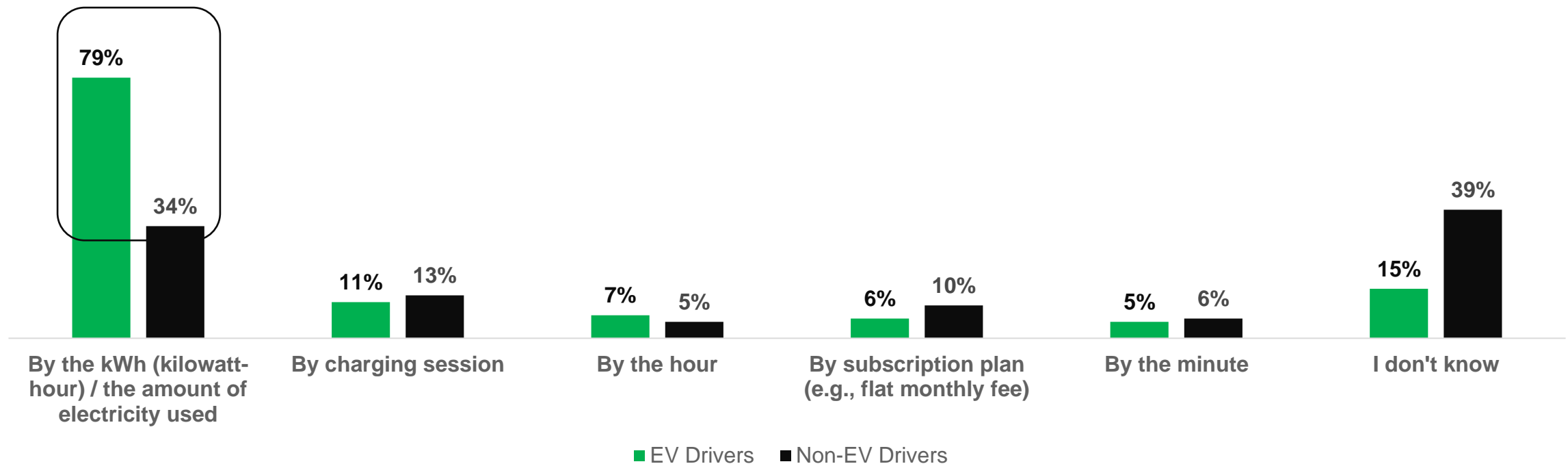
Preferred Payment Methods



When using a paid EV public charging station, what ways would you like to be able to pay? Please select all that apply. Base: EV Drivers (n=110); Non-EV Drivers (n=2,784)

People would prefer to pay for public charging by the kWh / the amount of electricity used.

Pricing Model Preference

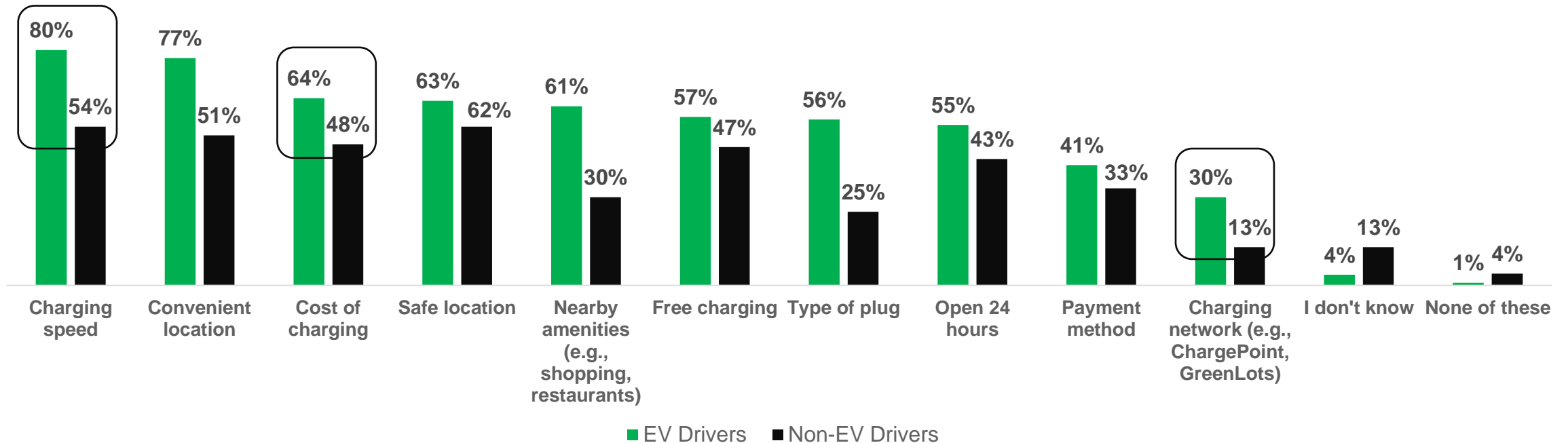


How would you prefer the price to be determined when using an EV public charging station? Please select all that apply. Base: EV Drivers (n=110); Non-EV Drivers (n=2,784)

Charging speed appears to be more important than cost for choosing a public charging station.

Charging network is the least important feature for both types of drivers.

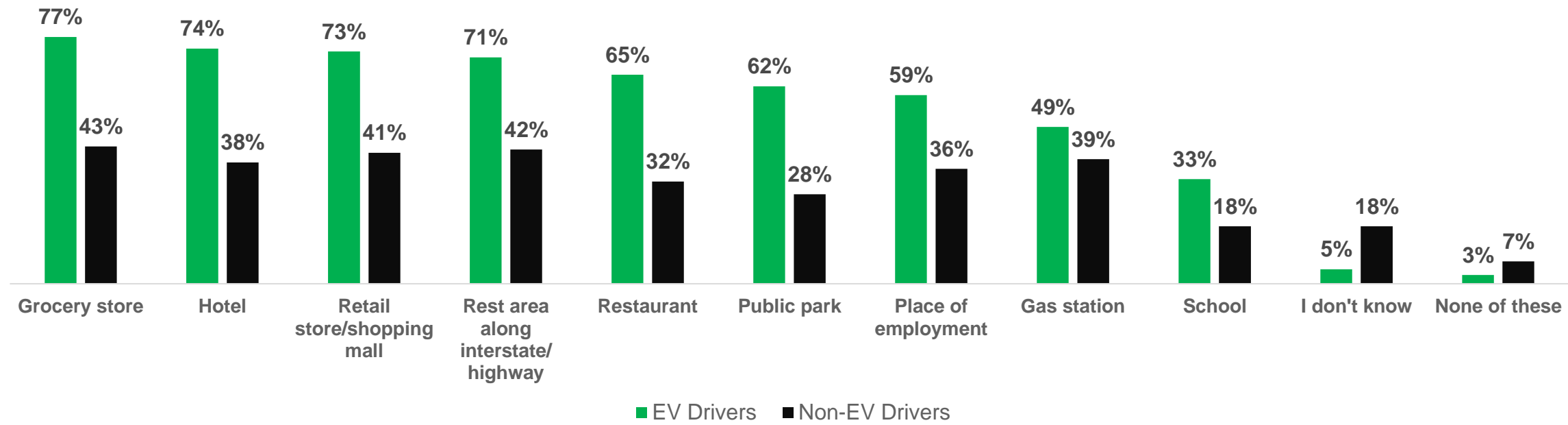
Important Public Charging Features



What features would be important to you when choosing an EV public charging station to use? (Select all that apply) Base: EV Drivers (n=110); Non-EV Drivers (n=2,784)

Likely acknowledging the amount of time it takes to charge, EV drivers prefer locations that are practical and have amenities.

Public Charging Locations Willing to Use

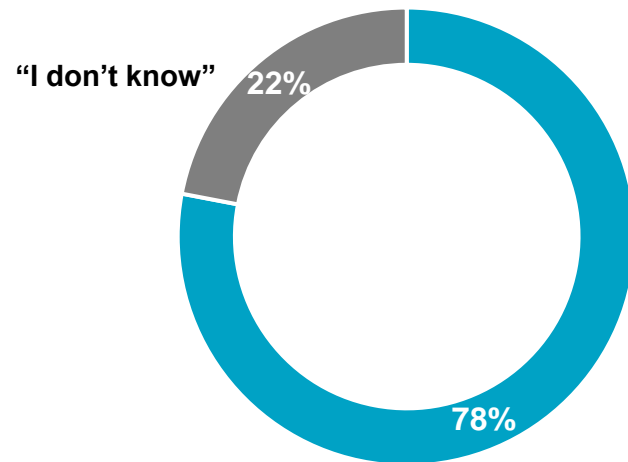


Where would you be willing to use an EV public charging station? (Select all that apply) Base: EV Drivers (n=110); Non-EV Drivers (n=2,784)

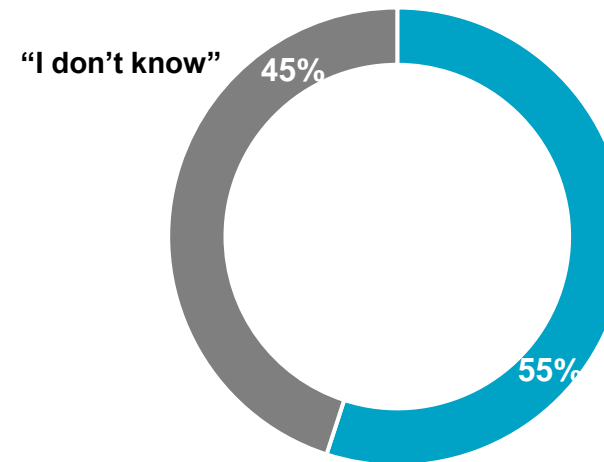
There is uncertainty around the cost of charging, especially among non-EV drivers.

*You are away from home, driving an all-electric vehicle (EV) and your battery is running low. You use an EV public charging station with a DC fast charger to “fill-up” your battery to about 80%. **How much would you expect this “fill-up” to cost?***

EV Drivers



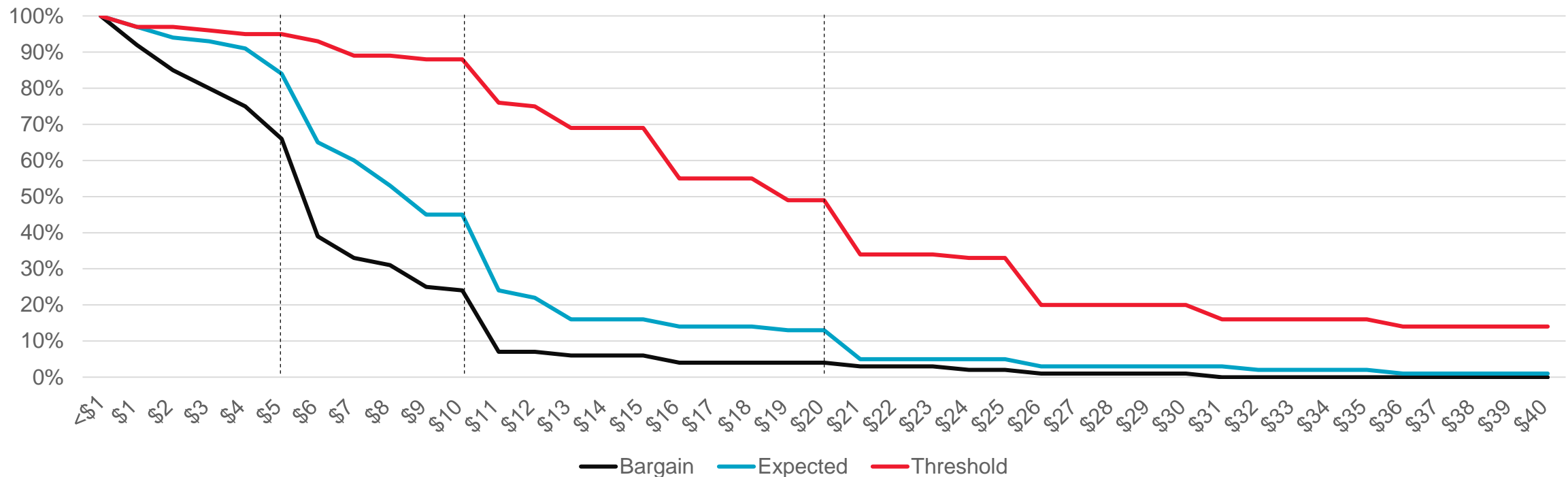
Non-EV Drivers



How much would you expect this “fill-up” to cost? Base: EV Drivers (n=110); Non-EV Drivers (n=2,784)

Most EV drivers expect to pay <\$10 for public charging; any more and they'd consider it too expensive.

You are away from home, driving an all-electric vehicle (EV) and your battery is running low. You use an EV public charging station with a DC fast charger to “fill-up” your battery to about 80%.



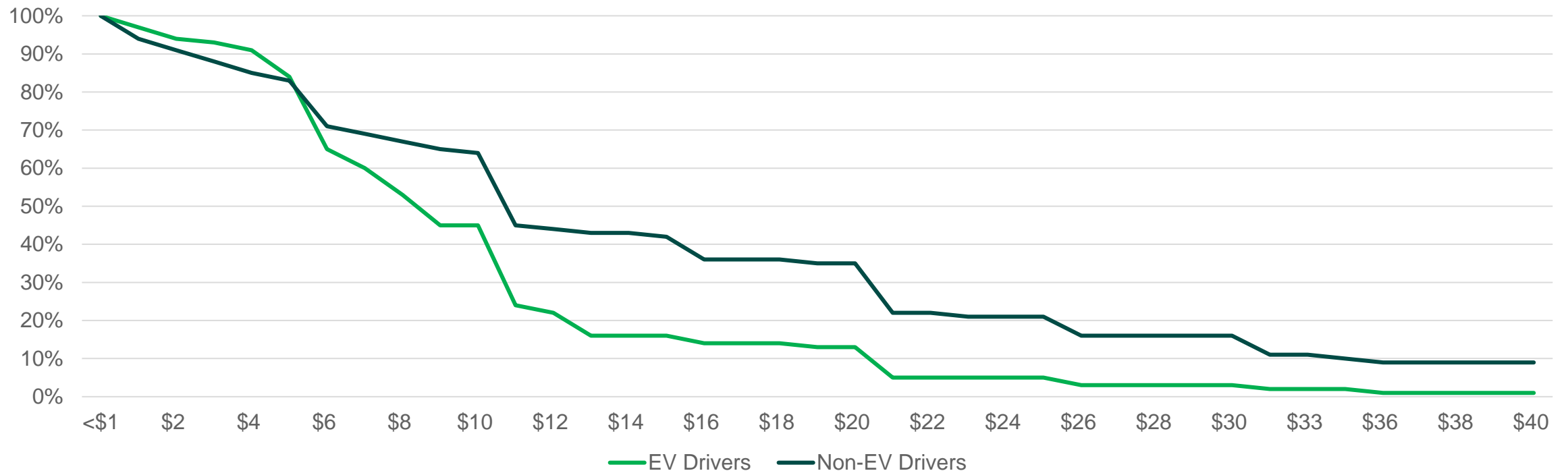
How much would you expect this “fill-up” to cost? Base: EV Drivers (n=86)

At what price would you consider it to be so expensive that you would not “fill-up” your battery to 80%? Base: EV Drivers (n=110)

And at what price would you consider it to be a bargain, a great buy for the money, to “fill-up” your battery to 80%? Base: EV Drivers (n=110)

Expected “fill-up” costs are generally higher among non-EV drivers probably due to lack of familiarity with charging cost.

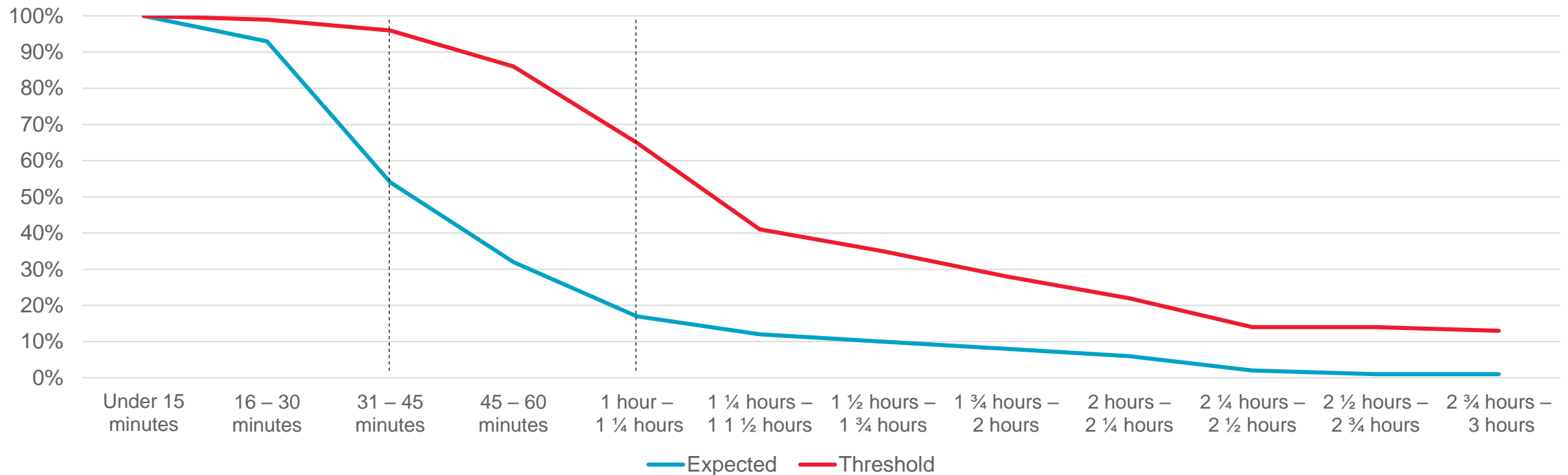
*You are away from home, driving an all-electric vehicle (EV) and your battery is running low. You use an EV public charging station with a DC fast charger to “fill-up” your battery to about 80%. **How much would you expect this “fill-up” to cost?***



How much would you expect this “fill-up” to cost? Base: EV Drivers (n=86); Non-EV Drivers (n=1,524) EXCLUDES ‘DON’T KNOW’

While EV drivers expect public charging to be fast (under 30 minutes), most are willing to spend an hour to charge.

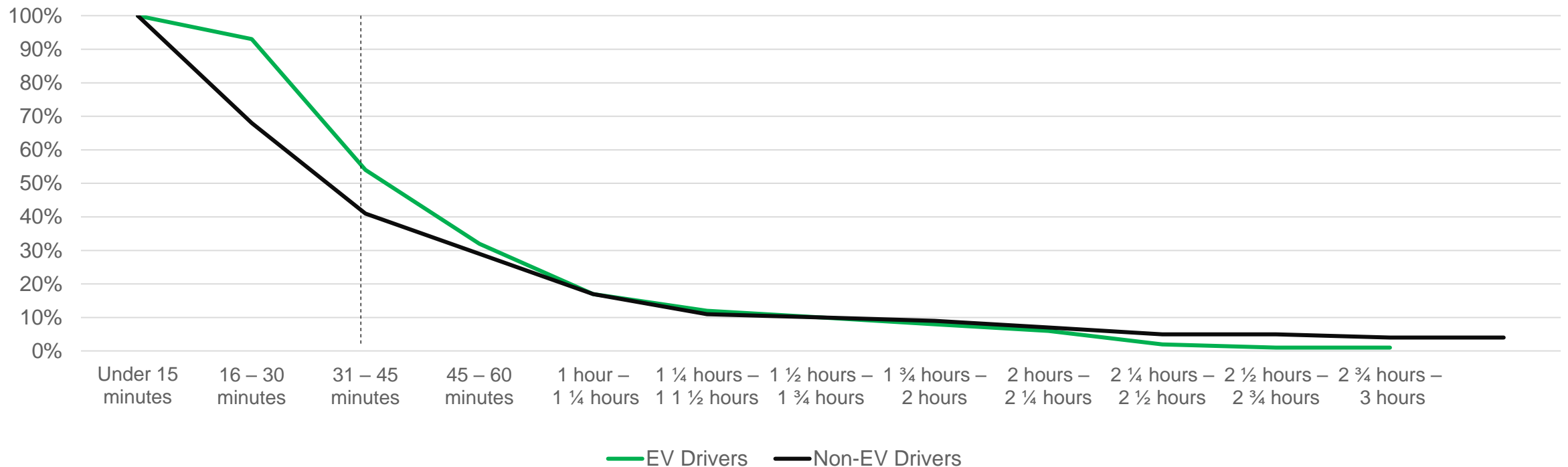
You are away from home, driving an all-electric vehicle (EV) and your battery is running low. You use an EV public charging station with a DC fast charger to “fill-up” your battery to about 80%.



How much time would you expect it to take to “fill-up” your battery to 80? Base: EV Drivers (n=103); EXCLUDES ‘DON’T KNOW’
How much time would be too long that you would not “fill-up” your battery to 80 at this station? Base: EV Drivers (n=110)

Fewer than half of non-EV drivers expect charging to take more than 30 minutes.

You are away from home, driving an all-electric vehicle (EV) and your battery is running low. You use an EV public charging station with a DC fast charger to “fill-up” your battery to about 80%. How much time would you expect it to take to “fill-up” your battery to 80?



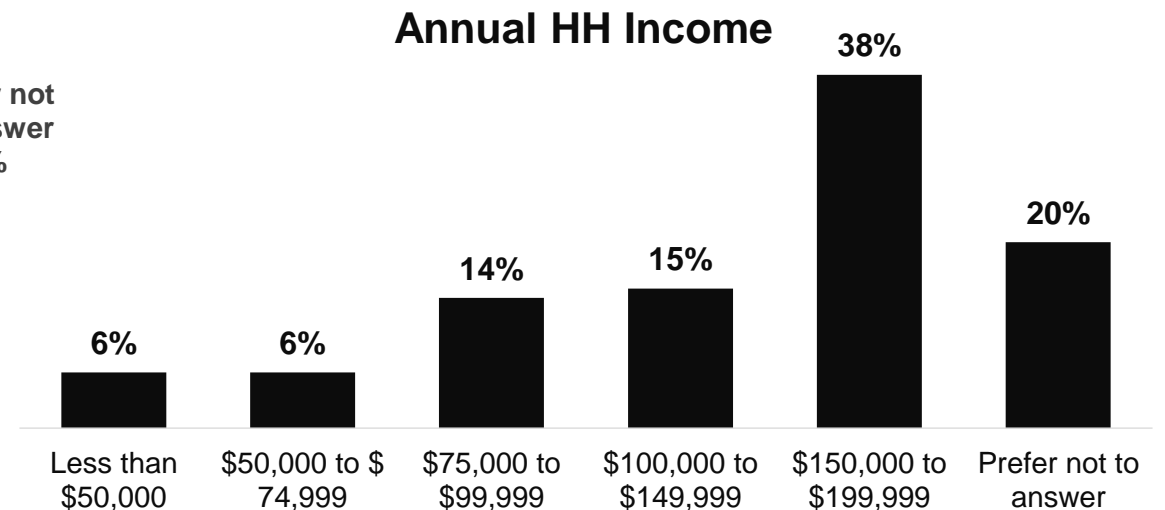
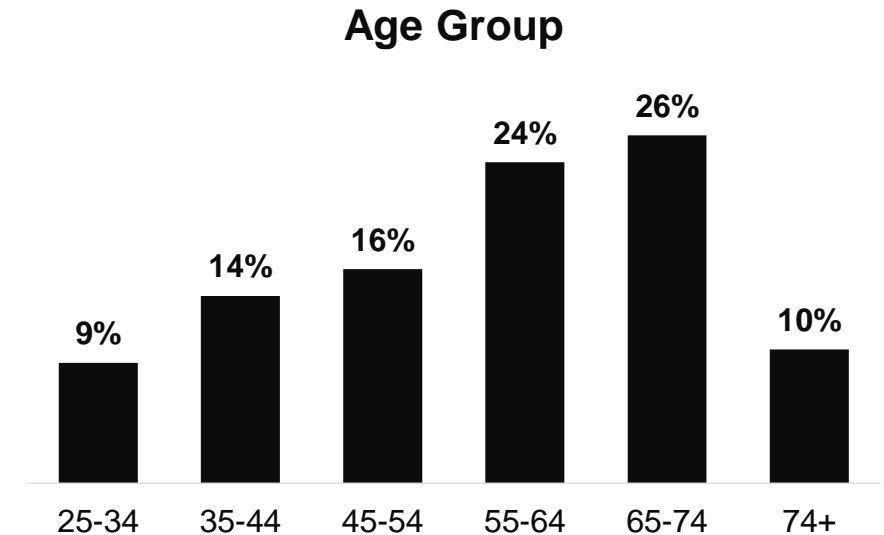
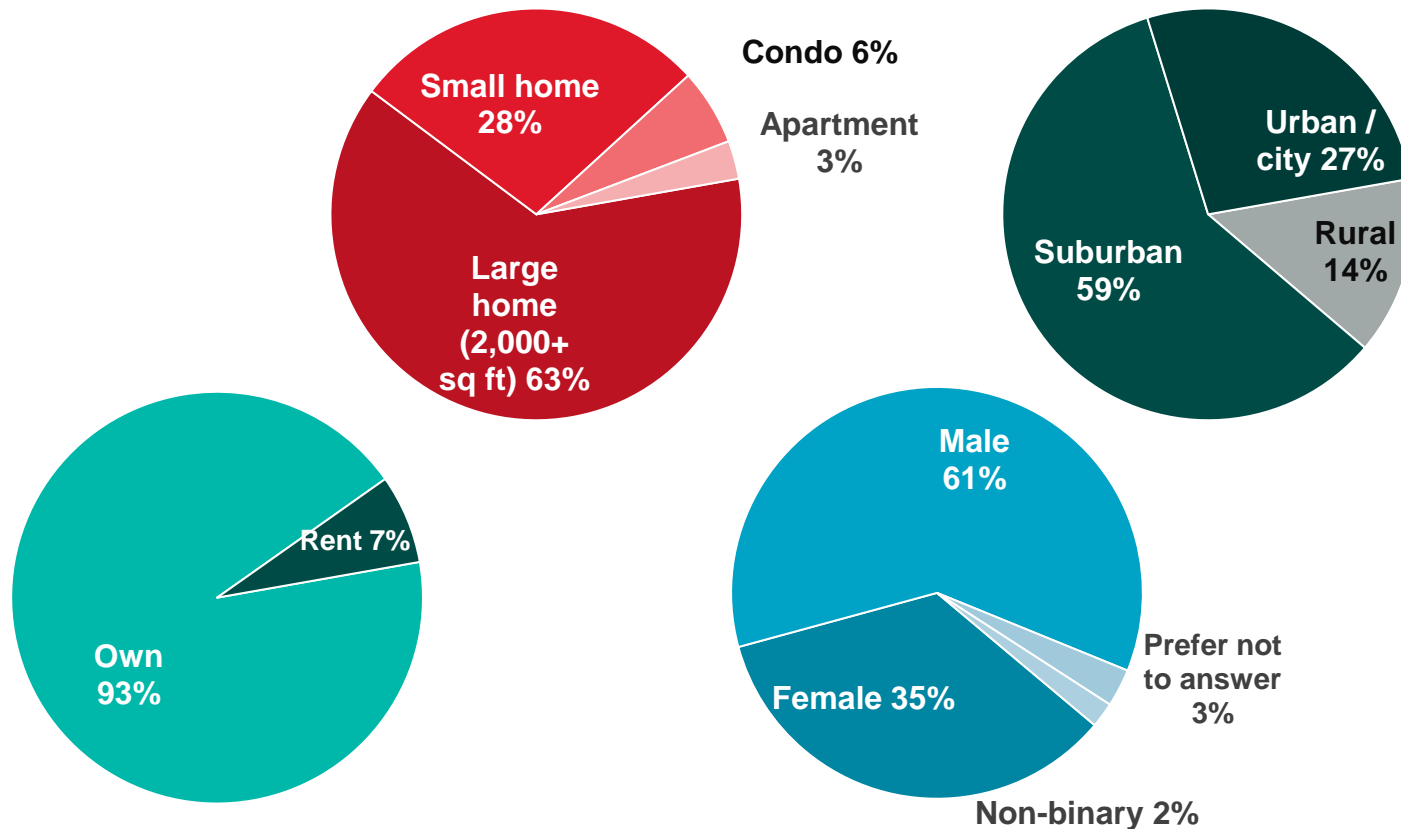
How much time would you expect it to take to “fill-up” your battery to 80? Base: EV Drivers (n=103); EXCLUDES ‘DON’T KNOW’



EV DRIVER DEMOGRAPHICS

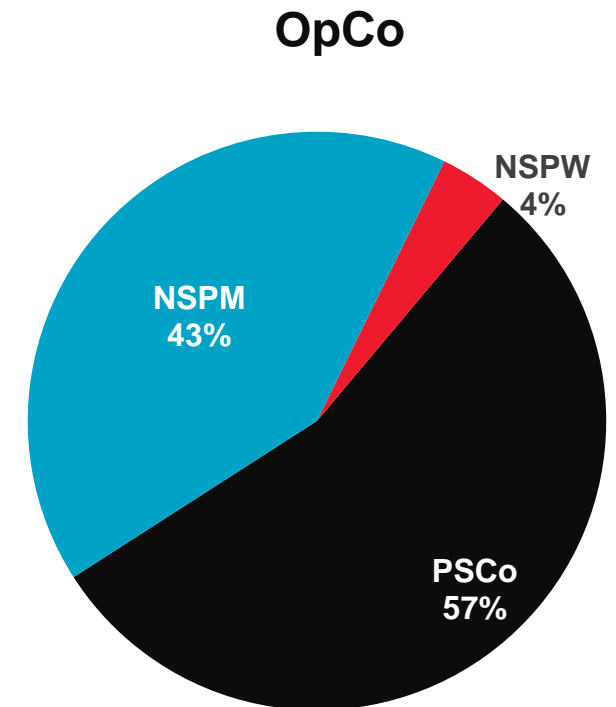
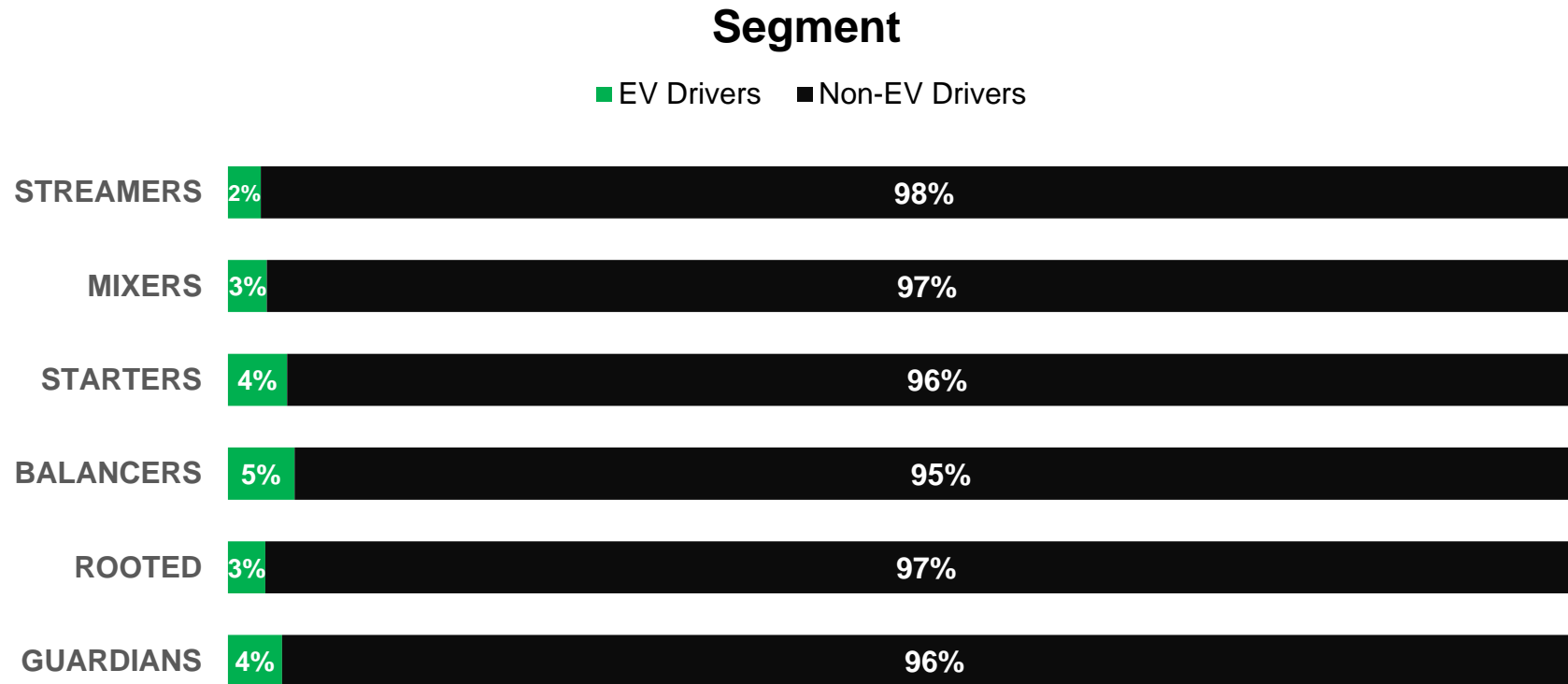


Current EV Drivers predominately own vs. rent, live in the suburbs, have large homes, higher income, are men and between 55 and 74 years old.



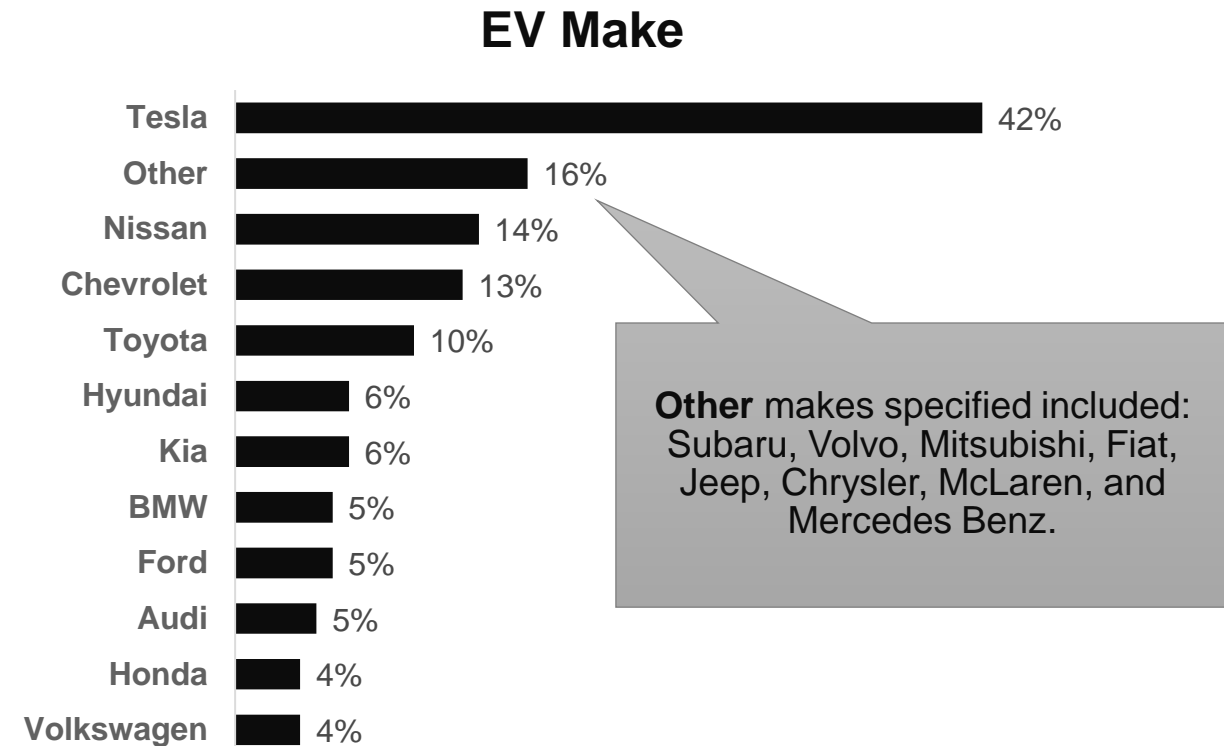
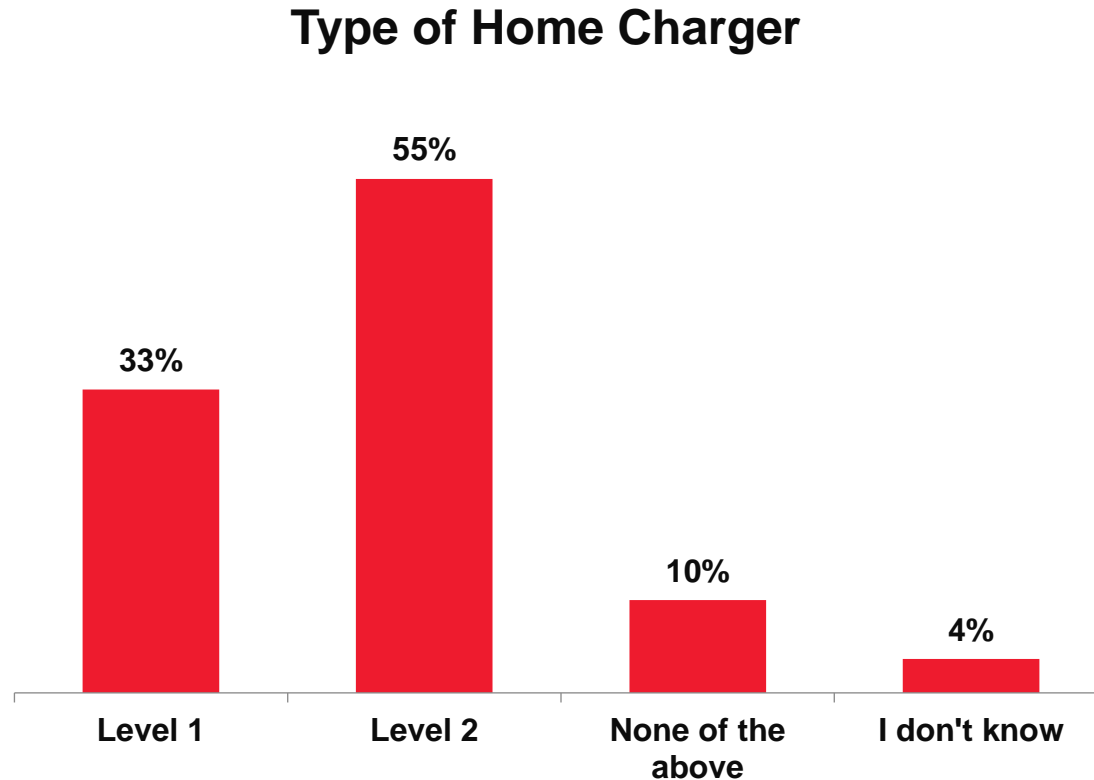
Base: EV Drivers (n=110)
Do you currently own or rent your place of residence?
Which of the following best describes your place of residence?
Which of the following best describes you?
Which of the following best describes the area you live in?
What is your age group?
What is your total annual household income before taxes?

EV Drivers account for a slightly larger share of Balancers than other segments.



Customer data. Base: EV Drivers (n=110); Non-EV Drivers (n=2,784)

Over half of EV Drivers indicate having a level 2 charger at home.



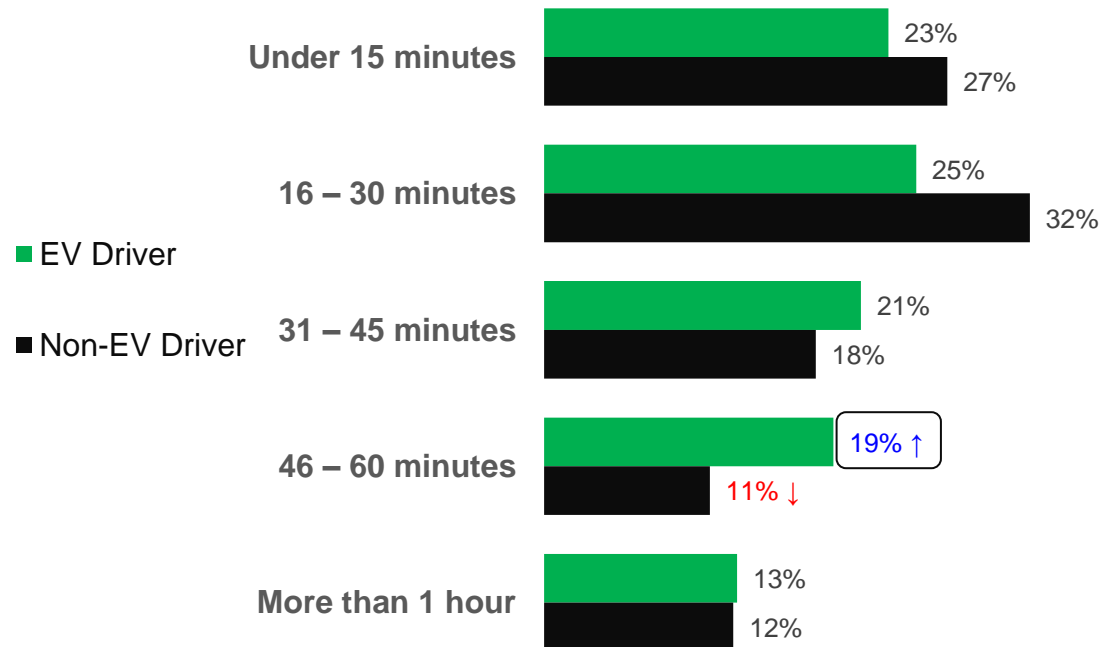
What kind of EV charging do you use at your home, if any? Please select all that apply. Base: EV Drivers (n=110)
What is the make/brand of your electric vehicle(s)? Base: EV Drivers (n=110)

EV Drivers are more likely to drive 46-60 minutes a day and 10,000-20,000 miles per year.

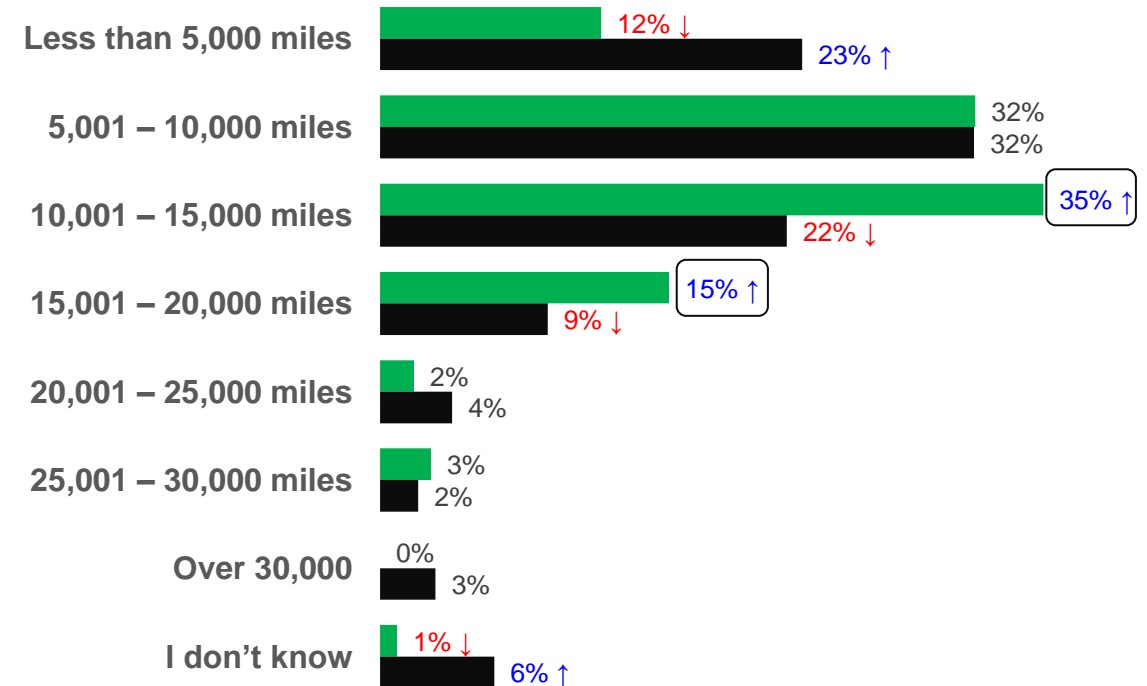
However, 69% of EV Drivers still drive less than 45 minutes each day.

The average person drove 14,263 miles per year in 2019, according to the U.S. Dept of Transportation.

Average Daily Drive Time



Miles Driven in a Year



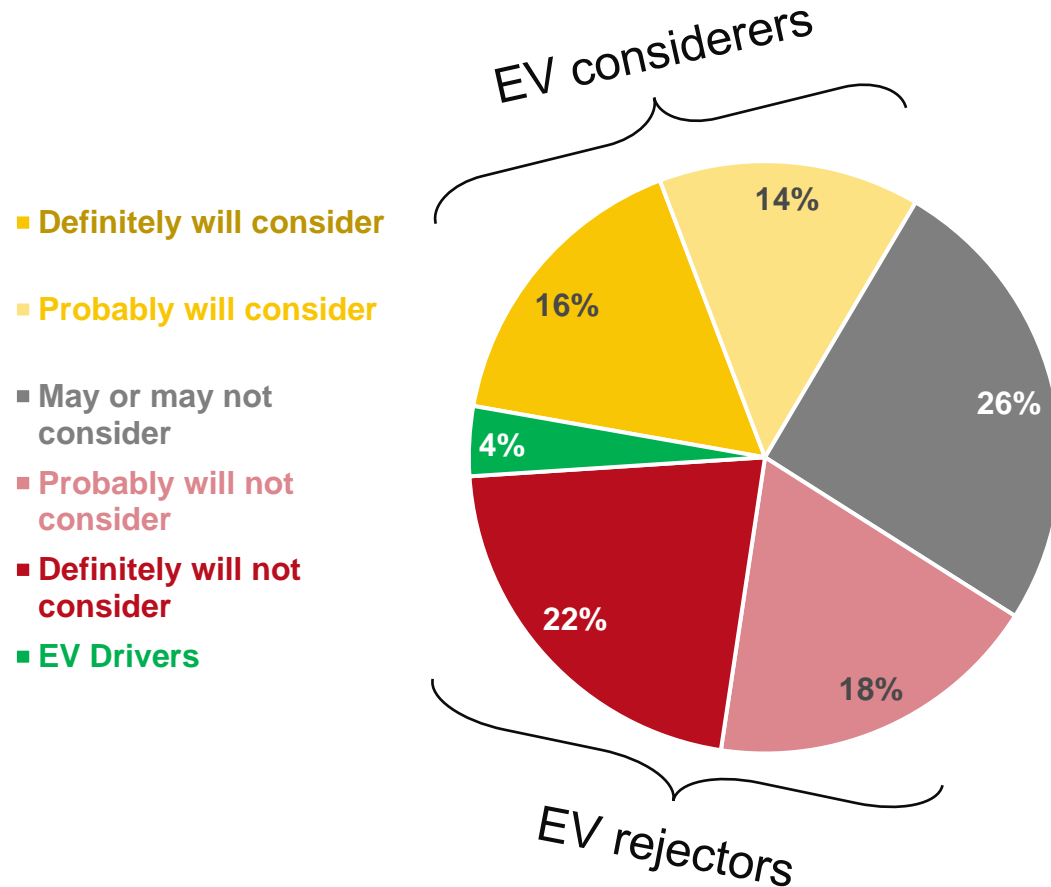
On average, how much time do you spend driving each day? Base: EV Drivers (n=110); Non-EV Drivers (n=2,784)
Approximately, how many miles do you drive in a year? Base: EV Drivers (n=110); Non-EV Drivers (n=2,784)



EV CONSIDERATION



About 1 of 3 non-EV drivers say they would consider getting an EV while just over 40% indicate they will not.



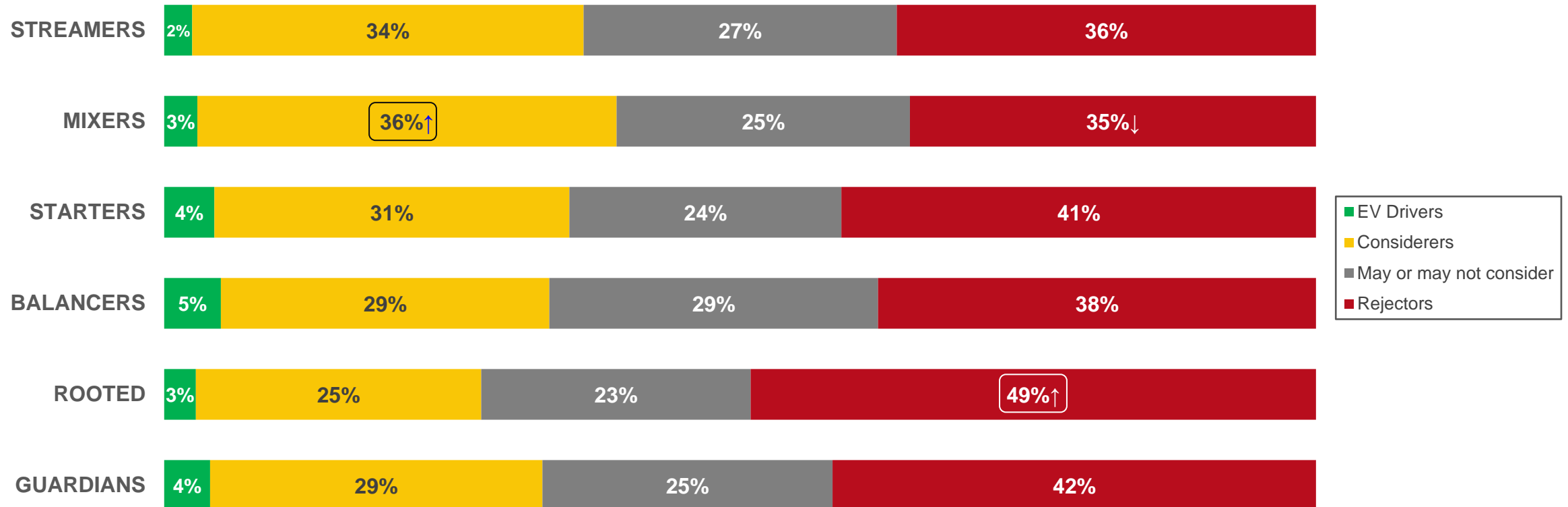
The following slides will look at the differences between these groups.

Side-by-side comparisons reveal what the next wave of EV drivers could look like.

The next time you are looking to buy or lease an automobile, would you consider getting an all-electric vehicle (EV)? (n=2,894)

EV consideration is generally similar across our residential segments.

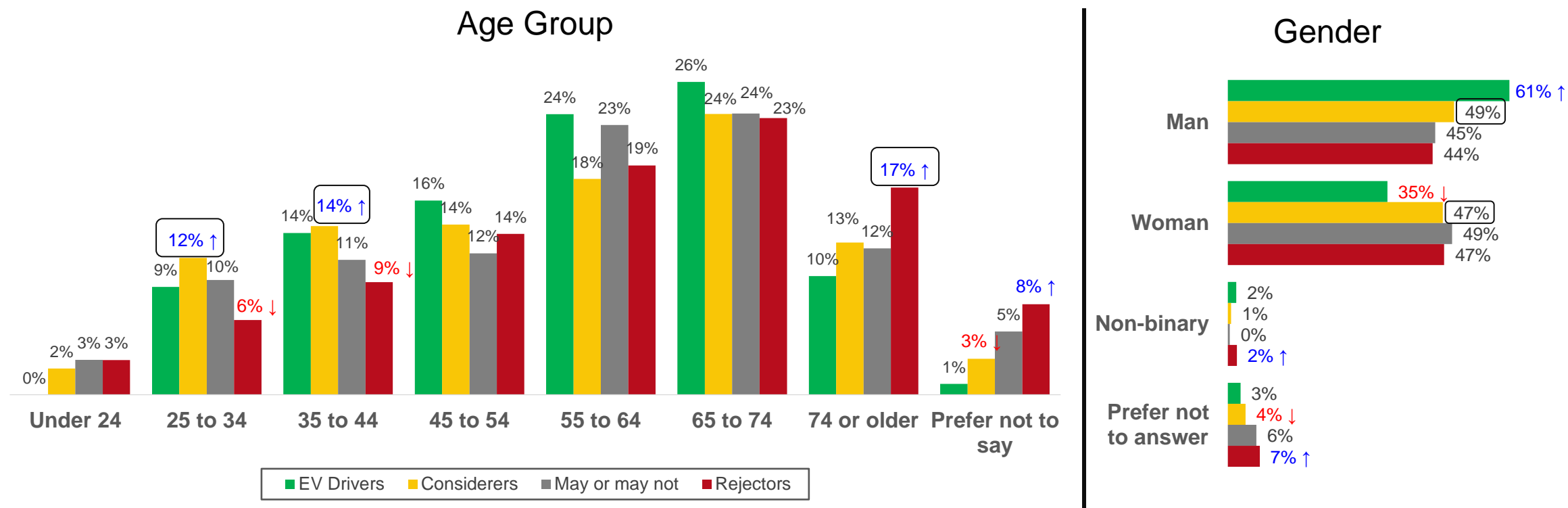
Mixers are more likely to consider getting an EV while Rooted are more likely to be EV rejectors.



Customer data: Segment. Base: EV Drivers (n=104); Considerers (n=853); May or May Not Consider (n=702); Rejectors (n=1,118)

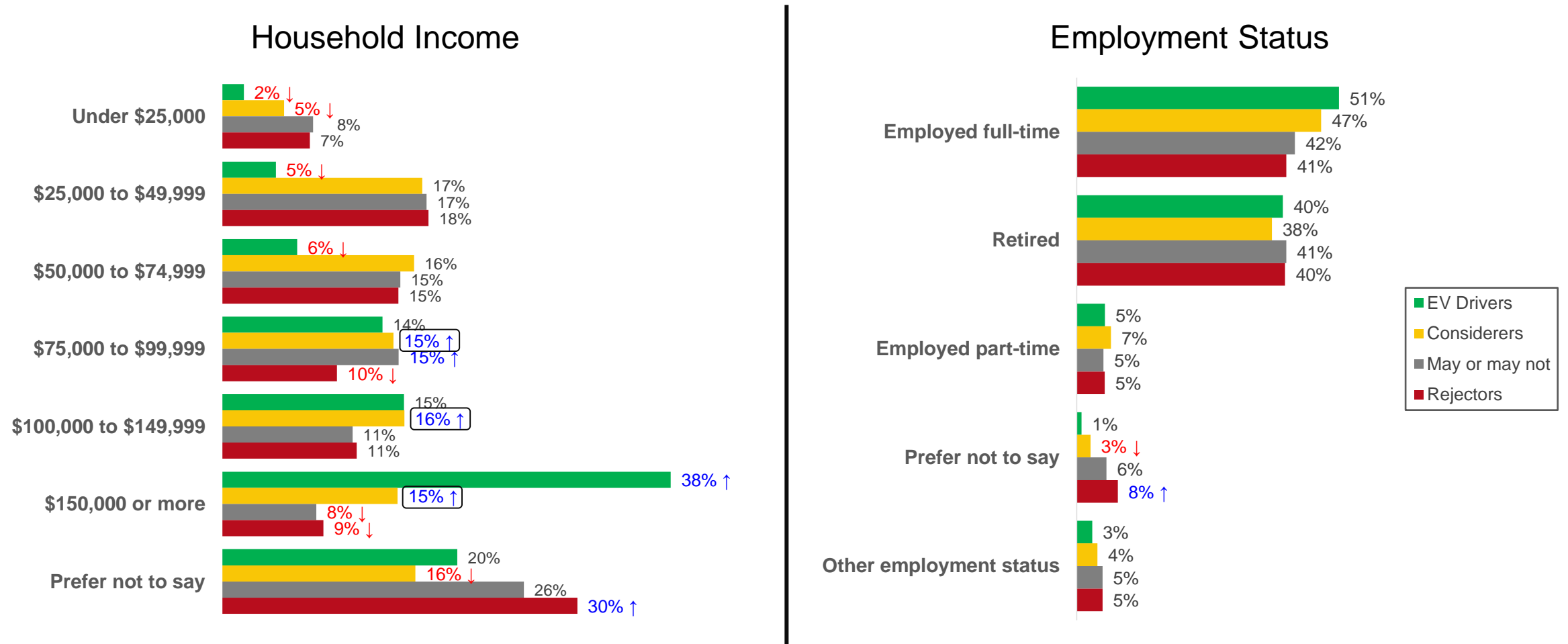
People who would consider getting an EV are more likely to be between 25 and 44 years old while people 74 and older are less likely.

There is an even split of men and women open to EV consideration hinting there will be a larger portion of women EV drivers in the future.



What age group are you in? Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)
Which of the following best describes you? Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)

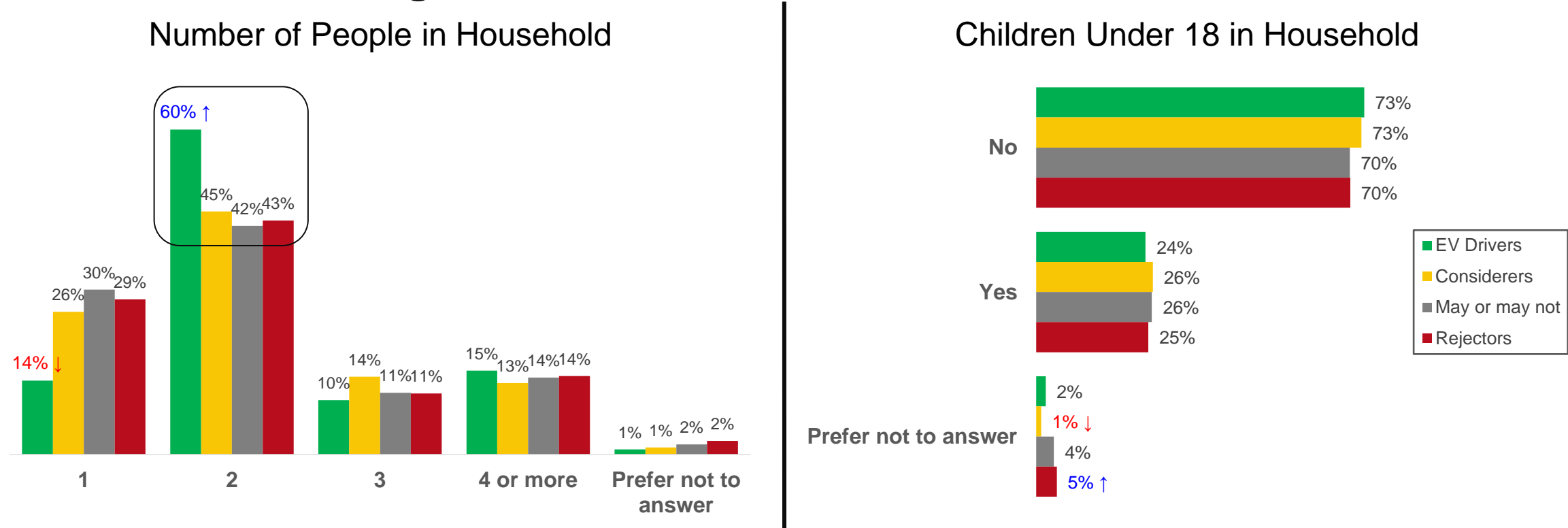
The average annual income for EV considerers is lower than current EV drivers, but they are still more likely to have higher income (over \$75k).



What is your total annual household income before taxes? Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)
Which of the following best describes your employment status? Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)

While current EV drivers are more likely to have 2 people in their household, this is not reflective of potential future EV drivers.

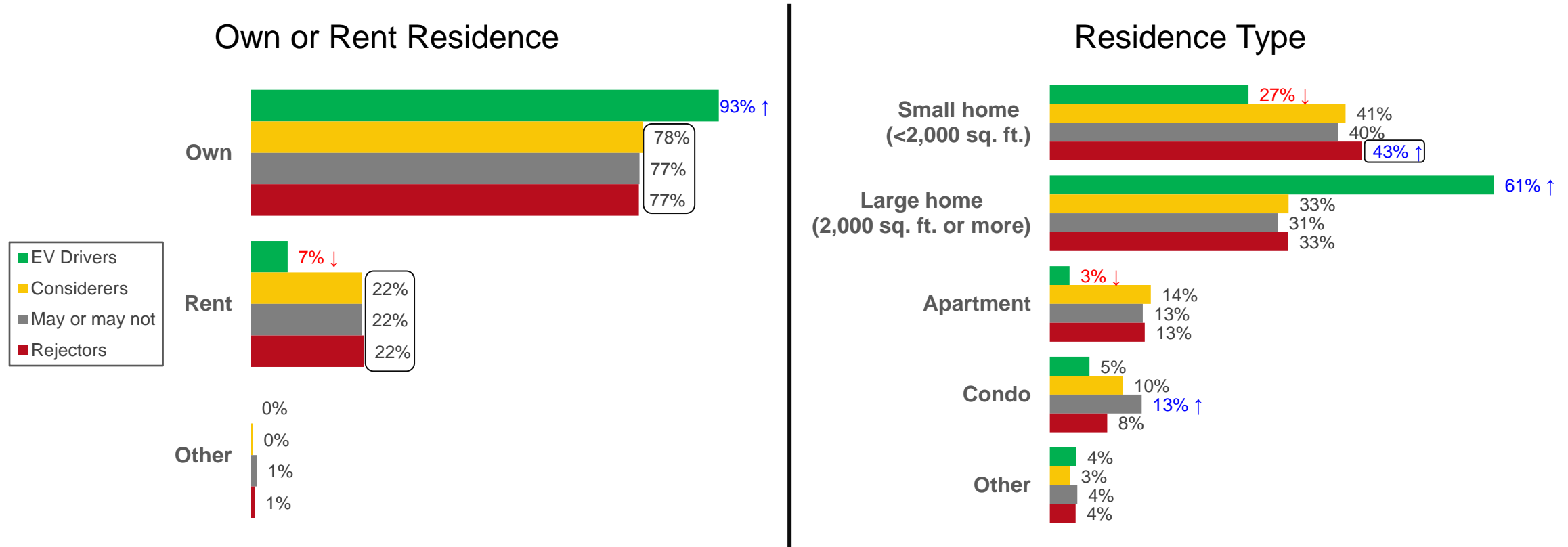
There is no statistical difference in EV consideration based on having children under the age of 18 in the household.



Including yourself, how many people currently live in your household? Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)
Are there children under the age of 18 in your household? Base: EV Drivers (n=94); Considerers (n=621); May or May Not Consider (n=483); Rejectors (n=777)

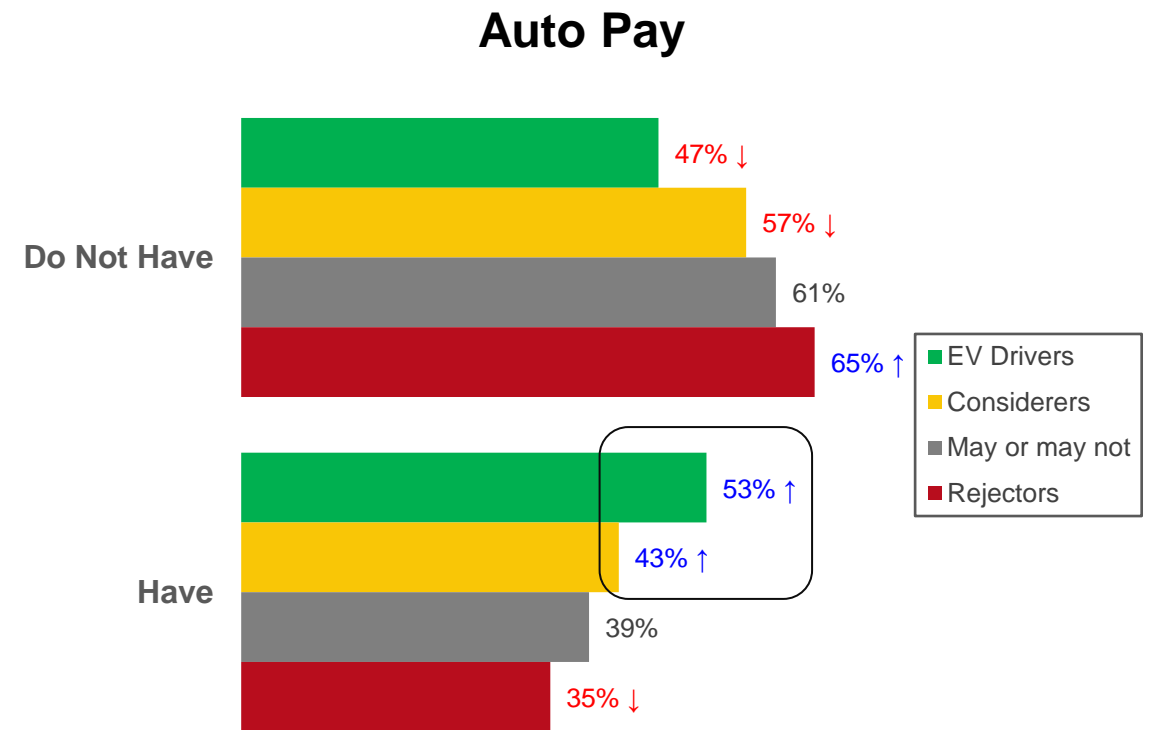
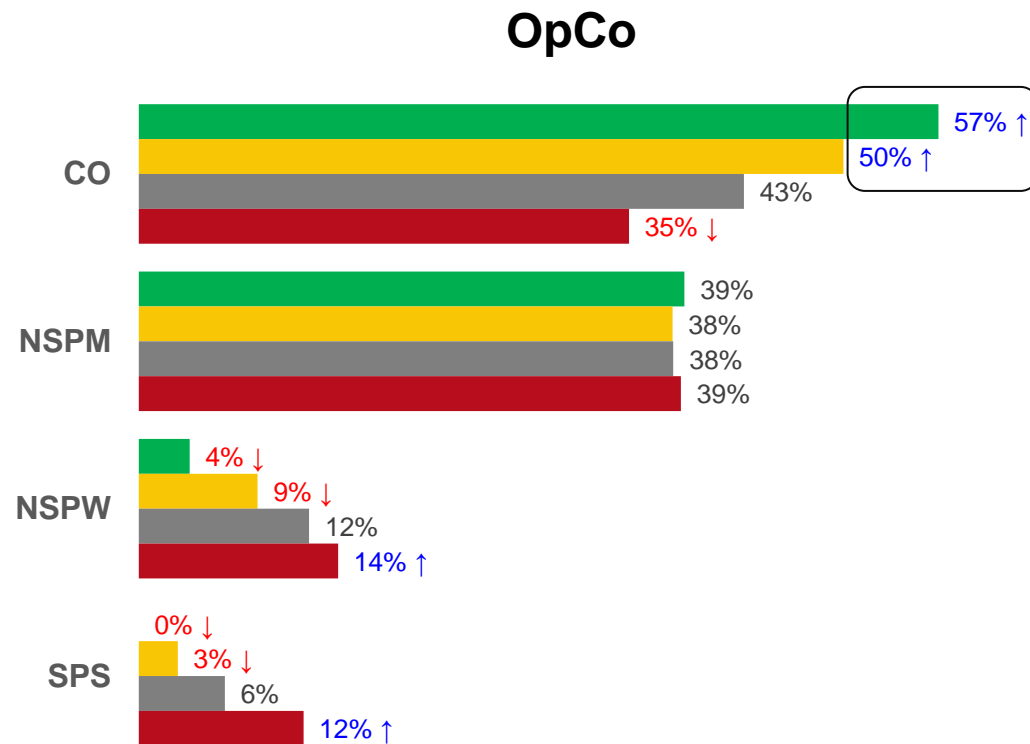
Among homeowners and renters there is not a significant difference in EV consideration.

EV rejectors are more likely to live in a small home.



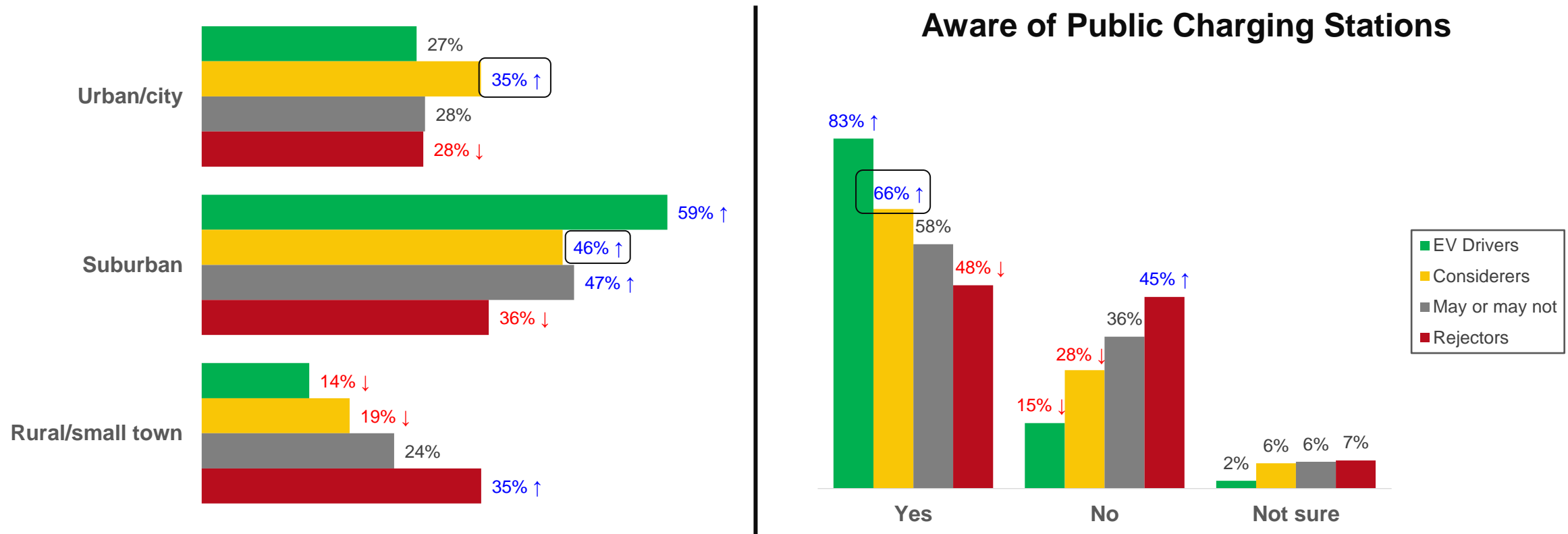
Do you currently own or rent your place of residence Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)
Which of the following best describes your place of residence? Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)

Like current EV drivers, EV considerers are more likely to live in PSCo and have Auto Pay.
EV resisters are more likely in NSPW & SPS.



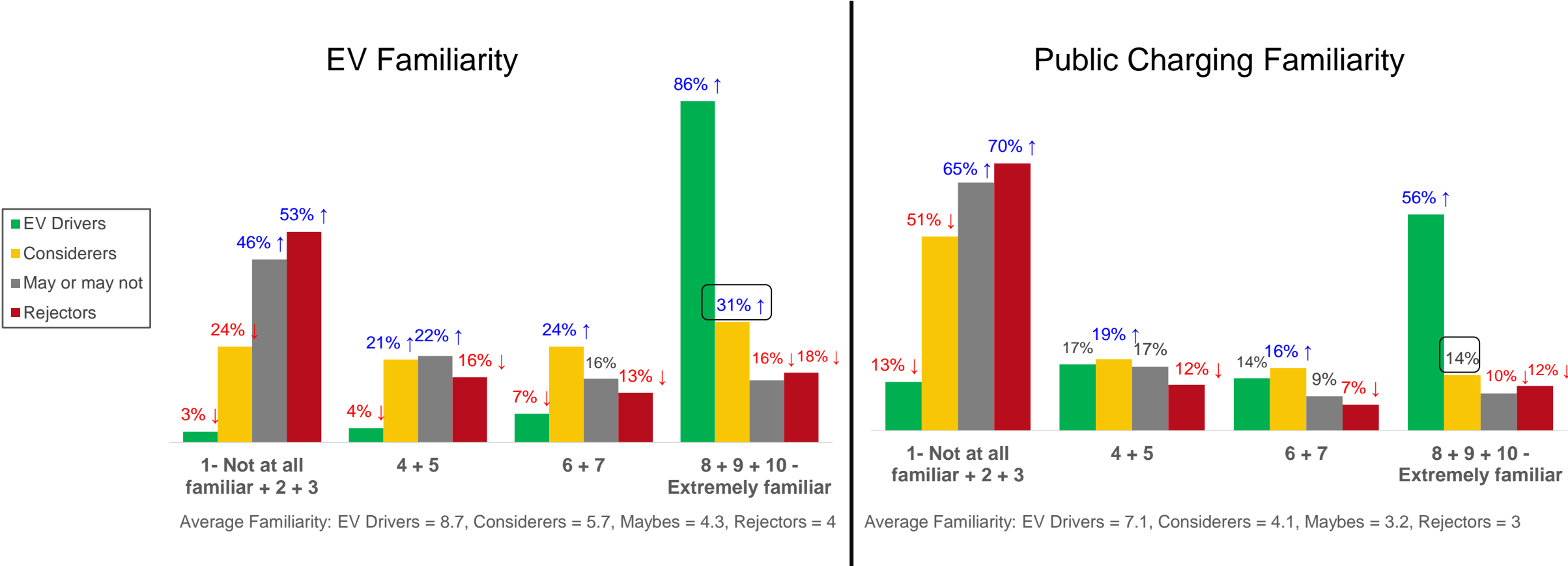
Customer data: State & Auto Pay. Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)

EV considerers are more likely to live in urban and suburban areas and to be aware of public charging stations in their community.



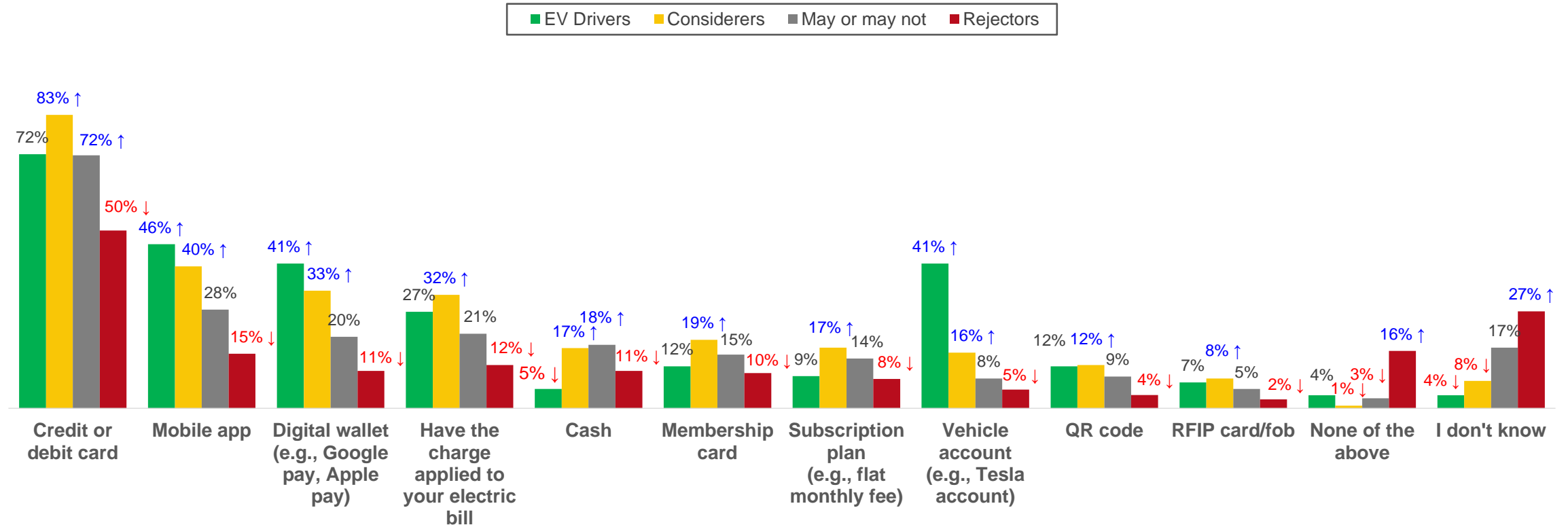
Which of the following best describes the area where you live? Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)
Are you aware of, or have you seen, any EV public charging stations in your community? Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)

About a third of EV considerers have high familiarity with EVs.
However, there is less familiarity in general with public charging stations.



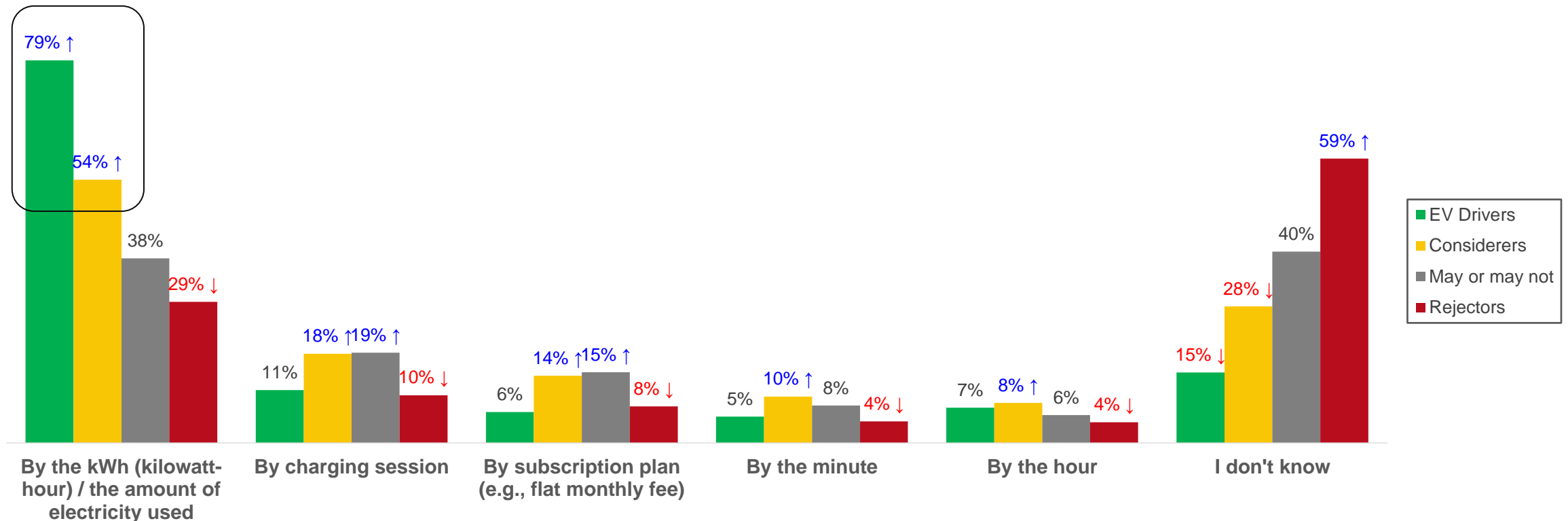
How familiar are you with electric vehicles (EVs)? Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)
How familiar are you with EV public charging stations? Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)

Credit / debit card is the top preferred way that EV considerers want to pay at public charging stations followed by mobile app.



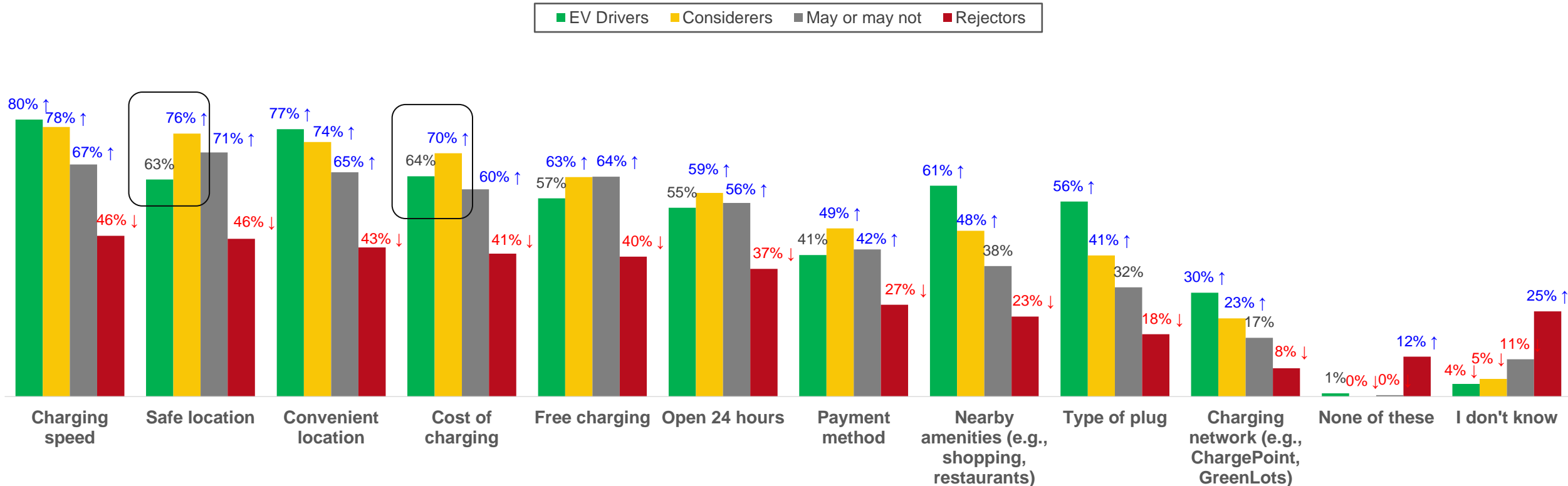
When using a paid EV public charging station, what way(s) would you like to pay? Please select all that apply. Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)

Like EV drivers, EV considerers are more likely to want the price to be determined by kWh.



How would you like the price to be determined when using a paid EV public charging station? Please select all that apply. Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)

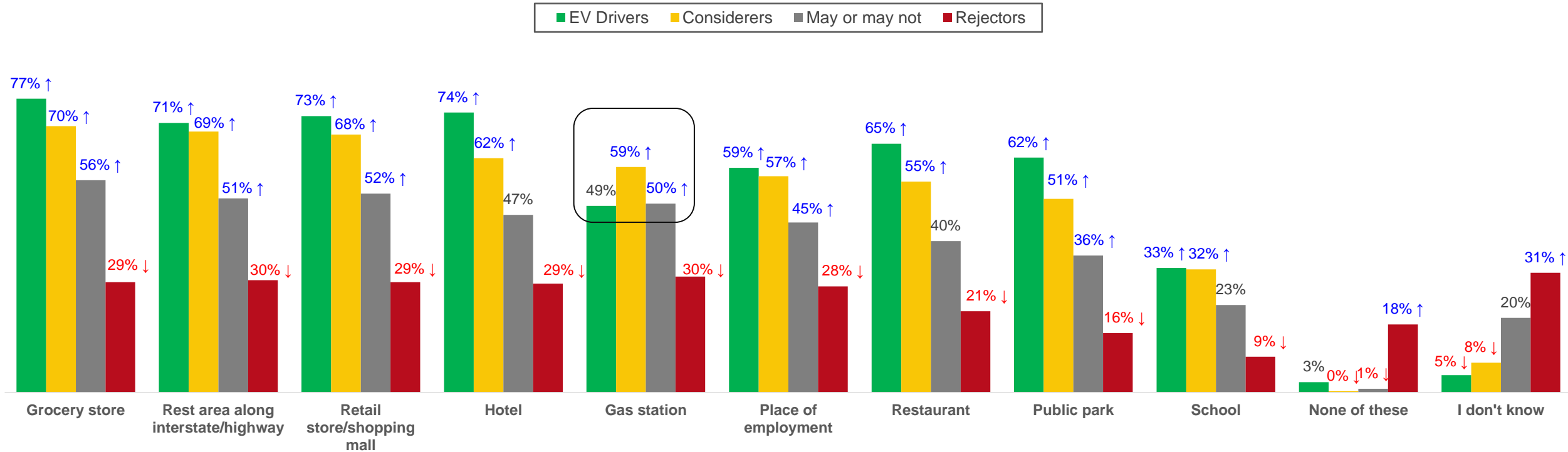
Speed, safety, convenient location and cost are all important public charging features for people who would consider an EV.
Notably, a safe location and cost may be more important to EV considerers than current EV drivers.



What features would be important to you when choosing an EV public charging station to use? Please select all that apply. Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)

There is a higher willingness by EV considerers to use charging stations at different locations.

People who would consider getting an EV indicate greater willingness to charge at a gas station compared to current EV drivers.



Where would you be willing to use an EV public charging station? Please select all that apply. Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)



 **Xcel** Energy®

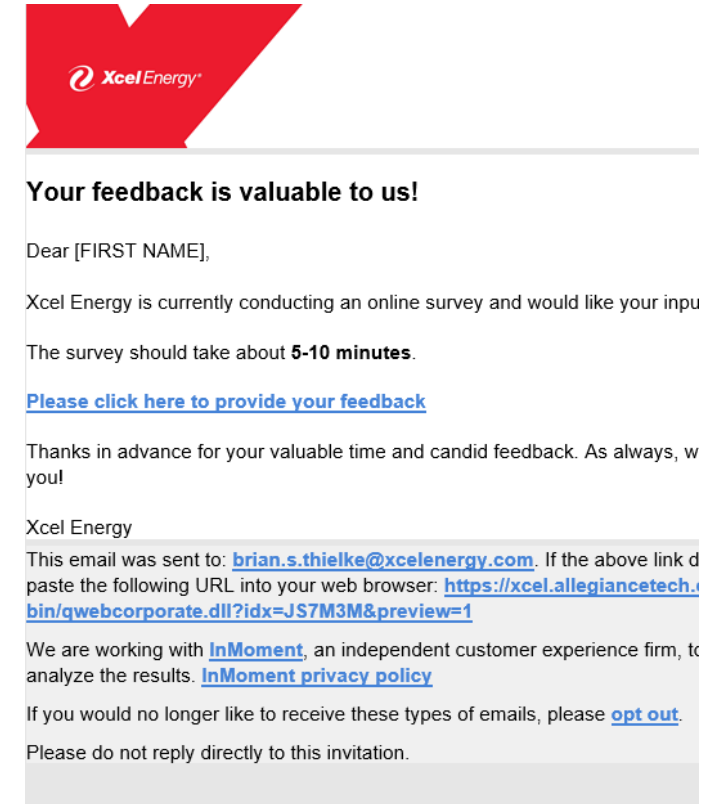


APPENDIX



Methodology

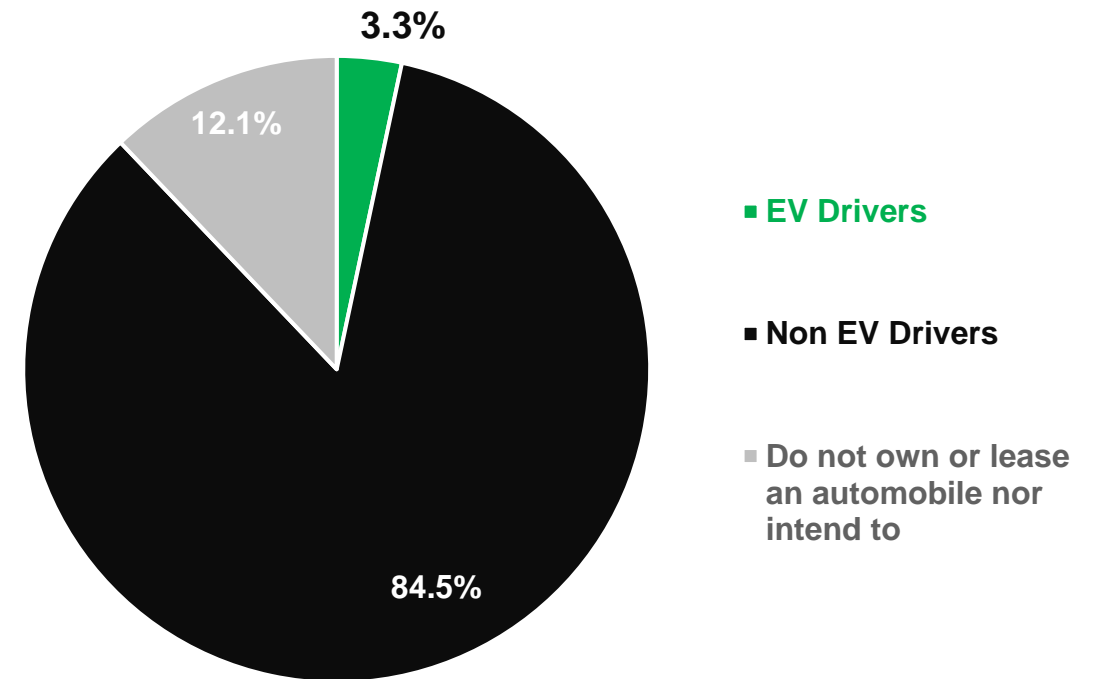
- Online survey
- Emails invitations & reminders sent to a random, representative sample of ~125,000 Xcel Energy residential customers
 - Have not participated in a survey in the last 12 months
- Conducted between **March 31st & April 10th, 2022**
- InMoment platform



Respondents

3,293 completed surveys

- **2,894** own or lease automobile(s) or expect to in the next year
- **110** own or lease an EV
 - (3.3% of sample is comparable to national and state estimates for EV drivers)
- People who do not own or lease an automobile and do not intend to in the next year were discontinued from the survey



Do you currently own or lease an automobile (e.g., car, SUV, light truck)? (n= 3,293)

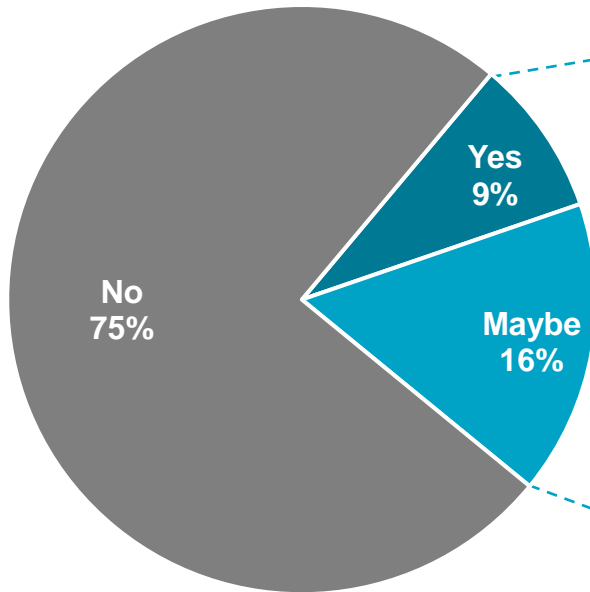
Do you plan or expect to buy or lease an automobile in the next 12 months? (n=3,293)

Which of the following types of automobiles do you own or lease? (n=2,866)

Among those planning to buy or lease in the next year, the likelihood of getting an EV is lower than consideration.

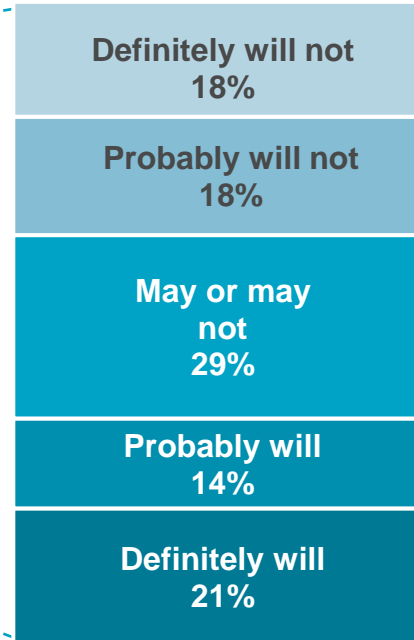
9% of respondents indicate they plan to buy or lease an automobile in the next year while 16% said they might.

Plan to buy or lease in the next year



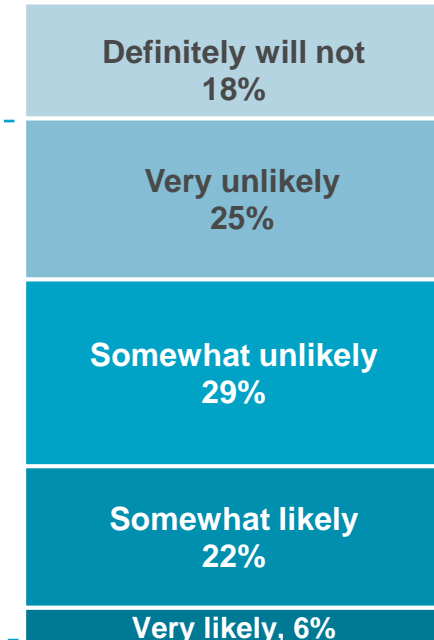
21% of people looking to buy/lease in the next year would definitely consider an EV.

Consideration to get an EV
(of those planning to buy or lease in next year)



While only 6% of people looking to buy/lease in the next year are very likely to get an EV.

Likelihood to get an EV
(of those planning to buy or lease in next year)

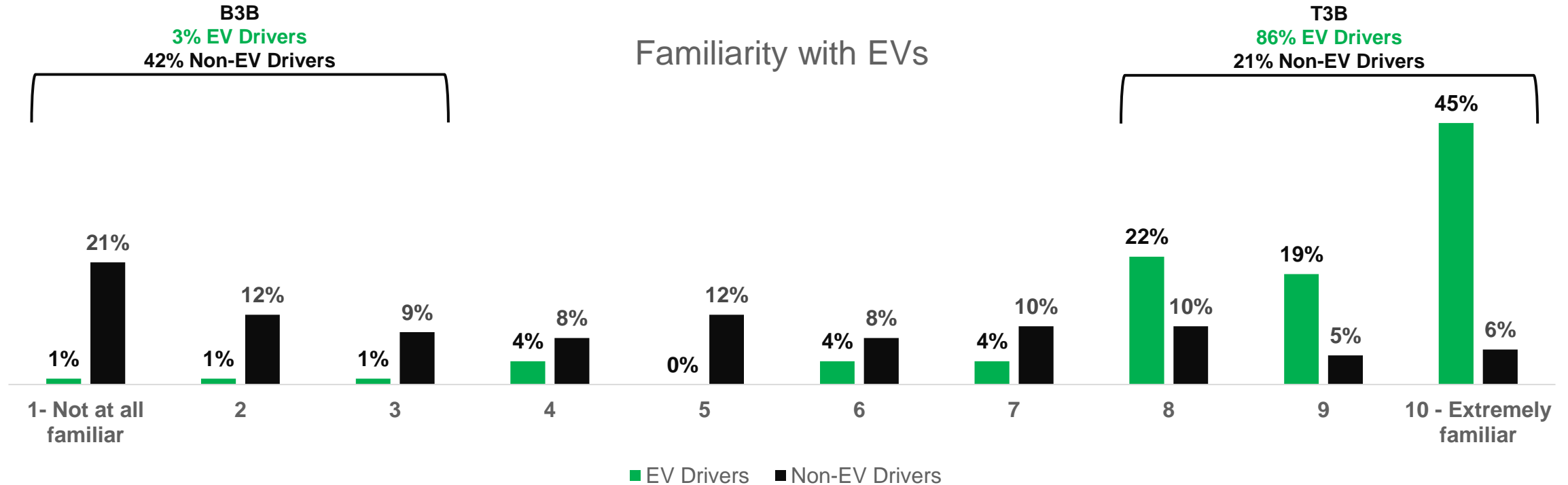


Do you plan or expect to buy or lease an automobile in the next 12 months? Base: (n=2,894)

The next time you are looking to buy or lease an automobile, would you consider getting an all-electric vehicle (EV)? Base: Yes/Maybe (n=817)

And how likely are you to buy or lease an all-electric vehicle (EV) in the next 12 months? Base: Yes/Maybe (n=817)

Not surprisingly, EV ownership largely impacts high familiarity with EVs. Half of non-EV drivers indicate a familiarity score of 4 or less.



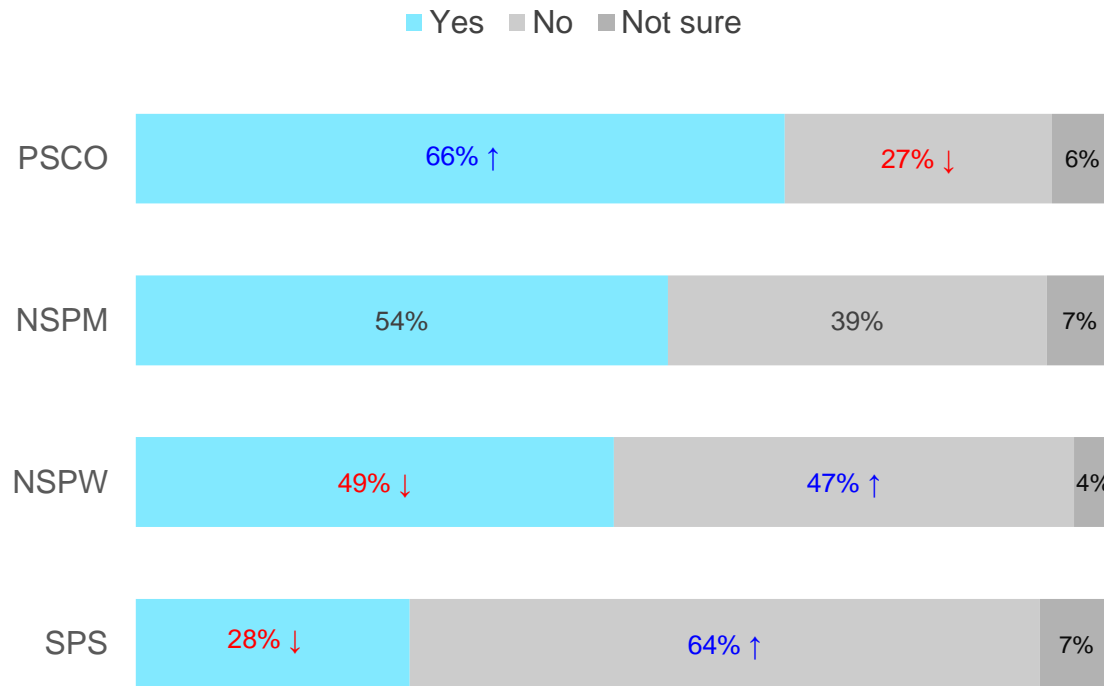
People with low familiarity (1-3) with EVs are more likely to be renters, apartment dwellers, urban or rurally-based, women, under the age of 24, drive <5,000 miles a year, have household income <\$75k and live in NSPW and SPS.

Average Familiarity: EV Drivers = 8.7, Non-EV Drivers = 4.6

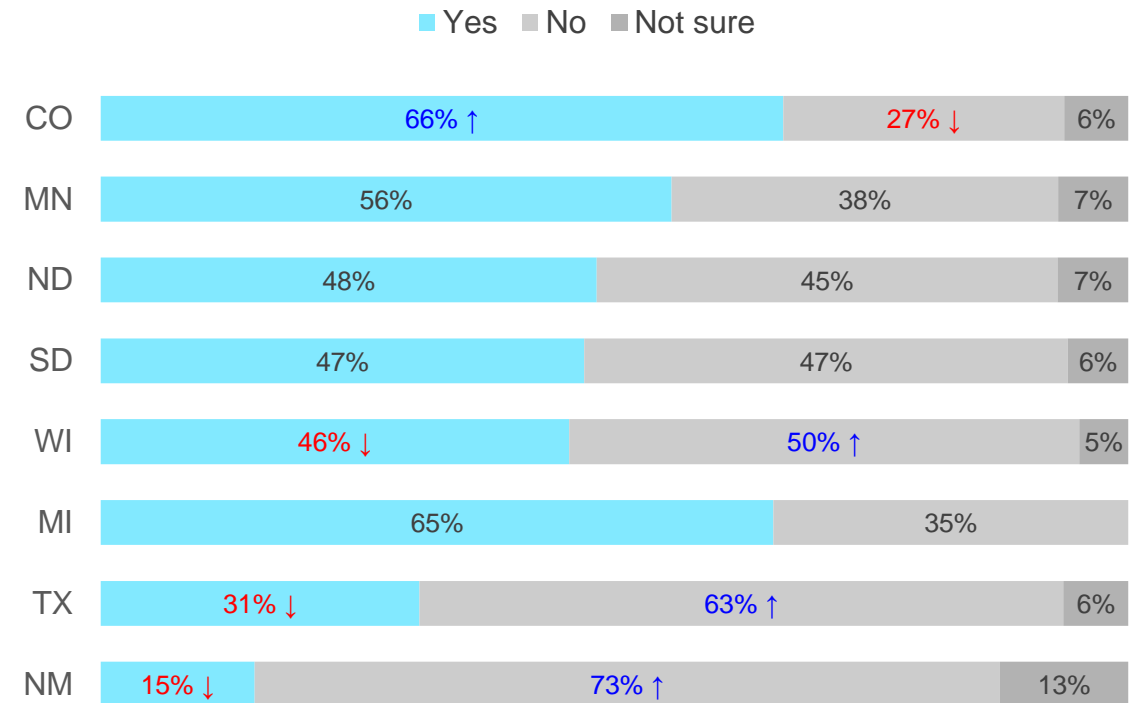
How familiar are you with EV public charging stations? 1-10 scale (Not at all familiar-Extremely familiar) Base: EV Drivers (n=110); Non-EV Drivers (n=2,784)

Customers in Colorado are *more likely* to be aware of public charging stations while customers in Wisconsin, Texas and New Mexico are *less likely*.

Awareness of Public Charging
by OpCo



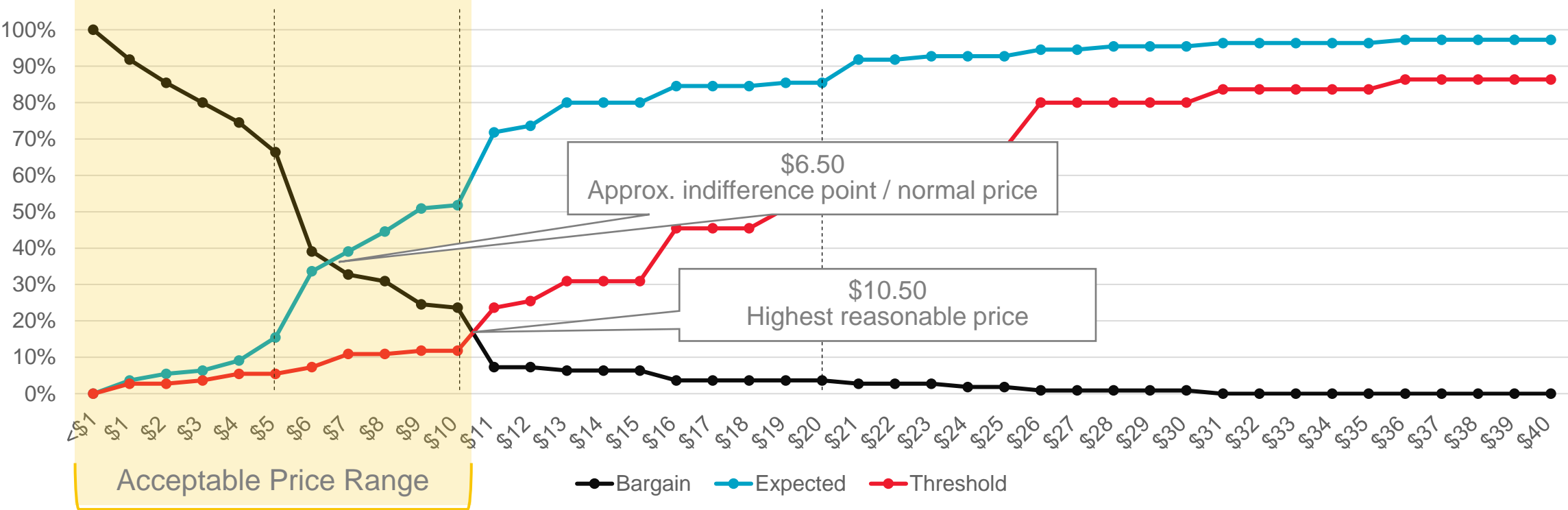
Awareness of Public Charging
by State



Are you aware of, or have you seen, any EV public charging stations in your community? Base: EV Drivers (n=110); Non-EV Drivers (n=2,784)

Approximated Van Westendorp Analysis

You are away from home, driving an all-electric vehicle (EV) and your battery is running low. You use an EV public charging station with a DC fast charger to “fill-up” your battery to about 80%.



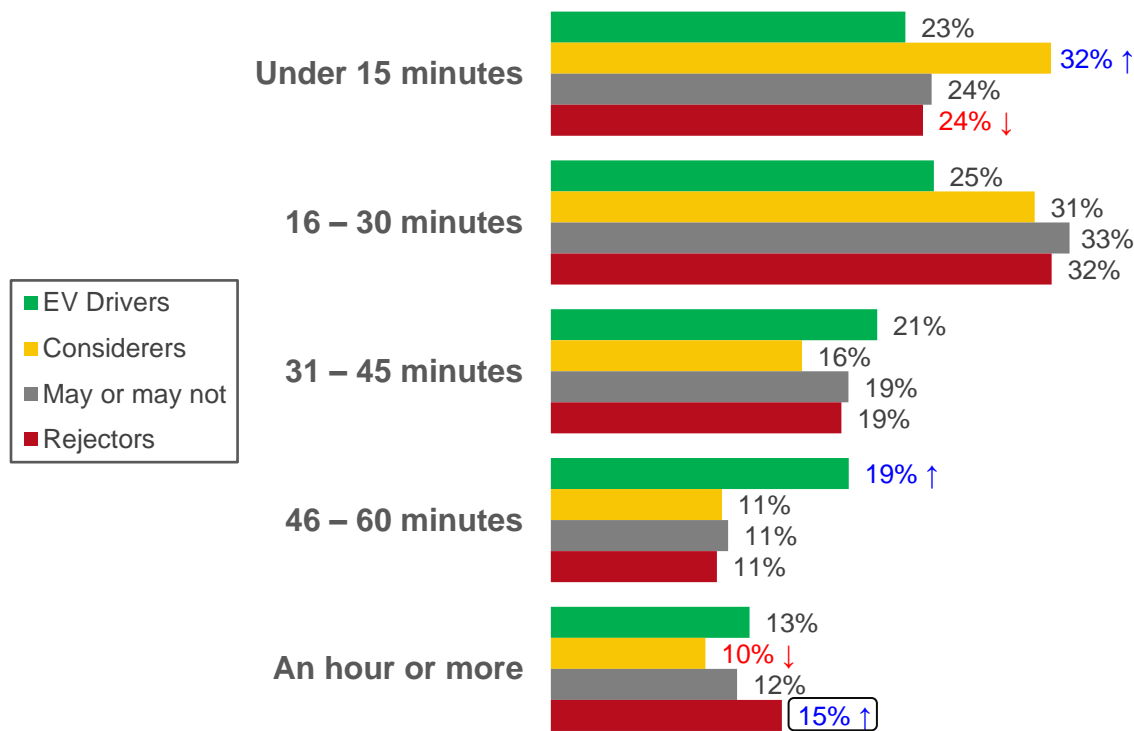
How much would you expect this “fill-up” to cost? Base: EV Drivers (n=86)
Even without being very sure, what is your best guess for how much it would cost to “fill-up” your battery to 80%? Base: EV Drivers (n=24)
At what price would you consider it to be so expensive that you would not “fill-up” your battery to 80%? Base: EV Drivers (n=110)
And at what price would you consider it to be a bargain, a great buy for the money, to “fill-up” your battery to 80%? Base: EV Drivers (n=110)

People who would NOT consider getting an EV are more likely to drive greater amounts.

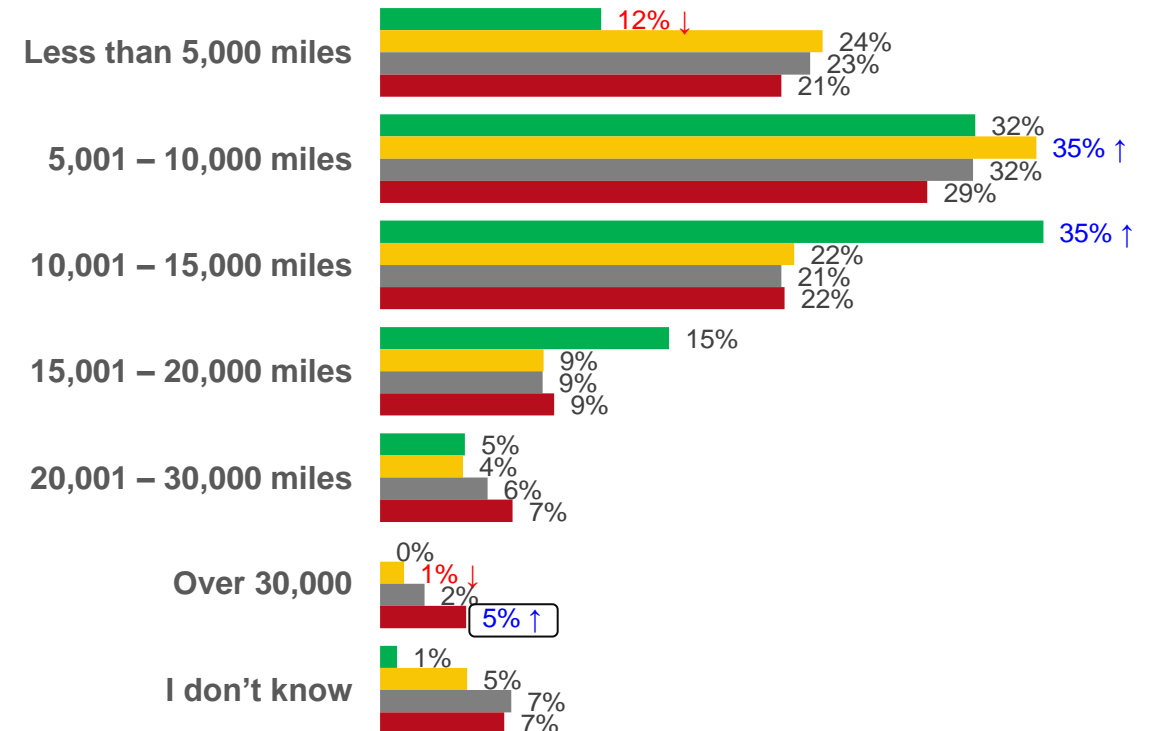
This includes people who drive more than an hour a day.

And those who drive over 30,000 miles a year.

Average Daily Drive Time

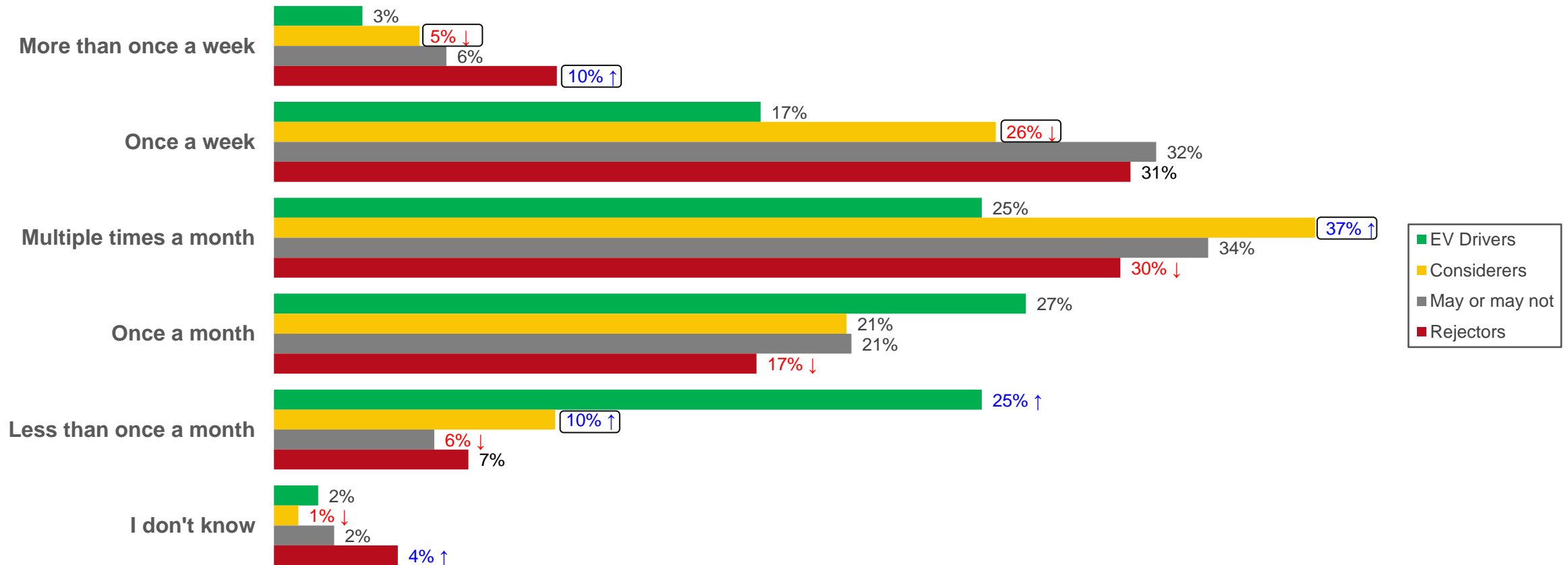


Miles Driven in a Year



On average, how much time do you spend driving each day? Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)
Approximately how many miles do you drive in a year? Base: EV Drivers (n=110); Considerers (n=858); May or May Not Consider (n=713); Rejectors (n=1,128)

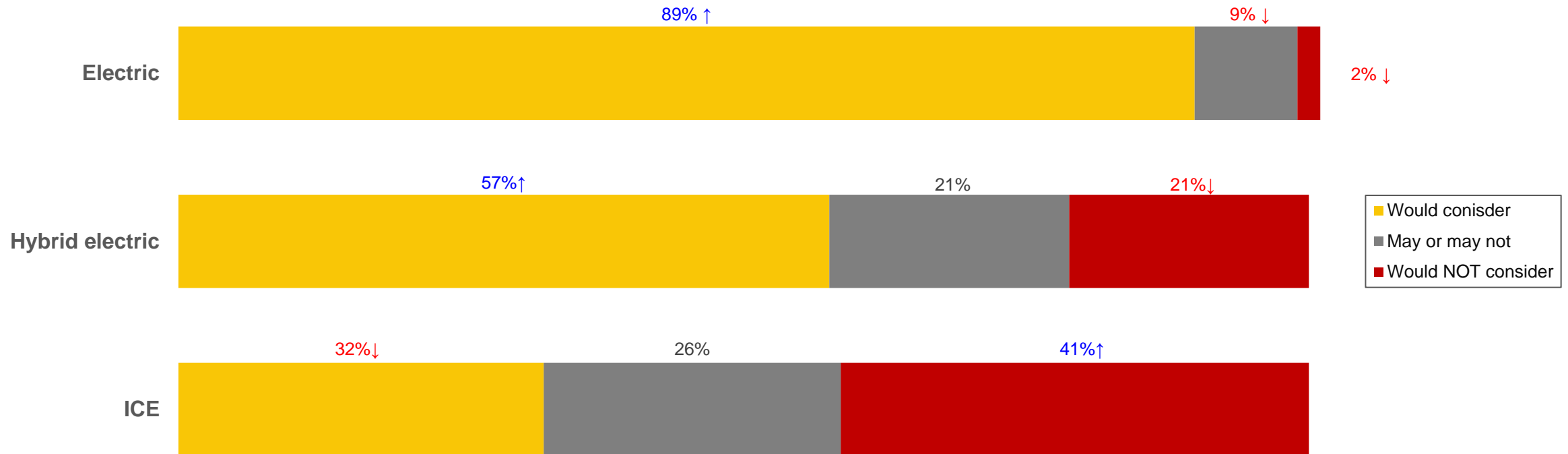
EV rejectors are more likely to fill up their gas tank more frequently than EV considerers.



On average, how often do you go through a tank of gas? Base: EV Drivers (n=63); Considerers (n=803); May or May Not Consider (n=695); Rejectors (n=1,103)

Current EV drivers have a high likelihood to continue driving EVs in the future.

32% of ICE drivers would consider getting an EV while 89% of EV drivers would consider another EV as their next vehicle.



The next time you are looking to buy or lease an automobile, would you consider getting an all-electric vehicle (EV)? Base: Electric (n=110); Hybrid electric (n=169); ICE (n=2,664)