Electric Cars and The City of Vancouver

Report Prepared at the request of the City of Vancouver Electric Vehicle Working Group, in partial fulfillment of UBC Geog 419: Research in Environmental Geography, for Dr. David Brownstein

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Executive Summary

Electric vehicles are beneficial from an ecological, economic, and social standpoint because they produce no greenhouse gas emissions from there use, the reduce noise pollution, and they reduce reliance on fossil fuel resources which are becoming increasingly expensive. Through research of scholarly sources, technical reports, and a survey of electric vehicle users in Vancouver, this study finds that existing battery electric vehicles such as the Nissan Leaf and the Mitsubishi iMiEV have ranges that exceed the majority of user trips with little to no adjustments in driving behavior. These vehicles also are typically parked for long enough periods of time that would allow for, at least, a partial recharge thus expanding the range of these vehicles. The City of Vancouver should continue to implement charging stations but at a wider variety of locations to allow for a broader charging network. The City of Vancouver should also make education about electric vehicles and their range a priority in attempt to alleviate the stress related to range limitations on electric vehicles. Further partnerships with Metro Vancouver municipalities will also provide a broader charging network and thus increased range and mobility for electric vehicles and their users.

Introduction

A looming energy crisis based on increasing demand and shrinking supply of oil, and a global push to combat climate change through the reduction of greenhouse gas (GHG) emissions, has led to a resurgence of the idea that the electric car is a viable option for the future of personal transportation. With many car companies such as Toyota, Honda, and Ford producing hybrid vehicles and others, such as Nissan, Chevrolet, and Mitsubishi, producing fully electric or plug-in hybrid vehicles, it appears that electric vehicles are gaining traction not only within the car industry, but with the public as well. The City of Vancouver is interested in expanding electric vehicle charging infrastructure that would allow for a more widespread adoption of electric vehicles across the city. Knowing how they are being used will help the City of Vancouver achieve its Greenest City 2020 initiative of developing more environmentally friendly and sustainable transportation. Although the idea of electric cars appears promising from the perspective of reducing vehicle-produced GHGs, there are other issues that a transition to an alternative fuel source would create. This paper will seek to discuss the benefits and costs of electric vehicles as an alternative to conventional vehicles (internal combustion engine vehicles) as well as analyze how electric vehicles are currently being used within the City of Vancouver. This paper will also seek to make recommendations on how the City of Vancouver will be able to shape policy and implement infrastructure that will create sustainable and environmentally friendly transportation.

Method

Through the use of scholarly articles the benefits and costs of the use of electric vehicles will be compared against one another. This comparison will take into account economical, social, and environmental considerations. This information will then be compared to vehicle usage data collected through an online survey of City of Vancouver employees and Modo: The Car Co-op members who are users of the two electric vehicles operated by the City of Vancouver and Modo. This vehicle usage data will assess to driving habits and behaviors of the electric vehicle users and has been reviewed by the University of British Columbia's ethics review board. The online survey results will also be compared to the United States' National Household Travel Survey to note similarities or differences in results. Through an analysis of the economical, social, and environmental benefits and costs and usage statistics a clearer picture should emerge about the importance and usefulness of electric vehicles in regards to help achieve Vancouver's goal of being the greenest city in the world by 2020. This data will provide the City of Vancouver with information about how people use, drive, and charge their vehicles.

Electric Vehicles

Confusion can easily occur when discussing the different facets of electric vehicles. Battery electric vehicles (BEVs) are vehicles that operate with an electric motor exclusively. BEVs contain batteries, typically lithium-ion, that are charged through by being plugged into an electric source such as a power outlet or vehicle-specific charging stations. BEVs are also capable of regenerative charging through the

energy produced by braking. The Nissan Leaf and the Mitsubishi iMiEV are examples of battery electric vehicles and are capable of travelling approximately 100 km or more on a single charge. Hybrid vehicles are far more common forms of electric vehicles. The Toyota Prius or the Ford Escape are examples of hybrid electric vehicles (HEVs). These vehicles possess both electric motors and conventional internal combustion engines. The vehicles are capable of using one or the other or both engines depending on what is most efficient. The batteries on HEVs charge through regenerative charging. Hybrid vehicles provide vehicles with greater fuel economy and reduced greenhouse gas emissions. Plug-in hybrid electric vehicles (PHEVs), such as the Chevrolet Volt, begin to bridge the gap between fully electric vehicles and hybrids. PHEVs, like hybrids, possess both a conventional engine and an electric motor, but plug-in hybrids have batteries that are chargeable like that of a battery electric vehicle. These vehicles utilize their electrical charge until it is depleted then switch to a conventional internal combustion engine for extended range. PHEVs are a logical first step towards fully electric vehicles and require the same charging infrastructure as BEVs.

Electric Vehicles Benefits

Electric vehicles represent one of many options as an alternative to the internal combustion engine. Battery electric vehicles (BEVs) do not use fossil fuels, and as such have limited ecological impacts because they do not produce any greenhouse

gases.[1] This reduction in greenhouse gases in their operation allows for an improvement in air quality and a reduction in one of the leading causes of climate change. Zero use of fossil fuels during the life of the vehicle will obviously reduce reliance on fossil fuels as a primary fuel source. Increasingly this adoption and use of electric vehicles will require more overall electrical energy production with more and more devices drawing from the electric grid. However, increased electrical production can be diversified into many more sustainable, resilient forms such as wind, solar, tidal, or hydro. Reducing reliance on fossil fuels helps to save money on ever increasing oil prices and can help to create and stimulate a whole new sector of economic development as new electrical projects are created and maintained. Battery electric vehicles are not only more environmentally friendly, but they are also quieter, reducing noise pollution.[2] Improved air quality coupled with a reduced noise pollution will improve quality of life for urban society without massively adjusting urban infrastructure, or driving behaviors and habits.

Electric Vehicle Costs

The production of electric vehicles, just like any other vehicle, creates greenhouse gas emissions. The production of electricity can create GHGs, for example coal

[1] Rienstra, Sytze A. "The Role of Electric Cars in Amsterdam's Transport System in the Year 2015; A Scenario Approach." *Transpn Res-D* 3.1 (1998): 29-40. *Elsevier*. Web. 24 Jan. 2012. 31.

[2] Rienstra, 31

generated electricity.[3] Even though British Columbia relies heavily on hydroelectric power, which faces its own controversies from an environmental perspective, energy trading and purchases of Alberta's coal-fired electricity[4] reduces the benefits of electric vehicles. For example, the additional strain on the electrical system through the use of battery electric vehicles and plug-in hybrid electric vehicles would require California to increasingly utilize its natural gas fired combustion turbines[5] to supply the electrical demand. Also, from a societal and economic perspective, electric vehicles are expensive compared to conventional vehicles.[6] For example, the iMiEV base cost is approximately $33,000.[7] In contrast fuel-efficient compact and subcompact vehicles with greater range can cost $10,000 or less. For many, a negative aspect of electric vehicles is their range.[8] 60% of Americans want an electric vehicle capable of travelling 200 miles (321.9 km) with 37% claiming they want a 300-mile (482.8 km) range.[9]

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[3] Van Vliet, Oscar, Anne S. Brouwer, Takeshi Kuramochi, Machteld Van Den Broek, and André Faaij. "Energy Use, Cost and CO2 Emissions of Electric Cars." *Journal of Power Sources* 196 (2011): 2298-310. *ScienceDirect*. Web. 24 Jan. 2012. 2308

[4] BC Hydro. *Energy Trade*. Issue brief. BC Hydro. Print.

[5] Thomas, C.E. Sandy. ""How Green Are Electric Vehicles?"." *International Journal of Hydrogen Energy* (2012): 1-10. *ScienceDirect*. Web. 25 Jan. 2012. 6.

[6] Rienstra, 31.

[7] *Mitsubishi Canada*. Mitsubishi. Web. 28 Mar. 2012.<http://www.mitsubishi-motors.ca/en/>.

[8] Rienstra, 31.

[9] Van Haaren, Rob. "Assessment of Electric Cars" Range Requirements and Usage Patterns Based on Driving Behavior Recorded in the National Household Travel Survey of 2009." *Solar Journey USA* (2011): 1-56. *Google Scholar*. Web. 20 Mar. 2012. 6.

Alternatives to Electric Vehicles

Alternatives to BEVs are plug-in hybrid electric vehicles, (such as the Chevrolet Volt) which possess both a conventional internal combustion engine and an electric motor. These vehicles are perceived as a transition towards fully electric vehicles such as BEVs. The literature also points to the future significance of fuel cell electric vehicles (FCEVs) powered by hydrogen, which is further supported by many who believe the future is based around a "hydrogen economy."[10] Unfortunately for those who have placed faith in hydrogen based fuel cells, this technology may still be many years off. There are also arguments against the electric vehicle in places like Sweden where the use of biofuels are perceived as a viable alternative fuel source.[11] Despite Sweden having many renewable energy resources, the production of biofuels are a cost effective method[12] available in the reduction of GHGs.

Electric Vehicles and the City of Vancouver

The City of Vancouver operates 5 electric vehicles within their employee fleet. There are two vehicles of primary interest to this research; the Mitsubishi iMiEV and the Nissan Leaf. Both are Battery Electric Vehicles or BEVs that are operated by

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[10] Van Mierlo, J., and G. Maggetto. "Fuel Cell or Battery: Electric Cars Are the Future." *Fuel Cells* 7.2 (2007): 165-73. *Wily InterScience*. Web. 23 Jan. 2012. 165.

[11] Johansson, Bengt, and Anders Mårtensson. "Energy and Environmental Costs for Electric Vehicles Using CO2-neutral Electricity in Sweden." *Energy* 25 (2000): 777-92. *Elsavier*. Web. 21 Jan. 2012. 776.

[12] Johansson and Mårtensson, 778

Modo. Modo is a car co-operative that works in co-operation with the City of Vancouver. The iMiEV is only used City of Vancouver employees. Both city staff and the public drive the Nissan Leaf. A brief 21-question survey was conducted of the users of these vehicles to ascertain how and where the vehicles were being driven. This survey has a small sample size of only 22 respondents, due to a small number of users. This will affect the generalizability of the survey. Fortunately, results in the survey fall in line with statistical information from the United States' National Household Travel Survey of 2009.[13]

City of Vancouver Electric Vehicle Survey Results

With the electric vehicle range being on the forefront of consumer concern, the survey results illustrated that just over 85% of the trips taken by the electric vehicle users are, on average, 50 km or less, with 47.6% of trips being 20 km or less.

[13] van Haaran

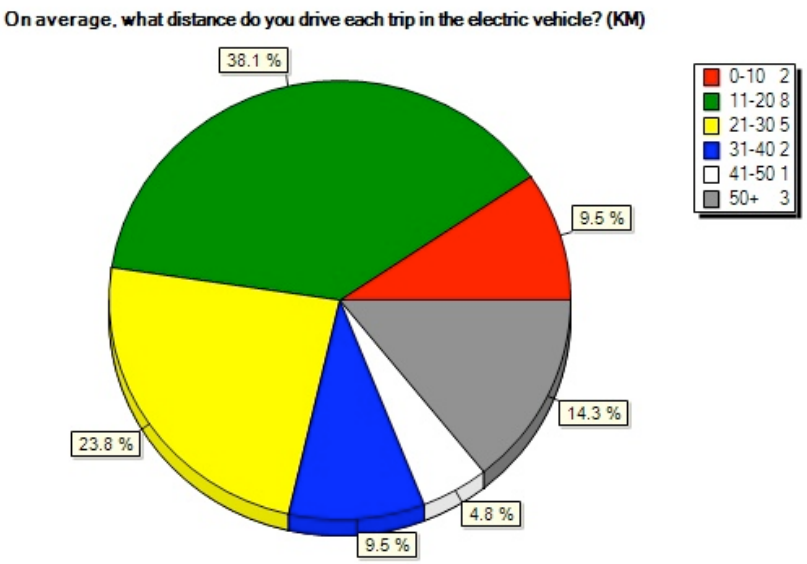

Figure 1

The United States' National Household Travel Survey States that 95% of trips are shorter than 30 miles (48.3 km) and 99% of trips are shorter than 70 miles (112.7 km)(p25). The National Household Travel Survey also states the average trip in an urban environment is 8.5 miles and the average trip in a rural environment is 12.1 miles with the weighted average being 9.4 miles (approx 15.1 km)(p26). Given the range of the Nissan Leaf and the Mitsubishi iMiEV, (rated at approximately 117 km and 100 km respectively), the vast majority of urban trips could occur in an electric vehicle. The survey also revealed that 90.5% of respondents had their electric vehicle parked for over 30 minutes of their booking. If plugged in while parked, these vehicles could achieve an 80% quick charge from a DC outlet within 30 minutes.[14] This fact helps to alleviate consumer worries about range constraints. However, since these vehicles are typically parked on the street, or in business

[14] van Haaren, 6.

parking lots, this illustrates a need for street side charging options as well as options for businesses to provide charging equipment for their customers.

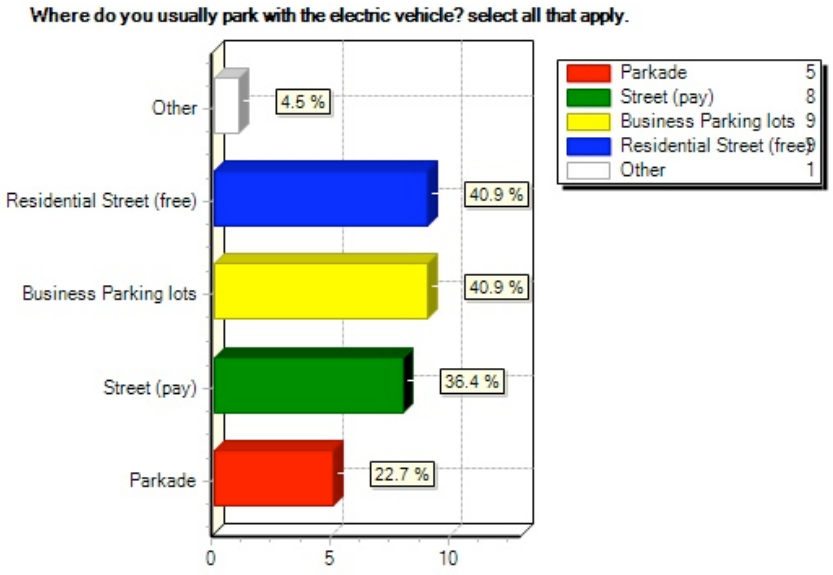

Figure 2

There are currently several parkade locations in downtown Vancouver with charging stations for electric vehicles, but the survey indicates only 22.7% of the vehicle users choosing to park in parkades. There needs to be other charging options available to electric vehicle users at a more diverse set of locations. The Vancouver Electric Vehicle survey also indicated that none of the respondents used these vehicles as a means of commuting to work. This is likely because members of a car co-op only use cars when necessary and city workers only use the electric vehicle once they are already at work. The National Household Travel survey does indicate that 95% of car commuters travel less than 40 miles (64.4 km) (p30), which still supports the idea that these mainstream electric vehicles can be used for commuting.

In terms of how these vehicles are being driven, according to the survey, 60% of people do not adjust how they drive when using an electric vehicle. Users only begin to adjust their driving behavior when they are experiencing a low charge. There is a jump from 40% of users adjusting their speed, distance, routes, and distances to 73.7% when the vehicle has a low charge. Despite this lack of adjustment by most users, only two respondents ever ran out of battery during their use of the electric vehicles. This indicates that there does not have to be a significant adjustment in how people drive an electric vehicle. There may be benefits in adjusting driver behavior, especially if the battery charge is low, but drivers of conventional vehicles are not anticipated to have to vary driving behavior when adopting/transitioning to electric vehicles.

Electric Vehicle Systems

The main question that is often visited upon when discussing electric vehicles is the range that they can go for and then what happens if one needs to go further. Currently within the City of Vancouver, there are a small number of charging stations located at certain Easy Park parkade locations, Sunset Community Center, Coal Harbor Community Center, and Granville Island to name a few. The existing charging system in Vancouver is set up to require electric vehicle users to leave their cars at specific locations for a period of time so that the electric vehicles are able to recharge. This is how Vancouver intends to expand its electric vehicle infrastructure in the future. This system is not impractical, but it would require driving habits to be adjusted.

Electric vehicles are regarded as excellent inner-city cars due to the lack of noise and pollution[15] but there needs to be a viable option for utilizing these vehicles outside of inner-city use. The City of Vancouver is a relatively small area. For electric vehicles to be fully embraced they must be capable of travelling anywhere a conventional vehicle may travel. Increasing regional and provincial use of electric vehicles is necessary and requires infrastructure development outside of the City of Vancouver. Improved battery and charging station technology will also allow for a wider electric vehicle system by providing a longer lasting storage option combined with faster, more efficient charging. Options presented by companies such as Better Place provide similar service a gas station would to a conventional vehicle. Better Place performs a quick replacement of an electric vehicles depleted battery for a fully charged one.[16] This would increase vehicle range due to the ability to replace batteries quickly and continue a trip without the wait time of a minimum of 30 minutes[17] that a charging station presents.

Recommendations and Conclusion

From a environmental sustainability perspective, electric vehicles make logical sense. Electric vehicles in Vancouver will cut vehicle and noise pollution, helping

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[15] Wirasingha, Sanjaka J., Nigel Schofield, and Ali Emadi. "Plug-in Hybrid Electric Vehicle Developments in the US: Trends, Barriers, and Economic Feasibility." Proc. of IEEE Vehicle Power and Propulsion Conference, China, Harbin. Web. 22 Jan. 2012. 8.

[16] *Better Place | The Global Provider of EV Networks and Services*. Better Place. Web. 1 Apr. 2012. <http://www.betterplace.com/>.

[17] van Haaren, 6.

the City of Vancouver achieve its environment and sustainability goals while improving quality of life for Vancouver residents. For electric vehicles to be widely used in Vancouver, the City will need to focus on educating the residents about the benefits of electric vehicles to the environment, the economy and to society as a whole. Once people begin to understand and think critically of how they drive, they hopefully will realize that moving towards electric vehicles is not only a reasonable decision but also a smart one. To help make the prospect of switching to electric vehicles more attractive, the City of Vancouver should attempt partnerships, initially, with Metro Vancouver municipalities in an attempt to create an expanded charging grid, thus increasing mobility across the Lower Mainland. The City should also create further incentives to purchase electric vehicles as well to create incentives, such as tax breaks, for the implementation of charging stations at private business to further increase the electric vehicle-charging grid.

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Better Place | The Global Provider of EV Networks and Services. Better Place. Web. 1 Apr. 2012. <http://www.betterplace.com/>.

Johansson, Bengt, and Anders Mårtensson. "Energy and Environmental Costs for Electric Vehicles Using CO2-neutral Electricity in Sweden." *Energy* 25 (2000): 777-92. *Elsavier*. Web. 21 Jan. 2012.

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Van Vliet, Oscar, Anne S. Brouwer, Takeshi Kuramochi, Machteld Van Den Broek, and André Faaij. "Energy Use, Cost and CO2 Emissions of Electric Cars." *Journal of Power Sources* 196 (2011): 2298-310. *ScienceDirect*. Web. 24 Jan. 2012.

Wirasingha, Sanjaka J., Nigel Schofield, and Ali Emadi. "Plug-in Hybrid Electric Vehicle Developments in the US: Trends, Barriers, and Economic Feasibility." Proc. of IEEE Vehicle Power and Propulsion Conference, China, Harbin. Web. 22 Jan. 2012.

Appendix A

Survey Results
& Analysis

for

City of Vancouver's Electric Vehicle User Analysis

Executive Summary

This report contains a detailed statistical analysis of the results to the survey titled *City of Vancouver's Electric Vehicle User Analysis* . The results analysis includes answers from all respondents who took the survey in the 5 day period from Thursday, March 08, 2012 to Monday, March 12, 2012. 22 completed responses were received to the survey during this time.

Survey Results & Analysis

Survey: City of Vancouver's Electric Vehicle User Analysis
Responses Received: 22

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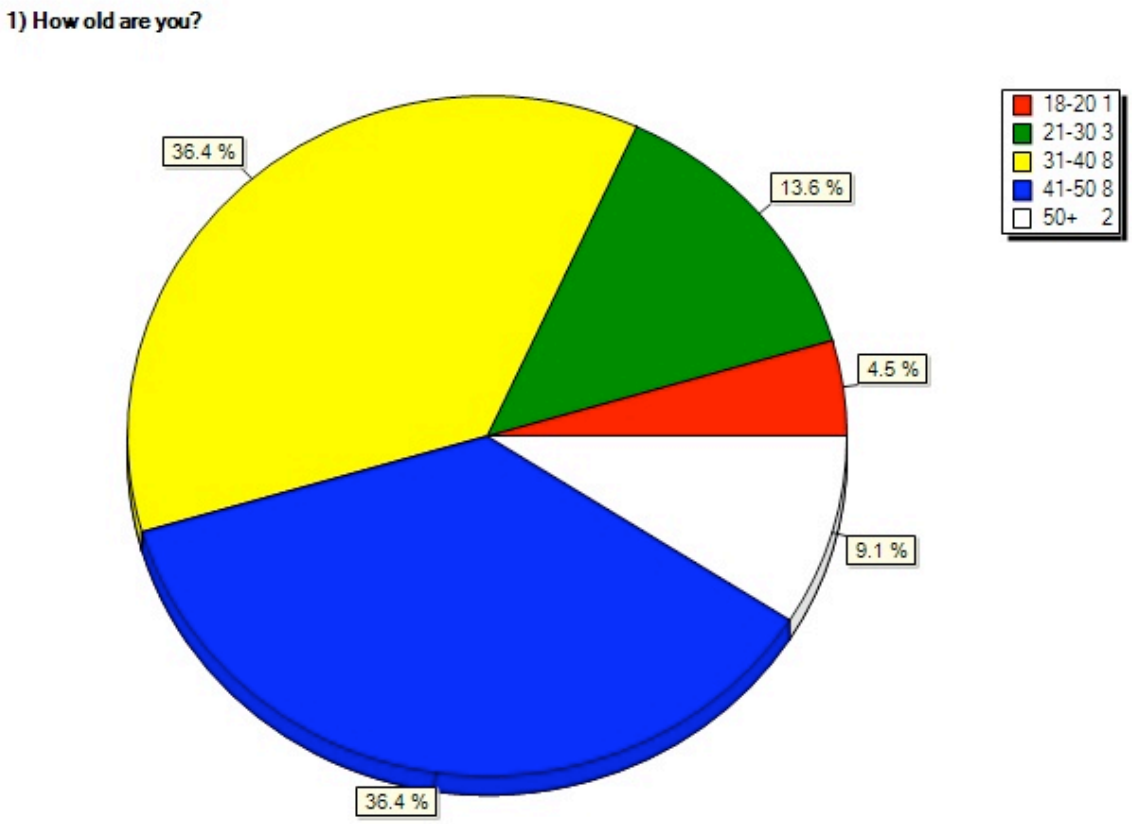
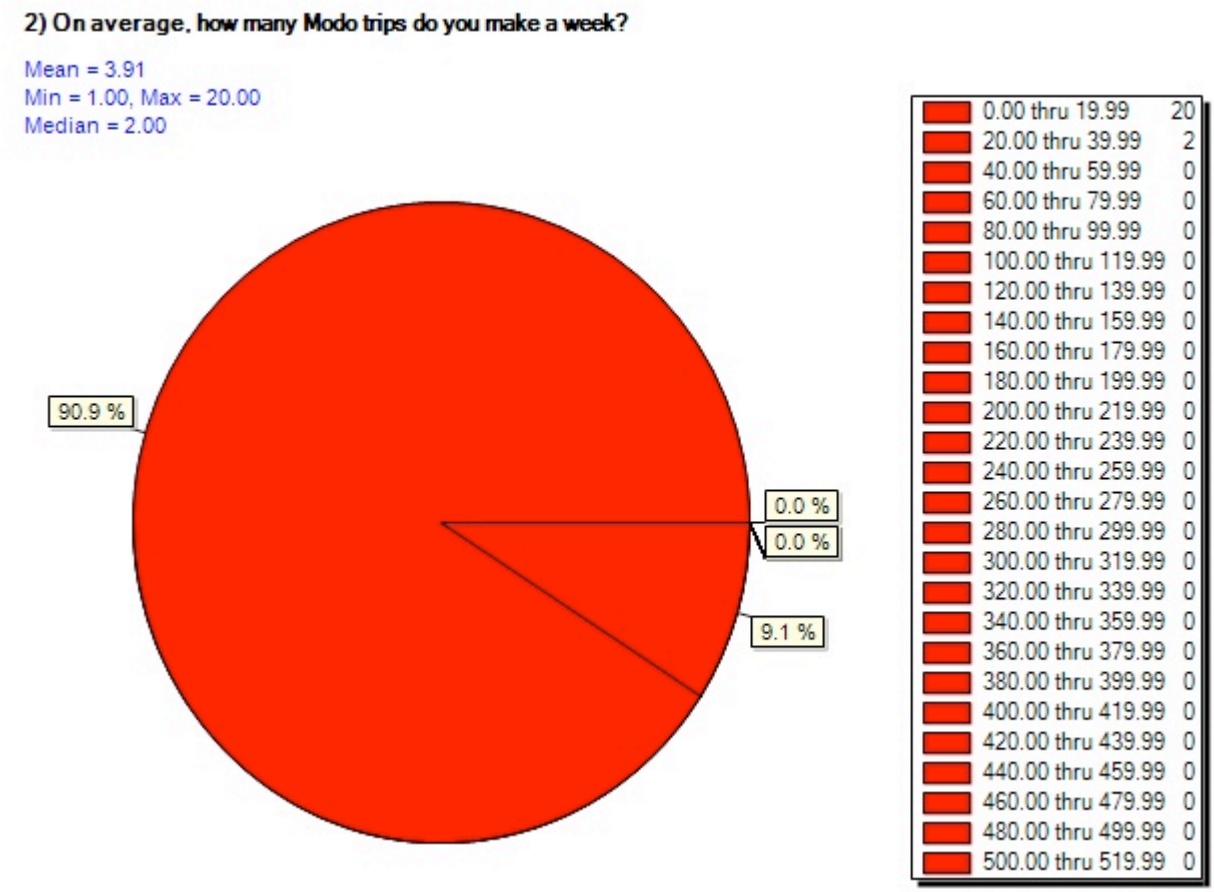
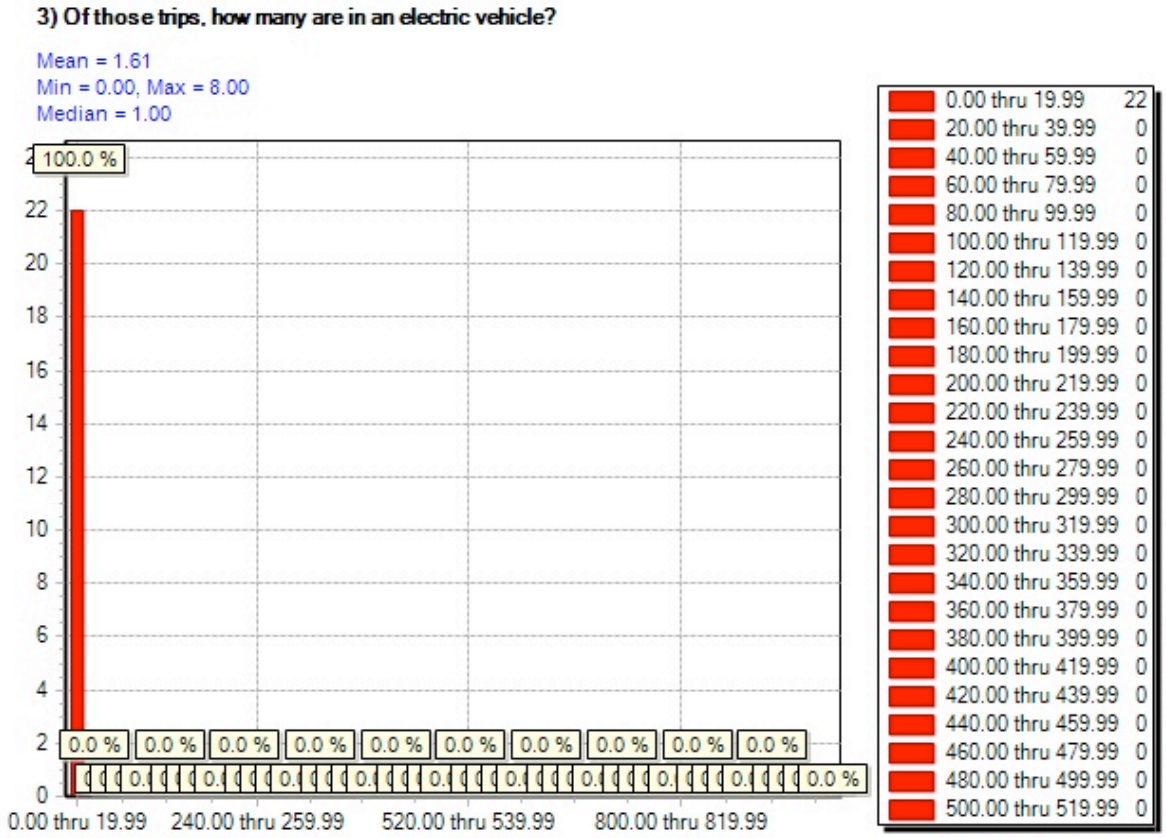
1) How old are you?



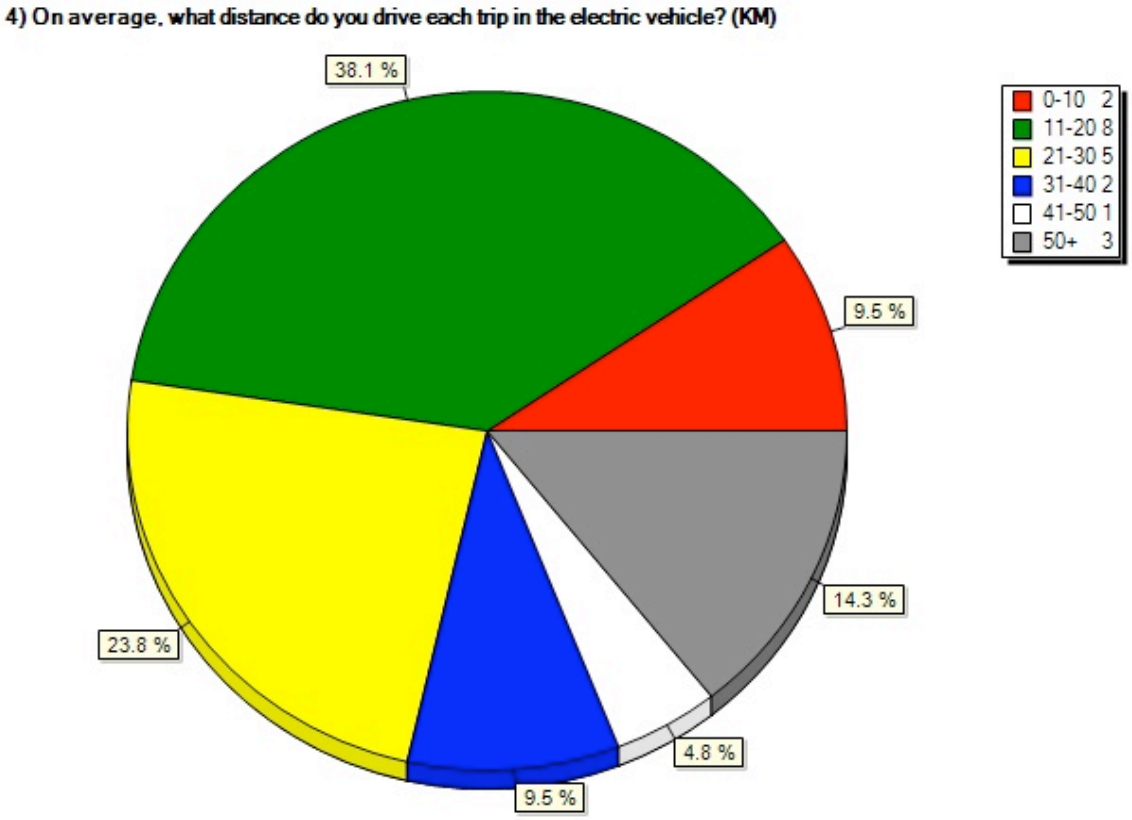
2) On average, how many Modo trips do you make a week?



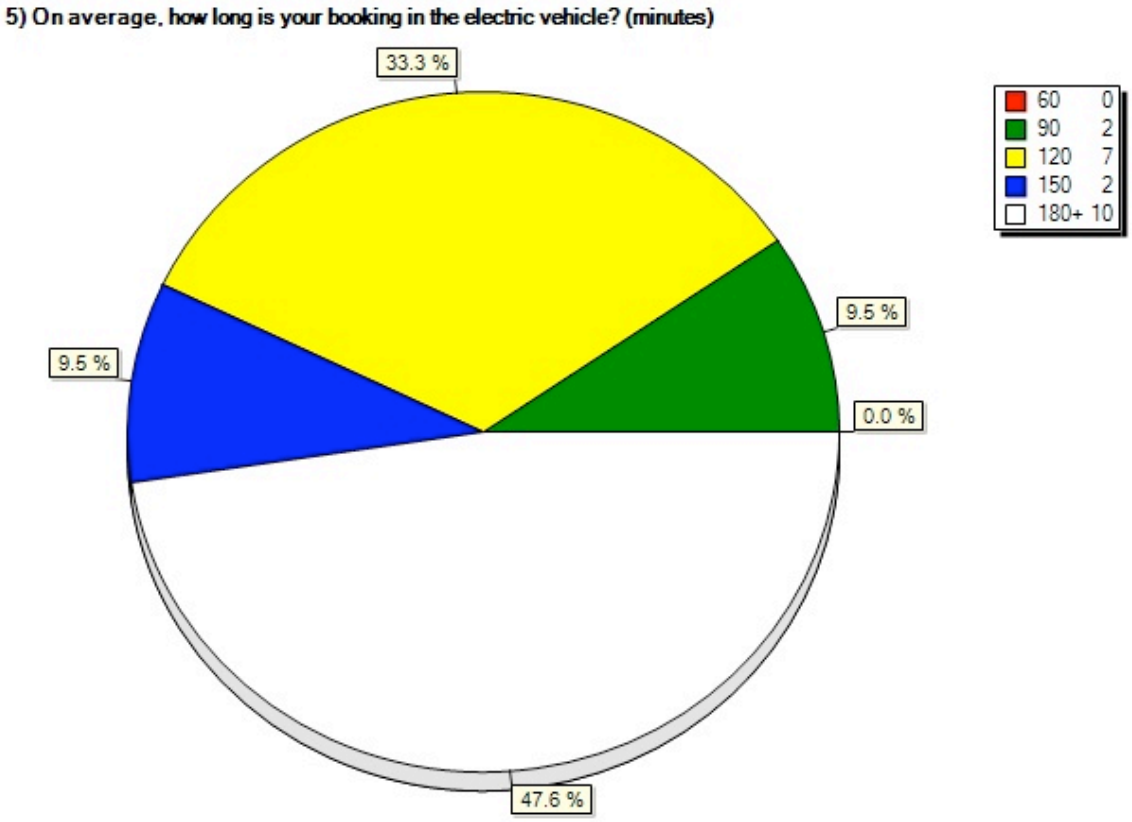
3) Of those trips, how many are in an electric vehicle



4) On average, what distance do you drive each trip in the electric vehicle? (KM)



5) On average, how long is your booking in the electric vehicle? (minutes)



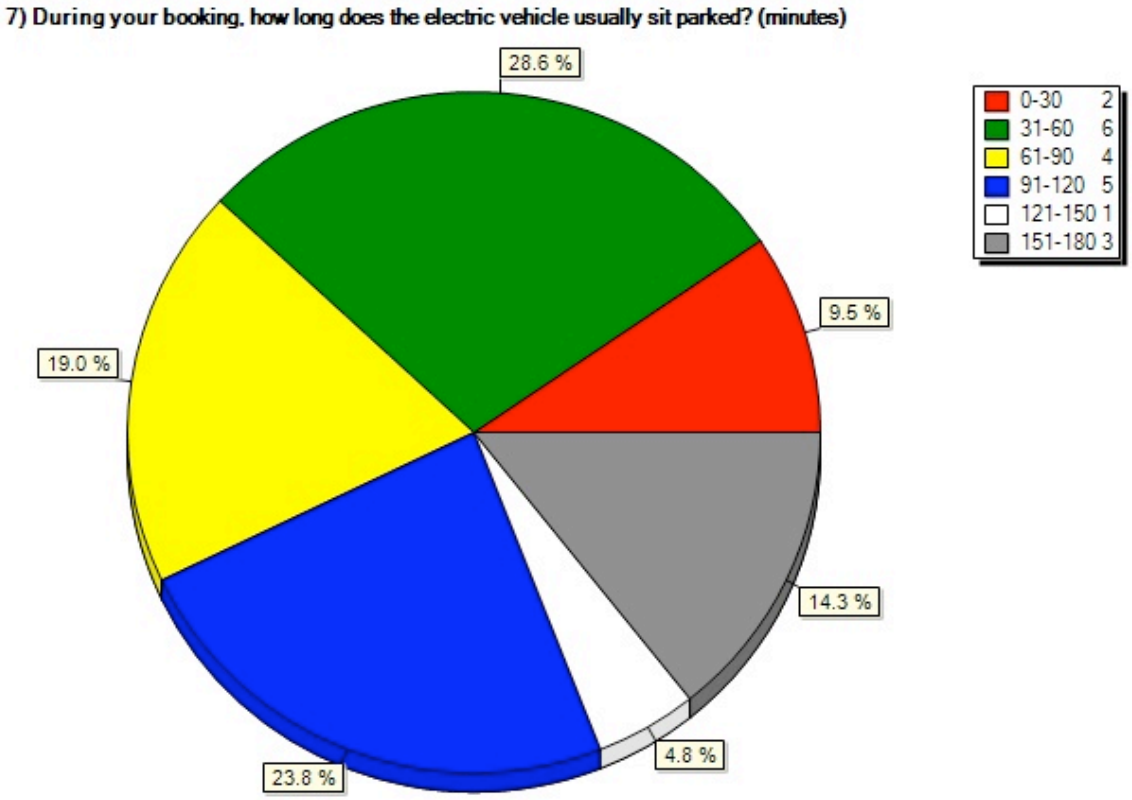
6) What is your main use of the electric vehicle

Response	**Count**	**Percent**
Work (driving vehicle for work purposes)	7	33.3%
Recreation/Entertainment (community centers, move theatres, etc)	5	23.8%
Commuting (driving to and from workplace)	0	0.0%
Errands (grocery shopping, appointments, etc.)	6	28.6%
Other (please specify)	3	14.3%

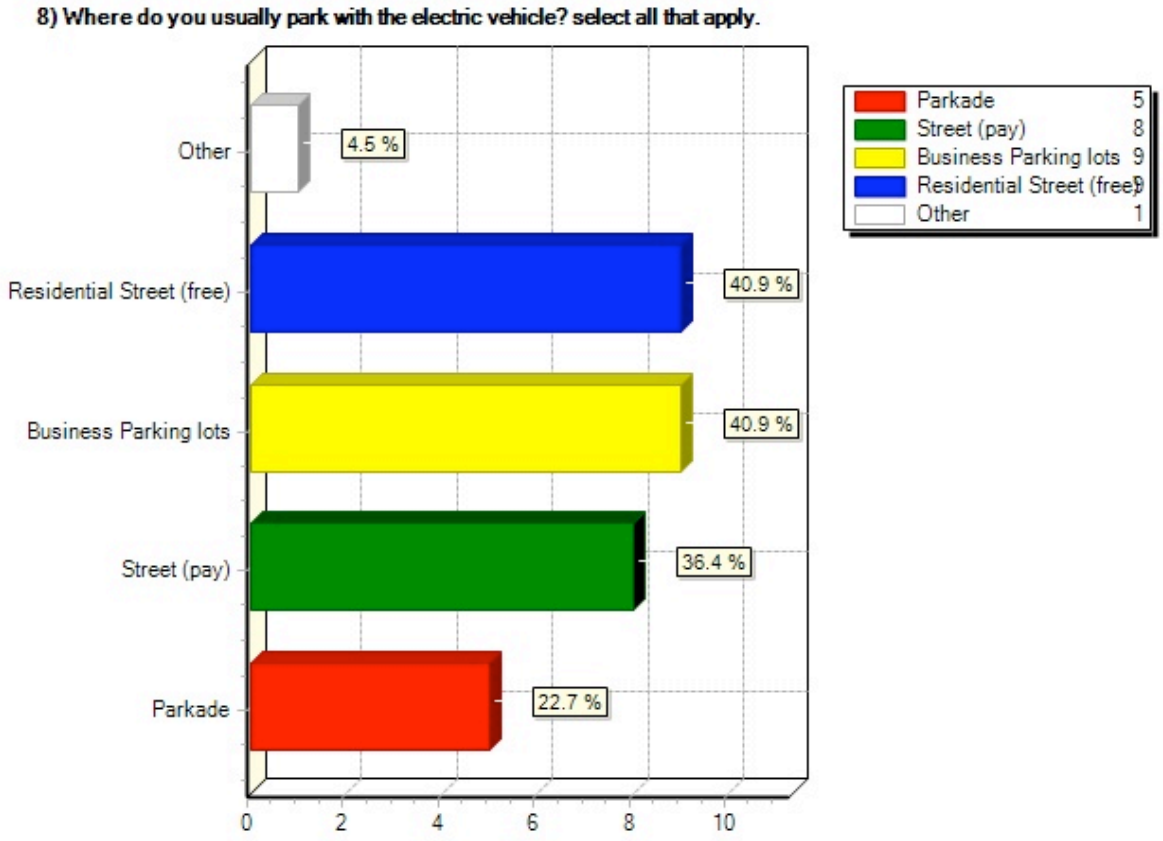
Other Responses:

Church & volunteer work
drop family at work and school
educational

7) During your booking, how long does the electric vehicle usually sit parked? (minutes)



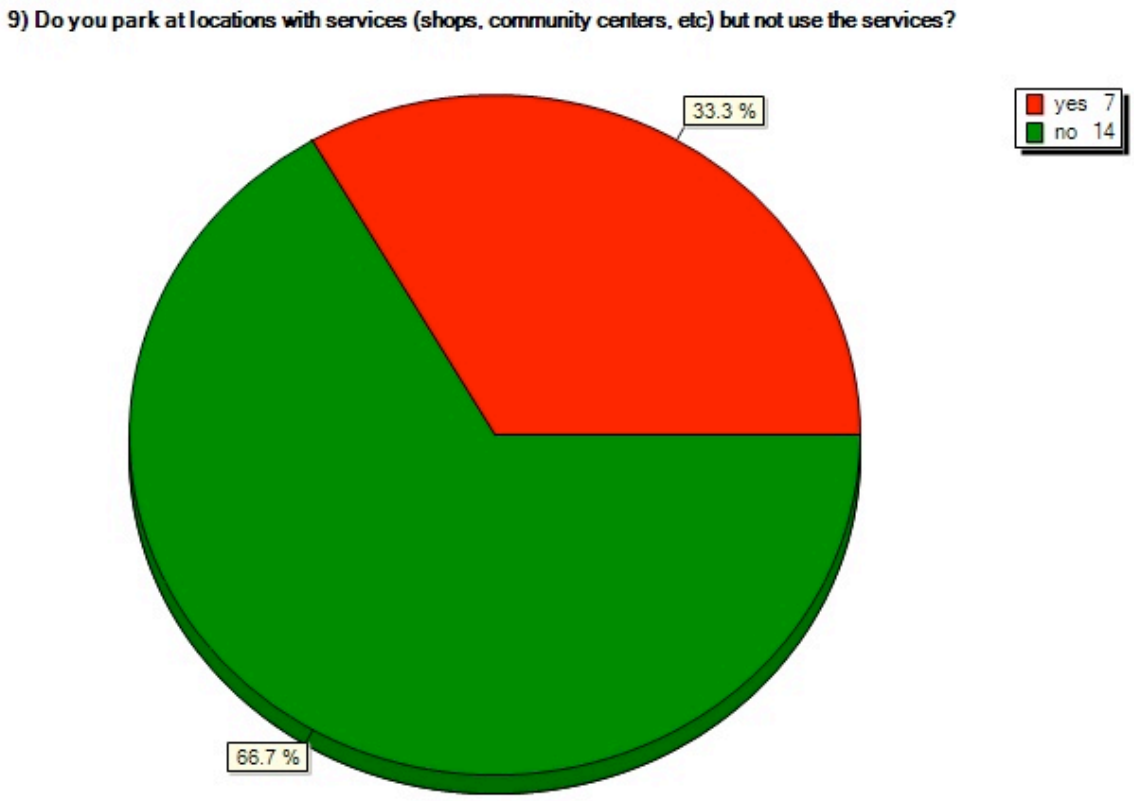
8) Where do you usually park with the electric vehicle? select all that apply.



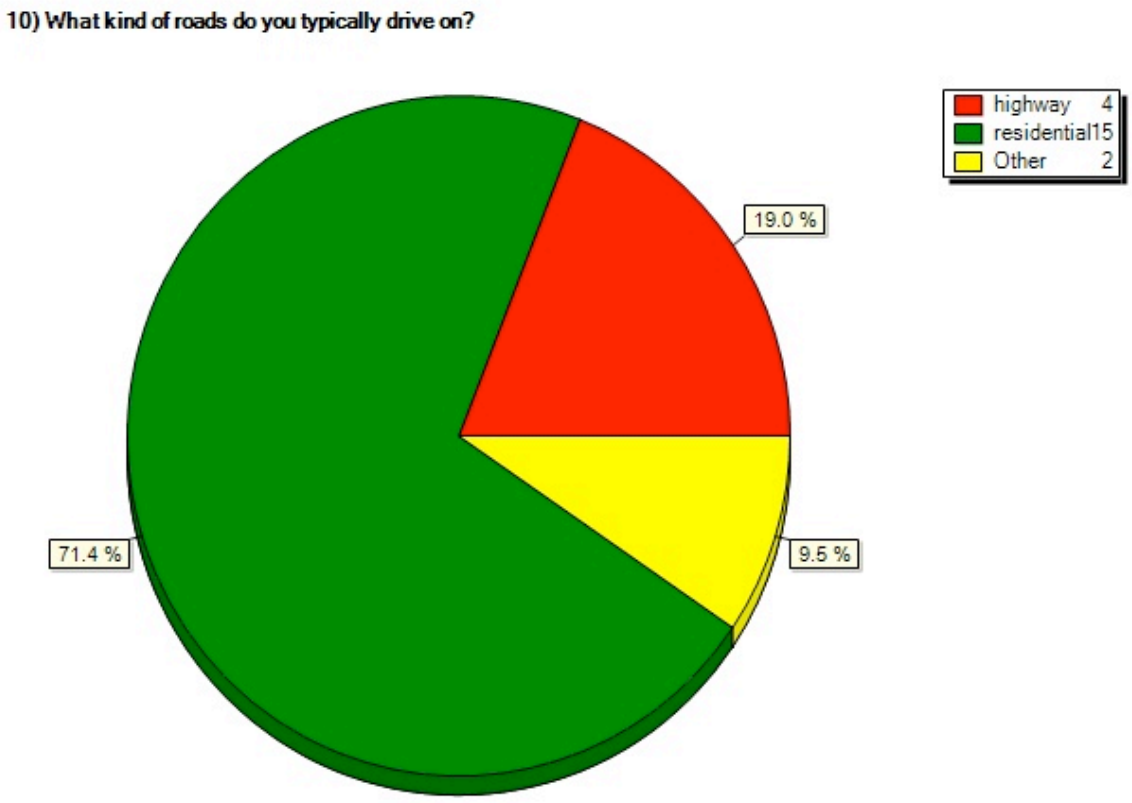
Other Responses:

city offices/sites

9) Do you park at locations with services (shops, community centers, etc) but not use the services?



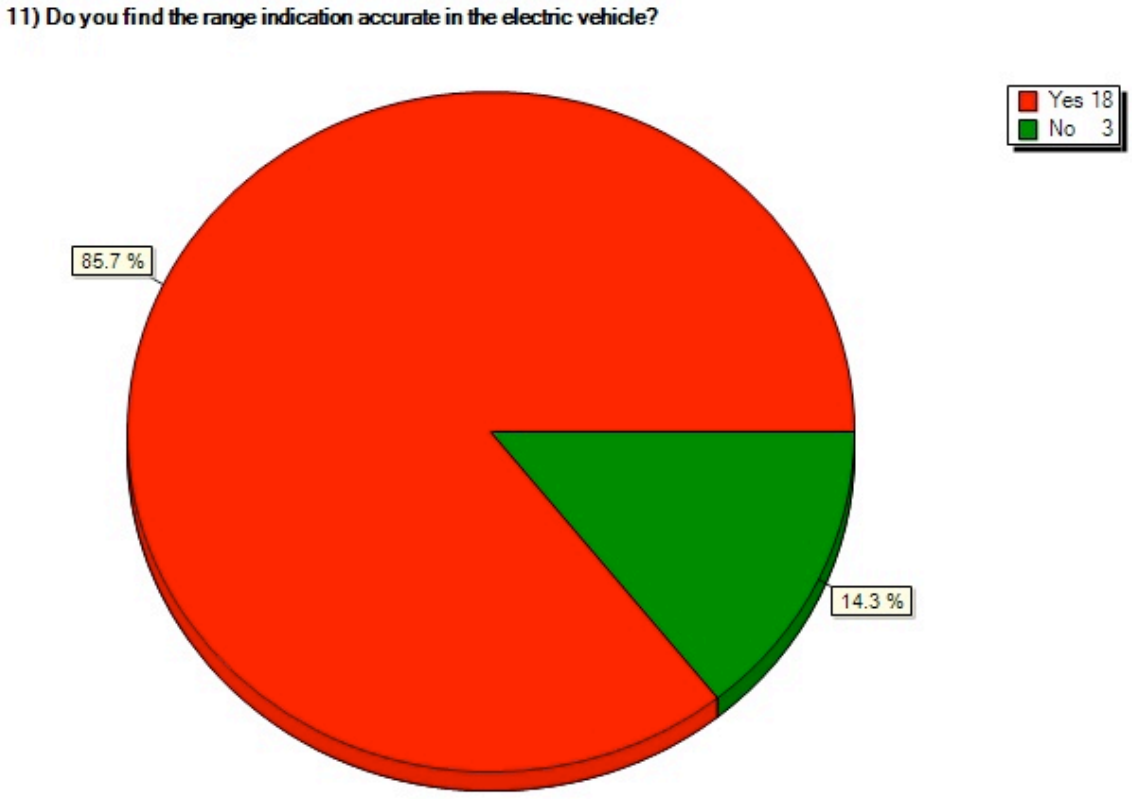
10) What kind of roads do you typically drive on?



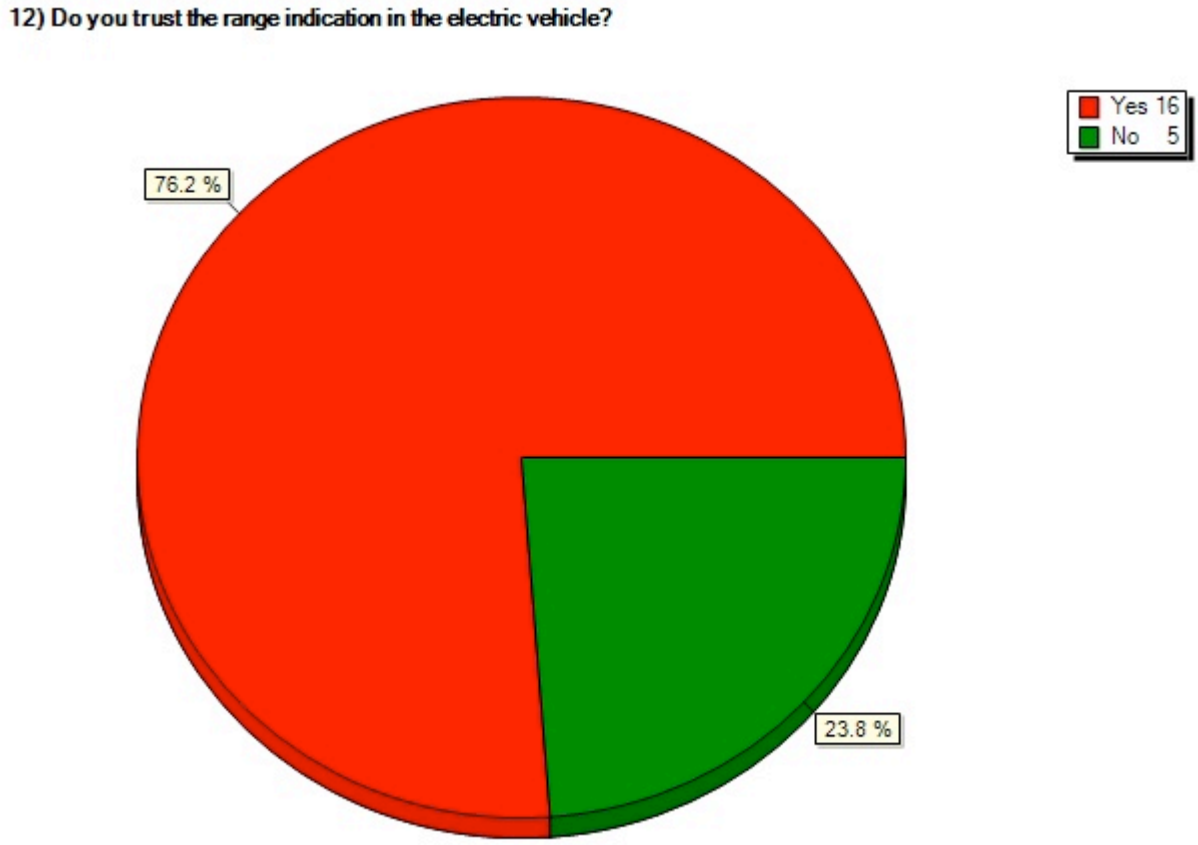
Other Responses:

Main thoroughfares like broadway
both

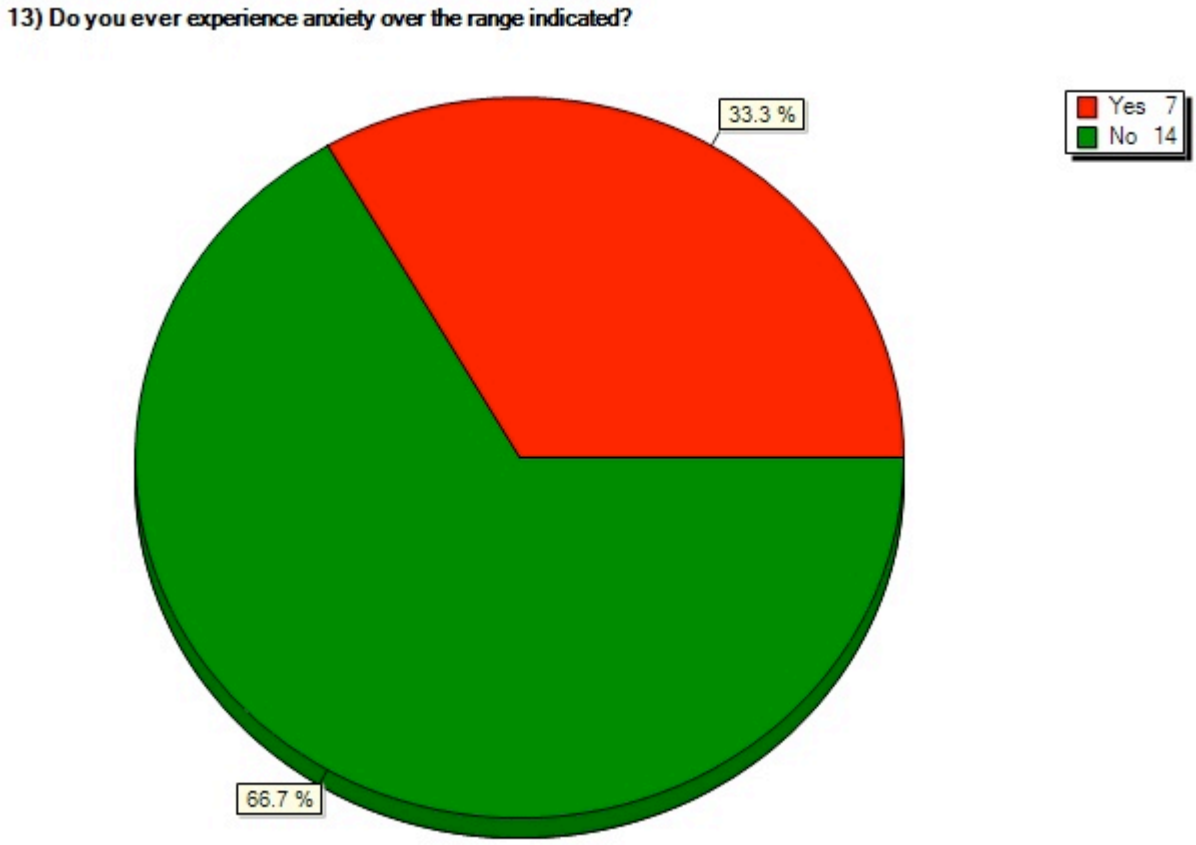
11) Do you find the range indication accurate in the electric vehicle?



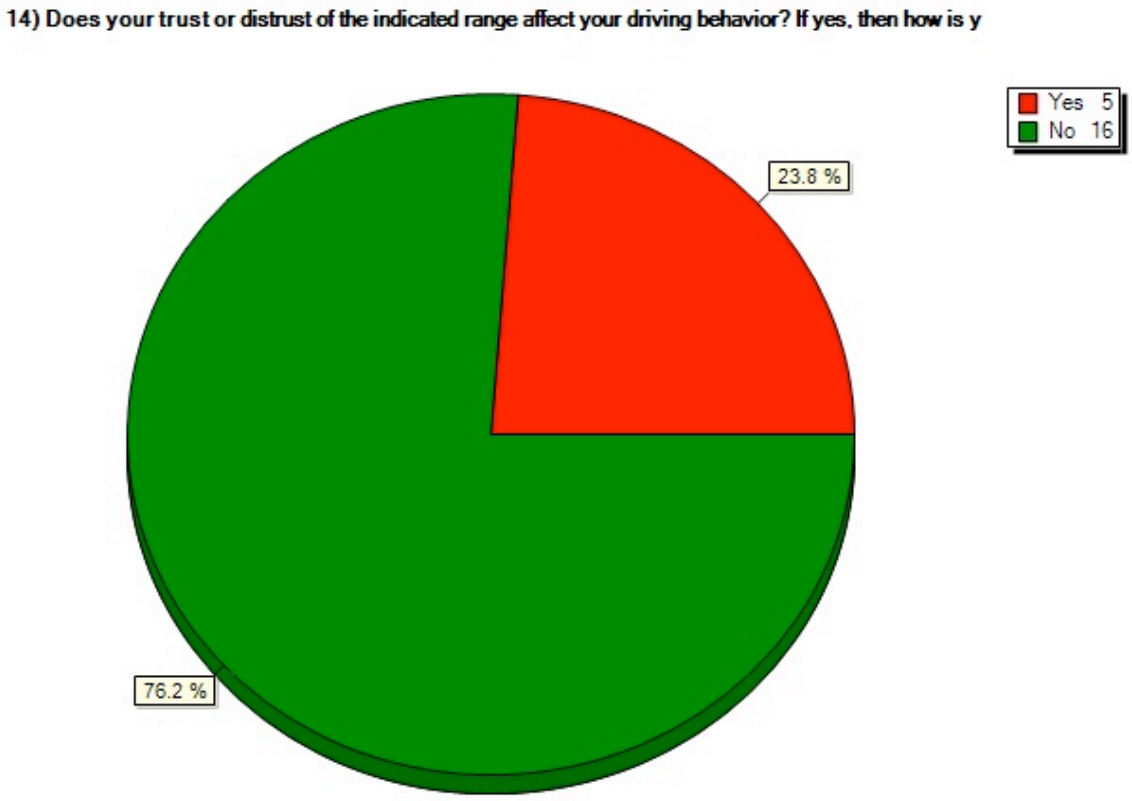
12) Do you trust the range indication in the electric vehicle?



13) Do you experience anxiety over the range indicated?



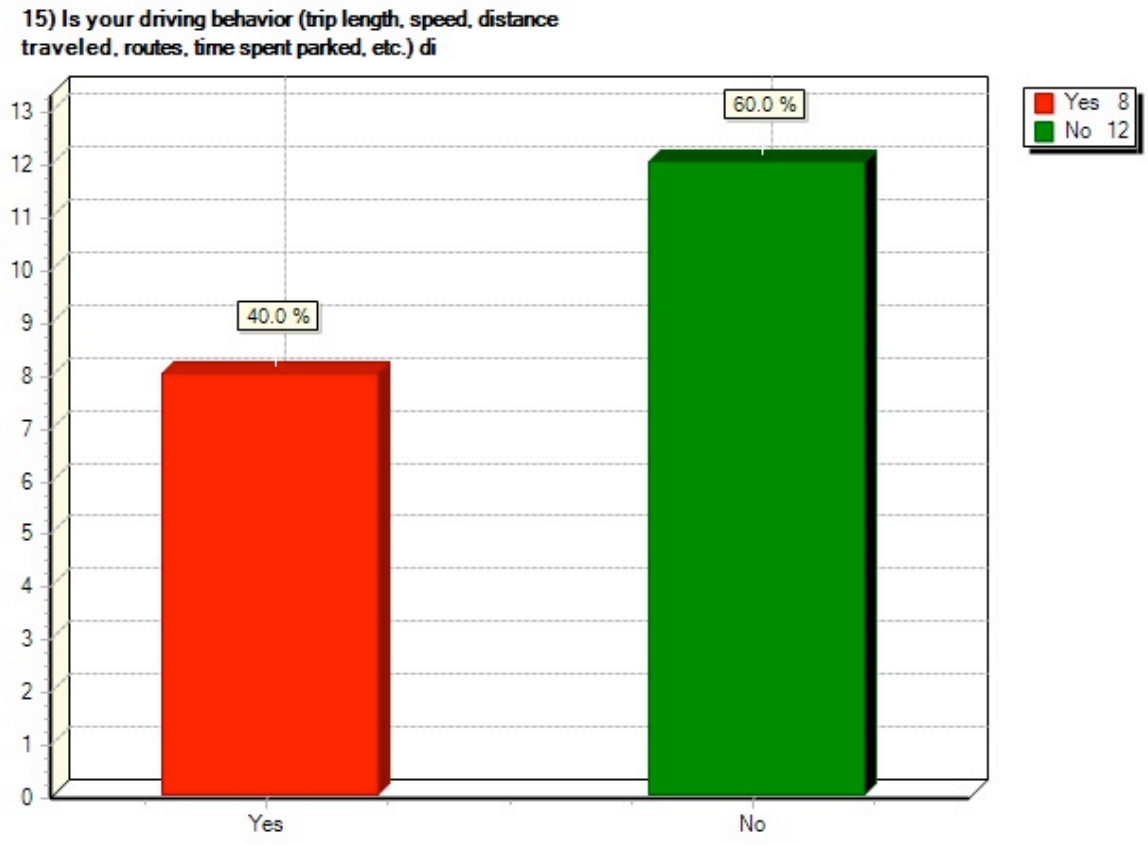
14) Does your trust or distrust of the indicated range affect your driving behavior? If yes, then how is your driving behavior affected?



Comment Responses:

More cautious
a lot more cruising when I am running low
a lot more cruising when I am running low

15) Is your driving behavior (trip length, speed, distance traveled, routes, time spent parked, etc.) different when using an electric vehicle as opposed to a conventional vehicle? If yes, then how so?

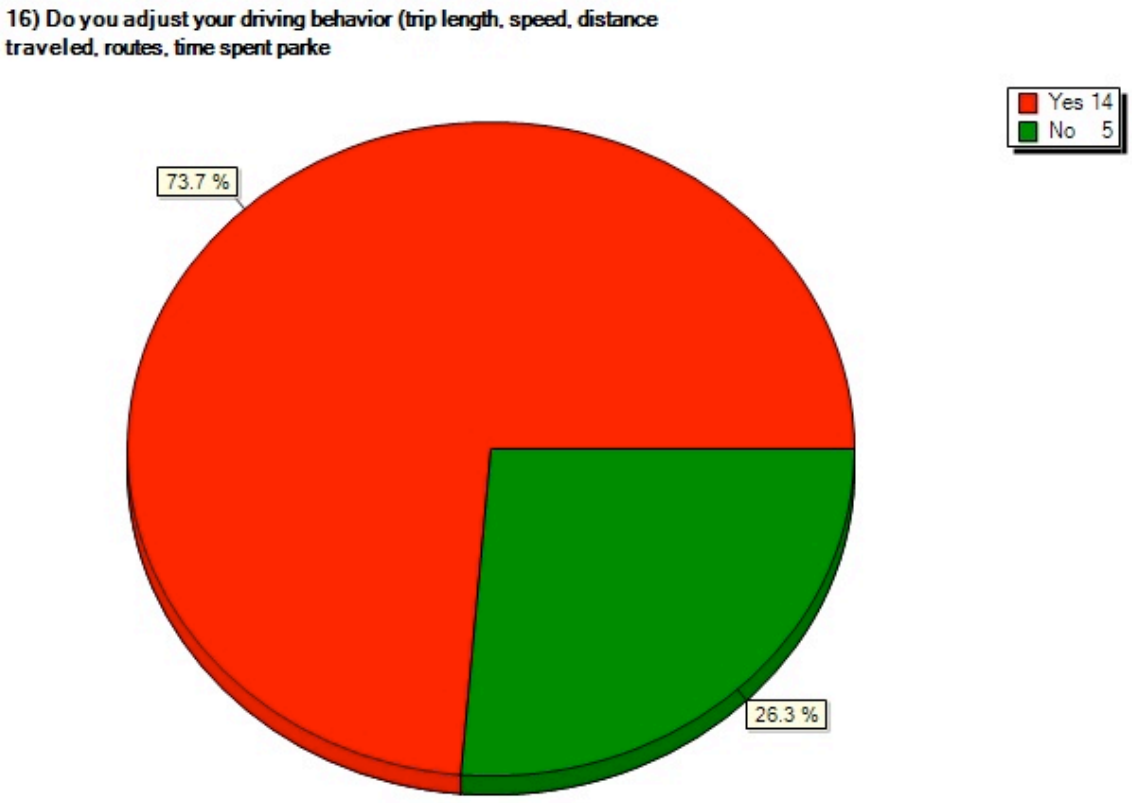


Comment Responses:

Slower acceleration
If I had a long range trip, I wouldn't book the electric vehicle.
I do not take long trips to Abbotsford on behalf of the church or volunteer work in the electric vehicle. All other factors same - I treat it like a regular car when I'm in the city.
I skip long trips only

Would likely not use for extended out-of-town trips
trip length not exceed battery charge
Shorter trips closer to home.
after almost running out of power on a recreational trip to mt seymour, i will never use an electric car again for long distance
after almost running out of power on a recreational trip to mt seymour, i will never use an electric car again for long distance
I drove faster to test performance

16) Do you adjust your driving behavior (trip length, speed, distance traveled, routes, time spent parked, etc.) when the electric vehicles has a low charge? If yes, then how so?

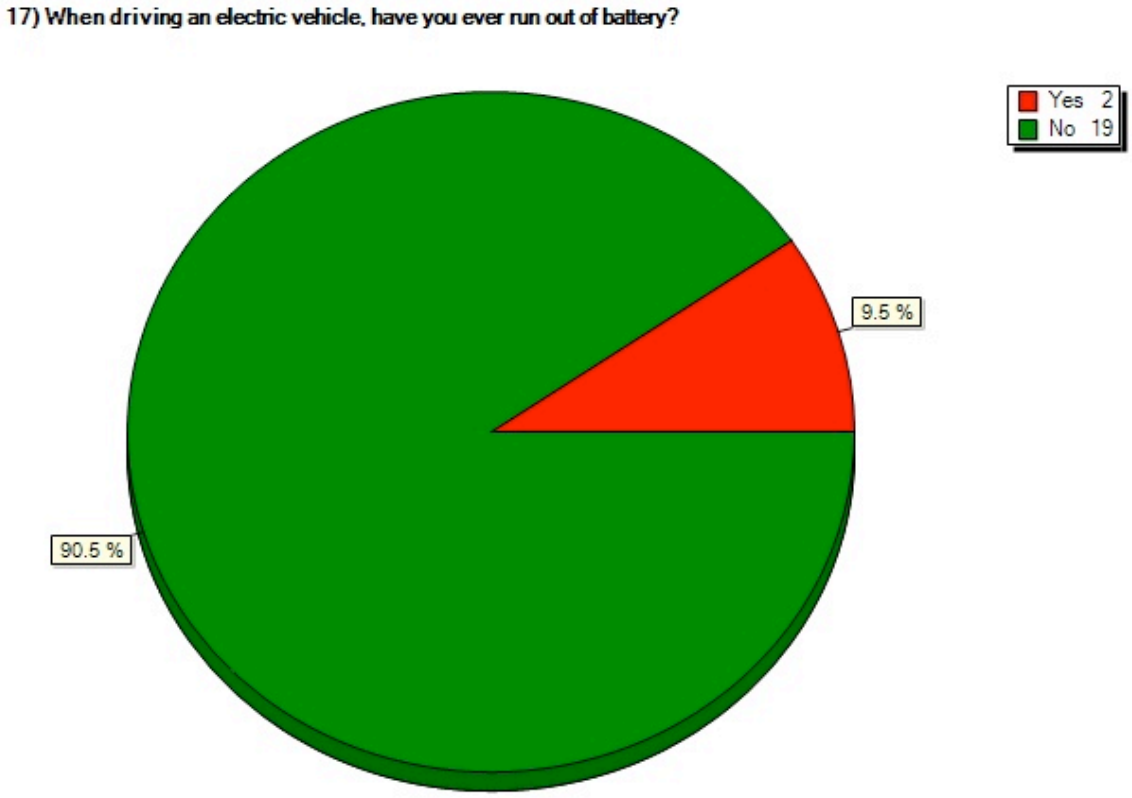


Comment Responses:

Slower driving
I have less of a 'lead foot' in an elec vehicle
It hasn't happened, but I would accelerate more slowly to conserve the battery.
Avoid hills where possible
drive more effeciently, turn down heater

Once had to abort a trip to richmond cause the range dropped to naught
Not applicable
never paid attention to charge
distance reduced
Shorter trips closer to home.
I wouldnt accelerate of brake as hard.
after almost running out of power on a recreational trip to mt seymour, i will never use an electric car again for long distance
after almost running out of power on a recreational trip to mt seymour, i will never use an electric car again for long distance
Not Applicable - Have not had this situation

17) When driving an electric vehicle, have you ever run out of battery?

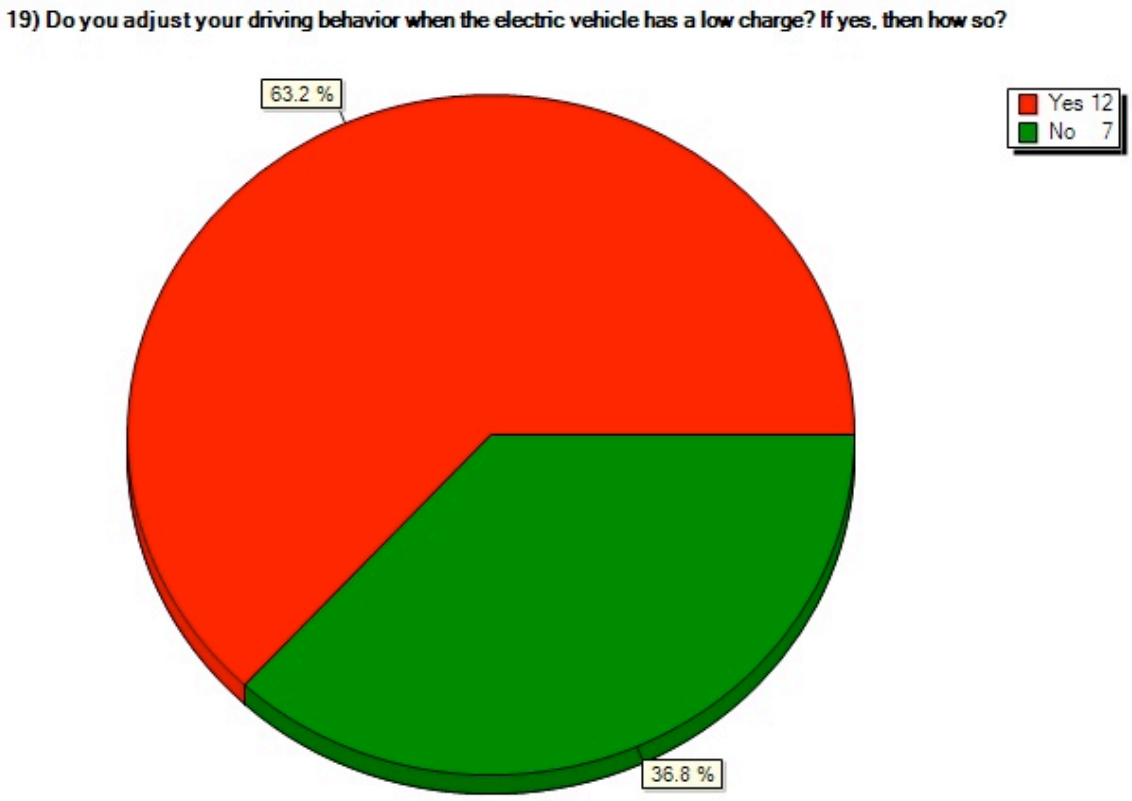


18) What do you consider a "low charge" on the electric vehicle's battery?

What do you consider a "low charge" on the electric vehicle's battery?
1/4 charge
<25km
I take short trips so I've never seen the charge under about 75%.
Less than 25 km on the indicator.
Don't know - can't understand the estimated mileage indicator. It swings all over the place. Once, when picking up the vehicle for a 20km round trip, I found the vehicle only half-charged with 89km range showing on the indicator - obviously previous driver hadn't figured out how to start the charge. After six blocks travelling on Cambie St, the range indicator was dowwn to 68 km. I am aware of "memory effect" and "voltage rebound" when a battery has rested for a time, but this was ridiculous. I asked advice from Modo, who could not advise whether they thought the remaining charge would be enough for my 20 km round trip, and made arrangements for me to return and take a gas-powered car.
less than 30km
Less than 20km
Less than 30 kms remaining.
25% remaining
40%
10 KMs left
never paid attention to charge
less than 1/8
Less than 30 kms.
When it says "Low"

30kms
less than 10km
less than 10km
When it says Low Charge or the dial is on "L" or 10% or so.
15 km
80% of nominal voltage

19) Do you adjust your driving behavior when the electric vehicle has a low charge? If yes, then how so?



Comment Responses:

Slower driving/Less Heat or Air conditioning/Return home
Drive more conservatively
Same as above!
What do you call a " low charge"? See 18 above. At all other times the range

indicator has been nearly full or full when I picked the car up.
Not applicable.
lightly tapping accelerator
slow down
Shorter trips closer to home.
I wouldnt accelerate of brake as hard.
Ive only used the ev once
more cruising, less accelerationg
more cruising, less accelerationg
Is this not the same as Question #16
have not experienced this condition

20) Why do you choose to use an electric vehicle as opposed to a conventional vehicle?

Why do you choose to use an electric vehicle as opposed to a conventional vehicle?
Less pollution, quiet ride, feels good
Because I work with them
Fun to drive
It's quieter and has a smoother acceleration than any other car I've driven.
Ummmm.... not for altruistic reasons. The Coop supported choice by purchasing the electric vehicle, and I support the Coop in as many of its decisions as I can. In generally, the car is available when I need it (eves/wknds), and apart from the information panel, it's a comfortable car to drive, unlike the Prius or the Mini.
It's clean. Makes me feel good.
Curiosity and environmental reasons.
No preference. Sometimes electric cars are the only ones available.
Test it out,
it is new, once the newness is gone then I won't use it as it is not reliable
couriousity
environmental reasons
Environmental (cleaner air), economical (no need to take 5-8 minutes out of booking to fill up), fun factor (a cool car to drive).
Quieter, environmentally better for air quality.
Environment
environmentally conscious

environmentally conscious
I like it and it's good for the environment.
Less pollution, an unusual car, quieter.
Oil companies are evil

21) Please insert any further comments about electric vehicles, driving behavior, or this survey

Please insert any further comments about electric vehicles, driving behavior, or this survey
The electric car is great! Perfect for city driving to complete daily errands etc. I am very satisfied with it's performance and range.
The Modo car is always fully charged, so I've never had to deal with a low battery. My trips are short. For the one trip I sometimes make that's out of range, I can just take a different car.
We need more!
delayed throttle, to sluggish, not enough battery life.
Q 11 - 14 ashould have option to say never paid attention to range readings
I have only driven the Mitsubishi for business travel and like it very much
The air in Vancouver is already very clean for a city of its size, a continued push for electric vehicles in the city could lead to even better overall air quality.
I would like to use more ev's.
disappointed that you had to pay to re-charge at public lots
As a car-sharing member, I have used an electric vehicle once. Based on a very positive experience, I would use it again in the future. Some of the questions on this survey were not applicable to my experiences - I have tried to indicate this where possible.

Information panel (dashboard) is the biggest barrier to comfortability. I'm a technical engineer, so I'm comfortable with interpreting readings and making allowances for how technology behaves, but I find the Nissan EV's dashboard very confusing and not conducive to efficient driving nor trustworthy to the limits

of the charge. I don't even know what advice to give. The indicator that shows what I think is power consumption on acceleration vs. regenerative braking capacity on coasting/braking doesn't indicate whether I'm regenerating, or merely just dissipating kinetic energy with the brakes. The range indicator varies way too much to be of much use - and 12 bars? Not 10? Seriously? A 3-block-long hill from Alma up W. 10th Ave past Crown is long enough to take 25 km off the range, and if you watch it over the next several blocks, it slowly recovers about 20km of that. What good is that? The 3/4 clock thingy in the upper left corner? No idea what it is. Symbols indicating equipment warning don't indicate what's wrong - a persistent warning indicator had me checking the parking brake twice while driving, once to sound of screeching tires when it was electrically activated in full (damn drive-by-wire!). That time it turned out to be a box of goods I'd placed on the passenger seat beside me, but with only a symbol, how can you know what the car wants is for the box to be wearing a seat belt? Words have vanished from dashboards, and I don't know why. It's very difficult to understand what the car is trying to tell you without words. I think that for now, most people who buy electric cars have some technical knowledge and are comfortable with words to offer explanatory information. I'm sure one of the target markets is people who aren't technically comfortable but want to "support the green thing" - true, they may shy away from electric vehicles fearing information overload with a wordy dashboard, but based on my wife's reaction, I'm quite sure this dashboard isn't the answer. My driving behaviour hasn't changed from gas to electric. I've rarely accelerated more than four dot's on the accelerometer, (once five dots, now that I think of it) I still coast a lot, time traffic lights, and occasionally speed down a hill by coasting in order to conserve momentum when going back up the other side. The electric is comfortable doing that, and one time I'd like to try driving it til the charge runs out just to see if it makes the advertised 132km I usually see when picking it up. But I've many better things to do first....