



THE STATE OF ELECTRIC VEHICLES IN AMERICA





INTRODUCTION

Volvo Car USA has teamed up with The Harris Poll to deepen insights into the American opinion across four core themes: design, safety, technology and environment. These insights are distilled into “Volvo Reports” and will feature a different topic each month.

This edition of Volvo Reports investigates the state of electric vehicles in America and the public’s changing perspective on them. Further amplifying Volvo’s commitment to electrification, this report sought to provide new insights on the evolution of electric vehicles (EVs), the current barriers to purchasing, and the future of the EV economy.

We encourage you to use these statistics freely, properly sourcing Volvo Car USA/The Harris Poll. If you have any questions regarding these findings or would like to delve deeper into Volvo’s electrification commitment, please reach out to Jim Nichols at jim.nichols@volvocars.com.

METHODOLOGY

This survey was conducted online within the United States by The Harris Poll on behalf of Volvo from October 11-17, 2018, among 1,510 U.S. drivers ages 18 and older, including 250 who currently drive or have driven EVs in the last year. This online survey is not based on a probability sample and therefore no estimate of theoretical sampling error can be calculated.

ENTHUSIASM AND EXPECTATIONS AROUND ELECTRIC VEHICLES ARE RISING

As environmental concerns continue to rise, brands and consumers alike are looking to do their part to reduce their carbon footprint. Part of this effort includes the rise of Electric Vehicles (EVs), which are charged electronically for propulsion, as opposed to using any other energy source like gasoline. The EV sector includes HEVs (Hybrid Electric Vehicles), PHEVs (Plug-In Electric Vehicles), and BEVs (Battery Electric Vehicles).

Driven largely in China, the U.S., and European countries like Norway and Sweden,¹ the electric vehicle passenger market is expected to reach a valuation of \$356 billion by 2023.²

In fact, many believe we will not be able to live without these vehicles in a resource-constrained future. Three in four drivers even say that “EVs are the future of driving (74%).” Among EV drivers, this number rises to 79%.

Yet relatively little is known about this young and rapidly growing category – and most importantly, the drivers behind it. To better understand this movement, we set out to explore overall drivers’ perceptions of EVs, as well as the mindset of EV drivers, from how they perceive these vehicles, to the driving experience, to day-to-day benefits and challenges.



74%
*of drivers believe that EVs
are the future of driving*

¹ Electric Vehicles, Tracking Clean Energy Progress | International Energy Agency, Retrieved November 1st, 2018 from <https://www.iea.org/tcep/transport/evs/>
² Upstarts Emerge to Chase Tesla’s Lead in Electric Vehicles | TechCrunch, Retrieved November 1st, 2018 from <https://techcrunch.com/2018/05/23/upstarts-emerge-to-chase-teslas-lead-in-electric-vehicles/>

RANGE ANXIETY IS A TOP CONCERN, BUT ONLY AMONG THOSE WHO HAVEN'T DRIVEN AN EV

According to the Department of Energy, the average EV in the U.S. can travel 114 miles between charges.³ Many drivers find this mileage capacity limiting, making the fear of running out of power, or “range anxiety,” one of the most discussed issues in the space. In fact, when we asked drivers overall what the top barriers to purchasing an EV are for them, the overwhelming choice among most drivers was running out of power (58%), followed by low availability of charging stations (49%). Given these concerns, it’s not surprising that the number one factor that would increase most drivers’ likelihood to purchase an EV was more charging stations (58%).

But among actual EV drivers, these numbers around charging barriers drop significantly. Even those EV drivers who did worry about staying charged initially say it wasn’t a lasting issue: 65% say they had range anxiety when they first purchased an EV, but it went away after a few months.

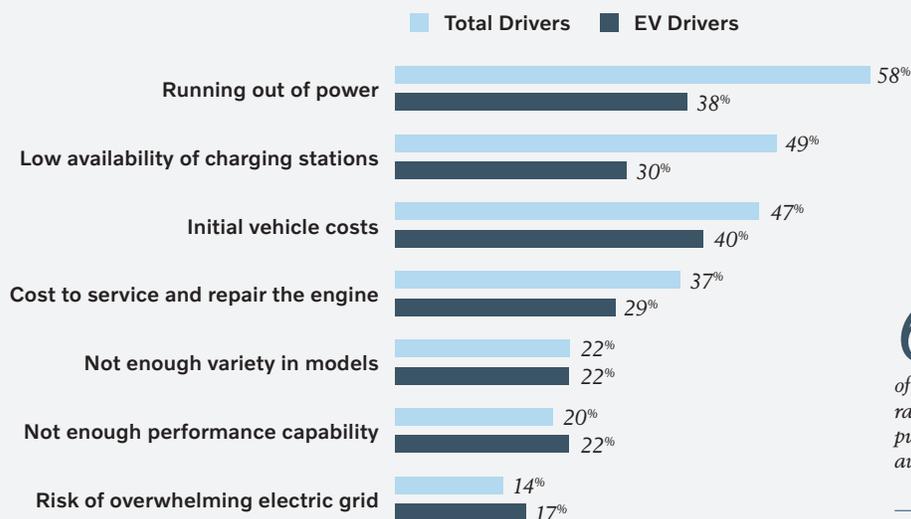
Would increase likelihood to purchase EV

Base: Non-EV drivers

- 1 More charging stations (61%)
- 2 Same price as a traditional vehicle (57%)
- 3 Government financial incentives (41%)
- 4 Trying it for 30 days before buying it (40%)
- 5 Manufacturer providing a gasoline or hybrid car to switch out (32%)
- 6 Charging the vehicle wirelessly (29%)
- 7 Styling similar to traditional vehicles (26%)

RANGE ANXIETY IS LESS OF A CONCERN FOR EV DRIVERS, WHO ARE MORE FOCUSED ON PRICE

Top barriers to purchasing an electric vehicle



65%
of EV drivers say they had range anxiety when they first purchased an EV, but it went away after a few months.

³ FOTW #1008, December 18, 2017: Median All-Electric Vehicle Range Grew from 73 Miles in Model Year 2011 to 114 Miles in Model Year 2017 | U.S. Department of Energy, Retrieved November 1st, 2018 from <https://www.energy.gov/eere/vehicles/articles/fotw-1008-december-18-2017-median-all-electric-vehicle-range-grew-73-miles>

Instead, what EV drivers are craving when it comes to charging is increased convenience and more options when on-the-go. While the most common place for recharging was at home (51%), many are also charging their vehicles while out and about. Despite charging their vehicles at public stations nearly half the time, most say charging stations leave much to be desired. Nearly two-thirds of EV drivers say public charging stations aren't reliable (61%) and one-third say the experience of using public charging stations is time-consuming (36%).

To improve the public charging station experience, EV drivers are looking for improved turnaround time and utility

while "refueling." Topping their wish list for upgrading public charging stations is a quick charge option that would cost more to charge the vehicle in half the time (48%). This is followed by a coffee shop or café with Wi-Fi to improve connectivity while they wait for their vehicle to charge (42%) to increase productivity during this otherwise wasted downtime. Others are interested in making the experience more fun – one third say they would like to use the charging time to work out in a gym or fitness facility onsite (32%), and a similar number are interested in a gamified rewards experience that incentivizes them to return (27%). On the more practical side, 1 in 4 EV drivers are looking for other maintenance services being provided onsite (26%).

AVERAGE CHARGING FREQUENCY BY LOCATION

Average charging frequency by location

Base: EV drivers



Most desired additions to public charging stations

- 1 Quick charge option to pay more to charge in half the time (48%)
- 2 Coffee shop or café with Wi-Fi (42%)
- 3 Gym or fitness facility (32%)
- 4 Gamification or rewards that incentivize drivers to return (27%)
- 5 Other vehicle maintenance services (26%)

EVs REDUCE GREEN GUILT — IN MORE WAYS THAN ONE



With range anxiety playing less of a role, the number one barrier to purchase among actual EV drivers was initial vehicle costs (40%). In fact, more than half of all drivers said if the price was the same as a traditional engine vehicle, they would be more likely to purchase an EV (55%). Similarly, when asked the top benefit of driving an EV, EV and non-EV drivers alike agree that cost savings from better fuel economy was the top choice (58%, 59% respectively).

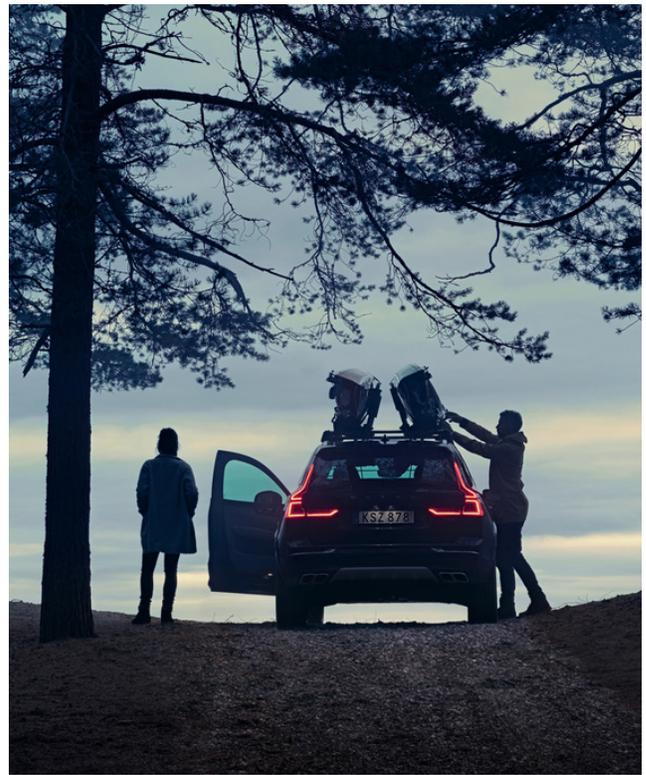
That said, misperceptions regarding the cost of EVs are common. While most EV drivers agree that their vehicle makes for a smarter decision long-term, as cost savings on fuel balance the higher upfront price tag, drivers overall are less confident in this benefit. In fact, three-fourths of EV drivers say, “the long-term savings on gas outweigh the higher upfront price tag of buying an electric vehicle (74%),” while only 60% of overall drivers say the same.

73%
*of EV drivers say their vehicle makes them
feel better about making less environmentally
conscious decisions in other areas of life*

In addition to monetary benefits, EV drivers cite environmental impact as a key green upside of their vehicles, citing a positive environmental impact as the number two overall benefit of driving an EV (50%). For many EV drivers, the reduction in their carbon footprint achieved by driving an EV helps alleviate their green guilt. 73% say their vehicle makes them feel better about making less environmentally conscious decisions in other areas of life.

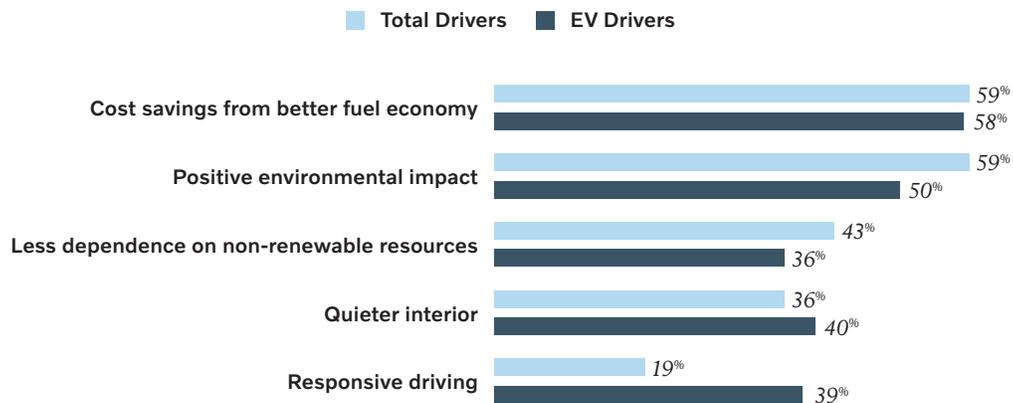
Overall, most drivers see the green upsides of driving an EV as well, viewing it as a fast-track tool to reduce their carbon footprint: 59% say having a positive environmental impact is a top benefit of driving an EV. In fact, they believe they can make more of a positive environmental impact by driving an EV compared to recycling (49%), switching to paperless billing (48%), and using smart home technology to regulate energy in their homes (44%).

While the environmental impacts of driving an EV are clear, those who have not driven an EV tend to overestimate the importance of environmental impacts, compared to actual EV drivers, who are more interested in the “feel” of getting behind the wheel. In fact, EV drivers are almost twice as likely to say the reactivity of the vehicle, also known as responsive driving, is a benefit of owning an EV, compared to drivers overall (39%, compared to 19% respectively). They are also more likely to cite a quieter interior as a benefit, with nearly three-fourths saying their vehicles are so quiet, the silence of their engine has startled pedestrians or cyclists in parking lots and at stoplights (71%).



EV DRIVERS ENJOY SAVING MONEY & THE PLANET WITH THEIR VEHICLES

Overall benefits of driving an electric vehicle



Drivers overall believe they can make more of an environmental impact by driving an EV than...

>  49%
Recycling

 48%
Paperless billing

 44%
Smart home technology

IT'S NOT ALL ABOUT THE ENVIRONMENTAL BENEFITS — EV DRIVERS CONSIDER THEMSELVES CAR ENTHUSIASTS WHO HAVE FUN BEHIND THE WHEEL

While financial and environmental benefits are certainly a key factor for EV drivers, it's not all about practicality – most are also in it to have fun behind the wheel. In fact, 72% of EV drivers say they like to gamify the energy efficiency of their vehicle. They are also more likely than other drivers to consider themselves “car enthusiasts” who are passionate and knowledgeable about their vehicles (38%, compared to 24% of drivers overall).

When asked to describe their driving style, EV drivers are actually less likely to describe themselves as defensive or sensible. Instead, they are more likely to classify their approach as adventurous, fast and even aggressive, demonstrating a need for speed. They are also more likely than other drivers to describe their experience behind the wheel as thrilling.

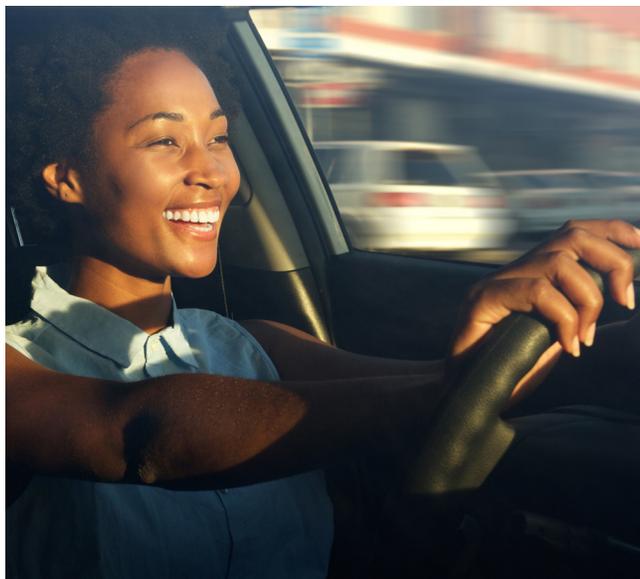
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Design and aesthetics are also a driving factor. EV drivers show an appreciation for the unique design of their vehicles, with 76% saying they “like the differentiated design of electric vehicles.”



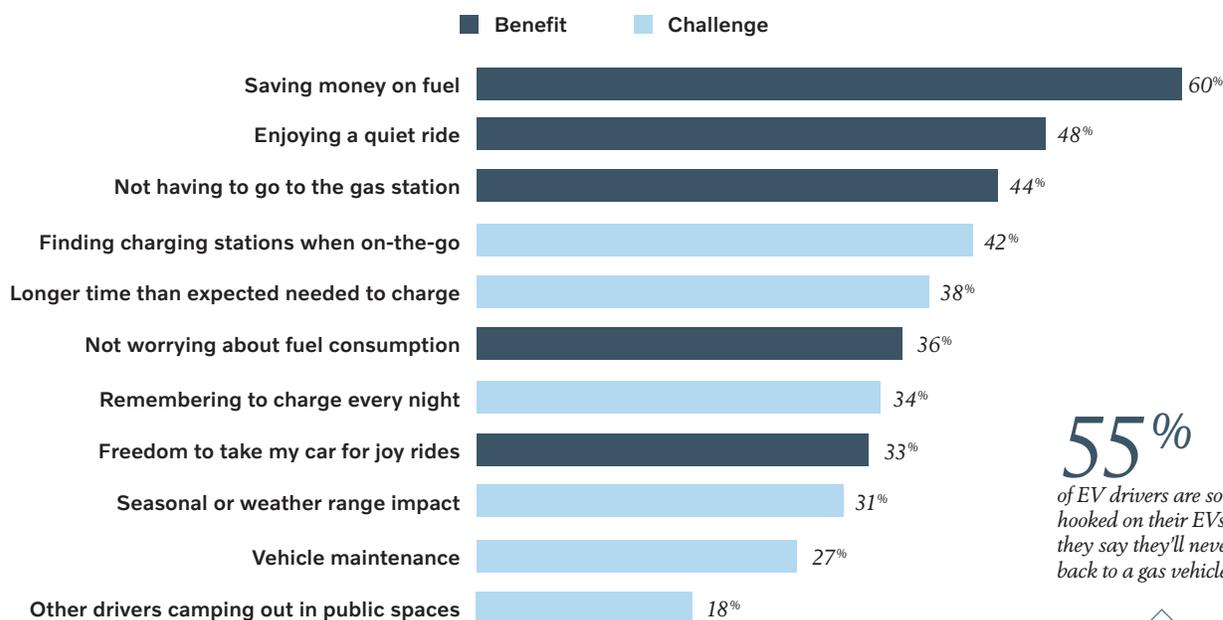
ULTIMATELY, THE BENEFITS OF DRIVING AN EV OUTWEIGH THE CHALLENGES



Compared holistically, the day-to-day upsides of electric vehicles are more prevalent than their negative counterparts. Reflecting their price sensitivity and craving for a high-quality drive, the top day-to-day benefits for EV drivers include saving money on fuel (60%), enjoying a quiet ride (48%), and not having to go to the gas station (44%). All of these outweigh challenges such as finding charging stations on-the-go (42%) and the length of time it takes to charge their vehicle (38%).

Ultimately, the positives ladder up to create a strong sense of pride and satisfaction among the EV driver community. In fact, 85% of EV drivers say they are satisfied with their vehicles, and a similar amount say they are “proud of their vehicle.” More than half are so hooked on their EVs that they say they’ll never go back to a gas vehicle (55%).

DAY-TO-DAY BENEFITS AND CHALLENGES OF DRIVING AN EV



55%
of EV drivers are so hooked on their EVs that they say they'll never go back to a gas vehicle.

VOLVO & ELECTRIFICATION

ELECTRIFICATION COMMITMENT

Volvo Cars is taking a bold lead with electrification in the auto industry. As the first major car brand to commit to a hybrid or full-electric powertrain for all models, Volvo aims to drive the automotive sector forward, improve the quality of the air in cities and increase awareness surrounding the benefits of electrification.

Volvo believes that the future is electric and its [Electrification Commitment](#) states that by 2025, 50% of Volvo Cars' sales volume will be fully electric. Additionally, every new Volvo car launched in 2019 onwards will have an electric motor. This ambitious announcement highlights Volvo's commitment to take the industry lead and embrace a cleaner mobility. It also underlines Volvo's commitment to reducing the environmental impact of its products, and most of all, it shows that Volvo listens to its customers and their needs.

ELECTRIFIED ALTERNATIVES

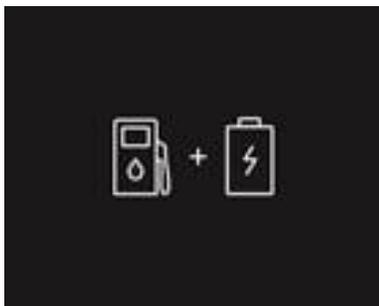
Volvo's dedication to electrification has been long-standing. Its commitment to world-changing innovation that provides

power, efficiency and environmental friendliness will drive a broader range of hybrids and fully battery electric models. Today, you can buy plug-in hybrid Volvo vehicles that offer drivers the choice to run the vehicle on gasoline or battery electric power. In the future, Volvo will add even more powertrain options – including mild hybrids and battery electric vehicles. All are designed to improve your life now and in the future.

ELECTRIFIED BENEFITS

In addition to doing your part to conserve the environment with lower emissions and fuel consumption, there are many immediate, personal benefits that come with electric motors, including:

- Instant power and increased performance
- A smooth ride and reduced operating costs
- Powertrain options to suit every driving need



Mild Hybrid vehicles offer an electric motor that provides instant power along with a gas motor that powers most driving activities. There is no need to 'plug in' with a Mild Hybrid.



Plug-In Hybrid vehicles utilize electric and gasoline power and allow drivers to control which motor they want to use.



Battery Electric vehicles never utilize gasoline and produce zero emissions.