
Virginia Drives Electric 2020

Electrify Your Ride
Campaign Report



Virginia Drives Electric 2020

Benefits, Barriers, and Policies Needed for Widespread EV Adoption in Virginia

A REPORT BY GENERATION180

ACKNOWLEDGEMENTS

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Thank you to the entire Generation180 team for its hard work and dedication to this project, and a special thank you to the organizations listed below who have demonstrated their support for transportation electrification across the Commonwealth of Virginia.





EXECUTIVE SUMMARY

In preparation for the 2021 Virginia General Assembly, Generation180 has released the *Virginia Drives Electric* report, providing a “State of the State” of electric vehicles in Virginia. In addition to leveraging existing data to inform the report’s findings, Generation180 undertook several projects to assess the state of EVs in Virginia, including a Consumer Sentiment Survey, a Dealership Sentiment Survey, an EV Shopping Experience assessment, and an EV Inventory analysis.

The findings indicate Virginians are overwhelmingly in favor of clean energy and electric vehicle technology, and new-car dealerships appear optimistic. In fact, Virginia is already 13th in the nation for electric vehicle sales, but much more needs to be done. Considering almost half of the state’s carbon dioxide emissions are transportation-related, now is the time for the General Assembly and Governor Northam’s administration to support an equitable transition to electric transportation in line with the state’s long-term carbon reduction goals.

In light of the current lack of policies supporting electric vehicle adoption in the Commonwealth, Generation180 recommends the adoption of the Advanced Clean Cars Program to ensure Virginians have access to an adequate supply of electric vehicles, an equitably designed point-of-sale EV rebate to mitigate the higher upfront cost of electric vehicles, and the Transportation and Climate Initiative to help fund carbon reduction programs. These complementary policies can help electrify Virginia’s light-duty vehicle sector while supporting job growth and public health across the Commonwealth.

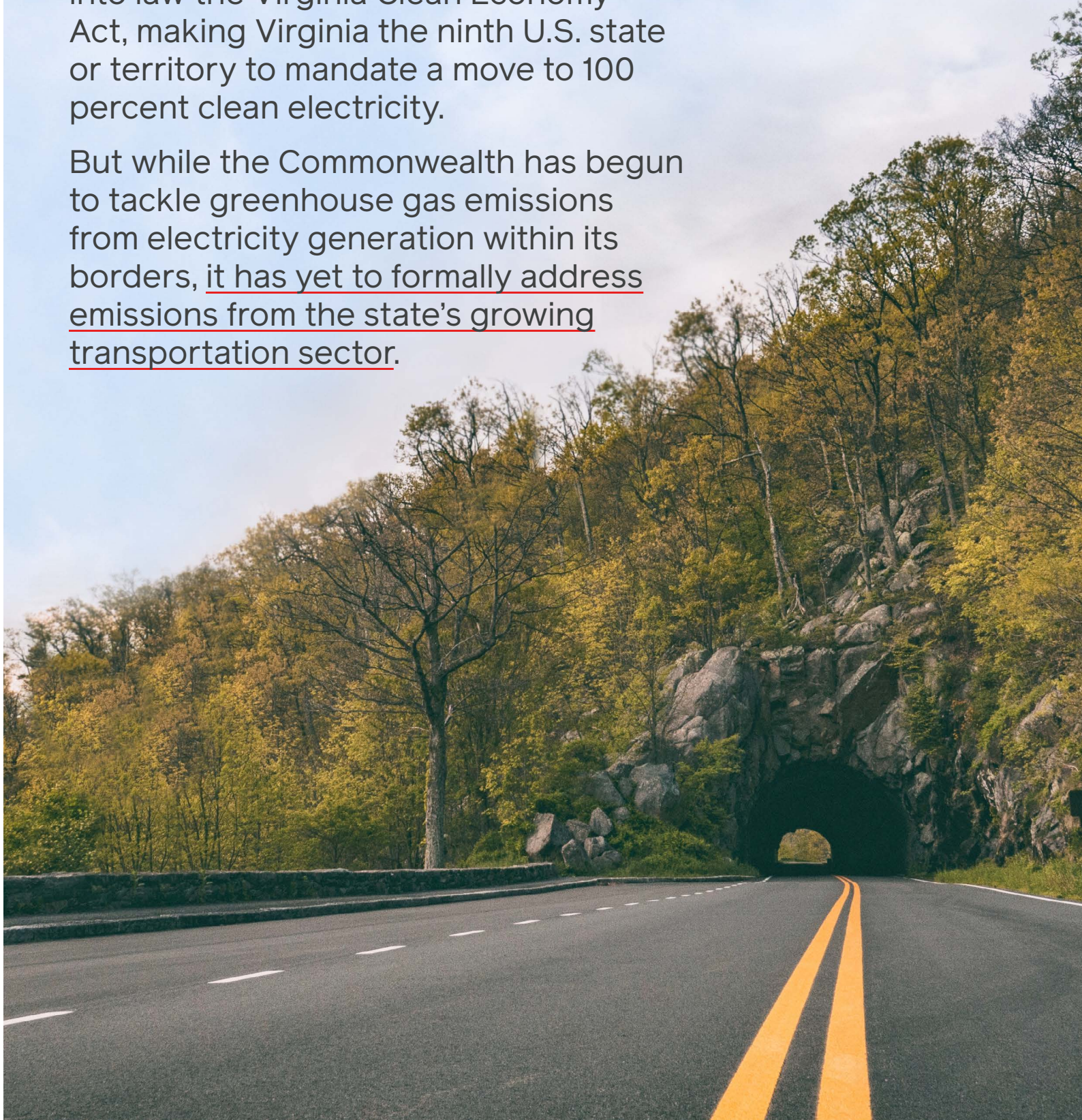
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INTRODUCTION

The past year has put Virginia on the map for clean energy leadership. In April 2020, Governor Ralph Northam signed into law the Virginia Clean Economy Act, making Virginia the ninth U.S. state or territory to mandate a move to 100 percent clean electricity.

But while the Commonwealth has begun to tackle greenhouse gas emissions from electricity generation within its borders, it has yet to formally address emissions from the state's growing transportation sector.



The transportation sector is the state's largest source of carbon dioxide emissions and represents a significant opportunity for Virginia to continue playing a leading role in our country's transition to clean energy.

To tackle these emissions, Virginia needs to rethink transportation across the board, shifting to cleaner and more equitable ways of getting around. While solutions should go beyond just personal vehicle ownership to public transit and community design, we must transition existing gasoline-powered internal combustion engines to more efficient, electrified forms of mobility. Electric vehicles (EVs) can provide significant reductions in transportation emissions and can yield immediate economic, health, and climate benefits for all Virginians.

According to the Rocky Mountain Institute, the US needs to electrify 40-50 million light-duty vehicles by 2030 in order to meet the goals set in the Paris Climate Accords and avoid the most catastrophic effects of climate change.¹ This is a lofty but necessary goal, and one that Virginia should support. Under the Virginia Clean Economy Act, the state has set an ambitious but achievable goal of having 100 percent of its electricity come from renewable and other clean energy sources by 2050. Now Virginia must look to the transportation sector, accelerating the adoption rate of EVs across the Commonwealth.

Generation180 developed this report to fill the need for a comprehensive overview of the opportunities that EVs provide to the Commonwealth, while also giving a voice to Virginians. The present report provides a detailed analysis of the benefits that EVs can provide, the current state of EV adoption in Virginia, the barriers we must address, and the key policies that support transportation electrification in the state. In addition, the report includes a representative survey that reveals, among other findings, that over half of Virginians are likely to consider an EV for their next car.



In a 2020 consumer survey, 53% of Virginians said they were likely or very likely to consider an EV for their next car.

KEY FINDINGS



Over half of Virginians are likely to consider an EV for their next car.

53% responded “somewhat likely” or “very likely” to consider an EV for their next vehicle (assuming they were in the market for a new car within the next two years).



Nearly three-quarters of Virginians have a positive view of electric vehicles.

When asked, “Given what you know, what is your perception of EVs?”, 71% responded as having a “somewhat positive” or “very positive” view of electric vehicles.



Nearly three-quarters of Virginians support state-level EV incentives.

Roughly 71% of respondents “strongly support” or “support” Virginia offering an EV incentive.



Savings on fuel costs is the biggest motivator to purchase an EV.

Of the benefits presented, “savings on gasoline costs” ranked #1, with 72% of respondents reporting it would make them “much more” or “somewhat more” likely to purchase an electric vehicle. “Better for the environment” was cited as the second highest benefit to purchasing an EV at 68%.



Availability of electric vehicle inventory is one of the most significant barriers to wider EV adoption for Virginia new-car dealerships.



Overall electric vehicle inventory was 44-54% lower in Virginia cities than in comparable cities in Maryland.



Inventories of the Toyota Prius Prime and Hyundai Kona EV were seven to ten times higher in Maryland cities than in comparable Virginia cities.



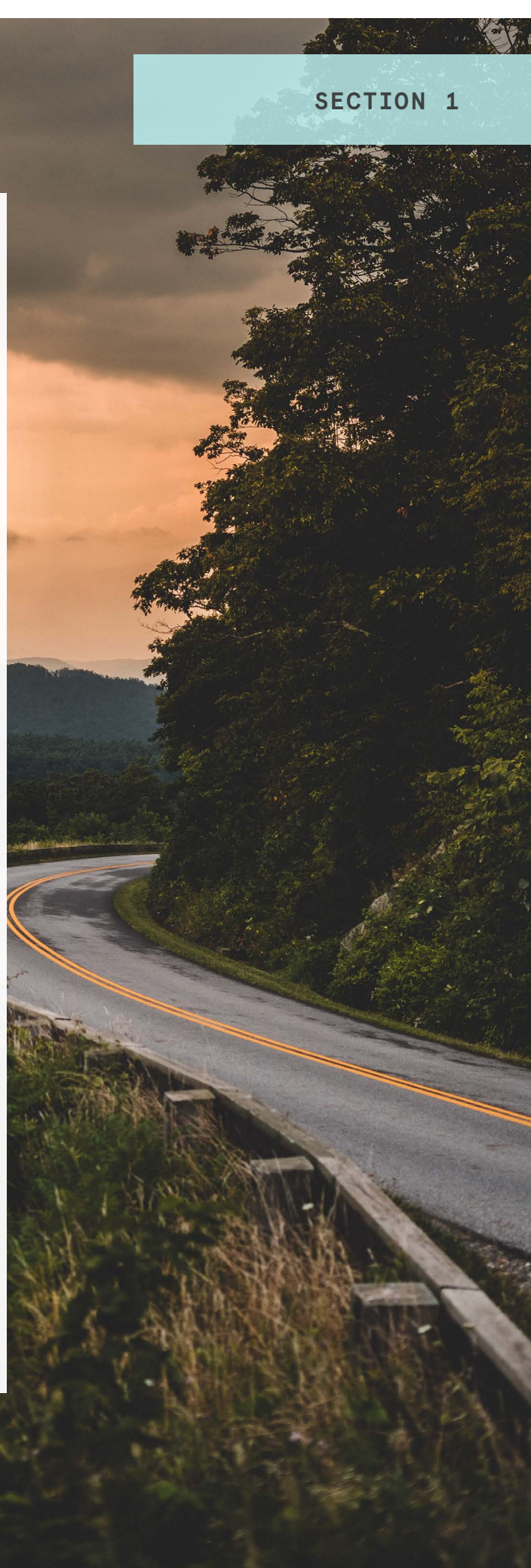
Support for Virginia’s transition from fossil fuels to clean energy is strong.

When asked, “How important is it to you that Virginia reduce its dependence on fossil fuels and transition to clean energy?”, 75% of respondents said it was “somewhat important” or “very important.”

Why EVs Matter to Virginia

As Virginia transitions to a 21st-century clean energy economy, electric vehicles will play an important role in achieving many of the state's climate, economic, and public health goals.

The more Virginia transitions to electric vehicles, the more the Commonwealth will benefit. From reduced greenhouse gas emissions and decreased dependency on foreign oil, to better air quality and the creation of new local jobs, transitioning to electric vehicles is good for both state residents and our economy as a whole.



Driving an EV charged from the average electricity mix in Virginia (including coal-fired power plants) saves more than 8,000 tons of CO₂ annually over gas-powered cars.

REDUCED CARBON DIOXIDE EMISSIONS

Transportation is the leading source of carbon dioxide (CO₂) emissions in Virginia.² Every year, the state's transportation sector releases over 48 million metric tons of greenhouse gases into the atmosphere.³ Nearly half (48%) of Virginia's energy-related CO₂ emissions come from transportation, compared to 29% from electric power generation.⁴

Electric vehicles are more climate-friendly than gas-powered cars, even when the electricity used to charge them comes from today's conventional power mix.⁵ According to studies, driving an EV charged from the average electricity mix in Virginia (including coal-fired power plants) saves more than 8,000 tons of CO₂ annually over gas-powered cars.⁶ Over their lifetime, electric cars currently produce less than half the emissions of comparable gas cars,⁷ and they're even cleaner when charged with 100 percent renewable electricity—typically generated from wind or solar power. Combining EVs with clean energy makes them an even greater win for the climate.

As part of a working group commissioned to assess the feasibility of an EV rebate program in the Commonwealth, the Virginia Department of Environmental Quality recently analyzed possible greenhouse gas reductions under different electric vehicle adoption scenarios. Based on projected new EV registrations between 2022 and 2027, Virginia could reduce between 400,000 tons and 885,000 tons of GHG (greenhouse gas) emissions by 2027.⁸ As more EVs hit the road and Virginia's electrical grid gets cleaner and cleaner, these GHG reductions will continue to rise.

Nearly half (48%) of Virginia's energy-related CO₂ emissions come from transportation.

48%
TRANSPORTATION

52%
COMMERCIAL,
ELECTRIC POWER,
RESIDENTIAL,
INDUSTRIAL

Attributable to Virginia-specific transportation PM_{2.5} emissions:

92
ANNUAL DEATHS

2,600
ANNUAL CASES OF
EXACERBATED ASTHMA

10,000
LOST WORKDAYS
PER YEAR

The mortality incidence associated with air pollution is highest among the most vulnerable populations in Virginia.

IMPROVED PUBLIC HEALTH

Virginia's transportation sector is not just the largest source of CO₂ emissions in the state—it also causes significant local air pollution. Pollutants from gasoline and diesel vehicles include nitrogen oxides, particulate matter, hydrocarbons, carbon monoxide, and other substances that are harmful to human health.⁹ Particulate matter—which includes airborne particles of soot and metals—can cause skin and eye irritation and allergies, and ultrafine particles can lodge deep in the lungs, leading to respiratory problems.¹⁰ Hydrocarbons react with nitrogen dioxide and sunlight to form ground-level ozone, which inflames the lungs and causes chest pain and coughing, making it difficult to breathe.¹¹ Carbon monoxide, released from an internal combustion engine's tailpipe, is particularly dangerous to infants and to people suffering from heart disease because it interferes with their blood's ability to transport oxygen.¹²

A recent study from Virginia Clinicians for Climate Action (VCCA) found that 92 deaths, 2,600 cases of exacerbated asthma, and 10,000 lost workdays per year are attributable to Virginia-specific transportation PM_{2.5} emissions,¹³ and these impacts are potentially much greater if we consider transportation emissions in their entirety. A study led by the Harvard School of Public Health found that transportation-related PM_{2.5}, ozone, and nitrogen dioxide emissions led to 750 premature deaths in Virginia in 2016.¹⁴ The VCCA study also reports that the “mortality incidence associated with air pollution is highest among the most vulnerable populations in Virginia.”¹⁵ Previous research has shown transportation-related health burden to be inequitably distributed, as communities of color in the Northeast and Mid-Atlantic breathe 66 percent more air pollution from vehicles than white residents on average.¹⁶

With zero tailpipe emissions, electric vehicles eliminate a wide range of contaminants—from nitrogen oxides to fine particulate matter—resulting in a significant improvement in air quality.¹⁷ EVs offer a tremendous opportunity to improve health outcomes across the state by reducing the costs of health impacts through avoided asthma attacks, fewer lost workdays due to respiratory illnesses, and fewer premature deaths.¹⁸

JOB CREATION AND VIRGINIA'S ECONOMY

The transition to electric vehicles will require ongoing expansion of Virginia's EV charging infrastructure, creating and supporting new jobs across the state. To achieve its climate goals and meet rising EV demand, the Commonwealth will need to dramatically increase the installation of new public, private, and workplace charging stations. The accelerated deployment of visible and convenient charging infrastructure in public spaces will support and accelerate EV sales and provide confidence to future EV buyers that they'll always be able to keep their vehicles "fueled" within range.¹⁹

A recent economic analysis of major electrification projects across the country shows that more jobs are created from \$100,000 of spending in the electric sector than are created from \$100,000 of spending in the petroleum sector.²⁰ For example, for each \$1 million spent on electrifying the Port of Baltimore (including vehicles and cargo handling equipment),²¹ twice the number of jobs were created than would have been created by investing that same amount in the petroleum sector.²²

These differences are associated with fuel costs staying within the local economy instead of being transferred to other states and countries involved in petroleum extraction, refining, and distribution.²³ The Commonwealth already has 5,400 jobs in advanced transportation, and there is potential for many more high-quality jobs in areas such as the manufacturing of electrical components, construction and installation of charging stations, electricity generation and supply, battery manufacturing, electrical service, and vehicle production and maintenance.²⁴

To achieve its climate goals and meet rising EV demand, the Commonwealth will need to dramatically increase the installation of public, private, and workplace charging stations.



Virginia spends around **\$25 million per day** or **\$10 billion per year** on imported fuels to meet its transportation energy needs.

Transitioning to EVs means fewer dollars leaving the Commonwealth to pay for out-of-state oil and gas. The average Virginian spends almost \$1,000 annually on gasoline—equivalent to around \$25 million per day or \$10 billion a year spent on imported fuels to meet the state's transportation energy needs.²⁵ Since Virginia doesn't produce any gasoline or diesel itself, very little of this money remains in the local economy. Replacing gas-powered vehicles with EVs presents an opportunity to shift consumer spending in ways that will have positive economic impacts for the state.

The projected gasoline savings from switching to EVs will promote energy security and independence while keeping more money in the local economy, leading to even greater economic impact. A 2017 preliminary report from the Energy & Environmental Research Associates showed how the injection of petroleum fuel savings towards other goods and services in the local economy creates new jobs and boosts economic output, potentially generating 16 times as many jobs per dollar spent compared to investment in the petroleum sector.²⁶ Additional studies in numerous other states have shown that for every \$1 million in direct savings, the switch to EVs can generate up to \$570,000 in additional economic benefits, resulting in up to 25 additional local jobs for every 1,000 electric vehicles in fleet.²⁷

Driving an EV saves Virginians Money

The benefits of driving electric are numerous, but some of the most immediate financial benefits will go directly to consumers.

LOWER COST OF OWNERSHIP

Research from Consumer Reports shows that when the total cost of ownership is considered—including factors such as the purchase price, fueling costs, and maintenance expenses—EVs come out ahead of gas-powered vehicles, especially in more affordable segments.

The savings advantage can be compelling in the first few years and continues to improve the longer you own the EV. During the first seven years, the fuel savings alone can be \$4,700 or more, while over the lifetime of most EVs the typical ownership savings totals \$6,000 to \$10,000.²⁸

WHERE DO THE SAVINGS COME FROM?

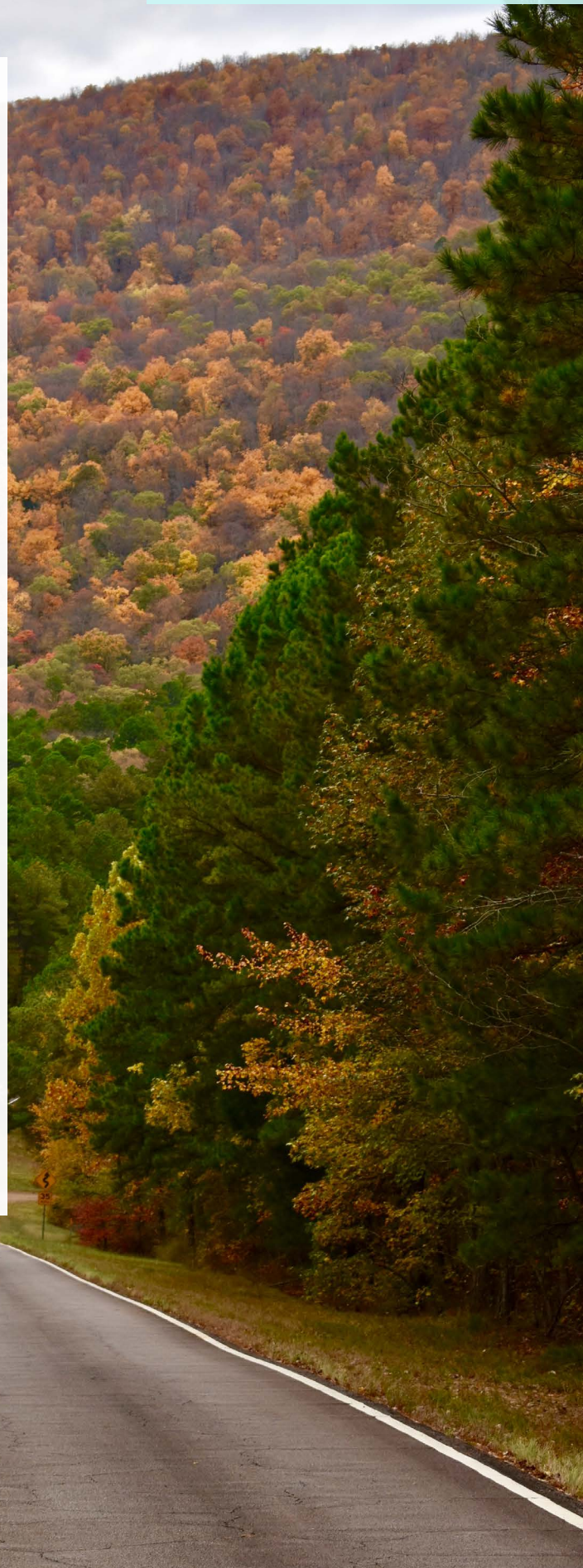
Compared to conventional vehicles that use internal combustion engines, EVs have far fewer moving parts and so require less maintenance—no oil changes, transmission repairs, or belt replacements necessary.

EVs also cost less to “fill up” on average: a typical eGallon (the cost of driving an EV the equivalent distance of one gallon of gasoline) is around \$1.12—less expensive than gas and a more stable price that doesn't fluctuate (like the prices at the pump).²⁹

Current Landscape

2020 has been a year like no other. The COVID-19 pandemic has affected nearly every industry, including the auto industry.

Nationwide, total new-car sales are projected to be down nearly 20 percent for the year, although demand is rebounding in response to attractive interest rates and vehicle incentives.³⁰ Supply remains a key challenge as manufacturers struggle to rebuild lost inventory due to facility shutdowns and supply chain disruptions during the early months of the pandemic.



53%

of Virginians said they were likely or very likely to consider an EV for their next car.

The recent combination of potential product delays and declining gasoline prices has affected EV sales in particular.³¹ Overall, the EV share of the U.S. auto market fell to 1.3 percent in April 2020, down from 2 percent in the fourth quarter of 2019, and it's projected to reach 3-6 percent in 2022, below pre-crisis expectations.³² While the impact from the pandemic means U.S. EV sales might increase only slightly over the next few years – from around 300,000 units in 2019 to between 400,000 and 1 million units by 2022³³ – these sales represent a significant opportunity for the Virginia economy, given the demonstrated demand within the Commonwealth. Virginia must act to accelerate the adoption of EVs to continue building momentum and prevent being left behind in the future clean mobility landscape.

Despite the pandemic, automakers are optimistic and continue to push forward with the introduction of new and refreshed EV offerings, with industry groups estimating nearly 40 such options coming to the U.S. market through 2021.³⁴

Virginia Consumer Sentiment Survey

As a part of this report, Generation180 conducted a survey designed to explore perceptions of electric vehicles among Virginia residents.

METHODOLOGY

This survey was conducted online from August 28 through September 17, 2020, using a sample and platform provided by the national market research firm Dynata.

The following analysis is based on a representative sample of 1104 Virginians age 18 and older across the Commonwealth and has a 95% confidence interval and a margin of error of +/- 3.0%.

Survey analysis was conducted by an independent consultant specializing in data analytics from Athenys Research.

KEY FINDINGS



OVER HALF of Virginians are likely to consider an EV for their next car.

53% responded “somewhat likely” or “very likely” to consider an EV for their next vehicle (assuming they were in the market for a new car within the next two years).



NEARLY 3/4 of Virginians have a positive view of electric vehicles.

71% responded as having a “somewhat positive” or “very positive” view of electric vehicles when asked, “Given what you know, what is your perception of EVs?”.



NEARLY 3/4 of Virginians support state-level EV incentives.

71% of respondents “strongly support” or “support” Virginia offering an EV incentive.

SEE APPENDIX FOR FURTHER DETAILS.

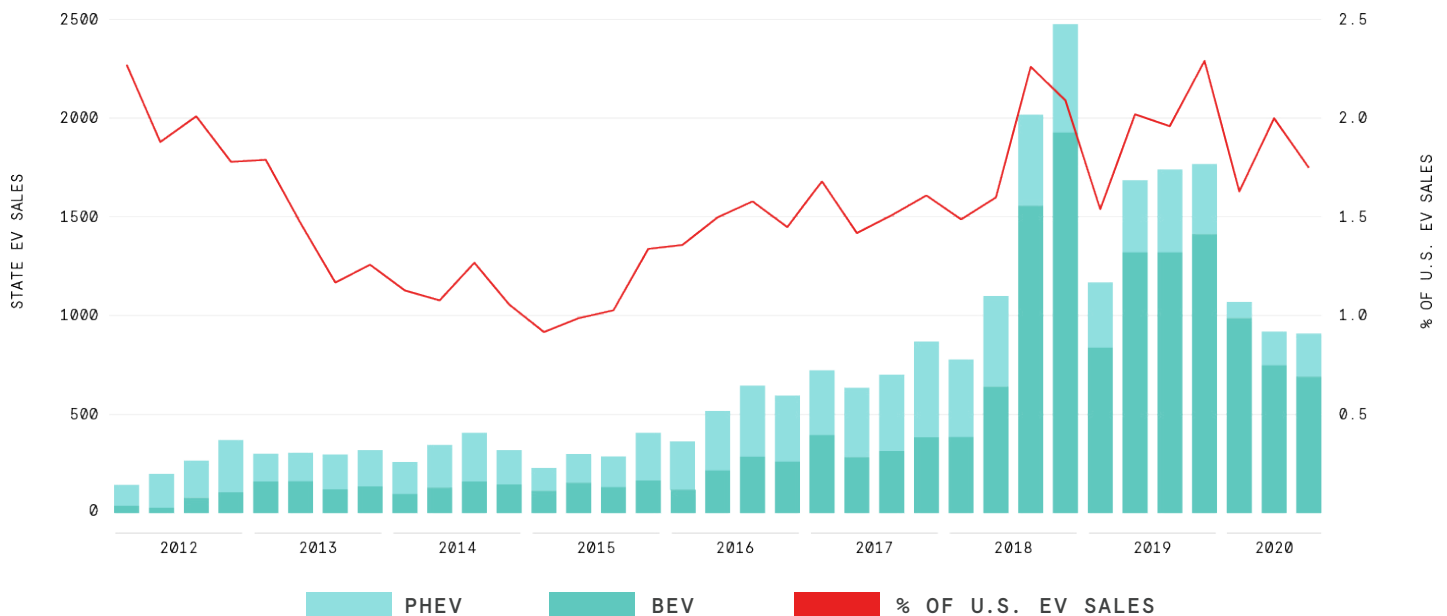
VIRGINIA'S EV FOOTPRINT

With more than 450 new car dealerships statewide, Virginia represents 2.3 percent of all new vehicle registrations in the country. Over 430,000 new cars and light-duty trucks were sold in the Commonwealth in 2019,³⁵ giving Virginia a sizable footprint in the U.S. automotive industry.

Although Virginia offers no state-level financial incentives for EVs and hasn't adopted any advanced clean car standards that require manufacturers to make low-to-no emission models available, EVs still have a surprisingly strong presence in the state. The Commonwealth currently ranks 13th in the nation in total EV sales,³⁶ highlighting consumer demand.

As of 2019, some 24,000 EVs were on Virginia's roads, including around 14,000 battery-electric vehicles and 10,000 plug-in hybrids.³⁷ Some 8,820 EVs have been sold in the state since 2019, for a total market share of 1.55 percent, below the national average of 1.9 percent.³⁸ Virginia's EV sales dropped nearly 9 percent in 2019, reflecting the overall decline in the nationwide EV market after federal tax incentives were reduced for two leading EV manufacturers, Tesla and General Motors.³⁹

Virginia offers extremely limited incentives to support the transition to electric vehicles. Existing state level incentives include emissions testing exemption, access to high-occupancy-vehicle lanes, and attractive time-of-use charging rates in select locales. In fact, Virginia is discouraging EV ownership by increasing EV registration rates. Effective July 1, 2020, the highway use fee for Virginia EV owners increased to \$88.20—further increasing the upfront cost of electric vehicles.⁴⁰



VIRGINIA HISTORICAL EV SALES. SOURCE: ATLAS EV HUB

Barriers to EV Adoption

While a variety of challenges continue to impede widespread EV adoption, three significant barriers continue to hold Virginians back from going electric:

- Lack of inventory
- High upfront costs
- Limited access to charging infrastructure





A lack of inventory is preventing Virginians who want to go electric from finding the car they need at a dealership in Virginia.

LACK OF AVAILABLE MODELS AND INVENTORY

It's not easy to track how many EV models are consistently available to Virginia dealerships. Manufacturers determine the overall distribution of EVs nationwide, prioritizing states with policies that support an EV market, such as ZEV states.* While a new-car dealership can technically order or trade for specific models, this is not always ideal as it can contribute to increased delivery times and costs.

In addition to specific models being unavailable, a 2019 Sierra Club report found significant nationwide differences between ZEV and non-ZEV states in the overall inventory of EVs in stock. Non-ZEV states had significantly less inventory: among those that offered EVs, a majority (52%) had only 1–2 EVs available. In ZEV states, meanwhile, a majority (53%) offered more than two EVs, 27% offered 3–5 EVs, 13% offered 6–10 EVs, and 12% offered more than 10 EVs.⁴¹

To evaluate the impact this has specifically in Virginia, we created a snapshot of available inventory of fourteen different EV models[†] within a 30-mile radius of six cities in Virginia. We then compared this inventory to six comparable cities in Maryland, a neighboring ZEV state. Using this methodology, we found 1,347 new and used electric vehicles available in Virginia, compared to 2,399 in Maryland. In other words, inventory was 44 percent lower in the Virginia cities than in the comparable cities in Maryland. This difference increases if we eliminate online only sellers from our consideration. At the time of our analysis there were 795 new and used EVs on the lot at dealerships in the six Virginia cities, compared to 1,721 in the six Maryland cities. Under this consideration, Virginia had 54 percent fewer EVs than Maryland.



I test drove the Hyundai Kona EV and really liked it. Unfortunately, the dealership only had one in stock and it sold. I would have had to wait at least a month and a half before there was any inventory available, so I bought a hybrid instead.

EMILY
CHARLOTTESVILLE, VA

I wanted an EV to go with my new home solar panels. After a fair amount of time shopping, the only EVs I could find in the entire state were the Bolt and Leaf. The dealership worked hard to try to find additional models for me, but they're all in Maryland.

KATHERINE
ARLINGTON, VA



* Zero Emission Vehicle (ZEV) states have minimum EV sales requirements to help address transportation emissions

† the top 12 best-selling plug-in models in Virginia, according to Atlas EV Hub, plus the Hyundai Kona EV and the Mitsubishi Outlander PHEV, two plug-in SUV models, not including Tesla

While the sampled Maryland cities generally had more EVs available than the sampled Virginia cities, the gap is even more pronounced when we consider which vehicles the cities in each state generally had in stock. The nation's top selling EV models such as the Chevrolet Bolt and Nissan LEAF were about 50 percent more available in Maryland, while others, such as the Toyota Prius Prime and Hyundai Kona EV, were seven to ten times more available in Maryland than in Virginia.

The Sierra Club's earlier finding clearly holds true in the Commonwealth, creating a barrier to consumers looking for the electric vehicle they want in Virginia. It also makes it harder for more mainstream consumers to learn EVs are an excellent choice that could meet their mobility needs. Because automakers tend to send their inventory to the states with strong EV policies, such as Colorado, Maryland, and New Jersey, Virginia misses out on these sales.

OVERVIEW

Virginia VS Maryland EV Inventory Analysis

METHODOLOGY

On October 22nd, Green Energy Consumers Alliance recorded the available inventory of fourteen different vehicle models (the top 12 best-selling plug-in models in Virginia, according to Atlas EV Hub, plus the Hyundai Kona EV and the Mitsubishi Outlander PHEV, two plug-in SUV models, and not including Tesla) within a 30 mile radius of six comparable cities in Virginia and Maryland, using [cars.com](https://www.cars.com).

We recorded the number of new vehicles, the number of used vehicles available at a dealership, and the number of used vehicles available from an online seller. (For those cities within 30 miles of a state border, we only counted in-state vehicles.)

RESULTS

In the 30-mile radii of the six surveyed Virginian cities, there were 1,347 new and used electric vehicles of these fourteen models available, compared to 2,399 in the six surveyed cities in Maryland.

In other words, inventory was 44% lower in Virginia cities compared to cities in Maryland. This difference grows if we consider only vehicles available on the lot of a dealership (in other words, if we exclude online sellers).

There are 795 new and used EVs available at dealerships in the six Virginia cities compared to 1,721 in the six Maryland cities; here, Virginia has 54% fewer EVs than Maryland.

While the Maryland cities generally had more EVs available than the Virginia cities, the gap is even more pronounced when we consider which vehicles the cities in each state generally have in stock. Key vehicles such as the Chevrolet Bolt and Nissan LEAF were about 50% more available in Maryland, while others, such as the Toyota Prius Prime and Hyundai Kona EV, were seven to ten times more available in Maryland than in Virginia.

SEE APPENDIX FOR FURTHER DETAILS.



All we have is a Prius [not an EV] and we aren't getting any of the RAV4 Prime allocated to us. ”

VIRGINIA TOYOTA
DEALERSHIP

In support of this report, Generation180 is actively surveying dealerships across Virginia about their views of electric mobility in partnership with the Virginia Automobile Dealers Association. While this survey is still in progress, initial results confirm there is a lack of adequate inventory to meet current and projected demand. Hyundai dealerships in particular have reported frustration about their inability to secure either battery-electric or plug-in hybrid EVs. Given that the Hyundai Kona is one of the most popular new EV models, Virginians should be able to purchase this vehicle without having to cross state lines.



We currently have no new or used EVs in our inventory... we get leftovers after they get sent to green states [with favorable EV policies]. ”

VIRGINIA HYUNDAI
DEALERSHIP

As part of a custom EV Shopping Experience assessment, Generation180 also contacted over 50 new-car dealerships in Virginia representing over 25 automotive brands in order to evaluate their response to prospective EV consumers. While dealerships were generally supportive in helping prospective customers find a specific vehicle and encouraged test drives if they had inventory, product availability was clearly their largest challenge. For example, of those dealers surveyed, typically only one model was available on the lot, if any. Feedback ranged from the “ability to order” to “no or limited available inventory” to “no product in brand portfolio.” While dealerships sometimes stated they could “order” a specific electric vehicle, few had any actual product on the lot.

Evaluating Virginia New-Car Dealerships

EV SHOPPING EXPERIENCE

Inspired by the methodology presented in Sierra Club's 2019 Rev Up Electric Vehicles report, Generation180 implemented a Virginia specific assessment in order to better understand the challenges unique to car-buying Virginians and Virginia auto dealerships.

Using previous research as a guide, a list of questions was created for EV shoppers to ask selected dealerships' staff during a remote electric vehicle inquiry. The questions were deployed over the phone instead of in person because of the current pandemic, prioritizing the health and safety of Generation180's volunteers. Based on the determined criteria, more than 50 dealerships were surveyed during the week of October 26th, 2020.

DEALERSHIP SENTIMENT SURVEY

To better understand potential barriers to EV adoption in Virginia, Generation180 partnered with the Virginia Automobile Dealers Association to conduct a detailed survey of new-car dealerships in the Commonwealth.

An anonymous online questionnaire regarding EV sentiment was launched on Monday, October 19th, 2020, directed at dealerships' General Managers. This survey is still in the field, with a target sample size of over 200 dealerships across the state in order to be considered representative.

SEE APPENDIX FOR FURTHER DETAILS.

HIGH UPFRONT COSTS

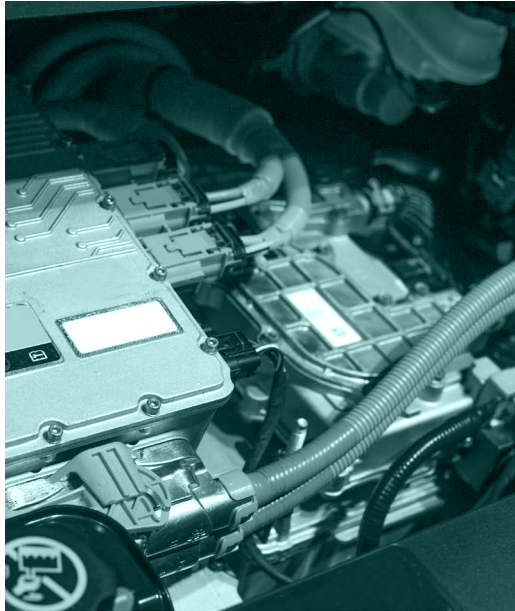
The relatively high upfront cost of EVs is also preventing many Virginians from accessing the benefits of electric transportation. EVs currently remain slightly more expensive than comparable gas-powered cars, mostly because of the cost of the battery. However, battery costs are coming down much faster than anticipated, and experts expect EVs to reach cost parity with gas-powered cars between 2024 and 2027.⁴²

Despite somewhat higher upfront costs, EVs save drivers money over the long run. A study by Consumer Reports found that EV owners are spending half as much to repair and maintain their vehicle as owners of gas-powered vehicles.⁴³ The analysis found that, for the most popular EVs under \$50,000, drivers save around 60 percent in fuel costs and \$6,000-\$10,000 in lifetime ownership costs compared to drivers of the best gas-powered cars in that segment.⁴⁴ Unfortunately, too many Virginians are being prevented from accessing these benefits because of the higher upfront costs of EVs today.

In Generation180's survey of Virginia consumers, more than 60 percent of participants reported that access to purchase discounts, such as rebates provided at the point of sale, would make them more likely to buy an EV for their next vehicle.

In a 2020 survey of Virginia consumers, more than 60% of participants reported that access to purchase discounts would make them more likely to buy an EV.

Low to moderate income communities could particularly benefit from EV technology, as they spend a greater proportion of their income on transportation (specifically vehicle ownership). This is due to higher fuel costs and maintenance costs associated with owning older and less efficient vehicles. Therefore, car-dependent low-income communities have the greatest to gain from the potential cost savings.⁴⁵



LIMITED ACCESS TO CHARGING INFRASTRUCTURE

The lack of available public charging stations is another significant factor holding back EV adoption in Virginia. In Generation180's recent survey of Virginia consumers, over half of participants reported that proximity to a public charging station would make them more likely to consider purchasing an EV. According to the Department of Energy's Advanced Fuels Data Center, Virginia currently has 1,520 public Level 2 plugs and 478 public DCFC* plugs⁴⁶ to support approximately 24,000 EVs.⁴⁷ In comparison, the neighboring state of Maryland has 1,909 public Level 2 plugs and 432 public DCFC plugs⁴⁸ to support approximately 25,000 EVs,⁴⁹ which is 343 more plugs than in Virginia.

When you consider that Virginia is over three times the size of Maryland, geographically speaking, with approximately 2.5 million more people and almost 3 million more cars on the road, it's troubling that the Commonwealth would be this far behind. Fortunately, Virginia is using funds from the Volkswagen settlement[†] in partnership with EVgo[‡] to grow the state's charging network. EVgo currently has 26 charging stations and 75 plugs in Virginia and is building a statewide network under a \$14 million-dollar contract with the Department of Environmental Quality (DEQ).

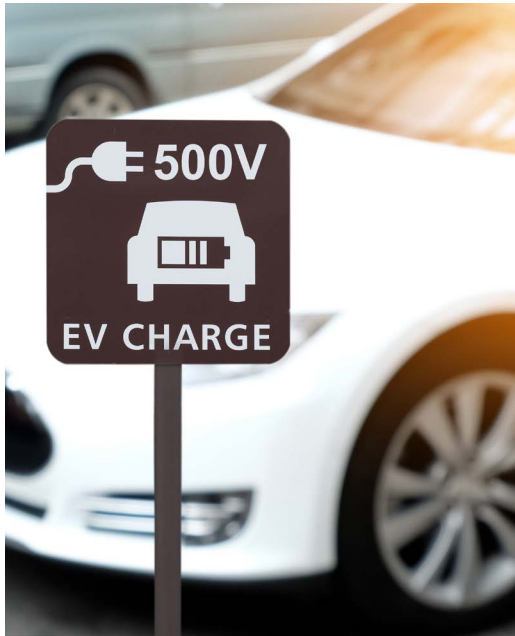
In our survey of Virginia consumers, over half of respondents reported that proximity to a public charging station would make them more likely to consider purchasing an EV.



* Direct Current Fast Charger

† Virginia received \$93 million from the Volkswagen Environmental Mitigation Trust to reduce air pollution in the Commonwealth

‡ EVgo is the nation's largest public fast charging network for electric vehicles, and the first to be powered by 100% renewable energy



In less than 12 months from the commissioning of the first VADEQ program site in September 2019, EVgo has tripled Virginia's public DCFC network.⁵⁰ The project prioritizes the installation of DC fast chargers along heavily traveled roads and in areas with high current and projected demand for EV charging. When the network is complete, approximately 95 percent of Virginians will be within 30 miles of an EV charger.⁵¹ Building and maintaining a robust EV charging infrastructure is a crucial part of accelerating EV adoption in Virginia.

Increasing Access to Electric Vehicle Charging Infrastructure

According to a 2018 white paper from the International Council on Clean Transportation, at least 43% of U.S. households don't park their vehicle within 20 feet of an electrical outlet.

While there are approximately 25,000 charging stations nationwide and growing, roughly 80% of charging still takes place at home. This can present problems for EV owners who live in apartments or condominiums (referred to as Multi Unit Dwellings), as it can be more difficult to get a charger installed. While single-family-home owners can more easily make any electrical upgrades necessary to install an EV charger, condo owners and apartment renters can experience significant barriers to installing charging in their building.

These might include securing the approval of an HOA or landlord, high upfront costs, ownership/maintenance responsibility, or insufficient parking spaces. In order to create equitable access to electric vehicles, Virginia should consider potential funding mechanisms to help offset the upfront costs and incorporate EV readiness into state building codes.

Sources:

Hall, D., & Nicholas, M. "Lessons Learned on Early Electric Vehicle Fast-Charging Deployments," International Council on Clean Transportation, 2018. theicct.org/sites/default/files/publications/ZEV_fast_charging_white_paper_final.pdf.

Valderrama, P. et al., "Electric Vehicle Charging 101," NRDC, 2019. nrdc.org/experts/patricia-valderrama/electric-vehicle-charging-101.



Policy

State-level policy can have a meaningful impact on electric vehicle adoption, but Virginia is lacking in pro-EV policies.

Although the state has made recent progress in passing legislation to reduce emissions in the power sector, comparatively little has been done to address transportation emissions.⁵² As of October 2020, EV adoption rates in Virginia were still under two percent. With the federal tax credit for EVs beginning to sunset,⁵³ state-level policy will be more important than ever in helping to tackle transport-related emissions in the Commonwealth.

For Virginia to remain relevant in the nationwide transition to EVs, we recommend the Commonwealth take the following three actions:

- Adopt the Advanced Clean Cars Program vehicle standards
- Fund a point-of-sale EV rebate
- Sign the Transportation and Climate Initiative MOU

ADOPT THE ADVANCED CLEAN CARS PROGRAM VEHICLE STANDARDS

At the federal level, clean vehicle standards are enforced by the U.S. Environmental Protection Agency and the Department of Transportation. Section 177 of the Clean Air Act* authorized California to enact even stricter vehicle emissions standards, which other states are eligible to adopt and enforce. This Advanced Clean Cars Program includes two components: low-emission vehicle (LEV) standards, which require a reduction in tailpipe emissions, and zero-emission vehicle (ZEV) standards, which require that automakers supply a certain percentage of ZEVs to the state or purchase credits from other automakers to meet state requirements. As of October 2020, 14 states and the District of Columbia have adopted the LEV standards, 11 states† have adopted the ZEV standards; and four additional states‡ are in the process of adopting the ZEV standards.§⁵⁴

As mentioned previously, a 2019 nationwide Sierra Club report showed there are significant differences between ZEV and non-ZEV states in the overall inventory and number of EVs available.⁵⁵ Our own Virginia specific findings confirm that availability in the Commonwealth is a barrier to EV adoption.

Given that Generation180's recent consumer sentiment survey indicated that over half of Virginians are likely to consider an EV for their next car, it is likely that, without policy intervention, these EV sales will increasingly go to Maryland, our ZEV state neighbor. Not only would adopting the Advanced Clean Car Program standards help keep these sales in Virginia, the ZEV standard could also generate an annual \$102 million-dollar health benefit for Virginia by 2035.§⁵⁶

We recommend that the Commonwealth of Virginia adopt the Advanced Clean Cars Program to increase consumer access and support Virginians' demand for EVs.

Given that over half of Virginians are likely to consider an EV for their next car, it is likely that, without policy intervention, these EV sales will increasingly go to Maryland.

* In spring 2020 under the Trump administration, the EPA and NHTSA finalized the *Safer, Affordable, Fuel-Efficient (SAFE) Vehicles* rule, which sought to revoke Sec 177 of the Clean Air Act. This decision is involved in ongoing litigation, which the new Biden administration will likely drop, and thereby restore California's right to set stricter vehicle emissions standards

† California, Colorado, Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, and Vermont.

‡ Nevada, Minnesota, New Mexico, and Washington.

§ By reducing PM_{2.5} concentrations.

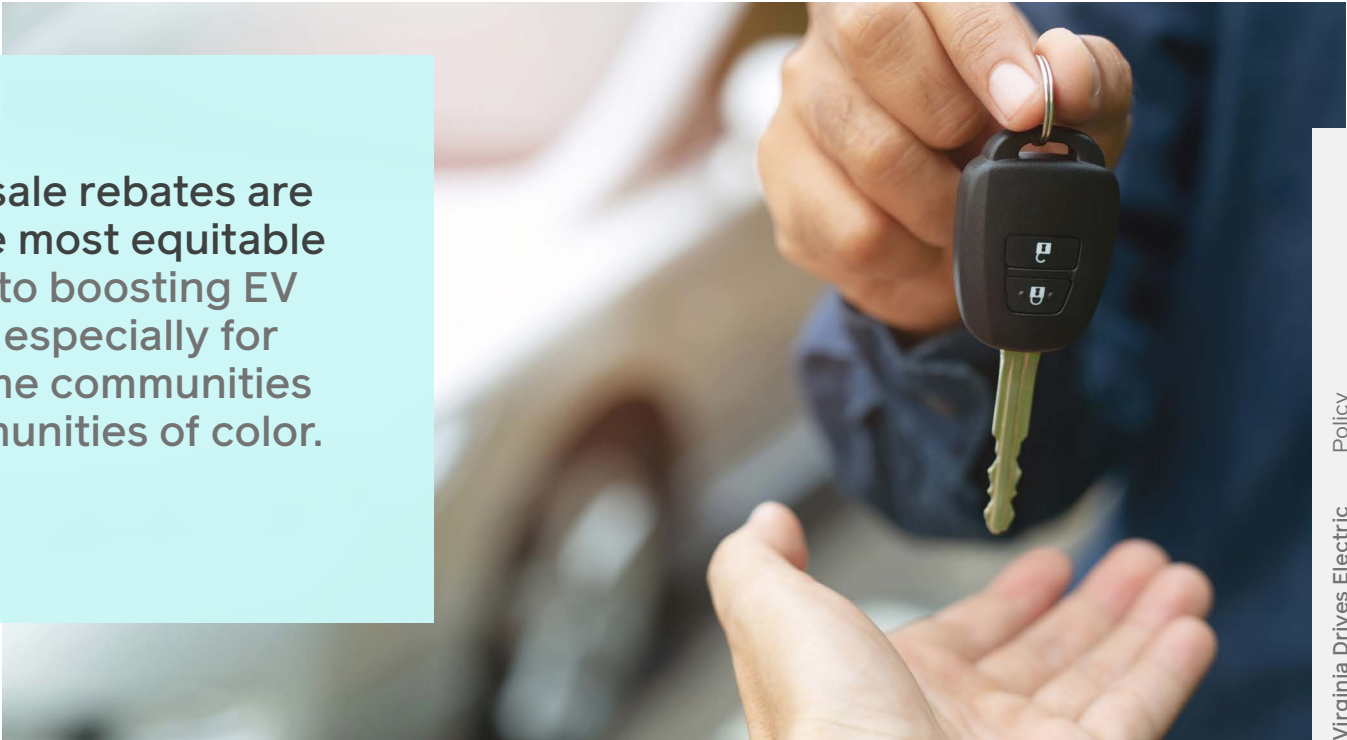
FUND A POINT-OF-SALE EV REBATE

The higher upfront cost of EVs continues to be a barrier to EV adoption; however, EVs are expected to reach cost parity with gas-powered vehicles by 2027.⁵⁷ Until that time, financial incentives can be extremely effective at helping increase EV uptake and expand access to the financial benefits of owning an EV. Studies have shown that even a \$1,000 increase in a state's EV subsidies can lead to a 7.5 percent increase in EV registrations in that state.⁵⁸ According to an analysis done by the Center for Sustainable Energy, the EV incentive programs in just six states* account for more than 40 percent of EVs sold nationwide.⁵⁹

Point-of-sale rebates, which reduce a vehicle's price at the time of purchase, can be one of the most equitable solutions to boosting EV adoption, especially for low-income communities and communities of color who may not benefit from other financial incentives, such as tax credits. The federal EV tax credit rewards those with the highest tax liability, and therefore is generally out of reach for low-to-moderate income communities. These same communities are often disproportionately impacted by vehicle pollution and can benefit the most from the clean air and cost-saving benefits of EVs.⁶⁰

To support a robust EV market in Virginia and also help the communities who can benefit the most from EVs, we recommend that the General Assembly fund an equitably designed point-of-sale EV rebate program that offers additional financial incentives for low-to-moderate-income communities, and is available to both new and used vehicles.

* California, Connecticut, Massachusetts, New Jersey, New York and Oregon.



Point-of-sale rebates are one of the most equitable solutions to boosting EV adoption, especially for low-income communities and communities of color.

SIGN THE TRANSPORTATION AND CLIMATE INITIATIVE MOU

The Transportation and Climate Initiative (TCI), founded in 2010, is a collaboration of 12 states and the District of Columbia committed to decreasing greenhouse gas emissions from transportation sources.⁶¹

In 2018, nine of the members,* including Virginia, announced plans to create a market-based “cap, tax, and trade” system to reduce transportation emissions—which account for around 40 percent of all greenhouse gas emissions across the region—by as much as 25 percent by 2032.⁶²

The TCI system would tax fuel wholesalers for the CO₂ emissions released from burning fossil fuels from most on-road transportation sources, with the tax rate set by an interstate auction. A cap on the total amount of emission credits (allowances) that wholesalers can bid for would shrink each year.⁶³ The revenue generated from selling the TCI credits could go toward programs that expand public transit, electrify buses, and fund EV incentives.⁶⁴ In addition to reducing transportation emissions, the TCI system would create an average of 10,000 new jobs annually† at a 25 percent reduction cap.⁶⁵

The revenue generated from selling the TCI credits could help expand public transit, electrify buses, and fund EV incentives.

We recommend that Governor Northam's administration formally join this initiative and sign the TCI memorandum of understanding (MOU). This should be done in tandem with a pursuit of the most aggressive emission reduction targets that can be supported by an equitably designed program, as outlined in the Dream Corps' Green for All TCI Equity Toolkit.⁶⁶



* Connecticut, Delaware, Maryland, Massachusetts, New Jersey, Pennsylvania, Rhode Island, Vermont, and Virginia.

† Across the Northeast and Mid-Atlantic TCI states.

POLICY CONCLUSIONS

The Advanced Clean Cars Program, point-of-sale EV rebates, and the Transportation and Climate Initiative are complementary programs that together can electrify Virginia's light-duty vehicle segment and support the state's long-term carbon reduction goals. In addition to these policies, Virginia should set clear targets for EV adoption and transportation electrification.

ADDITIONAL POLICIES

BANNING THE SALE OF NEW GAS-POWERED VEHICLES

California has taken bold action by declaring it will phase out the sale of all new gasoline-powered light-duty vehicles by 2035, encouraging the state's drivers to switch to electric cars.

The order signed by Gov. Gavin Newsom will still allow such vehicles to be owned and sold on the used-car market.

According to the California-based Coalition for Clean Air, electrifying transportation will also create jobs and help California move forward in its economic recovery from the Covid-19 pandemic.

New York and New Jersey are also considering similar policies.

Sources:

Sommer, L. "California Governor Signs Order Banning Sales Of New Gasoline Cars By 2035," NPR, September 2020. <http://npr.org/2020/09/23/916209659/>

Lewis, M. "New Jersey calls for gas-car sales ban by 2035," Elektrek, 2020. electrek.co/2020/10/20/new-jersey-ban-gas-car-sales-2035/

New York State Senate, Harckham Office. "Press Release: Harckham Introduces Bill Requiring Zero Emissions for New Vehicles in NY by 2035," September 2020. [nysenate.gov/newsroom/press-releases/pete-harckham/harckham-introduces-bill-requiring-zero-emissions-new-vehicles](https://www.nysenate.gov/newsroom/press-releases/pete-harckham/harckham-introduces-bill-requiring-zero-emissions-new-vehicles).

New Jersey Department of Environmental Protection. "New Jersey Scientific Report on Climate Change," June 2020. [nj.gov/dep/climatechange/docs/nj-scientific-report-2020.pdf](https://www.nj.gov/dep/climatechange/docs/nj-scientific-report-2020.pdf).

OTHER POLICIES FOR VIRGINIA TO CONSIDER:

In addition to the policy recommendations above, Generation180 also supports the proposed transportation-related policies in the Virginia Conservation Network's 2021 Environmental Briefing Book, including:

- Prioritize and fund projects that increase access to public transit.
- Support the electrification of school buses by conducting a feasibility study of financial models that would give school districts access to third party owned financial agreements, similar to the PPA model for solar schools.
- Ensure access to public EV charging stations by imposing a reasonable fine on drivers who park a non-EV in a space clearly marked for EV charging only.
- Join the 15 states and the District of Columbia which have signed a memorandum of understanding to work together to ensure 100% of medium- and heavy-duty sales are zero emissions vehicles by 2050.

Source:

Virginia Conservation Network. "2021 Briefing Book," 2020. <https://www.nj.gov/dep/climatechange/docs/nj-gwra-80x50-report-2020.pdf#page=5>.

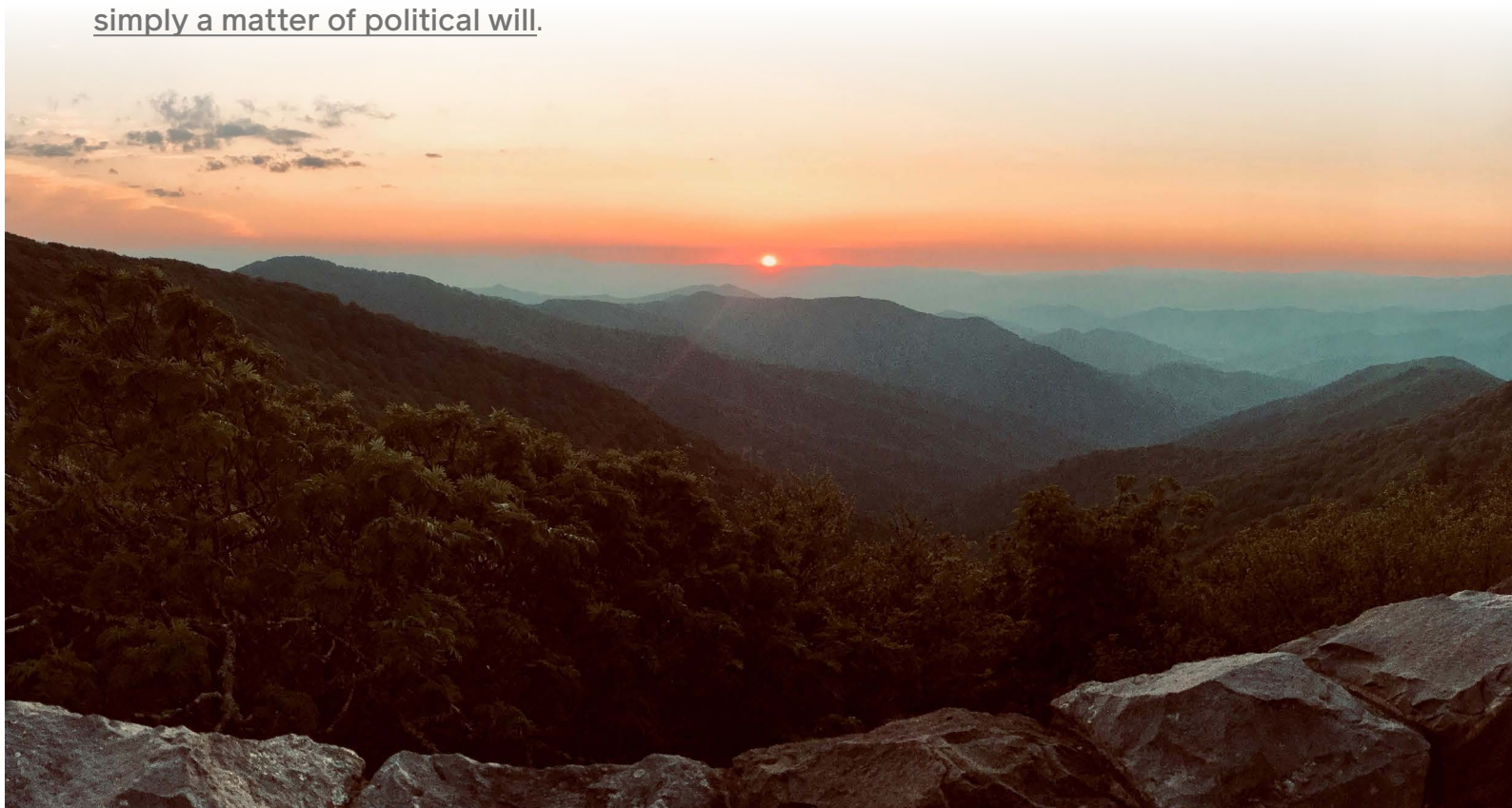
CONCLUSION

Addressing emissions from Virginia's transportation sector will require doing more than simply electrifying personal transportation across the Commonwealth. According to the Virginia Conservation Network, Virginians drive almost 234 million miles every day, and this alarmingly high level of driving has made transportation the largest source of carbon pollution in the state.⁶⁷ To address this, Virginia must transform its transportation sector while electrifying the vehicles on the road.

While it can take time to expand access to biking, walking, and public transit transportation options, supporting the adoption of electric vehicles can help to ease this transition and will be an important component of our evolving transportation system, providing significant reductions in transportation emissions. Accelerating transportation electrification could yield immediate health, environmental, and economic benefits for all Virginians.

Policymakers must focus on tackling pollution from the transportation sector while continuing to enforce and enhance the climate gains made this year for the Commonwealth's utility sector. Our findings show that Virginians already support a transition to clean energy and transportation electrification – how quickly we get there is simply a matter of political will.

Virginians drive almost 234 million miles every day. This alarmingly high level of driving has made transportation the largest source of carbon pollution in the state.



REFERENCE GUIDES

The following three pages highlight recommended actions that policymakers, EV advocates, and car dealerships can each take to support transportation electrification in the Commonwealth.



Generation180 inspires and equips individuals to take action on clean energy. We envision a 180-degree shift in our energy sources – from fossil fuels to clean energy – driven by a 180-degree shift in people's perception of their role in making it happen – from apathy to agency, from despondency to determination, from hopelessness to hopefulness. Join us.



The Electrify Your Ride campaign works to educate individuals about electric vehicles, transform EV owners into effective advocates, and accelerate the arrival of electric transportation and a 100% clean energy future. We host educational events, partner with regional and national influencers, and tap local owners to become EV ambassadors within their communities to help popularize electric vehicles. Whether you're just learning about EVs or you're looking to help spread the word, Generation180 can help you find ways to plug in. Visit our website to learn more and join over 3,000 Virginians who have pledged to make their next car electric.

BENEFITS

Support Our Economy

Accelerating VA's electric vehicle (EV) adoption is a catalyst for economic growth and innovation.

- Electric vehicles save Virginians money (Consumer Reports, 2020)
- Virginians spend \$25M on imported fossil fuels every single day (Business Insider, 2019)
- Currently there are 5,400 jobs in advanced transportation in VA (AAE, 2020)
- Investing in electrification creates more jobs than investing in petroleum and keeps money in the local economy (M.J. Bradley, 2019)

Support Our Environment

Transportation accounts for 48% of all carbon emissions in Virginia (VCN, 2020).

- Switching to an electric vehicle can result in a 70% reduction in carbon emissions under Virginia's current energy mix (Dept of Energy, 2020)
- EVs will continue to get cleaner as Virginia honors its electricity generation goals stipulated by the Virginia Clean Economy Act
- Recent research suggests that a low-emission vehicles (LEV) program could result in annual climate benefits of roughly of \$120 to \$520M by 2035 (VCCA, 2020)

Support Public Health

Pollution from conventional vehicles contributes to respiratory illnesses (asthma) and heart disease (VCCA, 2020).

- The overall health burden of vehicle emissions in VA is \$750M per year (VCCA, 2020)
- Air pollution-related health costs are borne disproportionately by VA's most vulnerable communities
- Recent research suggests that a zero-emission vehicles (ZEV) program could result in annual health benefits of roughly of \$102M by 2035 (VCCA, 2020)

Support EV Demand

Lack of EV inventory at Virginian auto dealerships is a major impediment to adoption.

- Survey of Virginians found 53% are likely or very likely to consider an EV for their next car (Generation180, 2020)
- EVs are popular among Virginians, but Virginia new-car dealerships do not have adequate inventory (Generation180, 2020)

RECOMMENDED POLICIES

Adopt the Advanced Clean Cars Program vehicle standards

- Join other US states that have already adopted low-emission vehicle (LEV) and zero-emission vehicle (ZEV) standards to accelerate EV adoption
- ZEV implementation will require auto manufacturers to send EVs to Virginia new-car dealerships

Fund an Equitably Designed Point-of-Sale EV Rebate

- Join multiple other US states that provide EV incentives and fund a \$3,500 rebate per new vehicle and \$2,000 rebate per used vehicle
- Provide additional incentive for Low-to-Moderate income communities of at least \$1,000

Sign the Transportation and Climate Initiative MOU

- Join the regional Transportation & Climate Initiative to create funding mechanisms and reduce transportation emissions
- Pursue the most aggressive emission reduction targets that can be supported by an equitably designed program

Transportation accounts for 48% of all energy-related carbon emissions in Virginia (VCN, 2020), and pollution from conventional vehicles contributes to respiratory illnesses and heart disease (VCCA, 2020). Because Virginians spend \$25M on imported fossil fuels every single day (Business Insider, 2019), transitioning to electric transportation represents a significant financial opportunity. In addition to millions in annual health and climate benefits, accelerating electric vehicle (EV) adoption in the Commonwealth could catalyze economic growth and innovation as Virginia recovers from the Covid-19 pandemic.

RECOMMENDED ACTIONS

Consider an Electric Vehicle

Schedule a test drive at your local dealership

- Electric vehicles save Virginians money (Consumer Reports, 2020)
- EVs provide instant torque and are fun to drive
- Switching to an electric vehicle can result in a 70% reduction in carbon emissions under Virginia's current energy mix (Dept of Energy, 2020)
- EVs will continue to get cleaner as Virginia honors its electricity generation goals stipulated by the Virginia Clean Economy Act

Use Your Voice

Let your elected officials know that they should support transportation electrification by adopting the following policies:

Adopt the Advanced Clean Cars Program vehicle standards

- Join other US states that have already adopted low-emission vehicle (LEV) and zero-emission vehicle (ZEV) standards to accelerate EV adoption
- ZEV implementation will require auto manufacturers to send EVs to Virginia new car dealerships

Fund an Equitably Designed Point-of-Sale EV Rebate:

- Join multiple other US states that provide EV incentives and fund a \$3,500 rebate per new vehicle and \$2,000 rebate per used vehicle
- Provide additional incentive for Low-to-Moderate income communities of at least \$1,000

Sign the Transportation and Climate Initiative MOU:

- Join the regional Transportation & Climate Initiative to create funding mechanisms and reduce transportation emissions
- Pursue the most aggressive emission reduction targets that can be supported by an equitably designed program

Sign the Pledge

Show support for EVs and pledge to make your next car electric

SIGN HERE

<http://gen180.org/pledge>

Become an EV Ambassador

Join Generation180 and our network of EV advocates to support transportation electrification across Virginia

LEARN MORE HERE

gen180.org/ev-ambassadors

BENEFITS

Greater Choice for Virginians

Lack of EV inventory at Virginian auto dealerships is a major impediment to adoption

- Survey of Virginians found 53% are likely or very likely to consider an EV for their next car (Generation180, 2020)
- EVs are popular among Virginians but Virginia new-car dealerships do not have adequate inventory (Generation180, 2020)
- Compared to neighboring states with pro-EV policies, Virginia has significantly fewer EVs available (Generation180, 2020)

Numerous Customer Benefits

Wide range of EV benefits appeal to diverse customer base

- Due to lower cost of ownership, wider EV adoption will save Virginians money (Consumer Reports, 2020)
- Switching to an electric vehicle can result in a 70% reduction in carbon emissions under Virginia's current energy mix (Dept of Energy, 2020)
- EVs provide instant torque, are fun to drive, and are increasingly available in numerous vehicle segments

Every Virginian Benefits from Wider EV Adoption:

- **Economy**
Accelerating VA's EV adoption is a catalyst for economic growth and innovation
- **Health**
Adoption of EVs reduces the overall health burden due to vehicle emissions (VCCA, 2020)
- **Environment**
EVs create up to 70% less carbon emissions when powered by VA's current energy mix compared to ICE vehicles (Dept of Energy, 2020)

RECOMMENDED ACTIONS

Engage with your Manufacturer

Approximately 100 new or refreshed EVs will come to market through 2024 (Automotive News, 2020).

- Request sufficient and sustained inventory of EVs, sending message to both OEM and customer
- Request specific EV and infrastructure training for existing and future EV products while empowering salespeople to become EV experts

Act as an EV Advocate

Dealers are uniquely positioned as the primary point of contact with the consumer.

- Offer EV test drives and educational events for prospective customers
- Partner with organizations (like Generation180) to share best practices with other dealerships and leverage communities of EV owners to help prospective buyers mitigate concerns

Engage with Virginia's Policymakers

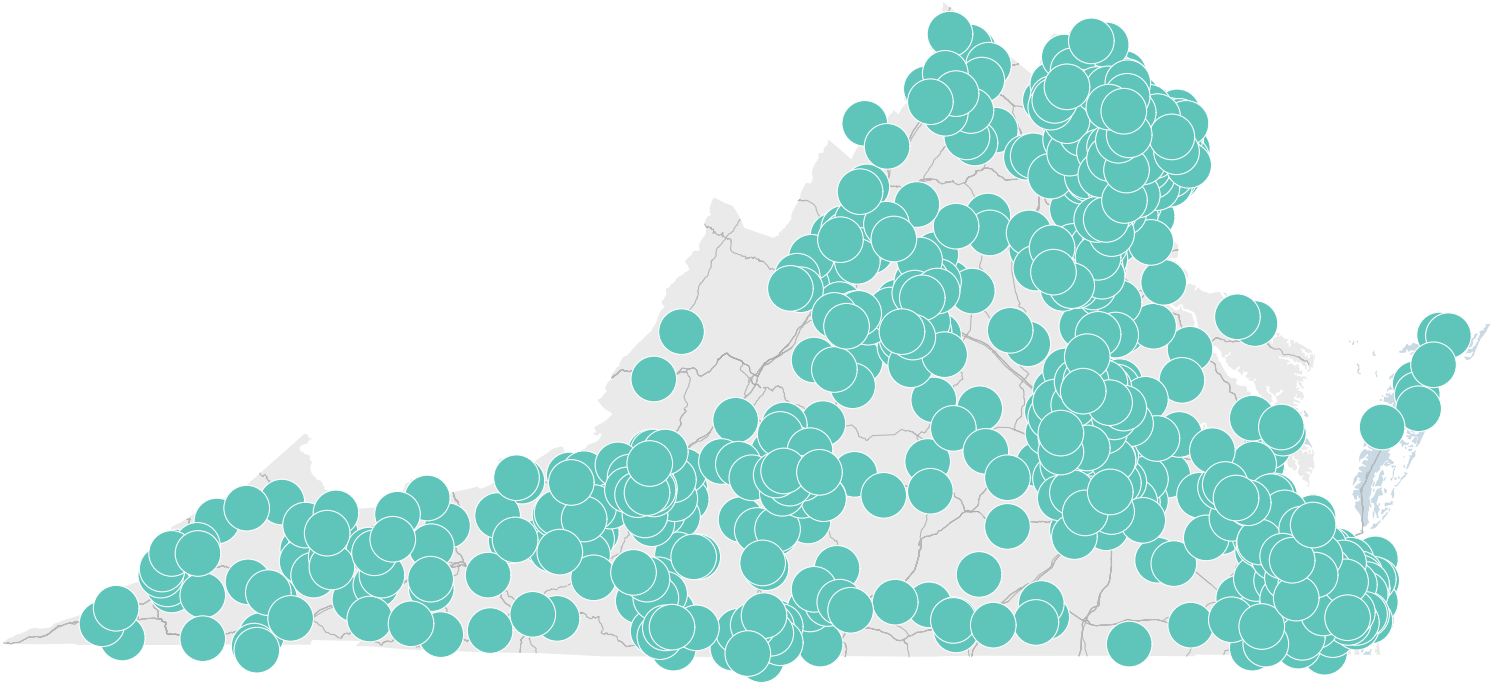
Encourage support for pro-EV legislation

- Adopt the Advanced Clean Cars Program vehicle standards to ensure Virginian car dealerships receive adequate supply of EV inventory from manufacturers
- Fund an equitably designed point-of-sale EV rebate to mitigate EV price premium compared to traditional powertrains
- Support VA's membership in the Transportation and Climate Initiative (TCI) to help fund EV incentives

- A.1** Virginia Consumer Sentiment Survey
- A.2** Virginia vs Maryland Inventory Analysis
- A.3** EV Shopping Experience Survey
- A.4** Dealership Sentiment Survey

A.1
VIRGINIA CONSUMER SENTIMENT SURVEY**OVERVIEW**

This document highlights the key findings from a survey designed to explore perceptions of electric vehicles among Virginia residents. This survey was conducted online from August 28 through September 17, 2020, using a sample and platform provided by the national market research firm Dynata. The following analysis is based on a representative sample of 1104 Virginians age 18 and older across the Commonwealth and has a 95% confidence interval and a margin of error of +/- 3.0%. Survey analysis was conducted by an independent consultant specializing in data analytics from Athenys Research.

*Distribution of Survey Participants*

DEMOGRAPHICS

The reported gender composition of respondents was 49.8% female, 49.8% male, and 0.4% other or unreported.

15.7% of respondents were ages 18-24; 20.1% were ages 25-34; 21.6% were ages 35-44; 21.6% were ages 45-54, and 20.5% were ages 55-64.

The highest educational attainment of respondents was as follows: 2.4% of respondents completed some high school; 18.7% graduated from high school; 20.7% had completed some college; 30.7% graduated college; 26.7% completed postgraduate work or a postgraduate degree; and 0.9% preferred not to answer.

The distribution of 2019 gross household incomes was: Less than \$25,000 - 16.9%; \$25,000 to \$49,999 - 20.1%; \$50,000 to \$74,999 - 10.1%; \$75,000 to \$99,999 - 13.9%; \$100,000 to \$149,999 - 19.0%; \$150,000 to \$199,999 - 10.5%; More than \$200,000 - 9.3%

Do each of the following factors make you more likely, less likely, or make no difference at all when thinking about purchasing an electric vehicle?

BETTER FOR THE ENVIRONMENT

MUCH MORE LIKELY	34.3%
SOMEWHAT MORE LIKELY	33.6%
NO DIFFERENCE	27.3%
SOMEWHAT LESS LIKELY	2.2%
MUCH LESS LIKELY	2.6%

SAVINGS ON GASOLINE COSTS

MUCH MORE LIKELY	39.1%
SOMEWHAT MORE LIKELY	33.0%
NO DIFFERENCE	23.6%
SOMEWHAT LESS LIKELY	2.0%
MUCH LESS LIKELY	2.3%

CONVENIENCE OF CHARGING AT HOME

MUCH MORE LIKELY	29.9%
SOMEWHAT MORE LIKELY	31.3%
NO DIFFERENCE	27.1%
SOMEWHAT LESS LIKELY	6.3%
MUCH LESS LIKELY	5.3%

ACCESS TO DISCOUNTS

MUCH MORE LIKELY	29.2%
SOMEWHAT MORE LIKELY	33.7%
NO DIFFERENCE	29.7%
SOMEWHAT LESS LIKELY	4.8%
MUCH LESS LIKELY	2.6%

QUANTITY OF CAR CHOICES ACROSS ELECTRIC CAR MODELS

MUCH MORE LIKELY	26.4%
SOMEWHAT MORE LIKELY	32.2%
NO DIFFERENCE	30.6%
SOMEWHAT LESS LIKELY	6.7%
MUCH LESS LIKELY	4.0%

PROXIMITY TO A PUBLIC CHARGING STATION

MUCH MORE LIKELY	28.7%
SOMEWHAT MORE LIKELY	30.0%
NO DIFFERENCE	25.5%
SOMEWHAT LESS LIKELY	9.8%
MUCH LESS LIKELY	6.0%

DURATION OF CHARGING

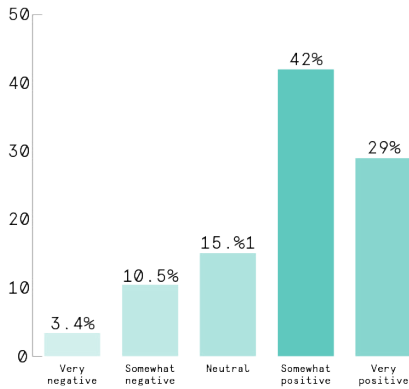
MUCH MORE LIKELY	30.4%
SOMEWHAT MORE LIKELY	28.1%
NO DIFFERENCE	25.1%
SOMEWHAT LESS LIKELY	10.5%
MUCH LESS LIKELY	5.9%

HIGHER UP-FRONT COSTS

MUCH MORE LIKELY	16.1%
SOMEWHAT MORE LIKELY	17.4%
NO DIFFERENCE	24.5%
SOMEWHAT LESS LIKELY	24.9%
MUCH LESS LIKELY	17.1%

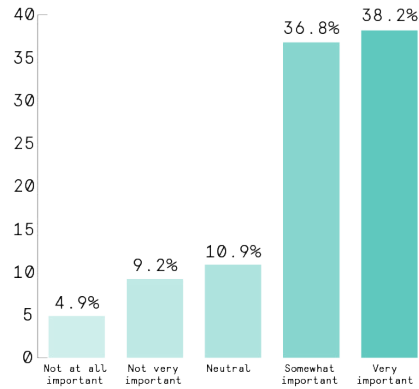
Given what you know about electric vehicles, what perception do you have of them?

VERY POSITIVE	29.0%
SOMEWHAT POSITIVE	42.0%
SOMEWHAT NEGATIVE	10.5%
VERY NEGATIVE	3.4%
NEUTRAL	15.1%



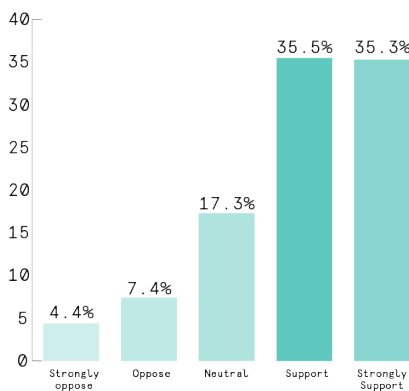
How important is it to you that Virginia reduce its dependence on fossil fuels and transitions to clean energy?

VERY IMPORTANT	38.2%
SOMEWHAT IMPORTANT	36.8%
NOT VERY IMPORTANT	9.2%
NOT AT ALL IMPORTANT	4.9%
NEUTRAL	10.9%



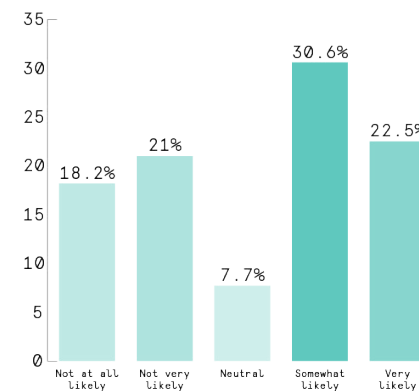
As you may know, some states offer incentives for buyers and leasers of electric vehicles. Do you support or oppose Virginia offering such an incentive?

STRONGLY SUPPORT	35.3%
SUPPORT	35.5%
OPPOSE	7.4%
STRONGLY OPPOSE	4.4%
NEUTRAL	17.3%



Assuming you were in the market for a new car within the next two years or so, how likely would you be to consider buying or leasing a plug-in electric vehicle?

VERY LIKELY	22.5%
SOMEWHAT LIKELY	30.6%
NOT VERY LIKELY	21.0%
NOT AT ALL LIKELY	18.2%
NEUTRAL	7.7%



How much have you seen, read, or heard about electric vehicles?

A LOT	23.4%
SOME	43.4%
NOT MUCH	24.3%
NOTHING AT ALL	9.0%

A.2 VIRGINIA VS MARYLAND EV INVENTORY ANALYSIS

On October 22nd, Green Energy Consumers Alliance recorded the available inventory of fourteen different vehicle models (the top 12 best-selling plug-in models in Virginia, according to Atlas EV Hub, plus the Hyundai Kona EV and the Mitsubishi Outlander PHEV, two plug-in SUV models, and not including Tesla) within a 30 mile radius of six comparable cities in Virginia and Maryland, using [cars.com](https://www.cars.com). We recorded the number of new vehicles, the number of used vehicles available at a dealership, and the number of used vehicles available from an online seller. (For those cities within 30 miles of a state border, we only counted in-state vehicles.)

SAMPLED CITIES

CATEGORY	CHARACTERISTICS	VIRGINIA	MARYLAND
LARGEST CITY		VIRGINIA BEACH	BALTIMORE
	POPULATION	449,733	593,490
	POPULATION DENSITY	1,838/SQ. MILE	7,672/SQ. MILE
	MEDIAN AGE	35.4	34.7
	MEDIAN HOME PRICE	\$262,200	\$153,000
WEALTHY, METROPOLITAN SUBURB		MCLEAN	POTOMAC
	POPULATION	48,867	45,882
	POPULATION DENSITY	1,972/SQ. MILE	1,826/SQ. MILE
	MEDIAN AGE	45.7	47.1
	MEDIAN HOME PRICE	\$982,900	\$889,100
OTHER SUBURB		CENTREVILLE	FREDERICK
	POPULATION	75,452	72,244
	POPULATION DENSITY	6,199/SQ. MILE	2,947/SQ. MILE
	MEDIAN AGE	36	35
	MEDIAN HOME PRICE	\$486,181	\$395,000
CAPITAL		RICHMOND	ANNAPOLIS
	POPULATION	216,773	39,009
	POPULATION DENSITY	3,628/SQ. MILE	5,419/SQ. MILE
	MEDIAN AGE	33.2	37.6
	MEDIAN HOME PRICE	—	—
RURAL		LEXINGTON	BEL AIR
	POPULATION	7,036	10,211
	POPULATION DENSITY	2,815/SQ. MILE	3,362/SQ. MILE
	MEDIAN AGE	22	40
	MEDIAN HOME PRICE	\$230,500	\$240,700
COLLEGE TOWN		BLACKSBURG	SALISBURY
	POPULATION	44,233	33,284
	POPULATION DENSITY	2,235/SQ. MILE	2,360/SQ. MILE
	MEDIAN AGE	22	27
	MEDIAN HOME PRICE	\$270,000	\$189,000

RESULTS

In the 30-mile radii of the six surveyed Virginian cities, there were 1,347 new and used electric vehicles of these fourteen models available, compared to 2,399 in the six surveyed cities in Maryland. In other words, inventory was 44% lower in Virginia cities compared to cities in Maryland. This difference grows if we consider only vehicles available on the lot of a dealership (in other words, if we exclude online sellers). There are 795 new and used EVs available at dealerships in the six Virginia cities compared to 1,721 in the six Maryland cities; here, Virginia has 54% fewer EVs than Maryland.

RESULTS BY CITY

When we drill down from the aggregate to look at the twelve cities individually, the Maryland advantage becomes even starker. The six Maryland cities all have significantly more EVs available than the six comparable Virginia cities (eight times more in the largest city, three times more in the capital, for example), with the exception of the college town and “other suburb” categories, where Virginia has a light advantage. In Virginia, EVs are most available in the suburbs, but in Maryland, there is a fair amount of availability in the largest city and capital as well. Particularly striking is the difference in rural areas: we could only find three EVs within 30 miles of Blacksburg, VA, while over 300 were available within 30 miles of Salisbury, MD. The difference between inventory in Virginia and inventory in Maryland increases when we exclude vehicles from online sellers.

NEW AND USED VEHICLES BY CITY

AT DEALER AND ONLINE

CITY TYPE	VA	MD	MD AS % OF VA
LARGEST CITY	55	519	944%
WEALTHY, METROPOLITAN SUBURB	546	645	118%
OTHER SUBURB	555	362	65%
CAPITAL	126	537	426%
RURAL	3	314	10467%
COLLEGE TOWN	62	22	35%
TOTAL	1347	2399	178%

NEW AND USED VEHICLES BY CITY

ONLY AT DEALER, NOT ONLINE

CITY TYPE	VA	MD	MD AS % OF VA
LARGEST CITY	42	434	1033%
WEALTHY, METROPOLITAN SUBURB	339	438	129%
OTHER SUBURB	349	255	73%
CAPITAL	55	346	629%
RURAL	3	229	7633%
COLLEGE TOWN	7	19	271%
TOTAL	795	1721	216%

RESULTS BY CAR

While the Maryland cities generally had more EVs available than the Virginia cities, the gap is even more troubling when we consider which vehicles the cities in each state generally had in stock. Key vehicles such as the Chevrolet Bolt and Nissan LEAF were about 50% more available in Maryland, while others, such as the Toyota Prius Prime and Hyundai Kona EV, were seven to ten times more available in Maryland than in Virginia.

NEW AND USED VEHICLES BY CITY

(ONLY AT DEALER, NOT ONLINE)

	NEW & USED, DEALER & ONLINE			NEW & USED, DEALER (NOT ONLINE)		
	VA	MD	MD AS % OF VA	VA	MD	MD AS % OF VA
CHEVROLET VOLT	169	203	120%	57	42	74%
NISSAN LEAF	131	183	140%	54	75	139%
FORD FUSION ENERGI	123	142	115%	87	115	132%
FORD C-MAX ENERGI	42	74	176%	10	44	440%
CHEVROLET BOLT	278	621	223%	114	406	356%
TOYOTA PRIUS PRIME	81	639	789%	57	596	1046%
CHRYSLER PACIFICA HYBRID	225	55	24%	225	55	24%
BMW I3 (REGULAR AND REX)	108	80	74%	61	31	51%
HONDA CLARITY PHEV	56	45	80%	15	15	100%
BMW X5 EDRIIVE	23	10	43%	20	8	40%
KIA NIRO EV	13	92	708%	11	91	827%
KIA NIRO PHEV	76	78	103%	74	77	104%
HYUNDAI KONA EV	2	155	7750%	0	154	—
MITSUBISHI OUTLANDER PHEV	20	22	110%	10	12	120%

A.3 EV SHOPPING EXPERIENCE

In 2016 and 2019, the Sierra Club published their well-known Rev Up Electric Vehicles report, a Nationwide Study of the Electric Vehicle Shopping Experience. The 2019 iteration found that non-ZEV states had a much more limited EV inventory compared with ZEV states, and that dealerships often failed to provide information on federal or state consumer incentives or were poorly informed or uninformative about EV technology.⁶⁸ While the 2019 Rev Up report did include the Commonwealth in its overall analysis, Generation180 wanted to see if this pattern held true with a more specific Virginia assessment in order to better understand the challenges unique to car-buying Virginians and Virginian auto dealerships. A constructive relationship between automotive dealerships and electric vehicle shoppers is a key element in supporting the adoption of electric vehicles.

METHODOLOGY

Inspired by the methodology presented in the Rev Up reports, Generation180 created a list of questions for EV shoppers to ask selected dealerships' staff during a remote electric vehicle inquiry. Because of the current pandemic, we decided to prioritize the safety of volunteers and deployed these questions over the phone, instead of in person. Based on the criteria below, we engaged with over 50 dealerships during the week of October 26th, 2020.

According to [AutoGuide.com](https://www.autoguide.com), the following automotive brands are sold in the state of Virginia:

- Audi
- BMW
- Buick
- Cadillac
- Chevrolet
- Chrysler
- Dodge
- Fiat
- Ford
- GMC
- Honda
- Hyundai
- Jaguar
- Jeep
- Kia
- Lincoln
- Mazda
- Mercedes Benz
- Mini
- Nissan
- Porsche
- Subaru
- Tesla
- Toyota
- Volkswagen

The following automotive brands were omitted from the survey due to premium segmentation, small segment share, or product line (only trucks, etc.):

- Acura
- Aston Martin
- Bentley
- Ferrari
- Infiniti
- Isuzu
- RAM
- Lamborghini
- Land Rover
- Lexus
- Lotus
- Maserati
- Mitsubishi

SAMPLE REQUIREMENTS

- Two dealerships per automotive brand
26 brands x 2 dealerships each = 52 dealerships,
representing 11% of all new-car dealerships in Virginia
- Preference for representative dealership sample to come from across Virginia
(i.e. not just Richmond dealerships, etc.)

QUESTIONS

- Do you sell electric vehicles?
 - If yes, could I schedule a test drive?
 - If yes, do you have any used models?
 - If no, is it possible to order one?
- Does Virginia offer any special incentives for electric vehicles?
- Can you service electric vehicles?
- Is there someone at the dealership that can help me with questions if I buy an electric vehicle?

RESULTS

Based on the survey of over fifty Virginia new-car dealerships representing 26 automotive brands, we found that the respondents were generally supportive in helping prospective customers find a specific vehicle and encouraged test drives if they had inventory. However, product availability was clearly the largest challenge for Virginia dealerships. While dealerships were encouraging, stating they could “order” a specific electric vehicle, few had any actual product on the lot. For example, of those dealerships surveyed, typically only one model was available on the lot, if any. Feedback ranged from the “ability to order” to “no or limited available inventory” to “no product in brand portfolio”. Though generally supportive, dealerships also had a general lack of awareness regarding available incentives. This is not particularly surprising given Virginia offers very little. Dealership focus tended to be on discounts offered by the manufacturer rather than Federal or State related incentives. Very few specifically cited the federal tax credit or access to high occupancy vehicle (HOV) lanes.

Overall, these findings are generally in line with previous research, including the 2019 Rev Up Electric Vehicles report.

*Selected responses:

ABILITY TO ORDER

Audi Dealership

"We can order any model you want."

BMW Dealership

"We can take orders for any fully electric you want."

Cadillac Dealership

"Lyric coming in a year and we will sell it."

Chrysler Dealership

"We don't have any to sell, but we can order any model that you want."

Infiniti Dealership

"We can try to get any EV model you want through dealer auctions."

LACK OF INVENTORY

Chevrolet Dealership

"None in inventory right now... we sell them, but don't have any."

Ford Dealership

"As fast as they can get them to us, we will sell them."

GMC Dealership

"We currently only have one...Don't have any new or used."

Honda Dealership

"I haven't had one here for a year... not available on this coast."

Hyundai Dealership

"We currently have no new or used EVs in our inventory... we will get leftovers after they get sent to 'green states.'"

Nissan Dealership

"We don't have too many... We get 1-2 a month."

Toyota Dealership

"We aren't getting any of the RAV4 Prime allocated to us."

Volkswagen Dealership

"We do sell EVs but currently have none in our inventory."

KNOWLEDGE OF INCENTIVES

Audi Dealership

"More than happy to look into it, but I don't know."

Cadillac Dealership

"I don't know, but it's a great question and I will look into it."

Chevrolet Dealership

"I am unsure about for the state, but model-wise, the Bolt gets a discount if you're a Costco member."

Chrysler Dealership

"For used EVs there is nothing, but you can use HOV lanes and you'll get zero emissions inspection. If buying new, you could get the Federal tax credit."

* QUOTATIONS ARE PARAPHRASED

A.4 DEALERSHIP SENTIMENT SURVEY

Virginia is currently home to more than 450 new-car dealerships, representing 2.3 percent of the nation's total new-car sales according to the Virginia Automobile Dealers Association. However, the lack of an adequate electric vehicle supply in Virginia is a challenge hindering wider EV adoption.

To better understand potential barriers to EV adoption in Virginia, Generation180 partnered with the Virginia Automobile Dealers Association (VADA) to conduct a detailed survey of new-car dealerships in the state. This survey is ongoing, with current methodology described below.

METHODOLOGY

Starting Monday, October 19th, 2020, Generation180 and VADA implemented an anonymous online questionnaire regarding EV sentiment directed at dealerships' General Managers. This survey is still in the field, with a target sample size of over 200 dealerships across the state in order to be considered representative. As of November 17th, 40 responses had been received.

The Virginia Automobile Dealers Association (VADA) offered access to dealer insights via a survey and supported the development of this report to better understand EV adoption in Virginia. VADA advocates for the interests of franchised new car and truck dealers across Virginia. Any assistance VADA offered in the administration of such survey does not amount to or otherwise indicate the support or opposition by VADA of Generation180's specific policy recommendations outlined herein.

SURVEY QUESTIONS

01. Have you ever driven an electric vehicle?
 - a. Yes
 - b. No
 - c. Uncertain
02. Do you sell new electric vehicles?
 - a. Yes
 - b. No
 - c. Uncertain
03. Do you sell used electric vehicles?
 - a. Yes
 - b. No
 - c. Uncertain
04. Has your staff received training on electric vehicles?
 - a. Yes
 - b. No
 - c. Uncertain
05. Has your dealership installed electric vehicle charging infrastructure?
 - a. Yes
 - b. No
 - c. Uncertain
06. Please rank the following barriers (largest = 1, smallest =8) to wider electric vehicle (either all-electric or plug-in hybrid) adoption in Virginia, from your perspective:
 - a. Product availability
 - b. Range
 - c. Price
 - d. Resale value
 - e. Charging infrastructure
 - f. Consumer education / awareness
 - g. Support from OEM (manufacturer)
 - h. Availability of state purchase incentives / discounts
07. Are there any additional barriers to wider electric vehicle (either all-electric or plug-in hybrid) adoption in Virginia you would like to add?
 - a. Short answer
08. Do you believe a point of sale rebate would encourage wider electric vehicle (either all-electric or plug-in hybrid) adoption in Virginia?
 - a. Yes
 - b. No
 - c. Uncertain

(SURVEY QUESTIONS CONT.)

09. Given electric vehicles require less maintenance than traditional powertrains, are you concerned about reduced service revenue?
- Yes
 - No
 - Uncertain
10. In the last thirty days, how many customer inquiries have you received for electric vehicles:
- None
 - 1-25
 - 26-50
 - More than 50
 - Uncertain
11. How do you feel about the future of electric vehicles in Virginia (either all-electric or plug-in hybrid)?
- Very Positive
 - Somewhat Positive
 - Neutral
 - Somewhat Negative
 - Negative
12. Do you wish to add any additional comments regarding electric vehicle adoption in Virginia? (optional)
- Short answer

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