

Pennsylvania EV Policy Landscape

Electrifying Transportation in the Keystone State



December 2020

Overview

As Pennsylvania continues to drive toward an electrified transportation future, which policies, strategies, and partners can help it succeed? The Pennsylvania EV Policy Landscape outlines how the state can move forward to achieve a more robust EV future. The Electrification Coalition (EC) developed this document to guide the work of the EC State EV Policy Accelerator over the next year, and it features our assessment of the policy opportunities, pathways, messaging, and key players that will be most effective in achieving progress in the near term. It reflects input from a wide range of on-the-ground stakeholders and builds upon the insights of previous roadmaps and guidance documents, including those developed by the EC. It reviews transportation’s current impacts to public health, safety, and the economy. From the collection of policy opportunities we examine here, the EC has identified a set of high-impact areas of engagement where we will dedicate our resources in partnership with other players. Our goal: Electrify the Keystone State.

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Pennsylvania Context for EV Policy Action

Pennsylvania has already taken important steps toward an electrified transportation future. This includes actions by the state government, local governments, and private sector, including utilities and EV related companies, in partnership with non-governmental organizations and other stakeholders.

Electrification commitment: Pennsylvania has shown a commitment to transportation electrification since 2004, when Act 178 established the Alternative Fuel Vehicle Rebate Program, allowing residents to apply for a rebate when purchasing a new alternative fuel vehicle. In 2008, Pennsylvania installed chargers at various Pennsylvania turnpike plazas. Since then, the Pennsylvania electric vehicle market has continued to grow and mature with annual electric vehicle sales increasing from 236 in 2011 to nearly 6,000 in 2019, an annual sales increase of more than 2400% (Fig. 1).¹

About the State EV Policy Accelerator and the Electrification Coalition

The Electrification Coalition (EC) launched the State EV Policy Accelerator in early 2020, with the goal of advancing state policy to drive widespread transportation electrification. Working with leaders across the government, private-sector, and advocacy community, the EC will lead deep-dive policy action focused on high-impact policy measures in the five priority states of Michigan, Nevada, North Carolina, Pennsylvania, and Virginia from 2020-2022. This work will include detailed market assessments, policy blueprints, resource toolkits, and customized bootcamps, alongside targeted implementation programs for bus electrification, fleet transitions, and other local programs to prove out electrification on the ground. In addition, the EC provides rapid response support for states across the country, in the form of targeted analysis, media and communications support, testimony, and policy comments.

The EC is a nonpartisan, nonprofit organization that promotes policies and actions to facilitate the widespread deployment and adoption of plug-in electric vehicles to overcome the national security and economic challenges resulting from America's dependence on oil.

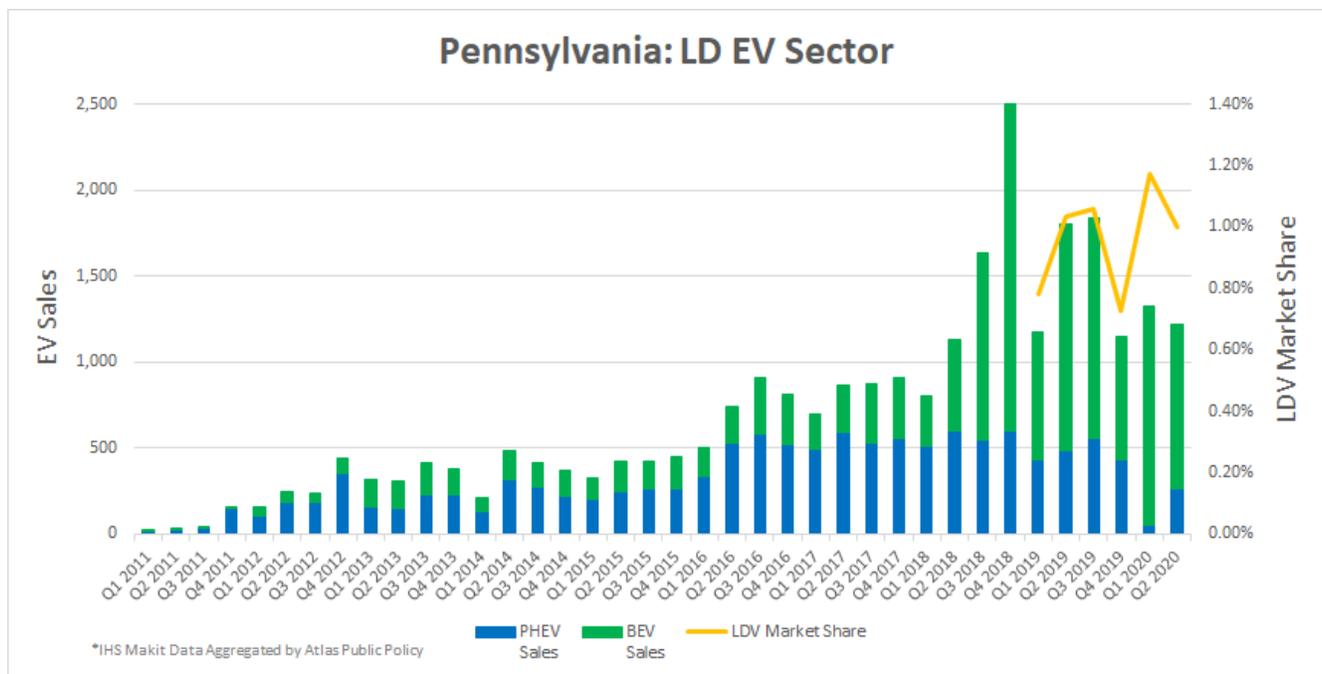


Figure 1. Light-duty plug-in electric vehicle sales in Pennsylvania, 2011-2020

¹ Auto Alliance – Advanced Technology Vehicle Sales Dashboard. 2011-2018 Sales Data. <https://autoalliance.org/energy-environment/advanced-technology-vehicle-sales-dashboard/>

Climate goals: The Pennsylvania Climate Change Act of 2008 requires the Pennsylvania Department of Environmental Protection to inventory GHG emissions annually. Governor Tom Wolf, under Executive Order 2019-01, set a series of greenhouse gas reduction goals for Pennsylvania. The first goal is to reduce GHG emissions 24% below 2005 levels by 2025, with a second goal of reducing emissions 80% below 2005 levels by 2050. Pennsylvania has made significant strides to meeting the first goal; by 2017, GHG emissions were 19% below 2005 levels, though they rose slightly during the prior reporting year. Still, Pennsylvania must reduce GHG emissions by another 20.98 million metric tons of carbon dioxide equivalent to meet its goal. The lion's share of emissions reductions have come from electricity generation because of a substantial shift away from coal toward natural gas. Despite this progress, the state is unlikely to meet future GHG reduction goals if it does not substantially reduce emissions in the transportation sector.

Drive Electric Pennsylvania: In 2016, the Pennsylvania Department of Environmental Protection (DEP) began working with a broad group of state, regional, and national actors interested in accelerating transportation electrification in the commonwealth.² This group continued to convene and engage, becoming known as the Drive Electric Pennsylvania Coalition. At the direction of DEP, the coalition hired a consultant to produce the Pennsylvania Electric Vehicles Roadmap (2019). The coalition's 250+ participants continue to meet quarterly for meetings hosted by DEP and the Department of Transportation (PennDOT), guided by the roadmap.

In June 2020, Pennsylvania signed onto the Multi-State Zero Emission Medium- and Heavy-Duty Vehicle Memorandum of Understanding, showing interest in addressing trucks and buses. Pennsylvania is also a Section 177³ state (low-emission light duty vehicles), adopting emission control standards identical to those of the State of California.

This policy landscape builds upon the findings and recommendations of the 2019 EV Roadmap. Various aspects of technology and policy have changed since the publication of the roadmap, and the COVID-19 pandemic has shifted the market and policy priorities.

The Case for EVs in Pennsylvania

Drivers for EV policy action in Pennsylvania include economic development opportunities; a desire to reduce emissions of greenhouse gases and air pollutants, such as particulate matter and nitrogen oxides, which adversely impact public health, especially for disadvantaged communities; and energy security threats associated with oil dependency.

Jobs and Economic Development

A recent analysis of the electric transportation supply chain in Pennsylvania found that electric transportation-related activity accounts for more than \$434 million annually – approximately 0.6% of gross state product. The analysis forecasts that electric transportation-related jobs growth were to outpace the overall economy over the next five years (24% versus 3%).⁴ This market growth is not just expected to create replacement jobs but additional jobs as well. Similar analysis for other states found analogous results that a growing electric transportation industry would increase gross state product, employment, real house income, and state revenue.

² See Page iii for a list of then active members in the Coalition.

³ California has the unique authority to set its own emissions standards (with a waiver granted by the US EPA), which are required to meet or exceed standards set by the federal government. Section 177 of the Clean Air Act (1970) authorizes states the ability to choose California's emissions standards in lieu of the federal requirements.

⁴ AEE (2020), *Electric Transportation Supply Chain in Pennsylvania*. <https://info.aee.net/electric-transportation-supply-chain-in-pennsylvania>

The potential avoided social cost of carbon between 2020-2060 is an incredible \$80-90 billion, while statewide spending on oil is roughly \$16 billion per year.⁵

National Security and Energy Security

Oil accounts for about 91% of energy use in transportation in the United States, and this dependence has bound the United States' national, economic, and energy security to a highly volatile, cartel-influenced global oil market.⁶ Pennsylvanians consume more than 233.6 million barrels of oil per year (over 26 million gallons per day).⁷

Every year the U.S. military spends roughly \$81 billion to safeguard global oil supplies. Ninety percent of conventional crude oil reserves are held by OPEC member states or national oil companies that do not share U.S. strategic values or interests. Some economists have estimated that the financial resources spent by the military equate to an implicit subsidy of up to \$0.70 per gallon of gasoline.⁸ The United States has gone to great lengths to secure supply and reduce volatility globally, but not all supply disruptions can be predicted or prevented – and no matter where supply is disrupted, prices everywhere are affected.

The recent collapse of the oil market is the latest disruption, which has not only damaged the domestic oil production sector but has also undermined innovation and investment in electrified transportation. If the United States is to reach true energy security, we must accelerate the transition away from petroleum-dependent transportation.

Air Quality, Public Health and Social Equity

Transportation is a significant source of harmful air pollutants – particularly in areas of high population density – that can be lowered significantly through a move to EVs. Conventional internal combustion engine (ICE) vehicles have long been leading emitters of criteria pollutants determined by the U.S. Environmental Protection Agency to be harmful to public health. They include particulate pollution (PM_{2.5} and PM₁₀), carbon monoxide (CO), volatile organic compounds, and nitrogen oxides (NOx). Globally, PM_{2.5} from fossil fuel emissions is responsible for nearly [9 million premature deaths per year](#), amounting to nearly one in five deaths worldwide. And transportation emissions are linked to health impacts including asthma, heart attacks, reduced lung capacity, chronic pulmonary disease, heart disease, and cancer.

Air quality is also critical to address, given that transportation pollutant exposure disproportionately affects Black, Latinx, Indigenous, and low-income communities – particularly important in the era of COVID-19. In Pennsylvania these communities are significant – 23% of residents are people of color, and 26% have incomes below 185% of the poverty line.⁹ Air quality non-attainment areas predominantly affect these communities.¹⁰ Recent studies suggest that higher exposure to PM_{2.5} increases COVID-19 mortality rate: An increase of only 1 µg/m³ in PM_{2.5} is associated with an 8% increase in the COVID-19 death rate.¹¹

⁵ Analysis and estimate by Hovland Consulting (2020).

⁶ US Energy used for transportation – US EIA, <https://www.eia.gov/energyexplained/use-of-energy/transportation.php>

⁷ US Energy Information Administration State Energy Data System (SEDS) - Petroleum consumption, <https://www.eia.gov/state/seds/seds-data-complete.php?sid=US> and \$2.20/gallon (<https://www.eia.gov/petroleum/gasdiesel/>)

⁸ Analysis by Securing America's Future Energy, <https://secureenergy.org/military-cost-defending-global-oil-supplies/>

⁹ GIS analysis using Census data. <https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.html>

¹⁰ American Lung Association (2020), *Disparities in the Impact of Air Pollution*. <https://www.lung.org/clean-air/outdoors/who-is-at-risk/disparities>

¹¹ Harvard (2020), *COVID-19 PM2.5: A national study on long-term exposure to air pollution and COVID-19 mortality in the United States*. <https://projects.iq.harvard.edu/covid-pm/home>. See also *Can exposure to PM2.5 particles increase the incidence of coronavirus disease 2019 (COVID-19)?* Elsevier Public Health Emergency Collection (Nov 2020). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7308784/>.

Pennsylvania child and adult asthma cases are estimated to exceed 1 million, and 5.5 million Pennsylvanians live in areas with air quality non-attainment (high criteria emissions). The Philadelphia-Wilmington-Trenton area sees at least 280 deaths every year due to on-road air pollution.¹²

Battery electric vehicles (BEVs) and plug-in hybrid vehicles in electric drive mode have zero tailpipe emissions, and thus drastically improve ambient air quality and health outcomes. A [study by the Denver Colorado Department of Environmental Health](#) found that BEVs charged on the city’s 2016 grid mix produced 38% lower NO_x and 99% lower VOC emissions than a new gasoline vehicle. Across Pennsylvania, the benefits of widespread transportation electrification would be substantial. According to analysis by the American Lung Association, the state could avoid 206 premature deaths, \$2.3 trillion in health costs, 2,400 asthma attacks, and 10,815 lost work days per year.¹³

Greenhouse Gas Emission Reductions

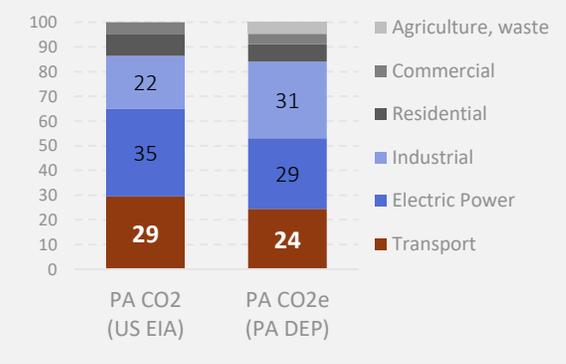
The transportation sector is the third-largest contributor to Pennsylvania’s greenhouse gas profile when considering the CO₂ equivalent (CO₂e) of all greenhouse gases.¹⁴ Transportation is the second-largest contributor of CO₂ alone (Fig. 2). Pennsylvania transportation emissions total about 65 million metric tons of carbon dioxide equivalent (MMT CO₂e) per year.

Reducing GHG emissions in the transportation sector is essential for achieving the state’s long-term emissions reduction goals. Reducing vehicle miles traveled (VMT) can be helpful, but it will not be substantial enough to achieve the state’s emission reduction goals on its own; vehicles themselves must produce drastically lower emissions.

Under an aggressive vehicle electrification scenario, cumulative CO₂ saved from 2020-2060 would be 875-990 Mt (Fig. 3). CO₂ emissions-reduction potential from light-duty passenger and freight electrification are both substantial. There are currently about three times as many registered light-duty vehicles (about 8.4 million LDVs) than medium- and heavy-duty trucks (about 2.9 million MHDVs) in the state, but transitioning the state’s fossil fuel powered MHD trucks would reduce CO₂ emissions by almost three times as much as electrifying the current fleet of fossil-fuel LDVs. This dynamic is driven by the much higher emissions per mile of ICE MHD trucks and by the massive efficiency improvements that are achieved by switching to electric drivetrains in larger-class vehicles. Decarbonizing the state’s heavier duty vehicles is essential to achieving significant transportation emissions.

Figure 2. Transportation is Pennsylvania’s second- or third-largest GHG-emitting sector (CO₂ only vs CO₂e)

Percent of GHG emissions by sector in Pennsylvania. Sources: Energy Information Administration (EIA [Table 4](#)) and PA Department of Environmental Protection (DEP, 2020, [Report](#))



¹² American Lung Association (2020), The Road to Clean Air: Benefits of a Nationwide Transition to Electric Vehicles. <https://www.lung.org/getmedia/99cc945c-47f2-4ba9-ba59-14c311ca332a/electric-vehicle-report.pdf>

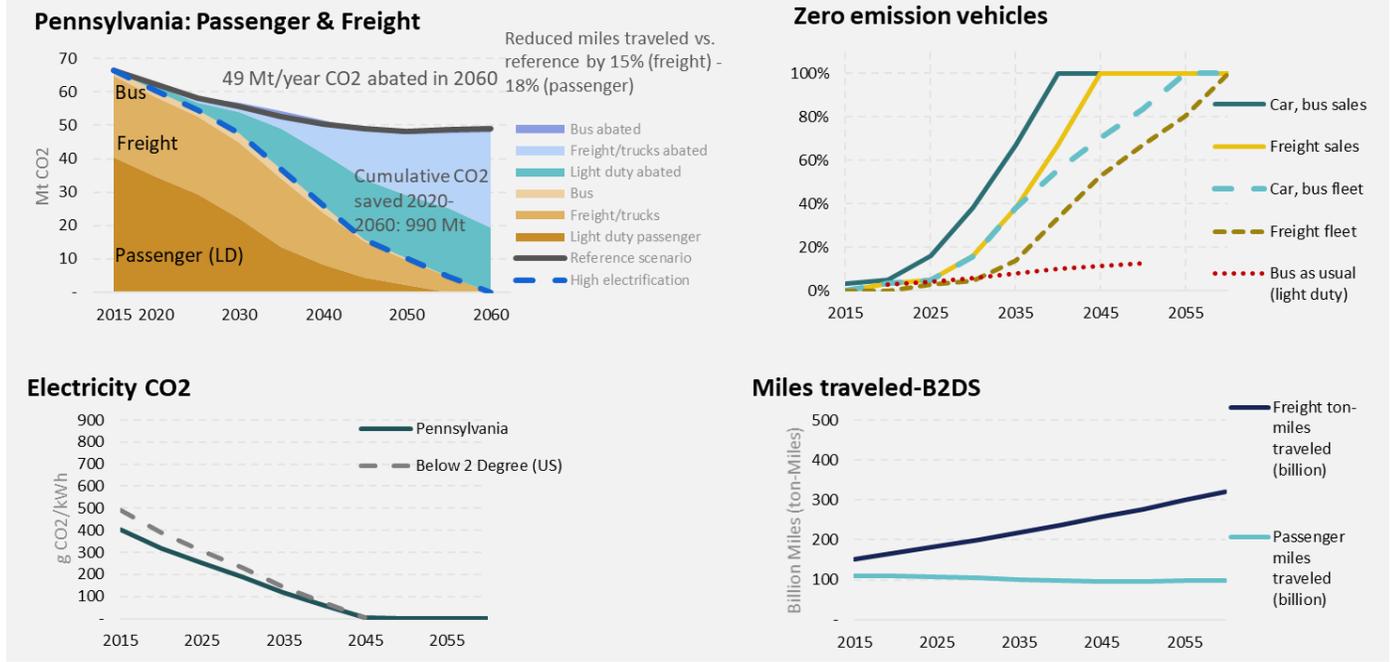
¹³ Ibid.

¹⁴ Industry shows the biggest jump when considering CO₂e, consider not just combustion of fossil fuels but also industrial processes, coal mining & abandoned mines, and natural gas & oil systems.

Figure 3. GHG emissions reductions possible with aggressive electrification

CO₂ reductions: About 50 Mt/year avoided in 2060; cumulative CO₂ saved from 2020-2060 is 875-990 Mt. Low range reflects reference travel patterns (flat passenger, increasing freight travel); higher range reflects 15-18% reduction in miles traveled consistent with a Below 2 Degree Scenario (B2DS) (bottom right). Electricity CO₂ intensity is specific to Pennsylvania, following an assumed decarbonization pathway to 0g CO₂/kWh in 2045 (bottom left).

Source: Hovland Consulting estimate (2020), with inputs from [IEA Energy Technology Pathways \(2017\)](#) and other sources.



Key Players

Many organizations, agencies, and individuals play a role in EV policy action in Pennsylvania.

Key Players for EV Action in Pennsylvania

Player(s)	Description
Governor	In passing Executive Order 2019-01, Gov. Wolf set the state’s first greenhouse gas reduction goal, 24% below 2005 levels by 2025 and 80% below 2005 levels by 2050. The order also included state agency performance goals, including for state fleet electrification. Pennsylvania is assessing the Regional Greenhouse Gas Initiative (RGGI), addressing the electric power sector, and considering a commitment to the Transportation Climate Initiative.
Legislature	A number of bills related to electric vehicles were considered in the 2019-2020 session, though none ultimately passed. It is expected that a number of those bills will be reintroduced in the next session.
Public Utility Commission (PUC)	The Pennsylvania PUC has four commissioners and one vacancy. Aspects of transportation electrification have come up in prior rate cases and the tentative implementation order of Act 58, but there is no evidence of strong support.
State Agencies	The departments of Environmental Protection, General Services, Conservation and Natural Resources, and Transportation and the Turnpike Commission have continued to explore and support aspects of transportation electrification. PennDOT and DEP jointly run the Drive Electric Pennsylvania Coalition (DEPA).

Player(s)	Description
Advocates	Advocates are largely in full support of transportation electrification and are loosely organization via a coalition led by the Energy Foundation. A subset of the larger group is active in a transportation table that focuses on electrification in addition to other aspects of mobility.
Vehicle Manufacturers and Infrastructure Companies	A number of companies are interested in growing their business in Pennsylvania. EVgo, Greenlots, and Tesla all operate EVSE throughout the state. Original equipment manufacturers (OEMs) such as Volvo, GM, and Arrival, are eager to expand their presence in the state.
Metropolitan Planning Organizations (MPOs)	Delaware Valley Regional Planning Commission (DVRPC) is highly engaged in its region as a champion of transportation electrification. Other MPOs and RPOs have been far less active. Developing stronger interest and engagement would be beneficial.
Transit Agencies	Only a select number of transit agencies are currently able to consider electrifying their fleets. A large number of smaller municipal transit agencies signed on to a long-term contract for CNG. Allegheny County's Port Authority, SEPTA, and Red Rose Transit Agency (RRTA) in Lancaster are interested in electrifying but are in need of policy support. The Port Authority and SEPTA operate a significant portion of the state's transit vehicles.
Local Governments	The cities of Pittsburgh and Philadelphia are participating in the American Cities Climate Challenge and focused on transportation electrification with the Electrification Coalition on contract as a technical advisor. Both the DVRPC EV mapping tool and the 2019 roadmap illustrate that more local governments need to be engaged outside of the state's large urban centers. In 2020, PennDOT issued a survey to local governments that included questions on transportation electrification.
State Fleet Managers	As part of Gov. Wolf's 2019 EO, Department of General Services staff are working to reach a 25% state fleet electrification goal.
Businesses	At a high level, a variety of businesses are interested in and continue to pursue aspects of corporate sustainability, including transportation electrification. As such, businesses are looking to install workplace charges at campuses for employees and explore options for their corporate fleets.

Policy Opportunities

Pennsylvania has a rich set of policy opportunities to pursue, with much groundwork already laid. The state has already signed the Multi-State Zero Emission Medium- and Heavy-Duty Vehicle Memorandum of Understanding, but it will need to adopt and aggressively push other associated policies to enable the ZEV freight vehicle market to thrive. Additional measures are needed to accelerate adoption in the light-duty sector.

EV policy success depends on an alignment of players, strategic pathways, and messages. Based on our assessment to date, there are several leading policy opportunities:

1. Legislation to drive utility efforts on transportation electrification planning
2. Implementation of steps to meet the goals of the MHD MOU, including for freight, transit and school buses
3. Defense against inequitable EV fees
4. Direct-to-consumer EV sales
5. EV-friendly rates and charges through the PUC
6. Use of Regional Greenhouse Gas Emissions Initiative proceeds for transportation electrification.

Uncertainties in the Next 12-18 months

The novel coronavirus pandemic has introduced a significant degree of uncertainty in the next 12 to 18 months. Impacts to date have included reduced travel, which lowers economic activity and state revenues; extended timelines for the introduction of new EV models, including in the much anticipated light-duty pickup segment; lower demand for public transit as well as new social distancing protocols that have constrained budgets; and broader employment impacts that have lowered consumers' economic activity. As a result, local and state governments are facing a significantly different financial picture than they had planned for just six months ago. As cities see lower emissions and improved air quality, there is greater awareness of the positive impacts that increased use of EVs could have in communities.

Acknowledgements

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