

Office of Regulatory Affairs
Department of Environmental Quality
P.O. Box 1105
Richmond, Virginia 23218



Dear Air Pollution Control Board,

We hope this letter finds you well. We are a group of students from Virginia Tech who have recently completed a research project regarding the Zero Emission Vehicle (ZEV) Sales Requirement and Low-Emission Vehicle (LEV) Standards adopted by the Virginia Air Pollution Control Board. Our project goal was to determine the feasibility of this legislation in Virginia considering different relevant criteria. Below is a summary of our findings.

The board has adopted a piece of legislation that requires that 100% of new passenger vehicles sold in Virginia, starting with model year 2027, must be zero-emission vehicles by 2035. Beginning January 1, 2024, these regulations apply to all passenger cars, light-duty trucks, and medium-duty vehicles. Manufacturers must meet the greenhouse gas emissions standard and the ZEV production and sales requirements.

As students and residents of Virginia, it is important to us that these regulations are beneficial to the entirety of the Commonwealth. Our research includes demographic, economic, and geographical data that is relevant to the feasibility of this new legislation. Based on our findings, we have determined that the Zero Emission Vehicle (ZEV) Sales Requirement and Low-Emission Vehicle (LEV) Standards are not currently feasible and equitable for the residents within the state of Virginia.

We acknowledge the benefits that this legislation would provide for Virginia, especially in reducing statewide and national carbon emissions. Transportation accounts for the largest source of greenhouse gas emissions in Virginia, making up 42.1% of total state emissions (NRDC). According to the MIT Climate Portal, despite the manufacturing of electric vehicles being more carbon-intensive than gas-powered vehicles, over the vehicle lifespan, electric vehicles emit significantly fewer carbon emissions. In theory, the implementation of electric vehicles will help the state reduce CO2 emissions and combat climate change.

Despite the benefits associated with the widespread implementation of electric vehicles, we have identified challenges to implementation that make this legislation unfeasible. The most concerning challenges we found are sustainability concerns, geographical constraints, and dependence associated with the mining of necessary minerals. We have summarized these challenges below.

While the United States does have rare earth metal reserves, China is the leading country with the largest supply. 6 countries are coming before the United States for the largest rare earth metal reserves. Mining practices in other countries, like the Democratic Republic of Congo, are highly unethical. Additionally, these mining operations result in severe environmental health implications such as deforestation, land degradation, and high carbon emissions. Aside from the ethical and environmental

implications, there is also the potential risk of international conflict surrounding resources, competition, and energy security.

Lithium-ion batteries used in electric vehicles, those used in electric vehicles perform best at certain temperatures and in certain geographical conditions. Ideally, electric vehicles will be driven between 68 to 86 degrees Fahrenheit. Estimates suggest that the EV range can drop by 15% when temperatures start to go above 95 degrees Fahrenheit, which is a common occurrence during the Summer months in Virginia. Similarly, colder temperatures in mountainous regions can affect electric vehicle range. Temperatures below 68 degrees Fahrenheit are common in the Fall, Winter, and Spring seasons. Given Virginia's diverse geography and weather patterns, these conditions impose geographical constraints on EV operations within the state.

Based on our research, we have determined that the Zero Emission Vehicle (ZEV) Sales Requirement and Low-Emission Vehicle (LEV) Standards adopted by the Virginia Air Pollution Control Board are not currently feasible. Considering this information, we hope that you will consider reforming this policy to account for feasibility concerns or adopt a new policy that funds electric vehicle implementation rather than requiring it. One potential solution to this issue is to grant variances in these regulations in specific districts based on local economic conditions. This would allow the regulation to exempt certain counties from this legislation.

Thank you for considering our concerns and taking the time to read this letter. We are hopeful that with your leadership and support, we can work together to address this issue and improve the lives of Virginians across the Commonwealth.

Sincerely,

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