SIERRA CLUB
MARYLAND CHAPTER

June 21, 2023

Re: Vehicles' Contribution to Maryland Ozone NAAQS Moderate Nonattainment: Implications for Public Health and Environmental Justice

We, the undersigned organizations, commend the Moore Administration and the Maryland Department of the Environment for their commitment to adopting the Advanced Clean Cars II ("ACC II") and Advanced Clean Trucks ("ACT") Rules this year. We urge MDE to publish the ACC II and ACT Rules in 2023 and swiftly implement these regulations in Model Year 2027. We also urge MDE to adopt the Heavy-Duty Engine and Vehicle Omnibus ("HDO") Rule as soon as possible. The rules should be incorporated into Maryland's ozone air quality state implementation plan ("SIP"). As discussed below, adoption of these rules is a critical step toward meeting the Moore Administration's goals of improving conditions in Maryland's environmental justice communities that are overburdened by pollution and achieving Maryland's climate commitments.

These rules are also critical to addressing Maryland's long-standing air quality attainment challenges and putting Maryland in a position to potentially redesignate the Baltimore area to attainment if recent improvements in air quality persist. The Baltimore area is currently designated as Moderate Nonattainment under the 2015 8-hour National Ambient Air Quality Standards ("NAAQS") issued by the U.S. Environmental Protection Agency ("EPA"), as is Northeastern Maryland, which is part of the Philadelphia-Wilmington-Atlantic City area.[1] Approximately 5.1 million Marylanders, comprising 82% of Maryland's entire population, continue to live in areas that are designated as failing to meet EPA's health-based NAAQS.[2] High ozone levels have documented adverse health impacts, including higher levels of asthma and asthma morbidity.[3]

Ozone formation in Maryland is traceable in significant part to emissions of nitrogen oxides ("NOx"), which are released by the combustion of gasoline and diesel fuel in Maryland's vehicles. Nearly half of Maryland's total NOx emissions—approximately 41.3%—are attributable to pollution from vehicles driving on Maryland's roads.[4]

Recent modeling commissioned by the Sierra Club confirms the massive contribution of on-road vehicles to ozone pollution in Maryland. On-road vehicles in Maryland contribute a staggering maximum of 11.15 parts per billion ("ppb") of ozone, which means that up to 15.9% of the total minimum federal air quality standard of 70 ppb of ozone is driven by pollution from

[1] EPA, *8-Hour Ozone (2015) Designated Area/State Information* (Mar. 31, 2023), https://www3.epa.gov/airquality/greenbook/jbtc.html. This area is still designated as nonattainment under the 2008 8-hour ozone NAAQS, but these comments are focused on the nonattainment designation under the more recent 2015 NAAQS. *See* EPA, *8-Hour Ozone (2008) Nonattainment Area Area/State/County Report* (Mar. 31, 2023), https://www3.epa.gov/airquality/greenbook/hnca.html.
[2] *See* Section I.a.
[3] *See* Section I.b.
[4] *See* Section II.a.

in-state vehicles alone.[5] Medium- and heavy-duty vehicle pollution contributes the majority of that transportation-generated ozone pollution.[6]

Maryland's historically high ozone levels are exacerbating race- and income-based health disparities and have a major impact on Maryland's environmental justice communities. For example, EPA's EJScreen Tool indicates that Baltimore, Maryland is in the 91st percentile for the ozone EJ index, an index that combines ozone levels with demographic data (by averaging populations of low-income people and people of color).[7] In other words, only 9% of the U.S. population has worse ozone pollution impacts than Baltimore, considering the demographic factors of income and race.[8] Emergency department visits for asthma are nearly five times higher for Black Marylanders than white Marylanders.[9] Reducing NOx emissions, an ozone precursor, is therefore essential for mitigating the adverse and unjust health impacts affecting Maryland residents.

The ACC II, ACT, and HDO Rules will significantly reduce NOx emissions from Maryland's on-road vehicles, as well as greenhouse gas emissions. Adopting these rules is therefore critical for bringing Maryland back into compliance with legally binding federal NAAQS standards and Maryland's own greenhouse gas emission reduction requirements, as set forth in the Climate Solutions Now Act ("CSNA"). Modeling reveals that adoption of the ACT Rule alone would cumulatively reduce tailpipe NOx emissions from medium- and heavy-duty vehicles by 63,000 metric tons through 2050—and adoption and implementation of the ACT and HDO Rules is projected to even more dramatically reduce NOx emissions by 90,000 metric tons by 2050. By implementing the ACT Rule, Maryland would also avoid 46.45 million metric tons of greenhouse gas emissions by 2050.[10] Accordingly, this combination of legal standards provides the most effective, equitable remedy for reducing the heavy levels of pollution emanating from Maryland's vehicles.

We appreciate the Moore Administration's recognition of the harms posed by vehicles and its preliminary steps toward decreasing air pollution from vehicles on this state's roads, including its plans to adopt the ACC II Rule[11] and ACT Rule.[12] The ACC II Rule is a critical tool for reducing emissions because it requires gradual increases in the sales of zero-emission light-duty vehicles, while the ACT Rule requires increasing sales of zero-emission medium- and heavy-duty vehicles. MDE, in addition to adopting the ACC II and ACT Rules, must adopt and enforce the HDO Rule as well.[13] The HDO Rule would serve the important function of internalizing the costs of pollution from medium- and heavy-duty vehicles by requiring reduced NOx emissions from those vehicles. We urge Maryland to expeditiously finalize adoption of these rules and incorporate them into Maryland's federally-enforceable moderate ozone nonattainment SIP.

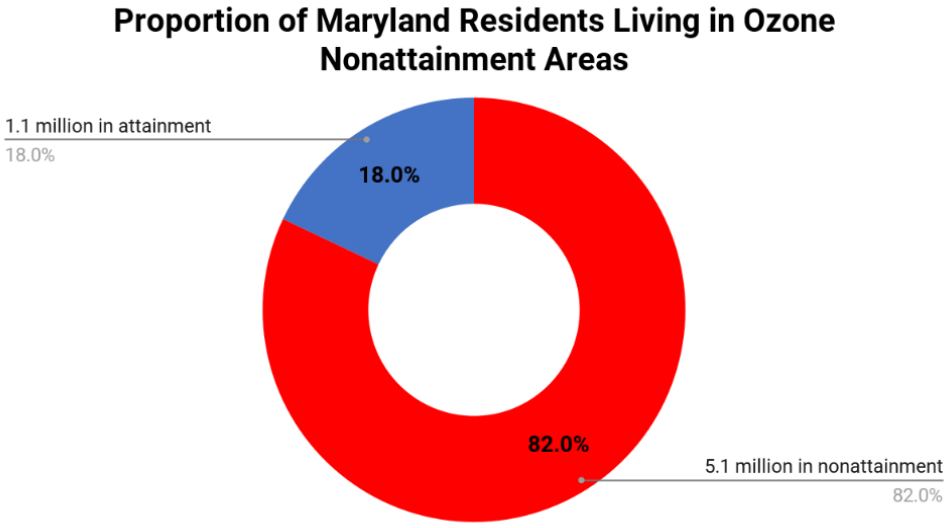
I. Marylanders Continue To Experience High Ozone Levels In Excess of Minimum National Ambient Air Quality Standards, Particularly In Urban Areas and In Communities of Color

[5] *See* Section II.b.1.
[6] *Id.*
[7] EPA, *EJ and Supplemental Indexes in EJScreen*, https://www.epa.gov/ejscreen/ej-and-supplemental-indexes-ejscreen.
[8] *Id.*
[9] *See* Section I.c.
[10] Greenhouse gas emissions results quantify well-to-wheel CO_2e emissions under the ACT rule. *See infra* note 58.
[11] *See* Section III.
[12] *See* Md. S.B. 224.
[13] *See* Section III.

Maryland for decades has had a persistent problem with high levels of ozone pollution in excess of health-based national ambient air quality standards. The Baltimore area was recently reclassified as "moderate" nonattainment under the 2015 ozone NAAQS. As reflected below, the majority of Marylanders continue to live in nonattainment areas that have regularly experienced air that EPA has determined is unsafe to breathe. This disproportionate burden of pollution results in inequitable, poorer health outcomes among disadvantaged, already overburdened communities of color.

a. Most Marylanders Live in Nonattainment Areas where Ozone Levels Regularly Exceed Health-Based Limits Set by NAAQS

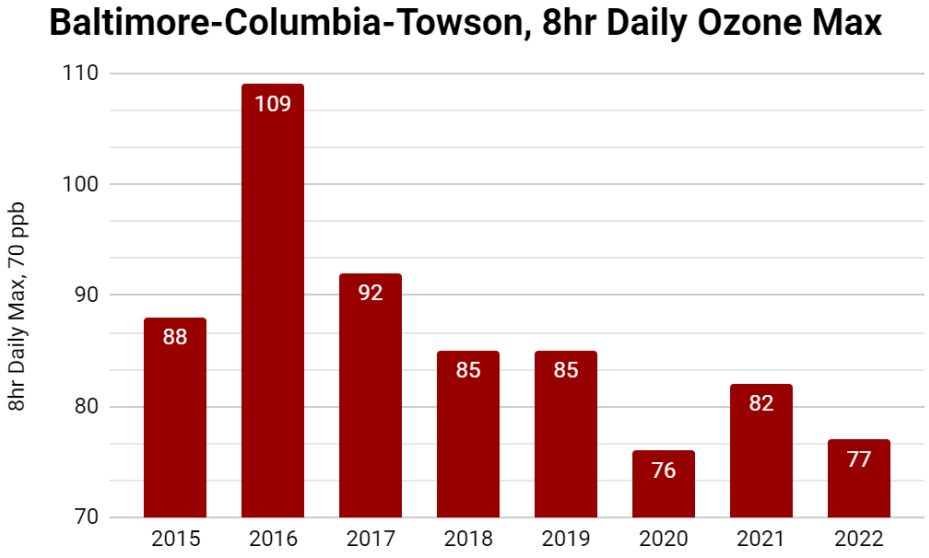
High ozone levels are a persistent public health issue in Maryland, with the vast majority of Maryland residents living in areas that are failing to attain safe, healthy levels of ozone. This has particularly been the case in the Baltimore nonattainment area. An alarmingly high 82% of all Maryland residents live in an ozone nonattainment area, based on current nonattainment designations in the Baltimore metro area and the Maryland portions of the Philadelphia-Wilmington-Atlantic City area, and the Washington, D.C. area:[14]



The Baltimore nonattainment area has continued to log high 8-hour daily ozone values, reaching as high as 109 ppb in 2016—which is 56% higher than the NAAQS of 70 ppb—as well as

[14] EPA, *8-Hour Ozone (2015) Designated Area/State Information* (last accessed April 19, 2023), https://www3.epa.gov/airquality/greenbook/jbtc.html. Data was sourced from this report and compared to the latest Census numbers for Maryland. EPA reports 2010 population in nonattainment, meaning the above percentage is likely a slight undercount, as Maryland's total population grew from 5.8 million in 2010 to 6.2 million today. For a map of nonattainment areas, *see* EPA, *Interactive Map of Air Quality Monitors* (last accessed April 19, 2023), https://www.epa.gov/outdoor-air-quality-data/interactive-map-air-quality-monitors. The Washington, D.C. area is not highlighted in this report because it received a Clean Data Determination from EPA, which temporarily pauses its air quality planning obligations; it remains designated nonattainment, and cannot be redesignated until it petitions for redesignation and complies with the requirements of Section 107(d)(3)(E). *See, e.g.,* EPA, *Clean Data Determination; District of Columbia, Maryland, and Virginia; Washington, DC-MD-VA Nonattainment Area for the 2015 Ozone National Ambient Air Quality Standard Clean Data Determination*, 88 Fed. Reg. 6688, 6688 (Feb. 1, 2023).

82 ppb in 2021 and 77 ppb in 2022.[15] This area has consistently exceeded the ozone NAAQS each year. While the 8-hour daily ozone maximum values and the number of days with exceedances have steadily been improving in recent years, Maryland still needs to improve and maintain its most recent gains in air quality in order to continually attain the ozone NAAQS. Again, even as recently as 2021, ozone levels reached 82—12 ppb in excess of the 70 ppb standard—and the Baltimore region exceeded the 70 ppb limit on 15 different days in 2021.[16]



As the numbers above demonstrate, Maryland's nonattainment areas are making halting steps toward meeting the ozone NAAQS, and communities in and surrounding urban areas are routinely exposed to extremely high ozone concentrations. This ozone exposure has a negative impact on human health, as explained in the following section.

b. Ozone Exposure At Levels Below What Marylanders Regularly Experience Has Significant Adverse Health Impacts

Although Maryland's air quality has shown important improvements in recent years, ozone continues to harm Maryland residents at levels below the current NAAQS. Indeed, at its most recent meeting in March, the ozone panel of EPA's Clean Air Scientific Advisory Committee—composed of preeminent national experts on ozone air pollution—voted to recommend tightening the primary health-based ozone standard from its current 70 ppb level to a range of 55-60 ppb.[17]

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[15] EPA, *Outdoor Air Quality Data, Monitor Values Report* (last accessed April 19, 2023), https://www.epa.gov/outdoor-air-quality-data/monitor-values-report. This data excludes exceptional events.

[16] EPA, *Outdoor Air Quality Data, Air Data - Ozone Exceedances* (last accessed April 19, 2023), https://www.epa.gov/outdoor-air-quality-data/air-data-ozone-exceedances. The number of exceedance days (DV > 0.070 ppm) from 2015 to 2022 for the specified nonattainment area was downloaded and graphed. For the Baltimore nonattainment area, these values are likely an undercount, as they were sourced from EPA's Air Quality System based on the Baltimore-Columbia-Towson Core Based Statistical Area and therefore may not be inclusive of every monitor in the Baltimore nonattainment area.

[17] *See* Sean Reilly, E&E News, "EPA advisers recommend steep cut to ozone standards" (May 2, 2023), https://subscriber.politicopro.com/article/eenews/2023/05/02/epa-panel-recommends-to-steep-cut-to-ozone-standards-00094886.

Exposure to ozone, the main component of smog, has detrimental effects on human health. Even short-term ozone exposure is linked to chronic conditions affecting the respiratory, cardiovascular, reproductive, and central nervous systems, as well as mortality.[18] Respiratory symptoms of ozone exposure include coughing, wheezing, and shortness of breath.[19] Notably, ozone exacerbates asthma and can contribute to new onset asthma.[20] Accordingly, ozone exposure is associated with increased asthma attacks, emergency room visits, hospitalization, and the need for asthma medications.[21]

The health effects of ozone exposure are cumulative, increasing with higher ozone concentrations and increased exposure time.[22] The impacts of ozone exposure on the respiratory system can occur at concentration levels below the 2015 8-hour ozone NAAQS of 70 ppb.[23] In fact, ozone concentrations as low as 60 ppb can cause inflammation and decreased lung function in healthy, exercising adults after 6.6 hours of exposure.[24] Furthermore, studies have observed an association between short-term ozone exposure and hospital admission or emergency department visits at concentrations as low as 31 ppb.[25]

While the health impacts of ozone are ubiquitous, certain populations are at an increased risk of ozone-related health effects. Those populations include people with asthma and/or lung disease, children, people over the age of 65, pregnant people, people of color, and outdoor workers.[26] Factors contributing to an individual's risk of ozone-induced health burdens include exposure, susceptibility, access to healthcare, and psychosocial stress.[27] These factors can intersect to place certain individuals at even greater risk. For example, children experience increased exposure to ozone because they are more likely to spend time being active outdoors, and increased susceptibility to the health impacts of ozone due to their developing lungs and higher occurrences of respiratory infections than adults.[28]

The pervasive impacts of ozone exposure disproportionately burden communities of color and economically marginalized populations. Higher levels of exposure can be attributed to the historical siting of polluting facilities in marginalized communities as opposed to more affluent, predominantly white neighborhoods.[29] Accordingly, people of color, especially Black individuals, carry a higher asthma burden than white people, and are overrepresented in the nation's ozone nonattainment areas. Furthermore, people of color are more susceptible to the impacts of air pollution, such as asthma, diabetes, and heart conditions, because they are more likely than white individuals to be living with one or more chronic conditions.[30]

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[18] *See* EPA, *Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards* (EPA-HQ-OAR-2008-0699-0404, Aug. 2014).
[19] *Id.* at 3-27.
[20] *Id.* at 3-28.
[21] *See id.*
[22] *See id.*
[23] EPA, *National Ambient Air Quality Standards for Ozone*, 80 Fed. Reg. 65,292, 65,292 (Oct. 26, 2015).
[24] EPA, *Integrated Science Assessment for Ozone and Related Photochemical Oxidants at IS-1* (2020), https://www.epa.gov/isa/integrated-science-assessment-isa-ozone-and-related-photochemical-oxidants/.
[25] *Id.* at IS-27.
[26] *Id.* at 2-30; EPA, *National Ambient Air Quality Standards for Ozone*, 80 Fed. Reg. 65,292, 65,310 (Oct. 26, 2015).
[27] American Lung Ass'n, *State of the Air 2022, Tracking Air Pollution & Championing Clean Air 25* (2022), https://www.lung.org/getmedia/74b3d3d3-88d1-4335-95d8-c4e47d0282c1/sota-2022/.
[28] *Id.* at 26.
[29] *Id.*
[30] *Id.*

c. Maryland's Elevated Ozone Levels In the Baltimore Nonattainment Area Demonstrate Clear Adverse Impacts On Environmental Justice Communities

The adverse health impacts of ozone exposure do not affect all Maryland residents equally. EPA's EJScreen tool shows that communities in the Baltimore nonattainment area have high environmental justice index values for ozone, considering both exposure to pollution and socioeconomic indicators. These impacts are reflected in disproportionately poor health outcomes for people of color.

The environmental justice ("EJ") index for ozone is calculated by combining the environmental factor of ozone concentration with demographic factors, including populations of low-income individuals and people of color residing in a geographic area.[31] In Baltimore, the EJ index for ozone is in the 89th percentile compared to the state of Maryland and 91st percentile compared to the United States. This means that only 11% of the state and 9% of the country's population have worse EJ index values for ozone than Baltimore.[32] This illustrates that ozone nonattainment in Maryland is especially harmful when considering the impacts of ozone pollution on people of color and low-income populations in nonattainment areas.

The unequal burden of ozone-caused public health impacts in Maryland is borne out by asthma data. Asthma is one of the primary public health impacts of ozone exposure and affects Black communities at disproportionate rates in Maryland, as shown by emergency department visits, hospitalizations, and death rates. The data below illustrate that emergency department visits for asthma are much more frequent—nearly five times higher—among Black children aged 2-17 years than white children.[33] Visits to emergency departments for asthma are also much higher in locations that fall within Maryland's nonattainment area, including Baltimore City and Baltimore County.[34]

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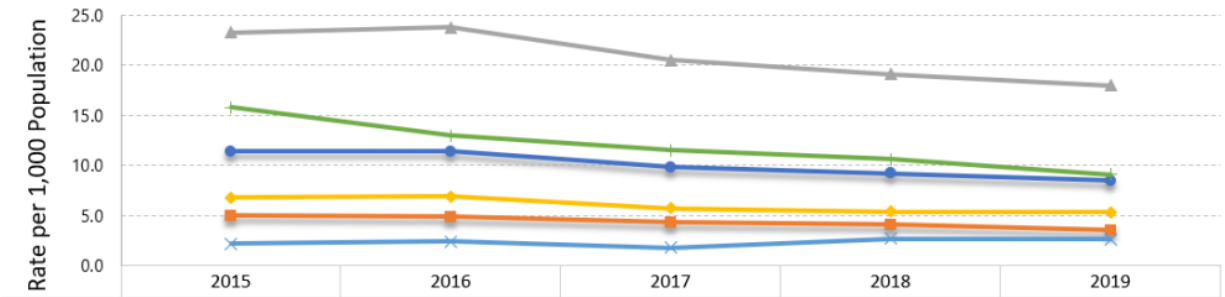
[31] For EPA's explanation of this indicator, *see* EPA, *EJ and Supplemental Indexes in EJScreen* (last accessed Feb. 13, 2023), https://www.epa.gov/ejscreen/ej-and-supplemental-indexes-ejscreen.

[32] *See* EPA, *EJScreen* (last accessed April 19, 2023), https://ejscreen.epa.gov/mapper/. Numbers for Baltimore were generated by selecting the city and generating the "Printable Standard Report."

[33] Maryland Department of Health, *HB 420 (Ch. 366) of the Acts of 2002 – 2021 Legislative Report of the Maryland Asthma Control Program* at 3 (May 5, 2022), https://dlslibrary.state.md.us/publications/Exec/MDH/HB420Ch366(2)2002_2021.pdf.

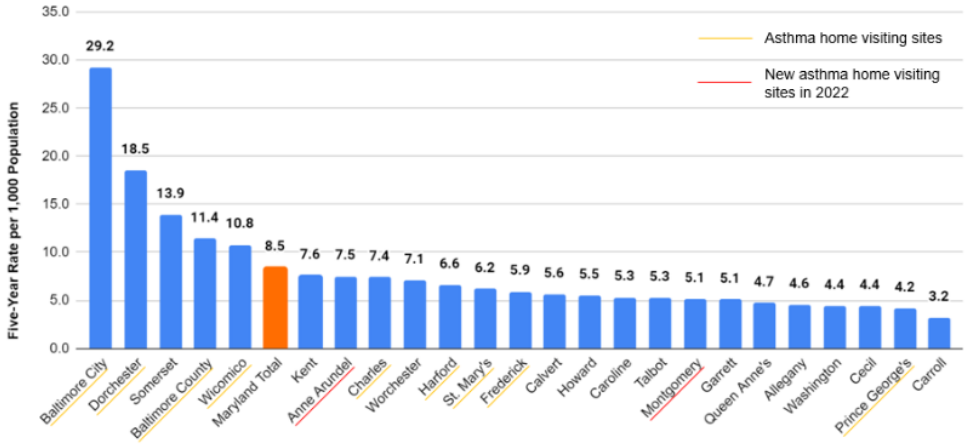
[34] *Id.*



	2015	2016	2017	2018	2019
All Races	11.4	11.4	9.8	9.2	8.5
White NH	5.0	4.9	4.3	4.1	3.5
Black NH	23.3	23.8	20.5	19.1	18.0
Hispanic	6.8	6.9	5.7	5.4	5.3
Asian NH	2.2	2.4	1.8	2.7	2.6
Other NH	15.8	13	11.5	10.6	9.1

Figure 2. Rates of emergency department visits for asthma for children aged 2 - 17 years (SIHIS measure) by race, 2015 - 2019 (source: HSCRC).

Rates of emergency department visits (per 1,000 population) for children aged 2 - 17 years by jurisdiction, 2016 - 2020 (source: HSCRC).



In 2019, Maryland's Health Service Cost Review Commission found that "*88% of pediatric asthma-related hospitalizations and 87% of emergency department visits in Baltimore City were for Black or African American children.*"[35] As Maryland.gov reports, "Black children in Maryland have almost five times the rate of asthma-related emergency department visits as White children," and the rates in Baltimore far exceed the rates elsewhere in the state.[36] Maryland's admonition that parents and guardians "[m]ake sure your child is being treated with their inhaler properly" and that people "[c]heck the air quality so

[35] Sara LaFave, "The Unequal Burden of Pediatric Asthma: A Call for an Equity-Driven, Multimodal, Public Health Approach to Asthma in Baltimore" (Oct. 2020) at 4, https://abell.org/wp-content/uploads/2022/02/2020_Abell_pediatric20asthma_FINAL-web20dr.pdf (citing Maryland Health Services Cost Review Commission) (emphasis added).

[36] Maryland Department of Health, Environmental Health: Asthma, https://health.maryland.gov/phpa/OEHFP/EH/pages/asthma.aspx.

that you can avoid exposure to ozone, particulate matter, and other asthma triggers during bad air quality days" is cold comfort to those families that lack access to health care, do not have asthma inhalers, and yet have school-aged children that have no choice but to travel to school each day.[37]

Based on the American Lung Association's 2023 "State of the Air" report, Baltimore County earned a grade of F in terms of the number of high ozone days that it experienced.[38] According to the American Lung Association, "[b]oth ozone and particle pollution are dangerous to public health and can increase the risk of premature death and other serious health effects such as lung cancer, asthma attacks, cardiovascular damage, and developmental and reproductive harm."[39]

Reducing ozone pollution and NOx emissions, a precursor to ozone pollution, is therefore essential to reducing the unequal public health harms unjustly borne by low-income populations and people of color in Maryland. As discussed below, adopting the ACC II, ACT, and HDO Rules, which require sales of increasing percentages of zero-emission vehicles, as well as decreasing quantities of NOx emissions from internal combustion engines, is critical for improving public health in Maryland's urban and rural environmental justice communities.

II. Pollution from Vehicles Is A Major Driver of Maryland's Elevated Ozone Levels

Pollution from light-duty, medium-duty, and heavy-duty vehicles is a significant source of NOx emissions—and therefore ozone formation—in Maryland. These emissions must be reduced to come into attainment with the ozone NAAQS and minimize public health harms. In order to reduce these emissions, Maryland must adopt and enforce California's ACC II, ACT, and HDO Rules.

a. Overview: NOx Emissions from Maryland Vehicles

As of 2022, there were about 52,300 registered electric vehicles in Maryland, making up only about 1% of the total vehicles on Maryland's roads.[40] The total vehicle miles traveled on an annual basis in Maryland was approximately 58 billion miles in 2022, nearly all of which were traveled by vehicles running on petroleum or diesel.[41]

Maryland's statewide NOx emissions emanate from a range of sources, including coal-fired power plant[s] and industrial operations,[42] but nearly half of Maryland's total NOx emissions stem from vehicles' exhaust. Light-duty vehicles contribute an estimated 17.1% of Maryland's total NOx

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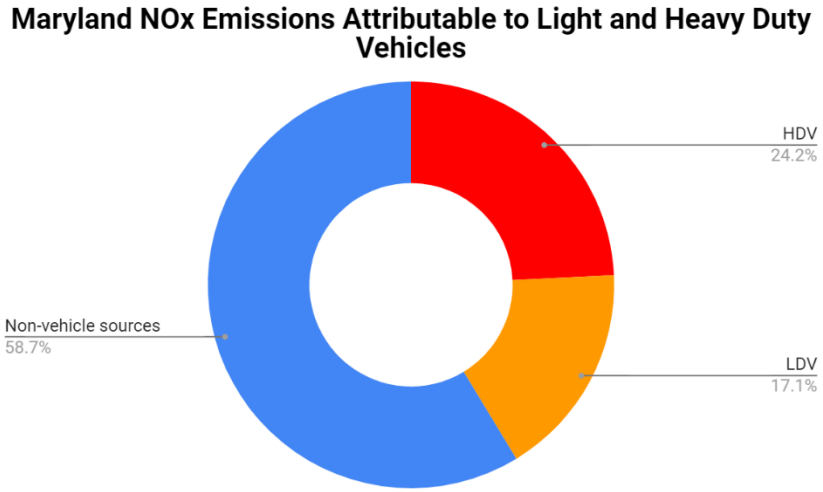
[37] *Id.*
[38] American Lung Association, *2023 State of the Air Report Card: Maryland*, https://www.lung.org/research/sota/city-rankings/states/maryland.
[39] American Lung Association, "Air Quality in Washington-Baltimore-Arlington Metro Area Worst in Four Years for Ozone Smog, Finds 2019 'State of the Air' Report, But Had Best Ever Results for Two Measures of Particle Pollution" (Apr. 24, 2019), https://www.lung.org/media/press-releases/air-quality-in.
[40] Maryland Department of Transportation, *2022 Status Report* at 19, https://www.mdot.maryland.gov/OPCP/MDOT_MCCC_State_Agency_Report_MSAR_14367.pdf.
[41] *Id.* at 8.
[42] *See* MDE, *Clean Air in Maryland* (2020), https://mde.maryland.gov/programs/air/Documents/PDF-Viewer/web/GoodNews2020.pdf.

emissions, while medium- and heavy-duty vehicles contribute approximately 24.2% of those total NOx emissions.[43]



Many of these emissions are in areas where Maryland is already in nonattainment of ozone NAAQS—that is, these areas fail to meet minimum health-based federal air quality standards.

b. CAMx Ozone Source Apportionment Technology Modeling by Sonoma Technology Demonstrates that Vehicles Are Major Drivers of High Ozone Levels In Maryland's Ozone Nonattainment Areas and Environmental Justice Communities

Sierra Club retained Sonoma Technology to model the ozone impacts of light-duty, medium-duty, and heavy-duty vehicles on Maryland's nonattainment areas and environmental justice communities using the Comprehensive Air Quality Model with Extensions ("CAMx") with Ozone Source Apportionment Technology ("OSAT") for the 2016 ozone season (April to October) in Maryland.[44] The source apportionment modeling simulations used EPA's 2016v2 (2016fj_6j) modeling platform, which relies on emissions data from the National Emissions Inventory, as well as EPA's 2023 projections platform.[45]

Sonoma Technology found that emissions from on-road vehicles in Maryland consistently have impacts greater than 1% of the 2015 ozone NAAQS at Air Quality System ("AQS") monitoring locations within ozone nonattainment areas. In fact, the highest modeled ozone impacts from vehicles in the Baltimore nonattainment area in 2016 and 2023 always exceed 0.7 ppb on days when the monitors register exceedances of the ozone standard of 70 ppb.

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[43] EPA, *2020 National Emissions Inventory (NEI) Supporting Data and Summaries* (last accessed April 19, 2023), https://www.epa.gov/air-emissions-inventories/2020-nei-supporting-data-and-summaries. NOx emissions by state and sector were downloaded and compared to determine the relative contribution of NOx emissions from on-road light-duty and heavy-duty vehicles.

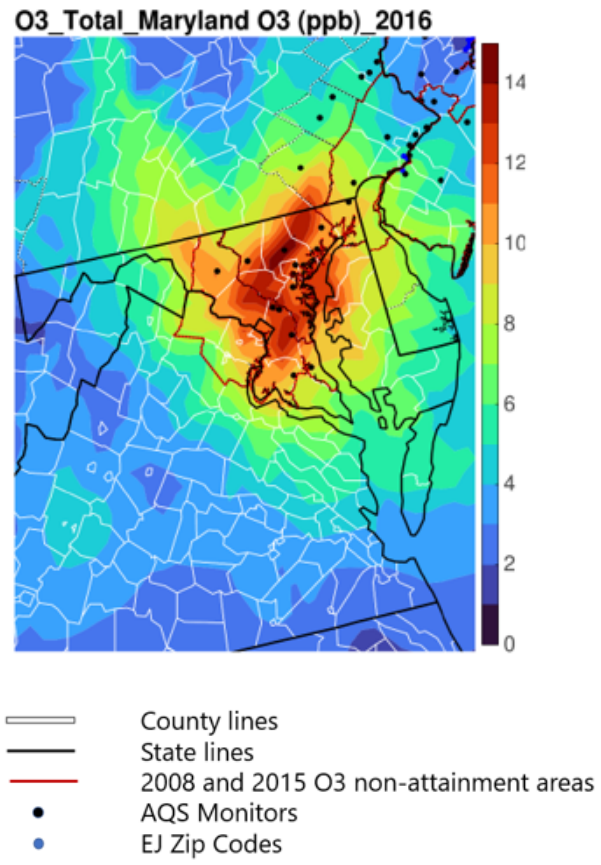
[44] Lynn Alley & Kenneth Craig, Sonoma Technology, *Technical Memorandum Re: Analysis of Air Quality Impacts from Onroad Mobile Sources on Ozone Nonattainment areas in Connecticut, Illinois, Maryland, Michigan, New Jersey, and Pennsylvania* (May 19, 2023).

[45] For an in-depth explanation of the data analysis methods of this report, *see id.* at 1-2, Appendix A.

EPA has considered contributions from *all anthropogenic emissions in an upwind state* to be significant if they exceed 1% of the ozone NAAQS averaged over a subset of high ozone days during an ozone season.[46] Consequently, results showing that *a single* class of vehicles on Maryland's roads *alone* contributes more than 1% of the ozone NAAQS on high ozone days are extremely significant.

1. Vehicles Operated In Maryland Have Significant Ozone Impacts On the Baltimore Nonattainment Area

On days in 2016 that exceeded the 2015 ozone NAAQS of 70 ppb, the ozone impacts from vehicles in Maryland frequently contributed multiple parts per billion of ozone to the atmosphere. On the day in 2016 with the highest combined contribution to ozone from all on-road vehicles in Maryland, 11.15 ppb, or 15.9% of the 70 ppb ozone NAAQS limit, came from vehicles alone. The collective impact of this pollution is reflected in the following map of ozone impacts on Maryland generated by Sonoma Technology:



What is particularly striking is the impact that trucks—medium and heavy-duty vehicles—are having on ozone levels in Baltimore. As of 2018, 74.52% of vehicles registered in Maryland were

[46] *See, e.g.*, EPA, *Revised Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS*, 86 Fed. Reg. 23054, 23057 (Apr. 30, 2021); EPA, *Federal "Good Neighbor Plan" for the 2015 Ozone National Ambient Air Quality Standards*, EPA-HQ-OAR-2021-0668, Mar. 2023).

motorcycles and passenger cars, leaving medium- and heavy-duty vehicles in the minority at 25.45%.[47] Even though medium- and heavy-duty vehicles are only about one-quarter of the vehicles plying Maryland's roads, they are so polluting that they significantly exceed light-duty vehicles' NOx emissions. As a result, on every single day in 2016 when Baltimore's air failed to meet basic minimum air quality standards—21 days in all—the impacts of medium- and heavy-duty vehicles were more significant than the impact of cars on Maryland's ozone levels. In fact, the contribution of medium- and heavy-duty vehicles alone even rose as high as 5.52, 5.86, and 5.96 ppb on some days. When the contributions of these vehicles to ozone in nonattainment areas in 2023 is modeled, the results are very similar, with contributions around 4 and 5 ppb on many days, and a maximum value of 5.97 ppb.

Maryland's embrace of the ACC II clean car standards is an important first step in providing Baltimore's environmental justice communities with the clean air they need and deserve. However, Maryland cannot fulfill its duty to those communities without also addressing the impacts of medium- and heavy-duty vehicles. It is therefore critical that MDE also adopt the ACT and HDO Rules in order to significantly curb NOx emissions from those vehicles.

[47] Maryland Department of Transportation, State Highway Administration, *Percent Of Vehicle Classifications By Functional Class For The Year 2018*, https://www.roads.maryland.gov/oppen/Vehicle_Class.pdf.

Table 9. Maximum **2016** Modeled Impacts from **Maryland** onroad mobile sources on days that exceeded the ozone NAAQS of 70 ppb at any monitor in the nonattainment area during the 2016 ozone season. 8-hr maximum modeled ozone contributions are relative values (ppb) at AQS monitors. Values that equal or exceed 1% of the NAAQS (0.70 ppb) are highlighted in red, while values that equal or exceed 0.5% of the NAAQS (0.35 ppb) are highlighted in yellow. Maximum source contributions are highlighted in **bold**.

Baltimore, MD Nonattainment Area Receptors

Ozone Nonattainment Day	Max Ozone Impact at any AQS Monitor (ppb)		
	LDV	MHDV	Total Vehicle
25-May	2.86	3.08	5.94
26-May	2.39	2.62	5.01
27-May	3.13	3.31	6.44
28-May	4.83	5.52	10.35
1-Jun	3.93	4.82	8.75
20-Jun	4.45	5.26	9.71
6-Jul	3.66	4.86	8.52
16-Jul	3.68	4.58	8.26
19-Jul	3.23	3.90	7.13
21-Jul	4.74	**5.96**	10.70
22-Jul	3.82	4.12	7.94
25-Jul	4.27	5.23	9.50
26-Jul	2.79	3.41	6.20
27-Jul	4.29	3.88	8.17
29-Jul	2.92	3.13	6.05
29-Aug	**5.45**	5.70	**11.15**
31-Aug	5.09	5.86	10.95
7-Sep	1.36	1.44	2.80
14-Sep	3.57	4.30	7.87
22-Sep	1.26	1.42	2.68
23-Sep	4.34	3.93	8.27

Table 10. Maximum **2023** Projected Modeled Impacts from **Maryland** onroad mobile sources on days that exceeded the ozone NAAQS of 70 ppb at any monitor in the nonattainment area during the 2016 ozone season. 8-hr maximum modeled ozone contributions are relative values (ppb) at AQS monitors. Values that equal or exceed 1% of the NAAQS (0.70 ppb) are highlighted in red, while values that equal or exceed 0.5% of the NAAQS (0.35 ppb) are highlighted in yellow. Maximum source contributions are highlighted in **bold**.

Baltimore, MD Nonattainment Area Receptors

Ozone Nonattainment Day	Max Ozone Impact at any AQS Monitor (ppb)		
	LDV	MHDV	Total Vehicle
25-May	1.28	2.73	4.01
26-May	1.31	2.78	4.09
27-May	0.84	3.25	4.09
28-May	2.20	4.85	7.05
1-Jun	1.90	4.35	6.25
20-Jun	1.98	4.58	6.56
6-Jul	1.57	4.18	5.75
16-Jul	1.82	4.66	6.48
19-Jul	1.23	2.82	4.05
21-Jul	2.17	5.16	7.33
22-Jul	1.85	3.97	5.82
25-Jul	2.29	4.96	7.25
26-Jul	1.22	2.98	4.20
27-Jul	2.40	4.68	7.08
29-Jul	1.54	3.22	4.76
29-Aug	**2.86**	**5.97**	**8.83**
31-Aug	2.33	5.20	7.53
7-Sep	0.99	2.27	3.26
14-Sep	1.84	4.29	6.13
22-Sep	0.65	1.46	2.11
23-Sep	2.43	4.61	7.04

Modeling based on AQS monitor data from the Philadelphia nonattainment area, which also encompasses part of Maryland,[48] shows high contributions from medium- and heavy-duty vehicles to total ozone levels. In 2016, the total contribution from Maryland's on-road vehicles reached as high as 9.13 ppb one day (13% of the 70 ppb ozone limit), with medium- and heavy-duty vehicles contributing as much as 5.02 ppb to total ozone pollution. When projected impacts in 2023 were modeled for the Philadelphia nonattainment area, sizable impacts of up to 3.98 ppb from medium- and heavy-duty vehicles are still expected.

[48] *See* EPA, *Intended Area Designations for the 2015 Ozone National Ambient Air Quality Standards Technical Support Document (TSD)*, https://www.epa.gov/sites/default/files/2017-12/documents/nj_120d_tsd_philly_area_final.pdf.

Table 11. Maximum **2016** Modeled Impacts from **Maryland** onroad mobile sources on days that exceeded the ozone NAAQS of 70 ppb at any monitor in the nonattainment area during the 2016 ozone season. 8-hr maximum modeled ozone contributions are relative values (ppb) at AQS monitors. Values that equal or exceed 1% of the NAAQS (0.70 ppb) are highlighted in red, while values that equal or exceed 0.5% of the NAAQS (0.35 ppb) are highlighted in yellow. Maximum source contributions are highlighted in **bold**.

Philadelphia-Wilmington-Atlantic City, MD Nonattainment Area Receptors

Ozone Nonattainment Day	Max Ozone Impact at any AQS Monitor (ppb)		
	LDV	MHDV	Total Vehicle
25-May	1.84	2.24	4.08
11-Jun	1.88	2.16	4.04
20-Jun	**4.11**	**5.02**	**9.13**
25-Jul	3.63	4.96	8.59
27-Aug	0.99	0.93	1.92
14-Sep	0.87	1.25	2.12
22-Sep	0.17	0.19	0.36
23-Sep	3.31	3.48	6.79

Table 12. Maximum **2023** Projected Modeled Impacts from **Maryland** onroad mobile sources on days that exceeded the ozone NAAQS of 70 ppb at any monitor in the nonattainment area during the 2016 ozone season. 8-hr maximum modeled ozone contributions are relative values (ppb) at AQS monitors. Values that equal or exceed 1% of the NAAQS (0.70 ppb) are highlighted in red, while values that equal or exceed 0.5% of the NAAQS (0.35 ppb) are highlighted in yellow. Maximum source contributions are highlighted in **bold**.

Philadelphia-Wilmington-Atlantic City, MD Nonattainment Area Receptors

Ozone Nonattainment Day	Max Ozone Impact at any AQS Monitor (ppb)		
	LDV	MHDV	Total Vehicle
25-May	0.62	1.45	2.07
11-Jun	0.92	2.13	3.05
20-Jun	**1.71**	3.93	**5.64**
25-Jul	1.58	**3.98**	5.56
27-Aug	0.40	0.70	1.10
14-Sep	0.42	1.14	1.56
22-Sep	0.18	0.43	0.61
23-Sep	1.65	3.33	4.98

As these data reflect, on every single ozone nonattainment day, the maximum ozone impact from on-road vehicles in Maryland exceeded 0.5% of the ozone NAAQS, and typically exceeded 1%—which, again, EPA considers a "significant contribution" triggering statewide NOx reductions in other regulatory contexts. Indeed, on-road transportation is the most significant single in-state contributor to ozone levels that we are aware of, reaching 15.9% of the 70 ppb NAAQS standards.

And medium- and heavy-duty vehicles are responsible for over half of these impacts. Therefore, adopting all of California's vehicle rules—not just ACC II, but ACT and HDO as well—would likely be the single strongest measure for reducing ozone pollution across Maryland.

The data also highlight the fact that multiple schools with high populations of low-income and minority students are located in areas with dangerously high levels of ozone pollution. For example, one of the AQS monitors that registered elevated ozone levels was located at Padonia International Elementary School in Cockeysville, Maryland. On each nonattainment day in 2016, the monitor at Padonia showed Maryland's vehicles contributing 2.68-10.95 ppb of ozone, or 4-16% of the NAAQS. EPA's EJScreen tool indicates that Padonia's zip code, 21030, is 63rd percentile in terms of ozone pollution compared to other zip codes in Maryland, and 74th percentile in terms of ozone pollution nationally. Ninety percent of Padonia's students identify as people of color—with 47% identifying as Hispanic/Latino, 22% identifying as Black, and 18% identifying as Asian/Pacific Islander—and 68% of the students enrolled at Padonia are economically disadvantaged.[49]

Another school with an AQS monitor on-site, which is also located within the Baltimore nonattainment area, is Baltimore's Furley Elementary School, which has an enrollment rate of 97% for people of color and an enrollment rate of economically disadvantaged students at 79%.[50] Furley's AQS monitor showed impacts of 4.02-10.10 ppb from on-road vehicles on nonattainment days, representing 6-14% of the ozone NAAQS. EJScreen shows that Furley's zip code, 21206, is 91st percentile in terms of ozone pollution within both the state of Maryland and nationally. It is inequitable for Furley's students to get off to a worse start in life than their white counterparts, and for students who already lack financial resources to face higher health risks than those in more affluent families.

III. Maryland Must Reduce NOx Emissions by Adopting More Stringent Rules That Set Low- and Zero-Emission Requirements for Vehicles

In order to comply with binding Maryland law, protect public health, and reduce climate-changing emissions, Maryland should adopt the ACC II, ACT, and HDO Rules, which reduce pollution from light-duty, medium-duty, and heavy-duty vehicles.

1. Status of Maryland's Adoption of ACC II, ACT, and HDO Rules

Governor Moore has recently taken important initial steps toward reducing air pollution from its roads—primarily committing to adopt the ACC II Rule and signing into law the Clean Trucks Act, which requires MDE to adopt the ACT regulations by December 1, 2023, but provides MDE with discretion to delay implementation of those regulations. Thus, several critical steps remain before Maryland can meaningfully begin to reduce the impact of transportation pollution on ozone levels. MDE must adopt and implement the ACC II Rule, it must exercise its discretion to

[49] U.S. News & World Report, *Padonia International Elementary*, https://www.usnews.com/education/k12/maryland/padonia-international-elementary-220635.
[50] U.S. News & World Report, *Furley Elementary*, https://www.usnews.com/education/k12/maryland/furley-elementary-215090#:~:text=Overview%20of%20Furley%20Elementary&text=The%20school's%20minority%20student%20enrollment,students%20and%2052%25%20male%20students.

timely implement the ACT Rule that it adopts under the Clean Trucks Act, and it must adopt regulations that encapsulate the HDO Rule to lock in critical additional NOx reductions.

a. Light-Duty Vehicles Rule: ACC II

In March, Governor Moore announced that Maryland will adopt the ACC II Rule, which requires manufacturers to sell an increasing percentage of new zero-emission cars and light-duty trucks starting in model year 2027, with 100% of these sales comprising zero-emission vehicles in 2035.[51] This is a strong step toward complying with mandates in the Maryland Clean Cars Act of 2007, which explicitly requires MDE to:

> establish by regulation and maintain a low emissions vehicle program that: (1) Is authorized by § 177 of the federal Clean Air Act; and (2) Is applicable to vehicles of the 2011 model year and each model year thereafter.[52]

In order to fully comply with this statutory provision, MDE must fulfill its commitment to promulgate an ACC II regulation in 2023,[53] and adequately "maintain" and enforce the zero-emission light-duty vehicle sales requirements mandated by the ACC II Rule.

b. Medium- and Heavy-Duty Vehicles Rules: ACT and HDO

The plain text of the Clean Cars Act strongly suggests its application to all types of vehicles, as it requires MDE to adopt California's rules pertaining to "vehicles" in general. Had the General Assembly intended to limit this rule to light-duty vehicles only, it could have provided that limitation in the statute. Both the ACT and HDO Rules are clearly "low emissions" programs pertaining to "vehicles," so MDE was already arguably required to adopt both of them. After all, the ACT Rule requires increasing reductions in greenhouse gas emissions from medium- and heavy-duty vehicles from model year 2024 through model year 2035,[54] and the HDO Rule requires increasing reductions in NOx emissions from medium- and heavy-duty vehicles.[55]

Nevertheless, the General Assembly recently addressed MDE's authority to adopt the ACT rule more directly. On April 21, 2023, Governor Moore signed into law the Clean Trucks Act,[56] recognizing the rule's strong importance for improving public health and reducing greenhouse gas emissions in Maryland. Importantly, the Clean Trucks Act requires MDE to adopt California's ACT regulations "establishing requirements for the sale of new zero–emission medium– and heavy–duty

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[51] California Air Resources Board, *Proposed Advanced Clean Cars II (ACC II) Regulations*, https://ww2.arb.ca.gov/rulemaking/2022/advanced-clean-cars-ii.
[52] Md. Envir. Code § 2-1102(a).
[53] *Id.*
[54] ACT Rule § 1963.1(b). The ACT rule's requirements vary for different weight classes of vehicles; several classes of trucks must attain 75% zero-emission sales by model year 2035, while others, like tractors, are required to reach 40% zero-emission sales by model year 2035. *Id.*
[55] California Air Resources Board, *Heavy-Duty Omnibus Regulation*, https://ww2.arb.ca.gov/rulemaking/2020/hdomnibuslownox; California Air Resources Board, *Heavy-Duty Low NOx*, https://ww2.arb.ca.gov/our-work/programs/heavy-duty-low-nox.
[56] The Office of Governor Wes Moore, "Governor Moore Continues 'More Opportunity Tour,' Highlights Progress at Tradepoint Atlantic Facility with Ørsted and Signs Bills Solidifying Maryland's Clean Energy Future" (Apr. 21, 2023), https://governor.maryland.gov/press/pages/Governor-Moore-Continues-More-Opportunity-Tour-Highlights-Progress-at-Tradepoint-Atlantic-Facility-with-%C3%98rsted.aspx.

vehicles in the state" by December 1, 2023.[57] The Clean Trucks Act also requires MDE to conduct a needs assessment and deployment plan to assess infrastructure and incentives available for electric vehicles in the state, and provides MDE with discretion to delay the implementation of the ACT rule if MDE concludes that such implementation "is not yet feasible."[58]

We urge MDE, in exercising the discretion accorded by the Clean Trucks Act, to determine that no delay in ACT implementation is warranted. This determination would be supported by numerous factors. First, the ACT Rule, as promulgated by the California Air Resources Board, has a two-year lead time that is carefully calibrated to the rapidly progressing technology of medium- and heavy-duty electric vehicles. Second, MDE will be in the company of numerous sister states that either already have adopted, or are in the process of adopting, the ACT Rule, reflecting their collective judgment that there is no need to delay adoption of the ACT Rule. Third, Maryland can take advantage of the many available federal funds that can accelerate the state's adoption of charging infrastructure, in a way that supports the goals of the ACT Rule and other key transportation electrification policies, and accelerate the acquisition of electric vehicles themselves. These federal funding sources include billions of dollars in grants for electric vehicle purchases under the Infrastructure Investment & Jobs Act's Low-No NOx, Competitive Bus & Bus Facilities, and Congestion Mitigation and Air Quality grant programs, as well as grants for charging infrastructure under the National Electric Vehicle Infrastructure and Charging & Fueling Infrastructure grant programs.[59] Fourth, there is nothing unique about Maryland that would suggest that Maryland, unlike all of the states that have already adopted the ACT Rule—California, Colorado, New York, New Jersey, Washington, Oregon, Massachusetts and Vermont—cannot adopt the ACT Rule.

Meanwhile, the HDO Rule is an important complementary measure to adopt in tandem with regulations implementing the ACT Rule. While the ACT Rule does not require sales of 100% zero-emission trucks right away, the HDO Rule would ensure that the diesel trucks that are still sold and purchased in the coming years are cleaner and safer for public health, and that the cost of these trucks reflects the actual societal cost of the dangerous air pollutants they emit. More specifically, the HDO Rule sets standards for the acceptable levels of certain harmful air pollutants—including NOx, non-methane hydrocarbons, carbon dioxide, and particulate matter—emitted by heavy-duty trucks.[60] These standards grow stricter over time, requiring trucks' NOx emissions to decrease by 75% in 2024 and by 90% beginning in 2027.[61]

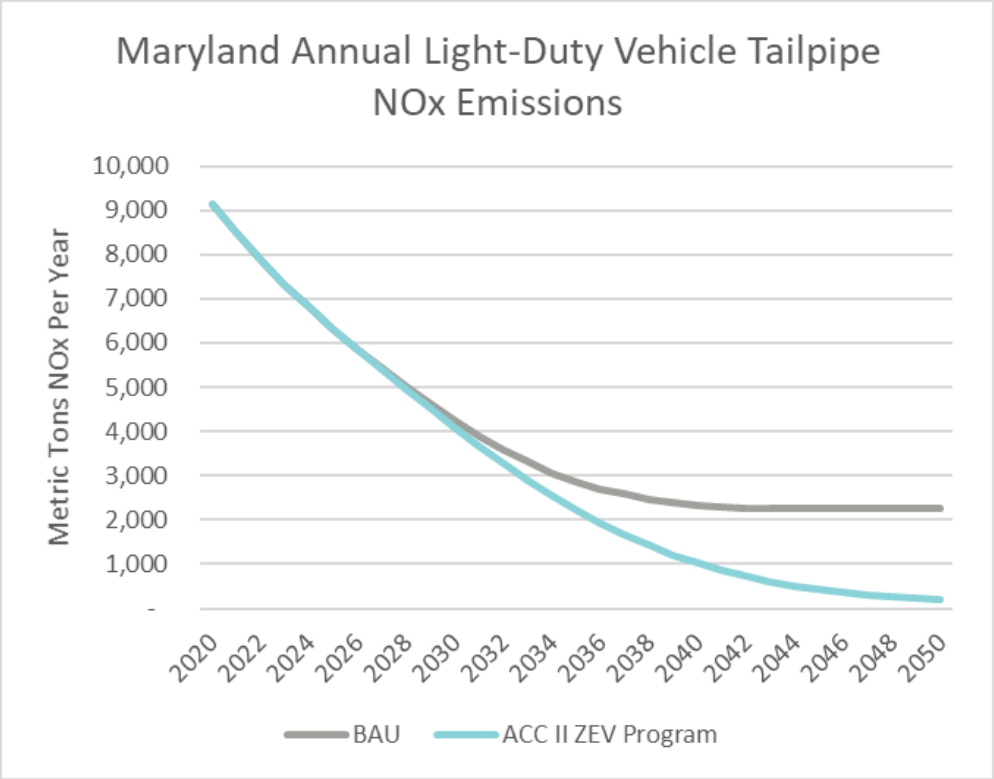
2. Adopting the ACC II, ACT, and HDO Rules Would Significantly Reduce Maryland's NOx Emissions and Ozone Levels

[57] Md. S.B. 224.
[58] *Id.*
[59] *See* Federal Transit Administration, "FTA Program Fact Sheets under the Bipartisan Infrastructure Law," https://www.transit.dot.gov/funding/grants/fta-program-fact-sheets-under-bipartisan-infrastructure-law.
[60] HDO § 1956.8(A)(2)(D).
[61] California Air Resources Board, *Heavy-Duty Omnibus Regulation*, https://ww2.arb.ca.gov/rulemaking/2020/hdomnibuslownox; California Air Resources Board, *Heavy-Duty Low NOx*, https://ww2.arb.ca.gov/our-work/programs/heavy-duty-low-nox.

Maryland can dramatically reduce NOx emissions—and ozone pollution that forms from the interaction of NOx emissions with other pollutants in the atmosphere—by adopting the ACC II, ACT, and HDO Rules.

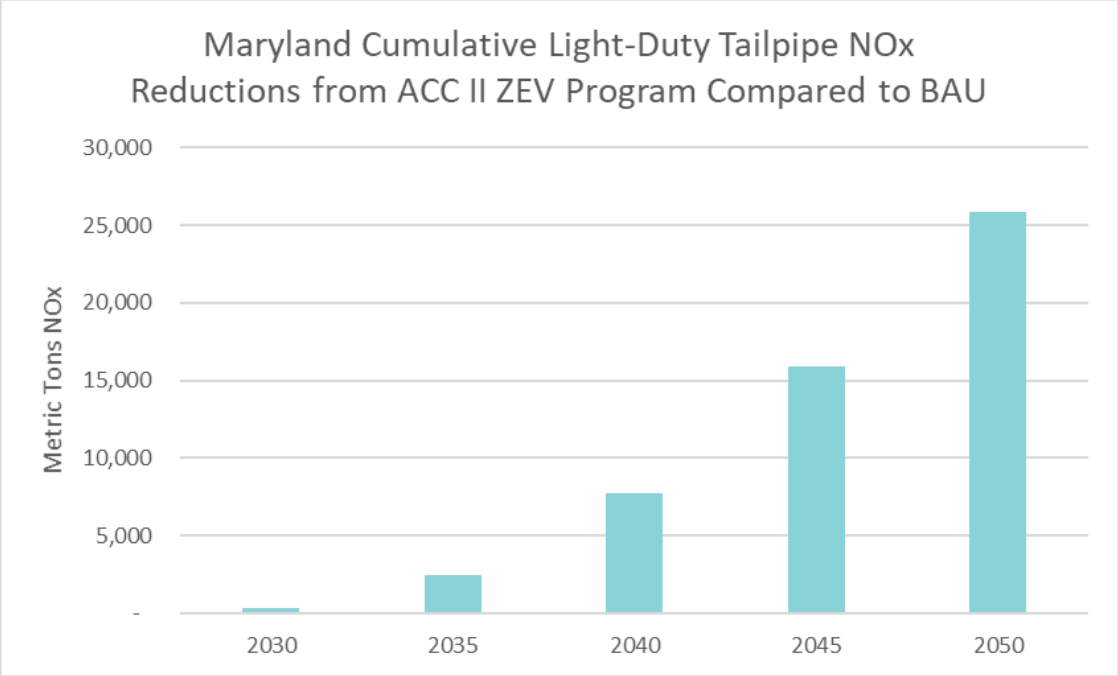
Sierra Club used EV-REDI, a transportation analysis tool developed by Synapse Energy Economics, to model the impacts of Maryland adopting the ZEV program of the ACC II Rule, as compared to a business-as-usual scenario where ZEV sales shares meet state-specific projections by Rhodium in the central scenario of its 2022 Taking Stock and IRA baseline.[62]

As illustrated in the graph below, Maryland's adoption of ACC II is expected to result in a 97% reduction in the state's light-duty vehicle tailpipe NOx emissions by 2050, relative to 2022 levels. This is higher than the expected 84% reduction in NOx emissions under the business-as-usual scenario. Under business as usual, a transition toward zero-emission vehicles is still predicted, but it would take place at a slower pace.



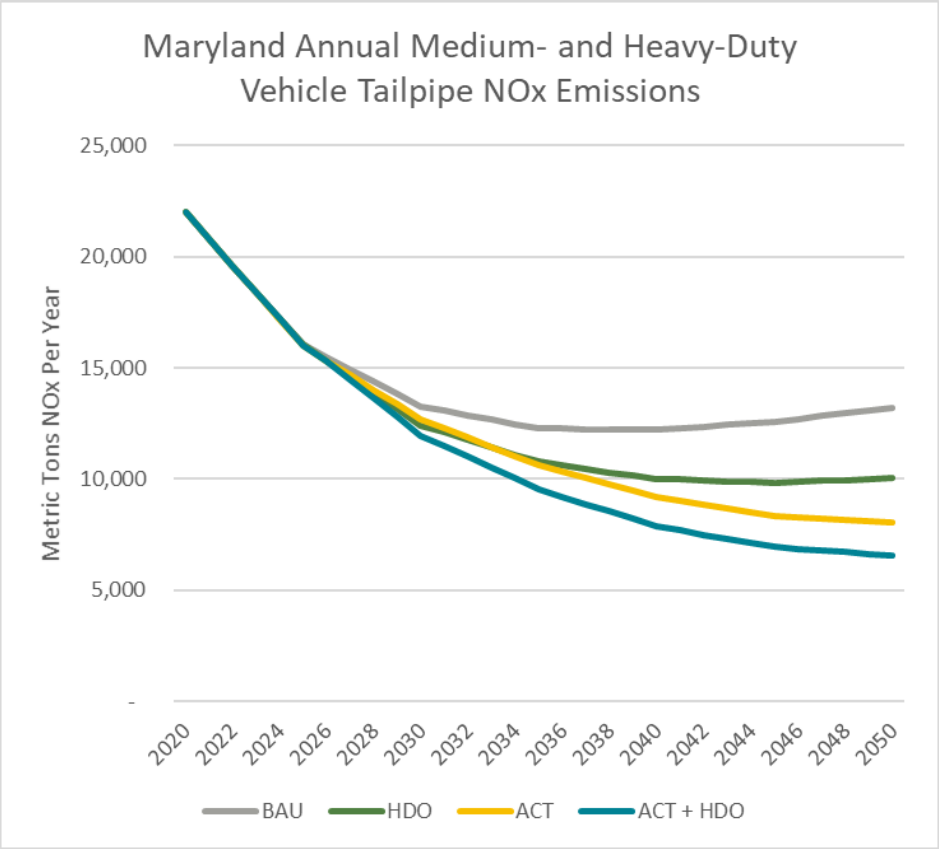
[62] This reflects an analysis of the ZEV component of the ACC II Rule by Sierra Club using EV-REDI, a transportation analysis tool developed by Synapse Energy Economics. In this case, EV-REDI takes inputs of annual EV sales percentage of new light-duty vehicles, and the allowed split between BEVs and PHEVs, and uses state-specific vehicle turnover and VMT data to quantify the impacts on emissions and other metrics. This analysis assumes that in the ACC II scenario, the state's EV sales share matches that of the business-as-usual scenario between historical data from 2022 and the rule's onset in model year 2027; that manufacturers use no compliance flexibilities; and that Class 2b trucks are credited under the ACT regulation rather than ACC II. The BAU scenario models the state reaching the state-specific EV sales shares projected by Rhodium Group in the central scenario of its 2022 Taking Stock + IRA baseline in 2025, 2030, and 2035, with interpolation in between, and with EV sales share held constant at 2035 levels through 2050.

With these annual savings, Maryland could cumulatively avoid emissions of nearly 2,500 metric tons of NOx by the ACC II program's end in 2035. By 2050, this quantity of avoided emissions is projected to increase tenfold, with cumulative NOx reductions at about 25,000 metric tons.

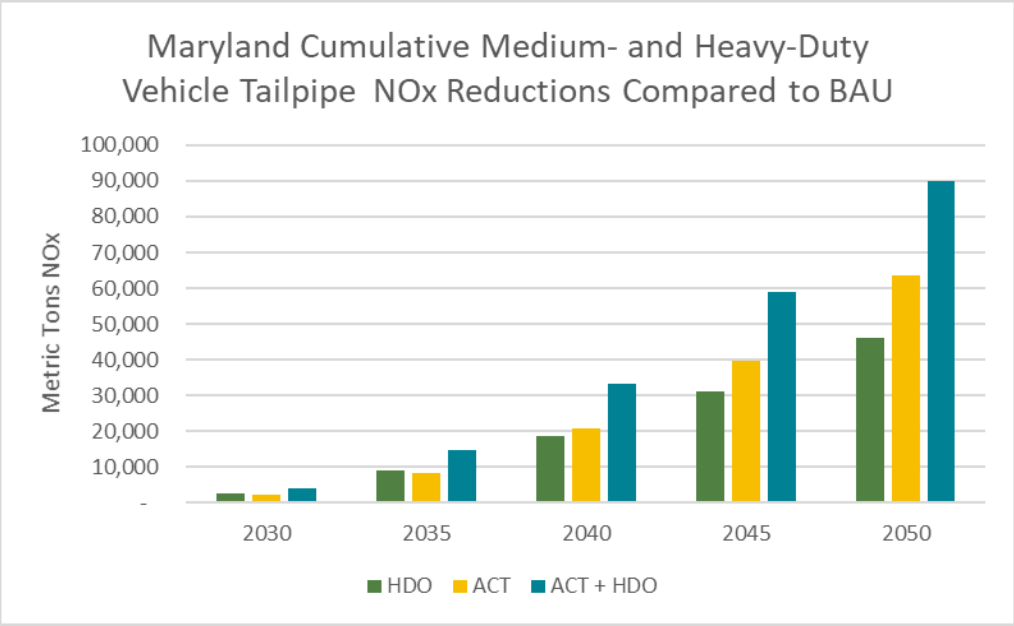


Further modeling of the anticipated impacts of adopting the ACT and HDO Rules shows that these rules are calculated to markedly decrease NOx emissions statewide through 2050. The International Council on Clean Transportation commissioned Sonoma Technology to model the impacts of Maryland adopting the ACT and HDO Rules, as compared to a business-as-usual scenario reflecting federal programs that were in place as of year-end 2021.[63] The graph below shows that adopting the ACT Rule could reduce the tailpipe NOx emissions from Maryland's medium- and heavy-duty fleets by 59% below 2022 levels by 2050, compared to only 33% in the business-as-usual scenario. Adding in the HDO Rule would bring emissions down by 67% below 2022 levels by 2050.

[63] This data is from the International Council on Clean Transportation and Sonoma Technology, Inc., converted to metric tons. *See* ICTT, *Benefits of Adopting California Medium- and Heavy-Duty Vehicle Regulations* (data updated August 30, 2022). As noted by the study's authors, these figures include tank-to-wheel NOx emissions from all medium- and heavy-duty vehicles "following California's approach to estimating in-use fleet penetration under the ACT program without adjustments to account for vehicles purchased out-of-state, ZEVs that may migrate out-of-state over time, or ZEVs that would have been produced to meet other requirements like the federal GHG Phase II standards." The data model Maryland's adoption of the ACT Rule beginning in model year 2026, but in reality Maryland adopted the ACT Rule in time for it to take effect in model year 2027, so the results may be slight overestimations. These policy scenarios are compared to a business-as-usual scenario reflecting federal programs available as of the end of 2021, and non-implementation of the GHG Phase 2 trailer requirements, which were under litigation.



By adopting the ACT Rule, Maryland could see cumulative NOx emissions reductions from its medium- and heavy-duty fleets reach over 8,000 metric tons by the program's end in 2035. By 2050, those benefits would increase eightfold, with cumulative NOx reductions reaching over 63,000 metric tons. If Maryland also adopts the HDO Rule, it could see NOx emissions reductions of nearly *90,000 metric tons* by 2050.



These graphs illustrate the importance of reducing NOx emissions from medium- and heavy-duty vehicles using both the ACT and HDO Rules, rather than only the ACT Rule alone. Given that the HDO Rule is directly targeted at reducing NOx emissions, this is an especially powerful tool to add to Maryland's arsenal of clean transportation policies.

3. Maryland Should Codify Its Adoption of the ACC II, ACT, and HDO Rules In Its Ozone Nonattainment State Implementation Plans

Because adopting California's vehicle rules would reduce NOx emissions and ozone levels in Maryland, this policy should be designated as a control measure to ensure reasonable further progress ("RFP") to compliance with ozone standards, and potentially a reasonably available control measure ("RACM"), in a future Maryland SIP. This is consistent with MDE's past practice.

In areas that are designated as moderate nonattainment under the Clean Air Act, states are required to provide for "reasonable further progress," which means measures that would reduce states' emissions of volatile organic compounds—another ozone precursor—by at least 15%.[64] EPA has clarified that measures to reduce NOx emissions can also count toward this 15% requirement.[65] In its 2023 SIP, Maryland already made the decision to classify California's vehicle rules as control measures for meeting the RFP requirement,[66] which sets a strong precedent for doing so in future SIPs. Similarly, California has also listed its vehicle rules as proposed measures for reducing NOx emissions in its 2022 ozone nonattainment SIP.[67]

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[64] 42 U.S.C. § 7511a(b)(1)(A).
[65] EPA, Guidance on Issues Related to 15 Percent Rate-of-Progress Plans (Aug. 23, 1993), https://www3.epa.gov/ttn/naaqs/aqmguide/collection/cp2/19930823_shapiro_15pct_rop_guidance.pdf.
[66] MDE, "Baltimore Moderate Nonattainment Area 0.070 ppm 8-Hour Ozone State Implementation Plan Attainment Demonstration" (Jan. 1, 2023), https://mde.maryland.gov/programs/air/AirQualityPlanning/Documents/DRAFT%20SIP%2070%20ppb%20BNAA%2012-27-2022%20-%20FINAL.pdf.
[67] *See* California Air Resources Board, *2022 State Strategy for the State Implementation Plan* (Sept. 22, 2022), https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf.

Maryland may also conclude that adopting the ACC II, ACT, and HDO Rules meets the definition of RACM for the purpose of future SIPs. The Clean Air Act requires nonattainment SIPs to "provide for the implementation of all reasonably available control measures [RACM] as expeditiously as practicable."[68] There are various criteria for categorizing a measure as a RACM:

> "RACM is defined by the EPA as any potential control measure for application to point, area, on-road and non-road emission source categories that meets the following criteria:
>
> • The control measure is technologically feasible
> • The control measure is economically feasible
> • The control measure does not cause "substantial widespread and long-term adverse impacts"
> • The control measure is not "absurd, unenforceable, or impracticable"
> • The control measure can advance the attainment date by at least one year."[69]

In its 2023 SIP, Maryland concluded that no control measures could qualify as RACMs, because they could not advance the 2023 attainment date of the ozone NAAQS up to 2022.[70] While California's vehicle rules could not have feasibly been adopted and implemented by 2022, if Maryland adopts those rules promptly, they could result in advancements of attainment dates relevant to future SIPs, and therefore qualify as RACMs in future nonattainment SIPs.

Maryland's air quality has recently been improving, likely due in part to reductions in vehicle use during the pandemic, but in order to pave a pathway toward redesignation to attainment for the ozone NAAQS, Maryland should adopt the ACC II, ACT, and HDO Rules. Maryland cannot be redesignated to attainment unless it can demonstrate that its "improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the applicable implementation plan and applicable Federal air pollutant control regulations and other permanent and enforceable reductions."[71] Adopting and implementing these vehicle rules would lead to significant, sustained reductions in NOx emissions that would support future efforts to redesignate the Baltimore area to attainment.

4. Adopting the ACC II, ACT, and HDO Rules Would Substantially Improve Public Health Outcomes Across the State

Timely adoption of the ACC II, ACT, and HDO Rules will have long-lasting positive impacts on Marylanders' health. An April 2023 report from Energy Innovation Policy & Technology calculates that, from adopting the *ACC II rule alone*, Maryland will experience the following tangible public health benefits by 2050:

- 3,150 Avoided Asthma Attacks
- 15,600 Avoided Lost Workdays
- 195 Avoided Premature deaths

[68] 42 U.S.C. § 7502(c)(1).
[69] *See, e.g.*, Approval and Promulgation of Implementation Plans; New York Reasonably Available Control Technology and Reasonably Available Control Measures, 74 Fed. Reg. 42,813, 42,817-42,818, https://www.govinfo.gov/content/pkg/FR-2009-08-25/pdf/E9-20394.pdf.
[70] MDE "Ozone State Implementation Plan," *supra* note 66.
[71] 42 U.S.C. § 7407(d)(3)(E)(iii).

- 5,380 Avoided Respiratory Symptoms and Bronchitis
- 60 Avoided Nonfatal Heart Attacks
- 48 Avoided Hospital Admissions
- 26 Avoided Respiratory ER Visits
- 91,800 Avoided Minor Restricted Activity Days[72]

Adopting the ACT and HDO medium- and heavy-duty vehicle rules would further reduce air pollution that is harmful to public health. Decreasing emissions of NOx and particulate matter from medium- and heavy-duty vehicles' diesel exhaust is expected to reduce the prevalence of asthma, lung disease, and cancer.[73] This public health improvement would be especially pronounced in communities of color and low-income communities, which tend to be disproportionately impacted by many forms of environmental pollution, as illustrated by the much higher rates of asthma experienced in communities of color in Maryland.[74]

5. Adopting the ACC II, ACT, and HDO Rules Is Critical for Complying with Maryland Climate Law

Requiring sales of cleaner light-duty, medium-duty, and heavy-duty vehicles is a key strategy for complying with not only the federal Clean Air Act's ozone NAAQS, but also Maryland's CSNA. The CSNA sets forth an ambitious requirement of reducing statewide greenhouse gas emissions 60% below 2006 levels by 2031.[75] In MDE's own words, this 60% reduction by 2031 is "the most ambitious near-term goal in the U.S." for greenhouse gas emission reductions.[76] This legally binding target is going to be a very challenging goal to meet, and the Moore Administration should use every measure in its toolkit to meet it. According to MDE's own modeling, even if the entire set of potential policy measures that MDE deemed most "optimistic" in 2022 were adopted, Maryland would still "need to reduce GHG emissions by an additional 13.3 MMT CO2e by 2031 (11% additional reduction)" in order to comply with the CSNA's target.[77]

Reducing greenhouse gas emissions from on-road vehicles is going to be a critical component of meeting the CSNA's very ambitious requirements. In Maryland, the transportation sector is the single largest source of the state's greenhouse gas emissions, adding over one-third of

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[72] Energy Innovation Policy & Technology LLC, "Nationwide Impacts Of California's Advanced Clean Cars II Rule" (April 9, 2023), https://energyinnovation.org/publication/nationwide-impacts-of-californias-advanced-clean-cars-ii-rule/.

[73] *See* Ghassan B Hamra, et al., "Lung Cancer and Exposure to Nitrogen Dioxide and Traffic: A Systematic Review and Meta-Analysis," Environmental Health Perspectives (Apr. 14, 2015), https://pubmed.ncbi.nlm.nih.gov/25870974/; Malgorzata Kowalska, et al., "Effect of NOx and NO2 Concentration Increase in Ambient Air to Daily Bronchitis and Asthma Exacerbation, Silesian Voivodeship in Poland," International Journal of Environmental Research and Public Health (Jan. 24, 2020), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7037218/; *see also* California Air Resources Board, *Overview: Diesel Exhaust & Health*, https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health.

[74] *See* Section I.b.

[75] Md. S.B. 65.

[76] Mark Stewart, "Closing the Emissions Gap between the GGRA Plan and 60x31 & the MWG's 2022 Work Plan: Presentation to the Mitigation Working Group" (May 18, 2022), https://mde.maryland.gov/programs/Air/ClimateChange/MCCC/MWG/Closing%20the%20Emissions%20Gap%20between%20the%20GGRA%20Plan%20and%2060x31_MDE%20presentation.pdf.

[77] *Id.*

these emissions to the atmosphere.[78] Of the 35% of Maryland's emissions emanating from the transportation sector, 82% of this sector's emissions stem from "on-road gasoline and diesel vehicles"[79]—or in other words, the light-duty, medium-duty, and heavy-duty vehicles that the ACC II, ACT, and HDO Rules are designed to regulate. MDE summed up the importance of regulating vehicles' emissions in its 2020 "Clean Air in Maryland Report," explaining, "With the growth in the number of vehicles on the road and reductions from power plant emissions, pollution from mobile sources *are now the largest contributing source category to Maryland's ozone and climate change problems*."[80]

This is surely the reason why MDE considered its most "optimistic" set of potential policies to include 100% sales of light-duty zero-emission vehicles by 2035 and 100% sales of medium-duty and heavy-duty zero-emission vehicles by 2045.[81] It comes as no surprise that the Maryland Commission on Climate Change's 2022 Annual Report explicitly called for adopting the ACC II and ACT Rules in its recommendations for reaching the CSNA's goal of a 60% emission reduction by 2031.[82] Now that more states are adopting the HDO Rule, MDE should make the HDO Rule part of the CSNA implementation plan that is due in December 2023.

Adopting the ACT and HDO Rules would also be consistent with a multi-state Memorandum of Understanding on Multi-State Zero Emission Medium- and Heavy-Duty Vehicles ("MOU") that Maryland joined on July 13, 2020.[83] Through this MOU, Maryland "agree[d] to strive to make sales of all new medium- and heavy-duty vehicles in our jurisdictions zero emission vehicles by no later than 2050," and agreed that, "[i]n order to ensure adequate progress toward the 2050 goal, the Signatory States will strive to make at least 30 percent of all new medium- and heavy-duty vehicle sales in our jurisdictions zero emission vehicles by no later than 2030."[84]

More broadly, by adopting these rules, Maryland will contribute to country-wide reductions in greenhouse gas emissions by assisting in precipitating a national shift toward electric trucks. A number of states have already adopted some combination of the ACC II, ACT, and HDO Rules, including Connecticut, Maine, Massachusetts, New Jersey, New York, Oregon, Washington, and Vermont.[85] If Maryland adopts these rules, manufacturers will receive a stronger message that

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[78] Maryland Department of Transportation, *2022 Status Report* at 8, https://www.mdot.maryland.gov/OPCP/MDOT_MCCC_State_Agency_Report_MSAR_14367.pdf.
[79] *Id.*
[80] MDE, *Clean Air in Maryland* (2020), https://mde.maryland.gov/programs/air/Documents/PDF-Viewer/web/GoodNews2020.pdf (emphasis added).
[81] Stewart, "Closing the Emissions Gap," *supra* note 76.
[82] Maryland Commission on Climate Change, *2022 Annual Report*, https://mde.maryland.gov/programs/air/ClimateChange/MCCC/Documents/MCCC%20Annual%20Report%202022/2022%20Annual%20Report%20-%20Final.pdf.
[83] *Multi-State Medium- and Heavy-Duty Zero Emission Vehicle Memorandum of Understanding ["MOU"]*, https://www.nescaum.org/documents/mhdv-zev-mou-20220329.pdf.
[84] *Id.*
[85] *See* National Caucus of Environmental Legislators, "What California's New Advanced Clean Car Rule Means for Other States" (Jan. 10, 2023), https://www.ncelenviro.org/articles/what-californias-new-advanced-clean-car-rule-means-for-other-states/#:~:text=Six%20states%20(Massachusetts%2C%20New%20Jersey,in%20adopting%20the%20ACT%20rule; Sierra Club New Jersey Chapter, "Advocates Urge New Jersey to Catch up to Ten Other States & Adopt the Advanced Clean Cars II Standards This Year" (Mar. 13, 2023), https://www.sierraclub.org/new-jersey/blog/2023/03/advocates-urge-new-jersey-catch-ten-other-states-adopt-advanced-clean-cars.

demand for electric cars and trucks is rising. As more and more states adopt these vehicle rules, manufacturers will receive a stronger incentive to shift toward producing only electric trucks.

IV. Conclusion: Maryland Should Adopt The ACC II, ACT, and HDO Rules Without Delay In 2023

The undersigned urge MDE to adopt the ACC II, ACT, and HDO Rules in 2023 and swiftly implement them in MY 2027. Doing so constitutes a critical step in fulfilling Governor Moore's commitment to environmental justice communities and addressing the existential threat of climate change. As discussed at length above, together these rules will deliver enormous public health benefits and lasting reductions in greenhouse gas emissions.

Supporting Organizations:

ArchPlan Inc.

Beaverdam Creek Watershed Watch Group

CALSTART

Central Maryland Transportation Alliance

Ceres

Chesapeake Bay Foundation

Chesapeake Climate Action Network

Climate Communications Coalition

Climate Partners

Climate Reality Greater Maryland

Coalition for Smarter Growth

Coalition for Transit Alternatives to Midcounty Highway Extended/M83

Earthjustice

Elders Climate Action Maryland

Environmental Justice Ministry Cedar Lane Unitarian Universalist Church

Fix Maryland Rail

Greenbelt Climate Action Network (GCAN)

Indivisible Howard County

Job Opportunities Task Force

Locust Point Community Garden

Maryland Chapter Elders Climate Action

Maryland LCV

Maryland Legislative Coalition

Maryland Legislative Coalition Climate Justice Wing

Maryland Sierra Club
Mobilize Frederick
NAACP Maryland State Conference
NRDC (Natural Resources Defense Council)
Policy Foundation of Maryland
Pro-Choice Maryland
Progressive Maryland
Recycle My Battery
St. Vincent's Green Team
The Nature Conservancy Maryland/DC Chapter
Transit Choices