Maryland
Department of
the Environment

Facts About …

Adoption of COMAR 26.11.43

Advanced Clean Trucks Program

6/12/23

Adoption of California's Advanced Clean Trucks Rule.

Purpose

The purpose of this proposed action is to adopt Regulation .01 — .05 under new Chapter COMAR 26.11.43 Advanced Clean Truck Program.

The purpose of this proposed action is to adopt implementing regulations for California's Advanced Clean Trucks (ACT) Program under COMAR 26.11.43

Submission to EPA as Revision to Maryland's State Implementation Plan (SIP)

The Advanced Clean Trucks Program will be submitted to the U.S. Environmental Protection Agency (EPA) for approval as part of Maryland's State Implementation Plan (SIP).

Background

The Clean Air Act established the framework for controlling harmful emissions from mobile sources. At the time, California had already established its own emission standards for mobile sources, and so was granted the sole authority to continue adopting vehicle emission standards, so long as they were at least as protective as the standards set by EPA.

The harmful emissions from Medium- and Heavy-Duty Trucks (MHD) pose a serious threat to both public health and climate change. Recognizing this, California has adopted the Advanced Clean Trucks regulation that aims to reduce on-road emissions from the MHD Truck sector to a greater extent than the current EPA standards.

Section 177 of the Clean Air Act allows other states to adopt the California standards if they are identical. The Clean Trucks Act of 2023 requires the Maryland Department of the Environment (MDE) to exercise this authority and adopt regulations implementing the California Advanced Clean Truck Program in Maryland. MDE will adopt implementing regulations through incorporation by reference of the applicable California regulations.

The Clean Trucks Act of 2023 reinforces the state's ongoing commitment to reducing climate pollutants in order to reach the nation-leading goal of achieving a 60% reduction in greenhouse gas emissions by 2031. Transportation accounts for over 40% of the GHG emissions in Maryland and MHD trucks account for about a third of those emissions. The emissions from MHD trucks continue to increase even as other sectors decrease. On-road diesel trucks are the largest contributor to NOx emissions in Maryland.

Maryland has been a California Clean Car state since 2011. Under the Clean Cars Program, Maryland has required light-duty manufacturers to deliver more zero emission

Facts About …

Adoption of COMAR 26.11.43

Advanced Clean Trucks Program

vehicles (ZEVs) as a growing percentage of their overall fleet. This rule proposes to adopt California's ZEV emission standards that apply to vehicles greater than 8,500 pounds gross vehicle weight rating.

This rulemaking will reduce the emissions of CO2 and other climate pollutants from the transportation sector by incorporating by reference California's ACT. As required by the Clean Trucks Act of 2023, the Department is proposing to incorporate by reference the portions of the ACT regulation pertaining to the requirements that manufacturers increase their sales of zero-emission MHD vehicles. The Department will establish a regulatory program with an identical purpose to California's ACT regulation.

Sources Affected and Location

This regulatory program will apply to manufacturers that sell vehicles in Maryland that have a gross vehicle weight rating over 8,500 pounds.

Requirements

Manufacturers of vehicles in weight Class 2b-8 must meet a sales requirement beginning with the 2027 model year. The sales requirement means that a certain percentage of vehicles in class 2b-8 must be zero emission. The sales percentage requirement gradually increases through the 2035 model year and varies by vehicle class.

Beginning with the 2027 model year, manufacturers subject to this rule would incur deficits for each vehicle sold. These deficits must be met with credits generated from selling MHD ZEV or near zero emission vehicles (NZEVs).

Medium- and heavy-duty ZEV and NZEV credits may be generated, banked, and traded in Maryland by manufacturers. Excess credits generated would have a limited lifetime to ensure MHD ZEVs are sold in Maryland. Manufacturers subject to this rule must report sales information and credit trade information annually to the Department to demonstrate compliance.

Table 1 shows the ZEV Sales Percentage requirements:

Table 1: ZEV Sales Percentage by Truck Class

MY	Class 2b-3	Class 4-8	Class 4-8 Tractors
2027	15%	20%	15%
2028	20%	30%	20%
2029	25%	40%	25%
2030	30%	50%	30%
2031	35%	55%	35%
2032	40%	60%	40%
2033	45%	65%	40%

2034	50%	70%	40%
2035+	55%	75%	40%

Projected Emission Reductions

Adopting ACT in Maryland will result in a significant reduction of harmful emissions associated with MHD trucks and help Maryland attain its air quality goals. The ACT program will reduce NOx, PM2.5, and GHG emissions from the mobile source sector as cleaner, zero-emission trucks replace older internal combustion powered vehicles.

In support of Maryland adopting ACT, the International Council on Clean Transportation (ICCT) developed estimates of emissions benefits of Maryland adopting ACT[1].

Table 2: Projected Tank-to-Wheel CO2e Emission Benefits:

Year	CO2e Reductions (million metric tonnes/year)	Percentage Reduction from Baseline per year
2027	.02	.2%
2030	.07	.7%
2035	.4	4.2%
2040	.8	8.0%
2045	1.18	11.3%
2050	1.49	13.6%

Table 3: Projected Tank-to-Wheel NOx Emission Benefits:

Year	NOx Reductions (short tons/year)	Percentage Reduction from Baseline per year
2027	30	.2%
2030	120	.8%
2035	550	4.1%
2040	1,010	7.5%
2045	1,440	10.4%
2050	1,810	12.4%

[1] https://theicct.org/benefits-ca-multi-state-reg-data/

Table 4: Projected Tank-to-Wheel PM2.5 Emission Benefits:

Year	PM2/5 Reductions (short tons/year)	Percentage Reduction from Baseline per year
2027	1	.2%
2030	2	.7%
2035	7	3.0%
2040	11	5.0%
2045	16	7.1%
2050	20	8.6%

Economic Impact on Affected Sources, the Department, other State Agencies, Local Government, other Industries or Trade Groups, the Public

MDE anticipates the proposed rulemaking will have a fiscal impact. Entities directly affected by the rule, such as MHD manufacturers, fleet owners and operators, and government agencies among others, will experience increased costs related to the purchase of MHD vehicles. However, the proposed rule will result in more MHD ZEVs in use in Maryland. More ZEVs on the road will help Maryland address its climate emission goals as well as reduce criteria pollutants which have harmful health impacts on the citizens of Maryland.

There are no direct costs anticipated for the public. However, as the rule only applies to truck manufacturers, there may be indirect costs passed on to those who purchase MHD trucks, truck dealers, and the public. The upfront cost of ZEVs is higher than those of conventional vehicles due to higher battery costs and charging infrastructure. Maryland anticipates the initial purchase price of MHD ZEVs will decrease over time as technology advances, battery costs decline, and economy of scale improve.

The California Air Resources Board (CARB) estimates ten large truck manufacturers will sell vehicles affected by the rules. Utilities will also be affected by the rule due to an increased demand for electricity for ZEV trucks and may also require utilities to upgrade their electrical distribution network.

When taking into account reduced fuel and maintenance costs, MHD ZEVs are expected to have a total cost of ownership less than that of conventionally fueled trucks.

The proposed rulemaking will result in increased compliance costs, however, incentives on both the state and federal level can help reduce this cost by lowering the purchase

price, thereby reducing the incremental cost, as well as reducing the cost of charging equipment.

The costs and benefits associated with Maryland's adoption of ACT were estimated by applying a scaling factor to California's estimates[2]. The Department compared annual vehicle miles traveled of MHD trucks in Maryland to California and calculated a scaling factor of 0.22. Using this scaling factor, the Department was able to estimate the economic impact of this program. The scaling factor was applied to incremental ZEV costs, Phase 2 GHG compliance savings, vehicle maintenance costs, maintenance bay upgrade costs, midlife service costs, electric vehicle supply equipment infrastructure and maintenance costs, and transition and workforce development costs.

The incremental cost of requiring MHD ZEV sales in Maryland is estimated at $1.9 billion from 2027-2040. State and federal incentives can help reduce this compliance cost. Phase 2 GHG compliance savings are estimated to be $125 million in Maryland from 2027-2040.

Fuel cost savings are expected due to the replacement of diesel and gasoline with electricity and hydrogen fuel. Fuel cost savings are estimated to be $2.75 billion in Maryland from 2027-2040. The maintenance cost of battery electric vehicles is expected to be lower compared to diesel and gasoline fueled vehicles due to fewer moving parts and reduced routine maintenance such as oil changes. Reduced vehicle maintenance costs are estimated to result in additional savings of $825 million from 2027-2040.

In order to accommodate new vehicle technologies, maintenance facilities will require upgrades to safety equipment, diagnostic tools, and other electric vehicle servicing equipment. The cost to upgrade maintenance facilities is estimated to be $122 million from 2027-2040.

Medium- and heavy-duty vehicles often have their main propulsion components rebuilt or replaced about halfway through their lifecycle. This midlife cost includes engine rebuild for diesel vehicles, battery pack replacement for battery electric vehicles, and fuel cell stack refurbishment for hydrogen fuel-cell vehicles. The estimated midlife costs for MHD ZEV vehicles are expected to total $199 million from 2027-2040.

ZEV vehicles require specialty fueling infrastructure. Battery electrics require electric supply equipment, including upgrades to service panels and utility connections. Hydrogen fuel cells require high pressure hydrogen fueling stations to refill hydrogen storage tanks. The estimated refueling infrastructure installation and maintenance costs are expected to be $2.1 billion from 2027-2040.

There are costs associated with transitioning to a new technology. Transitional and workforce development costs are estimated to be $7 million from 2027-2040.

The Advanced Clean Trucks regulation does not require fleet owners to purchase ZEV trucks. However, those that do chose to purchase ZEV trucks will incur higher upfront costs as well as costs related to refueling infrastructure. These costs are expected to be mostly offset by reduced operating costs thanks to cheaper fuel and reduced

[2] https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2019/act2019/30dayattc.pdf

maintenance. State and federal incentives have the potential to further reduce the increased upfront costs, however, the Department is not making any assumptions with regard to incentives since the funding availability of incentives per year and by truck class is ever-changing. As required by The Clean Trucks Act of 2023, the Department will complete a needs assessment to assess the electrical capacity needed to meet the demands of the regulation as well as the purchase incentives necessary to successfully implement the regulation.

It is estimated that battery-electric technologies will reach total cost of ownership parity with diesel-powered vehicles by the 2024 MY for some applications.

MDE will require additional resources to administer the Advanced Clean Trucks Program. The Department will need staff to oversee the development and implementation of the program. Beginning with the 2027 model year, MHD truck manufacturers are required to submit compliance reports to the Department detailing the credit deficits they've incurred as well as the credits generated by selling ZEV trucks or purchasing ZEV credits from other manufacturers to offset their deficits. Staff are needed to verify compliance reports and oversee the credit, banking, and trading program available for manufacturers to meet compliance.

Economic Impact on Small Businesses

Small businesses that choose to purchase ZEV trucks will face the same impacts as other ZEV truck consumers. ZEV Trucks have higher initial costs compared to diesel trucks, but reduced fuel and maintenance costs, along with other benefits and incentives, will reduce this initial burden. The ACT regulation does not mandate ZEV purchases, therefore, small businesses will be able to decide for themselves if purchasing a ZEV truck makes financial sense based on their own business model.

Is there an Equivalent Federal Standard to this Proposed Regulatory Action?

No.

Documents to be Incorporated by Reference

A new chapter of COMAR (26.11.43) is being proposed with four sections. Six new Incorporated by Reference documents will be added to COMAR 26.11.43.02

The six new incorporated documents are:

Title 13, California Code of Regulations (CCR), Division 3, Chapter 1, Article 2, §1963 Advanced Clean Trucks Purpose, Applicability, Definitions, and General Requirements, as effective March 15, 2021.

Title 13, California Code of Regulations (CCR), Division 3, Chapter 1, Article 2, §1963.1 Advanced Clean Trucks Deficits, as effective March 15, 2021.

Maryland
Department of
the Environment

Facts About …

Adoption of COMAR 26.11.43

Advanced Clean Trucks Program

Title 13, California Code of Regulations (CCR), Division 3, Chapter 1, Article 2, §1963.2 Advanced Clean Trucks Credit Generation, Banking, and Trading, as effective March 15, 2021.

Title 13, California Code of Regulations (CCR), Division 3, Chapter 1, Article 2, §1963.3 Advanced Clean Trucks Compliance Determination, as effective March 15, 2021.

Title 13, California Code of Regulations (CCR), Division 3, Chapter 1, Article 2, §1963.4 Advanced Clean Trucks Reporting and Recordkeeping, as effective March 15, 2021.

Title 13, California Code of Regulations (CCR), Division 3, Chapter 1, Article 2, §1963.5 Advanced Clean Trucks Enforcement, as effective March 15, 2021.