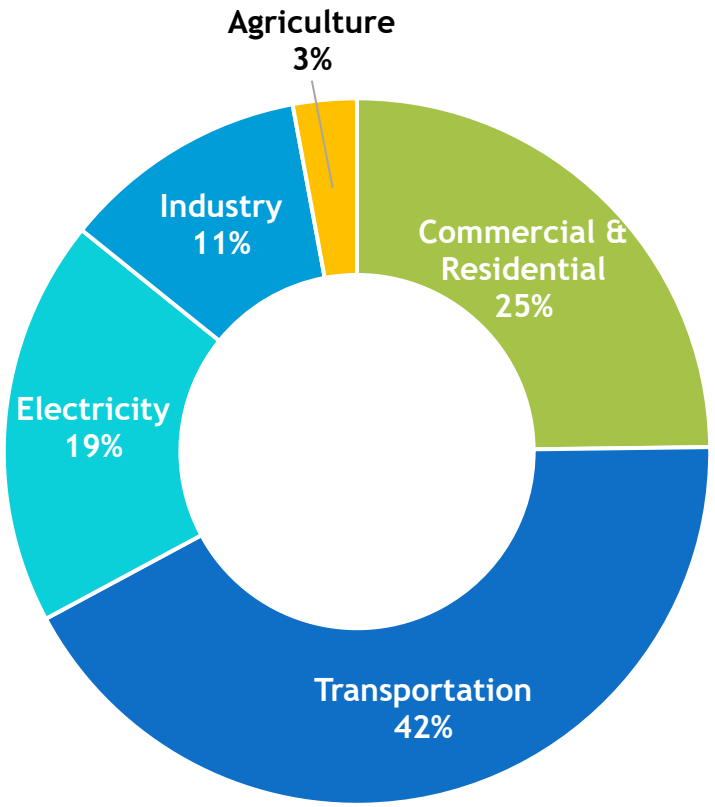
Public Stakeholders Meeting on Medium- and Heavy-Duty (MHD) On-Road Vehicle Actions

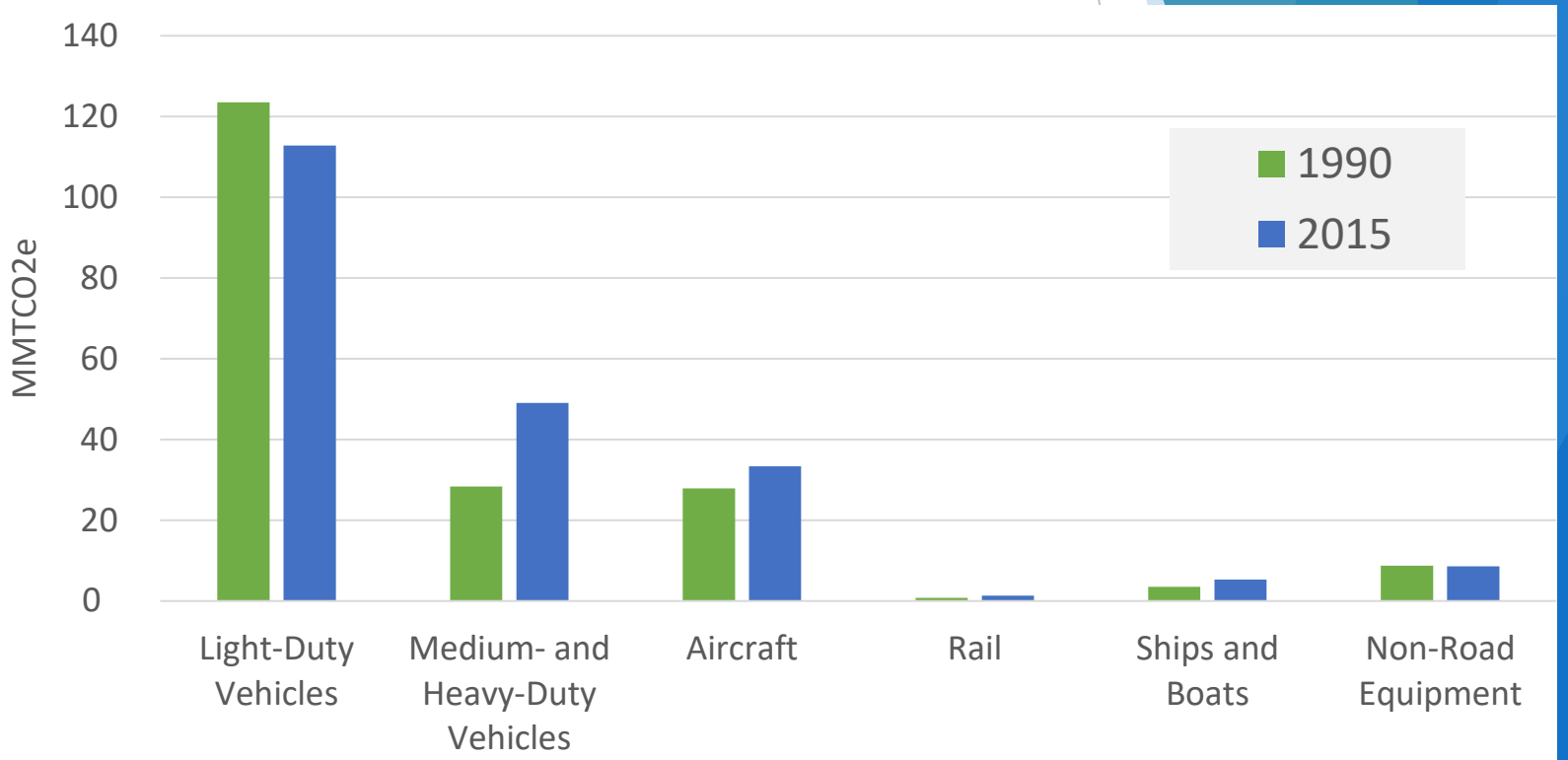
Massachusetts Department of Environmental Protection
April 28 & 29, 2021

Agenda

- Background / Statutory Authority
- Multi-State MHD Zero Emission Vehicle (ZEV) Memorandum of Understanding (MOU)
- California MHD Regulations including:
  - Advanced Clean Trucks (ACT)
  - One-Time Large Entity Fleets Reporting
  - Heavy-Duty Greenhouse Gas (GHG) Phases 1 & 2
  - Low Nitrogen Oxides (NOx) Heavy-Duty Omnibus
- MassDEP Rulemaking Timeline
- Questions

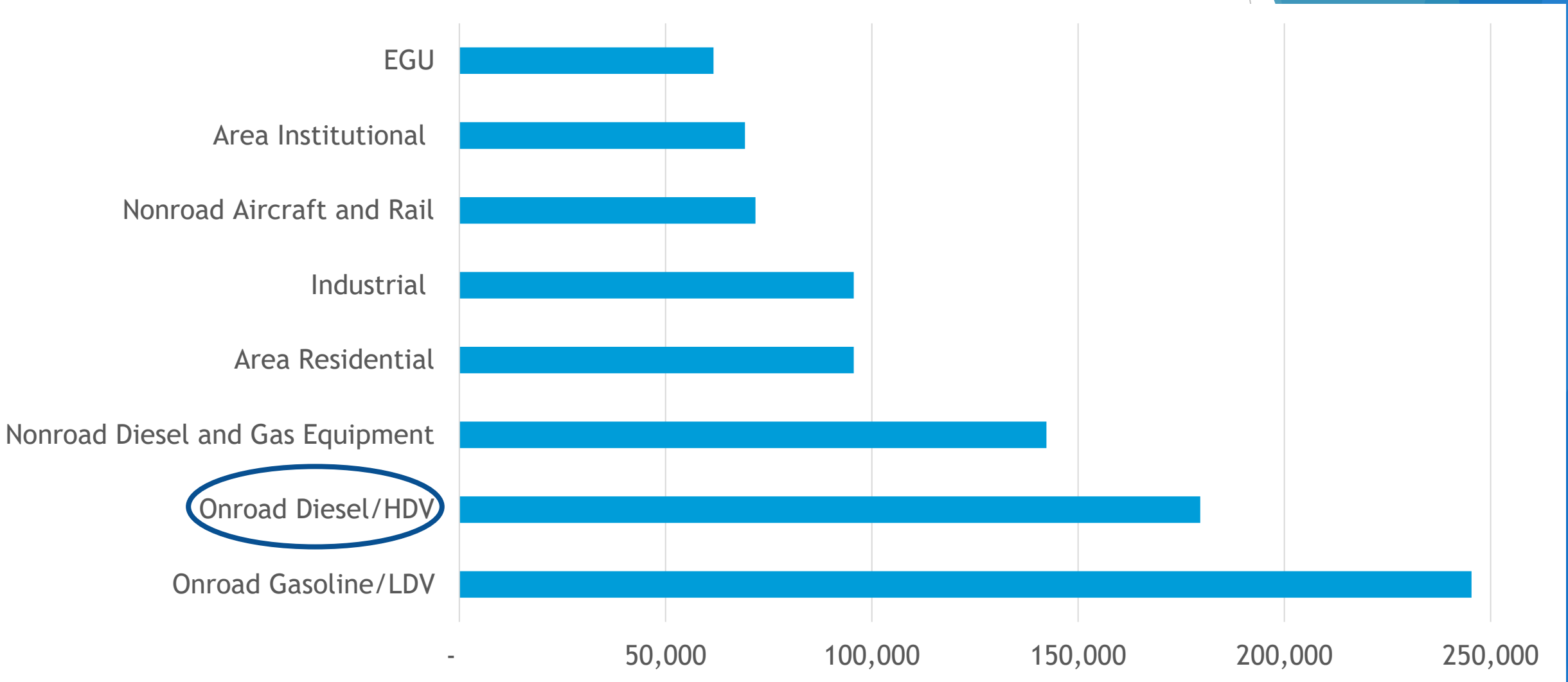
Greenhouse Gas Emissions in the Northeast





Source: State Inventory Tool (2015 emissions)

2017 NOx Emissions (Tons) in Mid-Atlantic/Northeast



Source: EPA 2017 National Emissions Inventory

NESCAUM

Diesel Exhaust Health Impacts

- Diesel trucks are significant source of particulate matter emissions, which can lead to adverse health effects
- Diesel exhaust can result in highly-localized air pollution that disproportionately affects Environmental Justice (EJ) neighborhoods
- Reducing diesel emissions through electrification can lead to better health outcomes in EJ neighborhoods

Massachusetts Laws and Plans

- MA General Law c.111 § 142K **requires** MA to adopt CA emissions standards as long as those standards achieve greater motor vehicle emissions reductions than the federal standards
  - 310 CMR 7.40 *Low Emission Vehicles* incorporates CA standards
- MA Climate Plans and Laws
  - *Interim Clean Energy and Climate Plan for 2030*
  - *2050 Decarbonization Roadmap*
  - 2021 *Next-Generation Roadmap for MA Climate Policy*

Federal Clean Air Act Provisions

- § 202(a): Requires United States Environmental Protection Agency (EPA) to establish motor vehicle emissions standards
- § 209(b): Provides California with ability to set stricter motor vehicle emission standards than EPA; authorizes California to apply for a “waiver of preemption” from EPA
- § 177: Authorizes states to adopt California’s motor vehicle emission standards in lieu of defaulting to EPA’s standards: no state shall adopt a different set of standards, which would create a so-called "third vehicle"

Multi-State MHD ZEV MOU

- Builds off success of 2013 Governors' light-duty MOU and subsequent Action Plans
- Commits signatories* to work together to foster a self-sustaining market for zero emission MHD vehicles
- Calls for 30% of new truck and bus sales to be zero-emission by 2030 and 100% by 2050
- Emphasizes need to accelerate deployment of zero-emission trucks and buses in disadvantaged communities
- Directs development and implementation of an Action Plan

*CA, CO, CT, DC, HI, ME, MD, MA, NJ, NY, NC, OR, PA, RI, VT, and WA

1. CA Advanced Clean Trucks

- Effective March 15, 2021
- ZEVs must be a minimum percentage of annual sales
- Starts model year (MY) 2025, can earn credits earlier
- Applies to vehicles greater than 8,500 lbs. gross vehicle weight rating (classes 2b-8)
- Manufacturers with less than 500 annual sales are exempt, but may opt-in to earn credits for selling ZEVs
- Report annually to demonstrate compliance

Vehicle Groupings Used in ACT

Class 2b-3

Class 4-8

Class 7-8 Tractors

ACT Deficit Generation

- Deficit generation will begin in 2025 MY in MA (to provide required two 2 MY lead time)
- More deficits generated over time due to increasing percentage requirements

Model Year (MY)	Class 2b-3	Class 4-8	Class 7-8 Tractors
2024	5%	9%	5%
2025	7%	11%	7%
2026	10%	13%	10%
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%

ACT Deficit Generation

- Deficits = Number of CA sales x % Requirement x WCM*
- Deficits calculated on a per vehicle basis, grouped into two categories – “tractor” deficits and “other truck” deficits
- Tractor deficits treated differently, must be met with tractor credits

* WCM: Weight Class Modifier; “Other truck” means Class 2b-3 and Class 4-8
Heavier vehicles generate more emissions (more deficits and credits generated)

	Class 2b-3	Class 4-5	Class 6-7	Class 8	Class 7-8 Tractors
Modifiers	0.8x	1x	1.5x	2x	2.5x

ACT ZEV Credit Generation

- Zero-emission means a vehicle which produces zero criteria or GHG emissions under any mode of operation

  ZEV Credits = Number of ZEV sales x WCM

- Credits calculated on a per vehicle basis, grouped into two categories – “tractor” credits and “other truck” credits
- Zero-Emission Powertrain (ZEP) Certification required starting in 2025 MY for Class 4-8 ZEVs

ACT NZEV Credit Generation

- Near-zero-emission means a hybrid electric vehicle that can achieve a minimum all-electric range (AER)
  - NZEV Credits = Number of NZEV sales x NZEV Factor x WCM
    - NZEV Factor = 0.01 x all-electric range, cannot exceed 0.75
- NZEV can generate at most 75% of the credit as a ZEV
- Minimum AER increases over time:

Model Year	2021-2023	2024-2026	2027-2029	2030-2035
Minimum AER	10 mi.	20 mi.	35 mi.	75 mi.

ACT Deficit Generation Example

- A manufacturer sells 100 Class 4 trucks, 100 Class 8 trucks, and 100 Class 7-8 tractors in 2024 MY

	Class 4	Class 8	Class 7-8 Tractors
Sales	100	100	100
Deficit Calculation	100 x 9% x 1.0	100 x 9% x 2.0	100 x 5% x 2.5
Total Deficits	9	18	12.5

- The manufacturer generates 12.5 tractor deficits and 27 other truck deficits

ACT Credit Generation Example

Manufacturers can achieve compliance in numerous ways

1) Manufacturer meets percentage requirement in all categories

	Class 4	Class 8	Class 7-8 Tractors
ZEV Sales	9	9	5
Credit Calculation	9 x 1.0	9 x 2.0	5 x 2.5
Total Credits	9	18	12.5

ACT Credit Example (Cont.)

2) Manufacturer focuses on Class 8 straight trucks and tractors

	Class 4	Class 8	Class 7-8 Tractors
ZEV Sales	0	14	5
Credit Calculation	0 x 1.0	9 x 2.0	5 x 2.5
Total Credits	0	28	12.5

3) Manufacturer focuses on Class 7-8 tractors

	Class 4	Class 8	Class 7-8 Tractors
ZEV Sales	0	0	16
Credit Calculation	0 x 1.0	9 x 2.0	5 x 2.5
Total Credits	0	0	40

ACT Other Credit / Deficit Provisions

- Vehicles must be produced and delivered to the ultimate purchaser to generate credits/deficits
- Credits/deficits are rounded to nearest tenth
- Early action – credits can be generated (starting with 2021 MY in CA)
- Five-year credit lifetime
  - Early action credits last until 2030 MY
- Credits may be banked and traded/sold between manufacturers

ACT Compliance

- Manufacturers achieve compliance when total credits retired equals total deficits
  - If a manufacturer does not have sufficient credits, they have one year to make up the deficit
- NZEV credits may fulfill up to 50% of deficits
- Class 7-8 Tractor deficits generally met with Class 7-8 tractor credits
  - For manufacturers who have a small number of tractor deficits (<25), they can use 25 other truck credits for their tractor deficits

ACT Credit Retirement Order

Regulation specifies credit retirement order

- Credits that expire first used first
- NZEV credits used before ZEV credits up to 50% limit
- Tractor credits to meet tractor deficits
- Other truck credits to meet other truck deficits
- Tractor credits to meet other truck deficits

ACT Reporting

90 days after the end of the model year, manufacturers report vehicles produced and delivered for sale in California:

- Weight Class
- Fuel and drivetrain type
- Whether it is a tractor or yard tractor
- All-electric range of NZEV, if applicable
- Volume sold in California for vehicle type

ACT Reporting (Cont.)

- Manufacturers must either submit all VINs or make available on request
- Credit transfers must be reported within 90 days of the end of the model year
  - Must include names of companies, number of ZEV/NZEV credits transferred, and if the credits are tractor credits
- Manufacturers selling Class 2b-3 ZEVs must state whether credits will be used for ACT or the light duty ZEV program, not both

ACT Recordkeeping

Records must be kept for 8 years from end of model year, including:

- Information submitted to the state
- Documentation showing delivery to ultimate purchaser in California
- Records for grouped information submitted must also retain individual VINs

2. Large Entity Reporting (LER)

- One-time reporting for large public and private entities that operate a facility in state
- Collect vehicles' usage and location data
- Collect vehicle usage information to:
  - Understand types of fleet vehicles and how they are used
  - Support future ZEV purchases and Fleet rules
  - Provide information needed to address issues around siting and rate design for EV charging infrastructure
  - Help accelerate the State's transition to ZEVs

LER Reporting to CA

- Fleets with 50+ trucks with a facility in CA
- Brokers direct 50+ trucks with a facility in CA
- State, local, and government agencies who own 1+ truck
- Any business with >$50 million annual revenue who owns 1+ truck with a facility in CA
- Exemptions include school districts, transit agencies, emergency vehicles, vehicles awaiting sale, military tactical vehicles

LER Reporting Information

- Company information – name, contact person, identification and permit numbers
- Contracted trucks – how many subhaulers and trucks under contract, how many companies contracted
- Facility information – address of each location with trucks, what fueling infrastructure is present

LER Vehicle Information

- Number of vehicles
  - Grouped by fuel type, body type, weight class
- Information to determine suitability for electrification
  - Typical daily miles, returns to base, predictable usage pattern, remains near base, remains parked for 8+ hours, whether it is used to support emergencies, annual mileage, typical replacement cycle

3. CA MHD Phase 1 & 2 GHG Standards

- Most recent amendments: April 1, 2019
- GHG emission standards for MHD with GVWR over 8,500 lbs.
- Amended the existing CA Tractor-Trailer GHG Regulation to provide trailer fleet owners options to comply with the regulation
- Amended the Heavy-Duty Hybrid-Electric Vehicles Certification Procedures

4. Draft CA Low NOx MHD Omnibus

- Lowers NOx Exhaust Emission standards: 75% in MY 2024, 90% in MY 2027 from current standard of 0.2 g/bhp-hr (grams per brake horsepower-hour) in place since 2007
- Includes optional standards to incentivize manufacturers to develop and certify engines that are even cleaner

NOx g/bhp-hr	Mandatory	Optional
MY2024-2026	0.05	0.02 (60% lower)
MY 2027 and beyond	0.02	0.01 (50% lower)

- Particulate Matter (PM) anti-backsliding: 0.005 g/bhphr starting in MY2024, to ensure PM does not increase as NOx decreases

Draft CA Low NOx MHD Omnibus

- Heavy-Duty In-Use Testing Program
- Moving Average Window (MAW) test procedures
- New low-load cycle testing for diesel engines
- Lengthened useful life and warranty
- Durability Demonstration Program
- Emissions Averaging, Banking, and Trading Program
- Powertrain Certification Test Procedures
- Optional 50-State-Directed Engine Standards for MYs 2024 to 2026

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MassDEP Rulemaking Timeline

- File proposed regulations with Secretary of State: July 2021
- Public Hearings and comment: September 2021
- File final regulations: December 2021

Additional Resources and Information

- **MassDEP Regulations & Policies Webpage**
  - www.mass.gov/service-details/massdep-public-hearings-comment-opportunities
- **CA Air Resources Board Regulations Webpage**
  - ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks
  - ww2.arb.ca.gov/our-work/programs/ghg-std-md-hd-eng-veh
  - https://ww2.arb.ca.gov/rulemaking/2020/hdomnibuslownox
- **NESCAUM MHD ZEV Action Plan development**
  - https://www.nescaum.org/documents/medium-and-heavy-duty-zero-emission-vehicles-action-plan-development-process/
- **Contact information**
  - Ngoc Hoang, ngoc.hoang@mass.gov

Questions?

Please type your name in the “chat box” and send to Jenny Outman if you want to be called on to ask a question or make a comment. We will also ask if anyone calling in would like to speak.