



CALIFORNIA
AIR RESOURCES BOARD

Public Workshop
Heavy-Duty Engine and Vehicle Omnibus
Regulation Amendments

March 20, 2024

Zoom Webinar Details

- Telephone Call-in: (216) 706 - 7005
- Access Code: 400363
- How to Ask Questions:
 - In Zoom:
 - Use the "Raise Hand" feature, or type in "Q&A" box
 - On phone:
 - #2 to "Raise Hand"
 - *6 to Unmute/Mute
 - Please state your name and affiliation before asking a question or making a comment

Agenda

Topic	Presenter
Opening Remarks	Kim Heroy-Rogalski and Paul Adnani
Heavy-Duty Engine and Vehicle Omnibus (Omnibus) Regulation Amendments and Alignment	Daniel Hawelti
In-Use Corrective Action Requirements Update	Adil Mahmood
On-Board Diagnostics (OBD) Amendments	
- Real Emissions Assessment Logging (REAL)	Paul Henderick
- OBD Aging	Yong Yu
In-Use Testing Amendments	Thomas Montes
Closing Remarks	Paul Adnani

Outline

- Background
- Staff Proposals:
 - Emissions Standards and Test Procedures
 - In-Use Corrective Action Requirements
 - OBD-related Amendments
 - Heavy-Duty (HD) In-Use Compliance Program
- Next Steps
- Contact Details

Reducing HD Truck NOx Emissions is Critical for State Implementation Plan (SIP) Attainment

- HD trucks remain the largest source of NOx emissions under CARB authority
- Further NOx reductions are needed from HD trucks to attain air quality goals
- Reductions are needed to achieve our SIP commitments



Comparison of Omnibus & U.S. EPA-NOx Rule*

CARB Omnibus Regulation	U.S. EPA-NOx Rule
Adopted on	
9/21/2021	1/24/2023
Applicability	
2024 and later MY	2027 and later MY
Spark-Ignition (SI) and Compression-Ignition (CI) > 10,000 pounds Heavy-Duty Engines (HDE)	SI and CI > 8,500 pounds HDEs
Elements included	
Certification Standards and Test Procedures	Certification Standards and Test Procedures
Averaging, Banking, and Trading (ABT)	ABT
In-Use Testing - 3-Bin Moving Average Window (MAW) Methodology	In-Use Testing - 2-Bin MAW
Emissions Warranty and Useful Life Periods	Emissions Warranty and Useful Life Periods

*U.S. EPA-NOx Rule:



United States Environmental Protection Agency (U.S. EPA) Clean Trucks Plan NOx Rule⁶

Clean Truck Partnership

- Agreement between CARB, Truck and Engine Manufacturers Association and its HD on-highway members and Ford Motor Company
- Signed July 5, 2023
- Commitments from CARB include proposing:
 - 2024-2026 MY amendments to the Omnibus legacy provisions
 - 2027 and later MY amendments to largely align Omnibus with the U.S. EPA-NOx Rule
- Clarifications on areas where CARB will maintain distinct requirements



Omnibus / U.S. EPA-NOx Rule Harmonization

- Staff proposes to largely align with the U.S. EPA-NOx Rule with some modifications
- CARB is not committing to issue “deemed to comply certifications” based on U.S. EPA certifications
- Areas where CARB will maintain separate programs:
 - Certification program
 - OBD Program
 - Emissions Warranty Information Reporting Program
 - HD in-use compliance program (with adopting 2-Bin MAW methodology)
 - Clean Idle Label requirement - (mandatory program - not voluntary as required by U.S. EPA)

Certification Emission Standards for 2027 and Subsequent MY Engines

- Staff proposes to align with the certification emission standards for criteria pollutants in the U.S. EPA-NOx Rule for CI and SI Engines

Engine Type	Duty Cycle ¹	NOx mg/hp-hr ²	HC ³ mg/hp-hr	PM ³ mg/hp-hr	CO ³ g/hp-hr
CI	SET, FTP	35	60	5	6.0
CI	LLC	50	140	5	6.0
SI	SET	35	60	5	14.4
SI	FTP	35	60	5	6.0

¹Duty Cycles: Supplemental Emissions Test (SET), Federal Test Procedure (FTP), Low Load Cycle (LLC)

²mg/hp-hr: milligrams per horsepower-hour

³HC: hydrocarbons; PM: particulate matter; CO: carbon monoxide

- Staff seeks feedback from stakeholders re: this proposal

Durability Demonstration Program

- Manufacturers must demonstrate durability and emissions compliance for the engine and aftertreatment system for the full useful life period
- Staff proposes to align with durability demonstration provisions in the U.S. EPA-NOx rule for HD engines
 - New method for deterioration factor determination (40 CFR §1036.245)
 - Dynamometer aging of engine and aftertreatment to a fraction of useful life, then bench accelerated aging of aftertreatment
 - Options for verifying deterioration factors (40 CFR §1036.246)
 - Engine dyno testing & portable emissions measurement systems testing
- For 2027 and subsequent MYs, staff proposes that engine manufacturers will no longer be required to submit in-use emissions reports
- Staff seeks feedback from stakeholders re: this proposal

ABT Program

- Starting with the 2027 MY, staff proposes to
 - Merge the California-ABT program with the federal-ABT program
 - Allow the use of credits accrued under the federal-ABT program to certify 50-state engine families in California
 - NOx Family Emission Limit (FEL) caps

Engine MY	NOx FEL Cap mg/hp-hr
2027-2030	65
2031+	50

- No credits from zero emission powertrains are permitted for 2027+ MY engines
 - No ABT program for HC, CO, or PM for 2027+ MY engines
- Staff seeks feedback from stakeholders re: this proposal

Useful Life

- Useful life period: the period for which the engine must remain emissions compliant
- Staff proposes to align with the useful life values for mileage, years, and hours in the U.S. EPA-NOx Rule for 2027 and later MYs

Primary Intended Service Class	Mileage	Years	Hours
SI HDE	200,000	15	10,000
LHDE ¹	270,000	15	13,000
MHDE ¹	350,000	12	17,000
HHDE ^{1,2}	650,000 ²	11	32,000

¹ LHDE: Light Heavy-Duty Engine, MHDE: Medium Heavy-Duty Engine, HHDE: Heavy Heavy-Duty Engine

² For HHDEs, manufacturers are required to demonstrate durability at the time of certification by aging the emissions controls system in a controlled laboratory through the equivalent useful life of 750,000 miles.

- Staff seeks feedback from stakeholders re: this proposal

Emissions Warranty Period

- Staff proposes to align with the warranty periods for mileage, years, and hours in the U.S. EPA-NOx Rule for 2027 and later MYs

Primary Intended Service Class	Mileage	Years	Hours
SI HDE	160,000	10	8,000
LHDE	210,000	10	10,000
MHDE	280,000	10	14,000
HHDE	450,000	10	22,000

- Staff seeks feedback from stakeholders re: this proposal

Off-Cycle Standards

- Staff proposes to align with U.S. EPA's 2-Bin MAW methodology and the off-cycle standards for 2027 and later MYs
 - **2-Bin MAW** methodology
 - Emissions measurements binned based on the type of operation the engine is performing during emissions data collection
 - **Bin 1 (Idle Bin):** extended idle and other very low-load operations
 - **Bin 2 (Non-Idle Bin):** a large fraction of urban driving conditions, as well as higher power operations, such as on-highway driving
 - Staff also proposes to align with the accuracy margins for the portable emissions measurement system (PEMS) in 40 CFR §1036.420(a)
- Staff seeks feedback from stakeholders re: this proposal

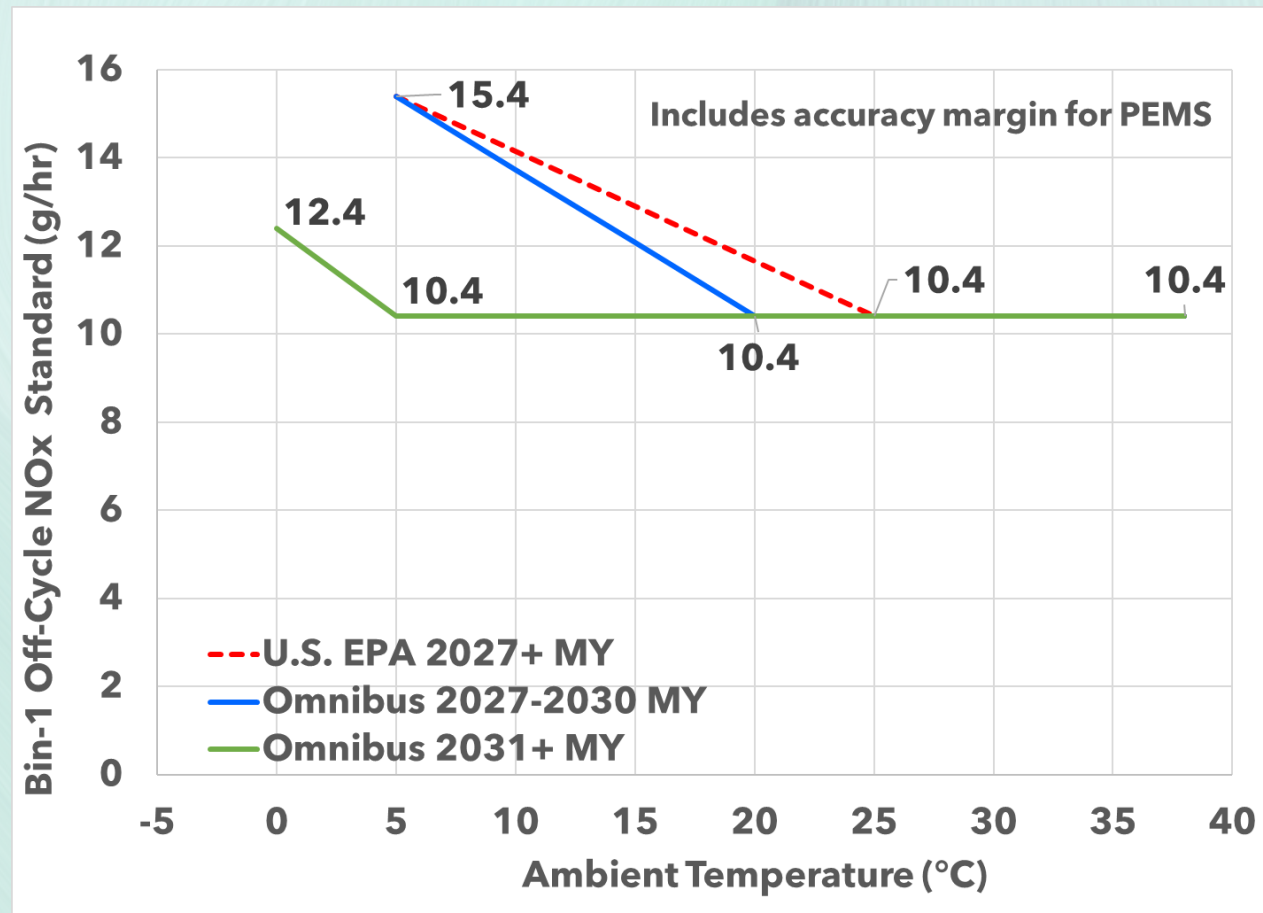
Proposed Omnibus Amendments - Interim Compliance Allowance

- **Interim compliance allowance:**
 - An additional compliance margin applicable to in-use engines
- **U.S. EPA-NOx Rule:**
 - 15 mg/hp-hr applicable to in-use duty-cycle and Bin 2 off-cycle NOx standards for 2027 and later MY MHDEs and HHDEs
 - Not applicable to LHDE
- **Staff proposal per Clean Truck Partnership:**
 - 15 mg/hp-hr applicable to in-use duty-cycle and Bin 2 off-cycle NOx standards for MYs 2027-2034 MHDEs and HHDEs
 - No compliance allowance for 2035 and later MYs
 - Not applicable to LHDE
- Staff seeks feedback from stakeholders re: this proposal

Proposed Omnibus Amendments - Temperature Adjustment for Off-Cycle NOx Standards

- Temperature Adjustment modifies the applicable Off-Cycle NOx standards based on the ambient temperature

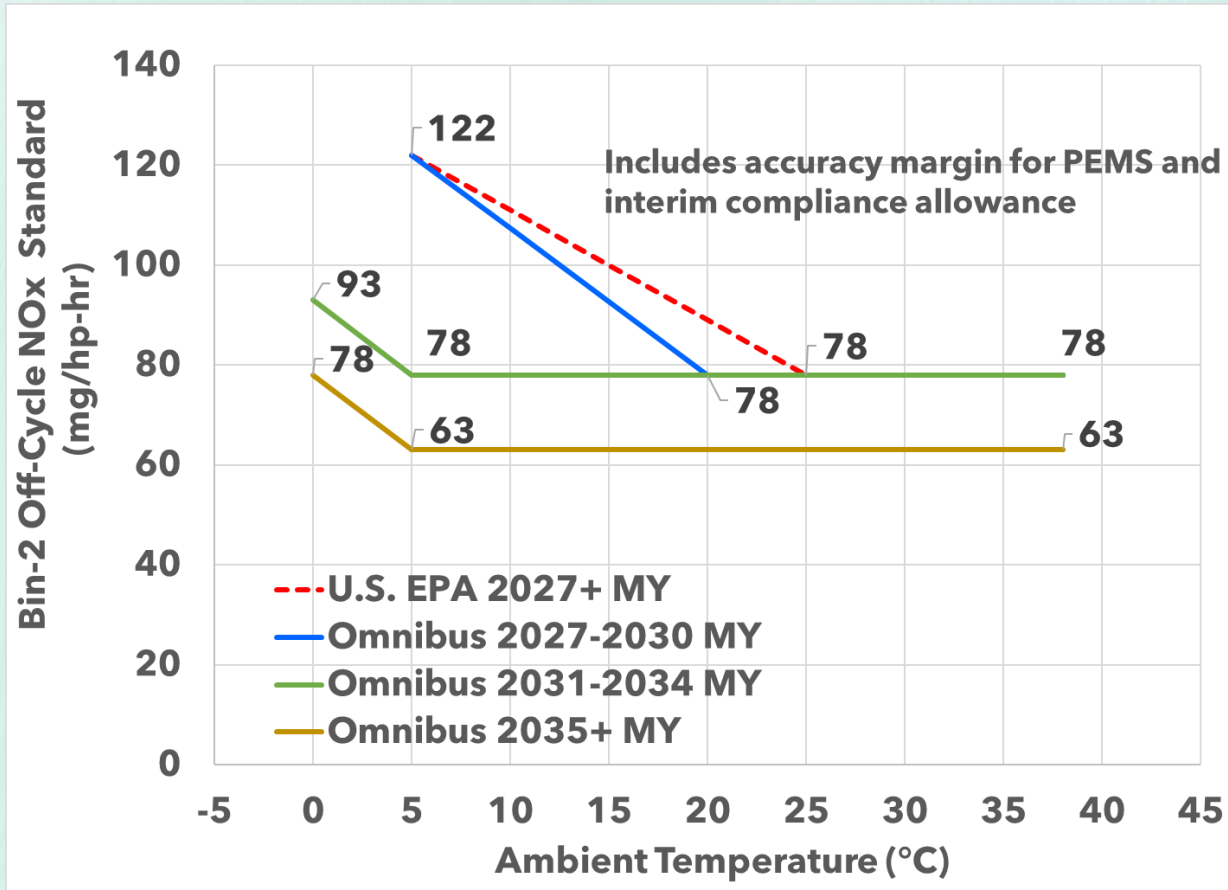
Bin 1 (Idle Bin) In-Use Off-Cycle Standards



Proposed Omnibus Amendments - Temperature Adjustment to Off-Cycle NOx Standards (Continued)

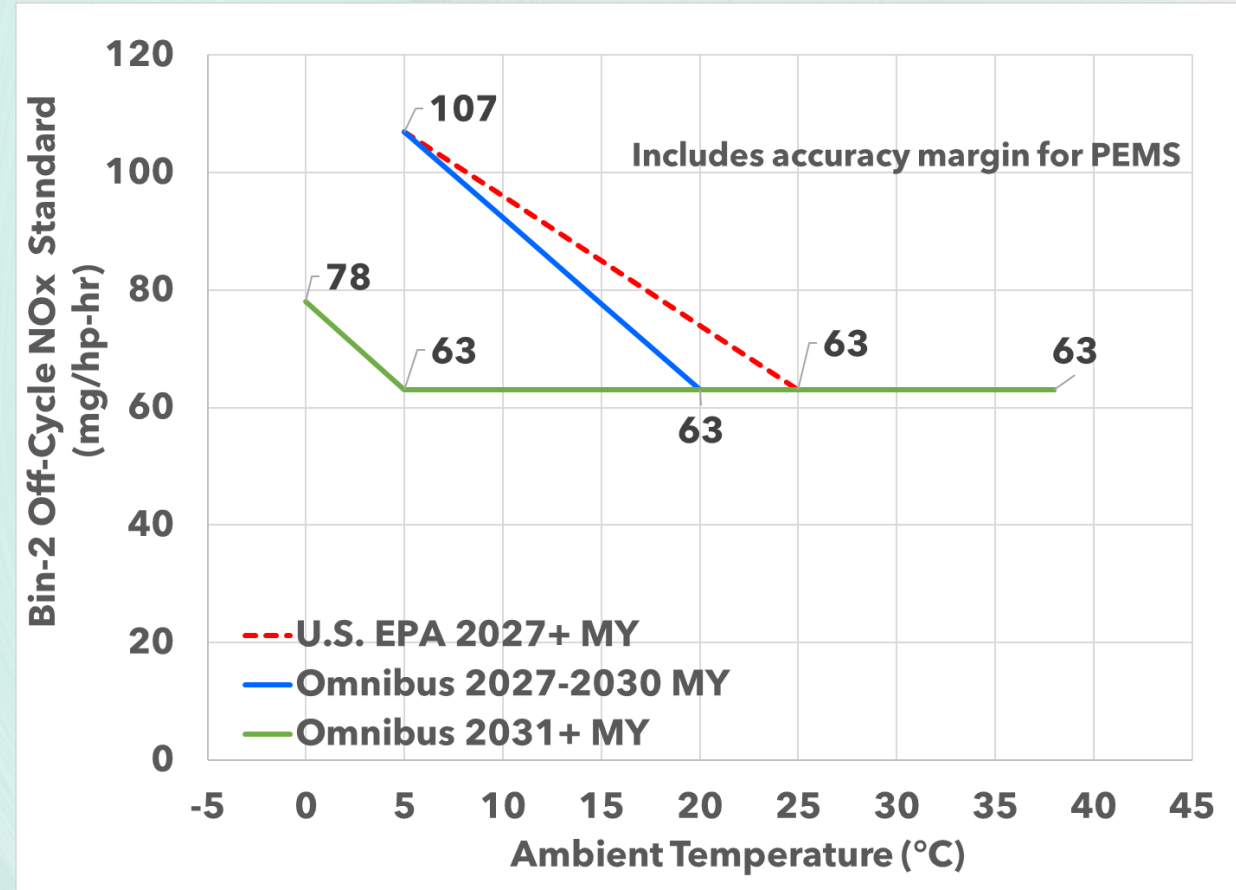
Bin 2 (Non-Idle Bin)

In-Use Off-Cycle Standards for MHDE and HHDE



Bin 2 (Non-Idle Bin)

In-Use Off-Cycle Standards for LHDE



Selective Catalytic Reduction (SCR) Inducement Requirements

- **U.S. EPA-NOx Rule:**

- Requirements to ensure SCR control systems are functional, effective and tamper resistant
- Encourages owners to maintain adequate supply of high-quality diesel exhaust fluid to the SCR system, and discourages tampering of the SCR system
- Replaces previous manufacturer's guidance documents, CISD-09-04R¹ and a joint U.S. EPA and CARB July 2010 public workshop²

- **Staff Proposal:** align with U.S. EPA's SCR inducement requirements

- Applicable to 2027 and later MY medium-duty and HDEs

¹U.S. EPA, [Revised Guidance for Certification of Heavy-Duty Diesel Engines Using Selective Catalyst Reduction \(SCR\) Technologies](#), December 30, 2009

²CARB, [Selective Catalytic Reduction Workshop](#), July 20, 2010

Proposed Omnibus Amendments - Transit Agency Diesel-Fueled Bus and Engine Exemption Request

(Title 13, California Code of Regulations, section 1956.8(a)(2)(F))

- Established process to purchase, rent, lease, contract for service, or re-power exempt buses or engines in California. Process started in 2022 MY
- Given the efforts to harmonize with federal requirements, staff proposes to sunset the transit agency exemption process beginning 2027 MY
- Staff seeks feedback from stakeholders re: this proposal



Next Steps

Next Steps

**Dec
2024**

- Second Workshop

**Aug
2025**

- Finalize Rulemaking Package

**Sep
2025**

- 45-Day Notice Posting

**Nov
2025**

- Board Hearing

Contact Details

Omnibus Amendments and Alignment

- HD Low NOx Program staff at lownox@arb.ca.gov
- Heavy-Duty Low NOx Homepage: <https://ww2.arb.ca.gov/our-work/programs/heavy-duty-low-nox>

In-Use Corrective Action Requirements Update

- Adil Mahmood at Adil.Mahmood@arb.ca.gov

OBD Amendments

- Paul Henderick and Yong Yu, or OBD Program at obd@arb.ca.gov
- OBD Program Homepage: <https://ww2.arb.ca.gov/our-work/programs/obd>

In-Use Amendments

- Thomas Montes or HD In-Use Compliance Section at hd-inuse@arb.ca.gov
- HD In-Use Compliance Programs Homepage: <https://ww2.arb.ca.gov/our-work/programs/heavy-duty-in-use-compliance-programs>