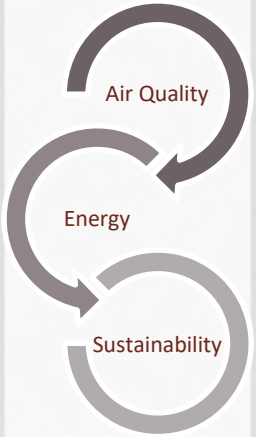
STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

# DIVISION OF AIR QUALITY

AIR QUALITY, ENERGY, AND SUSTAINABILITY

# CALIFORNIA HEAVY-DUTY ENGINE AND VEHICLE OMNIBUS REGULATION

BUREAU OF MOBILE SOURCES




Stakeholder Meeting - September 10th, 2020

# ACRONYMS

- CARB – California Air Resources Board
- NOx – Nitrogen oxides
- PM – Particulate matter
- GHG – Greenhouse gas
- ZEV – Zero emission vehicle
- ZE – Zero emission
- OEM – Original equipment manufacturer
- MY – Model year
- CY – Calendar year
- MD – Medium duty
- HD – Heavy duty
- CNG – Compressed natural gas
- LNG – Liquified natural gas
- LPG – Liquified petroleum gas
- DAC – Disadvantaged communities (CA's term for environmentally overburdened areas)
- NZEV – Near zero emission vehicle
- BEV – Battery electric vehicle
- FCEV – Fuel cell electric vehicle

# CARB STRATEGIES FOR MEDIUM AND HEAVY VEHICLES

1. Advanced Clean Truck (ACT) regulation– requires OEMs to sell ZEVs.
2. Heavy-Duty Engine and Vehicle Omnibus regulation – establishes more stringent NOx emissions standards for new engines.
3. Zero Emission Fleets – requires fleet owners to purchase ZEVs.
4. Drayage Trucks at Seaports and Railyards – directs a transition to zero emission operations at ports.

# OVERVIEW

1. What strategies are we considering?
2. What is the Heavy-Duty Engine and Vehicle Omnibus Regulation?
3. Answer questions and discuss issues.

# REGULATORY CONCEPT

- California is only in the initial proposal stage of their regulation.
  - Proposed June 23, 2020
  - Public hearing August 27, 2020
    - Board voted to approve with amendments
- Once adopted by California, New Jersey could consider adoption by reference of relevant sections of the California Code of Regulations.

# WHAT IS THE HEAVY-DUTY ENGINE AND VEHICLE OMNIBUS REGULATION?

1. Revised exhaust emission standards to apply to heavy-duty Otto-cycle and heavy-duty diesel engines intended for use in vehicle service classes with gross vehicle weight ratings (GVWR) greater than 10,000 pounds. New standards would be effective with model year 2024.

2. Revised in-use testing program.

3. Revised warranties and useful life periods.

4. More stringent heavy-duty engine durability requirements.

5. Emissions averaging, banking, and trading program.

6. Powertrain certification test procedures for an optional hybrid powertrain standard.

# *BRIEF ASIDE* – FUEL VS ENGINE CYCLE DEFINITIONS

- CARB uses terms Otto-cycle and diesel.
- NJ uses terms gasoline-fueled and diesel-powered.
- Otto-cycle = spark ignition = gasoline, CNG, LNG, propane
- Diesel = compression ignition = diesel, biodiesel, renewable diesel

# WHY DOES CARB THINK THESE REGULATIONS NEEDED?

- In 2013, CARB launched an optional low NOx certification program for HD engines. A number of engines were certified (all CNG or LPG) and the program was successful.
- Existing standards do not provide enough emission reductions and real-world testing of HD engines reveals significant excess emissions beyond certification levels.
- Regulatory amendments are needed to better address in-use operating conditions, longer useful life, and longer warranties for emission controls.
- CARB deems further emission reductions technically feasible and cost effective.

# HOW DOES THIS PROPOSAL WORK WITH OTHER HEAVY-DUTY VEHICLE REGULATORY CHANGES?

- These new heavy-duty engine standards complement the Advanced Clean Truck regulation by ensuring that those heavy vehicles not transitioned to zero emissions will be cleaner.

- We understand that it will take some time before zero emission vehicles are available to serve all heavy vehicle types and use cases. This is another step along the way toward cleaner vehicles.

# PARTICULATE MATTER REDUCTIONS

- While this strategy is aimed at reducing NOx, CARB does anticipate some ancillary PM benefits.
- *"The proposed PM standard of 0.005 g/bhp-hr is intended to encourage manufacturers to continue meeting the current PM emissions levels of 0.001 g/bhp-hr, and to prevent backsliding by using less efficient DPFs. Therefore, no additional direct PM benefits are expected from this requirement. However, since NOx is also a precursor to secondary PM2.5 formation, NOx emission reductions would also provide ambient PM2.5 emission benefits resulting in significant health benefits."**
- *CARB

# CARB REGULATORY PROPOSAL

- The complete proposal from CARB contains a very large amount of material and covers all the rules they are amending.
- We will only cover some of the most basic highlights today.
- For complete details, please refer to the CARB proposal here: https://ww2.arb.ca.gov/rulemaking/2020/hdomnibuslownox

# APPLICABILITY (CARB CLASSIFICATIONS)

**Table I-1. Applicable Heavy-Duty Engine and Vehicle Classifications**

| Engine Cycle | Vehicle Class | GVWR (lbs.) | Engine Category |
|---|---|---|---|
| Diesel-Cycle | 8 | >33,000 | Heavy Heavy-Duty Diesel (HHDD) |
| | 6-7 | 19,501 - 33,000 | Medium Heavy-Duty Diesel (MHDD) |
| | 4-5 | 14,001 - 19,500 | Light Heavy-Duty Diesel (LHDD) |
| | 3 | 10,001 - 14,000 | Medium-Duty Diesel Engine (MDDE) |
| Otto-Cycle | 4-8 | >14,000 | Heavy-Duty Otto (HDO) |
| | 3 | 10,001 - 14,000 | Medium-Duty Otto Engine (MDOE) |

# NEW HEAVY-DUTY ENGINE STANDARDS (CURRENT TO 2026)

**Table ES-1. Proposed Heavy-Duty Diesel- and Otto-Cycle Engine NOx Standards (MY 2024 to 2026)**

| MYs | MDDE/LHDD/MHDD/HHDD[a] | | | | MDOE/HDO[a] |
|---|---|---|---|---|---|
| | FTP (g/bhp-hr) | RMC-SET (g/bhp-hr) | LLC (g/bhp-hr) | Idling (g/hr) | FTP (g/bhp-hr) |
| Current | 0.20 | 0.20 | --- | 30 | 0.20 |
| 2024 - 2026 | 0.050 (0.10)[b] | 0.050 (0.10)[b] | 0.200 (0.30)[b] | 10 (10)[b] | 0.050 (0.10)[b] |

[a] MDDE: Medium-duty diesel engines 10,001-14,000 lbs. GVWR,
LHDD: Light heavy-duty diesel engines 14,001-19,500 lbs. GVWR,
MHDD: Medium heavy-duty diesel engines 19,501-33,000 lbs. GVWR,
HHDD: Heavy heavy-duty diesel engines >33,000 lbs. GVWR,
MDOE: Medium-duty Otto-cycle engines 10,001-14,000 lbs. GVWR, and
HDO: Heavy-duty Otto-cycle engines >10,000 lbs. GVWR.

[b] NOx standards in parentheses are optional 50-state-directed engine standards. Manufacturers may meet these less stringent standards in California if they do so for all engine families they produce nationwide.

# NEW HEAVY-DUTY ENGINE STANDARDS (2027 AND BEYOND)

**Table ES-2. Proposed Heavy-Duty Diesel- and Otto-Cycle Engine NOx Standards (MY 2027 and Subsequent)**

| Test Procedure | MDDE/LHDD/MHDD | MDOE/HDO | HHDD | |
|---|---|---|---|---|
| | MY 2027 and Subsequent | | MY 2027 - 2030 | MY 2031 and Subsequent |
| | (@Useful Life) | (@Useful Life) | (@435,000 miles)[a] | (@435,000 miles)[a] |
| FTP cycle (g/bhp-hr) | 0.020 | 0.020 | 0.020 | 0.020 |
| RMC-SET cycle (g/bhp-hr) | 0.020 | --- | 0.020 | 0.020 |
| Low-load cycle (g/bhp-hr) | 0.050 | --- | 0.050 | 0.050 |
| Idling (g/hr) | 5 | --- | 5 | 5 |

[a] For HHDD, the FTP, RMC-SET, and Low-load cycle standards at full useful life are higher to account for deterioration, as shown within the main document in Table III-4.

# NEW WARRANTY AND USEFUL LIFE PERIODS

**Table ES-3. Current and Proposed Warranty and Useful Life Periods**

| MY | LHDD | MHDD | HHDD | HDO |
|---|---|---|---|---|
| | Warranty (miles) | | | |
| June 2018 Step 1 Warranty 2022-2026 | 110,000<br>5 years | 150,000<br>5 years | 350,000<br>5 years | 50,000*<br>5 years |
| 2027-2030 | 150,000<br>7 years/<br>7,000 hours | 220,000<br>7 years/<br>11,000 hours | 450,000<br>7 years/<br>22,000 hours | 110,000<br>7 years/<br>6,000 hours |
| 2031 and Subsequent | 210,000<br>10 years/<br>10,000 hours | 280,000<br>10 years/<br>14,000 hours | 600,000<br>10 years/<br>30,000 hours | 160,000<br>10 years/<br>8,000 hours |
| | Useful Life (miles) | | | |
| Current-2026 | 110,000<br>10 years | 185,000<br>10 years | 435,000<br>10 years/<br>22,000 hours | 110,000<br>10 years |
| 2027-2030 | 190,000<br>12 years | 270,000<br>11 years | 600,000<br>11 years/<br>30,000 hours | 155,000<br>12 years |
| 2031 and Subsequent | 270,000<br>15 years | 350,000<br>12 years | 800,000<br>12 years/<br>40,000 hours | 200,000<br>15 years |

* Not included under Step 1 Warranty, but current periods are shown here for completeness.

# STAKEHOLDER FEEDBACK OPPORTUNITIES

- Are there any questions about this material?
- Specific issues for consideration and discussion are on subsequent slides.

# DISCUSSION ISSUES

- Issues for discussion:
  - Schedule
    - If we were to move forward with this regulation in NJ, how much additional lead time would be needed?
  - Industry assistance
    - Can industry organizations help us with outreach and education?
  - Enforcement
    - Most enforcement would reside with CA as the engine certifying agency.
    - NJ would need to ensure that only compliant engines are sold here.

# COMMENTS

Please send comments and/or technical support information to:

njairrulesmobile@dep.nj.gov

Use the following heading in the subject line of the email:

California Heavy-Duty Engine and Vehicle Omnibus Regulation

By September 24, 2020