2017 EMA Certification
AND
Compliance Workshop

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California Air Resources Board

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California’s Air Quality and Climate Goals

2023/2030/2031

Federal Air Quality Standards

Greenhouse Gas Reduction Targets

Renewable Energy Targets

Minimize Near-Source Health Risk

Petroleum Reduction Target
California’s Air Quality Challenges

- Over 12 million Californians breathe unhealthy air
- Most areas expected to attain PM standards by 2026
- Key challenges:
  - South Coast ozone
  - San Joaquin Valley PM 2.5
South Coast Emissions Inventory

Key Sources

- Current program NOx benefits by 2031
- Mobile source emissions reduced over 50 percent
- Heavy-duty vehicle emissions reduced by nearly 70 percent
- Heavy-duty trucks and federal sources remain largest contributors
- Reaching Federal ozone standards in 2031 requires an 80 percent reduction in NOx emissions from today
Significant NOx reductions needed to meet ozone standards in South Coast:

- ~70% reduction by 2023
- ~80% reduction by 2031

Heavy-duty (HD) trucks emit 33% of statewide NOx, 509 tpd

2015 NAAQS for ozone strengthened

National standards are important
Current HDE Emissions Standards Delivering Substantial Reductions

- NOx reduced 97%
- HC reduced 89%
- PM reduced 98%

- NOx 6.0 g/bhp-hr
- HC 1.3 g/bhp-hr
- PM 0.6 g/bhp-hr

- NOx 0.20 g/bhp-hr
- HC 0.14 g/bhp-hr
- PM 0.01 g/bhp-hr

1987 vs. 2015 emissions standards.
Reality Checks – Many Programs in Place to Monitor Emissions

- Smoke and Vehicle Inspections
  - Periodic Smoke Inspection Program
  - Heavy-Duty Vehicle Inspection Program (HDVIP)

- Warranty Claim Rates
  - Emissions Warranty Information Reporting

- Manufacturer In-Use Testing
  - Heavy-Duty In-Use Testing (HDIUT) Program

- Laboratory Dynamometer Testing
  - Engine and chassis dynamometer testing

- On-Road Emissions Measurements
  - Portable Emissions Measurement Systems

- Roadside and Remote Sensing Measurements
In-Use Surveillance Program
Revealing Emissions Higher than Expected

- UDDS is used as base emissions rate in EMFAC
- At 65,000 lbs, UDDS and engine FTP power close for many engine platforms
- Engine families already referred to full HD In-Use Compliance (HDIUC) Program

D. Quiros, CRC 2017
CARB In-Use NTE Testing Shows Concerns

- Out of 10 vehicles tested in the HD In-Use Compliance program,
  - 6 vehicles failed to meet the minimum $R_{pass} (0.90)$ for NOx
- Clean idle NOx emissions
  - 4 vehicles were under the limit (30g/hr) and 2 over the limit
- CARB is continuing its HD In-Use Compliance efforts with other engine manufacturers
  - Preliminary test results show 2 out of 4 vehicles failed to meet the minimum $R_{pass} (0.90)$ for NOx

D. Lee, CRC 2017 Poster
CARB Implemented Program Improvements: Enhanced Certification, OBD and In-Use

- More In-Depth Auxiliary Emission Control Devices (AECD) Review
  - AECD Guidance Document Workgroup Forming
- Additional Confirmatory Testing with Special Cycles and PEMS
- On-Board Diagnostics Evaluation In-Use
- Emission Warranty Information Reporting
- In-Use Compliance includes non-approved AECD and Defeat Device Screening
- HDE In-Use Compliance Program using NTE Protocol Underway
Future Program Improvements
Critical Next Steps

**Incentives**
Accelerate penetration to achieve sufficient reductions

**New Standards**
Bring cleanest technologies to market

**In-Use Requirements**
Ensure clean operations over life

**Demo & Pilot Projects**
Help develop next generation of cleanest technologies

**Introduce ZEVs**
Targeted applications well-suited for initial deployment
CARB Phase 2 GHG: Building on Federal Rulemaking

- **Combination Tractors**
- **Vocational Vehicles**
- **Large Pickups and Vans**

**Trailers Pulled by Combination Tractors**

Federal Implementation:
- 2018-2027 for trailers
- 2021-2027 for all other segments

**NEW!**
Cleaner Engine Standards

- Establish California low-NOx engine Standards (~90% reduction)
- Federal and State actions needed
- Implementation by 2023/2024 timing important

**NOx Emissions from On-Road Heavy-Duty Trucks in South Coast**

- **2031 Emissions with Current Program**
- **2031 Emissions with State Action**
- **2031 Emissions with State and Federal Action**

<table>
<thead>
<tr>
<th>Year</th>
<th>Emissions (tons per day)</th>
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<tbody>
<tr>
<td>2031</td>
<td>60 (Current Program)</td>
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<tr>
<td></td>
<td>30 (State Action)</td>
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<td>13 (State and Federal)</td>
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*Fair share HDE emissions target*
Engines Must Stay Clean In-Use

- Enhanced programs for in-use performance
  - Comprehensive inspection and maintenance program
  - Lower opacity standard
  - Expanded warranty requirements
  - Revise in-use testing program
  - Lengthen useful life
Introduction of ZEV Technologies

Last Mile Delivery
- Opportunity for near-term ZEV deployment in truck sector
- Purchaser and manufacturer requirements
- Advanced technology credit provisions
- Incentives

Zero-Emission Airport Shuttle Buses
- Facilitate deployment of ZEV passenger shuttles
- May include other airport-owned vehicles, e.g. operational and maintenance vehicles
Looking Forward

- CARB looks forward to working collaboratively with industry to meet California’s SIP and Climate Goals
  - Near Term Mobile Source Program Improvements
  - SIP Measures Adoptions
  - Scoping Plan Measures Adoptions
Thank You!

Comments and Questions