Development of Amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation

South Coast AQMP Mobile Source Working Group
June 15, 2021

Agenda

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California’s Air Quality and Climate Goals

2023: South Coast & SJV Ozone

2030: GHG 40 percent below 1990

2037: South Coast & SJV Ozone

2050: GHG 80 percent below 1990

2024/25: South Coast & SJV PM2.5

AB 617 Communities

Focus of today’s working group meeting

Off-Road NOx Emission Contribution

Mobile Source NOx emissions in SC in 2037

On-Road 43%

Off-Road Equip. 22%

OGV-100 nm 20%

Aircraft 11%

Trains 4%

Off-Road Equipment NOx emissions in SC in 2037

Construction 23%

Ag Z 2%

TRU 11%

CHC & CHE 10%

Recreational Watercrafts 12%

Forklifts 10%

GSE 5%

SORE 11%

PERP 19%

CHC & CHE 10%

Forklifts 10%

GSE 5%

SORE 11%

PERP 19%
Off-Road Diesel PM Emission Contribution

Diesel PM emissions in SC in 2020

- Off-Road: 63%
- On-Road Trucks & Buses: 32%
- Stationary Sources: 5%
- Trains: 14%
- Ocean Going Vessels: 15%
- Commercial Harbor Craft: 4%
- Farm Equipment: 4%
- Off-Road Equipment (Construction, Industrial, etc.) including <175HP preempted construction equipment: 63%

Draft 2021 In-Use Emission Inventory

- New inventory in progress, aiming for completion in summer 2021
- Initial distribution shows slightly more Tier 0 to Tier 2 than projected by the 2011 inventory

Statewide In-Use Equip. Population in 2020 by Tier: Projected vs Reported

- T0
- T1
- T2
- T3
- T4I
- T4F

☐ Projected by existing inventory   ☐ Actual 2020 Reporting
Current Off-Road Diesel Overview

Applicability
- Vehicles with diesel-fueled off-road compression-ignition engines with maximum horsepower of 25 or greater

Reporting
- Report to CARB
- Vehicle labeling is also required

Performance
- Meet declining fleet average target
- Gradually reduce fleet emissions through turnover, repower, or retrofits

Current Off-Road Diesel Structure

<table>
<thead>
<tr>
<th>Fleet Size</th>
<th>Total Max Horsepower</th>
<th>Fleet Average Target or BACT Dates*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large</td>
<td>L&gt;5000</td>
<td>2014 - 2023</td>
</tr>
<tr>
<td>Medium</td>
<td>2500&lt;M≤5000</td>
<td>2017 - 2023</td>
</tr>
<tr>
<td>Small</td>
<td>S≤2500</td>
<td>2019 - 2028</td>
</tr>
</tbody>
</table>

*A fleet using BACT to comply may have requirements beyond these dates if the fleet average target is not achieved.
Hypothetical Compliant Fleets

- Each fleet has 100 vehicles and is compliant with the 2023 final fleet average target
- Assumes all vehicles are in the 100-175 horsepower bin and have equal activity

Example Mixed Fleet Meeting Compliance

<table>
<thead>
<tr>
<th>Engine Tier</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 0</td>
<td>2</td>
</tr>
<tr>
<td>Tier 1</td>
<td>3</td>
</tr>
<tr>
<td>Tier 2</td>
<td>5</td>
</tr>
<tr>
<td>Tier 3</td>
<td>8</td>
</tr>
<tr>
<td>Tier 4i</td>
<td>10</td>
</tr>
<tr>
<td>Tier 4f</td>
<td>72</td>
</tr>
</tbody>
</table>
Construction, Industrial, Mining Sector Goals

- **Current regulation** allows continued use of Tier 0 to Tier 2 indefinitely if meeting Fleet Average requirements
- **MSS Scenario**: Implement full turnover of Tier 0/1/2 equipment by 2033

Goals for Off-Road Diesel Strategy

**Emission Reductions**

- Equivalent to removal of Tier 0-2 equipment by 2033

**Simplify**

- Easier for fleets to understand
- Streamline what is required of fleets

A single Tier 0 off-road engine in the 100-175 horsepower bin has 80 times higher NOx emissions than a Tier 4 Final off-road engine.
Example Mixed Fleet Meeting Compliance: Fully Implemented Strategy

<table>
<thead>
<tr>
<th>Engine Tier</th>
<th>Original Population</th>
<th>Strategy Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Tier 1</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Tier 2</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Tier 3</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Tier 4i</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Tier 4f</td>
<td>72</td>
<td>82</td>
</tr>
</tbody>
</table>

Potential Amendment Concept

- Operational Backstop on Old Equipment
- Extension of Adding Vehicles Provision
- Simplify the Low-Use Exemption
- Other Potential Changes
Operational Backstop on Old Equipment

<table>
<thead>
<tr>
<th>Fleet Size</th>
<th>Tier 0</th>
<th>Tier 1</th>
<th>Tier 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ban Year</td>
<td>Age of Equipment</td>
<td>Ban Year</td>
</tr>
<tr>
<td>Large</td>
<td>2024</td>
<td>27</td>
<td>2026</td>
</tr>
<tr>
<td>Medium</td>
<td>2026</td>
<td>29</td>
<td>2028</td>
</tr>
<tr>
<td>Small</td>
<td>2028</td>
<td>31</td>
<td>2030</td>
</tr>
</tbody>
</table>

Extension of Adding Vehicle Provision

<table>
<thead>
<tr>
<th>Engine Tier</th>
<th>Additions Banned in ORD Regulation</th>
<th>Lead Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Regulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T0</td>
<td>2010 (at adoption)</td>
<td>11 years</td>
</tr>
<tr>
<td>T1</td>
<td>2013 L/M 2016 S</td>
<td>8 years L/M 11 years S</td>
</tr>
<tr>
<td>T2</td>
<td>2018 L/M 2023 S</td>
<td>8 years L/M 13 years S</td>
</tr>
<tr>
<td>Potential Amendments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>On adoption (2023)</td>
<td>13 years L/M 13 years S</td>
</tr>
<tr>
<td>T4i</td>
<td>2024 L/M 2028 S</td>
<td>10 years L/M 14 years S</td>
</tr>
</tbody>
</table>
Tier 4f Availability Analysis

Engine Tier Distribution By HP Group

Simplify the Low-Use Exemption

Potentially Eliminate Year by Year Option

- Phased in at the same time as the operational backstop on old equipment

Analysis of Permanent Low-Use

- Potential backstop where oldest equipment will not be allowed
- Potential reevaluation of the maximum hour allowance
- Require additional documentation
Other Potential Changes

- Add requirements for other entities, such as contractors and third party reporters
- Eliminate provision that allows small fleets to keep vehicles with no VDECS indefinitely [2449.1(b)(3)(C)]
- Newly reported fleets must meet new fleet provisions [2449(d)(4)]
- Restrict adding oldest tiered equipment to emergency, snow removal, and low use exemptions
- Clarify applicability

CARB

Emission Reduction Potential

Staff used the 2011 In-Use Off-Road Model to calculate the potential emission reductions from this concept, assuming:

- Full implementation of operational bans with turnover to Tier 4 final
- All equipment currently exempt from performance requirements would remain exempt

<table>
<thead>
<tr>
<th>Reductions</th>
<th>Statewide</th>
<th>South Coast</th>
</tr>
</thead>
<tbody>
<tr>
<td>2031 NOx reductions (tpd)</td>
<td>6.0</td>
<td>1.9</td>
</tr>
<tr>
<td>2037 NOx Reductions (tpd)</td>
<td>5.4</td>
<td>1.3</td>
</tr>
</tbody>
</table>

PM 2.5 Reductions

- Approximately 37%

CARB
Timing and Next Steps

- Targeted Workgroups
  - Cost
  - Requirements for other entities
- Next Workshop
  - Q4 2021
- Regulatory Proposal
- Potential Board Date
  - Q4 2022

We also encourage one-on-one meetings with the regulatory team.

Executive Order N-79-20

Full transition to
ZE off-road equipment by 2035*
*where feasible

Transition of all off-road equipment operations to zero-emission where feasible by 2035

Strategies, in coordination with other State agencies, U.S. Environmental Protection Agency and local air districts, to achieve 100 percent zero-emission from off-road vehicles and equipment operations in the State by 2035.
**Potential Future Strategies**

**Green Fleet Recognition Program**  
(/action by: 2025)

Voluntary program for recognition of cleanest fleets, with an emphasis on zero emissions. Would allow public agencies and partnerships to recognize fleets with minimal environmental impact.

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**Contacts**

**Rulemaking**
- Lead: Nathan Dean, Air Pollution Specialist
- Johanna Levine, Manager, Off-Road Implementation Section  
  ordamendments@arb.ca.gov

**Inventory Update**
- Liang Liu, Air Pollution Specialist: Liang.Liu@arb.ca.gov
- Cory Parmer, Manager, Off-Road Diesel Analysis Section:  
  Cory.Parmer@arb.ca.gov
Webpage and Email Sign-Up

- Webpage:

- Sign-Up for Off-Road Diesel Amendment Email Updates
  - [https://public.govdelivery.com/accounts/CARB/subscriber/new](https://public.govdelivery.com/accounts/CARB/subscriber/new)
  - “Off-Road Equipment (In-Use) Control Measure”

CARB