Statewide Urban Bus Standards and Fleet Rule for Transit Agencies in South Coast Air District

Public Workshop

April 27, 2005 - Sacramento
1:00 - 4:00 PM
E-mail Comments During Workshop

• onair@arb.ca.gov

• Subject Heading: Urban Bus

• Only available during workshop (1-4pm)
Why Reduce Diesel Emissions?

• Diesel Engines are Long Lived
• NOx is an Ozone Precursor
• Diesel PM is a Toxic Air Contaminant
Health Impacts of Diesels in California

• Annual health impacts
  – 2,900 premature deaths
  – 3,600 hospital admissions
  – 240,000 asthma attacks/respiratory symptoms
  – 600,000 lost days of work

• By comparison
  – 3,700 deaths from car accidents
  – 2,000 homicides
What Vehicles Are We Talking About?
Urban Bus

- Passenger Carrying Vehicle
- Powered by Heavy Heavy-Duty Diesel Engine or of a Type Normally Powered By a Heavy Heavy-Duty Diesel Engine
- Load Capacity of 15 or More
- Fixed Route/Intracity Operation
- Generally 35+ Feet in Length
- Owned/Operated by a Transit Agency
Transit Fleet Vehicles

- Passenger Carrying Vehicle or Non-Revenue Vehicle
- Vehicle Greater than 8,500 GVWR
- Powered by Heavy-Duty Engine
- Diesel and Alternative-Fuels
- Owned/Operated by a Transit Agency
- Not an Urban Bus
Current California Programs

- Heavy-Duty Truck Engine Standards
- UB New Engine Standards
- UB Fleet Purchasing, Fuel, and Emission Reduction Requirements
- TFV Fleet Emission Reduction Requirements
## Heavy-Duty Truck
### New Engine Standards

<table>
<thead>
<tr>
<th>Model Year</th>
<th>NOx</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988</td>
<td>6.0</td>
<td>0.6</td>
</tr>
<tr>
<td>1990</td>
<td>6.0</td>
<td>0.6</td>
</tr>
<tr>
<td>1991</td>
<td>5.0</td>
<td>0.25</td>
</tr>
<tr>
<td>1994</td>
<td>5.0</td>
<td>0.10</td>
</tr>
<tr>
<td>1998</td>
<td>4.0</td>
<td>0.10</td>
</tr>
<tr>
<td>October 2002</td>
<td>2.2&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>0.10</td>
</tr>
<tr>
<td>2004</td>
<td>2.2&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td>0.10</td>
</tr>
<tr>
<td>2007</td>
<td>1.2&lt;sup&gt;(2)&lt;/sup&gt;</td>
<td>0.01</td>
</tr>
<tr>
<td>2010</td>
<td>0.2</td>
<td>0.01</td>
</tr>
</tbody>
</table>

<sup>(1)</sup> Nominal NOx based on 2.4 g/bhp-hr NMHC+NOx or 2.5 g/bhp-hr NMHC+NOx with 0.5 g/bhp-hr NMHC cap.

<sup>(2)</sup> Approximate value based on averaging.
Urban Bus
New Engine Standards

• Oct. 1, 2002: 0.01 g/bhp-hr PM
• 2004-2006: 0.5 g/bhp-hr NOx
  – Diesel, Dual fuel, Bi-fuel
• 2004-2006: 2.4 g/bph-hr NOx+NMHC or optional 1.8 - 0.3 g/bhp-hr NOx+NMHC
  – Alternative fuel
• 2004-2006: 1.8 g/bhp-hr NOx
  – Diesel HEB (w/ ARB Purchase Approval)
• 2007+: 0.2 g/bhp-hr NOx
Urban Bus Fleet Requirements

- Diesel/Alt Fuel Path Selection
- Ultra-low Sulfur Fuel July 2002
- 4.8 g/bhp-hr NOx Average October 2002
- Multiple Stage PM Reduction Requirement
- ZEB Demo and Purchase Requirement
## Transit Fleet Vehicle Fleet Requirements

Applies to Transit Fleet Vehicles, not Urban Buses

<table>
<thead>
<tr>
<th>Date</th>
<th>% PM reduction from baseline</th>
<th>Fleet NOx Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 1, 2005</td>
<td>0%</td>
<td>na</td>
</tr>
<tr>
<td>December 31, 2007</td>
<td>40%</td>
<td>3.2 or retire 1997 and earlier MY</td>
</tr>
<tr>
<td>December 31, 2010</td>
<td>80%</td>
<td>2.4 or retire 2001 and earlier MY</td>
</tr>
</tbody>
</table>
SCAQMD Rule 1192

- Adopted 2000
- Applies to Public Transit Fleets With 15 or More Transit Vehicles
- Alt Fuel Purchase/Lease Requirement Beginning 2001
Why is the ARB Considering Transit Bus Regulation?

• U.S. Supreme court ruled that certain aspects of Rule 1192 are preempted by federal authority
• ARB and U.S. EPA determined Rule 1192 not appropriate for waiver without state adoption
• ARB agreed to evaluate four fleet rules - including Rule 1192 affecting transit buses
What Are the Regulatory Concepts for Transit Agencies?

• Statewide
  – Alignment of Urban Bus Standards with HDT Standards in 2007

• South Coast
  – Urban Bus Purchase/Lease Requirement
UB Standard Alignment with HDT Standards: Proposal

• Need for Change
  – No Diesel Buses Available for 2007-2009
  – Keeps the Oldest, Dirtiest Diesel Buses on the Road

• Proposal to Modify Section 1956.1 and 1956.8
  – Harmonize Urban Bus Engine Emissions Standards with California’s 2007 HHD Truck Engine Standards
Recovered Benefits
Proposed Rule - Alignment

NOx Emissions - Urban Buses

- No Diesel Turnover Assumption
- Staff's Proposal: Align
- Original Assumptions
Recovered Benefits
Proposed Rule - Alignment

PM Emissions - Urban Buses

- No Diesel Turnover Assumption
- Staff's Proposal: Align
- Original Assumptions
Cost Impacts

• Alignment
  – Lower Cost to Transit Agencies on Diesel Path
  – No Effect for Transit Agencies on Alt Fuel Path
SC Urban Bus: Proposal

- Applies only to Transit Agencies Operating in the South Coast
- Alternative Fuel Path is Mandatory
- For TA on Diesel Path, Change Applies 1/1/2006.
### SC Transit Agencies Current Urban Bus Fuel Path Choices

<table>
<thead>
<tr>
<th>Alternative Fuel Path</th>
<th>Diesel Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commerce</td>
<td>Gardena</td>
</tr>
<tr>
<td>Culver City</td>
<td>Long Beach</td>
</tr>
<tr>
<td>Foothill</td>
<td>Montebello</td>
</tr>
<tr>
<td>Glendale</td>
<td>Norwalk</td>
</tr>
<tr>
<td>L.A. MTA</td>
<td>Santa Clarita</td>
</tr>
<tr>
<td>L.A. DOT</td>
<td>Torrance</td>
</tr>
<tr>
<td>Omnitrans</td>
<td></td>
</tr>
<tr>
<td>Orange County</td>
<td></td>
</tr>
<tr>
<td>Riverside</td>
<td></td>
</tr>
<tr>
<td>Santa Monica</td>
<td></td>
</tr>
<tr>
<td>Sun Line</td>
<td></td>
</tr>
</tbody>
</table>
SC Urban Bus
NOx Fleet Averages

NOx Averages

Alt Fuel  | Diesel
---|---
2.81 | 4.26

California Environmental Protection Agency
AIR RESOURCES BOARD

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Preliminary NOx Emission Benefits

• SCAQMD Alt Fuel Path
  – Six Transit Agencies Affected
  – 15-30 Buses Turnover Per Year to Alt Fuel (Result of Rule)
  – Estimated 3.65 tpy NOx in 2010
Preliminary Cost Estimates

• SCAQMD Alt Fuel Path
  – CNG Capital Increment Over Diesel: $85 to $100K per Bus
  – BUT Costs Reduced by
    • 80% (diesel) to 83% (alt fuel) FTA Match
    • Incentive Funding
  – CNG O&M Increment Over Diesel: $16K (Lifetime per Bus)
No Change Proposed for Transit Fleet Vehicles

- Emission Reductions Obtained Through the Current ARB TFV Rule

- ARB’s Rule Achieves Additional Reductions Beyond 1192
Comparison of Scope of 1192 and ARB Fleet Rule

- **1192**
  - 14,000 lbs. GVWR and Above
  - Fleets with 15 or More Vehicles
  - Impacts New Purchases/Leases Only

- **ARB Fleet Rule for Transit Agencies**
  - 8,500 lbs. GVWR and Above
  - Includes all Transit Agencies
  - Includes all TFV (Paratransit, Non-revenue)
  - Impacts In-use and New Vehicles
# Preliminary TFV: NOx Emissions

## Rule 1192 & ARB’s Fleet Requirement

<table>
<thead>
<tr>
<th></th>
<th>SCAQMD-TFV NOx Analysis Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># of Transit Agencies</td>
</tr>
<tr>
<td>SCAQMD 1192</td>
<td>18</td>
</tr>
<tr>
<td>ARB TFV</td>
<td>55</td>
</tr>
</tbody>
</table>

Additional ARB tons/yr: 2.3
Incentive Funding - Example

- Incentives based on surplus emissions
- No incentives 2007-2009
  - Unless urban bus aligns with truck standards, or
  - Engine certified below 0.2 g/bhp-hr
Summary

• Align 2007 Urban Bus Engines with 2007 HD Truck Engine Standards
• Transit Agencies in the South Coast Air District Follow Alt Fuel Path
• No Changes to Transit Fleet Vehicle Requirements
Public Process

- Public Workshops: 04/07/05, 04/27/05
- Comments Requested by 05/04/05
- Staff Report Released by 06/03/05
- Board Hearing 07/21-22/05
COMMENTS REQUESTED

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• onair@arb.ca.gov (available only during today’s workshop)