Urban Bus New Engine Emission Standards

October 20 - 21, 2005
Board Hearing
Sacramento, CA
Adopted Fleet Rules For Transit Agencies

- Adopted by Board in 2000
- Fuel Path Selection that Regulates New Bus Purchases
  - Transit agencies chose by January 31, 2001
  - Non-revocable decision to make 85% of annual purchases alternative fuel if on that path
- 57% of CA Transit Agencies Chose Diesel Path
  - Operate 38% of the CA Urban Bus Fleet
- Other Provisions Addressing NOx and PM Emission Reductions From Existing Fleet

Urban Bus vs. Truck Engine NOx Standards (g/bhp-hr)

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>2000</th>
<th>2004</th>
<th>2007</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban Bus Diesel</td>
<td>4.0</td>
<td>0.5*</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Urban Bus Alt. Fuel</td>
<td>4.0 ***</td>
<td>2.2 ***</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Truck HDE</td>
<td>4.0</td>
<td>2.2</td>
<td>1.2**</td>
<td>0.2</td>
</tr>
</tbody>
</table>

* 2004 Diesel hybrid electric UB at 1.8 g/bhp-hr
**Expected certification based on averaging
*** Actual emissions lower
Current Status

• Alt. Fuel Agencies Buying CNG and Other Non-Diesel Technology
  – CNG Buses Likely Available in 2007 meeting 0.2g NOx Standard
• Diesel Path Agencies Not Buying New Urban Buses
  – No Diesel Buses Available until 2010
  – Keeping Older Buses in Service
  – Expected Emission Reductions Not Achieved

Emission Reductions
Expected vs. Actual

[Graph showing expected versus actual emission reductions from 2006 to 2020]
Staff Proposal

• Initial Statement of Reasons
  – 3 Options, No Recommendations
• Today’s Proposal
  – Staff Recommendation

Option 1: No Change

• New Diesel Urban Bus Purchase
  Deferred until 2010
  – No Diesel Path Transit Agency Expected to Switch to Alternative Fuel
  – Older Urban Buses Remain in Service
• Delayed Purchase Results in:
  – Higher Emissions Through 2010
  – Slightly Lower Emissions Post-2010
Option 2: Alignment

- Align With 2007+ Truck Engine Standard
- Purchase of Cleaner Diesel Engines Beginning in 2007
  - Older Urban Buses Replaced
- 1.6 tons of NOx per Day in 2009
  - Slightly Higher NOx Post-2010

Option 3: Mandatory Alternative Path

- All Diesel Path Agencies Moved to Alt. Path Through 2015
- Purchase of Alt. Fuel Buses Increase
  - Deferred Purchases No Longer an Option
- 2.5 tons of NOx per Day in 2009
  - Same Emissions as “No Change” in 2015+
- Higher Costs for Diesel Path Agencies
  - Cost Effectiveness ($119,030 per Ton of NOx)
- Requires New Rulemaking Process
**Emission Reductions of 3 Options**

- **Option 1**: Align with Truck Engine Standard Beginning 2007 at 1.2 g/bhp-hr NOx
- **Option 2**: Provide NOx Mitigation When Purchasing Higher Emission Diesels
  - Diesel Path Transit Agencies with Fleets >30
  - One NOx Retrofit For Each Purchase
    - Verified Retrofit at 25%+ NOx Reduction
    - Limited to Available Urban Buses

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**Today’s Staff Proposal**

- Option 2: Align with Truck Engine Standard Beginning 2007 at 1.2 g/bhp-hr NOx
- Provide NOx Mitigation When Purchasing Higher Emission Diesels
  - Diesel Path Transit Agencies with Fleets >30
  - One NOx Retrofit For Each Purchase
    - Verified Retrofit at 25%+ NOx Reduction
    - Limited to Available Urban Buses
Issues Remaining

• Many Smaller Diesel Path Transit Need to Purchase Buses Now
  – Staff’s Proposal Allows Diesel Purchases
• Switch to Alt. Fuels Disruptive
  – Diesel Path Agencies Oppose
  – Capital Costs High
  – No Difference in Emissions in 2010+ Buses
• Alignment Signals Lack of Support for Alternative Fuel
  – 62% Fleet with Alternative Fuel Path Transits

Recommendation

• Adopt Option 2 – Alignment with the Truck Engine Standard
  – Require NOx Retrofit for Fleets Greater than 30.