Overview

- Need for emissions reductions
- Proposed regulation
- Emissions inventory, benefits, and costs
- Next steps

Need for Emissions Reductions

- Trucks are the largest source of diesel particulate matter (PM) in California
  - Diesel particulate matter contributes to premature death, cancer and other adverse respiratory health impacts
  - Diesel Risk Reduction Plan designed to reduce health risk caused by diesel particulate
- Trucks are the largest source of oxides of nitrogen (NOx) in California
  - NOx emissions cause ozone and PM2.5 formation
- Many areas of the state don’t meet clean air standards

Area Designations for National Ambient Air Quality Standards for Ozone and PM2.5

8-Hour Ozone
- 15 areas violate the standard

PM2.5 Annual
- 2 areas violate the standard

- Nonattainment
- Unclassified/Attainment
Health Benefits from the Proposed Truck and Bus Regulation are Significant

- Health impacts from trucks and buses are significant
- Proposed regulation would reduce health risks from 2010 to 2023
  - Preliminary estimates of up to 5,000 premature deaths avoided
  - Higher risk along freeways and areas where trucks operate

Compliance with the State Implementation Plan (SIP)

- Proposed regulation is most important SIP commitment in South Coast and San Joaquin Valley
  - Early PM and NOx reductions for PM2.5 attainment in 2014
  - NOx reductions for ozone in 2017, 2020, and 2023
- Benefits of regulation assessed relative to inventory used at the time SIP was developed
  - San Joaquin Valley
    - Meets PM and NOx targets
  - South Coast
    - Meets combined PM and NOx targets
Proposed Statewide Truck and Bus Regulation Scope

- Diesel vehicles operating in California
- Trucks, buses, yard trucks and other
- Interstate, intrastate, international, and other
- Vehicles greater than 14,000 GVWR and shuttle buses
- Any person, business, or government agency who owns, leases, rents, or sells a vehicle in California
- Excludes emergency vehicles, military tactical vehicles, and personal use motorhomes
- Schoolbuses subject only to PM requirements

Overview of Proposed Regulation

- Install PM controls in 2010 & 2011
- Almost all vehicles equipped by 2014
- Phase-in 2010 model year engine equivalent
- One turnover between 2012 and 2022
- Exhaust retrofits if equivalent emissions
- Certain special provisions
- Any of 3 compliance options for PM or NOx
  - Best available control technology (BACT), or
  - Fleet average, or
  - Limits on turnover and retrofits

Compliance Option 1: Best Available Control Technology Schedule

<table>
<thead>
<tr>
<th>Compliance by December 31:</th>
<th>Existing Engine Model Year</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>Pre-1994</td>
<td>PM BACT</td>
</tr>
<tr>
<td>2011</td>
<td>2000-2004</td>
<td>PM BACT</td>
</tr>
<tr>
<td>2012</td>
<td>2005-2006</td>
<td>PM BACT</td>
</tr>
<tr>
<td></td>
<td>1994-1999</td>
<td>NOx and PM BACT</td>
</tr>
<tr>
<td>2013</td>
<td>2000-2002</td>
<td>NOx and PM BACT</td>
</tr>
<tr>
<td>2014</td>
<td>Pre-1994</td>
<td>NOx and PM BACT</td>
</tr>
<tr>
<td>2015</td>
<td>2003-2004</td>
<td>NOx and PM BACT</td>
</tr>
<tr>
<td>2016</td>
<td>2005-2006</td>
<td>NOx and PM BACT</td>
</tr>
<tr>
<td>2017</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>2018</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>2019</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>2020</td>
<td>2007</td>
<td>NOx and PM BACT</td>
</tr>
<tr>
<td>2021</td>
<td>2008</td>
<td>NOx and PM BACT</td>
</tr>
<tr>
<td>2022</td>
<td>2009</td>
<td>NOx and PM BACT</td>
</tr>
</tbody>
</table>

Compliance Option 2: Turnover and PM Retrofit Limits

<table>
<thead>
<tr>
<th>Compliance by December 31:</th>
<th>PM BACT</th>
<th>NOx BACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>25%</td>
<td>NA</td>
</tr>
<tr>
<td>2011</td>
<td>50%</td>
<td>NA</td>
</tr>
<tr>
<td>2012</td>
<td>75%</td>
<td>25%</td>
</tr>
<tr>
<td>2013</td>
<td>100%</td>
<td>50%</td>
</tr>
<tr>
<td>2014</td>
<td>-</td>
<td>50%</td>
</tr>
<tr>
<td>2015</td>
<td>-</td>
<td>70%</td>
</tr>
<tr>
<td>2016</td>
<td>-</td>
<td>60%</td>
</tr>
<tr>
<td>2017</td>
<td>-</td>
<td>50%</td>
</tr>
<tr>
<td>2018</td>
<td>-</td>
<td>50%</td>
</tr>
<tr>
<td>2019</td>
<td>-</td>
<td>90%</td>
</tr>
<tr>
<td>2020</td>
<td>-</td>
<td>90%</td>
</tr>
<tr>
<td>2021</td>
<td>-</td>
<td>90%</td>
</tr>
<tr>
<td>2022</td>
<td>-</td>
<td>100%</td>
</tr>
</tbody>
</table>

- PM BACT
  - Highest level PM control technology
- NOx BACT
  - 2010 model year emissions or cleaner
  - 2004-2006 model year emissions with ≥ 85% NOx reduction
  - 2007 model year emissions with ≥ 70% NOx reduction
- Requires reporting
Compliance Option 3: Fleet Average

- Can be met by any method
- Provides opportunities for NOx controls
- Provides flexibility
  - Allows mix of cleaner and dirtier engines
- Staggered start dates
  - PM begins in 2010
  - NOx begins in 2012
- Reporting required

Emission Factors in Fleet Average
Class 8 Vehicles ( >33,000 lbs)

<table>
<thead>
<tr>
<th>Engine Model Year</th>
<th>NOx Emission Factors (g/mile)</th>
<th>PM Emission Factors (g/mile)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-1991</td>
<td>3.36</td>
<td>0.5</td>
</tr>
<tr>
<td>1991-1993</td>
<td>3.0</td>
<td>0.5</td>
</tr>
<tr>
<td>1994-2006</td>
<td>2.7</td>
<td>0.4</td>
</tr>
<tr>
<td>2007+</td>
<td>2.2</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Note: Most 2003 model year engines met 2004 emissions standard. Separate emission factors for smaller vehicles not shown.

Number of Trucks by Fleet Size

<table>
<thead>
<tr>
<th>Fleet Size</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 100 Trucks</td>
<td>16%</td>
</tr>
<tr>
<td>51 – 100 Trucks</td>
<td>4%</td>
</tr>
<tr>
<td>21 – 50 Trucks</td>
<td>8%</td>
</tr>
<tr>
<td>11 – 20 Trucks</td>
<td>8%</td>
</tr>
<tr>
<td>6 – 10 Trucks</td>
<td>9%</td>
</tr>
<tr>
<td>1 Truck</td>
<td>32%</td>
</tr>
<tr>
<td>2 Trucks</td>
<td>10%</td>
</tr>
<tr>
<td>3 Trucks</td>
<td>6%</td>
</tr>
<tr>
<td>5 Trucks</td>
<td>3%</td>
</tr>
<tr>
<td>4 Trucks</td>
<td>4%</td>
</tr>
</tbody>
</table>

2006 DMV DATA: HHD & MHD Truck Population

Special Provisions
Small Fleets

- Applies to fleets of up to 3 vehicles
- Exempt from performance requirements in 2010 and 2011
- First vehicle upgraded in 2012
  - 2004 emission engine with PM control exempt until 2017
- Remaining trucks upgraded 2013-2022
- Provide additional time for 3 vehicle fleets
- Subject to reporting requirements
Special Provisions
Exemption from Replacement Requirements

<table>
<thead>
<tr>
<th>Exempt Vehicle</th>
<th>Expires</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle with highest level PM control by Dec. 31, 2009</td>
<td>2013</td>
</tr>
<tr>
<td>Class 8 vehicle operated less than 7,500 miles</td>
<td>2020</td>
</tr>
<tr>
<td>Certain vehicles must also operate less than 250 hrs per year</td>
<td></td>
</tr>
<tr>
<td>Smaller vehicle operated less than 5,000 miles</td>
<td>2020</td>
</tr>
<tr>
<td>Certain vehicles must also operate less than 175 hrs per year</td>
<td></td>
</tr>
<tr>
<td>Cab-over-engine tractors exclusively pulling 57-foot trailers (must be 2004 or newer)</td>
<td>2017</td>
</tr>
<tr>
<td>Schoolbuses</td>
<td>Does not expire</td>
</tr>
</tbody>
</table>

- Remain subject to PM requirements
- Subject to reporting requirements

Other Special Provisions

- Certain specialty farm vehicles exempt from PM requirements until 2017
  - Cotton module, spreader, silage, and other
  - Remain subject to NOx requirements
- Vehicles used fewer than 1,000 miles and less than 100 hours per year exempt from all clean up requirements
- Credits for hybrid vehicles expires in 2017
- Subject to reporting requirements

Summary of Other Changes

- Equal treatment in BACT for engines with equivalent emissions to 2004 and 2007 engines
- No replacement to meet PM BACT until 2017
- BACT required for 2004 to 2006 MY drayage trucks starting in 2010
- Replacement delay for unique vehicles until 2017
- Exemption process if unsafe to add PM controls
- Online notice of reported compliance
- May exclude cleanest trucks for compliance
- Exemption from idling shut-off for workover rigs and armored cars
Additional Proposed Changes
Off-Road Diesel Vehicle Regulation

- Make two engine cranes subject to regulation for in-use off-road diesel fueled vehicles
  - Both upper and lower engine
- Exempt from portable engine and equipment registration requirements
  - Except for the opacity limits
- Would no longer be subject to the portable engine air toxic control measure
- Workover rigs must install on-road certified engines to operate on-road

Additional Proposed Changes
Public Agency and Utilities (PAU)

- Addition of Light Heavy-Duty Engines
- Include all heavy-duty engines in vehicles >14,000 lbs gvwr in record keeping, labeling and total fleet size calculation starting 1/1/2009
- Meet 2009 and future BACT compliance deadlines
- 2009 compliance extension application
  - Light heavy-duty engines only
  - August 1, 2009 application deadline

Additional Proposed Changes
Public Agency and Utilities (PAU)

- Addition of all 2007+ model year engines certified above 0.01g PM standard
- Add Group 4 Implementation Schedule
  - Apply BACT by 2012
  - Low Population follow Group 3 plus 1 year
- Meet all labeling and record keeping requirements as of 1/1/2009

Additional Proposed Changes
Public Agency and Utilities (PAU)

- Retirement: Out-of-State Sales
- To qualify as a retired vehicle:
  - Submit VIN stop request to ARB prior to sale of vehicle
  - Registration Hold (VIN Stop) in place prior to sale
  - Third Party Vehicle Seller Contract
Proposed School Bus Requirements

- Requirements begin in 2010
- Must meet PM only
- Same 3 compliance options
- Exemptions
  - Historic school buses
  - Low-use operation
- Reporting requirements

Revised BACT Compliance Schedule for School Buses

<table>
<thead>
<tr>
<th>Compliance Deadline As of December 31</th>
<th>Engine Model Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>2000 and newer</td>
</tr>
<tr>
<td>2011</td>
<td>1994 - 1999</td>
</tr>
<tr>
<td>2012</td>
<td>1987 - 1993</td>
</tr>
<tr>
<td>2013</td>
<td>Pre-1987</td>
</tr>
</tbody>
</table>

Note: Exemption delay until 2017, if engine cannot be retrofit, reporting requirement only.

Reporting Requirements

- Annual demonstration of compliance for all options except BACT schedule
- Owner contact information including motor carrier number
- Vehicle and engine information
  - Make, model, model year, VIN, License plate, engine family, engine serial number, etc.
  - Emission control system information
- Mileage exemptions or NOx Exempt Area
  - Records from a tracking system, Highway Vehicle Use Tax Return, other documentation

Enforcement

- Web based database for tracking vehicle records
- Provisions built into regulation to crosscheck other programs
  - DMV (registration/MCP), U.S. DOT, IRS
- Expand existing inspection efforts
  - Weigh stations, random roadside and fleet
- Audits of records
- Additional resources needed
Statewide Truck/Bus Proposed Regulation

Emissions Inventory and Benefits

Inventory Updates for Regulation

- Discussed at cost/inventory workshops
  - More statewide vehicle miles traveled
  - Younger interstate truck age
  - Updated medium duty emission rates
  - Phase-in of new engine standards
  - Updated mileage accrual by truck type

- Growth
  - Consistent with transportation planning agencies

- Spatial allocation
  - More in-state truck activity occurs in air basin of registration
    - South Coast: single-unit, drayage trucks
    - San Joaquin Valley: agricultural trucks
  - Interstate trucks and in-state tractors travel throughout the state

- Results presented today incorporate the best available data for use in the rulemaking

Statewide Emissions Benefits

<table>
<thead>
<tr>
<th>Cal Yr</th>
<th>NOx Tons per Day</th>
<th>Baseline*</th>
<th>With Rule</th>
<th>Tons Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>843</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>506</td>
<td>376</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>2023</td>
<td>324</td>
<td>220</td>
<td>104</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cal Yr</th>
<th>PM2.5 Tons per Day</th>
<th>Baseline*</th>
<th>With Rule</th>
<th>Tons Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>10</td>
<td>6</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>2023</td>
<td>10</td>
<td>7</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

* Baseline includes Drayage Truck Rule

Statewide Truck and Bus NOx Emissions

Results presented today incorporate the best available data for use in the rulemaking.
Statewide Truck/Bus Proposed Regulation

Statewide Truck and Bus PM$_{2.5}$ Emissions

South Coast Truck and Bus NOx Emissions

South Coast Truck and Bus PM$_{2.5}$ Emissions

San Joaquin Valley Truck and Bus NOx Emissions
Estimate of Statewide Costs

- Preliminary cost estimate ranges from $4.4 to $5.4 billion ($2008)
- Cost effectiveness
  - NOx: $6,100 to $7,600 per ton ($3 to $4 per lb)
  - PM: $90,000 to $110,000 per ton ($45 to $55 per lb)
- Recently completed cost methodology workshops

Company Specific Impacts

- Evaluating costs of proposed regulation on 12 individual businesses
  - Truckload, less than truckload, bus, construction, refrigerated transport, building supplies, farming
- Financial analysis includes impacts on cash flow, income, debt
- Evaluating costs from other regulations
- Still need follow-up

AB32 Truck Green House Gas Regulation
Proposed Heavy-Duty Vehicle
Green House Gas (GHG) Regulation Scope

- Long haul heavy-duty tractors
- Box-type trailers - 53’ or longer:
  - Dry van
  - Refrigerated van, and
  - Curtain-side van
- California and out-of-state registered
- Drivers, owners, motor carriers
- California based businesses that ship or receive freight in 53’ or longer box-type trailers

Overview of Proposed GHG Regulation

- Tractors pulling box-type trailer (≥53’)
  - SmartWay approved tires
  - 2011 and newer tractors must be SmartWay certified
- 53’ or longer box-type trailer
  - Retrofit with SmartWay approved technologies to meet SmartWay specification, or
  - 2011 and newer trailers must be SmartWay certified
  - Phased-in compliance schedule for large fleets (20+)
    - 1/1/2010 to 1/1/2014
- Contacts
  - Stephan Lemieux, Manager - (626) 450-6162
  - Daniel Hawelti - (626) 450-6149

Proposed GHG Reduction Measure: Exemptions

- Local Haul
  - (e.g., Operation within 100 mile radius of the home base or does not exceed a maximum of 50,000 miles/year)
- Emergency vehicles (tractors and trailers)
- Container chassis
- Drayage tractors
  - Travel within 100 miles of port or yard
- Military tactical support vehicles
- Drop Frame

Proposition 1B Incentives

- Administered locally by Air Districts and Ports
- $760 million for trucks operating exclusively in California and greater than 50% in trade corridors
- $222 million allocated for trucks in FY 2007-08
- Priority placed on retrofits and replacements
  - Up to $50,000 for truck replacement
  - Up to $5,000 for a retrofit
- Projects must be completed before required to do so by a regulation
  - http://arb.ca.gov/gmbond or (916) 444-6637
Other Potential Financing

- Innovative financing being explored to assist with costs
- Support reductions of criteria and toxic pollutants and greenhouse gases
- ARB working closely with the State Treasurer’s Office
  - California Pollution Control Finance Authority
  - California Alternative Energy and Advanced Transportation Finance Authority

Next Steps

- Staff report available September 5, 2008
- Additional meetings with stakeholders
- Board consideration October 2008

Statewide Diesel Truck and Bus Regulation Contacts

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Statewide Truck and Bus Regulation - www.arb.ca.gov/dieseltruck
Verified Devices - www.arb.ca.gov/diesel/verdev/verdev.htm

www.arb.ca.gov/msei/onroad/onroad.htm