Advanced Clean Cars Program

• Clean, efficient vehicles needed to meet California’s health and climate change goals
• Commercialization of advanced vehicle technologies by 2025 required to achieve 2050 climate change goal
  – HEV, PHEV, BEV, FCV
• Modifications to the LEV and ZEV programs being proposed to meet those goals
  – Define the “pathway” to 2050
  – Long-term standards provide certainty to manufacturers
    • Criteria 2014-2022
    • GHG 2017-2025
Advanced Clean Cars Workshop

LEV III Criteria Emissions Element

El Monte, California
November 16th, 2010
Low-Emission Vehicle Program

• Applicable to light- and medium-duty vehicles
  – LDVs up to 8,500 lbs GVW
  – MDVs 8,501-14,000 lbs GVW
• LEV II fully phased-in in model year 2010
  – NMOG fleet average requirements for PC/LDT1 (0.035 g/mi) and LDT2 (0.043 g/mi)
• Percentage certification requirement for MDVs
  – chassis certified - 40% LEV, 60% ULEV
  – engine certified - 100% - ULEV
Low Emission Vehicle Program
Light-Duty Vehicles
Proposed Revisions to LEV Program (LDVs)

- Phase-in 2014-2022
- Fleet average requirement equivalent to SULEV by 2022
- Additional emission categories provided for flexibility
- Combined NMOG and NOx standards
- Intermediate FUL standards
- Eliminate 50,000 mile intermediate useful life standards
- Increase durability requirement from 120,000 miles to 150,000 miles
- More stringent particulate matter standard
- NMOG+NOx credit 0.005 g/mi for 15 year/150,000 mile emission warranty
- Revised baseline reactivity factor (RFA)
## Proposed LEV III LDV Emission Standards

<table>
<thead>
<tr>
<th>Vehicle Emission Category</th>
<th>Durability Basis (miles)</th>
<th>Existing NMOG standards (g/mi)</th>
<th>Existing NO&lt;sub&gt;x&lt;/sub&gt; Standards (g/mi)</th>
<th>Combined NMOG+NO&lt;sub&gt;x&lt;/sub&gt; Standards (g/mi)</th>
<th>Proposed NMOG+NO&lt;sub&gt;x&lt;/sub&gt; Emission Standards (g/mi)</th>
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</thead>
<tbody>
<tr>
<td>LEV</td>
<td>150,000</td>
<td>0.090</td>
<td>0.070</td>
<td>0.160</td>
<td>0.160</td>
</tr>
<tr>
<td>ULEV</td>
<td>150,000</td>
<td>0.055</td>
<td>0.070</td>
<td>0.125</td>
<td>0.125</td>
</tr>
<tr>
<td>ULEV70*</td>
<td>150,000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.070</td>
</tr>
<tr>
<td>ULEV50*</td>
<td>150,000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.050</td>
</tr>
<tr>
<td>SULEV30</td>
<td>150,000</td>
<td>0.020</td>
<td>0.010</td>
<td>0.030</td>
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</tr>
<tr>
<td>SULEV20*</td>
<td>150,000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.020</td>
</tr>
</tbody>
</table>

*New emission standards
# Proposed LEV III LDV Intermediate In-use Emission Standards

Applicable to first two years a test group is certified to a new standard

<table>
<thead>
<tr>
<th>Vehicle Emission Category</th>
<th>Durability Basis (miles)</th>
<th>Proposed FUL Emission Standards (g/mi)</th>
<th>Proposed Intermediate In-use (NMOG+NOx) Emission Standards (g/mi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEV</td>
<td>150,000</td>
<td>0.160</td>
<td>-</td>
</tr>
<tr>
<td>ULEV</td>
<td>150,000</td>
<td>0.125</td>
<td>-</td>
</tr>
<tr>
<td>ULEV70*</td>
<td>150,000</td>
<td>0.070</td>
<td>0.100</td>
</tr>
<tr>
<td>ULEV50*</td>
<td>150,000</td>
<td>0.050</td>
<td>0.070</td>
</tr>
<tr>
<td>SULEV30</td>
<td>150,000</td>
<td>0.030</td>
<td>0.040**</td>
</tr>
<tr>
<td>SULEV20*</td>
<td>150,000</td>
<td>0.020</td>
<td>0.030</td>
</tr>
</tbody>
</table>

*New emission standards
** Not applicable to PZEV carry over
Baseline RFA Reactivity Factor

- Reactivity factor provides fuel specific emission adjustment relative to RFA
  - Favors clean fuels
- RFA, or reformulated fuel A, represents industry average commercial gasoline when LEV program adopted in 1990
  - Defined by Auto/Oil study
- Update baseline reactivity of RFA fuel to reflect revised MIRs
  - Approved by Reactivity Scientific Advisory Committee March 25, 2009
- Primarily benefits E85
Medium-Duty Vehicles
8,501 – 14,000 lbs GVW
Proposed Revisions to LEV Program (MDVs)

- Phase-in 2016-2022
- More stringent emission standards
  - Additional emission categories provided
- Combined NMOG and NOx standards
- More stringent PM standards
- Eliminate 50,000 mile intermediate useful life standards
- Increase durability requirement from 120,000 miles to 150,000 miles
- MDVs 8,501-10,000 lbs GVW must chassis certify
## Current LEV II MDV Emission Standards (Chassis Certified)

<table>
<thead>
<tr>
<th>Weight Class (lbs GVW)</th>
<th>Vehicle Emission category</th>
<th>NMOG (g/mi)</th>
<th>NO\textsubscript{x} (g/mi)</th>
<th>CO (g/mi)</th>
<th>HCHO (g/mi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,501-10,000</td>
<td>LEV</td>
<td>0.195</td>
<td>0.2</td>
<td>6.4</td>
<td>0.032</td>
</tr>
<tr>
<td></td>
<td>ULEV</td>
<td>0.143</td>
<td>0.2</td>
<td>6.4</td>
<td>0.016</td>
</tr>
<tr>
<td></td>
<td>SULEV</td>
<td>0.100</td>
<td>0.1</td>
<td>3.2</td>
<td>0.008</td>
</tr>
<tr>
<td>10,001-14,000</td>
<td>LEV</td>
<td>0.230</td>
<td>0.4</td>
<td>7.3</td>
<td>0.040</td>
</tr>
<tr>
<td></td>
<td>ULEV</td>
<td>0.167</td>
<td>0.4</td>
<td>7.3</td>
<td>0.021</td>
</tr>
<tr>
<td></td>
<td>SULEV</td>
<td>0.117</td>
<td>0.2</td>
<td>3.7</td>
<td>0.010</td>
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</table>
Proposed MDV Emission Standards
(Chassis Certified)

<table>
<thead>
<tr>
<th>Emission Category</th>
<th>8,501-10,000 lbs. GVW</th>
<th>10,001-14,000 lbs. GVW</th>
<th>VEC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NMOG+NOx (g/mi)</td>
<td>CO (g/mi)</td>
<td>NMOG+NOx (g/mi)</td>
</tr>
<tr>
<td>LEV</td>
<td>0.395</td>
<td>6.4</td>
<td>0.630</td>
</tr>
<tr>
<td>ULEV1</td>
<td>0.340</td>
<td>6.4</td>
<td>0.570</td>
</tr>
<tr>
<td>ULEV2</td>
<td>0.250</td>
<td>6.4</td>
<td>0.400</td>
</tr>
<tr>
<td>ULEV3</td>
<td>0.200</td>
<td>4.2</td>
<td>0.270</td>
</tr>
<tr>
<td>SULEV1</td>
<td>0.170</td>
<td>4.2</td>
<td>0.230</td>
</tr>
<tr>
<td>SULEV2</td>
<td>0.150</td>
<td>3.2</td>
<td>0.200</td>
</tr>
</tbody>
</table>
## MDV Phase-in
**(8,501-14,000 lbs GVW)**

<table>
<thead>
<tr>
<th>Year</th>
<th>LEV</th>
<th>ULEV34/ULEV57</th>
<th>ULEV25/ULEV40</th>
<th>ULEV20/ULEV27</th>
<th>SULEV17/SULEV23</th>
<th>SULEV15/SULEV20</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015*</td>
<td>40%</td>
<td>60%</td>
<td>0%</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2016</td>
<td>20%</td>
<td>60%</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>10%</td>
<td>50%</td>
<td>40%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>40%</td>
<td>50%</td>
<td></td>
<td>10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>30%</td>
<td>40%</td>
<td></td>
<td>30%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>20%</td>
<td>30%</td>
<td></td>
<td>50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>10%</td>
<td>20%</td>
<td></td>
<td>70%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td></td>
<td>10%</td>
<td></td>
<td>90%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Current Requirements*
Phase-in Requirements (LDV/MDV)

• Phase-in to 150,000 mile durability
  – New test groups must certify to 150K durability
  – Carry over/carry across existing test groups allowed

• Phase-in to E10 certification fuel by 2018
  – New test groups must certify to 150K durability
  – Carry over/carry across existing test groups allowed
Other Provisions

• 5 Year carry forward/back of credits or debits
  – Currently credits carry forward 3 MYs then discounted 50% next two MY years, go away in third MY year. Carry back 1 MY

• E10 NMHC to NMOG conversion factor
  – Additional data needed

• Aggregate manufacturers if 33.4% ownership
  – Currently 10%
  – Simply to interpret
  – Indicates strong investment

• Revising Intermediate Volume Manufacturer cutpoint from 60,000 to 20,000 units per year

• 3 year moving average to determine manufacturer status the following MY
  – Currently OEM moves to lower category the next MY when 3 year average sales meet category criteria
  – Currently OEM moves to higher category the 4th year after 3 year average sales meet category criteria
Emission Pooling?

• Industry has requested that pooling of criteria and GHG emissions in California and section 177 states for compliance purposes be allowed.
• ARB supports this.
• OEMs would still be required to report model year sales and emissions on a state-by-state basis.
• Buy-in of Section 177 states required.
  – Some may be concerned about impact on SIP compliance
Questions/Comments
Contacts/Information

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Advanced Clean Cars Webpage
http://www.arb.ca.gov/msprog/clean_cars/clean_cars.htm

LEV III Webpage
http://www.arb.ca.gov/msprog/levprog/leviii/leviii.htm