California’s
Advanced Clean Cars Program

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California Air Resources Board
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Advanced Clean Cars

Multi-pronged approach to meeting mid- and long-term emission reductions from light duty vehicles

- LEV: Conventional Vehicle Advancement
- ZEV: Future Technology advancement
- CFO: Infrastructure development
Advanced Clean Cars Program Goals

• Continued progress towards ozone attainment
• Reduce localized exposure
  – PM, toxics
• Ensure commercialization of ultra-clean vehicles
Meeting GHG Goals

Advanced Clean Cars

- Advanced Gasoline Vehicles
- Conventional (Non-Plug in) Hybrids
- Battery Electric Vehicles
- Plug-in Hybrid Electric Vehicles
- Hydrogen Fuel Cell Vehicles

% of On-Road LDV Fleet

Year

2000 2010 2020 2030 2040 2050

87%
LEV III Criteria Pollutant Fleet Avg Standards

150,000-mile New Vehicle Fleet Average Emissions

Model Year

% Lower

NMOG+NOx (g/mi)

PC, LDT1

LDT2, MDPV

LEV III Particulate Matter Standards

Advanced Clean Cars

PM Emissions (mg/mi)

Current Standard: 10
Proposed Standard (2017): 3
Proposed Standard (2025): 1
Lower GHG Standards

• Proposal target: 166 gCO$_2$e/mile by 2025
  – GHG reduction of 4.6%/year for 2017-2025 model years
  – GHG reduction of 34% from 2016 to 2025
Substantial GHG Reduction

- Major impact as low-GHG vehicles replace older vehicles
  - GHG reduction in California: 27% in 2035 and 33% by 2050
  - Cumulative: 870 million metric tons through 2050
2015-2025 ZEV Requirements

15.4% of Annual Sales in 2025

Projected: ZEVs
Projected: Plug-in Hybrids
How The ZEV Regulation Works

- Requires large OEMs to produce zero emitting passenger vehicles
  - Battery Electric Vehicles
  - Hydrogen Fuel Cell
- May substitute some with near-zero emission vehicles
  - Plug-in Hybrid Electric Vehicles
  - Conventional Hybrids
  - Clean Gasoline Vehicles
Clean Fuels Outlet

- Automaker surveys: 1,400 FCVs by 2014, 53,000 FCVs by 2017
- State infrastructure investment ~30 stations
- CFO will ensure fuel will be available in the appropriate timeframe
ACC Program: Vehicle Technology Cost

• Increasing costs from 2016 to 2025
  – Incremental 2025 price increase to consumers: $1,900/vehicle
  – At $1,900/vehicle, vehicle prices would increase by about 8%

Average 2025 vehicle price

Reference vehicle

ACC program

$1,340
LEVIII criteria (70% lower smog and soot emissions)

$80
LEVIII GHG (34% lower climate emissions)

$500
ZEV (15% electric and fuel cell vehicles)
ACC Program: Consumer impact

- Average 2025 vehicle consumer impact:
  - Consumer savings greatly outweigh the cost (by 3-to-1 margin)
  - “Off the lot” savings from the first month
  - Overall payback within first vehicle purchaser

<table>
<thead>
<tr>
<th>Lifetime effect per vehicle</th>
<th>Incremental technology price</th>
<th>$1,900</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Lifetime savings</td>
<td>$5,900</td>
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<tr>
<td></td>
<td>Net lifetime savings</td>
<td>$4,000</td>
</tr>
<tr>
<td></td>
<td>Payback period</td>
<td>3 years</td>
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</tbody>
</table>

| Monthly effects for financed vehicle purchase | Increased monthly payment | $35   |
|                                              | Monthly fuel savings        | $48   |
|                                              | Net monthly savings         | $12   |

Note: values may not match due to rounding
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