“The TAR”

Draft Joint Technical Assessment Report
for Adopted Light-Duty Vehicle Greenhouse Gas Emission Standards

Sacramento, California
July 21st, 2016
One National Program

• National Program requires all new vehicles improve efficiency and reduce GHG emissions over time
  – Started in 2012, when ARB adopted LEV III GHG emission standards for model year (MY) 2017-2025 light-duty vehicles
  – Later that year, U.S.EPA adopted nearly same GHG standards and NHTSA corresponding CAFE standards

• Agencies made commitment for Mid-Term Evaluation (MTE) of long-term standards (MY 2022-2025)

• TAR is key assessment and most important technical and economic underpinning of MTE
  – TAR led by U.S. EPA and NHTSA in collaboration with ARB
What are the regulated GHG emissions?
What are the GHG limits and how do they apply?

- Limits on CO₂ and other GHG emissions from light-duty vehicles
  - Passenger cars, SUVs, light trucks

- Applicable to model years 2017-2025
- Standards are based on vehicle footprint – CO₂ limits are higher for trucks than for cars
- MY 2025 vehicle fleet was projected to be at 54.5 mpg or 163 gCO₂e/mile on average
  - Achieving this will require ~40% improvement in fuel consumption and GHG emissions from today’s levels
What NAS study concluded

- NAS Report on fuel economy technologies
- Confirmed overall methodology of agencies’ original analysis was sound
- Affirmed 2025 standards can be met mostly with advanced gasoline technologies
  - Many technologies already widely in use
Updated technical and economic assessment used for MY 2022-2025 GHG standards
TAR Key Findings (1)

• 2025 GHG standards can be met cost effectively predominantly with advanced gasoline engines and transmissions
• In addition, light-weighting, improved aerodynamics and better tires also key technologies
• Nationwide, minimal reliance on ZEVs needed to meet GHG standards

<table>
<thead>
<tr>
<th>2025 Model Year Vehicle Technologies</th>
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<tbody>
<tr>
<td>Conventional Technologies</td>
<td>54%</td>
</tr>
<tr>
<td>Stop-Start</td>
<td>20%</td>
</tr>
<tr>
<td>Mild Hybrid (48 Volt)</td>
<td>18%</td>
</tr>
<tr>
<td>Strong Hybrid</td>
<td>3%</td>
</tr>
<tr>
<td>Plug-in Hybrid Electric Vehicle</td>
<td>2%</td>
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<tr>
<td>Battery Electric Vehicle</td>
<td>3%</td>
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TAR Key Findings (2)

• Current mix of new vehicle sales has shifted to more trucks:

<table>
<thead>
<tr>
<th>MY 2025 Fleet Mix</th>
<th>Original Projection</th>
<th>New Projection</th>
</tr>
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<tbody>
<tr>
<td>% Car</td>
<td>67%</td>
<td>52%</td>
</tr>
<tr>
<td>% Truck</td>
<td>33%</td>
<td>48%</td>
</tr>
</tbody>
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• Updated projection for MY 2025 fleet average is 175 gCO₂e/mile vs. original 163 gCO₂e/mile projection
  – Corresponding projected fuel economy is 50.8* mpg nationally

• Today, costs to meet standards are similar or lower than in 2012:

<table>
<thead>
<tr>
<th></th>
<th>Incremental Cost per Vehicle in MY 2025</th>
<th>Payback Period</th>
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<tbody>
<tr>
<td>2012</td>
<td>$1,070</td>
<td>3.2 years</td>
</tr>
<tr>
<td>2016 Draft TAR:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPA Analysis</td>
<td>$894</td>
<td>5 years</td>
</tr>
<tr>
<td>NHTSA Analysis</td>
<td>$1,128</td>
<td>6 years</td>
</tr>
</tbody>
</table>

*Unadjusted test cycle fuel economy, assuming all reductions achieved solely through fuel economy improvements
Automaker Concerns*

• Actual benefits from advanced technologies lower than projected, and costs are higher
  – ARB: Not supported in findings of NAS study and draft TAR

• Fuel efficiency not a consumer priority** (lower fuel prices, slower pace of hybrid sales)
  – ARB: Consumer Reports survey shows strong public support

• Project standards will require substantially higher hybrid vehicle sales by 2025
  – ARB: Draft TAR scenario shows compliance with minor sales of “strong” hybrids

• CA ZEV Reg makes national compliance more costly
  – ARB: ZEV sales necessary for longer term emission goals, and battery costs are declining (as reflected in the draft TAR)

* “Light-Duty Vehicle CAFÉ and GHG Standards” http://www.autoalliance.org/midtermevaluation
** http://consumersunion.org/2016/06/2016-fe-consumer-survey/
Next Steps

• 60 day public comment period for TAR
• California ACC Technology Symposium Sept 2016
• California Mid-term Review (MTR) – Dec 2016
  Board Hearing
  – TAR and other input go into ARB technical report for Board Hearing
• 2017: Federal Proposed Determination/Notice of Proposed Rulemaking on National Standards
• By April 2018: Federal Final Determination/Final Rulemaking on National Standards for MY 2022-2025