<table>
<thead>
<tr>
<th><strong>DOCKETED</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Docket Number:</strong></td>
<td>20-IEPR-02</td>
</tr>
<tr>
<td><strong>Project Title:</strong></td>
<td>Transportation</td>
</tr>
<tr>
<td><strong>TN #:</strong></td>
<td>234240</td>
</tr>
<tr>
<td><strong>Document Title:</strong></td>
<td>Presentation - ZEV Technology Rollout for Deep Emission Reductions</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>Supersedes TN 234217 S3. 1 Joshua Cunningham, California Air Resources Board</td>
</tr>
<tr>
<td><strong>Filer:</strong></td>
<td>Raquel Kravitz</td>
</tr>
<tr>
<td><strong>Organization:</strong></td>
<td>California Air Resources Board</td>
</tr>
<tr>
<td><strong>Submitter Role:</strong></td>
<td>Public Agency</td>
</tr>
<tr>
<td><strong>Submission Date:</strong></td>
<td>8/5/2020 4:52:44 PM</td>
</tr>
<tr>
<td><strong>Docketed Date:</strong></td>
<td>8/5/2020</td>
</tr>
</tbody>
</table>
ZEV Technology Rollout for Deep Emission Reductions

Joshua Cunningham
CEC AB 2127 Workshop
August 6, 2020
On-Road Vehicles

In 2017 on-road mobile sources contribute to 45% of statewide NOx emissions and 37% of statewide GHG emissions.

Statewide NOx Emissions

- Off-Road Mobile: 35%
- Light Duty Vehicles: 13%
- Medium Duty Vehicles: 6%
- Heavy Duty Vehicles: 26%
- Stationary: 17%
- Areawide: 3%

Statewide GHG Emissions

- Off-Road Mobile: 4%
- Light Duty Vehicles: 28%
- Medium Duty Vehicles: 2%
- Heavy Duty Vehicles: 7%
- Other Sectors (industrial, electricity generation, etc.): 59%
# Emission Reduction Targets

<table>
<thead>
<tr>
<th>Criteria Emissions (NOx)</th>
<th>GHG Emissions California</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>National Ambient AQ Std:</strong></td>
<td><strong>SB 32: 40% below 1990 / 2020</strong></td>
</tr>
<tr>
<td>75 ppb ozone, attainment in South Coast by 2031</td>
<td>Exec Order: Carbon Neutrality by 2045</td>
</tr>
<tr>
<td>70 ppb ozone, attainment in South Coast by 2037</td>
<td></td>
</tr>
</tbody>
</table>

- **Mobile Source Strategy update**
  - Fall 2020

- **Scoping Plan Update**
  - Late 2022
LDV Tech Projections in Baseline

Current policies expected to achieve on-road ZEV + PHEVs (and sales):

~1.5 M by 2025 (11%)
~2.4 M by 2030 (13%)
LDV Tech Needed for Deep Reductions

- 100% sales ZEVs & PHEVs by 2035; Not aggressive enough
- PRELIMINARY – New scenarios to be released in fall 2020

More than 5M ZEVs + PHEVs needed by 2030 (at least 50% sales)
LDV Policies and Strategies

- **Stronger vehicle regs for post 2026 model years**
  - ZEV Regulation – Moving beyond early adopters
    - With large population of ZEVs – implications on wide public EVSE/H2 needs
  - LEV GHG – Pushing ICE GHG improvements on top of ZEVs
  - LEV Criteria – Ensuring real world emission reductions
  - *Board hearing late 2021*

- **Clean Miles Standard on TNCs, 2023 - 2030**
  - Increasing eVMT requirements (Uber, Lyft, etc)
    - Implications for DCFC to support higher mileage TNC drivers
  - *Board hearing Dec 2020*
2020 Mobile Source Scenario for MDV

- Considered a scenario to achieve long-term climate goals
- Strategy: Ambitious ZEV penetration for newer vehicles

<table>
<thead>
<tr>
<th>Year</th>
<th>ICE</th>
<th>ZEVs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2031</td>
<td>6%</td>
<td>94%</td>
</tr>
<tr>
<td>2037</td>
<td>25%</td>
<td>75%</td>
</tr>
<tr>
<td>2045</td>
<td>60%</td>
<td>40%</td>
</tr>
</tbody>
</table>

Fuel Demand in 2045 (bil. gal. per year):
- gasoline – 0.27
- diesel – 0.16
2020 Mobile Source Scenario for HDV

- To achieve NOx reduction needed to meet near term air quality goals, and also maximize the number of zero-emission trucks for longer term climate goals.
- A hyper ambitious ZEV penetration combined with accelerated turnover of older vehicles.

Fuel Demand in 2045 (bil. gal. per year):
- Diesel – 1.01
- Gas – 0.08

Classes 4-8

<table>
<thead>
<tr>
<th>Year</th>
<th>Low NOx HD ZEV &amp; Accelerated Turnover</th>
<th>Federal Low NOx</th>
<th>CA Cert. Low NOx</th>
<th>HD ZEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>2031</td>
<td>23%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2037</td>
<td>31%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2045</td>
<td>24%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sales & Accelerated Turnover
M/HDV Policies and Strategies

**Medium-Duty Vehicles** (MDVs – GVWR 8,501 -14,000 lbs) include:
- ✓ Zero-emission technology penetration starting in 2024
- ✓ Enhanced LEV regulations through Advanced Clean Cars 2.0
- ✓ Continued energy efficiency improvements

**Heavy-Duty Vehicles** (HDVs – GVWR > 14,000 lbs) include:
- ✓ Zero-emission technology penetration starting in 2024
- ✓ Cleaner diesel technology (i.e., Low NOx diesel) starting in 2024
- ✓ Use of renewable fuels where electrification is not feasible
- ✓ Continued energy efficiency improvements
- ✓ In-use performance measures