2020 Mobile Source Strategy: A Vision for Clean Air

- Builds on 2016 Mobile Source Strategy
- Conceptual scenario approach
- Identifies potential technology mixes needed to meet air quality and climate targets
- Meets SB 44 requirements
- Informs policy development
California’s Goals

2023: South Coast & SJV Ozone

2024/25: AB 617 Communities South Coast & SJV PM2.5

2030: GHG 40 percent below 1990

2031: South Coast & SJV Ozone

2037: South Coast & SJV Ozone

2045: Carbon Neutrality

2050: GHG 80 percent below 1990
Achieving Air Quality and Climate Goals Requires Multiple Tools

- Enhanced Enforcement
- End User Requirements
- Outreach & Education
- Facility Requirements
- Manufacturer Requirements
- Incentive Programs
- Infrastructure Development
On-Road Sector

- In 2017, on-road mobile sources contributed to 45% of statewide NOx emissions and 37% of statewide GHG emissions.
2020 Mobile Source Scenario for LDV

- 100% sales ZEVs & PHEVs by 2035; Does not go far enough
- Half of fleet in 2045 still has combustion engine

Staff continue to evaluate more ambitious ZEV sales scenarios and the impact of high mileage vehicles
On-Road Medium-Duty Sector

- Medium-duty vehicles (8,501 – 14,000 lbs. GVWR) are responsible for 7% of statewide mobile source NOx and 5% of statewide mobile source GHG emissions

- **Strategies** for on-road medium-duty vehicles (MDVs) include:
  - Zero-emission technology transformation starting in 2024
  - Enhanced LEV regulations through Advanced Clean Cars 2.0
  - Continued energy efficiency improvements
    - Phase 3 Greenhouse Gas Standards for Medium/Heavy-Duty Vehicles
2020 Mobile Source Scenario for MDV

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

![Graph showing projected Statewide On-Road Population](image)

- **ZEVs vs ICE**
  - 6% ZEVs in 2031
  - 25% ZEVs in 2037
  - 60% ZEVs in 2045

- Fuel Demand in 2045
  - Gasoline: 0.27 bil. gal. per year
  - Diesel: 0.16 bil. gal. per year

- Internal Combustion Engines (Mostly LEV Certified)

- Medium Duty ZEVs
On-Road Heavy-Duty Sector

- Heavy-duty vehicles (above 14,000 lbs. GVWR) are responsible for 33% of statewide mobile source NOx and 16% of statewide mobile source GHG emissions

- **Strategies** for on-road heavy-duty vehicles (HDVs) 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
    - Tractor-Trailer Greenhouse Gas (TTGHG)
    - Phase 3 Greenhouse Gas Standards for Medium/Heavy-Duty Vehicles
  - In-use performance measures
    - Heavy-duty inspection and maintenance (HD I/M) program starting in 2023
    - More Stringent in-use performance standards
    - Lengthening engine useful life, warranty, and durability requirements
Meeting Midterm Goals

- To achieve NOx reduction needed to meet the air quality goals over the next two decades while also charting a course to achieve longer-term climate change goals.
- Ambitious ZEV penetration for newer vehicles combined with accelerated turnover of older vehicles (e.g., 2010-certified).

Classes 4-8

<table>
<thead>
<tr>
<th>Low NOx HD ZEV &amp; Accelerated Turnover</th>
<th>25%</th>
<th>39%</th>
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<tr>
<td>Year</td>
<td>18%</td>
<td>35%</td>
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<td>2031</td>
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<td>2045</td>
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Fuel Demand in 2045 (bil. gal. per year):
- diesel – 1.37
- gas – 0.10

Sales & Accelerated Turnover
Meeting Long Term Goals

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

Classes 4-8

- Low NOx HD ZEV & Accelerated Turnover

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<tr>
<th>Year</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>2035</th>
<th>2040</th>
<th>2045</th>
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<td>23%</td>
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<td>31%</td>
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<tr>
<td>2045</td>
<td>24%</td>
<td>76%</td>
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</table>

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

On-Road HDV

CARB
Energy and Infrastructure Needs

- Zero-emission technology for both on- and off-road sectors requires streamlined infrastructure build-out
- AB 2127: CEC preparing infrastructure assessment for meeting 2030 ZEV and GHG goals
- Significant investments being made in infrastructure
- Staff is coordinating with CEC and CPUC on assessment of infrastructure needs
<table>
<thead>
<tr>
<th>Event</th>
<th>Date/Status</th>
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</thead>
<tbody>
<tr>
<td>Scenario Modeling</td>
<td>Ongoing</td>
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<tr>
<td>Public Webinar</td>
<td>March 2020 ✔</td>
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<tr>
<td>Informational Update to the Board</td>
<td>April 2020 ✔</td>
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<tr>
<td>Release Draft Document and Workshop</td>
<td>Late Summer or Early Fall 2020</td>
</tr>
<tr>
<td>Board Consideration</td>
<td>Late 2020</td>
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Mobile Emissions Toolkit and Analysis (META)

- Building a process to share technical details of the MSS scenarios with external stakeholders through the META tool for heavy-duty on-road and off-road sectors
- META is a simple, user-friendly spreadsheet tool
- Provides a visualization of scenario results and more information on the major assumptions
- META beta version release – mid-August
META: On-Road Heavy-Duty

The user may select different scenarios and pollutants

Scenario visualization

Population - Technology Mix

- Federal Cert.: Low NOx
- CA Cert.: Low NOx
- MY 2024+ HD ZEVs
- ZEVs from Accelerated Turnovers
- 2010-certified
- Pre-2010