2020 Mobile Source Strategy

- Builds on 2016 Mobile Source Strategy
- Conceptual scenario approach
- Identifies technology mixes needed to meet air quality and climate targets
- Reflects Governor’s recent ZEV EO
- Informs policy development
Addressing Multiple Goals

2023:
South Coast & SJV Ozone

2030:
GHG 40 percent below 1990

2037:
South Coast & SJV Ozone

2050:
GHG 80 percent below 1990

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

2031:
South Coast & SJV Ozone

2045:
Carbon Neutrality
Senate Bill 44

- Requires CARB to update the Mobile Source Strategy every 5 years
- Update must include a comprehensive strategy for the deployment of medium- and heavy-duty vehicles in the State
- Include emissions reduction goals consistent with air quality and climate goals
Executive Order N-79-20

100% ZEV sales by 2035

Full transition to ZEV short-haul/drayage trucks by 2035

Full transition to ZEV buses & heavy-duty long-haul trucks by 2045*

Full transition to ZE off-road equipment by 2035* where feasible
Potential Benefits

2020 Mobile Source Strategy

- NO\textsubscript{x} Emissions:
  - 2031: 73% below 2017
  - 2037: 82% below 2017

- Greenhouse Gas Emissions*:
  - 2045: 76% below 2020

85 percent of passenger vehicles ZEV & PHEV in 2045

77 percent of heavy-duty fleet ZEVs in 2045

*well-to-wheel, excluding aviation

November 2020 Draft
Development Continues

2020 Mobile Source Strategy
- Scenarios & Programmatic Concepts

2022 State SIP Strategy
- Measures & CARB SIP Commitments

Regional SIPS
- Inclusion of State Measures / Commitments in Attainment Plans
# Addressing Near-Term Needs

<table>
<thead>
<tr>
<th>Measures Under Development</th>
<th>Target Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locomotive Measure</td>
<td>Early 2022</td>
</tr>
<tr>
<td>First Phase Heavy-Duty Vehicle Inspection &amp; Maintenance</td>
<td>2023</td>
</tr>
<tr>
<td>Cargo Handling Equipment Regulation</td>
<td>2023/2024</td>
</tr>
<tr>
<td>Construction and Mining Equipment Measure</td>
<td>2024</td>
</tr>
<tr>
<td>Co-Benefits from Climate Program</td>
<td>2020-2024</td>
</tr>
</tbody>
</table>
Complementary Effort

South Coast 2022 AQMP Working Groups
• CARB and South Coast AQMD joint process
• Kickoff this month
• 4 working groups
  • Ocean-going Vessels
  • Aircraft
  • Trucks and Infrastructure
  • Construction and Industrial Equipment
• Will look to identify additional near-term benefits
Importance of Mobile Source Emissions

Statewide NOx Emissions
- Off-Road Mobile: 35%
- Light Duty Vehicles: 13%
- Heavy Duty Vehicles: 26%
- Stationary: 17%
- Areawide: 3%

Statewide GHG Emissions
- Off-Road Mobile: 4%
- Medium Duty Vehicles: 2%
- Heavy Duty Vehicles: 7%
- Other Sectors (industrial, electricity generation, etc.): 59%
- Light Duty Vehicles: 28%

Other Sectors (industrial, electricity generation, etc.) account for 59% of the statewide GHG emissions.
### On-Road Vehicle Strategies

<table>
<thead>
<tr>
<th>Light-Duty</th>
<th>Medium-Duty</th>
<th>Heavy-Duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggressive ZEV penetration</td>
<td>Aggressive ZEV penetration</td>
<td>Aggressive ZEV penetration, and accelerated replacement of older vehicles</td>
</tr>
<tr>
<td>Enhanced ZEV and LEV regulations</td>
<td>Enhanced LEV regulations</td>
<td>Omnibus Rule</td>
</tr>
<tr>
<td>Reduce Vehicle Miles Travelled</td>
<td>Continued energy efficiency improvements</td>
<td>Continued energy efficiency improvements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In-use performance measures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Renewable fuels where electrification is not feasible</td>
</tr>
</tbody>
</table>
Light-Duty Vehicle Scenario

Statewide Vehicle Population (millions)

- 35
- 30
- 25
- 20
- 15
- 10
- 5

2020 2025 2030 2035 2040 2045 2050

ICE (with HEV)

PHEV

BEV

FCEV

85% of On-Road Fleet

100% ZEV+PHEV Sales

8M ZEV + PHEVs*

* ~28% of on-road fleet

CARB

12
## Reducing VMT in California

| Secure and sustain emissions reductions by linking transportation investments and land use decisions | Develop a VMT/GHG mitigation bank to assist with implementation of new requirements for project transportation impact mitigation | Align with the State’s initiative to establish a framework for integrated travel planning and payment through incentives and rebates | Explore non-regressive transportation pricing and demand management |

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[Image of urban street scene with a tram, a cityscape with a train, two women using a smartphone, and a parking meter]
On-Road Heavy-Duty Scenario

HD Omnibus & Fed. 0.02 g
HD ZEV (w/Accelerated Turnover)

2020 2025 2030 2035 2040 2045 2050
HDV Population

CA-Cert.: Omnibus
Federal Cert.: 0.02 g
Accelerated Turnover to ZEVs
MY 2024+ HD ZEVs

2010-Certified
Pre-2010

14
On-Road Heavy-Duty Scenario

HD Omnibus & Fed. 0.02 g
HD ZEV (w/Accelerated Turnover)

- HD Omnibus & Fed. 0.02 g: 20% in 2031, 27% in 2037, 22% in 2045
- HD ZEV (w/Accelerated Turnover): 24% in 2031, 48% in 2037, 77% in 2045

HDV Population: 2020-2050
NOx Emissions: 0-300
Growing Importance of Off-Road

Baseline Emissions without Additional Controls

Statewide Mobile Source NOx (tpd)

On-Road Vehicles

Off-Road Equipment

Trains

Vessels/Ships/Boats

Aircraft
Off-Road Engine Strategies

- Zero-emission technology wherever feasible
- Cleaner combustion engines
- Accelerated replacement of older equipment with cleanest available technology
- Retrofit with after-treatment technologies
- Renewable fuels where electrification is not feasible
Zero-Emission and Cleaner Off-Road Engine Standards

Full transition to ZE for most sectors with smaller engines
- Small Off-Road Engines
- Cargo Handling Equipment
- Airport Ground Support Equipment
- Transport Refrigeration Units
- Forklifts

Off-Road Tier 5
- 50%-90% NOx and PM reduction from Tier 4F
- Adoption around 2028
Ocean-Going Vessel Scenario

Address transit, anchorage and maneuvering emissions

- Replace Tier 0/1/2 visits with Tier 3 or cleaner by 2031
- Introduce Tier 4 marine standards in 2028
- Working with SC AQMD on a scenario to retrofit Tier 2 vessels

19 tpd NOx reduction in 2031
2020 MSS Estimated NOx Reductions

**2031**
- Total: 1105 tpd NOx
- 47% reduction

**2037**
- Total: 1083 tpd NOx
- 54% reduction

**CARB**
**Above levels do not include aviation fuel consumption and GHG emissions**
Potential Health Benefits

- Transitioning away from combustion will reduce pollution-related death and illness
- Beginning to analyze the impact of the 2020 MSS potential emissions reductions on future air quality & health benefits
- Reporting back to the Board with results next year
Important to Prioritize Benefits in Low-Income and Disadvantaged Communities

- DACs and people of color are disproportionately affected by both mobile and stationary source pollution
- MSS reductions will highly benefit DACs
- Seeks rapid transition to zero-emission technology in and near DACs
- Complements AB 617 strategies & consistent with CARB’s equity goals
Interagency Coordination on Infrastructure

- Zero-emission technology for both on- and off-road sectors requires streamlined infrastructure build-out
- Staff have been working with CEC, CPUC, and GoBiz throughout development of the 2020 MSS
- Results from the 2020 MSS are being incorporated into the CEC’s technical analysis for AB 2127 report
Controlling Federal Sources is Critical to Achieving our Clean Air and Climate Targets

- **California-Regulated Sources:** Cars, Trucks, & Equipment
  - Reductions from California Sources:
    - 75% as of 2019
    - >85% by 2032

- **Primarily Federally-Regulated Sources:** Interstate Trucks, Planes, Trains, & Ships
  - Emissions from Primarily Federally Regulated Sources Will Surpass California Source Emissions by 2030

Public Process for 2020 MSS

- **March 2020:** 1st Public Webinar
- **April 2020:** Informational Update to the Board
- **Sept/Oct 2020:** Release of Workshop Discussion Draft, 2nd Public Webinar
- **Nov 2020:** Release of Draft 2020 MSS
- **Dec 2020:** Update to the Board
- **Spring 2021:** Release of Final 2020 MSS, Board Consideration
Thank you