Strategies for Reducing Emissions from On-Road Heavy-Duty Trucks

2022 AQMP Mobile Source Working Group

January 26, 2020
Agenda

• Introduction to 2022 Air Quality Management Plan
• CARB Adopted Regulatory Measures
• 2020 Mobile Source Strategy
• Heavy Duty Inspection & Maintenance Program
• Advanced Clean Fleet & ZE Drayage Trucks Regulation
• Zero Emission Infrastructure
• ZEV Market Development Strategy
• Big ZEV Opportunities
• South Coast Incentive Programs
2022 AQMP

- Address the attainment of the 2015 8-hour ozone standard (70 ppb) for South Coast Air Basin and Coachella Valley without reliance on black box measures in 2037
2037 Attainment Working Draft

SCAB NOx Emissions (tpd)

Stationary and Area
Cars/Light-Duty Trucks/SUVs/Motorcycles
Medium-Duty & Heavy-Duty Gas Trucks
Heavy-Duty Diesel Vehicles
Aircraft
Locomotives
Ocean Going Vessels
Commercial Harbor Craft
Recreational Boats
Off-Road Equipment and Vehicles
Carrying Capacity

More than 70% Reduction

Baseline
Carrying Capacity 2037

Carrying Capacity 55-85 tpd

Stationary and Area
Cars/Light-Duty Trucks/SUVs/Motorcycles
Medium-Duty & Heavy-Duty Gas Trucks
Heavy-Duty Diesel Vehicles
Aircraft
Locomotives
Ocean Going Vessels
Commercial Harbor Craft
Recreational Boats
Off-Road Equipment and Vehicles
Carrying Capacity
Controlling Federal Sources is Critical to Achieving our Clean Air and Climate Targets

California-Regulated Sources: Cars, Trucks, & Equipment

Primarily Federally-Regulated Sources: Interstate Trucks, Planes, Trains, & Ships

Reductions from California Sources:
- 75% as of 2019
- >85% by 2032

Emissions from Primarily Federally Regulated Sources Will Surpass California Source Emissions by 2030

CARB Adopted Regulatory Measures

- HD Vehicle Inspection Program (HDVIP)/Periodic Smoke Inspection Program (PSIP)
- Innovative Clean Transit (ICT)
- Advanced Clean Trucks
- HD Engine Warranty
- Zero Emission (ZE) Airport Shuttle Bus
- HD Omnibus
CARB Incentive Programs

- Incentives play a pivotal role in supporting the State’s various air quality, climate change, ZEV deployment, and community risk reduction goals.
Federal Cleaner Trucks Initiative

• The Environmental Protection Agency (EPA) is pursuing a Cleaner Trucks Initiative (CTI) regulation to update NOx emissions standards for heavy-duty trucks
• In 2020, EPA released an Advanced Notice of Proposed Rulemaking
• Proposed rulemaking expected in 2021
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
2020 Mobile Source Strategy
On-Road Heavy Duty Vehicles

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Omnibus</th>
<th>ZEV (w/AT)</th>
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</thead>
<tbody>
<tr>
<td>2020</td>
<td>20%</td>
<td>24%</td>
</tr>
<tr>
<td>2031</td>
<td>27%</td>
<td>48%</td>
</tr>
<tr>
<td>2045</td>
<td>22%</td>
<td>77%</td>
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</table>

CA-Cert.: Omnibus
Federal Cert.: 0.02 g
MY 2024+ HD ZEVs
Accelerated Turnover to ZEVs
NOx Emission Reductions in South Coast

Baseline
ACT + CA HD Omnibus
ACT + CA HD Omnibus + Fed. CTI
2020 MSS

ACT: Advanced Clean Truck
CTI: Federal Clean Truck Initiative
* Preliminary estimate assuming 90% cleaner in-use
Potential Strategies

- Heavy-Duty Inspection and Maintenance
- Advanced Clean Fleets
- Zero Emission Infrastructure
- Incentives
Contact

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Heavy-Duty Vehicle Inspection and Maintenance (HD I/M) Program Development
HD I/M Program Objectives and Applicability

- Senate Bill 210 (Leyva; Statutes of 2019) directs CARB to develop and implement a new, comprehensive HD I/M program
  - Maintain low emissions throughout a vehicle’s life
  - Ensure emissions control systems are functioning properly
- Applicable to all heavy-duty vehicles (non-gasoline) with gross vehicle weight ratings (GVWR) > than 14,000 pounds operating in California
  - In-state, out-of-state/country
  - Diesel, alternative fuel, and hybrid vehicles
  - Limited exemptions (zero emission vehicles exempt)
  - Gasoline HDVs > 14,000 pounds GVWR not included - already in BAR’s Smog Check Program
Proposed HD I/M Program Structure

- Require periodic vehicle inspections
  - On-board diagnostic (OBD) system checks for 2013+ model year engines
  - Retain smoke opacity testing for pre-2013 model year engines
    - Adding a visual inspection component

- Complement periodic inspections with roadside emissions measurement and new enforcement mechanisms
  - Deploy remote sensing device (RSD) and automated license plate recognition (ALPR) cameras statewide
  - Compliance certificate required to operate in CA
  - Link HD I/M compliance to DMV registration
HD I/M Inspection Methods

• OBD-equipped vehicles – 4x/year data submittals
  • CARB-certified telematics service providers
  • CARB-certified OBD data collection tools operated by HD I/M-Approved Testers
  • CARB-certified dongles and/or kiosks operated at approved private locations throughout California

• Non-OBD vehicles – 2x/year data submittals
  • Maintain current SAE J1667 opacity test procedure and thresholds
  • Perform visual inspection
Roadside High-Emitter Vehicle Screening

- Real-time emissions monitoring equipment with ALPR cameras to identify high emitting vehicles
  - NOx and PM
- High emitters would be required to demonstrate compliance via testing mechanisms discussed previously
Coordinated Field Enforcement

• Continued CARB field inspection efforts in coordination with CHP

• SB 210 authorizes CHP to:
  • Check for illuminated MIL in vehicle
  • Check for excessive visible smoke
  • Check for valid HD I/M Compliance Certificate
HD I/M Implementation: Proposed Program Phase-In

- **First Phase** – Begins **January 1, 2023**
  - High emitter vehicle screening

- **Second Phase** – Begins **July 1, 2023**
  - Enforcement of compliance certificate requirements starts
  - DMV registration holds for California registered vehicles start

- **Third Phase** – Begins **January 1, 2024**
  - Periodic testing starts
These are preliminary estimates of NOx benefits from the HD I/M program assuming that it will reduce the number high emitting trucks by 50 and 25 percent for in-state and out-of-state trucks, respectively. Staff are working on a more comprehensive analysis to better quantify the impact of the program.
HD I/M Development and Next Steps

- Multiple public workshops and workgroup meetings throughout 2019 and 2020
- Most recent workgroup meetings:
  - November 16, 2020: Pilot Program Activities and On-Board Diagnostics (OBD) Specifications
  - December 17, 2020: Draft HD I/M regulatory concepts
- Additional HD I/M workgroup meetings and workshops throughout 2021
  - Enforcement HD I/M workgroup expected in February 2021
- Staff report and proposed regulation order: October 2021

Board Hearing: December 9 – 10, 2021
For More HD I/M Program Information

- Visit CARB’s website at:  https://ww2.arb.ca.gov/our-work/programs/heavy-duty-inspection-and-maintenance-program

- Subscribe to receive HD I/M email updates at:  https://public.govdelivery.com/accounts/CARB/subscriber/new?topic_id=hdim

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Advanced Clean Fleets & Zero Emission Drayage Trucks
Proposed Advanced Clean Fleets Rule

• Transition fleets to zero emission trucks and buses
• Target high priority fleets with later requirements for others
  o Government, drayage, refuse, last mile delivery
• Complement manufacturer sales requirement
• Support California’s transition to zero-emission where feasible to meet ACT Board Resolution and Governor’s Executive Order
  o 2035 – Drayage, public fleets, last mile delivery
  o 2040 – Refuse, buses, utility fleets (may include NZEVs)
  o 2045 – For all other trucks and buses where feasible
Regulatory Concepts

- **ZEV purchase requirement**
  - Increasing percentage of new purchases must be ZEVs
- **ZEV fleet standard**
  - Increasing portion of the fleet must be ZEVs
- **Green fleet contracting**
  - Large fleets and businesses must contract with “green” fleets to ship cargo or serve customers
- **Zero-emission zones**
  - Only ZEVs may enter certain areas
- **Infrastructure requirements**
  - Require stores, warehouse, and other locations with truck traffic to install infrastructure to enable broader electrification
Public Fleet Concept

- City, county, state owned vehicles
  - Exclude school buses
- Phase-in best available ZEV or NZEV for new purchases
  - 2023 – XX% of purchases
  - 2026 – 100% of purchases for all fleets
- Exemption process if suitable ZEV/NZEVs are not available
- Consistent with normal truck purchase cycle
- No significant subcontracting or competitive disadvantage issues
Private and Federal Fleet Concept

- Includes owned, rented, leased vehicles and hired sub haulers
- Meet ZEV milestones as the total fleet
- Initially applies to straight trucks then others
- Example fleet milestones for box trucks
  - 2025 – 5%
  - 2030 – 50%
  - 2035 – 100%
- Baseline registry to determine fleet composition in 2023
- Annual reporting
Drayage Truck Concept

- Trucks must register with CARB if they conduct drayage activities at the seaports and railyards
- Beginning in 2023, any truck added to the CARB Drayage Truck Registry must be zero-emissions
- Legacy drayage trucks removed from registry at the end of their useful life
- All drayage trucks would be required to be zero-emission by 2035
Green Fleet Contracting Concept

• Large entities and government must hire green fleets for certain services starting in 2025
  • Hire green fleets listed on CARB website or
  • Pool of vehicles used must meet the ZE fleet standard
• Service types include parcel, food, beverage, home delivery, linen services, armored car, buses, refuse, and freight transportation
• Reporting required
NOx Emissions Benefit in South Coast

The green striped area represents benefits from CARB’s initial assessments of proposed concepts. Staff are working on a more comprehensive analysis to better quantify the impact of the program.
Advanced Clean Fleets Timeline

• Workshop anticipated in February/March timeframe
  • More workshops and workgroups throughout 2021
• Board consideration planned December 2021
• Expected implementation in 2023
For More Information

- Visit CARB’s website at: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets
- Subscribe to receive ACF email updates at: https://public.govdelivery.com/accounts/CARB/subscriber/new?topic_id=zevflleet

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Infrastructure Needs for Medium- and Heavy-Duty Zero Emissions Vehicles
Medium- and Heavy-Duty Zero Emission Vehicles (MD/HD ZEVs) Regulations

- **Adopted**
  - Innovative Clean Transit
  - Zero Emission Airport Shuttle Buses
  - Advanced Clean Trucks

- **Under Development**
  - Advanced Clean Fleets

- **Other regulations that promote ZE deployment:**
  - Zero Emission Forklifts
  - eTRU
  - Ocean Going Vessels At-Berth
### Commercially Available ZEVs Are Here!

<table>
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<tr>
<th>Weight Range</th>
<th>Commercial Vehicles Today</th>
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<tbody>
<tr>
<td>2B-3 (8,501 – 14,000 lbs.)</td>
<td>![Images of Commercial Vehicles]</td>
</tr>
<tr>
<td>4-5 (14,001 – 19,500 lbs.)</td>
<td>![Images of Commercial Vehicles]</td>
</tr>
<tr>
<td>6-7 (19,501 – 33,000 lbs.)</td>
<td>![Images of Commercial Vehicles]</td>
</tr>
<tr>
<td>8 (33,000 lbs. and over)</td>
<td>![Images of Commercial Vehicles]</td>
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</tbody>
</table>

Note: Excludes transit buses and all models not shown. Updated Sept. 2020.
Charging Capability

• **Level 2 Chargers**: 240 volt Chargers
  - Home charger typically less than 10 kW (up to 19.2 kW at charging stations)

• **Direct Current Fast Chargers** (DCFC)
  - Typical 50 kW – 150 kW
  - 350 kW in use today – some 500 kW, but uncommon
  - Multi-MW is underway

• **An electric drayage truck with a 400 kWh battery capacity can be charged within**:
  - 8 hours using a 50 kW charger
  - Less than 1.5 hour with 350 kW charger

- 40 – 70 kWh (Typical)
- 140 – 280 kWh
- 260 – 485 kWh
Interagency Coordination on Infrastructure

• New infrastructure needed to support transition to ZEV
  • Zero-emission technology for both on- and off-road sectors requires streamlined infrastructure build-out
  • Staff have been working with CEC, CPUC, and GO-Biz throughout development of the 2020 MSS
  • Results from the 2020 MSS are being incorporated into the CEC’s technical analysis for AB 2127 report
Key Priorities in Building the Charging Network

- Building Codes
- Financing California’s Charging Infrastructure Needs
- Streamlining Local Permitting Ordinances
- Community-Centric Planning
- Support Grid Reliability
Meeting the Demand of the Charging Network

• AB 2127 required an analysis of light- and heavy-duty infrastructure needs through 2030
  o 2020 Mobile Source Strategy projected a total of 180,000 zero emission medium- and heavy-duty vehicles by 2030
  o CEC estimated that this would create the demand for 141,000 50 kW chargers and 16,000 350 kW chargers for medium- and heavy-duty (750,000 for light duty vehicles).
Planning to Address Demand

- State agencies, NGOs and Utilities
  - GO-Biz coordinating State agency efforts
  - CEC charging infrastructure needs analysis
  - CalETC Statewide Infrastructure Strike Force

- Not just more chargers
  - Vehicle to Grid Integration (VGI)
    - "Smart" technology that can optimize charging of multiple vehicles
    - Can also help power homes, businesses, the grid—early development
  - Load management
    - Varying charging times
    - Off-peak pricing
Financing Opportunities

• Governor’s proposed budget includes securitizing up to $1 billion to accelerate the pace and scale of the infrastructure needed.

• CPUC regulates Independently Owned Utilities (IOUs)
  o SB 350 required CA IOUs to support transportation electrification
  o $1 billion in authorized IOU transportation electrification infrastructure projects; requesting additional $1 billion

• $100 million annually through CEC’s Clean Transportation Program
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ZEV Market Development Strategy & Big ZEV Opportunities

2022 AQMP Mobile Source Working Group - Heavy Duty Trucks

Hannah Goldsmith
Lead Advisor, Zero Emission Vehicle Market Development
California Governor’s Office of Business & Economic Development (GO-Biz)
Executive Order Policy Directives

- **Air Resources Board**: regulations and strategies
- **GO-Biz**: ZEV Market Development Strategy
- **Energy Commission**: charging infrastructure assessment
- Air Resources Board, Energy Commission, Public Utilities Commission and other agencies: accelerate deployment of fueling/charging infrastructure
- And related actions to ensure enhanced clean mobility options, just workforce transition, continued fuel carbon intensity reduction
The Strategy is centered around the four market pillars: vehicles, infrastructure, end users, and workforce. The pillars must all be fully supported and are built upon a foundation of five core principles:

1. equity in every decision,
2. embracing all zero-emission pathways,
3. collective problem-solving,
4. public actions drive private investment, and
5. designing for system resilience and adaptability.

Inform roadmap for who is focused on what, including public and private actors.
ZEV Market Development Strategy

Process:
- Strategy due January 31st and will be updated at least every 3 years
- Annual state agency action plans, due March 1st
- Annual priority summaries for each pillar, plus an equity implementation strategy and a cross-cutting priority view, due March 15th
- Public ZEV Strategy website to track our progress on diverse metrics
Big ZEV Efforts

Interviews
- Interviewed over 25 organizations/representatives
- February 2020 – August 2020

Sectors Represented
- Included vehicle manufacturers, fuel providers, fleets, state and local agencies, trade associations, NGOs
- Broad perspectives on achieving a successful transition to big ZEVs

Sort and Organize Information
- Sorted themes and details into barrier and opportunity sub-categories
- Created barriers summary and corresponding opportunity charts

Big ZEV priorities will be included in the annual pillar priority summaries
Charting prior work to new Strategy process
Barrier Themes → Opportunity Mapping

- **Costs**
  - Vehicle, infrastructure, fuel, other

- **Infrastructure**
  - Installation and scaling timelines
  - Real estate, planning, support

- **Incentives**
  - Adequacy and consistency
  - How funding, financing programs fit together

- **Choosing a technology**
  - Uncertainty with how to choose a vehicle, what to consider to ensure operational needs will be met
  - Standardization and interoperability of vehicles/fueling

- **Deployment process and best practices**
  - Guidance, tools to transition for fleets, as well as parties in chain of deployment (e.g., permitting jurisdictions)

- **Transparency of helpful efforts**
  - Many active proceedings and efforts to overcome these barriers, but challenging to track them all

- **Workforce**
  - Need to ensure workforce to support all aspects of transition exists; create good jobs
Complementary State Efforts: Infrastructure

Energy Commission AB 2127 Assessment and Clean Transportation Program

Public Utilities Commission Transportation Electrification Framework and Utility Programs

Charging and hydrogen station permitting

Building Code updates to help achieve ZEV targets
Governor’s Proposed January Budget

Cap and Trade Expenditure Plan
(Dollars in Millions)

<table>
<thead>
<tr>
<th>Investment Category</th>
<th>Department</th>
<th>Program</th>
<th>Early Action 2020-21</th>
<th>Budget Year 2021-22</th>
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<tr>
<td>Equity Programs</td>
<td>Air Resources Board</td>
<td>AB 617 - Community Air Protection</td>
<td>$125</td>
<td>$140</td>
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<td></td>
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<td>AB 617 - Local Air District Implementation</td>
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<td>$50</td>
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<td>Water Board</td>
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<td>$315</td>
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<td>Transportation &amp;</td>
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<td>Agricultural Diesel Engine Replacement &amp; Upgrades</td>
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<td>ZEV Strategy</td>
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<td>Clean Cars 4 All &amp; Transportation Equity Projects</td>
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<td>Natural &amp; Working</td>
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<td>Healthy &amp; Resilient Forests (SB 901) ($75 million included in 2020 Budget)</td>
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<td>Lands</td>
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<td>Healthy Soils</td>
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<td>$15</td>
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<td>Total</td>
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<td>$624</td>
<td>$745</td>
<td>$1,369</td>
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Zero Emission Vehicle Budget Highlights:

- **ZEV Infrastructure**: Securitization of $1B in future revenues to accelerate pace/scale of station installation
- **Greening of State Infrastructure**: $50M one-time General Fund for state-owned facilities
- **ZEVs**: $465M from Cap & Trade for equity programs and medium-, heavy-duty, off-road vehicles and equipment
- **Delayed Property Tax Assessment of ZEV Charging and Fueling Stations**
Hannah Goldsmith
Lead Advisor, Zero Emission Vehicle Market Development
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www.business.ca.gov/ZEV
South Coast AQMD Incentives Update

Vicki White
Technology Implementation Manager
Role of Incentives

- Accelerate deployment of new, cleaner technologies that have become commercialized
- Designed to offset the higher cost of new, cleaner technologies
- Higher incentive for the cleanest technologies (zero emissions)
- Existing programs require retirement of an older vehicle, engine or piece of equipment in order to maximize emission reductions
- Projects must achieve “surplus” emissions reductions – go beyond existing regulations
- Infrastructure to enable deployment of near-zero & zero emission heavy-duty vehicles and equipment
Incentive Project Types
Main Incentive Programs

Carl Moyer Program
- Trucks
- Transit buses
- Refuse trucks
- Public agency/utility vehicles
- Emergency vehicles
- Construction/Ag
- Marine Vessels
- Shore Power
- Locomotives
- Cargo Handling
- Infrastructure

Prop 1B
- Trucks
- Shore Power
- Locomotives
- Cargo Handling
- TRUs

Replace Your Ride
- Light-Duty Vehicles
- Alternative Mobility Options (transit passes, car sharing)
- Electric vehicle chargers

Lower Emission School Bus Program
- School buses
- Infrastructure
- CNG tank replacements

- 1998 – Present
- $530 Million
- 7,977 vehicles
- Emissions Reduced (tpy):
  NOx: 8,600 PM: 248

- 2009 - Present
- $486 Million
- 7,503 vehicles/equipment
- Emissions Reduced (tpy):
  NOx: 7,285 PM: 220

- 2015 - Present
- $59 Million
- 7,424 vehicles
- Emissions Reduced (tpy):
  NOx: 34 HC: 7.9

- 2001 - Present
- $325 Million
- 5,200 vehicles
- Emissions Reduced (tpy):
  NOx: 857 PM: 59
Other Incentive Programs

- Community Air Protection Program (supports AB 617)
- Voucher Incentive Program (for small fleets with ten or fewer vehicles)
- Commercial Electric Lawn and Garden Equipment Program
- Volkswagen Environmental Mitigation Trust Program
- Funding Agricultural Replacement Measures for Emission Reductions (FARMER)
Community Air Protection Program

- Financial incentives to support the goals of AB 617
- Approved by Governor as part of the State budget each year
- Specific bills:
  - AB 134 (2017) – $250M statewide ($107.5M to SCAQMD), for Moyer and Prop 1B projects
  - SB 856 (2018) – $245M statewide ($85.57M to SCAQMD) to reduce emissions from mobile and stationary sources
  - AB 74 (2019) - $245M statewide ($79.4M allocation to SCAQMD) to reduce emissions from mobile and stationary sources, and community-identified projects
The Board approves annually how to distribute revenues from $2 DMV fee among the following programs:

- Carl Moyer on- and off-road mobile source project
- Lower Emission School Bus Program (including zero-emission buses)
- Metrolink passenger locomotive project (multiple phases)
Lower-Emission School Bus Program

• Replace older, high-emitting school buses with cleaner technologies
• Participants include public school districts, including JPA, charter schools and private transportation providers under contract with a public school district
  • Program strives to fund the cleanest bus technologies commercially available
  • School districts must pay at least $15K as their local match
    - Funds are often combined with HVIP funds to help offset the higher cost of the new near-zero or zero-emission school bus
    - Up to $400k for an electric school bus (with HVIP funds)
    - South Coast AQMD funds also available for infrastructure
## VW Mitigation Program

<table>
<thead>
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<th>Technology</th>
<th>Allocation (millions)</th>
<th>Air District Administrator</th>
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<tr>
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<td>SJVAPCD</td>
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<td>Zero-Emission Class 8 Freight and Port Drayage Trucks</td>
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<td>Zero-Emission Freight and Marine Projects</td>
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<td>Combustion Freight and Marine Projects</td>
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<td>Light-Duty Zero-Emission Vehicle Infrastructure</td>
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<td>CARB Reserve</td>
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<td>$63</td>
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<td><strong>Total</strong></td>
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<td><strong>$423</strong></td>
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South Coast AQMD Incentive Programs (Past 4 Years)
# Emission Reduction Benefits from Incentive Programs (2020)

<table>
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<tr>
<th>Program</th>
<th>Funding Amount</th>
<th>No. of Equipment/Engines</th>
<th>NOx (tpy)</th>
<th>PM2.5 (tpy)</th>
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<td>Carl Moyer</td>
<td>$33,959,122</td>
<td>162</td>
<td>222.1</td>
<td>4.0</td>
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<td>Carl Moyer State Reserve</td>
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<td>AB 923 Match Funds</td>
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<td>FARMER</td>
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<td>AB 617 Community Air Protection Program (CAPP) Incentives</td>
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<td>EFMP (Replace Your Ride)</td>
<td>$13,532,012</td>
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<td>Proposition 1B</td>
<td>$39,610,000</td>
<td>399</td>
<td>151.1</td>
<td>0</td>
</tr>
<tr>
<td>Voucher Incentive (VIP)</td>
<td>$2,705,000</td>
<td>63</td>
<td>43.2</td>
<td>0.2</td>
</tr>
<tr>
<td>VW Mitigation Program</td>
<td>$4,980,238</td>
<td>69</td>
<td>25.1</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$138,960,631</strong></td>
<td><strong>2,540</strong></td>
<td><strong>584.7</strong></td>
<td><strong>11</strong></td>
</tr>
</tbody>
</table>

* EPA DERA/TAG awards and other smaller grants not included.
HD Trucks

- Freight trucks (drayage and other)
- Solid waste collection vehicles
- Emergency vehicles
- Public agency/utility vehicles
- Any on-road vehicle >14,000 lbs GVWR (LHD to HHD)
- Other trucks (concrete mixers, dump trucks)
- Transit and school buses (included for incentive purposes)
South Coast AQMD Main Incentive Programs for HD Trucks

- Carl Moyer Program
- Community Air Protection Program (CAPP) Incentives
- Proposition 1B – Goods Movement Program (in final stage of funding)
- Voucher Incentive Program (small fleets only)
- Volkswagen Mitigation Program (statewide)
Carl Moyer Program – Funding Distribution by Project Category

- Off-Road: 58%
- Marine: 15%
- Infrastructure: 15%
- Locomotive: 1%
- On-Road: 10%
- TRUs: 1%
Bars to Participation

- Requirement to scrap an older diesel truck
- Limited incentive – not qualified for maximum incentive amount
- No new purchase option (low NOx and ZE)
- Cost-effectiveness limit
- Ownership for past 2-years
- EMY eligibility
- DMV registration gaps
- No trade-down option with another fleet
- Usage records (incomplete or low mileage)

<table>
<thead>
<tr>
<th>Incentive Program</th>
<th>Scrapping</th>
<th>Maximum Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>VW</td>
<td>Yes</td>
<td>$85,000 *</td>
</tr>
<tr>
<td>Prop1B</td>
<td>Yes</td>
<td>$100,000</td>
</tr>
<tr>
<td>Carl Moyer</td>
<td>Yes</td>
<td>$100,000 **</td>
</tr>
<tr>
<td>HVIP</td>
<td>No</td>
<td>$45,000</td>
</tr>
</tbody>
</table>

*If non-drayage, limited to 25% of truck cost.
**May be capped at lower incentive due to C/E limit
## CAPP Results

<table>
<thead>
<tr>
<th>Project Category</th>
<th>Technology</th>
<th>AB 134 (CAPP Year 1)</th>
<th>SB 856 (CAPP Year 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Funded Amount</td>
<td>No. of Units</td>
</tr>
<tr>
<td></td>
<td>On-Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zero emission</td>
<td>$12,566,150</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>Optional low-NOx</td>
<td>$22,858,674</td>
<td>415</td>
</tr>
<tr>
<td></td>
<td>Other (Emergency)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Off-Road Agriculture</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tier 3/4F</td>
<td>$19,607,167</td>
<td>156</td>
</tr>
<tr>
<td></td>
<td>Off-Road Construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zero emission</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Tier 3/4F</td>
<td>$22,698,620</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>Cargo Handling Equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zero emission</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Hybrid-Electric</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Tier 4F</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Marine</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tier 3</td>
<td>$9,490,812</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>Transport Refrigeration Unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electric</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Infrastructure</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electric charging</td>
<td>$122,500</td>
<td>1</td>
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<tr>
<td></td>
<td>Renewable natural gas</td>
<td>$12,243,034</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Natural gas</td>
<td>$1,237,782</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Locomotive</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tier 4</td>
<td>$11,533,500</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>$112,358,239</td>
<td>813</td>
</tr>
</tbody>
</table>
## Total Investment - Near Zero and Zero Emission Trucks (2017 to Present)

<table>
<thead>
<tr>
<th>Program</th>
<th>NZ Emission (0.02 g/bhp-hr)</th>
<th>Funding</th>
<th>Zero Emission</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moyer/CAPP</td>
<td>451</td>
<td>$31,654,703</td>
<td>3</td>
<td>$600,000</td>
</tr>
<tr>
<td>Prop 1B</td>
<td>757</td>
<td>$73,500,000</td>
<td>71</td>
<td>$14,200,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,208</strong></td>
<td><strong>$105,154,703</strong></td>
<td><strong>74</strong></td>
<td><strong>$14,800,000</strong></td>
</tr>
</tbody>
</table>

* Not including recent awards made under Volkswagen Mitigation Program.
<table>
<thead>
<tr>
<th>Funding Category</th>
<th>1st Installment</th>
<th>Open</th>
<th>Closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZE Transit, School, and Shuttle Buses</td>
<td>$65 million</td>
<td>10/21/19</td>
<td>Still open (Shuttle and Transit only)</td>
</tr>
<tr>
<td>Combustion Freight and Marine Projects</td>
<td>$30 million</td>
<td>12/6/19</td>
<td>3/4/20</td>
</tr>
<tr>
<td>Light Duty Infrastructure – Hydrogen</td>
<td>$5 million</td>
<td>2/20/20</td>
<td>5/22/20</td>
</tr>
<tr>
<td>ZE Freight and Marine Projects</td>
<td>$35 million</td>
<td>6/18/20</td>
<td>8/31/20</td>
</tr>
<tr>
<td>ZE Class 8 Freight and Port Drayage Trucks</td>
<td>$27 million</td>
<td>8/18/20</td>
<td>Still open (backup list)</td>
</tr>
<tr>
<td>Light Duty Infrastructure - Battery Electric</td>
<td>$5 million</td>
<td>February 2021 (Est)</td>
<td>TBD</td>
</tr>
</tbody>
</table>
## School Bus Awards by County (2018/19)

<table>
<thead>
<tr>
<th>County</th>
<th>No. of Schools</th>
<th>No. of Buses</th>
<th>U.S. EPA Air Shed Grant</th>
<th>South Coast AQMD AB 923 Funds*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles</td>
<td>12</td>
<td>36</td>
<td>$628,800</td>
<td>$5,613,200</td>
</tr>
<tr>
<td>Orange</td>
<td>16</td>
<td>100</td>
<td>$1,100,400</td>
<td>$17,162,600</td>
</tr>
<tr>
<td>Riverside</td>
<td>6</td>
<td>19</td>
<td>$275,100</td>
<td>$3,154,400</td>
</tr>
<tr>
<td>San Bernardino</td>
<td>7</td>
<td>41</td>
<td>$1,100,400</td>
<td>$6,686,100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>41</strong></td>
<td><strong>196</strong></td>
<td><strong>$3,104,700</strong></td>
<td><strong>$32,616,300</strong></td>
</tr>
</tbody>
</table>

* In addition, $2,050,000 in HVIP funds were provided.

**Note:** South Coast AQMD recently released a new Program Announcement in October 2020, closes January 26, 2021.
Funding Opportunities in 2021

- Lower Emission School Bus Program  
  Closing 1/26/21

- VIP for small fleets (first-come, first-served)  
  February 2021 (Est)

- Carl Moyer Program  
  (incl. SOON, FARMER and other programs if available)  
  March 2021

- Prop 1B – Goods Movement Program  
  Closing 4/30/21

- Volkswagen - Combustion and ZE Freight & Marine  
  and Light Duty Infrastructure (Battery Electric)  
  Qtr. 2 2021

- AB 617 Community Air Protection Incentives  
  TBD

- Other Programs  
  Ongoing (until funds are depleted)
### Useful Links

<table>
<thead>
<tr>
<th>Program</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPP Incentives</td>
<td><a href="http://www.aqmd.gov/cappincentives">www.aqmd.gov/cappincentives</a></td>
</tr>
<tr>
<td>Proposition 1B - Goods Movement Emission Reduction Program</td>
<td><a href="http://www.aqmd.gov/prop1b">www.aqmd.gov/prop1b</a></td>
</tr>
<tr>
<td>Volkswagen Environmental Mitigation Program</td>
<td><a href="http://www.aqmd.gov/vw">www.aqmd.gov/vw</a></td>
</tr>
<tr>
<td>Carl Moyer Program</td>
<td><a href="http://www.aqmd.gov/moyer">www.aqmd.gov/moyer</a></td>
</tr>
<tr>
<td>Voucher Incentive Program (for small fleets of 10 trucks and less)</td>
<td>www/aqmd.gov/vip</td>
</tr>
<tr>
<td>Lower Emission School Bus Program</td>
<td><a href="http://www.aqmd.gov/schoolbus">www.aqmd.gov/schoolbus</a></td>
</tr>
<tr>
<td>Commercial Lawn and Garden Equipment Incentive Program</td>
<td><a href="http://www.aqmd.gov/lawngarden">www.aqmd.gov/lawngarden</a></td>
</tr>
<tr>
<td>Replace Your Ride (Clean Cars for All)</td>
<td><a href="http://www.replaceyourride.com">www.replaceyourride.com</a></td>
</tr>
</tbody>
</table>
Please submit comments, questions, or suggestions on control strategies for on-road heavy-duty vehicles to:

AQMPMobileSources@aqmd.gov