Today’s Overview

• Background
• Zero emission truck market outlook
• Summary of proposed regulation
• Proposed reporting requirement
• Next steps
Major NOx Reductions Needed

- Nearly all trucks to have 2010 model year engines by 2023
- Action beyond current programs needed by 2031
  - Mobile source emissions reduced more than 50%
  - Truck and bus emissions reduced by nearly 70%
- Heavy-duty trucks and federal sources remain largest contributors
California’s Climate Change Targets – Transportation Remains Largest GHG Source

☑ Achieve 1990 GHG levels by 2020
- 40% below 1990 levels by 2030
- 80% below 1990 levels by 2050

- Cleaner electricity targets (SB 100)
  - 60% renewable by 2030
  - Zero carbon by 2045
- Carbon neutrality by 2045

CA GHG Emissions (2017)

- Mobile Sources 36%
- Electrical Power 16%
- Industrial 21%
- Agriculture 9%
- Residential and Commercial 10%
- High GWP 5%
- Recycling and Waste 3%

Note: Mobile sources represent ~50% of GHG inventory when including emissions from fuel production.
California’s Air Quality and Climate Goals

- Federal Air Quality Standards
- 100,000 Zero-Emission Freight Vehicles and Equipment
- Community Risk Reduction
- 5 Million Zero-Emission Vehicles
- Greenhouse Gas Reduction Targets
- Petroleum Reduction Target

Zero-Emission Solutions
Suite of Mobile Source Measures

Zero-Emission (ZE) Operation

- ZE Airport Shuttle
- ZE truck certification
- Advanced Clean Trucks
- ZE ships at berth
- Rail yard idling
- ZE TRUs
- ZE forklifts
- ZE truck fleets
- ZE drayage trucks
- ZE cargo equipment

Innovative Clean Transit

- CA GHG Phase 2
- Truck OBD
- Truck Smoke Tests

2018: CA GHG Phase 2, Truck OBD, Truck Smoke Tests

2019: Handbook-1 Warehouses, ZE ships at berth

2020: Heavy-duty Omnibus, Heavy-duty I/M, Harbor craft

2021: Handbook-2 Ports, Rail, Low-emission diesel fuel

2022: Non-preempted locomotives

Lower Emissions
Market Outlook
Emerging Zero-Emission Truck Market

• Several manufacturers offering commercially available Class 3-8 battery electric (BE) trucks and vans
• Nearly all conventional OEMs have EV demonstrations or have announced plans for commercialization
  • Battery electric and fuel cell electric
• Announcements by several new entrants to truck market
  • Bollinger Motors, Nikola, Roush, Tesla, Thor Trucks
## Heavy-duty Electric Market Growing

<table>
<thead>
<tr>
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<th>2B-3</th>
<th>4-5</th>
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<tr>
<td><strong>Commercial Today</strong></td>
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<td>Lightning Systems</td>
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Zero-Emission Truck Total Cost of Ownership

- Higher upfront costs for truck and infrastructure
- Lower operating costs (fuel and maintenance)
- Comparable total cost of ownership (TCO) over a 12 year period without rebates for some truck/use types\(^1\)
- TCO is expected to continue to improve
  - Battery prices declining and technology continues to improve

\(^1\)Draft Fleet TCO paper: [https://ww2.arb.ca.gov/sites/default/files/2019-02/190225tco_0.pdf](https://ww2.arb.ca.gov/sites/default/files/2019-02/190225tco_0.pdf)
Low Carbon Fuel Standard (LCFS)

• Lowers carbon intensity of transportation fuels 20% by 2030
• Fleets earn credits if dispensing H2 or electricity for HD ZEVs
• Battery electric credit value goes to EVSE owners
  • $0.10/kWh* for Class 1-3 vehicles
  • $0.16 per kWh* for Class 4-8 vehicles
  • Offsets most or all electricity costs for charging

* Assumes LCFS credit price of $125 per credit

LCFS program information: https://www.arb.ca.gov/fuels/lcfs/lcfs.htm
Fuel Cost Saving Opportunity

Battery Electric vs Diesel

Airport Shuttle
EV: 0.56 kWh/mi.
Diesel: 22 mpg
45%

EV: 1.04 kWh/mi.
Diesel: 10 mpg
55%

Package Delivery
EV: 2.1 kWh/mi.
Diesel: 3.5 mpg
70%

Local Drayage
with LCFS
75%
100%
100%

Note: Example for 12 year period assumes average of $3.70/gal., about $0.16/kWh, and LCFS at $125 per credit
SB350 Transportation Electrification for Medium and Heavy Duty

- California utilities supporting site upgrades and design
  - $579 million approved through 2023 (PG&E, SCE)
    - Can fund charging of 15,000 ZE vehicles
  - Additional $107 million under review (SDG&E)
- Publicly-owned utilities developing programs
- New rates being designed to encourage electric vehicles

Transportation Electrification (SB 350) [www.cpuc.ca.gov/sb350te/](www.cpuc.ca.gov/sb350te/)
## Significant Incentives Available Now

<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
<th>Fiscal Year</th>
<th>Amount</th>
</tr>
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<tbody>
<tr>
<td><strong>HVIP</strong></td>
<td>Low NOx engines, ZEVs plus infrastructure, advanced technology</td>
<td>FY 18-19</td>
<td>$125 M</td>
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<tr>
<td><strong>VW</strong></td>
<td>Zero-emission truck and bus replacements</td>
<td></td>
<td>$423 M</td>
</tr>
<tr>
<td><strong>Carl Moyer</strong></td>
<td>Cleaner engines &amp; ZEVs plus fueling infrastructure</td>
<td>FY 18-19</td>
<td>$79 M</td>
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<tr>
<td><strong>AB 617</strong></td>
<td>Engine replacement &amp; infrastructure in DAC</td>
<td>FY 18-19</td>
<td>$245 M</td>
</tr>
<tr>
<td><strong>Truck Loans</strong></td>
<td>Helps small businesses with 10 or fewer trucks upgrade to newer trucks</td>
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</tr>
<tr>
<td><strong>Utility Programs</strong></td>
<td>Charging infrastructure service upgrades and electricity rates (SB350)</td>
<td></td>
<td>&gt;$579 M</td>
</tr>
<tr>
<td><strong>LCFS</strong></td>
<td>Credits for using low carbon transportation fuels</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Offsets Most/All Electricity Costs for Trucks and Buses</td>
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</table>

More information at: [https://ww2.arb.ca.gov/our-work/topics/incentives](https://ww2.arb.ca.gov/our-work/topics/incentives)
Fostering Zero Emission Truck and Bus Deployments

• Support early market development with incentives
• Early candidates for zero emission technologies
  • Centrally fueled, low average speed, stop-and-go duty cycles
• Regulations to accelerate self sustaining market and to provide certainty
• Early experiences benefit the market for other applications
Regulatory Development Overview

• Initiated a manufacture sales concept – April 2017
• Held multiple public fleet/manufacturer meetings in 2018
• Governor issued directive to assess viability of ZEV fleet requirements - August 2018
• Expanded discussion to include potential fleet strategies
  • Need to assess fleet specific information
  • Explore other ideas to identify best overall approach
• 100% zero-emission pickup and delivery goal by 2040

ACT Website: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks
Governor’s letter regarding ZE Fleet rules: https://ww2.arb.ca.gov/resources/documents/governors-letter-regarding-zero-emission-fleet-rules
ZEV Fleet Website: https://ww2.arb.ca.gov/our-work/programs/zero-emission-vehicle-fleet
Advanced Clean Trucks Summary

• Manufacturer sales requirement
  • ZEVs as a percentage of sales - 2024-2030 model year
  • Revisit in 2025 for post-2030 action
• Large company and fleet reporting requirement
  • Information about vehicles and contracted services
  • Future fleet rules, ZE truck standard, and/or other
Manufacturer ZEV Sales Requirement

- Percent of California chassis/vehicle sales must be zero-emission
- Use new Zero-Emission Powertrain certification procedure starting 2024
- Credit system to encourage early sales and for flexibility

<table>
<thead>
<tr>
<th>Model Year</th>
<th>Class 2B-3(^1)</th>
<th>Class 4-8(^2)</th>
<th>Class 7-8 Tractors</th>
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<tbody>
<tr>
<td>2024</td>
<td>3%</td>
<td>7%</td>
<td>0%</td>
</tr>
<tr>
<td>2025</td>
<td>5%</td>
<td>9%</td>
<td>0%</td>
</tr>
<tr>
<td>2026</td>
<td>7%</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>2027</td>
<td>9%</td>
<td>13%</td>
<td>9%</td>
</tr>
<tr>
<td>2028</td>
<td>11%</td>
<td>24%</td>
<td>11%</td>
</tr>
<tr>
<td>2029</td>
<td>13%</td>
<td>37%</td>
<td>13%</td>
</tr>
<tr>
<td>2030</td>
<td>15%</td>
<td>50%</td>
<td>15%</td>
</tr>
</tbody>
</table>

1. Excludes pickups until 2027 MY
2. Except Class 7-8 tractors

Note: Class 2B-3 (GVWR: 8,501-14,000 lb.), Class 4-8 (GVWR: 14,001 lb. or greater), Class 7-8 tractor (GVWR: 26,001 lb. or greater)
Proposed Reporting Requirement
Regulatory Strategy

- Goal is to align interests of all parties
Principles for Developing Future Rules

• Expand ZE truck market to meet air quality and GHG goals
• Accelerate a self-sustaining market
• Maximize use of ZEVs where suitable
• Match ZEV availability with individual fleet operational needs
  • Initial focus on urban, short-haul, return to base
• Provide benefits in disadvantaged communities
• Expand infrastructure availability to enable new markets
• Ensure level playing field between types of fleet operators
Regulatory Concepts to Explore

• Percent of fleet purchases must be ZEVs
• Fleets must meet a ZE truck standard
• Zero-emission zones (cities, or other boundary)
• Large entities to hire fleets that meet a ZE truck standard
Who Would Be Reporting

- All entities with gross receipts > $50 million annually and do business in California (may or may not own trucks)
  - Retailers, wholesalers, hotels, utilities, refuse/recycling services, port terminal operators, others
- Entities that own or direct 100 or more trucks (>8500 lb GVWR)
  - Motor carriers, freight forwarders, brokers, other
- Federal, state, county, and city governments
- Reporting required in early 2021
Information Needed

Basic company/entity information
Do any of the items to the right apply

- Contract to move freight, materials by truck or van
- Contract for regular pick-up or delivery services
- Contract for shuttle or bus service
- Contract for vocational truck services
- Own/lease trucks, vans or buses
- Offer for-hire truck or bus transportation services
- Receive deliveries that are shipped by others

NO

Done

YES
Reporting for All Organizations

- Organization name
- Corporate parent information
- Contact information
- Headquarters address
- Business type (NAICS Code)
- General business description
- Revenue ($ million)
  - US (50-100, 100-1000, more)
  - California (<10, 10-50, 50-100, 100-1000, more)
Reporting for All Organizations (continued)

• Provide additional information if any of the following apply:
  • Contract to move freight, materials by truck or van
  • Contract for regular pick-up or delivery services
  • Contract for shuttle or bus service
  • Contract for vocational truck services
  • Own/lease trucks, vans or buses
  • Provide for-hire truck or bus transportation services
  • Receive deliveries that are shipped by others
Questions if You Contract to Move Freight or Other Materials

- Outbound from each of your facilities
  - Type of facility and address (warehouse, factory, store, other)
  - Type of freight/material/items shipped
  - Destination distance (local, regional in-state, out of state)
  - Destination facility type (store, warehouse, port, railyard, home, other)
  - Annual ton/miles; shipments; units moved
- Inbound to each of your facilities
  - Type of facility and address (warehouse, factory, store, other)
  - Type of freight/material/items shipped
  - Origin distance (local, regional in-state, out of state)
  - Origin facility type (store, warehouse, port, railyard other)
  - Annual ton-miles, shipments, units moved
Questions if You Contract for Regular Pick-up or Delivery Service

- Facility location
  - Street, city, zip code
- Facility type
  - Store (grocery, restaurant, merchandise...)
  - Warehouse
  - Manufacturing plant
  - Other (office, hotel, bank, school, park, hospital...)
- Type of pick up or delivery service
  - Parcel, food, linen, garbage, home, recycling, supplies, other
  - Frequency (daily, weekly, monthly, other)
Questions if You Contract for Regular Shuttle Bus Service

• Area of service (local, regional, long distance)
• Origin/destination includes (parking lot, transit hub, airport, other)
• Service period (week days, all week, other)
• Service type (fixed route, on demand, other)
• Annual miles, passenger miles
• Number of vehicles under contract
• Annual contract amount
Questions if You Contract for Vocational Truck Services

• Type of service
  • Debris removal, tree trimming, sweeping, towing, etc.
• Do you specify the type of truck needed
  • Dump truck, flatbed, low boy, service truck...
• Frequency of service needed
  • Daily, weekly, monthly, seasonal, etc.
• Annual contract amount, other
Questions if You Own Trucks and Buses

• Upload truck data in TRUCRS for California fleet
• Provide additional information
  • Assigned terminal/yard/division (zip code, or city, other)
  • Average daily miles
  • Operating distance from base (50, 100, 200 miles)
  • Route characteristics (predictable, variable)
  • Location parked – yard, terminal, driver’s home, other
  • Operation type (Return to base, other)
  • Towing needs
  • Number of daily stops
  • Daily hours of operation
  • Dwell time

1. Includes vehicles leased for one year or more
Data Already Collected from Truck Owners in TRUCRS

Vehicle Information
- VIN
- GVWR over 26,000 (Y/N)
- Manufacturer (vehicle/engine)
- Model year (vehicle/engine)
- Vehicle model
- Body type
- Fuel type
- License plate
- Registration state/type
- Odometer reading (if low-use)
- PTO hours (if low-use)

Company Information
- Name
- Contact
- Company/agency type
- Business category
- Motor carrier number
- Tax payer-ID
- Corporate parent ID
Questions if You Provide For-Hire Transportation

• Company type
  • Motor carrier, broker, logistics company, other

• Service type
  • Truck load, less than truck load, flatbed other

• Freight types transported
  • Bulk material, liquids, dry goods, refrigerated goods…

• Total California loads (ton-miles, revenue, other)

• Portion of loads provided by sub-haulers or subcontractors (tons-mile, revenue, other)

• Annual number of subhauler trucks dispatched/directed
Questions if You Receive Deliveries Shipped by Others

• Facility type (warehouse, retail store, other)
• Facility location
• Type of products received (refrigerated, general merchandise, other)
• Owner or intermediary for shipment
• When are deliveries made (mornings, evenings, overnight, etc.)
• How are products received (loading dock, walk-in, etc.)
• Frequency of deliveries
  • Daily, weekly, monthly, seasonal, etc.
• How long are delivery trucks on site (1, 2, 4, other hours)
Next Steps

• Staff report available October 2019
  • Formal comment period begins
• First of two board hearings in December 2019
  • Final decision mid-2020
• Plan future regulation for Board consideration in 2022
  • Initial implementation in 2024
Additional Information

• Advanced Clean Trucks website
  • www2.arb.ca.gov/our-work/programs/advanced-clean-trucks

• Fact Sheet
  • www2.arb.ca.gov/resources/fact-sheets/advanced-clean-trucks-act-fact-sheet

• Contacts
  • Craig Duehring - craig.duehring@arb.ca.gov
  • Paul Arneja - paul.arneja@arb.ca.gov