Zero-Emission Fleet Rule Workshop
Advanced Clean Truck Fleets

Diamond Bar, California
February 12, 2020
Today’s Outline

- Introduction and background
- Proposed Advanced Clean Truck regulation
- Zero-emission (ZE) truck market overview
- General truck characteristics
- ZE fleet rule concepts
- Market segments discussion
- Timeline and next steps
Discussion Overview

- How to achieve a zero-emission truck and bus fleet by 2045 everywhere feasible
  - Earlier transition for certain market segments
  - Initial focus on larger fleets and large entities that hire them

- Scope includes wide range of stakeholders
  - Owners of vehicles with a GVWR >8,500 lb (or Class 2b and up)
  - Entities that hire truck and bus fleets
  - Government, private business, and others

- Build on other supporting zero-emission vehicle policies
Major NOx and PM$_{2.5}$ Emission Reductions Needed

- California has the worst air quality in the nation
- Key challenges
  - San Joaquin Valley – PM$_{2.5}$
  - South Coast - ozone
- Heavy-duty trucks and federal sources remain largest contributors
- Action beyond current programs needed by 2031
  - Nearly all heavy trucks to have 2010 model year engines by 2023
Disadvantaged Community (DAC) Focus

- Assembly Bill 617 directs CARB to identify community level strategies
- Communities seek action on transportation and freight emissions
- Seek rapid transition to ZE technology
Transportation Is Largest Source of Greenhouse Gases (GHGs)

- California’s climate change targets
  - Achieve 1990 GHG levels by 2020
  - 40% below 1990 levels by 2030
  - 80% below 1990 levels by 2050
  - Carbon neutrality by 2045

- Clean electricity
  - 33% renewable by 2020
  - 60% renewable by 2030
  - Zero-carbon by 2045

2017 CA GHG Emissions By Economic Sector

- Transportation 41%
- Industrial 24%
- Agriculture and Forestry 8%
- Residential 7%
- Electricity Generation (In State) 9%
- Electricity Generation (Imports) 6%

Note: Mobile sources represent ~50% of GHG inventory when including emissions from fuel production

California GHG Inventory: https://ww2.arb.ca.gov/ghg-inventory-data
California Vehicle Populations

- Class 2b-3 Trucks and Vans: 1,040,000
- Class 4-8 Straight Trucks and Buses: 450,000
- Class 7-8 Tractors: 180,000

Source: EMFAC2017, 2020 Calendar Year
The Importance of Addressing Truck Emissions

Trucks only make up 6% of the state’s fleet...  
...but represent 21% of transportation GHG emissions...  
...and near half of transportation NOx emissions

Vehicle Population | Transportation GHG Emissions | Transportation NOx Emissions

- Medium- and Heavy-duty Vehicles
- Rest of the Fleet

Note: “Truck” refers to all vehicles above 8,500 lb. GVWR
Zero-Emission Key to California’s Future

- Multiple NOx and GHG reduction plans
- Core to CARB and the state’s strategies
  - Zero-emissions everywhere feasible
  - Cleaner fuels and cleaner combustion everywhere else
Suite of Mobile Source ZE Measures

Zero-Emission Operation

- ZE Airport Shuttle
- ZE Powertrain Cert
- ZE Ships at Berth
- ZE Airport GSE
- Rail Yard Idling
- ZE TRUs
- ZE Forklifts
- ZE Truck Fleets
- ZE Drayage Trucks
- ZE Cargo Equipment

Innovative Clean Transit

- Advanced Clean Trucks
- CA GHG Phase 2
- Truck OBD
- Truck Smoke Test

2018
- Handbook-1 Warehouses

2019
- Heavy-duty Low-NOx Omnibus
- Heavy-Duty I/M Harbor Craft

2020
- Handbook - 2 Ports, Rail
- Low-Emission Diesel Fuel

2021
- Non-preempted Locomotives

2022
- Lower Exhaust Emissions
Benefits of ZEVs

- Health benefits, especially in disadvantaged communities
- Climate benefits
- Expanded green jobs and workforce
- Reduce energy use and petroleum dependence
- Fuel cost savings and price stability
- Maintenance cost reductions
- Low noise and other societal benefits
Comments, Questions, Clarifications?

Email questions to zevfleet@arb.ca.gov
Proposed Advanced Clean Truck Sales Regulation

As proposed on December 12, 2019
Advanced Clean Trucks Sales Summary

- First Board hearing
  - December 2019
- Next Workshop
  - Proposed changes
  - February 20, 2020
- Final hearing
  - May 2020

More information on Advanced Clean Trucks:
https://ww2.arb.ca.gov/rulemaking/2019/advancedcleantrucks
Proposed ZEV Sales Requirements

- Manufacturers with California sales
  - Exemption for <500 annual sales
- Zero-emission Powertrain Certification required starting 2024 MY
- Credit for near-zero-emission vehicles
  - Minimum all-electric range
  - Up to 75% of a ZEV credit
- Credits tradable across weight classes
- Minimum tractor sales required

<table>
<thead>
<tr>
<th>Model Year (MY)</th>
<th>Class 2b-3¹</th>
<th>Class 4-8</th>
<th>Class 7-8 Tractors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2024</td>
<td>3%</td>
<td>7%</td>
<td>3%</td>
</tr>
<tr>
<td>2025</td>
<td>5%</td>
<td>9%</td>
<td>5%</td>
</tr>
<tr>
<td>2026</td>
<td>7%</td>
<td>11%</td>
<td>7%</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>2030²</td>
<td>15%</td>
<td>50%</td>
<td>15%</td>
</tr>
</tbody>
</table>

1. Excludes pickups until 2027 MY
2. 2030 MY requirements continue after 2030

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 Large Entity Reporting

Who would need to report (one-time)?

**Businesses**
>$50 Million in Revenue
- With facilities in California (may not own vehicles)

**Large Fleets**
Own 100+ Vehicles\(^1\)
- With facilities in California

**Brokers**
Directing 100+ Vehicles\(^1\)
- To or from California

**Government**
All Levels
- Municipalities, State, Federal Agencies

Why do we need reporting?

**Support ZE regulatory frameworks**
- Fleet standards, purchasing requirements, must contract with ZE fleets, ZE zones

**Ensure level playing field**
- Large fleets vs. small fleets
- Owned trucks vs. contracted services

**Assessing infrastructure needs**
- Energy demand, barriers, build-out planning

**Match technology with duty cycles**
- Understanding spectrum of existing use cases
Fleet Questions for ZEV Feasibility

- Group by vehicle body type fuel type and assigned facility
- Onsite fueling infrastructure
- Daily and total annual miles
- Variable or predictable use
- Portion that returns-to-base
- How long are vehicles kept
- How many have GPS tracking
- How many stay close to base

- How many tow trailers >100 mi.
- How many are at a weight limit
- How many are registered in CA
- How many at facility for >8 hrs.
- How many used for emergency
- How many have all-wheel drive
Board Direction from First Hearing

- Increase the number of zero-emission trucks sold and deployed
- Accelerate benefits in disadvantaged communities
- Evaluate the EMA proposal of 100% ZEV sales by market segment
- Work with industry to streamline the reporting requirement
- Expedite complementary zero-emission fleet rules
- Establish pathway to 2045 carbon neutrality
- Additional considerations

EMA – Engine and Truck Manufacturers Association
Comments, Questions, Clarifications?

Email questions to zevfleet@arb.ca.gov
Zero-Emission Truck Market Overview
ZE Truck and Bus Market Highlights

- Transit buses and airport shuttles lead the way
  - ZE buses already available in nearly all configurations
- Early ZEV market supported with early funding programs
- Wide range of ZE trucks commercially available today
- All established manufacturers announced ZE truck sales
- Truck market benefiting from technology transfer and experience from ZE passenger cars and buses
- Costs declining rapidly and innovative designs expanding markets
Role of Incentive Funding

- Early demonstration and commercialization
- Current CARB funding sources
  - Hybrid and Zero-Emission Truck and Bus Voucher Incentive Program (HVIP)
  - Volkswagen Environmental Mitigation Trust
  - Carl Moyer Memorial Air Quality Standards Attainment Program
  - Truck Loan Assistance Program
- Primarily targets early actors ahead of regulatory requirements
ZANZEFF Pilot Projects

- $205 million awarded across California (2018)
- Manufacturers include Ballard, BYD, Hydrogenics, Kenworth, Meritor, Peterbilt, Tesla, Toyota, TransPower, Volvo, XOS and others
- Most projects within disadvantaged communities (DAC)
- Collecting data on all vehicles deployed
- [https://content.govdelivery.com/accounts/CARB/bulletins/21027cf](https://content.govdelivery.com/accounts/CARB/bulletins/21027cf)

### Summary of Vehicle Types Awarded

<table>
<thead>
<tr>
<th>Battery Electric Trucks</th>
<th>Battery Electric Off-Road</th>
<th>Fuel Cell and Low-NOx</th>
<th>Other Off-Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>43 Yard Goats</td>
<td>48 Forklifts</td>
<td>19 FCEV Delivery Vans</td>
<td>9 Electric Gantry Cranes</td>
</tr>
<tr>
<td>46 Class 8 Trucks</td>
<td>2 Top-Handlers</td>
<td>10 FCEV Class 8 Tractors</td>
<td>7 Electric Transport Refrig. Units</td>
</tr>
<tr>
<td>37 Class 8 Tractors</td>
<td>1 Side-Loader</td>
<td>2 FCEV Yard Trucks</td>
<td>2 Hybrid Gantry Cranes</td>
</tr>
<tr>
<td>5 Class 7 Tractors</td>
<td>1 Locomotive</td>
<td>38 Low-NOx Engine Trucks</td>
<td>2 Tier 3 Ocean-Going Vessels</td>
</tr>
<tr>
<td>29 Medium-Duty Trucks</td>
<td>29 Freight Equipment</td>
<td></td>
<td>1 Hybrid Tugboat</td>
</tr>
<tr>
<td><strong>160 Total</strong></td>
<td><strong>81 Total</strong></td>
<td><strong>69 Total</strong></td>
<td><strong>21 Total</strong></td>
</tr>
</tbody>
</table>

ZANZEFF Applications Received: [https://www.arb.ca.gov/msprog/aqip/solicitations/fy1718_freight_facilities_applications.pdf](https://www.arb.ca.gov/msprog/aqip/solicitations/fy1718_freight_facilities_applications.pdf)
ZANZEFF Press Release: [https://content.govdelivery.com/accounts/CARB/bulletins/21027cf](https://content.govdelivery.com/accounts/CARB/bulletins/21027cf)
### Commercially Available ZEVs Today

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2B-3</td>
<td>(8,501 – 14,000 lbs.)</td>
</tr>
<tr>
<td>4-5</td>
<td>(14,001 – 19,500 lbs.)</td>
</tr>
<tr>
<td>6-7</td>
<td>(19,501 – 33,000 lbs.)</td>
</tr>
<tr>
<td>8</td>
<td>(33,000 lbs. and over)</td>
</tr>
</tbody>
</table>

**Note:** Transit buses not shown
Major Manufacturers Entering Market

- Many major manufacturers have plans to enter the ZEV market prior to 2024
  - Cummins, Ford, Freightliner, Mack, Navistar, Mitsubishi Fuso, Peterbilt, Tesla, Volvo have announced plans for commercial products

Image source: Ford, Cummins, Mack, Trucks.com
Major Suppliers and Service Providers Entering Market

- Established suppliers entering ZE truck supply chain
  - Partnering with existing ZE vehicle/drivetrain manufacturers
  - Numerous demonstrations underway
- Established companies servicing, distributing, training, leasing ZE trucks

Electric Powertrain Providers

Service, Support, Training

PENSKE
Ryder® Ever better™
Technology Outlook for the Future

- ZE truck demonstrations for types previously assessed as challenging
- Battery density and cost reductions expected to continue
  - Decreases weight or enables greater range
- Innovative designs create other advantages
  - Skate board platforms, composite bodies, e-axles
  - Some with better payload and lower weight than diesel today
- Fueling/charging network development to expand market potential

Image Source: Workhorse Group, Rivian
Medium- and Heavy-Duty ZEV Model Availability Expanding

- Cargo van: 5 FCEV, 15 BEV
- HD truck: 3 FCEV, 18 BEV
- MD step van: 1 FCEV, 9 BEV
- MD truck: 12 FCEV, 12 BEV
- Refuse truck: 1 FCEV, 6 BEV
- School bus: 12 FCEV, 12 BEV
- Shuttle bus: 2 FCEV, 14 BEV
- Transit Bus: 36 BEV
- Yard tractor: 4 BEV

CARB
City, State and Port Policies Enacted

- Law requires Class 6-8 ZEV purchases by state fleets (AB 739)
  - 15% starting in 2025
  - 30% starting in 2030
- San Pedro Bay Port’s Clean Air Action Plan goals
  - 100% ZE drayage trucks by 2035
  - 100% ZE cargo-handling equipment by 2030
- Los Angeles’s Green New Deal
  - “Zero-emission first” policy for all city vehicle procurement
  - Taxis, drayage, urban delivery, cargo handling equipment & more
- Municipal plans from cities of Sacramento, San Francisco, & others
Multistate MD/HD ZEV Statement of Intent

- Multiple states* seek to support rapid expansion of the ZEV truck market
- Goal to formalize an agreement for a multi-state ZEV Action Plan
- NESCAUM is reaching out to more states

* California, Connecticut, Maine, Massachusetts, New Jersey, Oregon, Rhode Island, Vermont and the District of Columbia
Zero-Emission Charging/Fueling Standards

- Existing standards
  - J1772 CCS – Charging up to 19 kW AC and 350 kW DC
  - J3068 – Charging up to 166 kW AC
  - J2601 – Hydrogen fueling up to 10 kg

- High-powered conductive charging in development
  - Fast charging above 1 MW
  - CharIN (Multiple manufacturers and charging station providers)

- Hydrogen refueling protocol in development for heavy-duty trucks
  - Air Liquide, Hyundai, Nel Hydrogen, Nikola, Shell, and Toyota

Hydrogen MOU: https://www.greencarcongress.com/2019/02/20190221-h2.html
Low Carbon Fuel Standard (LCFS)

- Regulation to reduce carbon intensity of transportation fuels
  - 20% reduction by 2030
- Fleets can earn credits
  - Charging equipment owners
  - Hydrogen station operators
- LCFS credit sales offset fuel costs

More information on LCFS: https://ww3.arb.ca.gov/fuels/lcfs/lcfs.htm
Battery Electric Fuel Cost Saving with LCFS

<table>
<thead>
<tr>
<th>Electric vs Diesel</th>
<th>Airport Shuttle</th>
<th>Package Delivery</th>
<th>Local Drayage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Savings</td>
<td>40%</td>
<td>50%</td>
<td>40%</td>
</tr>
<tr>
<td>Fuel Savings with LCFS</td>
<td>75%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Note: Example assumes fuel prices of $3.70/gal., $0.18/kWh (includes transmission, energy, fixed fees, and demand charges), LCFS credit value at $125 per credit.
SB350 Transportation Electrification

- California utilities supporting battery electric truck and bus deployments
- $686 million approved through 2023 for three largest utilities
  - Pay for design and electrical service upgrades on customer property
  - Support charging 18,000 trucks, buses, and off-road vehicles through 2023
  - Rebates for chargers in DACs
- Publicly-owned utilities developing own programs
- New electricity rates to encourage electric vehicles

Transportation Electrification (SB 350) [www.cpuc.ca.gov/sb350te/](http://www.cpuc.ca.gov/sb350te/)
Infrastructure Forecasting and Planning

- Biennial statewide charging infrastructure assessment (AB 2127)
  - California Energy Commission
  - Light-duty, heavy-duty, off-road
  - Spatially model future infrastructure and energy demand
- Transportation Electrification Framework
  - California Public Utility Commission
  - Support SB 350 and other transportation electrification goals
  - Provide guidance and direction to investor-owned utilities
Comments, Questions, Clarifications?

Email questions to zevfleet@arb.ca.gov
MD/HD Infrastructure Discussion

Hannah Goldsmith
Governor’s Office of Business Development (GO-BIZ)
General Truck Characteristics
ZE Truck Technology Assessment

- Most single-unit trucks average less than 100 miles per day
- Most in-state tractors travel less than 200 miles per day
- ZE technology improvements and cost reductions continue
- Larger fleets have ability to manage small ZE deployments
  - Variable routes met by conventional trucks
- Weight limit concerns
  - Some ZEV designs lighter than diesel vehicles
  - AB 2061 (2018) increases the upper weight limit by 2,000 lb.
  - Could impact CDL requirements at Class 6/7 split

CDL: Commercial Driver's License
Example of Available and Announced ZEVs


*Multiple models to be commercial before 2024.
Most Trucks Average Below 100 Miles/day

Variety in Class 7-8 Tractor Annual Mileage
All California Tractors

Source: 2018 California VIUS, including DMV and California IRP tractors, excludes out-of-state IRP tractors
Class 2b-3

- Pickups have higher towing and payload capabilities than light-duty versions
  - Commonly purchased by small fleets and individuals
- Vans often used for last-mile delivery, and services (shuttle, repair, maintenance, sales, other)
- Chassis cabs based on pickup or van platforms and equipped with utility bodies, box trucks, flat beds...
Class 4-8 Straight Trucks

- Start as chassis cab or incomplete vehicle
- Wide range of bodies
  - Box/Van, reefer, flat bed, utility, vocational
- Most likely category to return to base and travel shorter distances
- Commonly used for first/last mile and worksite operation
Same Chassis for Multiple Bodies
Class 7-8 Tractors

- High concentrations at ports, warehouses, DACs
- Highest total emissions of all truck categories
- Long-haul, regional, drayage, yard, local delivery, vocational uses
- Day cab, sleeper cab, city tractor, yard truck, heavy haul, vocational
Comments, Questions, Clarifications?

Email questions to zevfleet@arb.ca.gov
Regulatory Strategy Overview

- One rulemaking to address all truck and bus types
- Expect differing requirements by vehicle type or market segment
  - (ie. drayage, step van, last mile delivery, box truck, other)
- Initial focus on larger fleets in most suitable markets for ZEVs
- Expand ZEV market in all segments as quickly as possible
  - Support a robust secondary market
  - Encourage early action before 2023
  - No plans for accelerated replacements
- Complement other ZEV regulations and policies
- Rule implementation 2024 through 2045
Minimum Useful Life Criteria

- Road Repair and Accountability Act of 2017 (SB1) establishes minimum useful life criteria for commercial vehicles
  - Based on date of first engine emissions certification date
  - 18 years if vehicle has less than 800,000 miles
  - 13 years if vehicle exceeds 800,000 miles
- Applies to new CARB regulations or amendments
Principles for Developing ZE Fleet Rules

- Expand ZE vehicle use to meet air quality and GHG goals
- Maximize the total number of ZEVs deployed
- Focused action in disadvantaged communities
- Simple and streamlined compliance and enforcement
- Match vehicle capabilities with fleet operational needs
- Expand infrastructure access to enable new markets
- Support and enable workforce training
- Ensure level playing field
- Avoid unintended consequences
Scope of ZEV Technology Options

- Zero-emission vehicles
  - Battery electric, fuel cell electric, catenary electric
- Near-zero-emission vehicles
  - Plug-in hybrid electric with a minimum all-electric range
- Other zero-emission cargo vehicles
  - Light-duty vans and trucks
  - Cargo bikes (zero-emission)
ZEV Suitability Today Varies by Vehicle Type and Use Case
Factors Affecting Suitability for ZEVs

- Fleet vehicle operational characteristics
- ZEV availability and characteristics
  - Fueling time, range/ability to do work
  - Compatibility with final body configuration
- Access to infrastructure
  - On-site fueling/charging initially
  - Retail/public charging network as market develops
- All are subject to change over next decade
Zero-Emission Regulatory Concepts

- Phase-in ZEV purchases
- EMA Proposal - 100% ZEV purchases by truck segment
- ZE fleet standards
- Green contracting
- ZE zones
- Facility requirements
- ZE miles standard
Approved Phase-in of ZE Bus Purchases

- Innovative Clean Transit approved 2018
- Phase-in ZE transit bus purchases
  - 25% starting 2023
  - 50% starting 2026
  - 100% starting 2029
- Small transit fleets start 2026
- Off-ramps for certain circumstances
- 100% ZE bus fleet around 2040

More information on Innovative Clean Transit:
Phase-in ZEV Purchases

- Ramp up ZEVs as a percent of normal purchases by calendar year
  - No accelerated replacements
- Questions to consider
  - How to maximize ZEVs for different vehicle/fleet types
    - Level playing field, match fleet needs, infrastructure
  - When/how to set 100% ZEV purchase requirement for simplicity
  - How to benefit DACs
  - How to guard against pre-buys or delayed purchases
Model Year Requirements - EMA Proposal

- Require 100% ZE sales/purchases in market segments by model year
  - 2023 – School buses and municipal stepvans
  - 2024 – Public utility vehicles and yard tractors
  - 2025 – All stepvans, airport service vehicles, non-airport shuttle buses
  - 2026 – All refuse trucks
  - 2027 – Concept continues for other segments

- Questions to consider
  - How do you maximize ZEV deployments
  - How do you address segments not yet ready for 100% sales
  - How do you ensure benefits in DACs (tractors or other)
  - How to guard against pre-buys or delayed purchases

Approved ZE Fleet Standard

- ZE Airport Shuttle Bus approved 2019
- Public and private airport shuttle bus fleets
- Buses, cutaway shuttles, passenger vans
  - 33% of fleet ZE by 2027
  - 66% of fleet ZE by 2031
  - 100% of fleet ZE by 2035

More Information on ZE Airport Shuttle Bus:
https://ww2.arb.ca.gov/rulemaking/2019/asb19
ZE Fleet Standard

- ZEVs must make up percentage of fleet by milestone dates
  - Report body type and fuel type annually
- Questions to consider
  - How to set goals to maximize ZEVs for different fleets, vehicle types or market segments
  - What fleet definition for level playing field
  - How to ensure benefits in DACs
  - Any unintended consequences
Approved Green Truck Contracting

- Broker and hiring entities must hire compliant fleets
  - Truck and Bus regulation
  - Tractor Trailer GHG regulation
  - Off-Road Vehicle regulation
Green Truck Contracting

- Requires large entities to hire fleets that meet a voluntary ZE Fleet Standard
  - May include retailers, wholesalers, public agencies, brokers, terminal operators, motor carriers...
  - Certified fleets would be listed on CARB webpage

- Questions to consider
  - Will demand for ZE fleets maximize ZEV deployments
  - How do you achieve benefit in DACs
  - How to track and audit contract agreements for enforcement
  - Leaves door open for funding fleets if needed
  - Are there unintended consequences

Maximize ZEVs, benefit DACs, simplicity, match fleet needs, expand infrastructure access, level playing field, unintended consequences.
Approved Lower-Emission Zone Requirements

- Drayage Truck regulation
  - Clean trucks to enter ports & railyards
- Truck and Bus regulation
  - NOx exempt area provisions
- Public Agency and Utility Regulation
  - Low population county extension

Green-patterned areas represent NOx-Exempt Counties
Zero-Emission Zones

- Geographic boundaries surrounding targeted areas
- Only ZEVs or fleets meeting the ZE Fleet Standard may enter ZE zone
  - Ports, rail yards, warehouse hubs, city boundaries, disadvantaged communities, air basin, or other
- Questions to consider
  - How and when to transition to a pure ZE zone
  - How to determine locations and boundaries to benefit DACs
  - How to ensure feasibility for all fleets (small and large)
  - How to address differences for drayage vs long-haul tractors
  - How to ensure compliance and enforcement during transition
  - Any unintended consequences
Facility Requirement: Proposed TRU Regulation

Starting in 2022:
- All newly manufactured TRU units built to use refrigerant with a global warming potential ≤ 2,200

Starting in 2024:
- Applicable facilities complete installation of electric charging or fueling infrastructure to support zero-emission operation of TRUs

Starting in 2025:
- Trailer TRUs - Zero-emission operation when parked or stationary for >15 minutes at an applicable facility
- Meet U.S. EPA Tier 4 final emission standards for 25-50 hp engines
- Truck TRU fleets phase in full zero-emission at 15% per year (over 7 years)
Facility Requirements

- Facilities that receive trucks must install infrastructure for ZEVs
  - Install H2 stations or chargers at stores, ports, railyards, warehouses, or other hubs with sufficient dwell time
  - Workplace charging
- Questions to consider
  - Can this complement other strategies to maximize ZEVs
  - How to determine which sites appropriate for infrastructure
  - Are there other ways facilities can attract ZEV trucks into DACs
Proposed Light-Duty Clean Miles Standard (SB 1014)

1) GHG Target: grams CO₂ per passenger mile traveled (PMT)
2) Electric Miles Driven Target: %eVMT

Applicable to: Passenger service on TNC platforms

Key Goals:
- Promote electrification
- Reduce VMT

Align with:
- SB 375
- SB 350
- ZEV Action Plan

For more information, please visit the Clean Miles Standard website: https://ww2.arb.ca.gov/our-work/programs/clean-miles-standard

TNC: Transportation Network Company
VMT: Vehicle Miles Traveled
ZE Miles Standard

- Set fleet ZE mile targets based on metrics
  - Energy use, miles travelled, ton-miles
- Questions to consider:
  - How to maximize ZEVs and benefits in DACs
  - How to match fleet needs and maintain level playing field
  - Can the same metric work for all truck types and uses
  - Is there simple way to track and report data
  - How to address fluctuations in truck use
    - Contracts, economy, or other issues beyond fleet’s control
Other Issues to Discuss

- How to define fleets
  - Companies who contract services with truck and driver
  - Brokers directing trucks
  - Motor carriers and subhaulers
  - Subsidiaries, partners, franchisee and other

- How to define large entities (may or may not own vehicles)
  - Already required to hire compliant fleets
  - May be required to hire ZEV fleets

- How to treat other delivery vehicle types
  - Light-duty vehicles
  - E-cargo bikes used for moving freight
Comments, Questions, Clarifications?

Email questions to zevfleet@arb.ca.gov
Market Segments Discussion
Early Market Segments for Focus

• Drayage and intermodal
• First/last mile delivery
• Private bus/shuttle operators
• Refuse services
• Public agencies
• Utility providers
• Others to be identified
Drayage & Intermodal Fleets

- Goal to achieve 100% ZE fleet by 2035
- Trucks that service ports, inland ports, railyards (23,000 statewide)
- Major emission sources in disadvantaged communities
- Opportunities for shared, centralized infrastructure
- Significant number of owner-operators
First and Last Mile Delivery/Services

- Goal to achieve 100% ZE fleet by 2040
- Parcel, food, beverage, linen services, home/residential delivery, other
  - Initial population estimate – 80,000
- Return to base, predictable routes
- Large ZEV purchases from UPS, FedEx, and Amazon

CARB
Buses and Shuttle Buses

- Goal to achieve 100% ZE fleet by 2040
- Employee shuttles, motor coaches, other buses
- About 25,000 beyond transit and ASB
- Wide range of ZE buses commercially available
- Long distance motor coaches requires further study
Refuse Services

- Goal to achieve 100% ZE fleet by 2040
- Garbage, recycling, compactor and roll-off trucks, and other
  - About 16,000 vehicles (mostly Class 7-8)
  - Transfer trucks require further study
- Owned by or under contract with municipalities
- Return to base, predictable routes, operate in neighborhoods
- City of Los Angeles committed to 100% ZE refuse by 2035
Public Fleet Vehicles

- Goal to achieve 100% ZE capable fleet by 2040 including NZEVs
- Public fleets to lead the way for work trucks
- Diverse vehicle weight classes and body types
  - About 100,000 in Class 2b-8
  - Mostly variable use, low miles, and operate locally
- Different budget and funding issues than private
- Specialized vehicles and emergency use considerations
- No plans to require ZEV school buses
Goal to achieve 100% ZE capable fleet by 2040 including NZEVs
- Electricity, water, sanitation, telecommunications
- Diverse fleet of weight classes and body types
  - Some specialized equipment
- Operate regionally, some vehicles have long dwell times at jobsites
- Occasional long distance, or rapid response/emergency operation
What About ZEVs in Other Segments

- Need to include other truck types and market segments to meet 100% ZEV goal by 2045
  - Role for NZEVs with all-electric range
  - Requires substantial on infrastructure build-out
- Work trucks, service trucks, vans and other
- Short haul, regional, long-haul tractors
  - Largest heavy-duty emissions category
- Considerations for specialized equipment and uses
- How/when to bring in smaller fleets
Timeline and Next Steps

- Summer workshops
  - Establish workgroups as needed
  - Begin cost discussions
- Continue interagency infrastructure coordination
- Meetings and site visits with fleets
- Receive fleet reported data April 2021
- Fleet rule recommendation to Board in 2021/2022
  - Implementation starts 2024

Implementation starts 2024
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Web Page:  https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets