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AIR RESOURCES BOARD

Zero-Emission Fleet Rule Workshop
Advanced Clean Truck Fleets

Diamond Bar, California
February 12, 2020

Today's Outline

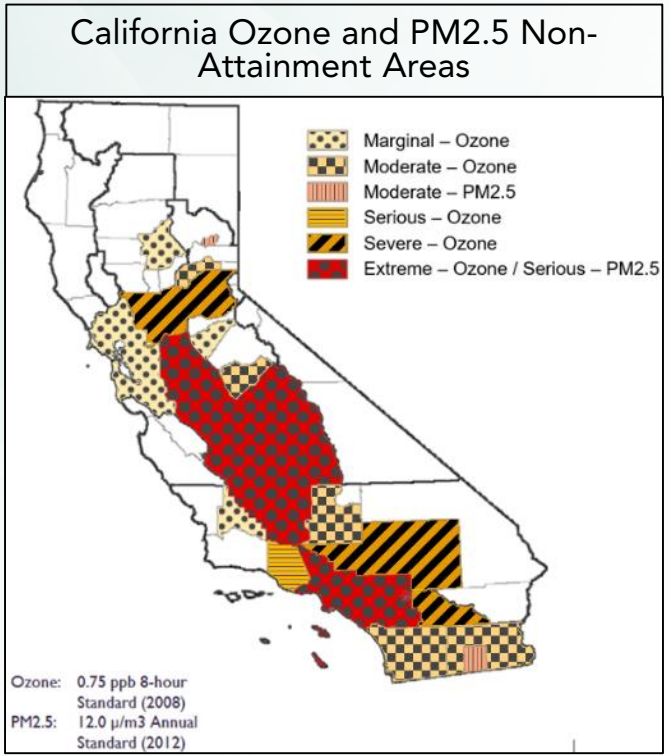
- Introduction and background
- Proposed Advanced Clean Truck regulation
- Zero-emission (ZE) truck market overview
- General truck characteristics
- ZE fleet rule concepts
- Market segments discussion
- Timeline and next steps

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 – PM2.5
  - 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



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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

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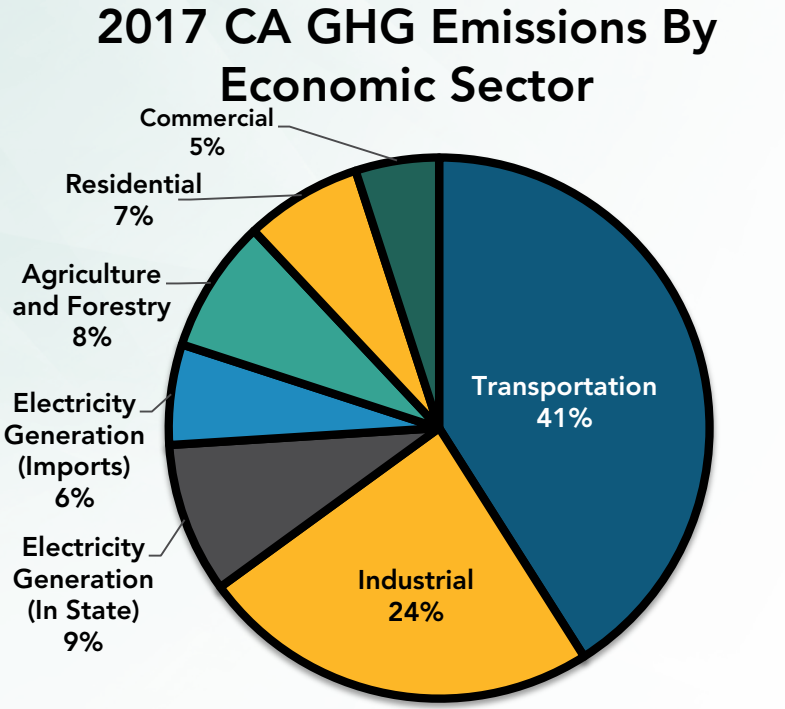
Transportation Is Largest Source of Greenhouse Gases (GHGs)

- 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



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

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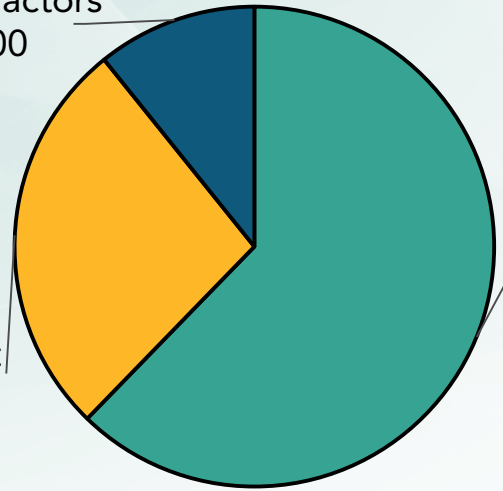
California GHG Inventory: https://ww2.arb.ca.gov/ghg-inventory-data

California Vehicle Populations

Class 7-8 Tractors
180,000



Class 2b-3 Trucks
and Vans
1,040,000

Class 4-8 Straight
Trucks and Buses
450,000

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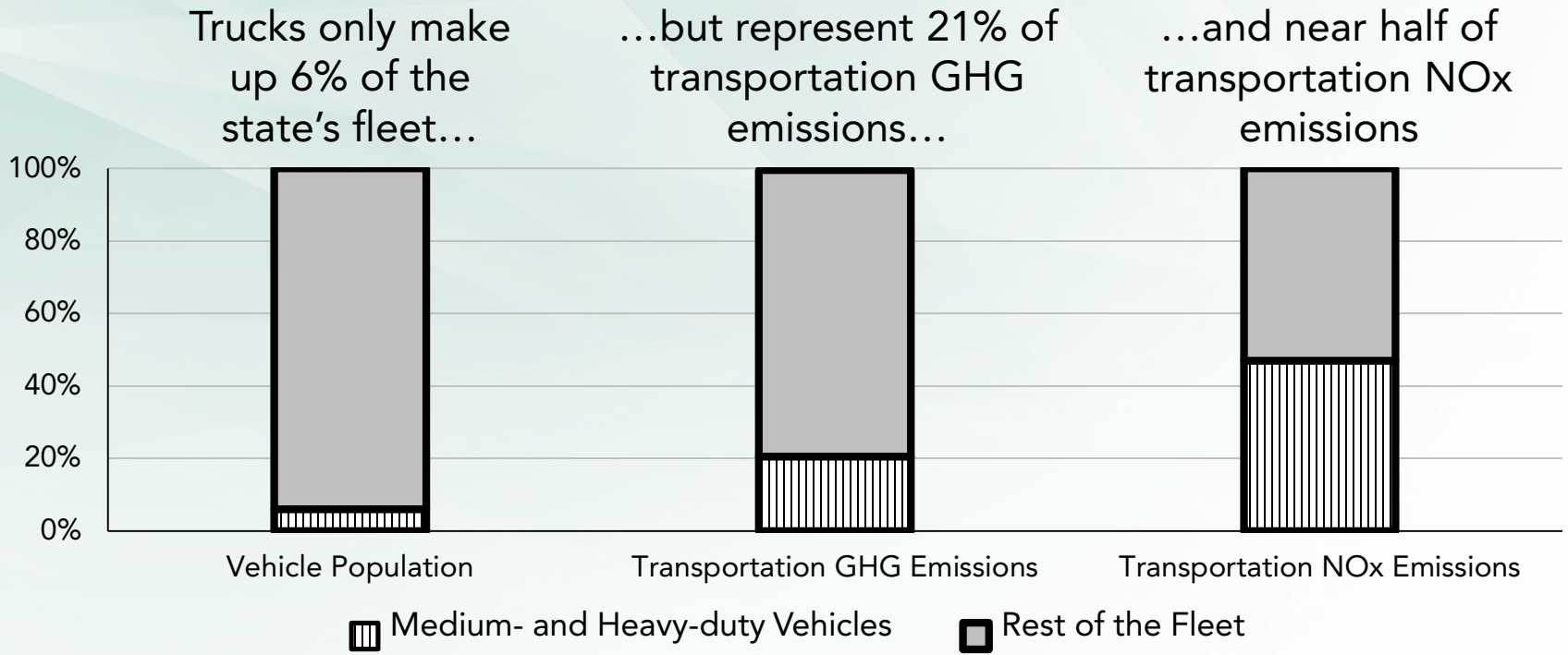
Source: EMFAC2017, 2020 Calendar Year

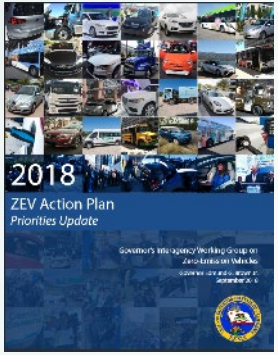
The Importance of Addressing Truck Emissions

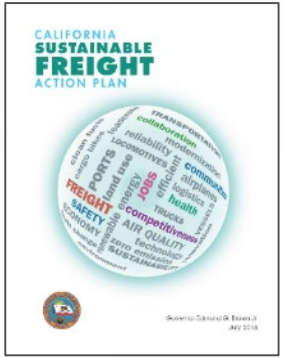


Note: "Truck" refers to all vehicles above 8,500 lb. GVWR

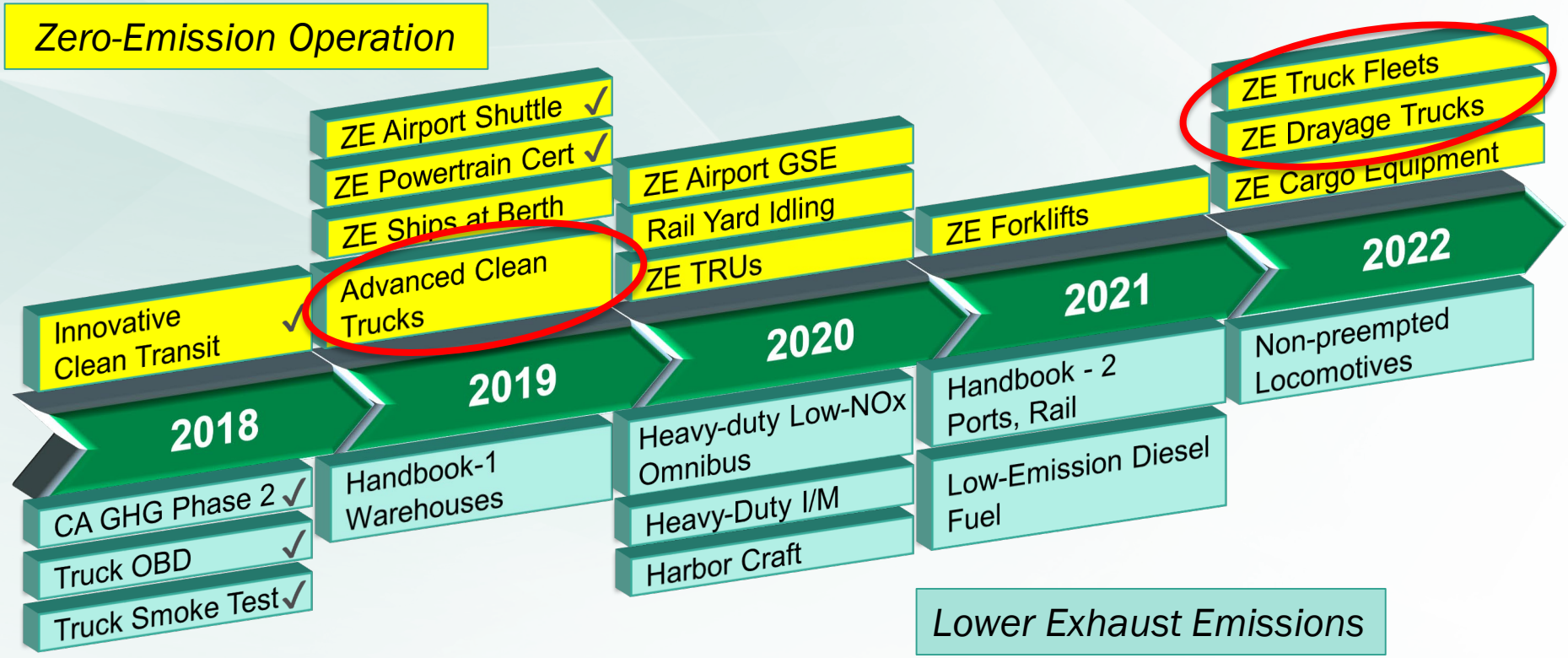
Zero-Emission Key to California's Future

- 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



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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

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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

Manufacturer ZEV Sales

Must sell ZEVs as a percentage of annual sales

Large Entity Reporting

One time reporting in 2021

Vehicles, facilities, contracted vehicle services

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

Model Year (MY)	Class 2b-3[1]	Class 4-8	Class 7-8 Tractors
2024	3%	7%	3%
2025	5%	9%	5%
2026	7%	11%	7%
2027	9%	13%	9%
2028	11%	24%	11%
2029	13%	37%	13%
2030[2]	15%	50%	15%

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

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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

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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

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

ZANZEFF Applications Received:
https://www.arb.ca.gov/msprog/aqip/solicitations/fy1718_freight_facilities_applications.pdf
ZANZEFF Press Release: https://content.govdelivery.com/accounts/CARB/bulletins/21027cf

Commercially Available ZEVs Today

2B-3 (8,501 – 14,000 lbs.)	4-5 (14,001 – 19,500 lbs.)	6-7 (19,501 – 33,000 lbs.)	8 (33,000 lbs. and over)

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




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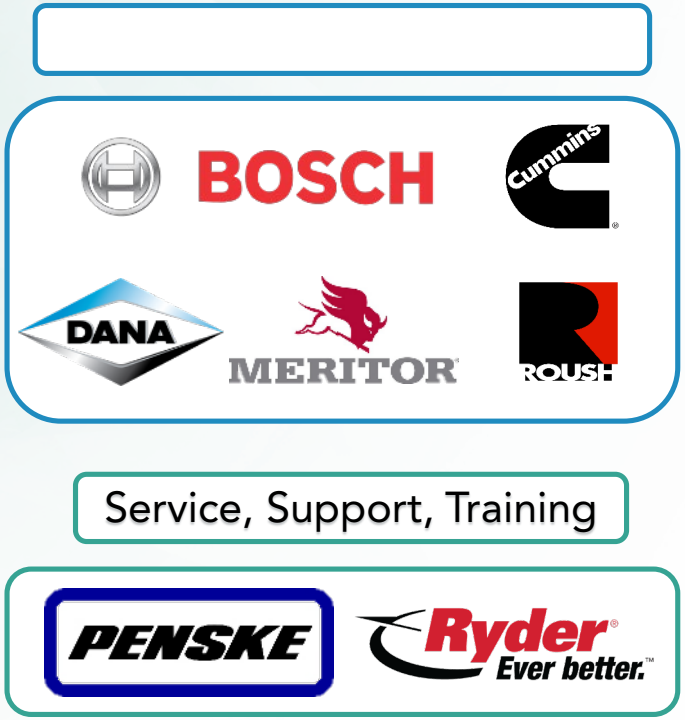
Image source: Ford, Cummins, Mack, Trucks.com

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

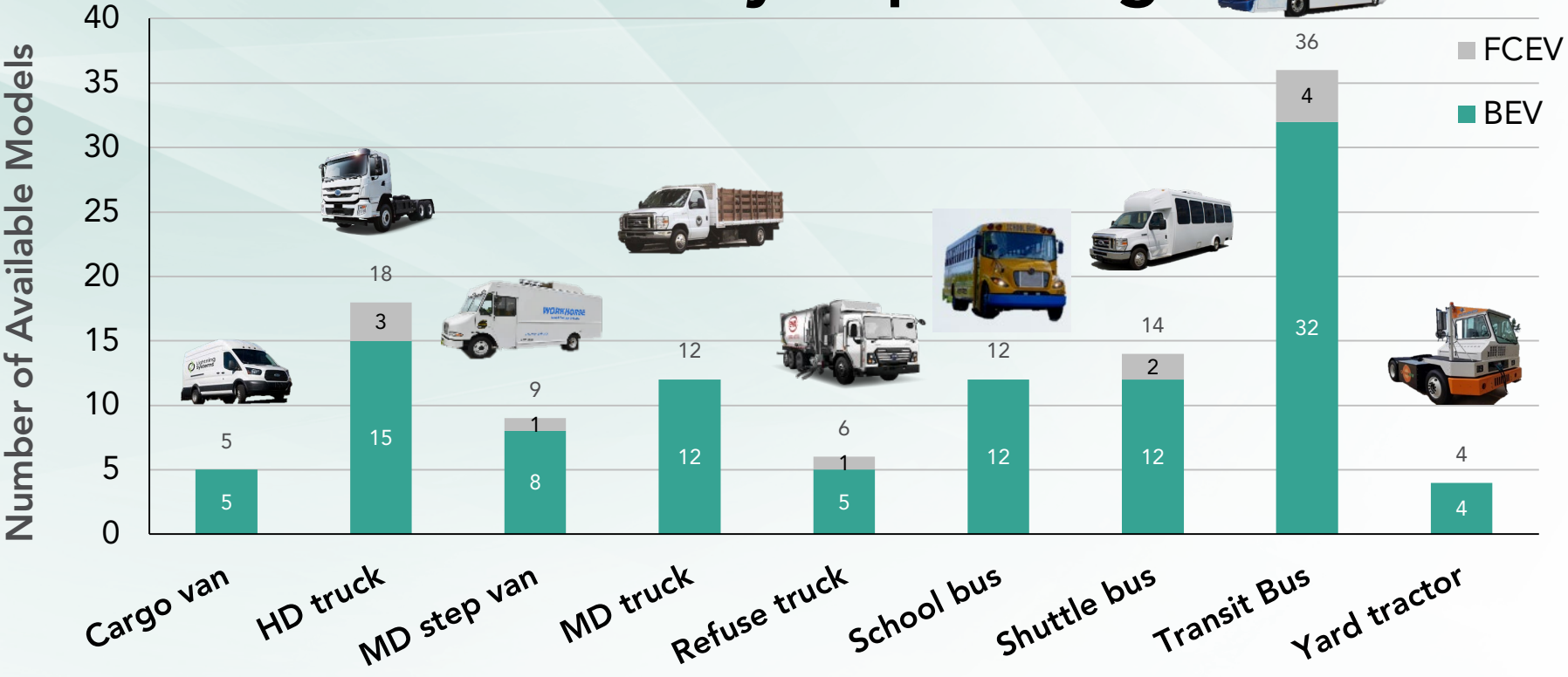


Technology Outlook for the Future

- 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



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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

MULTI-STATE MEDIUM- AND HEAVY-DUTY
ZERO EMISSION VEHICLE INITIATIVE

STATEMENT OF INTENT
DECEMBER 12, 2019

The urgency of the climate crisis demands immediate, aggressive action by all levels of government and all sectors of the global economy. Our communities are already experiencing the damaging effects of climate change – more frequent and extreme weather events, devastating floods, rising sea levels, prolonged drought, destructive wildfires, and mounting economic losses in the billions of dollars.

States, as well as the District of Columbia, have a critical leadership role to play in establishing and implementing policies and programs to rapidly decarbonize our economy at a pace needed to avoid the worst impacts of climate change. Our states recognize that nearly all new motor vehicles need to be electric by 2050 to achieve the necessary reductions in greenhouse gas emissions. Therefore, transportation electrification is a key climate action strategy and a top air quality priority for our states.

Many of our states are signatories to a 2013 Governors' Zero Emission Vehicle (ZEV) Memorandum of Understanding, by which the states committed to formation of a Multi-State ZEV Task Force and development of a comprehensive ZEV Action Plan to accelerate consumer adoption of zero emission light-duty passenger cars and trucks. This successful effort has proven to be a model for effective and efficient collaborative state action. The same kind of public commitment and focused collaborative state effort to develop and implement a range of market enabling programs and initiatives is needed for medium- and heavy duty vehicles.

After light-duty vehicles, medium- and heavy-duty vehicles are the next largest contributor to transportation sector greenhouse gas emissions. Diesel emissions from these vehicles are also a major source of nitrogen dioxides, particulate matter, and air toxics, and are preventing many densely

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* 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

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High-powered charging: https://www.charinev.org/news/news-detail-2018/news/charin-is-publishing-a-solution-for-high-power-charging-of-tucks-and-busses-beyond-1-mw/
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

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More information on LCFS: https://ww3.arb.ca.gov/fuels/lcfs/lcfs.htm

Battery Electric Fuel Cost Saving with LCFS

EV: 0.6 kWh/mi.
Diesel: 22 mpg

EV: 1.0 kWh/mi.
Diesel: 10 mpg

EV: 2.1 kWh/mi.
Diesel: 6 mpg

Electric vs Diesel	**Airport Shuttle**	**Package Delivery**	**Local Drayage**
Fuel Savings	40%	50%	40%
Fuel Savings with LCFS	**75%**	**100%**	**100%**

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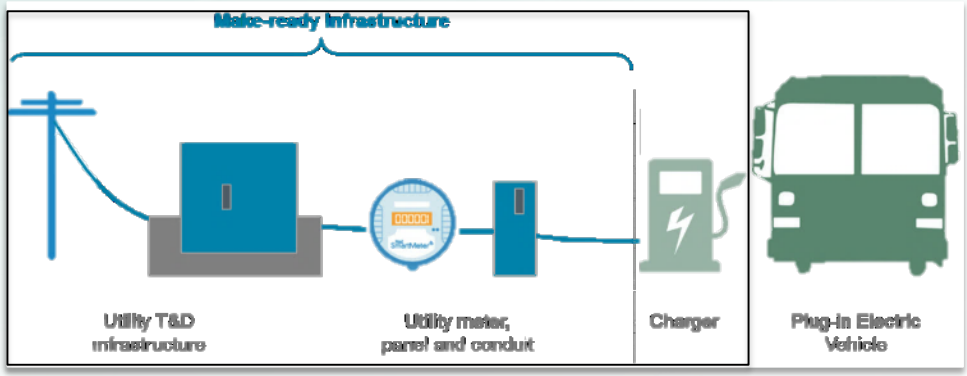
Note: Example assumes fuel prices of $3.70/gal., $0.18/kWh (includes transmission, energy, fixed fees, and demand charges), LCFS credit value at $125 per credit.

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/

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)

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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

Heavy-duty Pickup*
Range: 250-500 miles

Conventional Chassis
Range: 100-230 miles
Battery: 106-325 kWh

Step Van
Range: 90-120 miles
Battery: 96-128 kWh

Tractor*
Range: 500-1,000 miles
Battery: 250 kWh+100 kg H2

Cargo/Passenger Van
60-120 mi. range
Battery: 43-86 kWh

Cabover Chassis
Range: 100 miles
Battery: 136 kWh

Refuse Truck
Range: 80 miles
Battery: 352 kWh

Tractor*
Range: 100-500 miles

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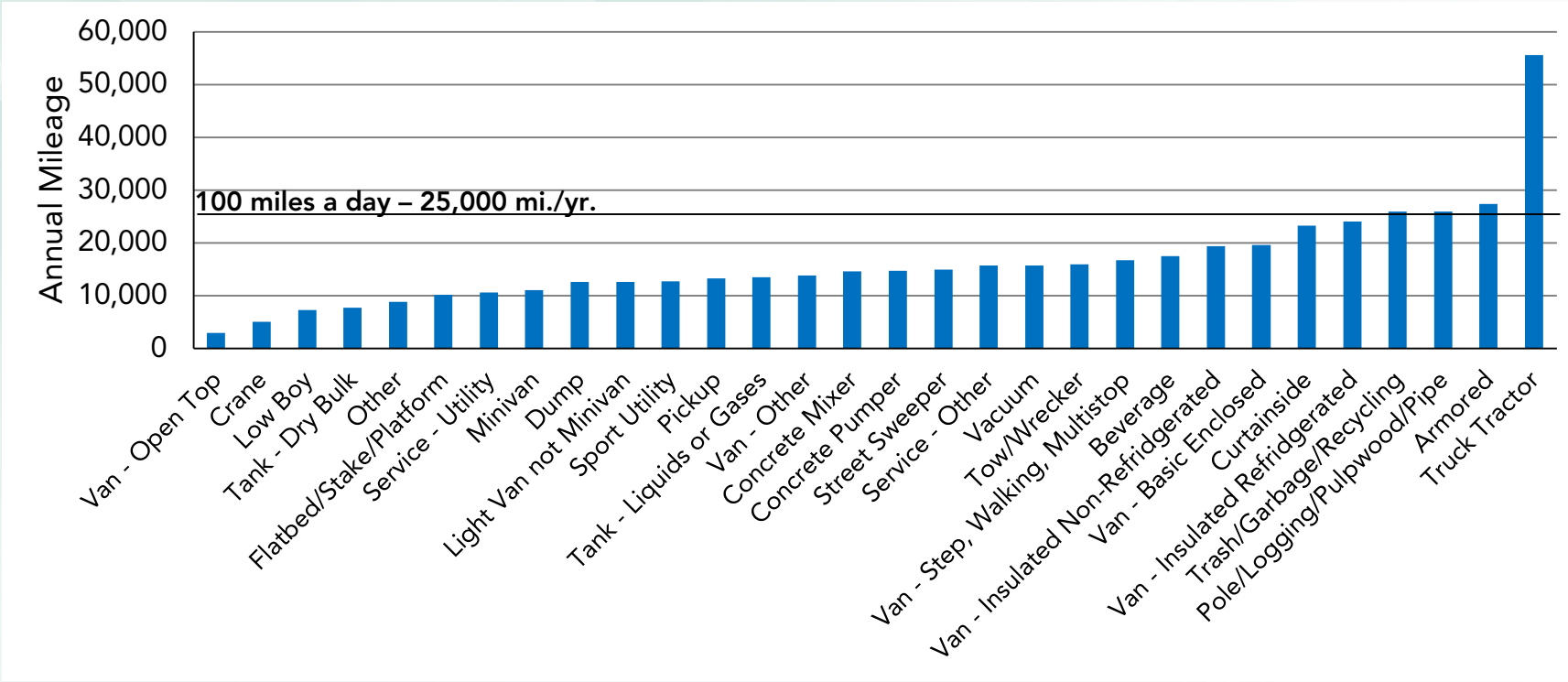
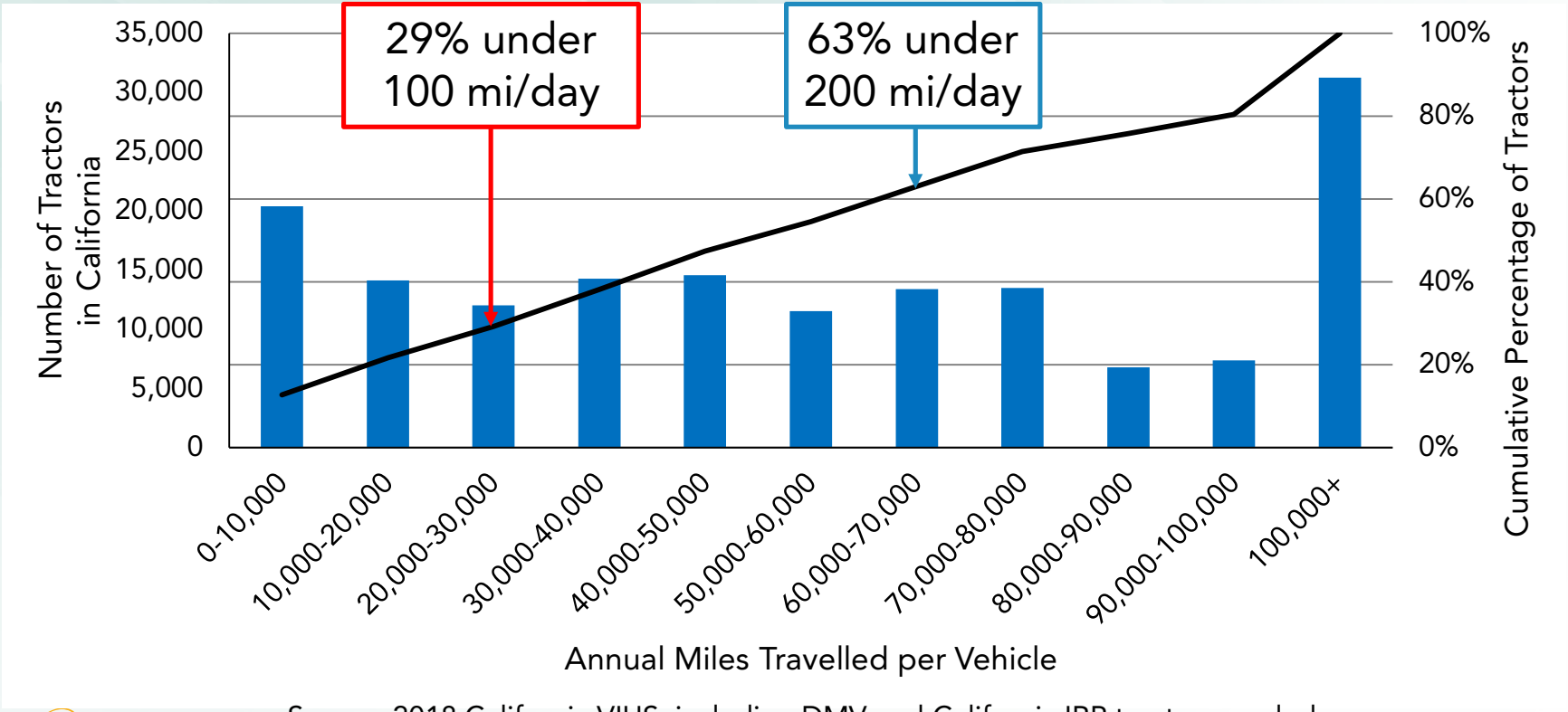
Image source: Wikipedia
*Multiple models to be commercial before 2024.

Most Trucks Average Below 100 Miles/day



Source: 2002 VIUS survey https://www.census.gov/library/publications/2002/econ/census/vehicle-inventory-and-use-survey.html

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…



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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

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Same Chassis for Multiple Bodies

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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





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Comments, Questions, Clarifications?

Email questions to zevfleet@arb.ca.gov

Zero-Emission Fleet Rule Concepts

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

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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

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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

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More information on Innovative Clean Transit:
https://ww2.arb.ca.gov/rulemaking/2018/innovative-clean-transit-2018

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

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EMA Proposal: https://www.arb.ca.gov/lists/com-attach/142-act2019-WjAAY1A1AAwEbwdm.pdf

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

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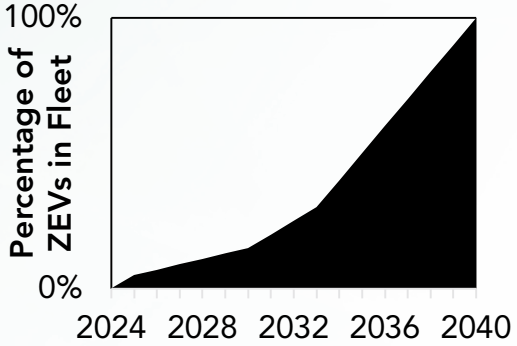
More Information on ZE Airport Shuttle Bus:
https://ww2.arb.ca.gov/rulemaking/2019/asb19

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



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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

Truck and Bus Regulation
NOx Exempt Areas

Green-patterned areas represent
NOx-Exempt Counties

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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)

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TRU: Transport Refrigeration Unit

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

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Proposed Light-Duty Clean Miles Standard (SB 1014)

1) GHG Target: grams CO_2 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

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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

Image source: UPS

Comments, Questions, Clarifications?

Email questions to zevfleet@arb.ca.gov

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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

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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

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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

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Private Utility Fleets

- 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

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

List Serve: https://public.govdelivery.com/accounts/CARB/subscriber/new?topic_id=zevfleet

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