Assessment of a Zero Emission Vehicle Requirement for Light and Heavy-Duty Vehicle Fleets

Public Workshop
August 30, 2018
ZEV Fleet Directive from Governor Brown

Explore new regulatory actions to accelerate zero emission vehicles in light and heavy-duty vehicle fleets

Consider opportunities in a broad range of fleets:

- Public and private
- New mobility fleets
- Large employer fleets
- Rental fleets
- Delivery fleets
Goal: Stakeholder input on what to consider in evaluating fleet EV requirements

- Background
- Light Duty Vehicle Programs
- Medium and Heavy Duty Programs
- ZEV Fuel infrastructure and incentive policies
- ZEV Fleet Considerations
- Next Steps
- CPUC and CEC Supporting Actions
CALIFORNIA’S CLIMATE POLICY PORTFOLIO

- Double building efficiency
- 50% renewable power
- More clean, renewable fuels
- Cleaner zero or near-zero emission cars, trucks, and buses
- Walkable/Bikeable communities with transit

Cleaner freight and goods movement

- Slash potent “super-pollutants” from dairies, landfills and refrigerants
- Cap emissions from transportation, industry, natural gas, and electricity
- Invest in communities to reduce emissions
Emissions Targets & Sector Contributions

**NOx, South Coast**

Under Current Programs

- Year: 2012, 2017, 2025, 2035
- Emissions (Tons per Day):
  - Areawide
  - Stationary
  - Other Mobile Sources
  - Heavy-Duty Vehicles
  - Light-Duty Vehicles

**GHGs, Statewide**

Under Current Programs

- Year: 2017, 2020, 2030, 2040, 2050
- Emissions (mmtCO2 E/yr):
  - Light-Duty Vehicles
  - All Other Transportation
  - Agriculture
  - Residential & Commercial
  - Electric Power
  - Industrial
  - High GWP
  - Recycling and Waste
  - SIP Targets
  - AB 32
  - SB 32
  - Exec Order


Note: CARB 2030 Scoping Plan contains strategies for achieving 2030 GHG target, [https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf](https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf)
Zero-Emission is Key to California’s Future
ZEV Trajectories from Plans

• Mobile Source Strategy and Scoping Plan
  • 4 to 5 million LDV ZEVs + PHEVs on road by 2030

• Sustainable Freight:
  • 100,000 ZEVs and pieces of equipment by 2030

• ZEV Action Plan: Key barriers to ZEV market:
  • Consumer awareness
  • Vehicle costs
  • Fueling infrastructure available
Light Duty Vehicle Programs and Actions
Major State Policies for LDV Emission Reductions

**Vehicles:**
- **Rules:** Advanced Clean Cars Regulations
- **Incentives:** Clean Vehicle Rebate Program

**Efficient Safe Access:**
- **375:** Sustainable Community Strategies
  - $$$ transit, active trans., affordable housing

**Fuels:**
- **Rules:** Low Carbon Fuels Standard
- **Incentives:** Infrastructure funding, planning
Low Carbon Transportation Program Investments

• Clean Vehicle Rebate Program (CVRP):
  • Consumer rebates for ZEVs, higher rebates for low-income consumers

• Transportation Equity Projects to Increase Access:
  • Car scrap and replace, financing assistance, and car sharing/mobility options
Today in California:
- Over 15,000 public EV chargers
- 35 retail-open hydrogen stations

Current programs project ~100,000 EV chargers and 100 hydrogen stations by 2025

New EO B-48-18 sets 2025 targets:
- 250,000 EV chargers
- 10,000 DC Fast Chargers
- 200 hydrogen stations
Progress in California

- Nearly 50% of the ZEVs in the U.S.
- 40% of North American clean fuel investments
- 90% of total U.S. investment in clean transportation
Light-Duty ZEV Models On-Road Today and Coming Soon

ZEV/PHEV Sales in CA
(Cumulative to July 2018)
420,000

ZEV/PHEV Market Share in CA
(2018 ave to date)
6%

Increased Diversity:
• Longer range BEVs
• AWD Models
• SUVs
• Minivan

85 Models Projected in MY2021

Source: IHS Automotive Registrations and Assorted trade press reports
What Might the LDV Sector Need to do to Achieve the Emissions Targets?

By 2050, 100% sales of ZEVs and PHEVs

• Compared to MY2025 vehicles, MY2035 vehicle emissions would be:
  • ~50% lower GHGs (emission rate declines 5-7% year-over-year)

• Significant increases in renewable fuel feed stocks and energy generation

• Slower growth of vehicle miles traveled (VMT) from light-duty vehicles
Currently Developing Advanced Clean Cars 2

- Working on 2026 and subsequent model year standards for further emission reductions and ZEVs, based these guiding principles:
  - Real-world emission reductions
  - Increased certainty of future ZEV volumes
  - Similar or lower system-wide emissions from new mobility options
  - Implementation feasibility (costs, jobs, infrastructure, consumers)

- Tentative 2020 Rulemaking for 2026 and beyond model years
Existing Fleet Actions and Efforts to Leverage

- Department of General Services
  - The Governor’s Executive Order, B-16-12, specifically directs DGS and state departments to increase the share of ZEVs in their own fleets

- Pacific Coast Collaborative
  - West Coast Electric Fleet – Joint initiative of California, Oregon, Washington, and British Columbia to expand ZEVs in public and private fleets

- U.S. Department of Energy
  - Clean Cities – National Clean Fleets Partnership work with large private fleets to implement transportation projects

- City of Sacramento
  - Fleet Sustainability Policy – Requires the city to purchase 50% zero-emission vehicles for all light-duty replacements
Medium and Heavy Duty Vehicle Programs and Actions
Zero-Emission Truck Strategy

• Accelerate the development of self-sustaining market

• Early zero-emission trucks suitable in certain operations:
  • Urban, stop-and-go driving, return to base, centrally-fueled
  • Pickup and delivery, short haul operations, vocational

• Continued data collection and education needed

• Gather information on costs and benefits
  • Potential for operational savings to offset incremental costs
Major Policies for HDV Emission Reductions

**Clean Vehicles/Engines:**
- **Rules:** Engine and Vehicle Stds, In-Use Controls
- **Incentives:** ZE Demos. and Pilots, HVIP, and other

**Clean, Efficient Freight System:**
- Sustainable Freight Action Plan, Ports’ Clean Air Action Plan, SCAQMD ISR, SB 375

**Fuels and Infrastructure:**
- **Rules:** Low Carbon Fuel Standard, Fuel Stds
- **Incentives:** LCFS, SB 350, HVIP
Heavy Duty Zero Emission Incentive Programs

• Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP)
  • Point-of-sale voucher
  • Zero-emission & advanced technology
  • Offset incremental cost
  • Varies by technology/vehicle type
  • Higher for operating within a disadvantaged community (DAC)

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*Not all vehicles pictured, excludes transit buses*
Proposed HD Zero-Emission Rules

• Innovative Clean Transit
  • Transit fleet transition to zero-emission by 2040
  • September 2018

• Zero-Emission Airport Shuttle Bus
  • Public and private fixed-route airport shuttle buses
  • All zero-emission by 2036
  • Board consideration December 2018

• Zero-Emission Powertrain Certification
  • Ensure reliability and performance for ZE trucks and buses
  • Board consideration December 2018

Innovative Clean Transit: https://www.arb.ca.gov/msprog/ict/ict.htm
Zero-Emission Airport Shuttle Bus: https://www.arb.ca.gov/msprog/asb/asb.htm
ZE HD Powertrain Certification: https://ww2.arb.ca.gov/our-work/programs/zero-emission-powertrain-certification
Proposed HD Zero-Emission Rules (Cont’d)

• Advanced Clean Trucks
  • Manufacturer sales requirement
  • Portion of California sales as zero-emission
  • Start with model year 2024 (Class 2B+)
  • Board consideration mid-2019

• Zero-Emission Drayage Truck Rule
  • Implementation 2026+
  • Board consideration in 2022

Advanced Clean Trucks: [https://www.arb.ca.gov/msprog/actruck/actruck.htm](https://www.arb.ca.gov/msprog/actruck/actruck.htm)
Existing Fleet Actions and Efforts to Leverage

• State agency zero emission purchase requirements (AB 739, 2017)
  • 15% of Class 6-8 purchases starting 2025
  • 30% of Class 6-8 purchases starting 2030

• South Coast Air Quality Management District
  • Indirect Source Rule development
  • Reduces emissions from vehicles associated with a facility rather than the facility itself

• San Pedro Bay Ports Clean Air Action Plan (Los Angeles, Long Beach)
  • 2020 – Trucks entering port must be near-zero emission or pay a fee
  • 2035 – Trucks entering the port must be zero emission or pay a fee

• Climate Mayor’s Electric Vehicle Initiative
  • Demonstrating leadership on climate change including electrifying their fleets
  • 407 mayors across the nation
BEV Fuel Cost Saving Opportunities

- **Airport Shuttle**
  - EV: 0.56 kWh/mi. Diesel: 22 mpg
  - 15% vs Diesel
  - 45% with LCFS

- **Package Delivery**
  - EV: 1.04 kWh/mi. Diesel: 10 mpg
  - 35% vs Diesel
  - 75%* with LCFS

- **Local Drayage**
  - EV: 2.1 kWh/mi. Diesel: 3.5 mpg
  - 50% vs Diesel
  - 80%* with LCFS

Data from [CARB Paper](https://www.arb.ca.gov). Assuming $3.00/gal., $0.17/kWh plus a 15% charging loss, LCFS Credits at $100. *Under proposed amendments*
ZEV Fuel Infrastructure and Incentive Policies
SB 350 – Transportation Electrification

• California Public Utility Commission directing investor-owned utilities to implement programs to accelerate widespread transportation electrification

• Recently approved infrastructure programs for the next five years
  • 15 shovel-ready projects totaling $42 million in 2017
  • Southern California Edison for $343 million – medium-duty and heavy-duty
  • Pacific Gas and Electric for $236 million – medium-duty and heavy-duty
  • San Diego Gas and Electric (SDG&E) $137 million – light-duty

• SDG&E proposing $151 million for medium-duty and heavy-duty
  • Decision expected 2019

SB 350 Transportation Electrification Press Release:
http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M215/K467/215467739.PDF
Low Carbon Fuel Standard

• Lower the carbon intensity (CI) of California transportation fuels 10% by 2020

• Proposed amendments (September 2018)
  • Lower CI target to 20% by 2030
  • Recognize higher efficiency of battery electric trucks
    • Class 1-3 vehicles can earn about $0.08/kWh at $100/credit
    • Class 4-8 vehicles can earn about $0.13/kWh
  • Clarify credit recipient for hydrogen fuel
  • Adds capacity credits for new hydrogen stations

LCFS program: [https://www.arb.ca.gov/fuels/lcfs/lcfs.htm](https://www.arb.ca.gov/fuels/lcfs/lcfs.htm)
Zero Emission Vehicle Fleets Considerations
Key Benefits of ZEVs

**Benefits to California:**
- Emission benefits
  - GHG, NOx, PM
  - Greater in higher mileage vehicles
- Accelerate sales
- Consumer awareness from users

**Benefits to fleet operator:**
- Two to six times more efficient
- Reduced maintenance
- Fuel cost savings and price stability
- Noise reduction
Challenges for ZEV Fleet Adoption

• Incremental costs that affect fleet purchase decisions
• Level playing field between types of fleet operators
• Customers lacking familiarity with ZEV technology
• Emerging disruptive fleet business models
• Infrastructure planning and availability
• Range limitations/refueling time
• Access to EV incentives
• Workforce training
Potential Areas of Analysis

• Identifying business case applications
• Estimating size of each type of fleet, and impact on emissions
• Identify and capture costs to fleets
  • Technology, fuel, maintenance, infrastructure, etc.
• Technology assessment of vehicles
• Evaluate unique fueling infrastructure needs
• Data collection efforts and evaluation for public policy
Discussion

With comments, specify fleet type

• Medium/Heavy Duty vs. Light Duty
• Public vs. private
• New mobility fleets
• Large vs. small employer fleets
• Rental fleets
• Delivery fleets
Next Steps

- Request preliminary comments to CARB by October 1, 2018
- 2-3 workgroups to be formed by fleet type

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Comments from the CPUC and CEC