

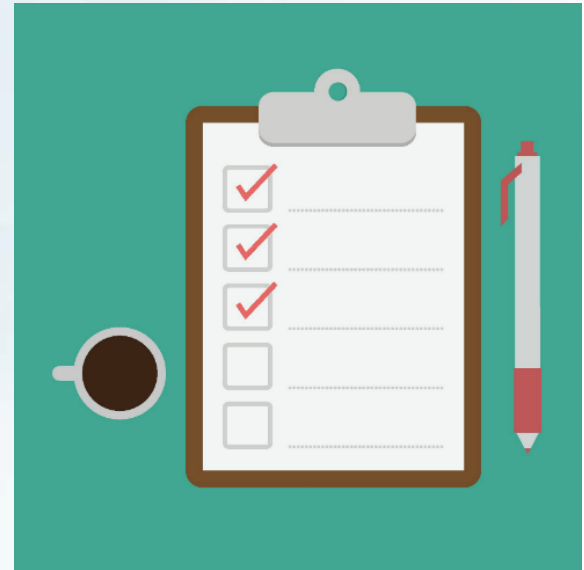


Advanced Clean Trucks Workshop

June 20, 2019

Today's Overview

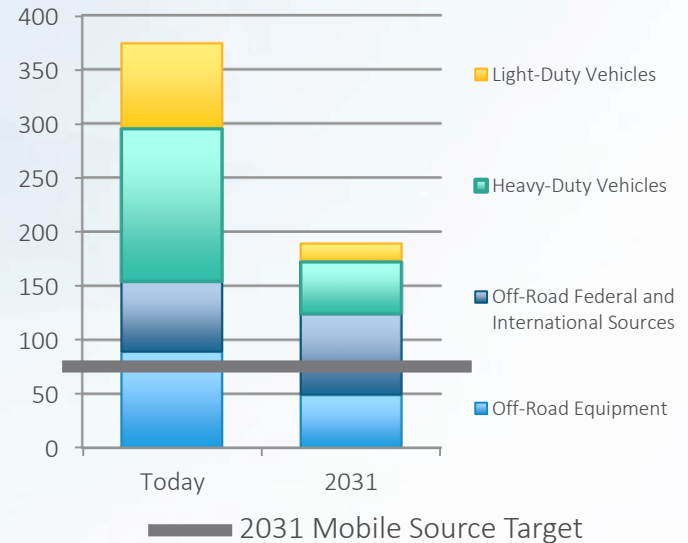
- Background
- Zero emission truck market outlook
- Summary of proposed regulation
- Proposed reporting requirement
- Next steps



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

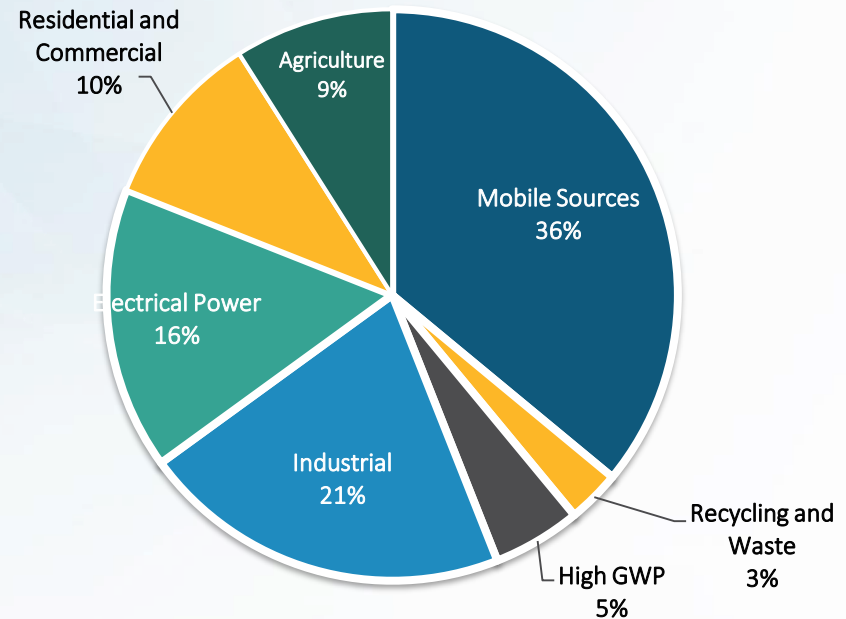
South Coast Mobile Source NOx Emissions (tons per day)



California's Climate Change Targets – Transportation Remains Largest GHG Source

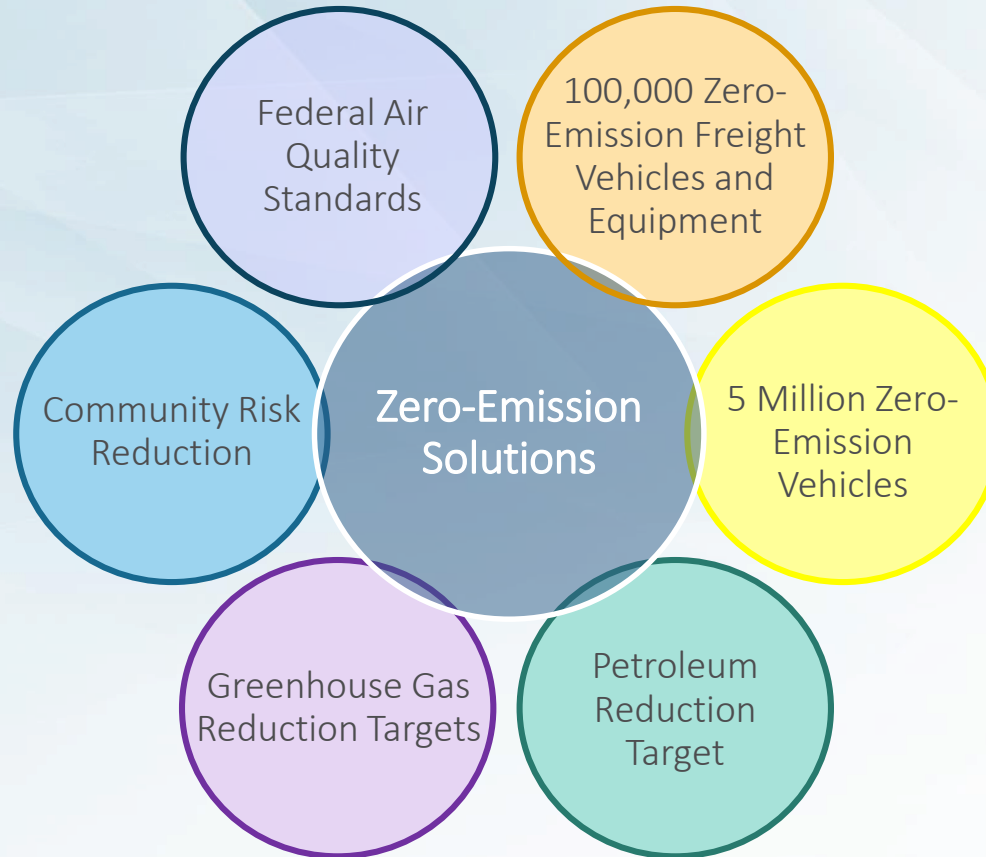
- ✓ Achieve 1990 GHG levels by 2020
- 40% below 1990 levels by 2030
- 80% below 1990 levels by 2050
- Cleaner electricity targets (SB 100)
 - 60% renewable by 2030
 - Zero carbon by 2045
- Carbon neutrality by 2045

CA GHG Emissions (2017)

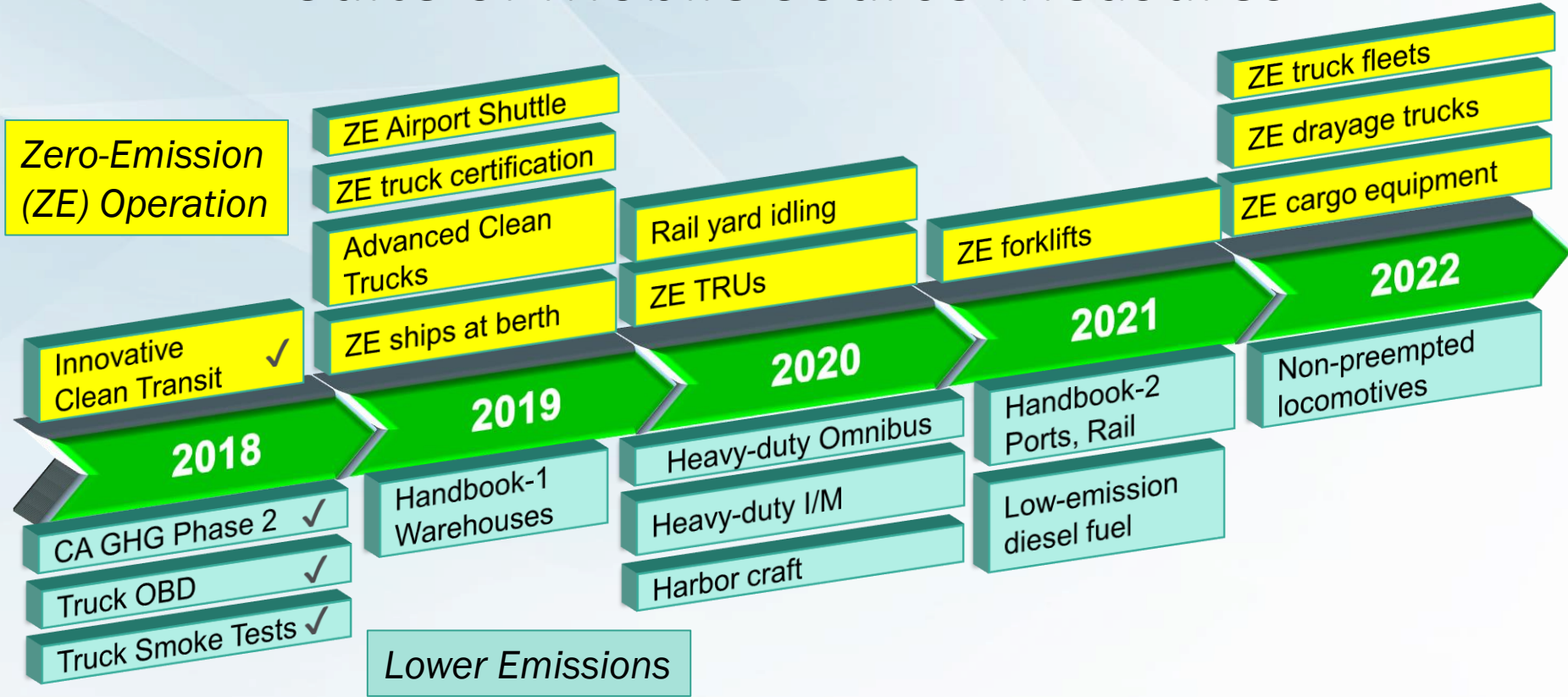


Note: Mobile sources represent ~50% of GHG inventory when including emissions from fuel production

California's Air Quality and Climate Goals



Suite of Mobile Source Measures





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

2B 3

4 5

6 7

8



Motiv



ISUZU



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 types¹
- TCO is expected to continue to improve
 - Battery prices declining and technology continues to improve

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



Fuel Cost Saving Opportunity



EV: 0.56 kWh/mi.
Diesel: 22 mpg

Airport Shuttle



EV: 1.04 kWh/mi.
Diesel: 10 mpg

Package Delivery



EV: 2.1 kWh/mi.
Diesel: 3.5 mpg

Local Drayage

Battery Electric
vs Diesel

45%

55%

70%

with LCFS

75%

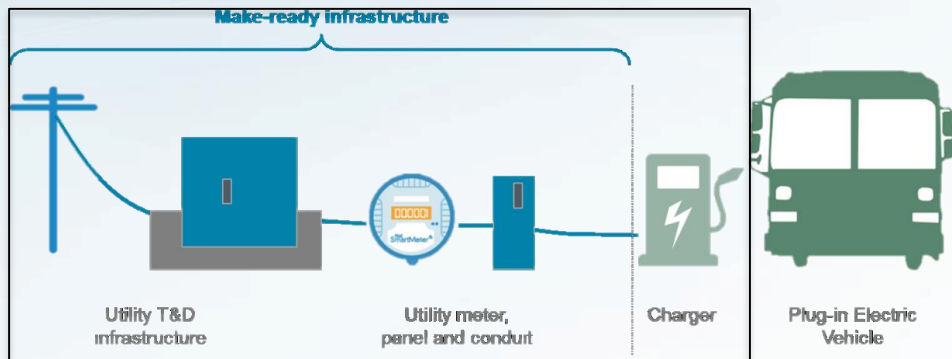
100%

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



Significant Incentives Available Now

HVIP

Low NO_x engines, ZEVs plus infrastructure, advanced technology

FY 18-19

\$125 M

VW

Zero-emission truck and bus replacements

\$423 M

Carl Moyer

Cleaner engines & ZEVs plus fueling infrastructure

FY 18-19

\$79 M

AB 617

Engine replacement & infrastructure in DAC

FY 18-19

\$245 M

Truck Loans

Helps small businesses with 10 or fewer trucks upgrade to newer trucks

Utility Programs

Charging infrastructure service upgrades and electricity rates (SB350)

>\$579 M

LCFS

Credits for using low carbon transportation fuels

**Offsets Most/All
Electricity Costs for
Trucks and Buses**

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





Summary of Advanced Clean Trucks Proposed Regulation

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

Model Year	Class 2B-3 ¹	Class 4-8 ²	Class 7-8 Tractors
2024	3%	7%	0%
2025	5%	9%	0%
2026	7%	11%	0%
2027	9%	13%	9%
2028	11%	24%	11%
2029	13%	37%	13%
2030	15%	50%	15%

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



Proposed Reporting Requirement

Regulatory Strategy

- Goal is to align interests of all parties



Large Employers

Manufacturers

Fleet Owners

Utility/Fuel Suppliers

Government

Zero
Emission
Future

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

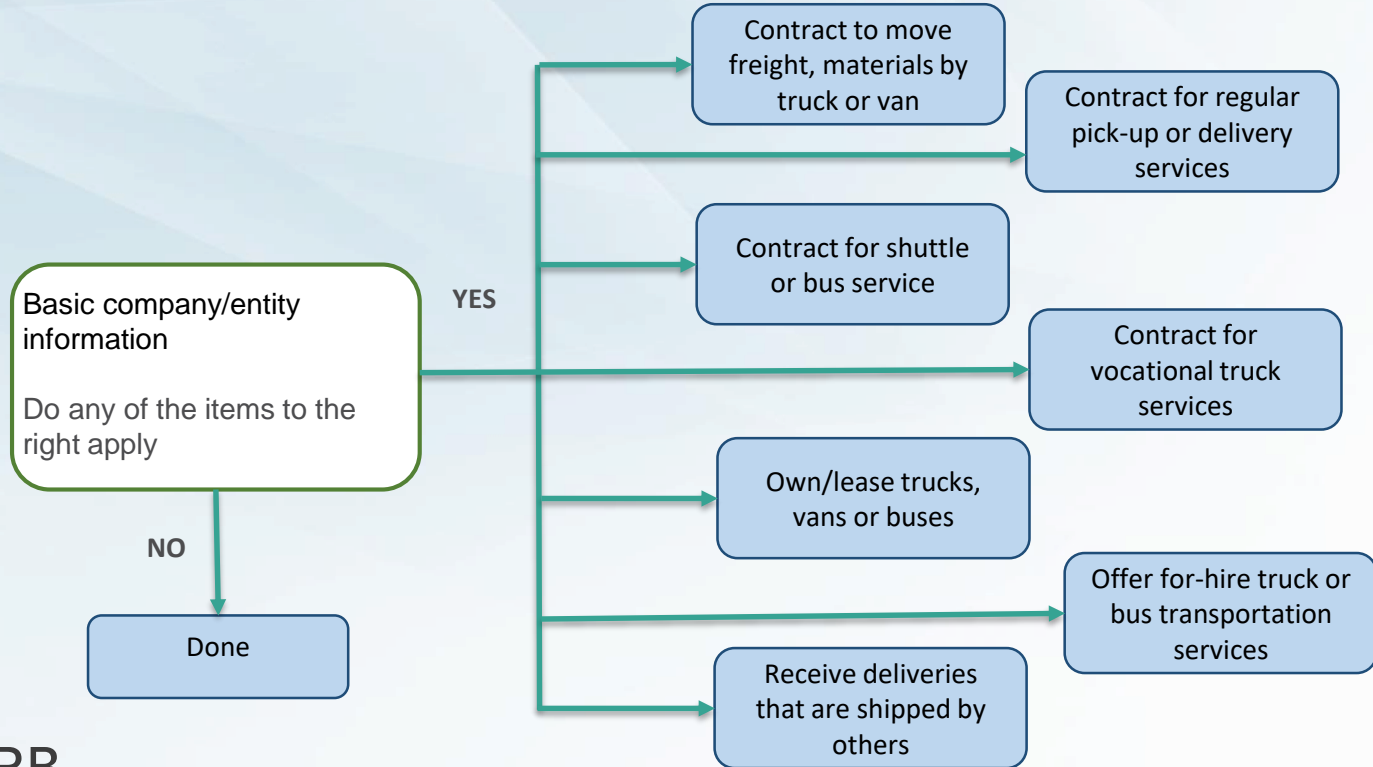
- Percent of fleet purchases must be ZEVs
- Fleets must meet a ZE truck standard
- Zero-emission zones (cities, or other boundary)
- Large entities to hire fleets that meet a ZE truck standard



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



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 Buses¹

- 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
 - ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks
- Fact Sheet
 - ww2.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