



Advanced Clean Fleets Regulation Workgroup: Zero-Emissions Vehicle Infrastructure and Availability

January 13, 2023

Today's Outline

- Background
- Infrastructure Delay Extension
 - More time for construction related delays
 - Expanded to address site electrification delays
- Zero-Emission Vehicle (ZEV) Availability Exemption
 - Modifications to address availability concerns
- Next steps

Timeline

- First of two Board hearings on October 27, 2022
- Board provided direction to address:
 - ZEV availability criteria
 - Utility delays in providing power to site
- 15-day comment period Spring 2023
- Second hearing planned for Spring 2023

Drayage Trucks Requirements

Applies to Class 7-8 on-road trucks operating at California's seaports and intermodal railyards

December 31, 2023

Registration required
for legacy trucks

January 1, 2024

Newly added
drayage trucks
must be ZEVs

January 1, 2025

Must annually
report mileage
for trucks over
12 years

January 1, 2035

All drayage
trucks must be
ZEVs

- Legacy trucks may operate until the end of their useful life
- Must visit a regulated seaport or railyard at least once a year
- May use limited extensions

State and Local Government Requirements

2024-2026

January 1, 2027

50 percent of additions to the fleet must be ZEV

All additions must be ZEV

- Agencies in designated counties exempt until 2027
- Eligible for ZEV Milestone Schedule (new)
- May use exemptions and extensions



High Priority Fleets Model Year Schedule Requirements

January 2024

January 1, 2024

February 1, 2024

Registration required for legacy trucks

Newly added trucks must be ZEVs

Must annually report mileage for trucks over 12 years

- Legacy trucks may operate until the end of their useful life
- May use certain exemptions and extensions



Optional ZEV Milestone Phase-in

- Meet ZEV milestones as a percent of total fleet
- Phase-in based on vehicle type
- May use exemptions and extensions

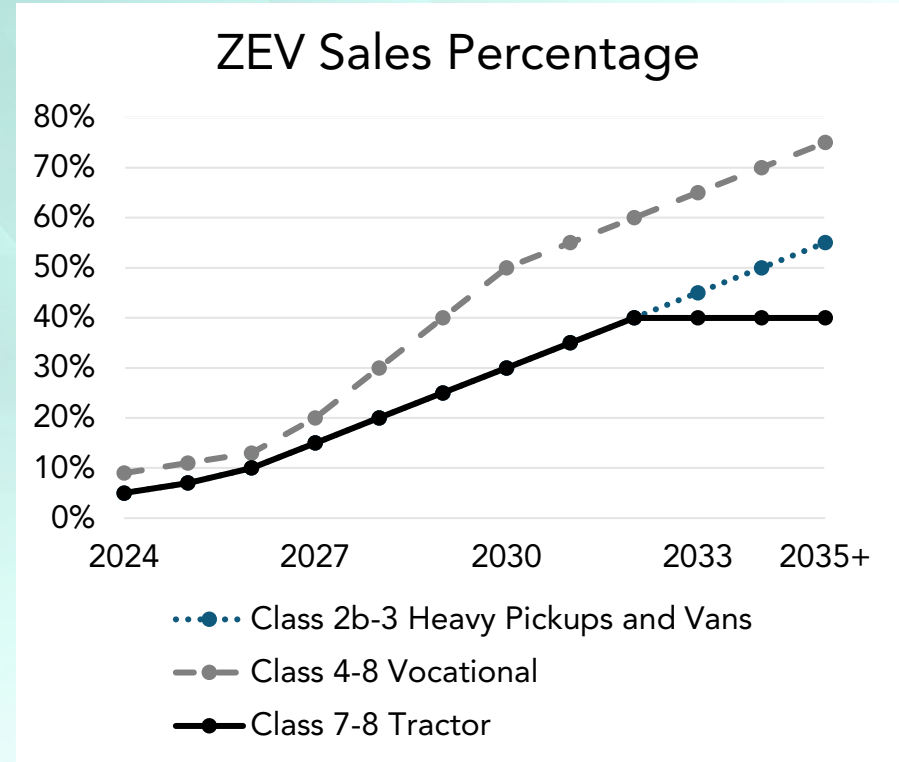
Zero-Emission Fleet Percentage	10%	25%	50%	75%	100%
Box trucks, vans, two-axle buses, yard trucks, light-duty package delivery vehicles	2025	2028	2031	2033	2035
Work trucks, day cab tractors, three-axle buses	2027	2030	2033	2036	2039
Sleeper cab tractors and specialty vehicles	2030	2033	2036	2039	2042

Compliance Options Provide Flexibility

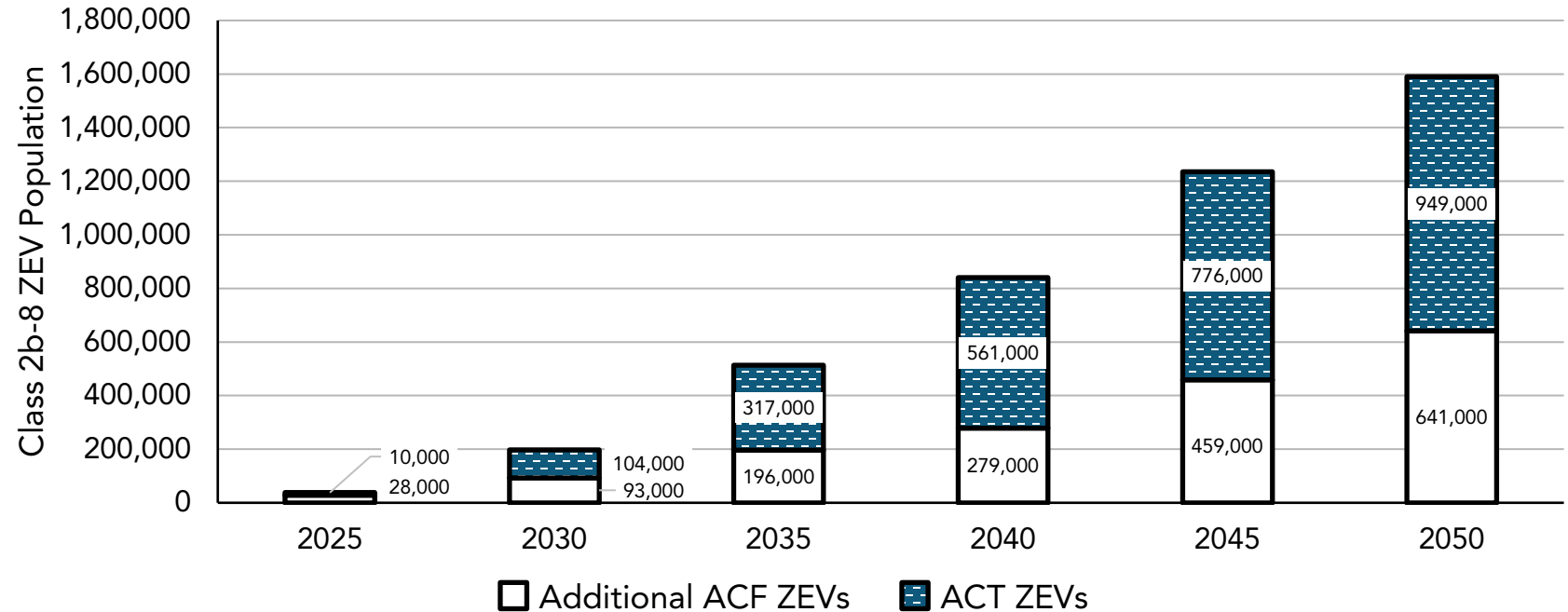
- State and local government fleet
 - 50% of purchases can be internal combustion engine (ICE) vehicles until 2027
- Model Year Schedule
 - Does not require vehicle replacement until end of useful life
- ZEV Milestones Option
 - Fleets may purchase ICE vehicle if meeting ZEV milestones

Manufacturer Increasing ZEV Sales

- Advanced Clean Trucks regulation approved June 2020
- Manufacturer sales requirement starts 2024
- Credit for early sales
- Other states adopting same requirements
- Manufacturers partnering with infrastructure providers



Significant Increase in Medium- and Heavy-Duty ZEVs Expected (2025 to 2050)



Infrastructure Coordination





Infrastructure Delay Extension

Guiding Principles

- Recognize circumstances beyond the fleet owner's control
- Extension if fleet cannot otherwise comply
- Fleets must act in good faith to meet project deadlines
- Fleet owner must deploy all ZEVs that are feasible
 - Consider all fleet locations
- Consistent with existing planning processes

What does this Extension Mean?

- Fleets will not be out of compliance during delay period
- State and local government fleets
 - May postpone ZEV deployments
- Drayage trucks
 - Temporarily operate existing vehicles beyond their useful life
- Model Year Schedule
 - Temporarily operate existing vehicles beyond their useful life
- ZEV Milestones Option
 - Temporary ZEV credit for existing vehicles

Construction Based Delays

- Construction started one year prior to compliance date
- Circumstances outside of fleet owner control, include:
 - Change of a general contractor
 - Unexpected safety issues
 - Discovery of archeological, historical, or tribal cultural resources
 - Natural disasters
 - Delay in manufacture and shipment of zero-emission charging and fueling infrastructure equipment*
- Up to 2-years extension (extended one year)*
- Information on granted extension posted online*
 - Reason, city, duration, number of ZEV affected*

Timeline for Site Electrification

Step	Example Energization Steps
1	Customer submits site inquiry to utility
2	Utility performs preassessment/engineering study
3	Customer reviews site feasibility study and submits all required information
4	Utility executes preliminary design
5	Customer approves or declines preliminary design
6	Utility finalizes design and delivers contract to customers
7	Utility creates and submits easement documents and Administration Having Jurisdiction (AHJ) permit requests
8	Customer and utility completes pre-construction field meeting
9	Customer delivers easement signatures and signed contracts to utility, and AHJ issues requested permits
10	Customer completes all on-site work and applicable inspections
11	Utility schedules and completes civil construction work
12	Utility schedules and completes electric construction work



Site Electrification Delays*

- Contract with utility executed one year prior to compliance date
 - Utility feedback shows more than a year is needed
- Extension approved for ZEV that can't be supported
 - First extension up to 3 years
 - Can re-apply for up to 2 more years
- Would apply to power needs for charging or electrolyzers
- Sunsets January 1, 2030
- Information on granted extension posted online
 - Reason, city, duration, number of ZEV affected

Infrastructure Extension Process*

- Email an application package to CARB
- Summary of need for extension, amount of time requested
- Supporting documents for construction delay
 - Construction permit
 - Executed ZEV purchase agreement
- Supporting documents for site electrification delay
 - Utility's response to fleet's upgrade request
 - Copy of executed contract with utility to upgrade the site

Information to Determine Number of ZEVs Affected and Extension Period*

- Fleet's extension application will need to include:
 - Copy of the contract with utility for site electrification
 - The additional load the site can support immediately
 - The additional load supported each year until project is finished
 - ZEV information
 - Charging/fueling equipment ratings

Questions

- What documents should be used to show action taken one year ahead of compliance date?
- What information to be used to determine number of ZEVs and schedule that can be supported?
- What extension information should be posted online?
- How to address fleets with multiple sites?
- How to consider distributed generation or other electrical upgrades in the project?



ZEV Availability

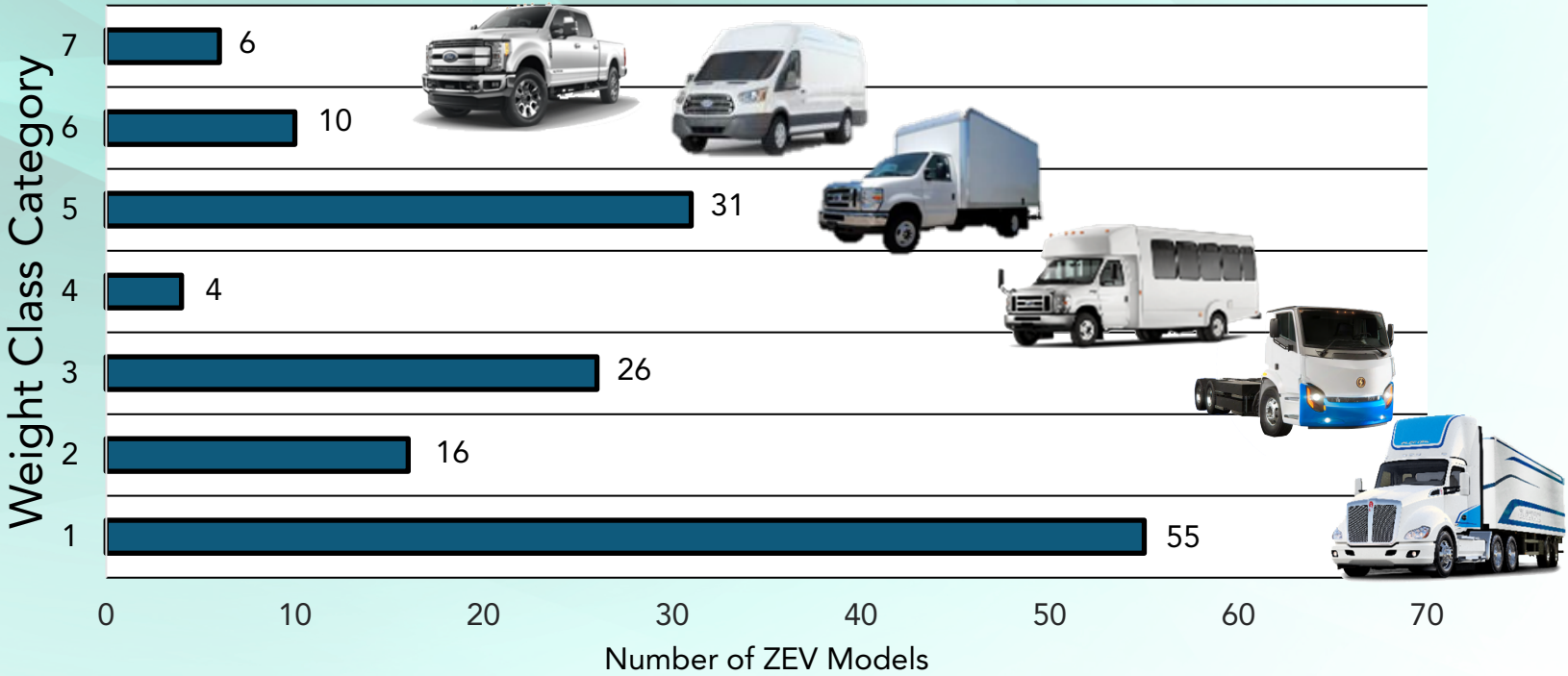
Overview

- Background of ZEV market
- ZEV Availability Exemption
 - Streamlined ZEV availability list
 - Fleet-specific needs

Current ZEV Market

- Complete vehicles
 - Already available as ZEVs for common vehicle types
 - Pickups, day cab tractors, vans, and buses
- Cab and chassis
 - ZEVs already available in every weight class
 - Each chassis can be upfitted with several bodies
 - Uncommon or specialized vehicles to be determined
- Truck market is segmented
 - Vehicle manufacturers, upfitters, drivetrain converters
 - Some vehicles tailor-made for large fleets

ZEV Models in United States



135 models already delivered to fleets, 148 different models are available to be ordered/pre-ordered,

ZE Tractor Commercial Availability

Available 2022

- BYD 8TT
- Freightliner eCascadia
- Kenworth T680E
- Lion Electric LION8



- Nikola TRE
- Peterbilt 579
- Volvo VNR Electric
- Hyzon Class 8




Planned 2023

- Hyundai XCIENT
- XOS HDXT
- Nikola One/Two
- Tesla Semi



ZEV Chassis Available in All Weight Classes

Class 2b	Class 3	Class 4	Class 5
<ul style="list-style-type: none"> • Ford E-Transit Chassis Cab • Ford E-Transit Cutaway 	<ul style="list-style-type: none"> • Via Motors Electric Chassis Cab 	<ul style="list-style-type: none"> • Bollinger E-Chassis • Envirotech Cutaway Van • GreenPower EV Star Cab and Chassis • VMC Optimal E1 Cutaway Chassis 	<ul style="list-style-type: none"> • Freightliner MT50e Custom Chassis • Zeus Z-19 Electric Chassis Cab
			
Class 6	Class 7	Class 8	
<ul style="list-style-type: none"> • Zeus Z-22 Electric Chassis Cab • Zeus Z-26 Electric Chassis Cab • Freightliner MT50e Custom Chassis • Lion 6 Cab and Chassis • International eMV Chassis • BYD 6F Cab and Chassis 	<ul style="list-style-type: none"> • International eMV Chassis • Volvo VNR 4x2 Straight Truck Chassis • Volvo VNR 6x4 Straight Truck Chassis 	<ul style="list-style-type: none"> • BYD 8TT Tandem Axle Chassis • Lion 8 Tractor Truck Cab and Chassis • Lion 8 Straight Truck Cab and Chassis • Volvo VNR 4x2 Tractor Chassis • Volvo VNR 6x2 Tractor Chassis • Volvo VNR 6x4 Tractor Chassis 	

Same ZEV Chassis with Multiple Configurations



Class 2 - 3



BrightDrop Zevo Step Van
250 Mi Range
Available



Ford E-Transit Chassis Cab
126 Mi Range
Available



Ford T-350 Cargo Van
126 Mi Range
Available



Ford F-150 Lightning
240 Mi Range
Available



Bollinger B2
200 Mi Range
Available



Workhorse C-650/ C-1000 Step Van
100-150 Mi Range
Available



Lightning eMotors ZEV3
Cargo Van
140 Mi Range
Available



Rivian R1T
260-400 Mi Range
Available

Class 4 - 7



BYD 6F
200 Mi Range
Available



BYD 6R
80 Mi Range
Available



Envirotech Cutaway
170 Mi Range
Available



Envirotech Logistic Van
170 Mi Range
Available



Envirotech Urban Truck
170 Mi Range
Available



Freightliner MT50e
Custom Chassis
150-170 Mi Range
Available



GreenPower EV Star
150 Mi Range
Available



Kenworth K270E/ K370E
100, 200 Mi Range
Available

Class 4 - 7



SEA Hino 195EV
200 Mi Range
Available



Freightliner eM2
230 Mi Range
Available



Lightning eMotors ZEV4
Box Truck
130 Mi Range
Available



Lightning eMotors E-450
105 Mi Range
Available



Lion Lion6
200 Mi Range
Available



Motiv Epic F-59
105 Mi Range
Available



Motiv Epic E-450
105 Mi Range
Available



Motiv Epic E-450
Utility Truck
105 Mi Range
Available

Class 4 - 7



Optimal EV E1
125 Mi Range
Available



Peterbilt 220 EV
200 Mi Range
Available



Phoenix ZEUS 500
70-160 Mi Range
Available



XLE Battery Electric Refuse Truck
100 Mi Range
Available



International eMV
Electric Truck
135 Mi Range
Available



Volvo 4x2 Straight
175 Mi Range
Available



Zeus Electric Truck
175-210 Mi Range
Available



VMC Optimal S1 Shuttle Bus
125 Mi Range
Available

Class 8



Lion Lion8 Straight
170 Mi Range
Available



Lion Lion8 Refuse
170 Mi Range
Available



Lion Lion8 Bucket
130 Mi Range
Available



Mack LR Electric
100 Mi Range
Available



Peterbilt 520 EV
80-100 Mi Range
Available



Terex EV Aerial Bucket Truck
135 Mi Range
Available



Van Hool TDX25E
260 Mi Range
Available



BYD C10MS Bus
230 Mi Range
Available

Class 8 Tractors



BYD 8TT
124 Mi Range
Available



Freightliner eCascadia
155-230 Mi Range
Available



Kenworth T680
150 Mi Range
Available



Lion Lion8 T
221 Mi Range
Available



Nikola TRE Day Cab
330 Mi Range
Available



Peterbilt 579 EV
150 Mi Range
Available



Hyzon Class 8 FCEV
350-500 Mi Range
Available



Volvo VNR Electric
175-275 Mi Range
Available in 4x2, 6x2 and
6x4 configurations

Class 8 – Yard Trucks



BYD 8Y
10+ Hour Range
Available



Kalmar Ottawa T2E+
8-20 Hour Range
Available



Lonestar SV S12, S22
12-22 Hour Range
Available



OrangeEV
24 Hour Range
Available



Gaussin APM
Available



TICO Manufacturing
Pro-Spotter Electric
Available

Compliance Flexibility Options

- State and Local Government fleets
 - 50% of purchases can be ICE until 2027
- High Priority Fleet Model Year Schedule
 - No action required until end of vehicle useful life
- ZEV Milestones Option
 - Group 1 trucks already widely available as ZEVs
- Above options treat NZEVs** same as ZEVs until 2035
- Drayage trucks not part of discussion since multiple tractors already widely available as ZEVs

Exempt From Regulation

- School and transit buses
- Dedicated snow removal vehicles
- Heavy cranes
- Two-engine trucks except two engine street sweepers
- Workover rigs





ZEV Availability Exemption

Exemption Guiding Principles

- Ensure fleet is not out of compliance if acting in good faith
 - Fleets to deploy available ZEVs
- Maintain streamlined process using defined, objective criteria
 - Focus is on core vehicle function/configuration criteria
 - Other extensions address vehicle range/usage and other concerns
- If you can't buy it, it is not available

Approved ZEV Availability Exemption Means

- Fleet may add ICE vehicle if ZEV and NZEV not available in equivalent configuration if needed to remain in compliance
 - May purchase new ICE vehicles with California-certified engines*
- State and local government fleets
 - Applies if annual ZEV purchase percentage cannot be met
- High Priority Fleet Model Year Schedule
 - May purchase new ICE vehicle to replace vehicle at end useful life
 - Guarantees useful life for replacement vehicle
- ZEV Milestones Option
 - Based on fleet composition including vehicle purchases starting 2024
 - Purchased ICE vehicle may be excluded from ZEV milestone calculation
- Drayage trucks already have ZEV tractors available

How to Balance Fleet Needs With Complexity

- Streamlined exemption process
 - All body configurations in weight class are not available with ZEV drivetrain
 - Hay squeeze, cement mixing drum truck, etc.
- Fleet-specific exemption and application process*
 - Body configuration is available but still not suitable to meet core function
 - Boom truck available as ZEV but reach length not adequate for some fleets
 - Crew cab, all wheel drive, cab and chassis vs. cutaway
 - Other frame attachments needed to serve core function
 - Rail wheel attachments, stabilizing outriggers, self-loading cranes
 - Safety conflicts with installing body or with other safety requirements
 - Example where mine equipment/trucks need to be UL-certified
 - Would not include other specifications that do not limit core functionality

Basic Criteria to Determine if Comparable ZEV is Available

- Evaluate vehicle configuration by weight class
- Must be Zero-Emission Powertrain (ZEP) certified (if applicable)*
- Available for order from at least one manufacturer/upfitter*
- ZEV can be purchased in same or earlier model year than year of compliance date*
 - 2025 model year or earlier for a 2025 compliance date
- Exemption applies to purchases 1 year prior to compliance date
- Does not include:*
 - Demonstration/test/experimental vehicles
 - Manufacturer placeholder reservations for future models

Streamlined ZEV Availability Exemption

- CARB to list vehicle body type categories that are not available to purchase as ZEVs/NZEVs
 - Simplified approach not needed for pickups, two-axle buses, box trucks, vans, and on-road tractors
- No need for fleet owners to apply for exemptions
 - Purchase ICE vehicles of listed configuration
 - Report when vehicle is received and keep records
- Does not address fleet-specific issues

Common Body Configurations

Common Body Configurations	
Armored Truck	Log Truck
Auger - Digger Derrick	Pickup Truck
Box Truck (Dry Van, Shredder, Reefer)	Service/ Utility Body Truck
Bucket Truck - Insulated	Steet Sweeper
Bucket Truck - Non-Insulated	Tank - Fuel Truck/ Lube Truck
Bus - Motorcoach	Tank - Septic Truck
Bus - Shuttle	Tank - Spreader/ Other
Car Carrier	Tank - Vacuum Truck
Concrete Mixer	Tank - Water Truck
Concrete Pump	Toter Truck
Crane Truck - Non-Cargo Body	Tow Truck - Heavy Wrecker
Crane Truck - Self-Loading	Tow Truck - Roll Back
Dump Truck	Tow Truck - Wrecker
Flatbed Fixed (Stake)	Tractor - Day Cab On Road
Flatbed Tilt (Dump, Roll Off, Hay Retriever)	Tractor - Heavy Haul Day Cab
Garbage Packer - Front Loader	Tractor - Sleeper Cab Over the Road
Garbage Packer - Rear Loader	Tractor - Vocational
Garbage Packer - Side Loader	Tractor - Yard Tractor
Garbage Roll Off	Van (Cargo, Passenger, Step)
Hay Squeeze	

Streamlined ZEV Availability Exemption List Updates

- Limited to body configurations available as ICE vehicles
 - Does not apply to unique or custom-built vehicles
- Vehicle exemption list updated as information becomes available
 - Fleet owners, manufacturers, body builders
- Vehicle configuration removed from list 6 months after ZEV configuration becomes available

Example ZEV Availability Exemption List

Body Configurations	Class
Car Carrier	6-8
Concrete mixer	7-8
Concrete pump	7-8
Hay squeeze	4-8
Tow truck – heavy wrecker	8

- Anything on the list would be able to be purchased as an ICE vehicle

Add to ZEV Availability Exemption List

- Submit the following by email to TRUCRS@arb.ca.gov:
 - Information about vehicle configuration, and
 - Documentation from all chassis manufacturers that it is not suitable for the configuration; or
 - Documentation from at least two authorized body installers about safety conflicts with body installation
- CARB will add to the list within 45 days of receiving complete application package if all conditions met
- Body configurations removed from list 6 months after becoming commercially available

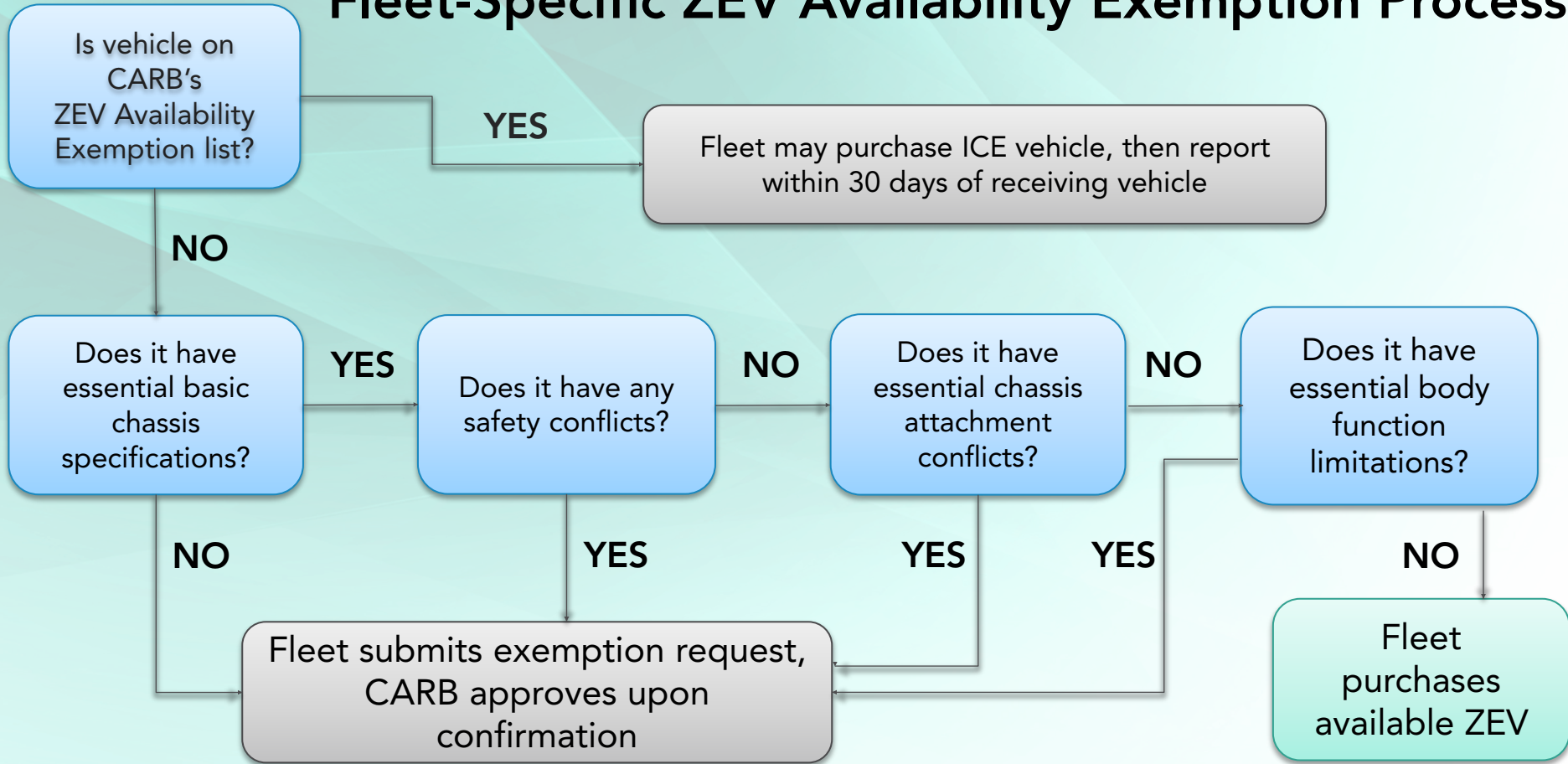
Fleet Specific Exemption Process*

- Fleet applies for special exemption if unique safety or basic functionality conflict prevents from purchasing/using available ZEV
- Evaluation criteria for fleets to determine availability of needed configuration
 - Essential basic chassis specifications
 - Crew cab, all wheel drive, cab and chassis vs. cutaway
 - No conflicts with other existing health and safety laws
 - No essential chassis (frame) attachment conflicts
 - Outriggers, plow, rail wheels, car lift...
 - No essential body functionality limitations
 - Boom reach, lift capacity, other
- CARB to evaluate and approve extension request within 45 days
- Fleet may purchase specified ICE vehicle and keep records

Manufacturer Feedback*

- CARB to post vehicle exemption request information online for 30 days
 - Opportunity for manufacturers/upfitters to comment
- CARB will direct applicant to manufacturer/upfitter or grant exemption request

Fleet-Specific ZEV Availability Exemption Process



ZEV Order Cancellations*

- Covered under the Vehicle Delivery Delay Extension
- If a manufacturer cancels an order, fleet must secure another ZEV purchase agreement within 180 days to maintain the extension
- If no other ZEVs available, then fleet eligible for ZEV availability exemption
- If fleet owner cancels purchase agreement, extension becomes invalid

Next Steps

- Workshop on pre-15 day regulation edits in February
- 15-day change package released for formal comments
- Second Board hearing in Spring 2023