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# ADVANCED CLEAN TRUCKS (ACT) RULE RECOMMENDATIONS FOR OTHER GLOBAL REGIONS

# Welcome!

California's Advanced Clean Trucks (ACT) rule Digital Dialogue  
July 30, 2020

# Webinar Logistics

- Please use the Questions Pane on your GoToWebinar Control Panel to submit your questions
  - We will not be using the “raise your hand” feature
- Slides and a recording of today’s webinar will be distributed
- Participation is encouraged

# Speakers



Cristiano Façanha, PhD  
Global Director, CALSTART



Sydney Vergis, PhD  
Assistant Division Chief, California  
Air Resources Board (CARB)



Meredith Alexander, JD  
Policy Director, CALSTART

# Drive to Zero aims to accelerate the growth of zero-emission commercial vehicles

**2025**

Near- and zero-emission commercial vehicles are cost-competitive and commercially viable in beachhead applications and first-mover regions by 2025.

**2040**

Zero-emission commercial vehicles achieve 80% of new vehicle sales by 2040.

# ACT follows the “beachhead” strategy recognizing that zero-emission vehicles will come in waves

## Wave 1 Transit

**ZE transit buses**  
Available now



**ZE industrial lifts**  
Available now



## Wave 2 Delivery

**Chanje Class 5 Delivery Van**  
Available now



**Fuso ECanter**  
Available now

**Orange EV yard tractor**  
Available now



## Wave 3 Medium Freight

**E-Fuso Vision One**  
Announced 2021



**Freightliner eM2**  
Demo now  
Announced 2021



## Wave 4 Heavy Regional Freight

**Freightliner e-Cascadia**  
Demo Now; Announced 2021



**Volvo VNR**  
Demo now; 2019  
Europe; 2021 NA?



**Mack e-Refuse**  
Demo 2020;  
Coming 2022?



**Tesla demo**  
Coming 2021?

## Corridor Longhaul

**Nikola FC tractor**  
Coming 2022?



Similar drivetrain and component sizing can scale to early near applications

Expanded supply chain capabilities and price reductions enable additional applications

Steadily increasing volumes and infrastructure strengthen business case and performance confidence

2019

2020

2021

2022

2023

# Model availability is increasing rapidly

## Model availability to double by 2023

Total cumulative vehicle models, U.S. & Canada



## M/HD ZEV model availability growing

Total cumulative vehicle models by vehicle type and year, U.S. & Canada



Source: <https://globaldrivetozero.org/tools/zero-emission-technology-inventory/>



# **Advanced Clean Trucks Regulation California's Zero-Emission Truck Program**

# Today's Overview

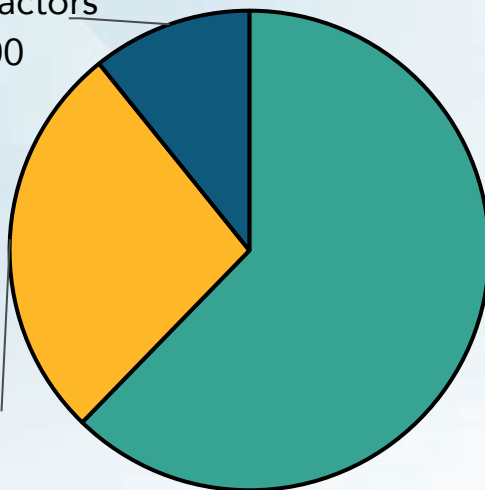
- Background: California's trucks
- Regulation Summary: Advanced Clean Trucks
- Next steps



# California Vehicle Populations



Class 7-8 Tractors  
180,000



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



Class 4-8 Straight  
Trucks and...



*\*Trucks are the largest single source of air pollution from vehicles, responsible for **50% of greenhouse gas emissions**, and **more than 95% of toxic diesel particulate matter emissions**; even though there are only about 2 million trucks among the 30 million registered vehicles in the state.*

# Examples of Zero- Emission Trucks Commercially Available Today

Commercial Vehicles 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)
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*\* Over 100 models of Zero Emission Trucks are available or announced*



# **Advanced Clean Trucks Regulation Summary**

# Regulation Overview

- Approved by the CARB Board in June 2020
- Requires zero emission truck and bus sales in California
  - Class 2b and above (gross vehicle weight rating > 8500 pounds)
  - Starts with 2024 model year
- Applies to large truck manufacturers who sell trucks into California
- Credit and deficit system for compliance
- Partial credit for plug-in electric hybrids (“near-zero emissions” vehicles or NZEVs)

# Diverse Universe of Class 2b-8 Vehicles

## Class 2b-3



## Class 4-8



## Class 7-8 Tractors



# ZEV Sales Requirements

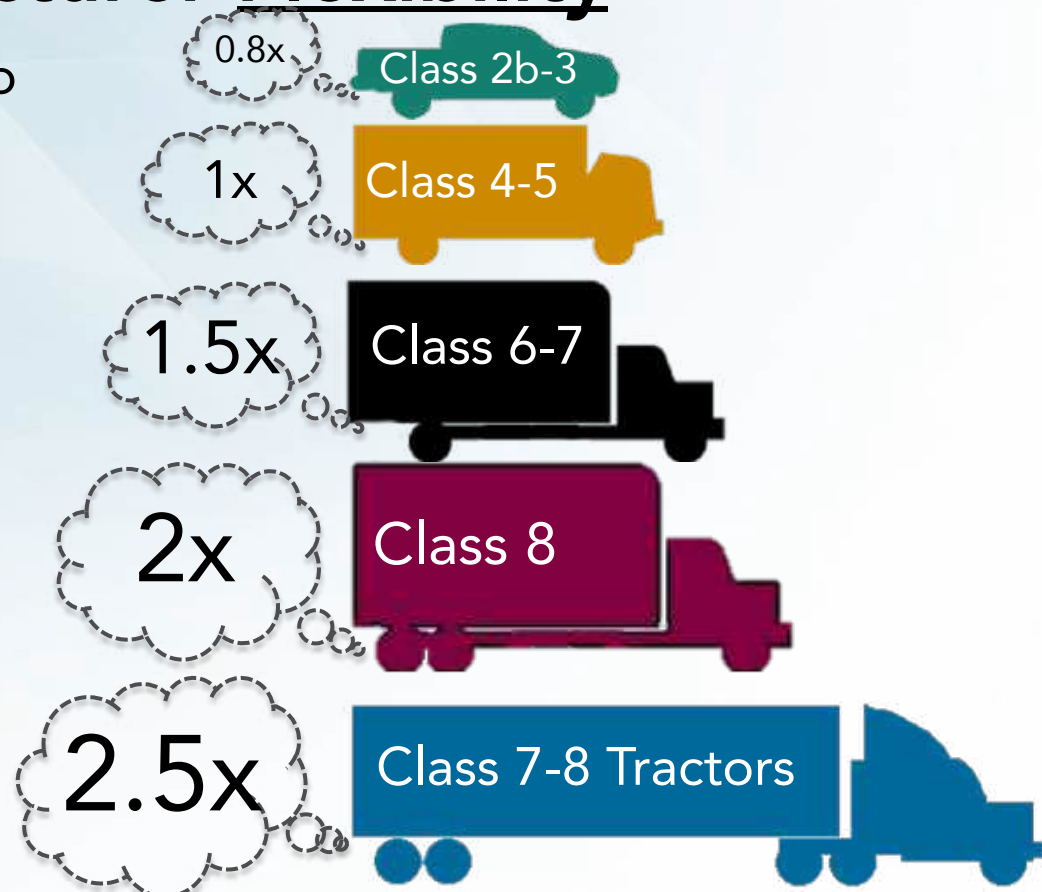


- Applies to manufacturers with >500 annual California sales
- Percent of California sales must be zero-emission starting in 2024
  - ~100,000 ZEVs by 2030
  - ~300,000 ZEVs by 2035
- Near-Zero Emissions Vehicle credits based on all electric miles and model year
  - Up to 50% of compliance obligation

Model Year (MY)	Class 2b-3	Class 4-8	Class 7-8 Tractors
2024	5%	9%	5%
2025	7%	11%	7%
2026	10%	13%	10%
2027	15%	20%	15%
2028	20%	30%	20%
2029	25%	40%	25%
2030	30%	50%	30%
2031	35%	55%	35%
2032	40%	60%	40%
2033	45%	65%	40%
2034	50%	70%	40%
2035+	55%	75%	40%

# Deficit/Credits System Developed for Manufacturer Flexibility

- Combustion trucks sold into California generate *deficits*
- ZEV truck sales generate credits
- Manufacturers may bank and trade their credits
- Credits expire after 5 years



# Anticipated Benefits of the Advanced Clean Truck Regulation

- Significant air quality and greenhouse gas benefits
- \$5.9 billion in estimated net *economic* savings to California
- Additional \$8.9 billion in estimated *health benefit* savings
  - Avoided premature mortality, emergency room visits, hospitalizations, lost workdays
- Net creation of roughly 7,500 jobs
- Reduce energy use and petroleum dependence



# Next Step – Zero Emission Fleet Rule

- Upcoming regulation to require purchase of ZEVs by fleets
- Transition to zero emission vehicles
  - 2035 – Drayage trucks at ports and railyards
  - 2040 – First/last mile delivery, buses, and utilities\*
  - 2040 – Refuse trucks and government fleets\*
  - 2045 – All others where feasible\*
- Will bring a proposal to the CARB Board 2021/2022, requirements start in 2024



# More Information

- Advanced Clean Trucks
  - Webpage: <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks>
  - Staff Report: <https://ww3.arb.ca.gov/regact/2019/act2019/isor.pdf>
  - Rulemaking Documents: <https://ww2.arb.ca.gov/rulemaking/2019/advancedcleantrucks>
- ZE Fleet Rule
  - Webpage: <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets>
- Contacts
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# CALSTART BEACHHEAD ANALYSIS FOR ACT & FLEET RULES

**Meredith Alexander, JD**

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# CALSTART Beachhead Categories for ACT Analysis

Vehicle Type	% of Annual Sales- 2024	% of Annual Sales- 2027
Cargo Van (Class 2b-3)	33.3%	75.0%
Cutaway/Shuttle Bus (Class 3)	33.3%	66.6%
Coach Bus	33.3%	66.6%
Cutaway/Shuttle Bus (Class 4)	33.3%	66.6%
Regional DeliveryTruck (Class 4-6)	40.0%	75.0%
School Bus	50.0%	80.0%
Step Van (Class 4-5)	40.0%	75.0%
Terminal Tractor	50.0%	80.0%
Class 7-8 Regional-Haul Tractor	20.0%	40.0%

## Results – Aggregates of Beachheads in CARB ACT Regulatory Groupings vs. CARB Requirements (% of annual sales)

Model Year (MY)	CARB Class 2b-3	CALSTART Class 2b-3	CARB Class 4-8	CALSTART Class 4-8	CARB Tractors	CALSTART Tractors
2024	5%	8.6%	9%	16%	5%	8%
2025	7%		11%		7%	
2026	10%		13%		10%	
2027	15%	22%	20%	31%	15%	18%

# Best Practice Recommendations for OEM & Fleet Rules

- Rule will best achieve its goals as part of a broader and more comprehensive policy and investment structure
- Fleet rules structured around beachheads would provide clear directional signals to vehicle buyers, and guarantees to manufacturers that the market will materialize.
- Regulations will most likely succeed if accompanied by other key policies:
  - Robust purchase incentives that “step down” at key milestones
  - Commitments by other state agencies to accelerate supportive infrastructure policy, including **guaranteed funding & timelines for infrastructure deployment.**



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# Thank you!

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For more information:  
[www.calstart.org](http://www.calstart.org)  
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@Calstart  
@TeamDriveToZero

# Panel Discussion



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