



California's Push to Zero-Emissions in the Off-Road Sector

Peter Christensen
Off-Road Decarbonization Symposium
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Outline

- California Policy Leadership
- California Air Resources Board (CARB) Priorities
- Incentive Programs
- Off-Road Zero-Emission Regulations
- Conclusion



California Policy Leadership

- Governor Gavin Newsom Executive Order sets vision for zero-emission across all vehicle and equipment types in the next 10-20 years

 **100% ZEV sales** by 2035

Full transition to
ZEV short-haul/drayage trucks 
by 2035

 Full transition to **ZEV buses & heavy-duty long-haul trucks** 
by 2045*

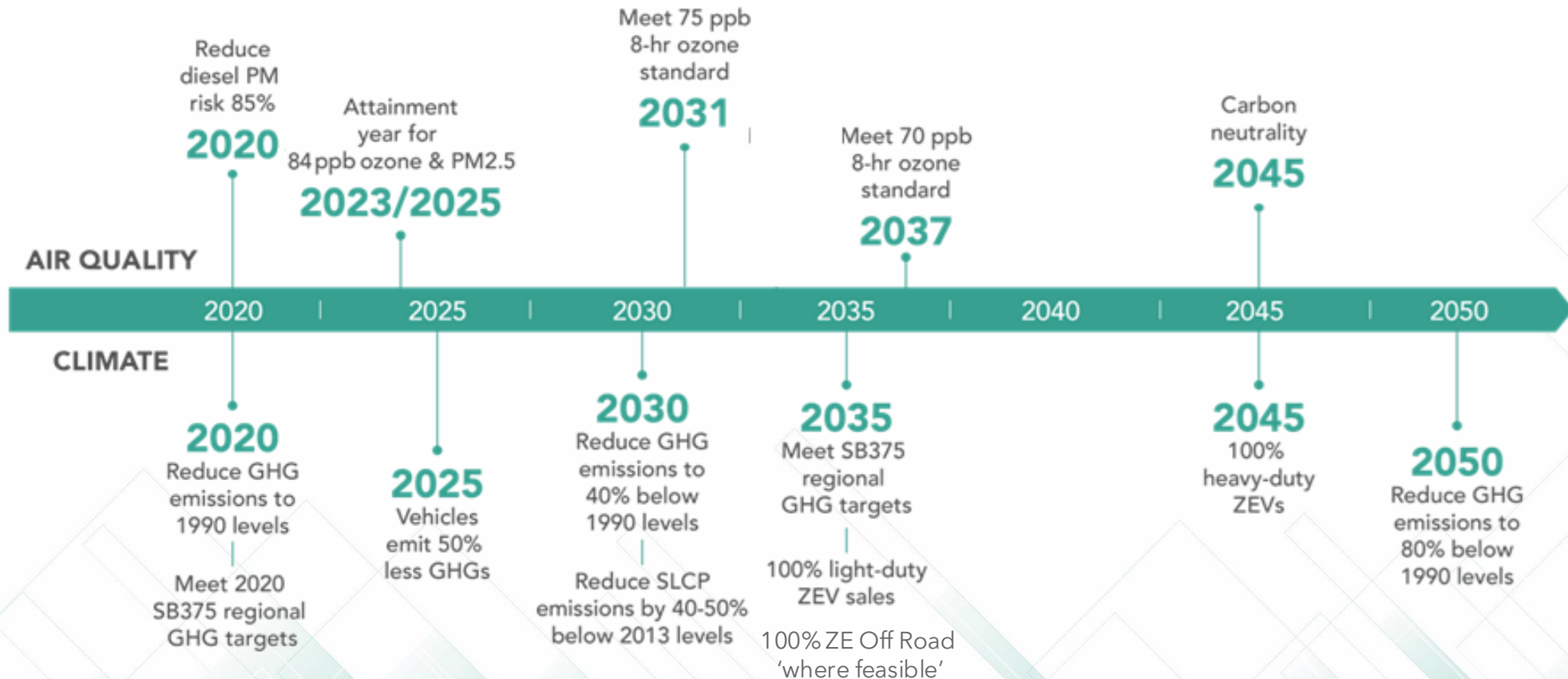
 Full transition to
ZE off-road equipment
by 2035*
*where feasible

CARB Priorities

- Climate
 - Regional Air Quality
 - Local Exposure
- Aggressive goals and targets for criteria pollutant, toxic and greenhouse gas emission reductions
 - Action required across economy, broadly within sectors



Timeline - Air Quality and Climate Targets



- Zero emission off-road helps achieve all of these targets

CARB Portfolio of Incentive Programs

Air Quality Improvement Program

Criteria pollutant and toxics reductions

Carl Moyer Program Cost-effective emission reductions

Volkswagen Mitigation Trust

Nitrogen oxides mitigation

Fluorinated Gases (F-Gas) Reduction Incentive Program

Reduces F-Gas emissions

Community Air Protection Program (AB 617) reductions for community goals

Funding Agricultural Replacement Measures for Emission Reductions Program

Ag sector emissions reductions

Low Carbon Transportation

Advance technologies includes **Clean Off-Road Voucher Incentive Program (CORE)**

Woodsmoke Reduction Program particulate reductions

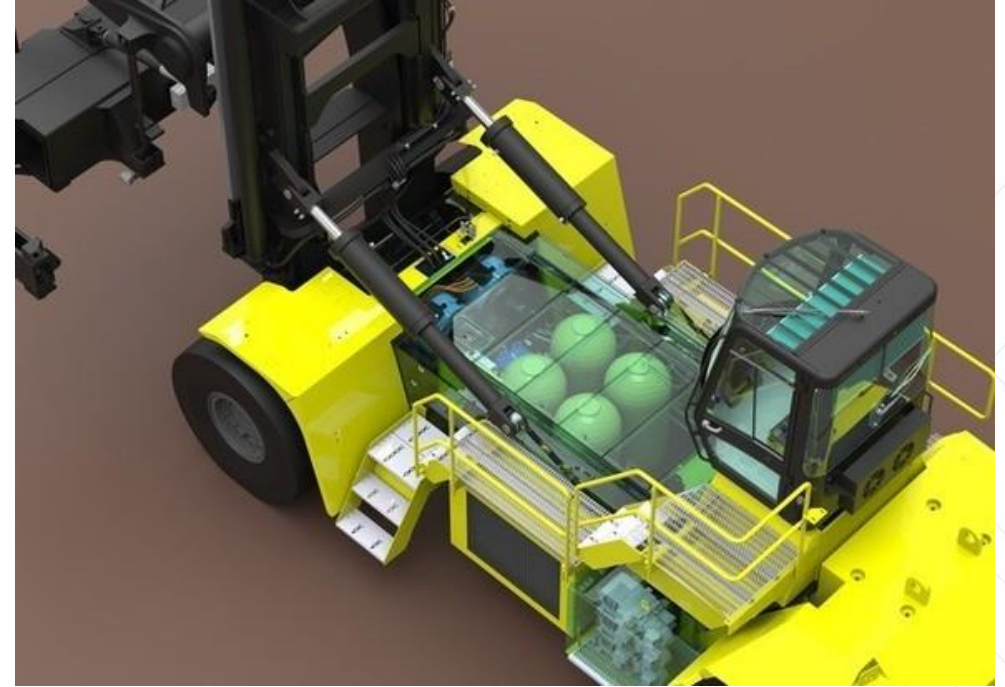
CORE: Off-Road Incentives

- Funding for commercial ZE off-road equipment
- Eligible Categories: forklifts, construction, agriculture, marine, railcar mover, terminal tractor, transport refrigeration unit, mobile charging
- \$300M in funded equipment since 2020
- Over 2,500 projects
- www.californiacore.org



Funding for Off-Road Demonstrations

- Support new technologies ready for commercialization
- About \$120 million in funding since 2015 for Off-Road Demonstration and Pilot Projects, a few examples of which are:
 - Cargo handling equipment, such as electric yard trucks, top loaders, and side loaders
 - Fuel cell passenger ferry
 - Electric locomotive
 - Electric farm tractors



Regulations Pushing Off-Road ZE

- ZE Forklift Regulation
- In-Use Locomotive Regulation
- In-Use Off-Road Diesel-Fueled Fleets Regulation
- ZE Transport Refrigeration Unit (TRU) Regulation
- Small Off-Road Engine Regulation
- Low Carbon Fuel Standard (LCFS)
- Phased Advanced Clean Equipment Regulation (Targeted Manufacturer Rule)
- Amendments to the Cargo Handling Equipment (CHE) Regulation



Zero-Emission Forklift (ZEF) Regulation

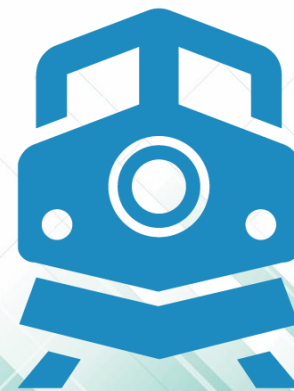
- Adopted by CARB in June 2024
- Reduce criteria-pollutant and GHG emissions from large spark ignition (LSI) forklifts (e.g., propane-fueled forklifts)
 - Requirements on Manufacturers, Dealers, Rental Agencies, and Fleet Operators
 - Restrict purchase of LSI forklifts from January 2026
 - Phase-out affected forklifts beginning January 2028
- For more information:
<https://ww2.arb.ca.gov/our-work/programs/zero-emission-forklifts>



In-Use Locomotive Regulation

- Adopted by CARB April 2023
- Operators must pay an amount, based on emissions while in California, into a fund for upgrading to cleaner locomotive technologies
- Non-freight (i.e., switch, industrial, and passenger) locomotives built 2030 onwards will be required to operate in ZE while in California
- Same for freight line haul built from 2035
- 30-minute idling limit
- For more information:

<https://ww2.arb.ca.gov/rulemaking/2022/locomotive>



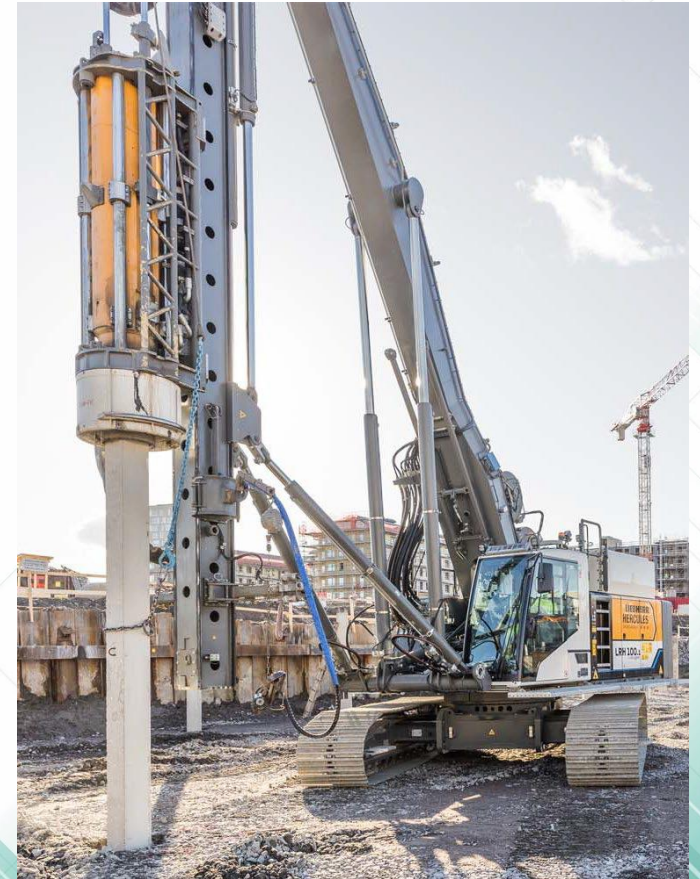
In-Use Off-Road Diesel-Fueled Fleets Regulation

- Adopted by the Board December 2022 (amendments)
- Requires fleets to turn over older diesel equipment to newer, cleaner equipment
- Fleets adding ZE equipment can delay turnover of older equipment by 2 years
- Recent amendments provide alternative compliance pathway available to fleets committing to go at least 50% ZE (effective from October 2023)
- For more information:

<https://ww2.arb.ca.gov/our-work/programs/use-road-diesel-fueled-fleets-regulation>



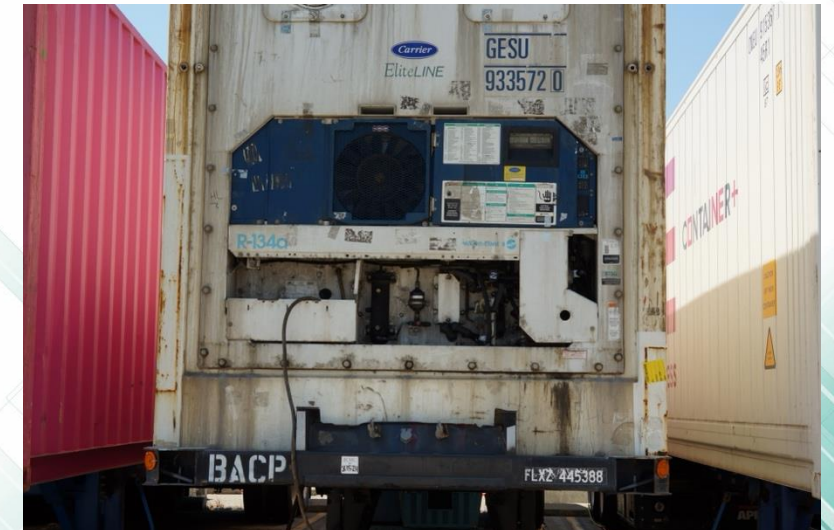
Credit: Global-CE.com



Credit: Leibherr.com

ZE Transport Refrigeration Unit (TRU) Regulation

- Adopted by CARB February 2022
- Owners required to turn over truck TRUs to ZE from 2023 through 2029
- For more information:
<https://ww2.arb.ca.gov/our-work/programs/transport-refrigeration-unit>



Small Off-Road Engine Regulation

- Adopted by CARB December 2021
- Applies to spark ignition engines rated at or below 19kW (25hp)
- ZE for most new engines starting with model year 2024
- No requirements placed on equipment owners
- For more information:
<https://ww2.arb.ca.gov/our-work/programs/small-off-road-engines-sore>



Low Carbon Fuel Standard (LCFS)

- Requires fuel producers to meet carbon intensity standards thereby encouraging the production of low-carbon fuels and reducing GHG emissions
- LCFS reduces costs of ZE fuels, contributing to lower total cost of operation for ZEV
- For more information:
<https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard>



Upcoming Phased Advanced Clean Equipment Regulation (Targeted Manufacturer Rule)

- Would require more ZE equipment production
- CARB adoption in 2027 for implementation in 2031
- <https://ww2.arb.ca.gov/our-work/programs/phased-advanced-clean-equipment-pace-regulation>



Upcoming Amendments to the Cargo Handling Equipment Regulation

- Existing regulation requires fleets to meet best available control technology requirements.
 - Amendments would establish ZE requirements
- Staff are developing a technology assessment and determining options for ZE requirements for a planned future rule making
- For more information:
<https://ww2.arb.ca.gov/our-work/programs/cargo-handling-equipment>



California Committed to Support Off-Road ZE Deployment

- Off-Road ZE is here and growing
 - Lower total cost of ownership
 - Inherent fuel savings
 - Less maintenance and greater equipment uptime
 - Upfront costs declining
- California is committed to pushing off-road ZE
 - Necessary to achieve federal air quality standards and climate targets



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Thank you!

