



Public Workshop to Discuss the Potential Off-Road Phased Advanced Clean Equipment Regulation (PACE)

September 24, 2024

Zoom Webinar Logistics

- Staff will respond to comments and questions at the end of the workshop presentation.
- How to ask questions:
 - In Zoom:
 - Use the “Raise Hand” feature or type in “Q&A” box
 - On phone:
 - #2 to “Raise Hand”
 - *6 to unmute/mute
- Please state your name and affiliation before asking a question or making a comment.

Agenda

- Background
- Proposed PACE Concept and Considerations
- Infrastructure
- Next steps

Background



Mobile Sources & Air Quality

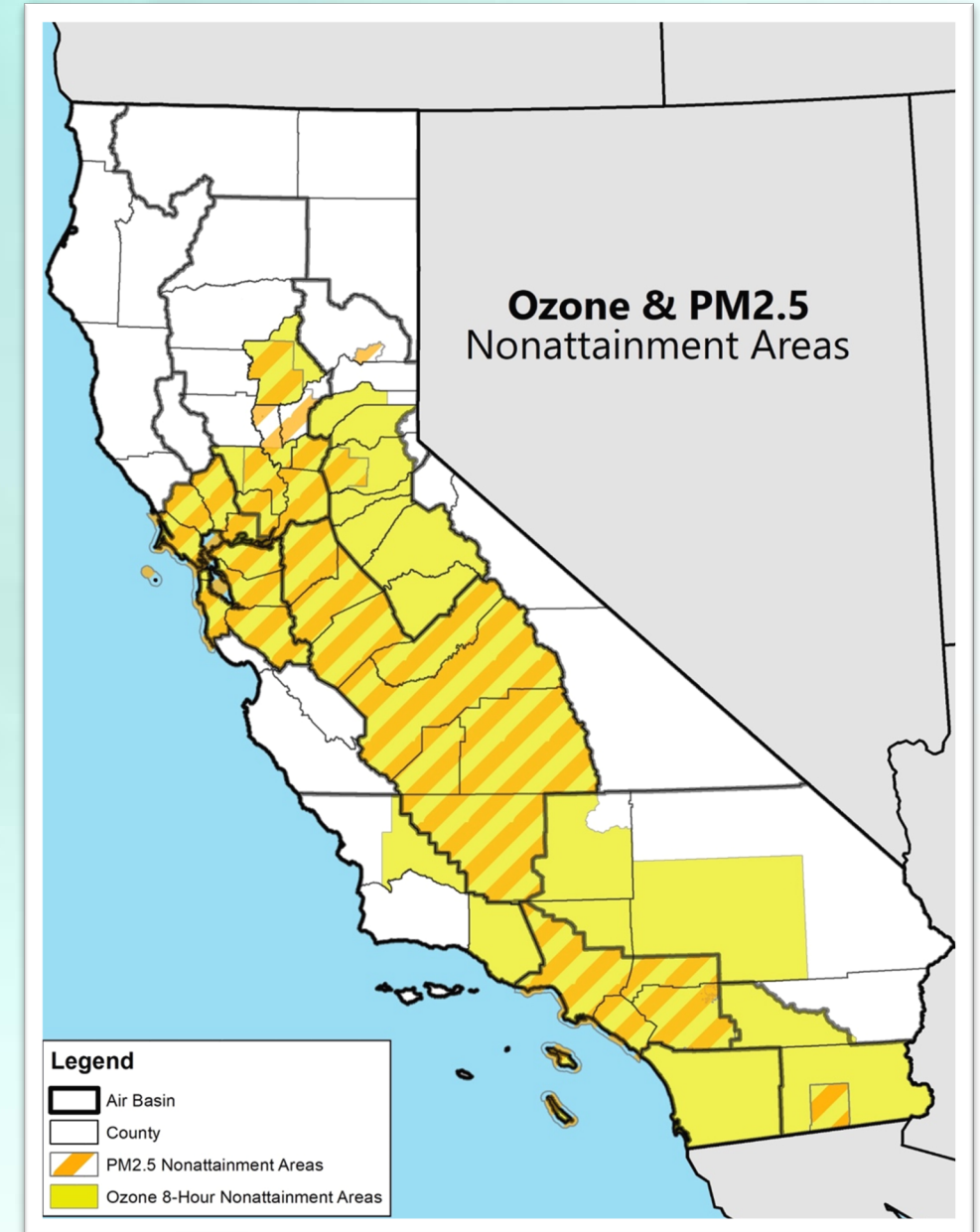
More than **21 million out of ~39 million** Californians live in areas that exceed federal ozone standards¹

- Disproportionate impacts on low-income and disadvantaged communities

Mobile sources and the fossil fuels that power them are the largest contributors to:

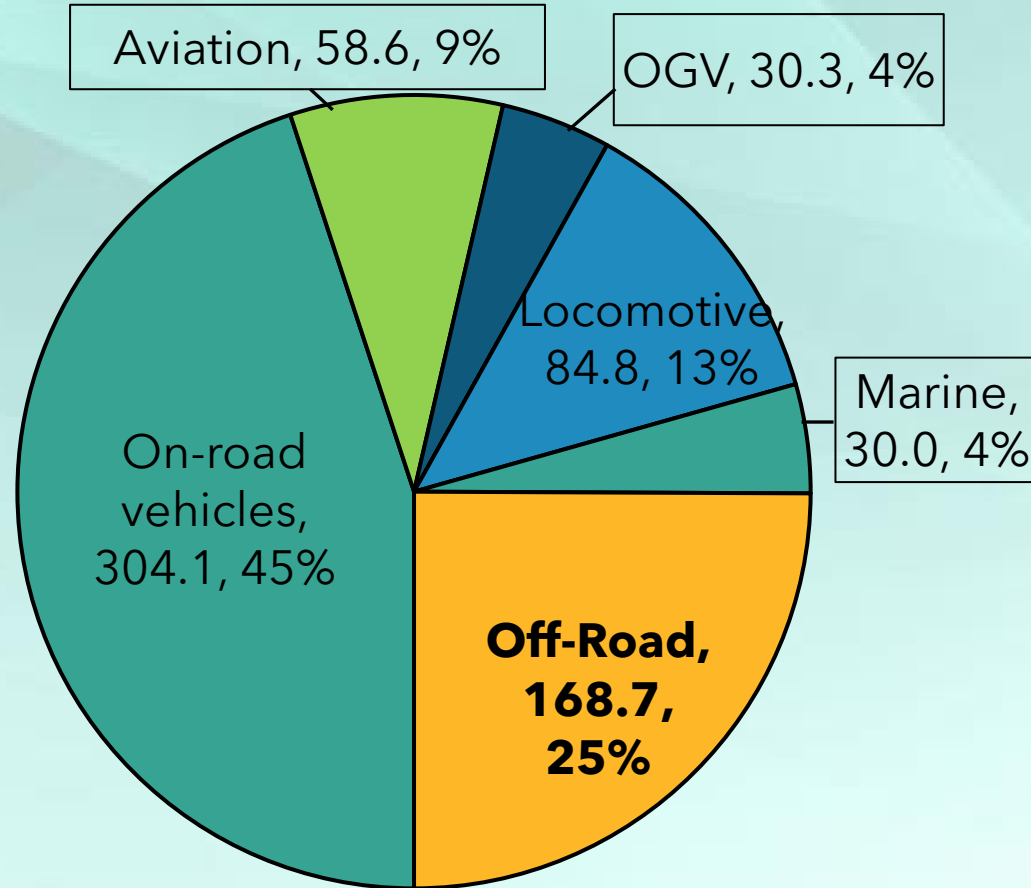
- Ozone precursors
- Fine particulate matter (PM2.5)
- Diesel PM
- Greenhouse gases (GHG)

1: Based on 2020 monitored ozone design values contoured over population by census tract

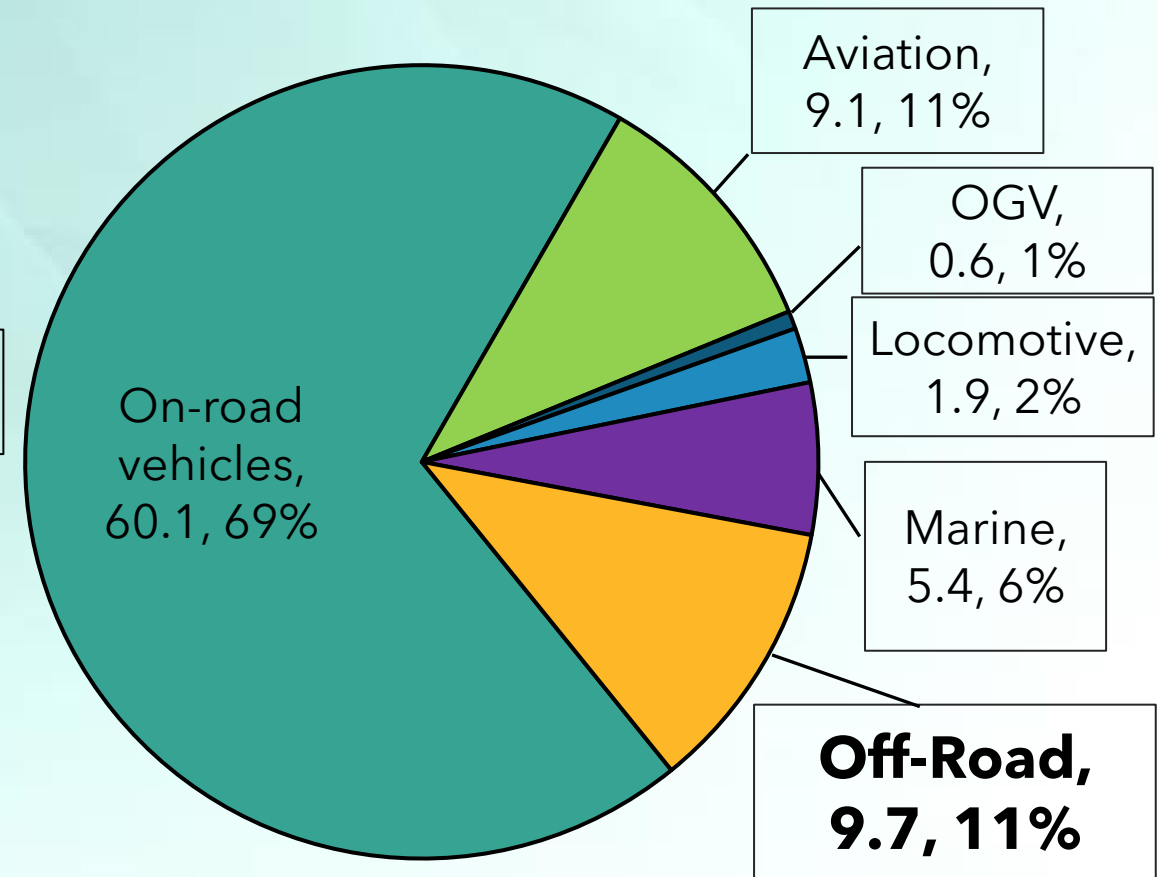


Off-Road Emissions Contribution

2024 Oxides of Nitrogen (NOx) Emissions and Contributions

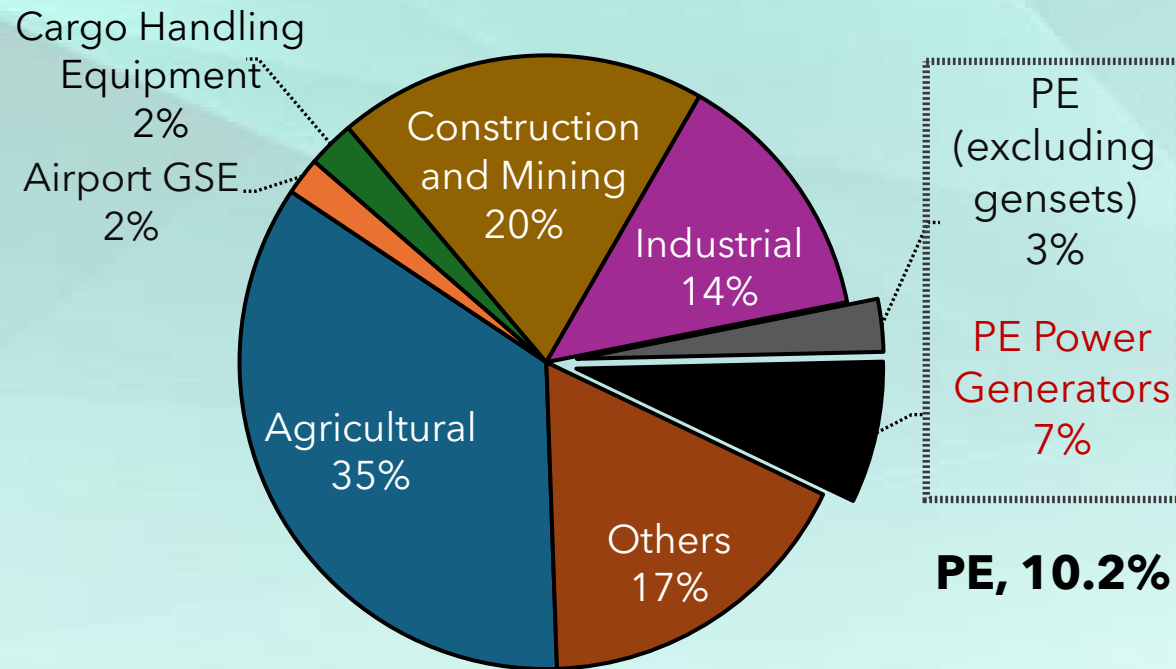


2024 PM Emissions and Contributions

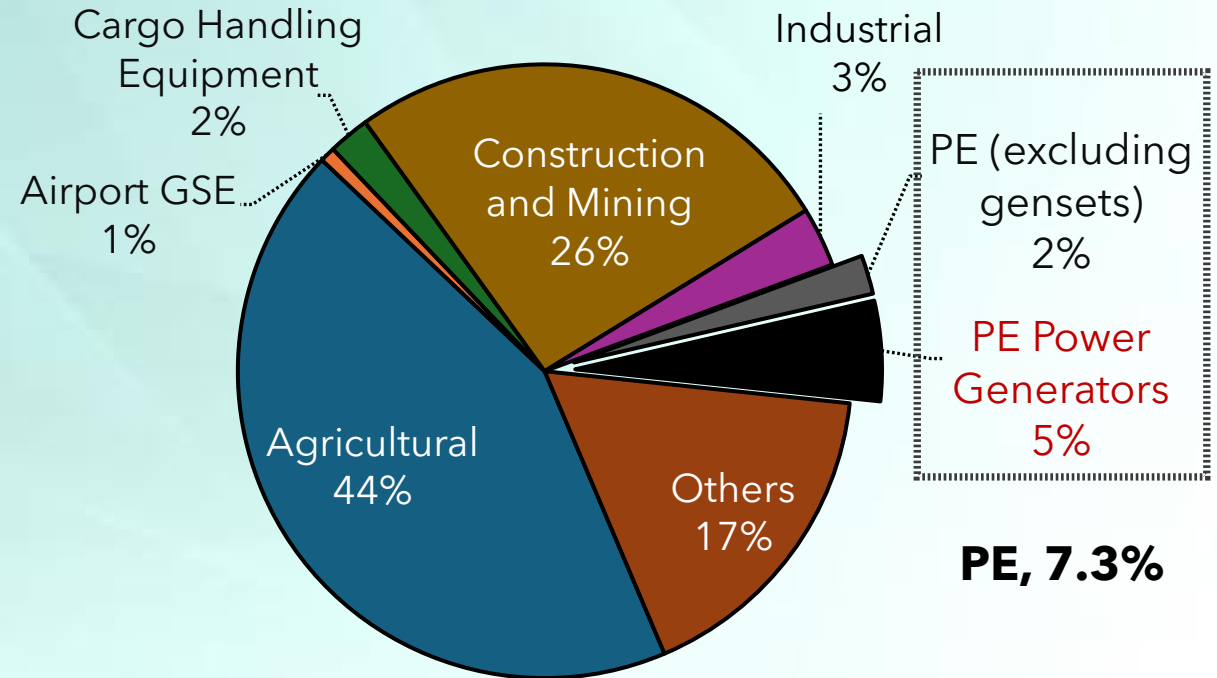


Contribution of Portable Equipment (PE)

NOx Emissions Contributions

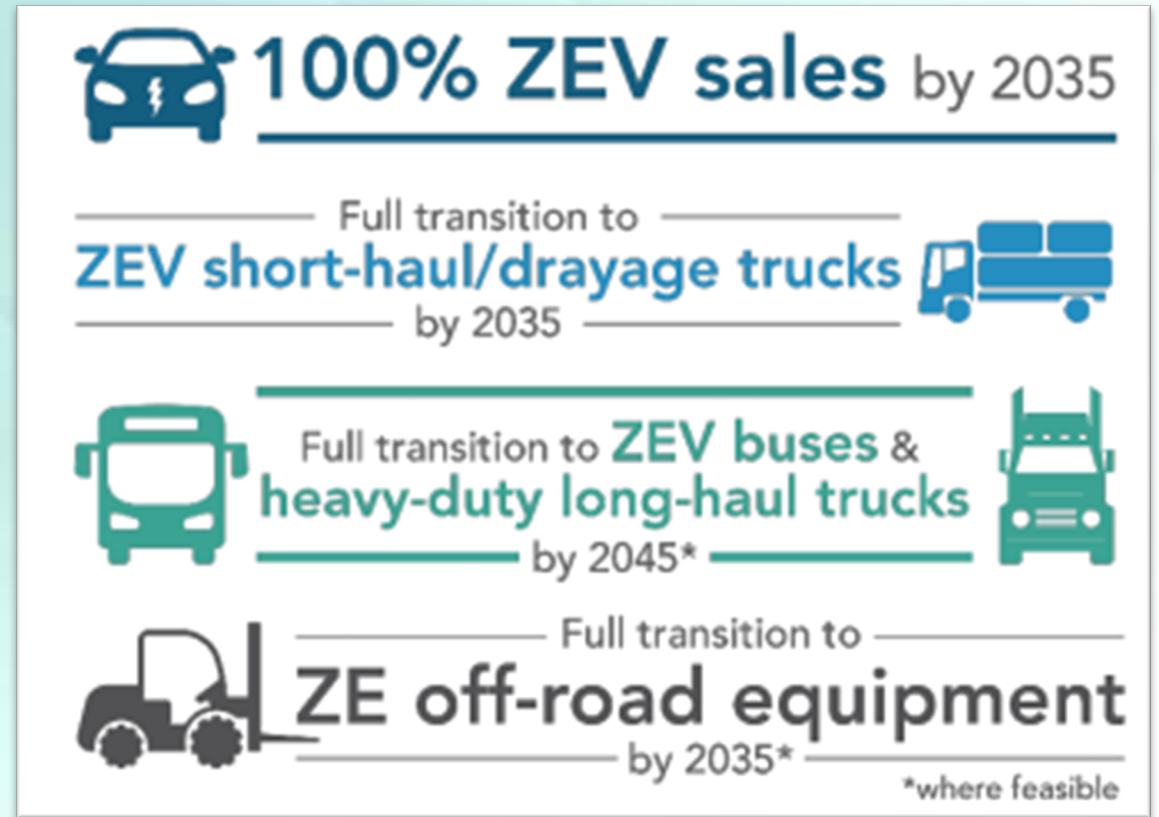


PM2.5 Emissions Contributions



Legislative and Governor Level Leadership

- **Reduce GHG Emissions** to 40% below 1990 levels by 2030
Senate Bill (SB) 32
- **Carbon Neutrality by 2045**
across California economy
SB 100
- **100% Zero-Emission (ZE) in 2035 for Off-Road** operations
'where feasible'
Executive Order N-79-20



ZEV - Zero-Emission Vehicle

Background: What is PACE?

- **Manufacturer-Directed Rule Concept:** Proposed requirements on manufacturers to produce for sale ZE equipment and/or powertrains as a portion of their annual statewide sales volume in California
- **Electrification-Potential-Specific Sales Schedule:** Mandated sales/production targets based on the projected technical and economic feasibility of ZE technology across various off-road sectors.
- Included in the 2022 State Strategy for the State Implementation Plan
 - Previously known as the Targeted Manufacturer Rule (TMR)
 - Proposed Board date for consideration of 2027, with implementation starting in 2031

CARB's Advanced Clean Off-Road Equipment List

Category	# of equipment models
Electric Construction and Mining Equipment	312
Energy Storage System	53
H2FC Construction and Mining Equipment	11
Grid-electric Construction & Industrial Equipment	36
ZE Agricultural Equipment	29
Electric Industrial & Airport GSE	54
ZE Forklifts	394
Total	889

H2FC - Hydrogen Fuel cell:

GSE - ground support equipment

<https://ww2.arb.ca.gov/our-work/programs/msei/off-road-advance-clean-equipment>

CARB Incentive Programs

Millions / Fiscal Year (\$624M FY23/24) to Foster Cleaner Equipment

Air Quality Improvement Program

Criteria pollutant and toxics reductions

Carl Moyer Program Cost-effective
SIP creditable 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

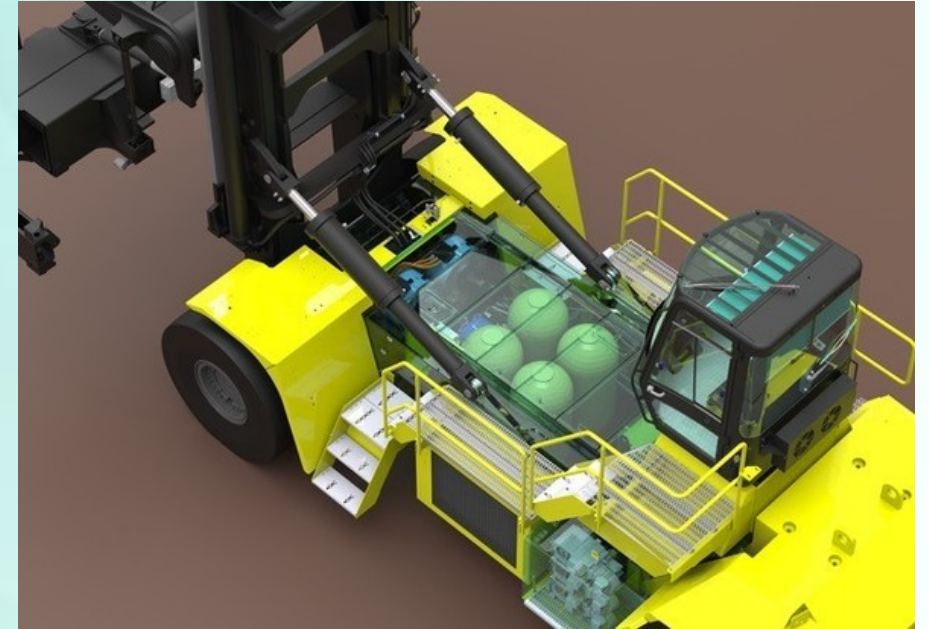
Advance technologies
includes **Clean Off-Road Voucher
Incentive Program (CORE)**

**Woodsmoke Reduction
Program** particulate
reductions



CARB Demo/Pilot Off-Road Projects

- Support technologies on the cusp of commercialization
- Over \$700 million in State Funds Invested; Total Investment near \$1.4 Billion
- Examples of Funded Demos/Pilots:
 - Yard trucks
 - Other cargo handling equipment
 - Fuel cell ferry
 - Locomotive
 - Agriculture and construction equipment
 - Mobile energy storage systems



CARB's Clean Off-Road Equipment Voucher Incentive Project (CORE)

- Vouchers for commercialized ZE off-road equipment
- ~\$240M in voucher funded equipment since 2020
- Growing list of eligible equipment categories
 - Construction
 - Agriculture
 - Forklifts
 - Cargo handling Equipment
 - Mobile power units



Proposed PACE Concept and Considerations



Potential PACE Phases

- First phase
 - Portable generators (excluding small off-road engine powered units)
 - Mobile off-road equipment 130 kilowatt (kW) and greater in applications with greater demonstrated feasibility
- Second phase
 - Additional mobile off-road equipment types 130kW and greater
- Third phase
 - Mobile off-road equipment under 130kW

Potential PACE Regulatory Approach

- Regulation would apply to equipment and powertrain manufacturers
- Percent-of-Portfolio Requirements
 - Increasing annual requirements that a percentage of the total equipment power sold be ZE
 - Potential Alternate Approach: More stringent NO_x standard to drive greater ZE equipment production

PACE Measure Considerations

- Costs / economic impact
- Feasibility
- Infrastructure
 - Mobile, temporary, and fixed
- Impacts of other regulations, e.g., Tier 5
- Small business impacts
- Environmental justice – disadvantaged communities
- Fairness - level playing field
- Enforceability – ease of determining compliance

Other Staff Considerations

- Pros and cons of powertrain versus equipment requirements
- Potential role of hybrid, plug-in, and range extended technologies in PACE
- ZE and hybrid powertrain conversion kits
- Certification requirements for ZE powertrains and/or equipment
- May consider a credit system for equipment in harder to electrify applications

Intended PACE Outcomes

- Emission reductions via increased ZE Deployment
- Accelerated introduction of existing ZE equipment types not currently available in the state
- Accelerated ZE development in equipment types for which ZE options do not currently exist
- Greater overall ZE product availability in off-road sector
- Greater competition in off-road ZE market
 - Lower cost for fleets
 - Improved product quality and reliability

Intersections with Other CARB Regulations

- PACE staff are committed to coordinate internally
- Staff seeking industry input on options to maximize the potential for emission reductions through PACE, while also accounting for Tier 5 requirements

Infrastructure



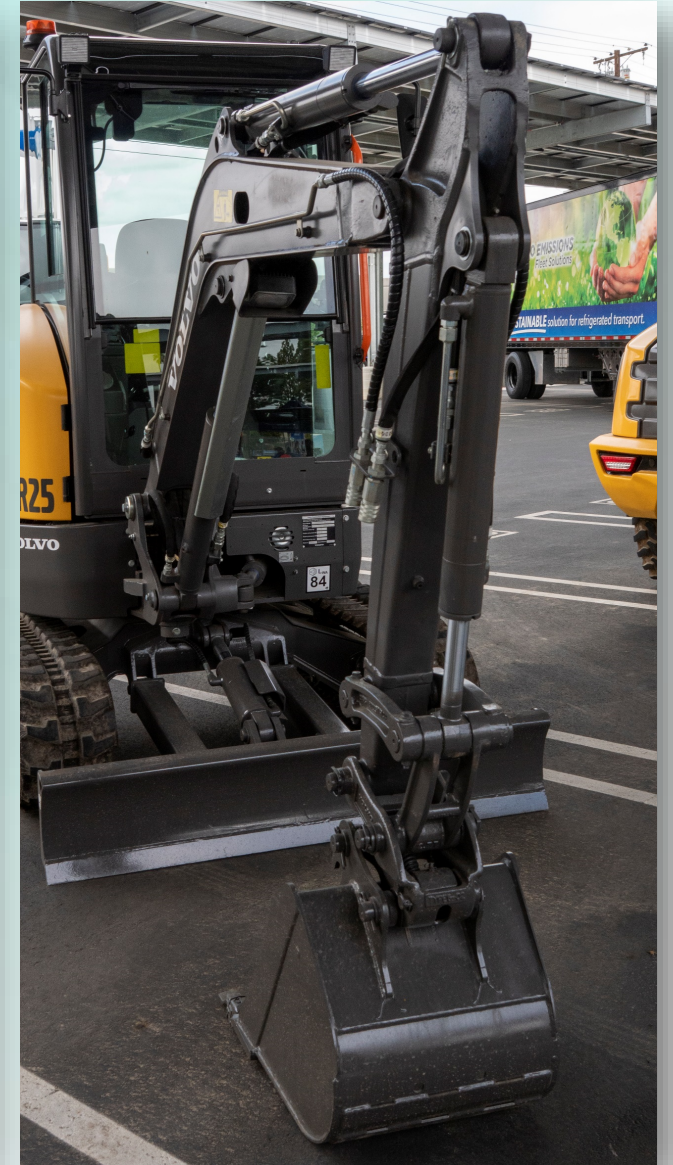
Infrastructure Collaboration

Matching ZEV infrastructure with vehicle deployments

- CARB-California Energy Commission (CEC) funding/incentive collaboration
- CARB, CEC, California Public Utilities Commission and utility collaboration to support planning and forecasting
- ZEV Infrastructure Joint Statement of Intent
 - Signed April 20, 2023
 - Robust data sharing and analysis – feeds into infrastructure planning
 - Joint planning and funding alignment
 - Communication and stakeholder engagement
 - Equity



Next Steps



Next Steps

- Engage with stakeholders, including manufacturers, technology providers, industry representatives, non-governmental organizations, users of off-road equipment, community groups, and other interested stakeholders.
- Topic-specific workgroups; topics could include:
 - Portable ZE equipment
 - Mobile ZE equipment 130kW and above
 - Hybrid and range extended equipment
- Request for Information on topics, such as:
 - Product availability
 - Equipment feasibility and infrastructure needs
 - Cost information

Contacts

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Webpage and Email Sign-up

- CARB PACE Website
 - <https://ww2.arb.ca.gov/our-work/programs/phased-advanced-clean-equipment-pace-regulation>
- PACE Email Distribution List
 - Sign up to stay informed of future meetings and notification
 - https://public.govdelivery.com/accounts/CARB/subscriber/new?topic_id=pace