

Welcome to CARB's Public Workshop to Discuss Development of a Regulation to Accelerate the Deployment of Zero-Emission Forklifts

The webinar will begin shortly. Here is a brief overview of your webinar controls.

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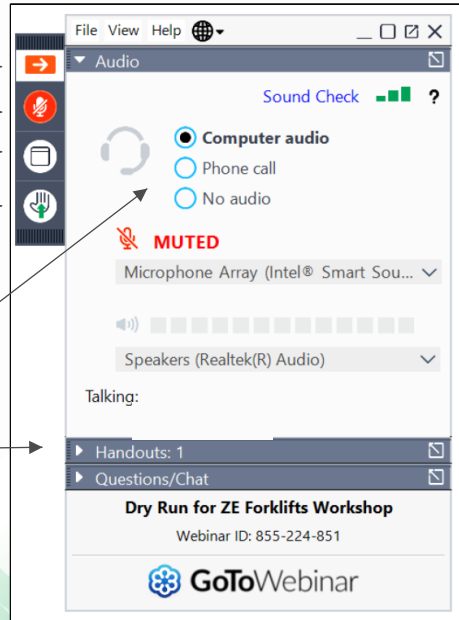
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Public Workshop to Discuss the Zero-Emission Forklifts Measure

October 7, 2020

Agenda

- Background
- Inventory Update
- Example Regulatory Approach
- Next Steps

Air Quality Goals

2023:
South Coast
& SJV Ozone

2031:
South Coast
& SJV Ozone

2024/25:
AB 617
Communities
South Coast &
SJV PM2.5

2037:
South Coast
& SJV Ozone

Climate & Zero-Emission Goals

GHG 40%
Below 1990 Levels

2030

GHG 80%
Below 1990 Levels

2050

2035

New Vehicles, Trucks
& Off-Road Equipment
Zero-Emission

2045

Carbon Neutrality &
New Heavy-Duty
Non-Drayage Trucks
Zero-Emission

Achieving Our Goals

- State Implementation Plan
 - State's roadmap to meeting federal ambient air quality goals
- 2016 Mobile Source Strategy
 - State's plan that targets mobile sources
 - Covers air quality, GHG emissions, petroleum consumption, & health risks from transportation emissions
- Sustainable Freight Action Plan
 - Vision for the state's transition to a more efficient, more economically competitive, and less polluting freight transport system

Zero-Emission Forklift Measure

- Identified in the SIP, the 2016 Mobile Source Strategy, the Sustainable Freight Action Plan
- Supported in Governor's Executive Order N-79-20 (signed Sep 2020)
- Purpose: Accelerate deployment of zero-emission technology in forklifts
- Full implementation by 2035
- Board consideration in early 2022

Forklift Inventory Background

- Purpose - Estimate emission reductions from regulatory proposals
- Current Inventory
 - Last updated for LPG/gas forklifts in 1998
(Sources : Power System Research, ITA data, research report)
 - Last updated for diesel forklifts in 2011
(Source: DOORS database)
- Updates To Inventory
 - New sources of data
 - Feedback from stakeholders

Forklift Inventory Inputs

Inventory Calculation Inputs : Population, Activity, Emission Factor, Growth

| Inputs | Data Sources |
|-----------------|--|
| Population | ITA Historical U.S. Shipment (1988 to present) CARB Production Line Testing (PLT) Database (gas and LPG/propane) DOORS Database (diesel/gas/LPG) CSU Fullerton 2016 LSI Survey EPA Nonroad Model |
| Activity | CSU Fullerton 2016 LSI Survey OFFROAD2007 Model DOORS Survey and Used Equipment Sales (2020) |
| Emission Factor | CARB LSI Certification Database (2001-present) OFFROAD2007 Model Diesel Engine Certification Tests |
| Growth Factor | Economic Surrogates (Industrial Production, Manufacturing) ITA Shipment Growth/CARB PLT historical growth rates |
| Others | Age distribution of forklifts – CSU Fullerton Survey/DOORS Database Horsepower of forklifts – CARB LSI Certification |

Forklift Inventory Timeline

- Current Status/Timeline
 - Analyzing data sources
 - Feedback from stakeholders
 - Preliminary estimates for population, activity, emission factor, growth rates
 - Model development
 - Future inventory workshop and staff report
 - Benefit calculations for regulation

Questions or Comments???

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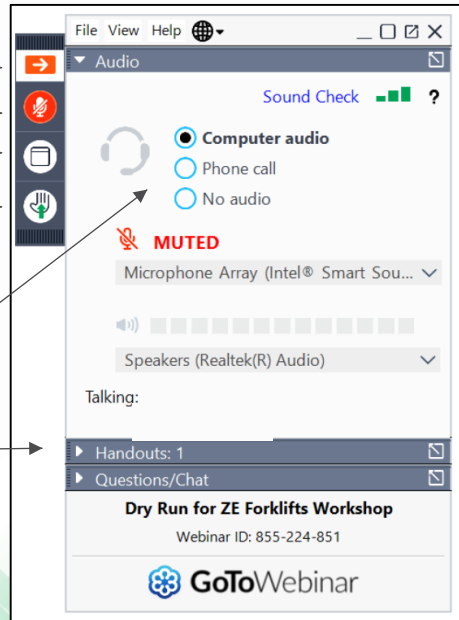
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ZE Forklift Measure Considerations

- Costs / Economic Impact
- Feasibility
- Infrastructure
- Impacts of Other Regulations
- Small Business Impacts
- Environmental Justice – Disadvantaged Communities
- Fairness - Level Playing Field
- Enforceability – Ease of Determining Compliance
- Monitoring and Reporting

Forklift Types

- Electric Forklifts
 - Class 1 counterbalanced
 - Class 2 narrow-aisle
 - Class 3 pallet jacks & walkies (excluded from measure)
- Internal Combustion Forklifts
 - Class 4 cushion tire
 - Class 5 pneumatic tire
 - Class 6 industrial tow tractor
 - Class 7 rough terrain forklift

Technology Status of Battery-Electric Forklifts

- 46% of U.S. forklift shipments in 2018 were battery electric.
 - Among Classes 1,2, 4, & 5
 - Source: Industrial Truck Association
- Battery-electric forklifts are prevalent in lower lift capacities & are offered in > 30,000 lb. lift capacity.
- Advanced lead acid and lithium battery technologies
 - Improving performance and charging

Technology Status of Battery-Electric Forklifts (Continued)

- Commonly found in indoor operations.
- Outdoor weatherized versions are commercially available.
- Every major industrial lift supplier offers battery-electric options.
- Lower total cost of ownership due to fuel savings and reduced maintenance.

Technology Status of Fuel Cell Forklifts

- Over 25,000 hydrogen fuel cell forklifts have been deployed in the U.S.
- Commonly used in warehouse applications with high workflow.
- Offer quick refueling for increased productivity.

Regulatory Approach

- One of our goals today is to initiate meaningful conversation on a potential regulatory approach
- We'll signal to you what we're thinking
- Likewise, we want to hear your ideas and get your feedback

Request for Alternatives

- We encourage public input throughout this regulatory development, including feedback on alternatives to today's example regulatory approach.
- In particular, based on SB 617^[1], we encourage input on alternative approaches that:
 - May yield the same or greater benefits than those associated with the proposed regulation (note - no proposed regulation at this stage), or
 - May achieve the goals at lower cost.

[1] SB 617:

http://dof.ca.gov/Forecasting/Economics/Major_Regulations/SB_617_Rulemaking_Documents/documents/Section%202000%20ISOR%201%20sb_617_bill_20111006_chaptered.pdf

See also the Department of Finance's implementing regulations CCR Title 1, Division 3, §2000-2004

Example Regulatory Approach

- Proposed Applicability
- Approach Elements
- Preliminary Emission Reduction Estimates

Approach Applicability

- California forklift owners/operators
- LSI and diesel forklifts
- Not applicable to Class 3 forklifts

Approach Requirements

- Near-term requirements for forklifts that currently have significant zero-emission market penetration
 - Forklifts with 8,000 lb. lift capacity and less
 - Correlates to about 65 hp
- Delayed requirements for forklifts with greater than 8,000 lb. lift capacity
 - Contingent upon zero-emission availability

Example Approach Overview

- In-use fleets would be required to phase out internal combustion forklifts by model year
- Replacements and additions must be zero-emission
- Starting in 2025 for Class 4 & 5 forklifts ≤ 65 hp
- Starting in 2030 for Class 4 & 5 forklifts > 65 hp

Example Approach Phase-Out ≤ 65 HP

- Phase out internal combustion forklifts by model year (MY)
- Example for Class 4 & 5 forklifts at ≤ 65 hp

| Calendar Year | Engine Phase-Out by MY |
|---------------|------------------------|
| 2025 | 2017 & Older |
| 2026 | 2018 |
| 2027 | 2019 |
| 2028 | 2020 |
| 2029 | 2021 |
| 2030 | 2022 |
| 2031 | 2023 |
| 2032 | 2024 |

Example Approach Phase-Out >65HP

- Example for Class 4 & 5 forklifts at > 65 hp

| Calendar Year | Engine Phase-Out by MY |
|---------------|------------------------|
| 2030 | 2020 & Older |
| 2031 | 2021 |
| 2032 | 2022 |
| 2033 | 2023 |
| 2034 | 2024 |
| 2035 | 2025 |
| 2036 | 2026 |
| 2037 | 2027 |
| 2038 | 2028 |
| 2039 | 2029 |
| 2040 | 2030 |

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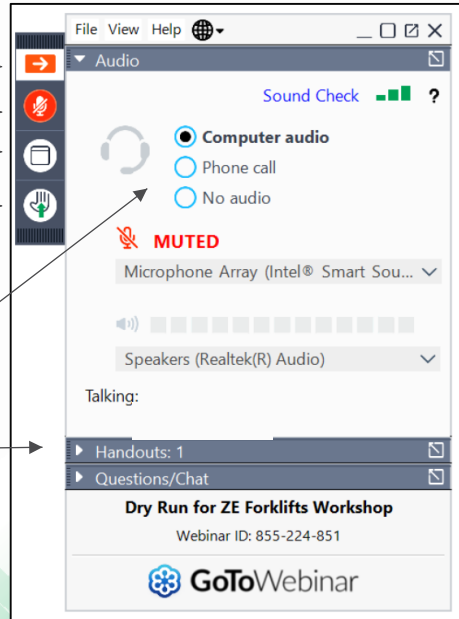
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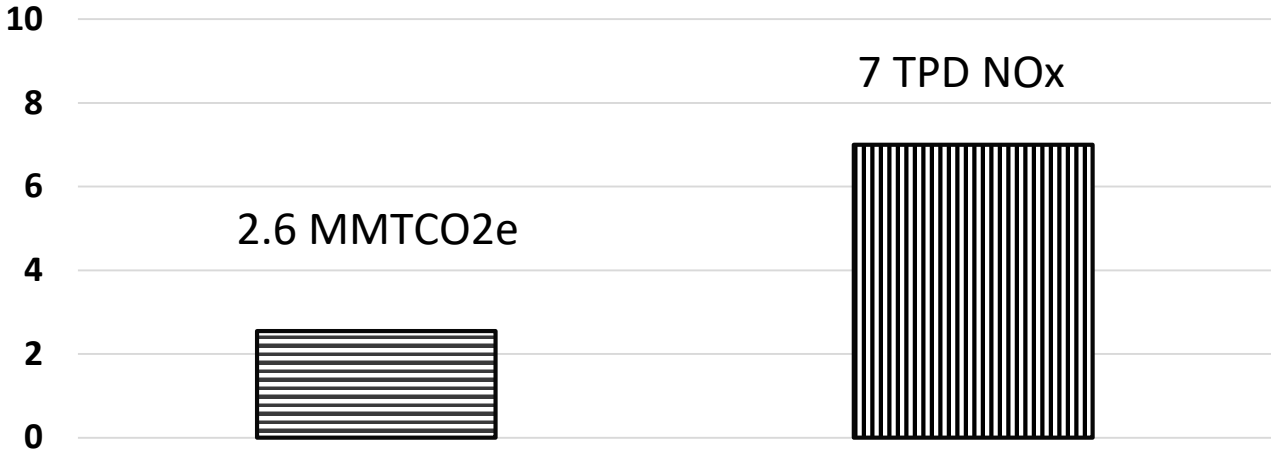
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Example Approach – Other Elements

- Consider establishing certification requirements for zero-emission forklifts
 - To ensure that zero-emission technologies meet reliability and performance expectations
- Consider applying delayed requirements to Class 6 & 7 forklifts (contingent upon availability)
- Reporting and Labelling

Preliminary Emission Reduction Estimate for Class 4 & 5 Forklifts in 2031

Based on a mandated engine phase-out age of 8 years and zero-emission additions/replacements.



Next Steps

- Obtain feedback/information from stakeholders through working groups and individual meetings
- 2nd workshop in March 2021 (tentative)
- Board consideration in 2022

Contacts

Rulemaking

- Lead: Lori Berard, Air Pollution Specialist: Lori.Berard@arb.ca.gov
- David Chen, Manager, Advanced Emission Control Strategies Section: David.Chen@arb.ca.gov

Inventory Update

- Walter Wong, Air Resources Engineer: Walter.Wong@arb.ca.gov
- Cory Parmer, Manager, Off-Road Diesel Analysis Section: Cory.Parmer@arb.ca.gov

Webpage & Email Sign-Up

- Webpage:
 - <https://ww2.arb.ca.gov/our-work/programs/zero-emission-forklifts>
- Sign-Up for Zero-Emission Forklifts Email Updates
 - https://public.govdelivery.com/accounts/CARB/subscriber/new?topic_id=zeforklifts

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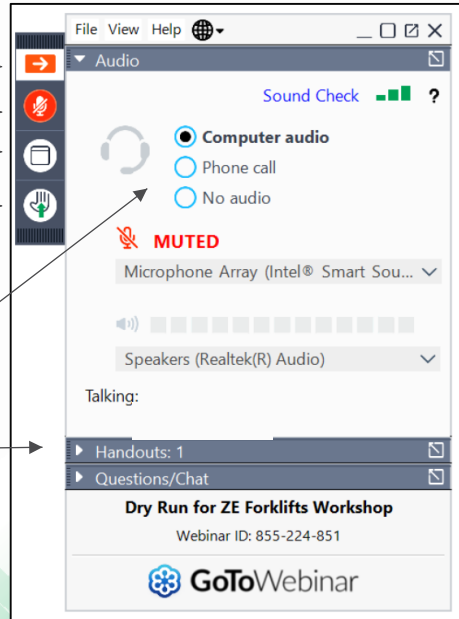
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