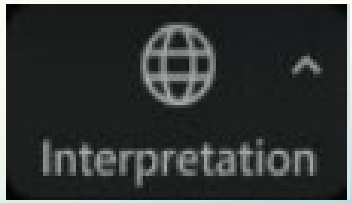
CALIFORNIA
AIR RESOURCES BOARD

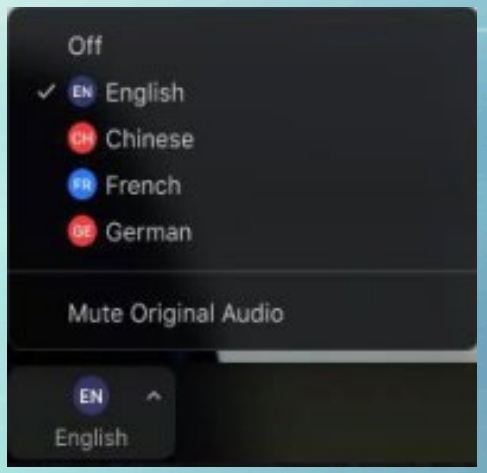
2022 State Strategy for the State Implementation Plan: Draft Measures Workshop

October 19, 2021

Zoom Language Selection

- Click “Interpretation” found at the bottom of the screen
- Click the language you would like to hear: English or Spanish.
- To only hear interpreted language (Spanish), click “Mute Original Audio”





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Zoom Webinar Details

- Telephone Call-in: (877) 336-1831
  Access Code: 7673700
- Questions will be taken in the middle and at the end of the presentation
  - In Zoom: Use “Raise Hand” feature, or type in “Q&A” box
  - On phone:
    - #2 to “Raise Hand”
    - *6 to Unmute/Mute

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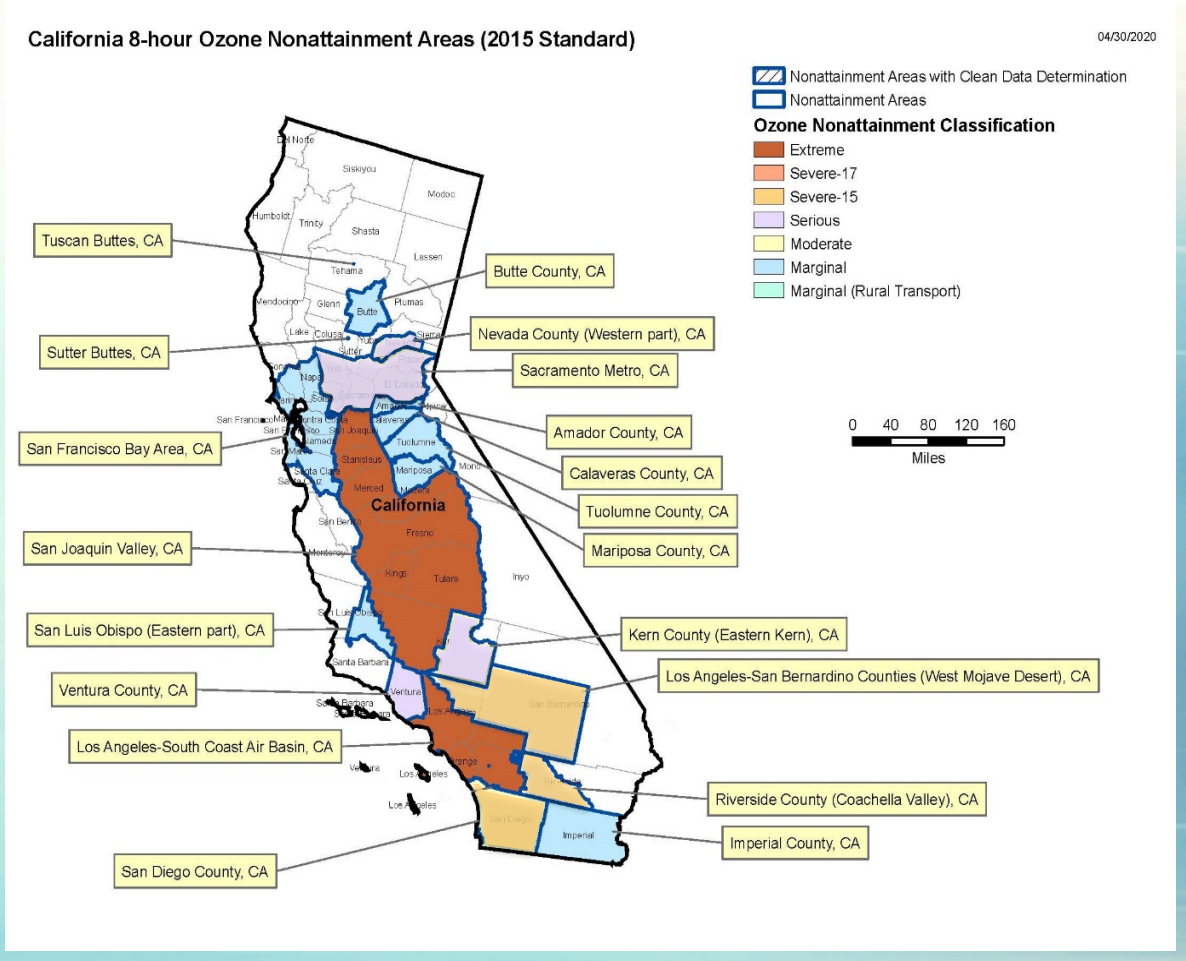
Today's Agenda

- Background and Purpose
- Potential Measures
- Public Measure Suggestions
- Federal Measures and Actions
- Moving Forward

Background and Purpose

70 ppb 8-hour Ozone Standard

- EPA revised the 8-hour ozone standard to 70 ppb in 2015
- 19 areas in California are designated nonattainment
- State Implementation Plan (SIP) revisions required are dependent on classification



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Attainment Plans and 2022 State SIP Strategy

SIP Process has Significantly Improved California Air Quality

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Additional Progress is Needed

Nonattainment Area	Classification	2019 Design Value ppb
South Coast Air Basin	Extreme	108
San Joaquin Valley	Extreme	90
Western Mojave Desert	Severe	95
Coachella Valley	Severe	89
San Diego County	Severe	80
Ventura County	Serious	76
Sacramento Metro	Serious*	86
Eastern Kern County	Serious*	81
Western Nevada County	Serious*	85

*Pending EPA approval

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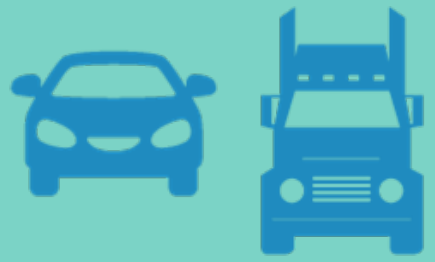
Important to Prioritize Benefits in Low-Income and Disadvantaged Communities

- 99% DACs are within ozone NAAs
- DACs and people of color are disproportionately affected by both mobile and stationary source pollution
- Measures will benefit DACs
- Seeks rapid transition to zero-emission technology in and near DACs
- Complements AB 617 strategies & consistent with CARB's equity goals

Potential SIP Measures can Reduce Emissions in Priority Communities

Near-Road Communities



Near-Port Communities

Communities Near Industrial Facilities & Warehouses

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Co-Benefits Help Reduce Criteria Pollutants

CARB Actions on Previous SIP Commitments

2020
Heavy-Duty Omnibus Regulation
Advanced Clean Trucks Regulation
Ocean-Going Vessels At-Berth Regulation

2021 and 2022
Advanced Clean Cars II
Heavy-Duty Inspection and Maintenance Program
Small Off-Road Engines
Zero-Emission TRU (Part I)
Zero-Emission Forklifts
Consumer Products

Ongoing
Incentivized Turnover Vehicles and Equipment





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Potential Measures

On-Road Mobile Sources

- Advanced Clean Fleets Regulation
- Greenhouse Gas Emissions Standards for Medium- and Heavy-Duty Engines and Vehicles (Phase 3)
- On-Road Motorcycles New Emissions Standards
- Clean Miles Standard Regulation




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Advanced Clean Fleets Regulation

Advanced Clean Fleets (ACF) Regulatory History

- CARB adopted Advanced Clean Trucks (ACT) regulation June 2020, sets M/HD ZEV sales requirement for manufacturers
- ACT Board resolution sets 100% zero-emissions vehicles (ZEV) fleet targets
  - 2035 – Last mile delivery, drayage, public fleets
  - 2040 – Refuse, utilities, buses
  - 2045 – All other trucks where feasible
- Governor's Executive Order 100% ZEV goals
  - 2035 for drayage trucks
  - 2045 for all other trucks and buses, where feasible

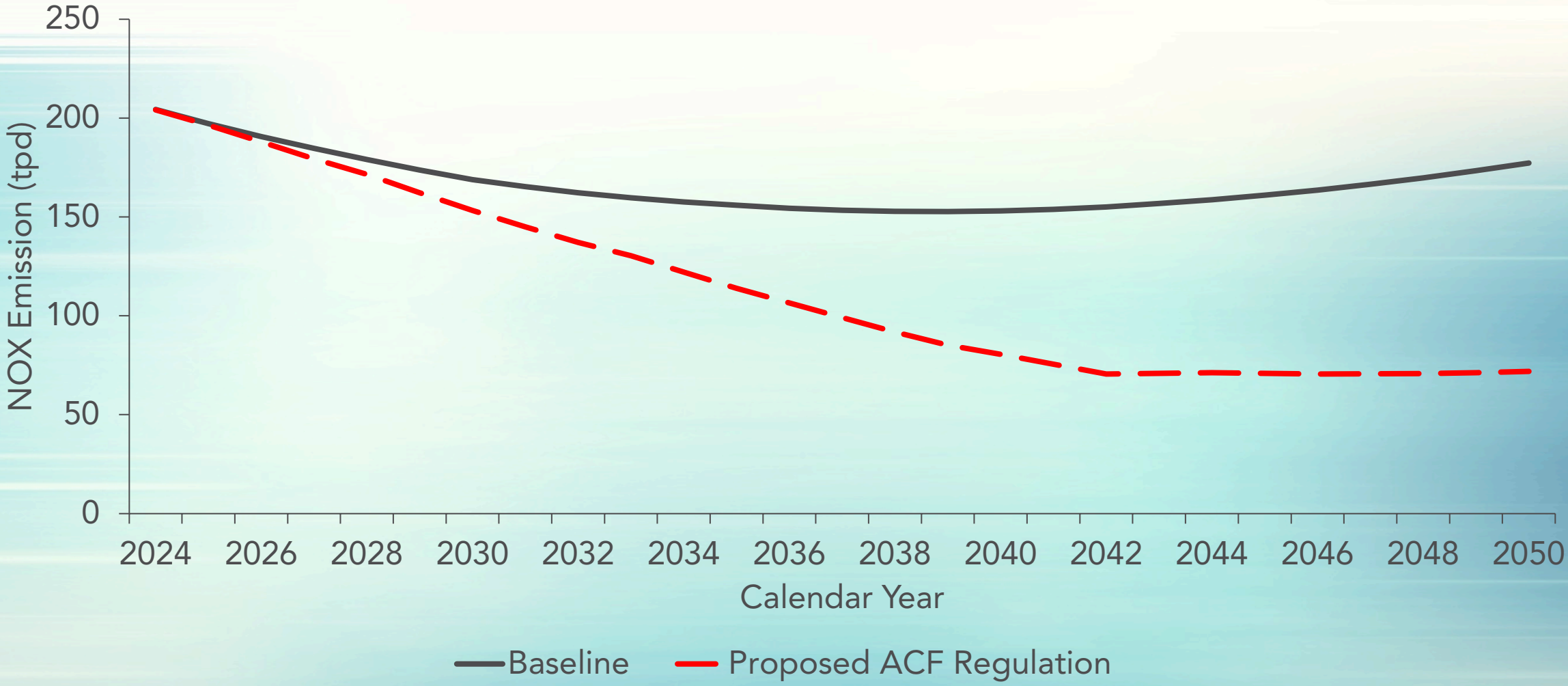
Potential CARB Measure: ACF

- Affected sources include medium- and heavy-duty vehicles operating in California (Class 2b and up), ~200 tpd NOx in 2024
- Public fleets
  - To lead by example, community impact and visibility
  - ZEV purchases begin at 50% in 2024 and 100% in 2027
- Drayage Trucks (Seaports and railyards)
  - Community health impact in railyard and portside communities
  - Starting late 2023, all new additions to the registry must be ZEV
  - Trucks must visit a California seaport or railyard at least once each calendar year to remain in CARB Drayage Truck Registry
  - Existing trucks removed from the registry at the end of their useful life
  - Transition to 100% ZEV drayage fleet by 2035

Potential CARB Measure: ACF (Cont'd)

- High priority and federal fleets
  - Well-suited for early electrification, achieve ZEV transition
    - 50 or more vehicles under common ownership or control
    - >$50 million gross annual revenue with at least 1 vehicle
    - Federal government fleets
  - Phase-in ZEVs as a percentage of the fleet 2025-2042[19]
- 100% ZEV sales by 2040 for all vehicles

Statewide NOx Emissions



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More Information

- Advanced Clean Fleets program page: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets
- Staff contact:
  - Craig Duehring, Manager: craig.duehring@arb.ca.gov
  - Paul Arneja, Lead Staff: paul.arneja@arb.ca.gov
- Board consideration in 2022

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Greenhouse Gas Emissions Standards for Medium- and Heavy-Duty Engines and Vehicles (Phase 3)

Build on Phase 1 and 2 GHG Standards

- Phase 1 GHG standards
  - Adopted by U.S. Environmental Protection Agency (EPA) in 2011 and by the Board in 2013
  - Applicable to 2014 model year and later medium- and heavy-duty engines and vehicles
  - Assumed use of off-the-shelf technologies
- Phase 2 GHG standards
  - Adopted by EPA in 2016 and by the Board in 2018
  - Begin with model year 2021 for medium- and heavy-duty engines and vehicles
  - Will be fully implemented by model year 2027
  - More ambitious, more technology-forcing, and longer-term than those of Phase 1

Phase 3 GHG Standards

- Staff anticipates the Phase 3 stringency would be set assuming significant penetration of zero-emission vehicles nationally.
- Upon EPA adoption of national Phase 3 GHG standards, CARB staff would propose CARB adopt Phase 3 GHG standards as well to align California's standards with the national standards and enable CARB to enforce them for California-certified vehicles.

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On-Road Motorcycles New Emissions Standards

On-Road Motorcycles
New Emissions Standards

- There are ~700,000 on-highway motorcycles (ONMC) in California
  - Annual sales ~30,000 vehicles per year
- ONMCs currently emit ~20 tpd ROG+NOx Statewide*
- ONMC VMT is about 0.5% of light duty vehicle (LDV) VMT
- Per vehicle, ONMC emissions are much higher than LDV
- Potential for significant emissions reductions by transfer of LDV control technologies to ONMC

* EMFAC2021 with evaporative emissions scaling

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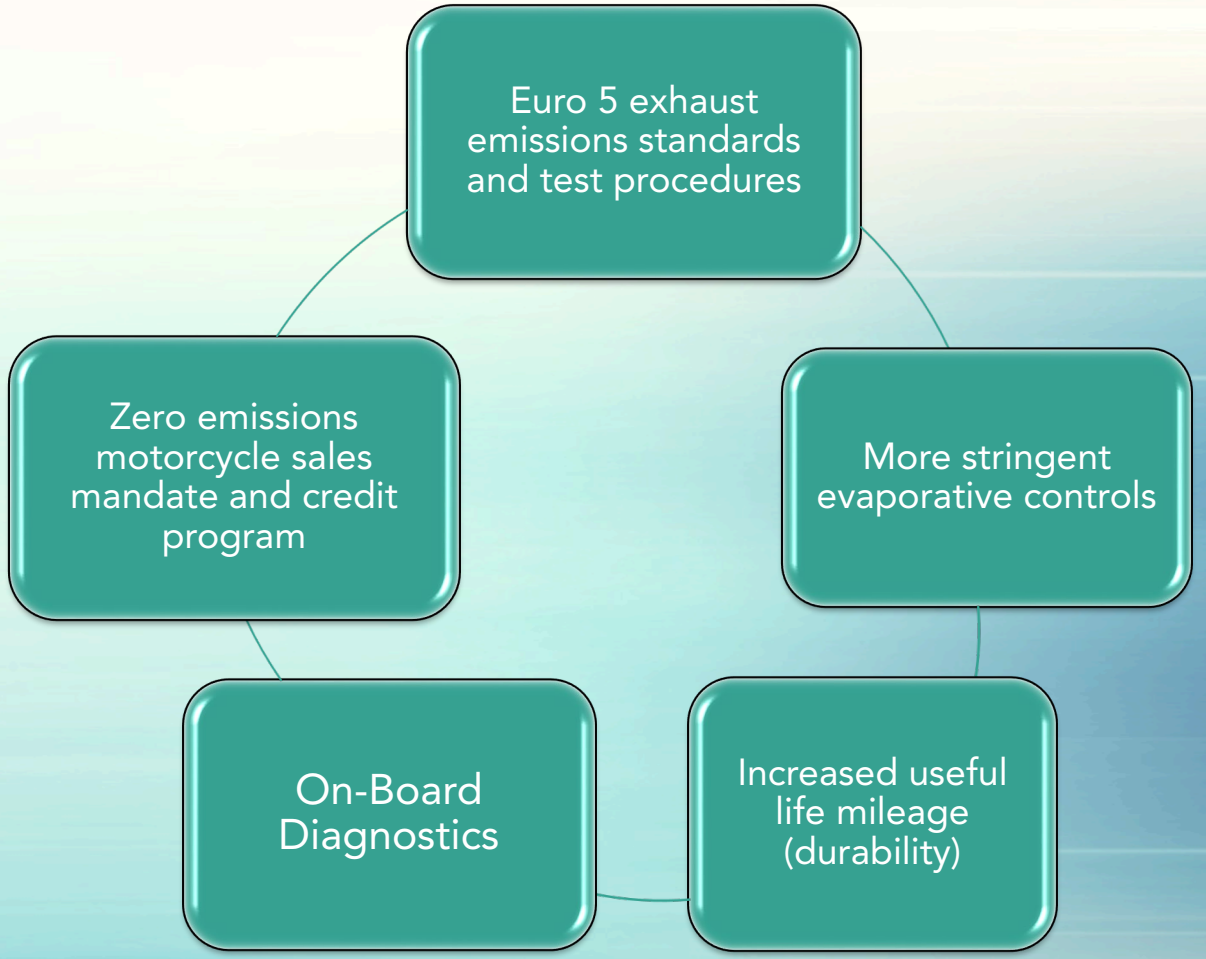
Regulatory History

- CARB first adopted emissions standards for ONMC in 1975
- Standards have not been updated since 1998
  - Current standards started with the 2008 model year
- Jurisdictions throughout the world have adopted much tighter emissions standards
- Since late 2018, CARB staff has been developing a comprehensive revision to standards and test procedures that will significantly reduce emissions from new ONMC
- Expected Board Hearing: Fall 2022

Proposal for ONMC

- Staff proposal based on stringent "Euro 5" regulations
  - HC+NOx standards reduced by 80%
  - Includes basic OBD system
  - More stringent testing requirements
- Requirements based on Euro 5 would be effective starting with MY 2024
- Staff will propose some requirements that go beyond Euro 5
  - Additional OBD monitors
  - Improved evaporative emission controls
  - Zero emissions motorcycle sales targets and credit program
- More stringent requirements would phase in starting with MY 2028.



Benefits of Proposed ONMC Measure

- Lower ROG and NOx exhaust emissions starting in 2024
- Lower ROG evaporative emissions starting in 2028
- OBD systems to help ensure in-use performance
- Accelerated transition to zero emissions
- Statewide ROG+NOx reductions starting in 2024, increasing as existing fleet is replaced with new models
  - ~ 5 tpd in 2035, ~10 tpd in 2045*

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* Based on EMFAC2021, with additional modeling of projected benefits of staff's proposal

More Information

https://ww2.arb.ca.gov/our-work/programs/on-road-motorcycles

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On-Board Diagnostics Lead
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Clean Miles Standard Regulation

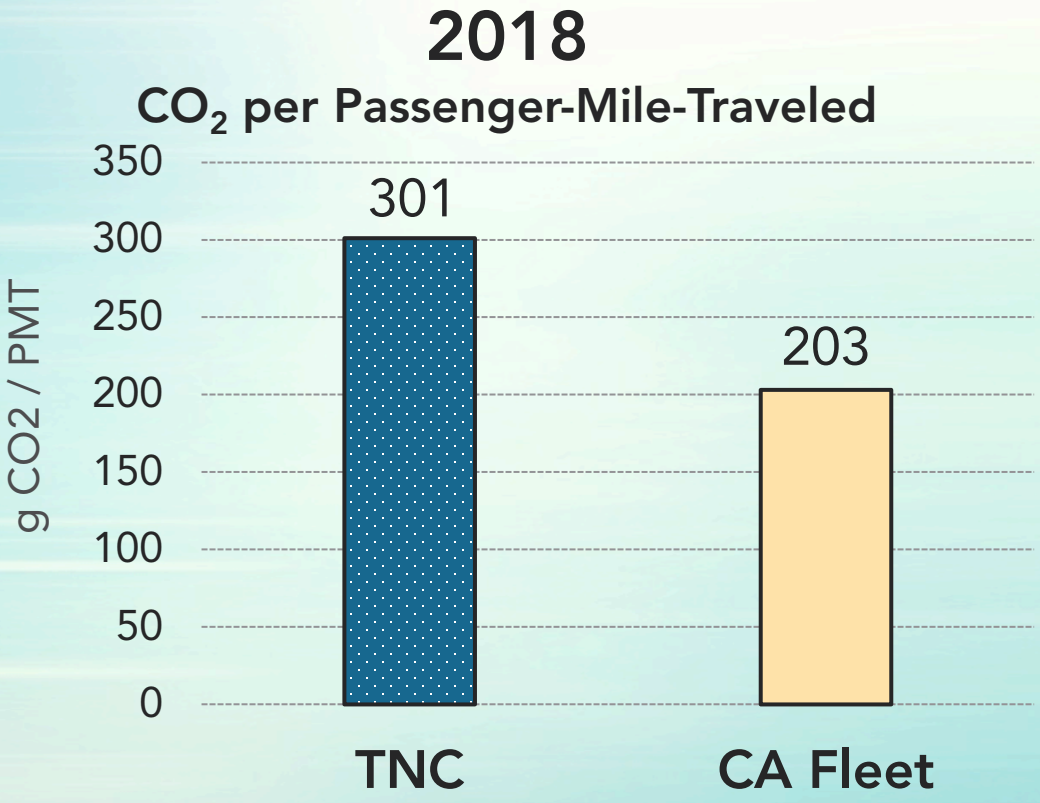
Clean Miles Standard

- Senate Bill 2014
- Reduce GHG emissions, primarily through **annual eVMT targets**
- Encourage reduction of VMT relative to passenger miles with **annual g CO_2/PMT targets**
- Provide co-benefit of criteria pollutant reductions
- Board adoption in May 2021 with modifications

Calendar Year	% eVMT Target	g CO_2 / PMT Target
2023	2%	252
2024	4%	237
2025	13%	207
2026	30%	161
2027	50%	110
2028	65%	69
2029	80%	30
2030+	90%	0

Clean Miles Standard

Emissions Inventory



CO_2 emissions were

50%

higher than the rest of CA

TNCs contributed

0.35%

of total CO_2 emissions in CA

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Clean Miles Standard

More Information

- Clean Miles Standard website

  https://ww2.arb.ca.gov/our-work/programs/clean-miles-standard
- Program contacts:
  - Gloria Pak (gloria.pak@arb.ca.gov)
  - Shobna Sahni (shobna.sahni@arb.ca.gov)

Questions and Comments?

Zoom:

type in "Q&A" box

https://ww2.arb.ca.gov/resources/documents/2022-state-strategy-state-implementation-plan-2022-state-sip-strategy

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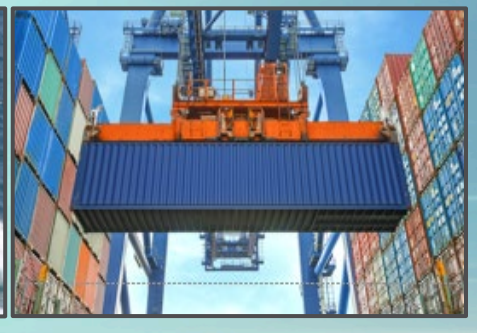
Off-Road Vehicles and Equipment

- Tier 5 Off-Road New Compression-Ignition Engine Standards
- Amendments to the In-Use Off-Road Diesel Fuel Fleets Regulation
- Transport Refrigeration Unit Regulation
- Commercial Harbor Craft Amendments
- Cargo Handling Equipment Amendments







Off-Road Vehicles and Equipment

- Off-Road Zero-Emission Targeted Manufacturer Rule
- Clean Off-Road Fleet Recognition Program
- Clean Off-Road Equipment Voucher Incentive Program – Construction (CORE-CON)
- Spark-Ignition Marine Engine Standards

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Tier 5 Off-Road New Compression-Ignition Engine Standards

Current Off-Road Tier 4 Standards

Tier 4 Final Exhaust Emission Standards after 2014 Model Year (g/kW-hr)						
Power Category	Application	PM	NOx	NMHC	NOx+NMHC	CO
< 19 kW (< 25 HP)	All	0.40			7.5	6.6
19 ≤ kW < 56 (25 ≤ HP < 75)	All	0.03			4.7	5.0
56 ≤ kW < 130 (75 ≤ HP < 175)	All	0.02	0.40	0.19		5.0
130 ≤ kW ≤ 560 (175 ≤ HP ≤ 750)	All	0.02	0.40	0.19		3.5
> 560 kW (> 750 HP)	Gen Sets	0.03	0.67	0.19		3.5
	Mobile Machines	0.04	3.5	0.19		3.5

Upcoming Tier 5 Off-Road New Compression-Ignition Engine Standard Rulemaking

- Staff will be amending the off-road diesel regulation
  - Considering proposing NOx standard ~90 percent more stringent than current Tier 4
  - Considering proposing PM standard ~75 percent more stringent than current Tier 4
  - Considering proposing CO_2 standards to reduce engine GHG emissions from 5 to 10 percent below current levels

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Possible Tier 5 Elements Under Consideration

- Addressing low-load and low-temperature NOx emissions
- Extending useful life and warranty provisions
- Work-based in-use compliance procedures
- First-time off-road diesel OBD requirements
- Proposing to go to the Board in 2024-2025 with implementation beginning in 2028-2029
- First workshop November 3, 2021
- Questions: contact us at Tier5@arb.ca.gov

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Amendments to the In-Use Off-Road Diesel Fueled Fleets Regulation

In-Use Off-Road Diesel-Fueled Fleets Regulation Amendments

- Construction, mining, industrial, oil drilling, and similar industries
- Self-propelled, diesel off-road vehicles
  25 horsepower or greater

Regulatory History

- Existing regulation originally adopted in June 2007, significant amendments in 2010
- Meet declining fleet average target through turnover, repower, or retrofits

Fleet Size	Total Max Horsepower	Fleet Average Target or BACT Dates*
Large	L>5000	2014 - 2023
Medium	2500<M≤5000	2017 - 2023
	S≤2500	2019 - 2028

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Potential CARB Measure

Operational Backstop on Old Equipment

Fleet Size	Tier 0		Tier 1		Tier 2	
	Ban Year	Age of Equipment	Ban Year	Age of Equipment	Ban Year	Age of Equipment
Large	2024	27	2026	24	2028	22
Medium	2026	29	2028	26	2030	24
Small	2028	31	2030	28	2032	26

Potential CARB Measure

Additional Actions
• Extension of Adding Vehicles Provision
• Simplify the Low-Use Exemption
• Renewable Diesel Requirement
• Requirements for Contractors and Public Works Awarding Bodies
• Other Potential Changes

Emission Reduction Potential

Staff used the 2011 In-Use Off-Road Model to calculate the potential emission reductions from this concept, assuming:

- Full implementation of operational bans with turnover to Tier 4 final
- All equipment currently exempt from performance requirements would remain exempt

Reductions in 2031	Statewide
NOx (tpd)	6.0
PM 2.5 (tpd)	0.33 (37%)

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More Information

- Rulemaking staff

  Nathan Dean, Air Pollution Specialist
  Johanna Levine, Manager
  Off-Road Implementation Section

- ordamendments@arb.ca.gov
- https://ww2.arb.ca.gov/our-work/programs/use-road-diesel-fueled-fleets-regulation/proposed-amendments-use-road-diesel

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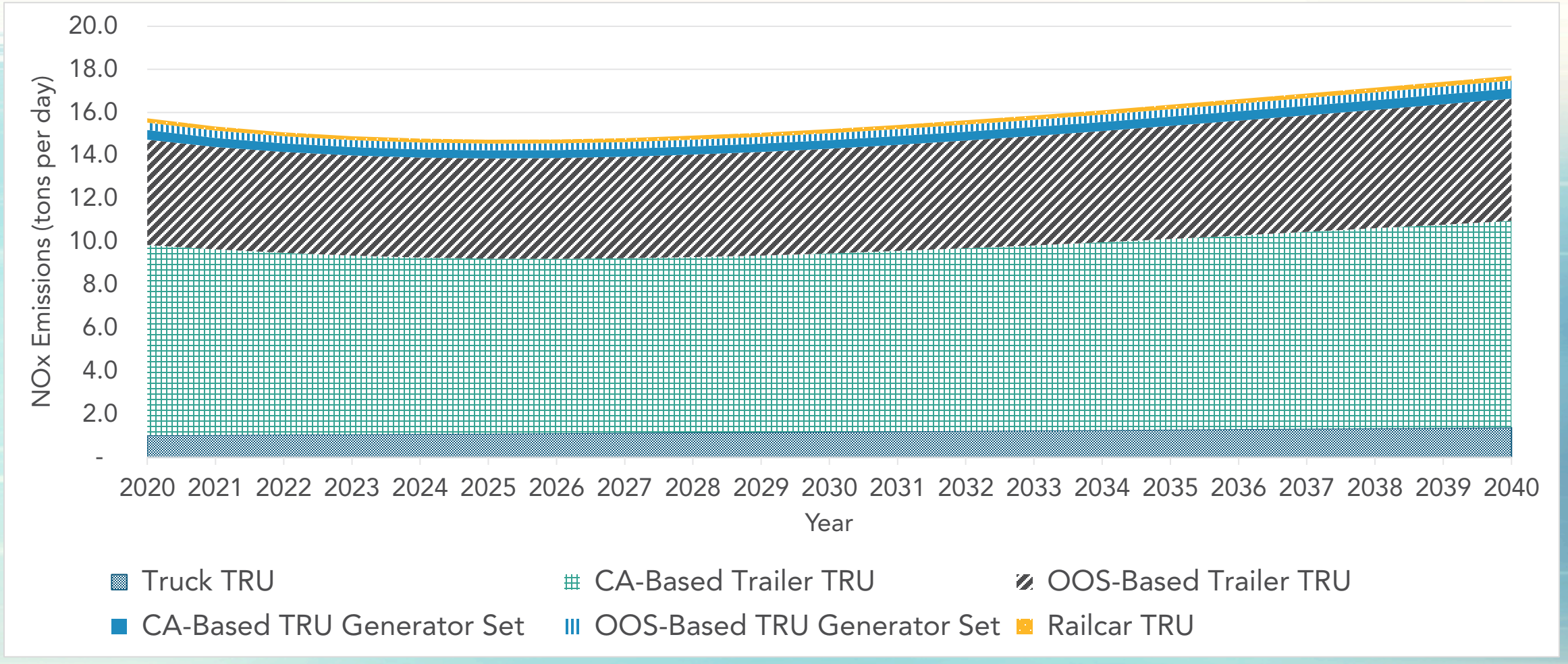
Transport Refrigeration Unit Regulation Part 2

Baseline Statewide NOx Emissions from Transport Refrigeration Units (TRU)



Source: 2021 Update to CARB Statewide TRU Emission Inventory

Current Airborne Toxic Control Measure for TRUs (TRU ATCM)

- Adopted in 2004 (amended in 2010 and 2011)
- Requires all TRUs operating in California to meet in-use PM standard 7 years after the engine model year (85 percent PM reduction)

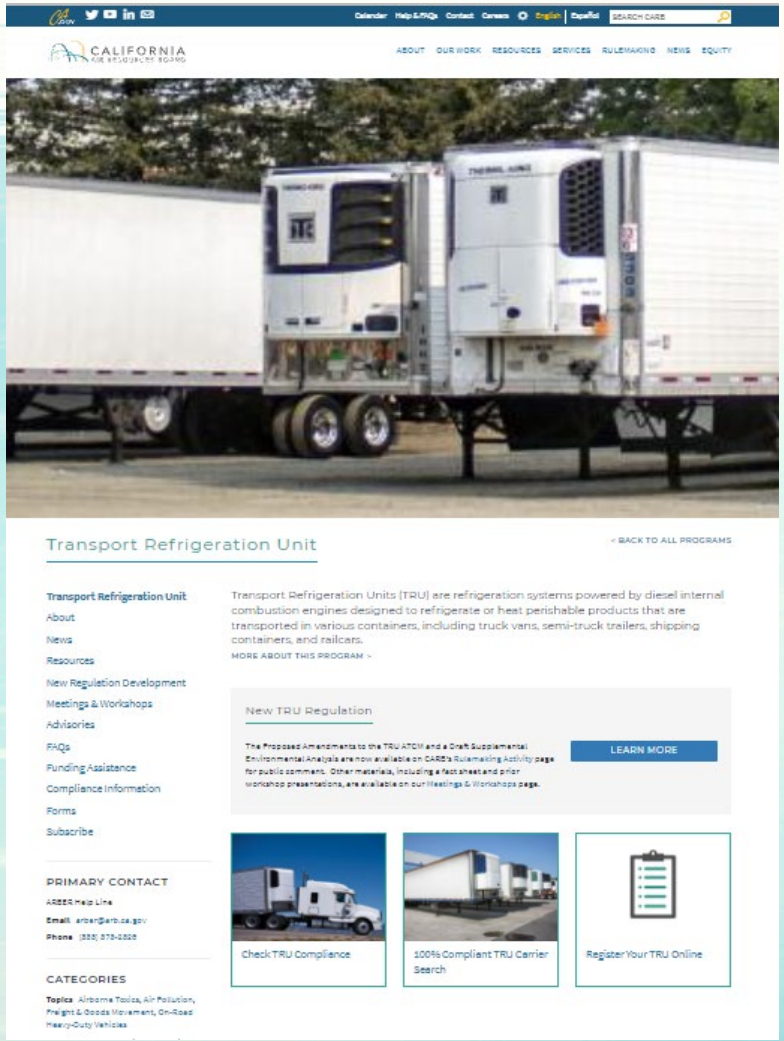
TRU Part 1

- Proposed amendments to current TRU ATCM
- Key elements
  - Zero-emission truck TRUs (CA-based, return-to-base operations)
  - PM emission standard for newly-manufactured non-truck TRU engines
  - Lower-global warming potential refrigerant
- Estimated 8 percent statewide reduction in NOx after full implementation in 2031

TRU Part 2

- Zero-emission requirements for non-truck TRUs (California- and out-of-state-based, generally do not return to a home base facility each night)
- Staff currently working on technology assessment

More Information



- Website: https://www.arb.ca.gov/newTRU
- Contact: Lea.Yamashita@arb.ca.gov

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Commercial Harbor Craft Amendments

Amendments to the Commercial Harbor Craft Regulation

- Applies to diesel-powered commercial craft that do not meet recreational or ocean-going vessel definitions.
- Statewide Emissions:*
  - 14.0 tons per day (TPD) of oxides of nitrogen (NOx)
  - 149 tons per year (TPY) of Diesel Particulate Matter (PM)
  - 0.90 TPD of Reactive Organic Gases (ROG)

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*Emission for 2038 calendar year without the Proposed Amendments (Measure)

Regulatory History

- Original regulation adopted in 2008, amended in 2010.
- Current Regulation accelerated turnover to Tier 2 and Tier 3 engines between 2009 and 2022 for excursion, ferry, tug, crew and supply, barge, and dredge.
- Fleet regulation affecting owners and operators of vessels.
- U.S. establishes engine manufacturer requirements and certifies new marine engines (40 Code of Regulations Parts 94 and 1042).

Amendments Would Require Zero-Emission Harbor Craft Operations

- Zero-emission capable new-build **excursion vessels** starting on 12/31/24*.
- Full zero-emission for all **short-run** (service trips less than three nautical miles) **ferries** by 12/31/25.
- **Shore power** required for electrical auxiliary power on **all vessels** when at dock for more than 15 minutes.

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*Defined as deriving 30 percent of onboard power, auxiliary and propulsion, when averaged over a calendar year, from a zero-emission tailpipe source such as a battery or hydrogen fuel cell powertrain.

Cleaner Combustion for all Other Vessels

- More stringent standards for all vessels except commercial fishing: Tier 4* + Diesel Particulate Filter (DPF).
- Phase-in from 2023 to 2031, with extensions expiring in 2035.
- Newly applies to pilot, tank barge, research, workboat, and commercial passenger fishing vessels (CPFV).
- Commercial fishing vessels required to meet Tier 2 or newer standard by 2032.

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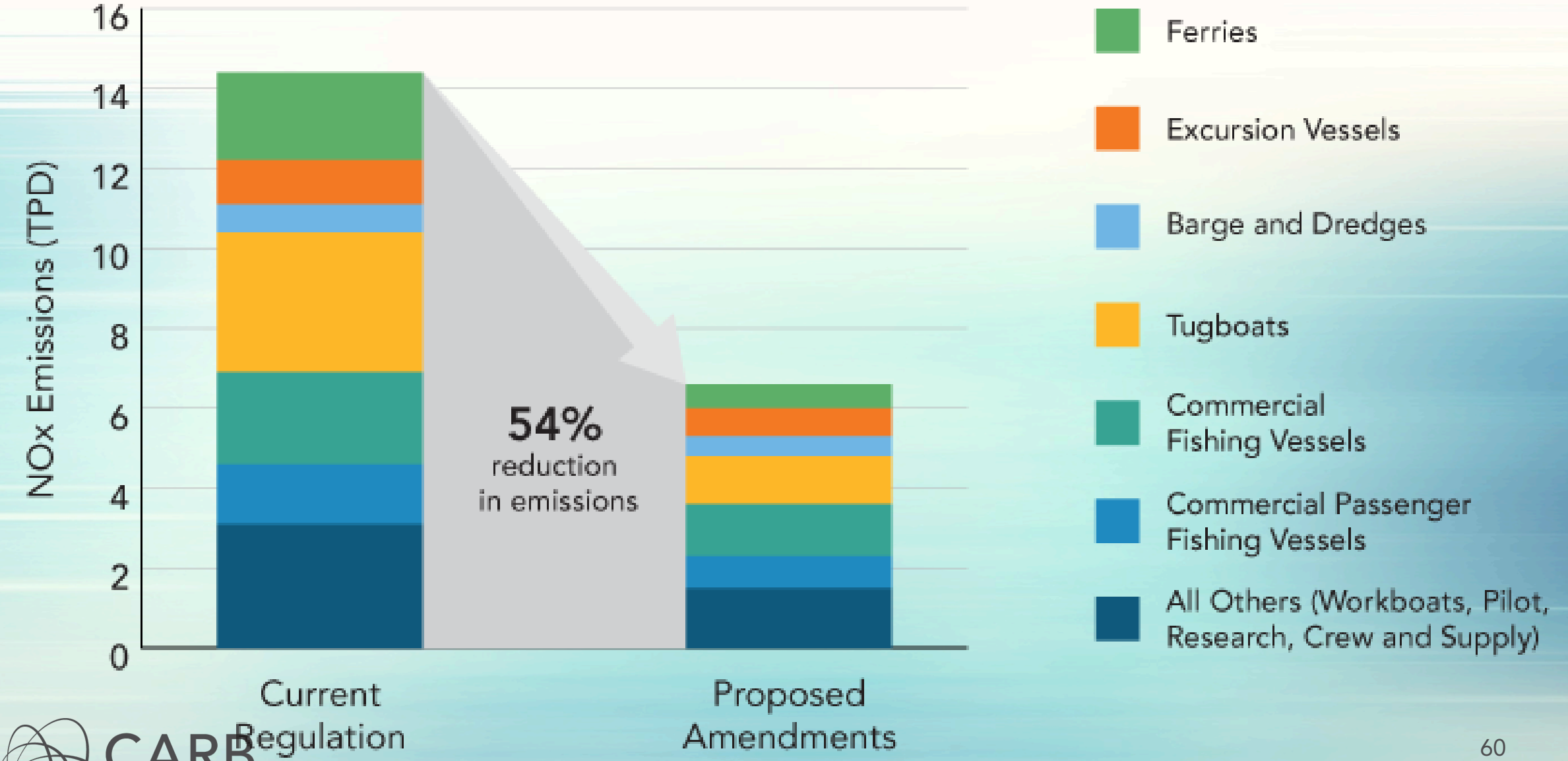
*Unless under 600 kilowatts (kW) and no Tier 4 available.

Statewide CHC NO_x Emissions in 2035



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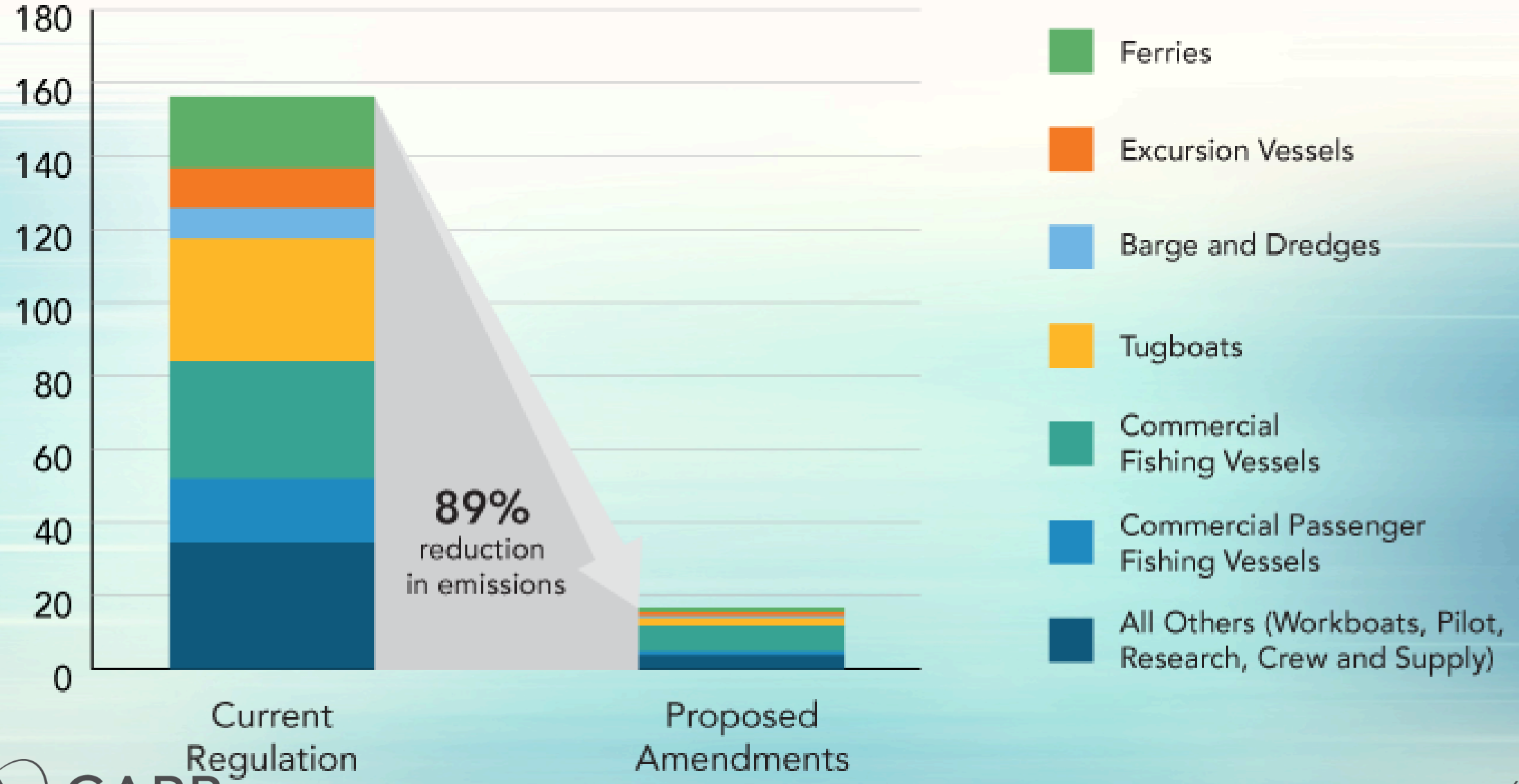
Statewide CHC DPM Emissions in 2035



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More Information

- General information and resources:
  https://ww2.arb.ca.gov/our-work/programs/commercial-harbor-craft

- Rulemaking activities
  https://ww2.arb.ca.gov/rulemaking/2021/chc2021

  - 45-day comment period closes on November 15, 2021

  - Board consideration scheduled for November 19, 2021

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Cargo Handling Equipment Amendments

Zero-Emission Cargo Handling Equipment (CHE) Regulation

- Equipment used at seaports and rail yards to move containers and freight
- Wide variety of equipment types, including container handling equipment, cranes, off-road trucks, and construction equipment
- Engines are mostly diesel-fueled and generally off-road certified, but some are on-road certified

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Regulatory History

- Regulation for Mobile CHE was adopted in 2005 and amended in 2011
- Established requirements for in-use and newly purchased diesel-powered equipment at ports and intermodal rail yards
- Fully implemented in 2017
- Achieved 2.164 tons per day of PM and 26.68 tons per day of NOx emission reductions

Regulatory Considerations

- CARB directive and Executive Order N-79-20 goals to transition to zero-emission CHE
- Engage early with stakeholders
- Aim for 100 percent zero-emission operations where feasible
  - Evaluate role of hybrid equipment for near-term emission reductions on pathway to zero
- Maximize emission reductions in 2030 and beyond

Potential Regulatory Concepts

- Transition to full zero-emission operations by 2030 - 2037
  - Phase 1: Yard tractors and forklifts, beginning ~2026
  - Phase 2: Rubber Tired Gantry (RTG) cranes, beginning ~2028
  - Phase 3: Other CHE TBD
- Extended compliance deadlines for early adoption of hybrid CHE operations
  - Provides certainty for early adopters of advanced technology
    - Conventional hybrid CHE
    - Zero-emission capable hybrid CHE

More Information

- David Quiros, Manager
  David.Quiros@arb.ca.gov
- Bonnie Soriano, Branch Chief
  Bonnie.Soriano@arb.ca.gov
- https://ww2.arb.ca.gov/resources/documents/cargo-handling-equipment-regulation-transition-zero-emissions

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Off-Road Zero-Emission Targeted Manufacturer Rule

Off-Road Zero-Emission Targeted Manufacturer Rule

- Manufacturers of off-road equipment
- Examples: construction, industrial, landscaping, & airport GSE

Background

- Off-road equipment is one of the largest contributors to emissions in the state, and actions beyond current programs are needed
- Executive Order N-79-20

100% zero-emissions equipment by 2035, where feasible

- Zero-emission off-road equipment has been successfully produced and adopted by fleets

Potential CARB Measure

- Require manufacturers to produce zero-emission equipment and/or powertrains as a percentage of their annual statewide sales volume
- Sales/production mandate levels based projected feasibility of zero-emission technology
- Expected to increase the availability of zero-emission options in the off-road sector

More Information

- Contact

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  Mobile Source Control Division
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Clean Off-Road Fleet Recognition Program

Clean Off-Road Fleet Recognition Program

- Entities that own and operate off-road vehicles
- Examples: construction, public fleets, utilities, etc.
- Voluntary
- Objective standards

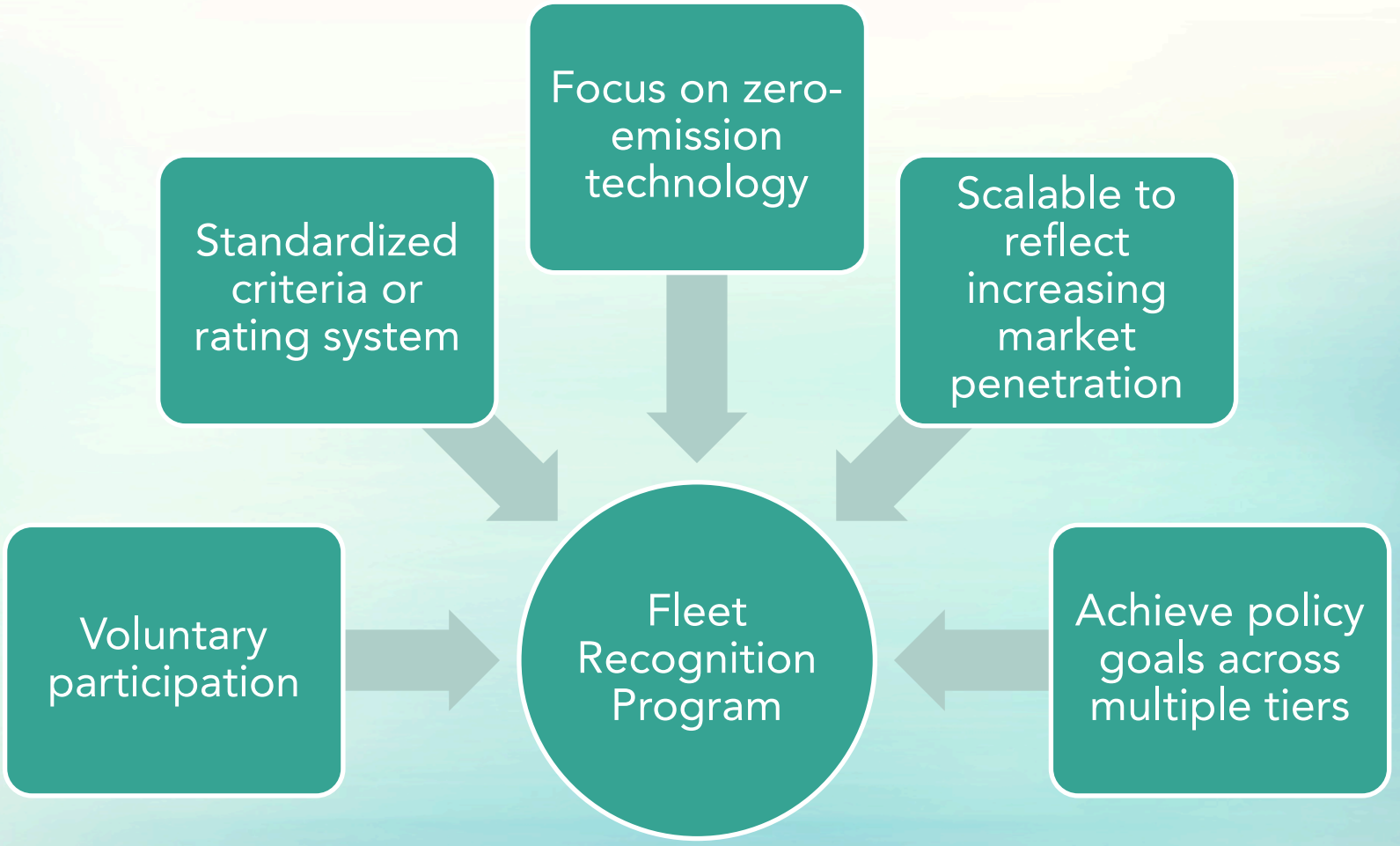
Regulatory History

- Off-road vehicles subject to in-use fleet regulation
  - Requires compliance declining fleet average target
  - Diesel-Fueled Fleet Amendments being considered
- Executive Order N-79-20

100% zero-emissions equipment by 2035, where feasible

- Monetary and non-monetary incentives are proven strategies to aid in the transition

Potential CARB Measure



More Information

- Contact

  Johanna Levine, Manager
  Off-Road Implementation Section
  Mobile Source Control Divsion
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Clean Off-Road Equipment Voucher Incentive Program – Construction (CORE –CON)

Start working with Zero-Emission NOW

- CORE is for commercialized off-road vehicles, beyond the demonstration phase
- CARB wants to get zero-emission vehicles into the hands of construction workers
- Reduce harmful emissions in local area
- Less operator diesel exhaust exposure

CORE Adding Zero-Emission Equipment to the Construction Site

- Provide incentive funding for zero emission construction equipment
- Works like previous CORE projects
  - First come, first serve
  - Companies select from CORE eligible equipment catalog http://californiacore.org/
  - Helps cost difference between zero-emission and comparable diesel equipment
  - No scrappage required
- Funding enhancements for
  - Low-Income and Disadvantaged Community Use Area
  - Infrastructure
  - Extended Warranty

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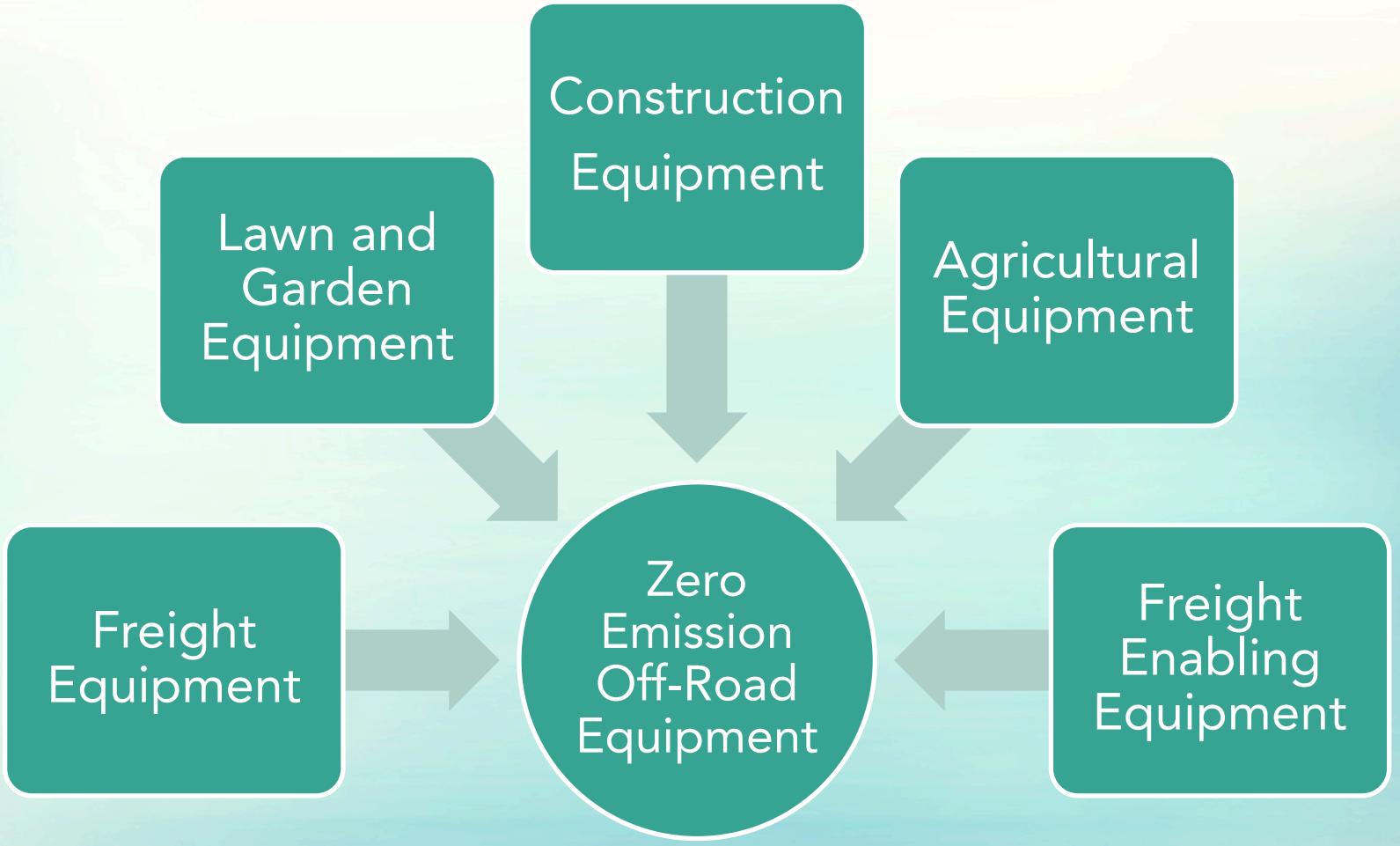
CORE-CON One Piece of CORE



More Information

- Contact

  Todd Sterling, Air Pollution Specialist
  Off-Road Implementation Section
  Mobile Source Control Division
  todd.sterling@arb.ca.gov

http://californiacore.org/

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Spark-Ignition Marine Standards

2022 State SIP Strategy Workshop
October 19, 2021

Outboard and Personal Watercraft

- 1998 CARB adopted new outboard (OB) and personal watercraft (PWC) HC+NOx standards

Outboard

Personal Watercraft

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Proposed Action

- Staff is considering:
  - Zero emission (ZE) technologies for <19 kW OB and some PWC
  - For ≥40 kW OB and PWC catalyst-based standards
    - ➢Considering 5.0 g/kW-hr HC+NOx (70% below current levels)
  - For <40 kW OB and PWC improved engine controls
    - ➢Considering 10.0 g/kW-hr HC+NOx (40% below current levels)
  - Averaging allowed

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Timing

- **Proposed Implementation Schedule:**
  - Approximately 2029-2035
  - Questions? contact Jeff.Lowry@arb.ca.gov

CARB

Questions and Comments?

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https://ww2.arb.ca.gov/resources/documents/2022-state-strategy-state-implementation-plan-2022-state-sip-strategy

Control Measures for Other Sources

- Amendments to the Consumer Products Regulation
- Zero-Emission Standards for Space and Water Heaters

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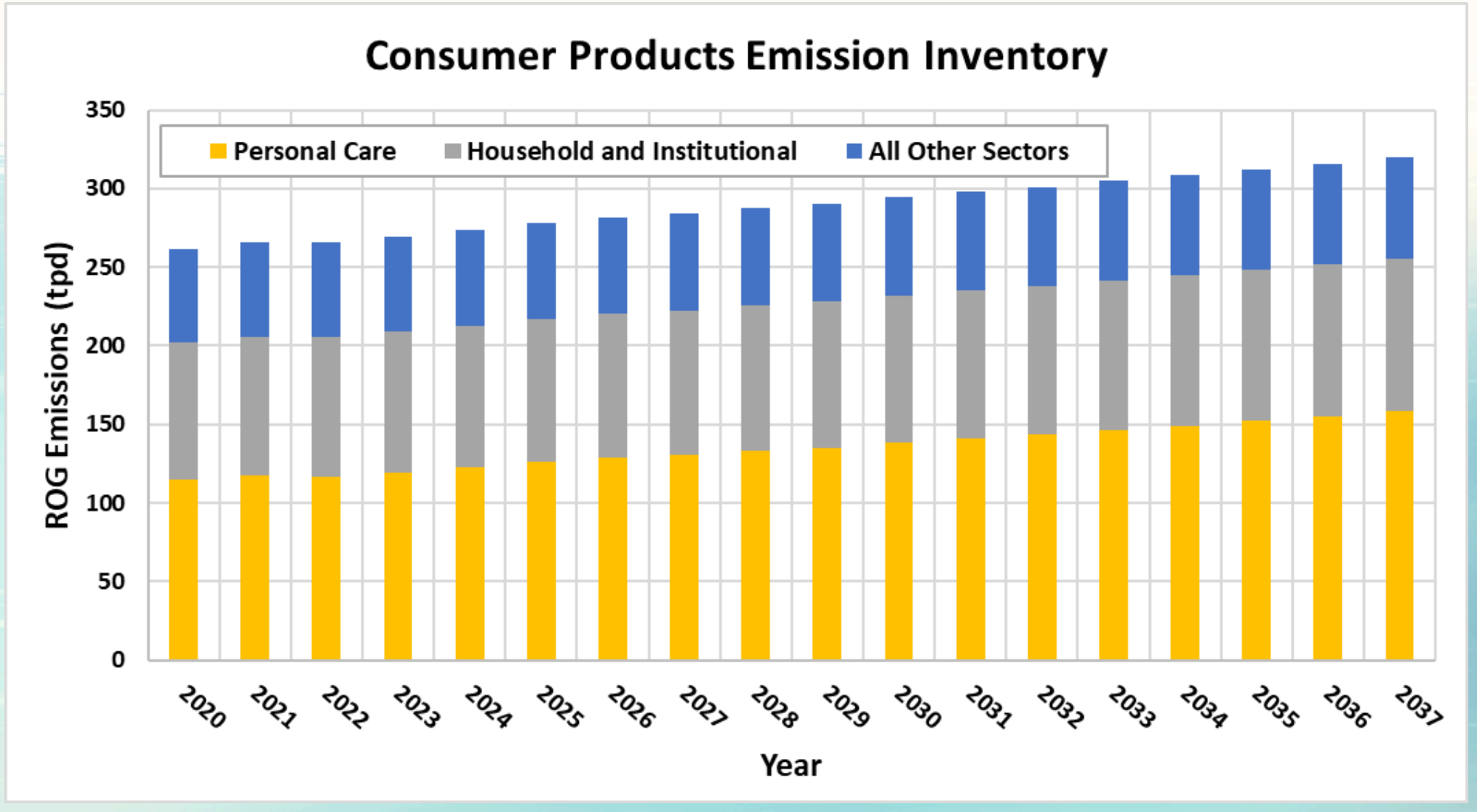
Amendments to the Consumer Products Regulation

Consumer Products Measure



CEPAM: 2022 SIP Baseline

Consumer Products Regulatory History

- 1988 State law requires maximum feasible emission reductions
- CARB adopted first consumer product regulation in 1989
- Two dozen rule amendments have reduced emissions by over 50%
- VOC content standards or reactivity limits for over 150 categories
- National consumer products regulation is generally less stringent
- 2021 regulation amendment fulfills 2016 SIP commitment, yielding:
  - By 2023, 3.00 tpd statewide and 1.25 tpd in the South Coast
  - 2031, 9.80 tpd statewide and 4.03 tpd in the South Coast

Potential CARB Measure

- Target maximum feasible reductions to offset projected growth in VOC emissions
- Update category-specific emissions data through surveys
- Evaluate potential control strategies
  - Focus on high-growth categories with greatest ozone impact
  - Consider technical and commercial feasibility
- Emission reductions by 2031 and 2037

More Information

- Program website: https://ww2.arb.ca.gov/our-work/programs/consumer-products-program
- Send general questions to: consprod@arb.ca.gov
- Contact information:
  - Ravi Ramalingam, Chief, Consumer Products and Air Quality Assessment Branch, ravi.ramalingam@arb.ca.gov
  - Jose Gomez, Manager, Consumer Products Technical Development Section, jose.gomez@arb.ca.gov
  - Josh Berghouse, Consumer Products Implementation Staff, josh.berghouse@arb.ca.gov

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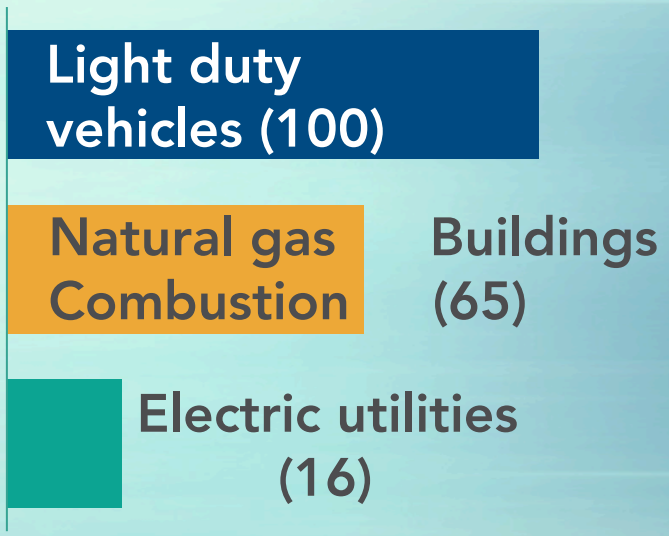
Zero-Emission Standards for Space and Water Heater

Electrification of Buildings Can Reduce NOx

- **Potential Measure:** Beginning in 2030, 100% of sales of new space heaters and water heaters statewide would meet:
  - Zero-GHG emission limit
  - Provides NOx co-benefits
  - By 2037, building-related NOx and GHG emissions can be reduced by ~40%
  - Total Statewide NOx emissions can be reduced by ~3% by 2037
- To electrify all end-uses statewide:
  - An additional ~10% building-related NOx and GHG emissions could be reduced by 2037

2019 NOx emissions (65 tons/day)



Source: NOx emissions from CEPAM: California 2019 - Version 1.02.

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Questions and Comments?

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https://ww2.arb.ca.gov/resources/documents/2022-state-strategy-state-implementation-plan-2022-state-sip-strategy

CARB

Public Measure Suggestions

Public Measure Suggestions

On-Road Heavy-Duty Vehicle Useful Life Strategy
Additional Incentive Programs Zero-Emission Trucks
Enhanced Transportation Choices
Suggested Control Measure – Indirect Source Rule
BACT/BARCT Determination
Additional Building and Appliance Emission Standards
Pesticides Regulation
Enhanced Bureau of Automotive Repair Consumer Assistance Program

On-Road Heavy-Duty Vehicle Useful Life Strategy

- Retire all existing trucks at the end of their useful life and upgrade to zero-emissions technology
- More NOx reductions beyond Advanced Clean Fleets
- Help meet Governor's Executive Order N-79-20 ZEV targets and carbon neutrality goals by 2045

Additional Incentive Programs Zero-Emission Trucks

- To facilitate additional incentives, CARB could develop a differentiated registration fee based on engine emission certification level
  - Cleanest engines pay lower fees
  - Zero-emission trucks pay lowest fees
- Fees support zero-emission replacement truck incentives for small disadvantaged fleets
- Complements scrap and replace regulations

Enhanced Transportation Choices

- CARB could work with partners to advance vehicle miles travelled (VMT) reductions via enhanced choice
- Measures that support alternative modes of transportation (walk, bike, public transit) reduce vehicle emissions
  - Travel demand management programs, incentive programs that fund enhanced transportation planning, or zoning changes that encourage dense, walkable, infill development

Suggested Control Measure – Indirect Source Rule

- Indirect Source Rules are designed to limit emissions from any facility which attracts or generates mobile source activity that results in emissions
  - I.e. warehouses, railyards, ports, airports
- CARB could develop a Suggested Control Measure that would act as a model rule to assist the air districts in the rule development process

BACT/BARCT Determination

- CARB could develop Best Available Control Technology (BACT) and/or Best Available Retrofit Control Technology (BARCT) determinations that define limits that would be enforced at the local level for equipment and/or processes
- Once a BACT or BARCT determination is in place, air districts could be required under applicable State and federal laws to implement the defined levels of control through local rules and regulations

Additional Building and Appliance Emission Standards

- CARB could propose additional emissions standards for appliance combustion sources used in buildings to accelerate the removal of fossil fuels from the building stock in both new and existing buildings
- Such measures could potentially significantly accelerate the transition away from pollution associated with combustion in these sources while creating economic opportunities for building retrofits

Pesticides Regulation

- Pesticides are used in commercial and agricultural operations across the State, and are a source of VOC and other types of emissions
- CARB could work with the California Department of Pesticide Regulation to develop new regulations to further reduce VOC emissions from commercial and agricultural pesticides used in California

Enhanced Bureau of Automotive Repair Consumer Assistance Program

- California Bureau of Automotive Repair (BAR) Consumer Assistance Program offers eligible consumers repair assistance and vehicle retirement options to help reduce emissions and improve air quality
- CARB could work with BAR to enhance the Consumer Assistance Program by expanding the eligibility

Questions and Comments?

Zoom:

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https://ww2.arb.ca.gov/resources/documents/2022-state-strategy-state-implementation-plan-2022-state-sip-strategy

CARB

Sources Primarily Regulated at the Federal and International Level: CARB Actions

- In-Use Locomotive Regulation
- Future Measures for Aviation Emissions Reductions
- Future Measures for Ocean-Going Vessel Emissions Reductions

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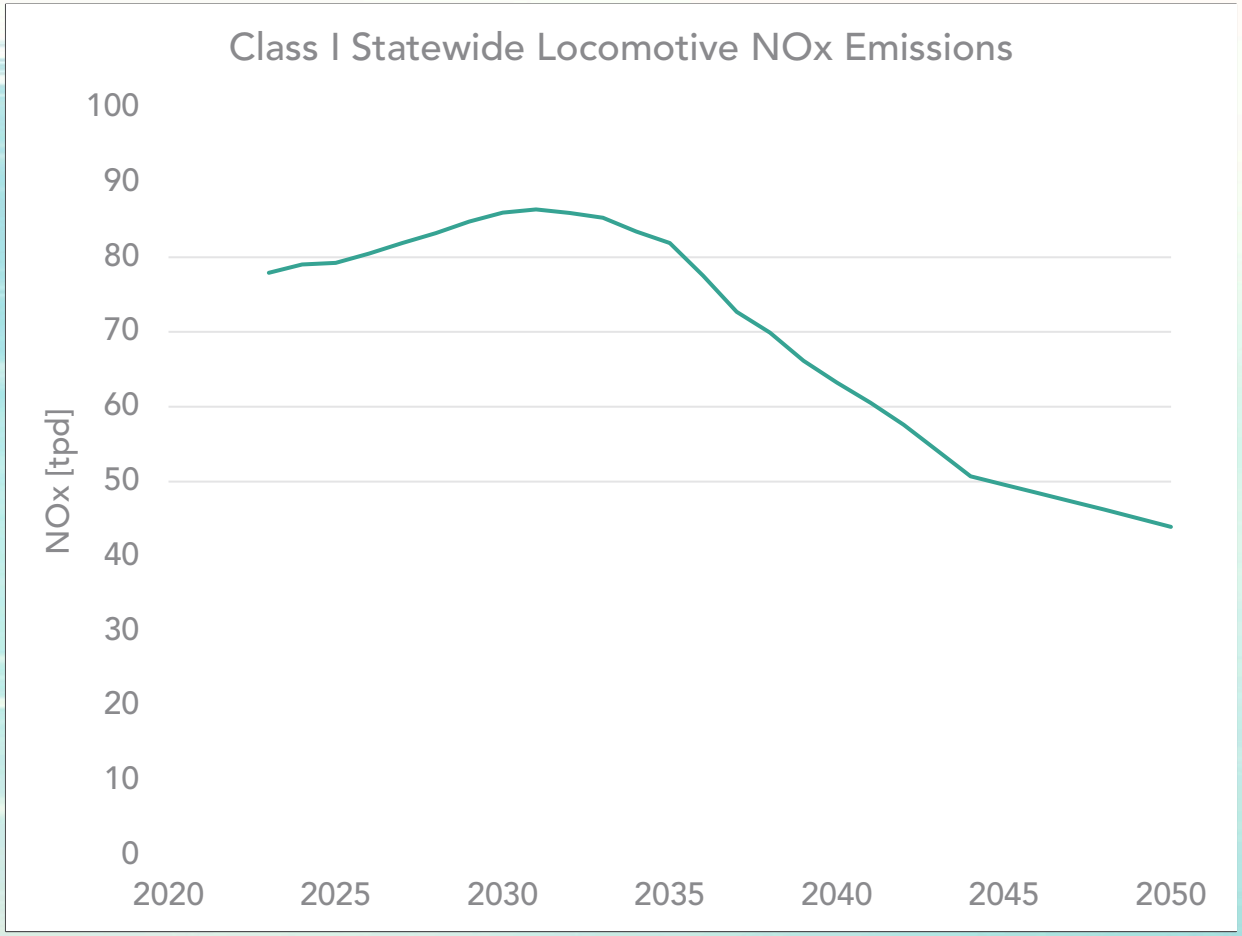
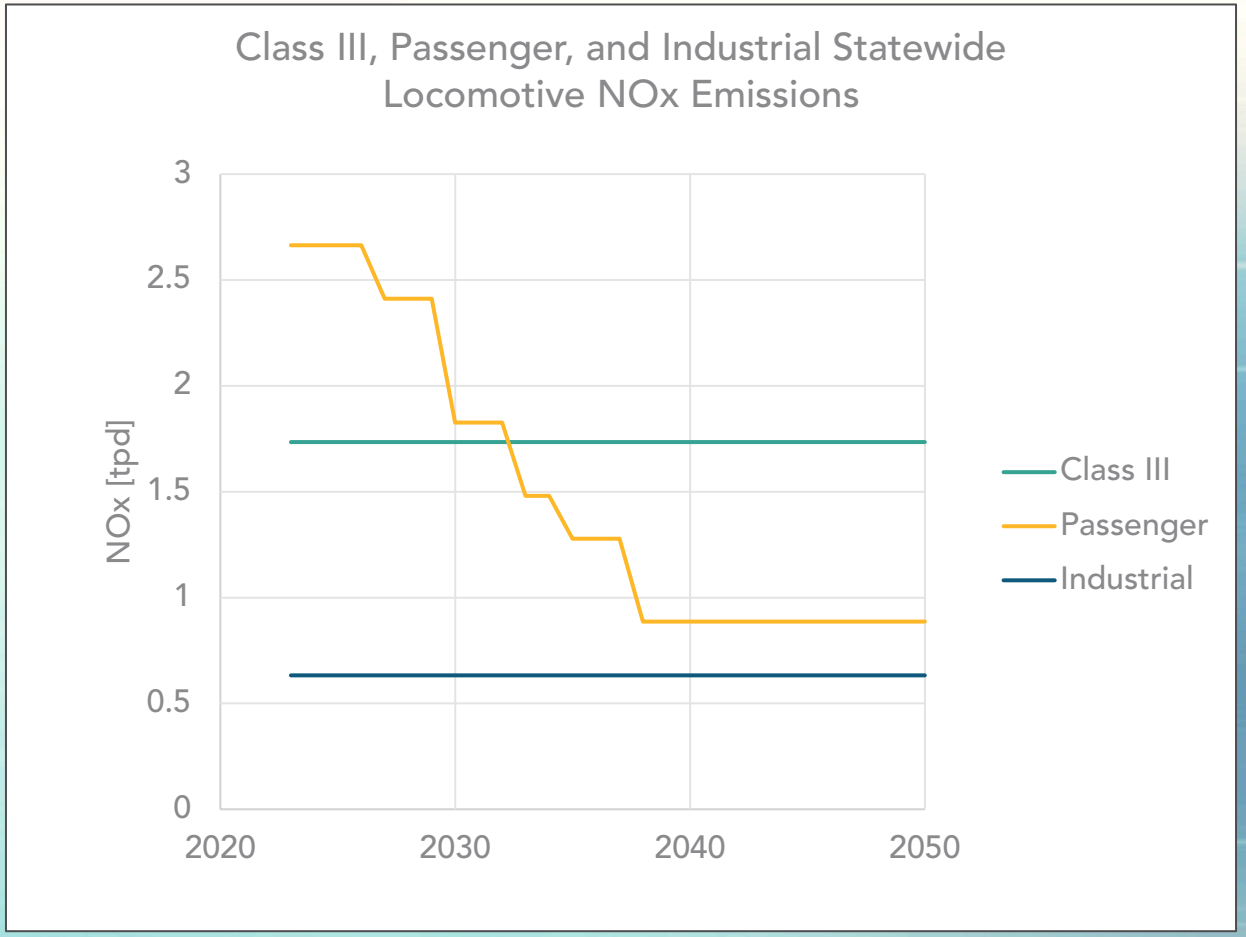
In-Use Locomotive Regulation

Statewide Locomotive Baseline NOx Emissions

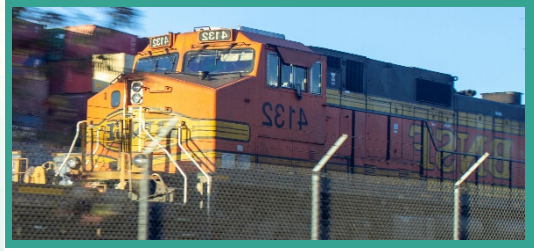




CARB

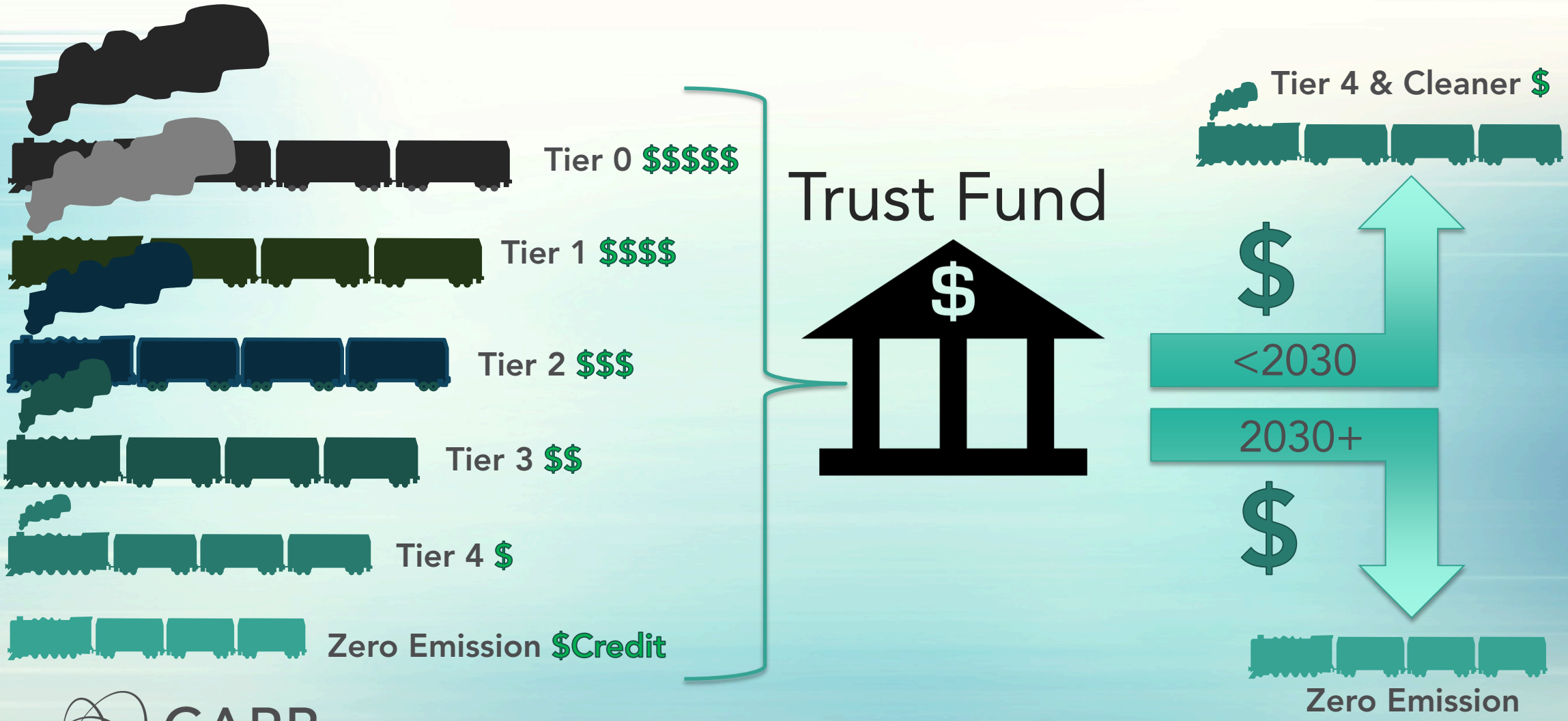
Locomotives

New Regulation for Board Consideration in 2022

Line Haul	Switcher	Passenger
		

- No current California regulation for locomotives
- California regulation is needed to reduce emissions in rail communities
- CARB staff regulatory concepts (still in development):
  - Spending Account
  - In-use Operational Requirements
  - Idling Limit
  - District Level Reporting

Spending Account



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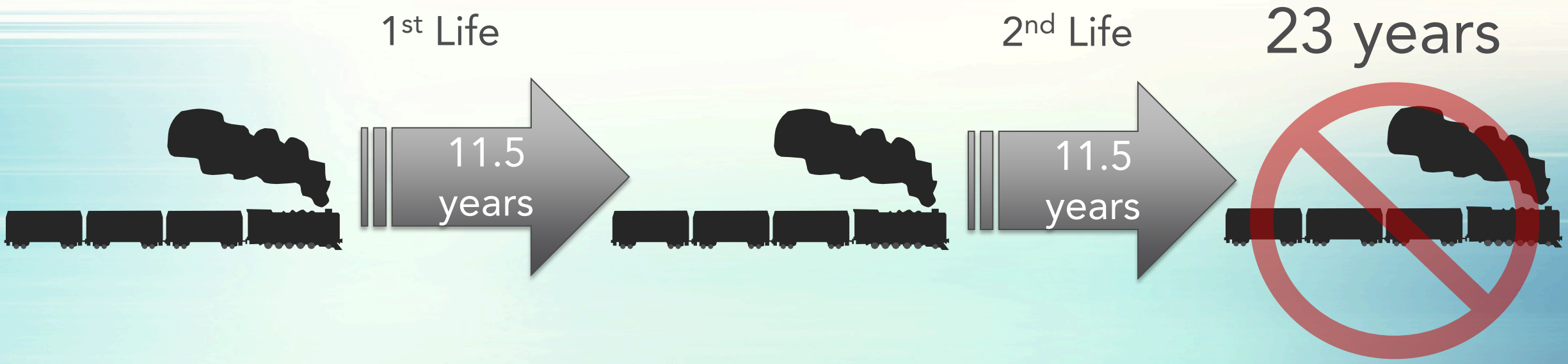
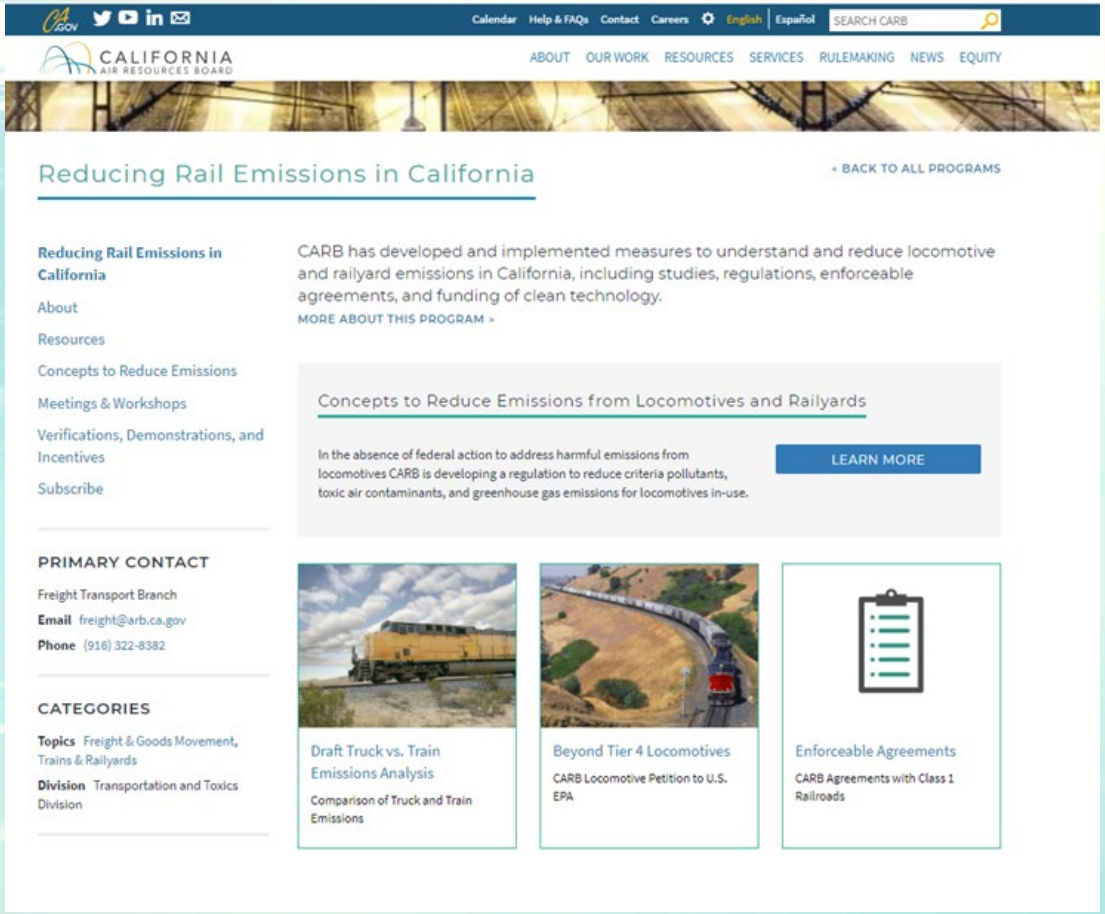
In-Use Operational Requirements



- Can operate over 23 years if it meets emissions of the cleanest locomotive required

CARB

More Information



- Website: https://ww2.arb.ca.gov/our-work/programs/reducing-rail-emissions-california
- Contact: Layla.Gonzalez@arb.ca.gov

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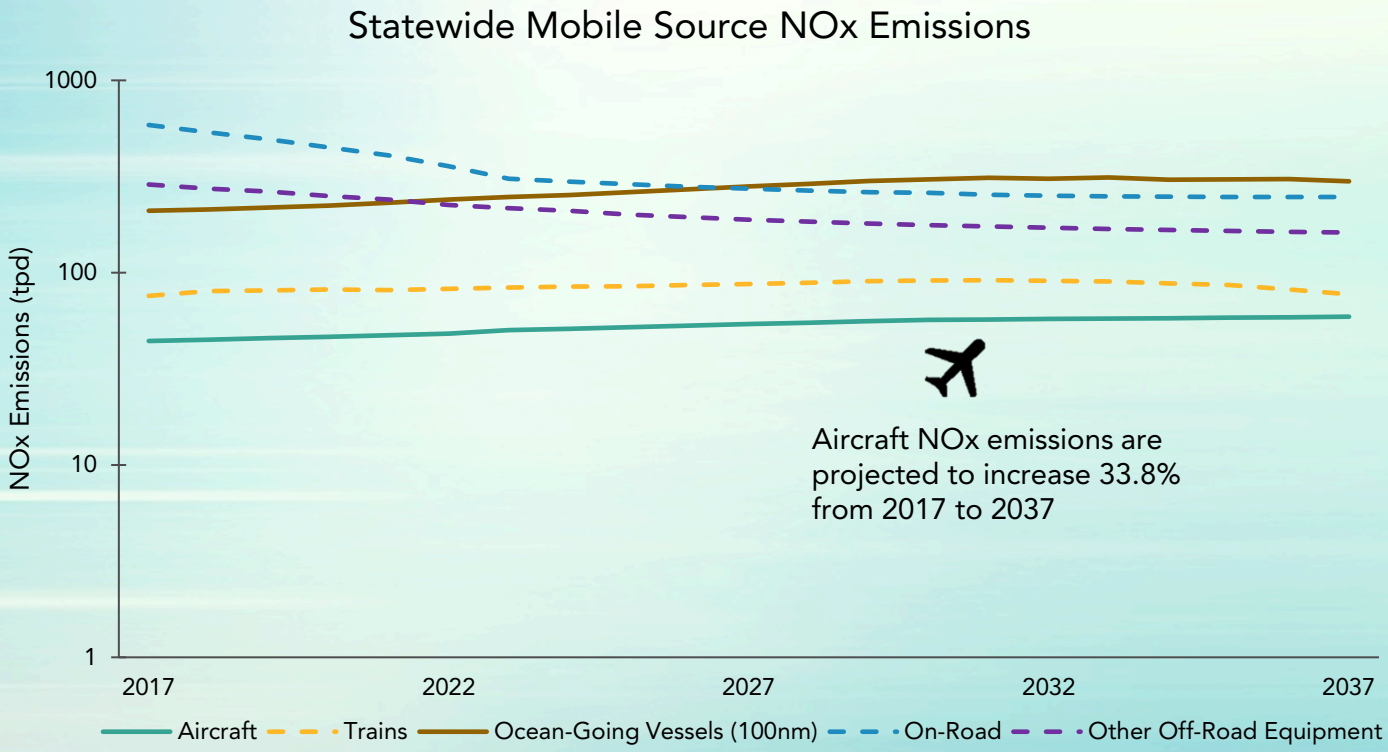
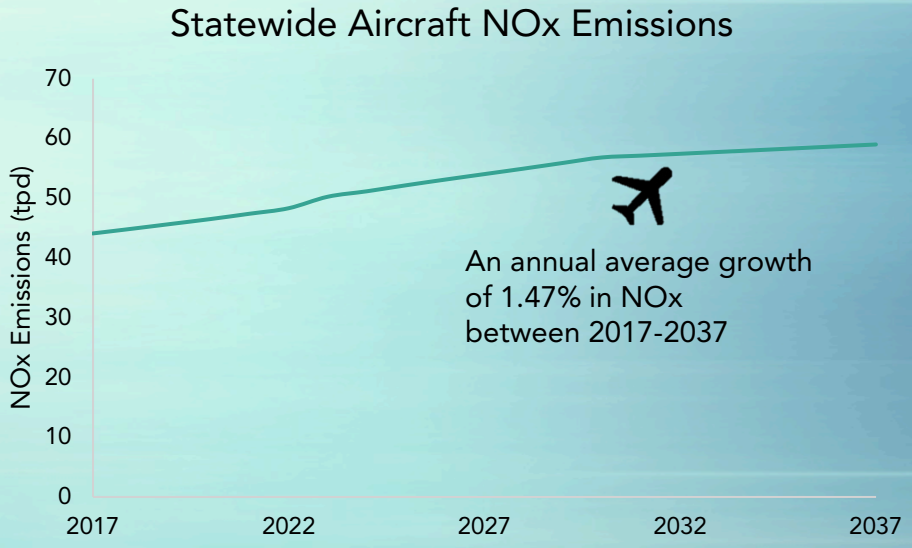
Future Measures for Aviation Emissions Reductions

Potential Future Measures For Aviation Emissions Reductions

Goal of future measures is to reduce emissions from airport and aircraft related activities.





Source: CEPAM 2019 Summer

Statewide NOx emission contribution

Need for Further Emissions Reductions

- Further action is needed to protect public health and to reach our clean air goals
- Emission sources:
  - Aircraft jet engines, auxiliary power units (APU) and airport ground transport
- Strong action is required at the federal and international as well as state and local level
- Established standards are mostly technology following instead of being technology forcing

Regulatory History

Agency	Description
International Civil Aviation Organization (ICAO)	Sets and adopts emission standards for aircraft
United States Environmental Protection Agency (EPA)	EPA has historically adopted ICAO standards
Federal Aviation Administration (FAA)	Ensure safety and has governance over aircraft design, maintenance and air traffic management
California Air Resources Board (CARB)	Ground support equipment and airport shuttle regulations
Air Districts	Memorandum of Understanding (MOU) between air districts and airports

Potential CARB Actions

- Explore requiring airports to perform a comprehensive and standardized emission inventory
- Further evaluate federal, State and local authority in setting requirements for aircraft/airports
- Work closely with the EPA and FAA on more stringent aircraft engine and fuel emission standards
- Work with airports, airlines, and stakeholders to evaluate and develop incentive programs
- Pursue stricter emission reduction strategies

More Information

Staff Contact Information:

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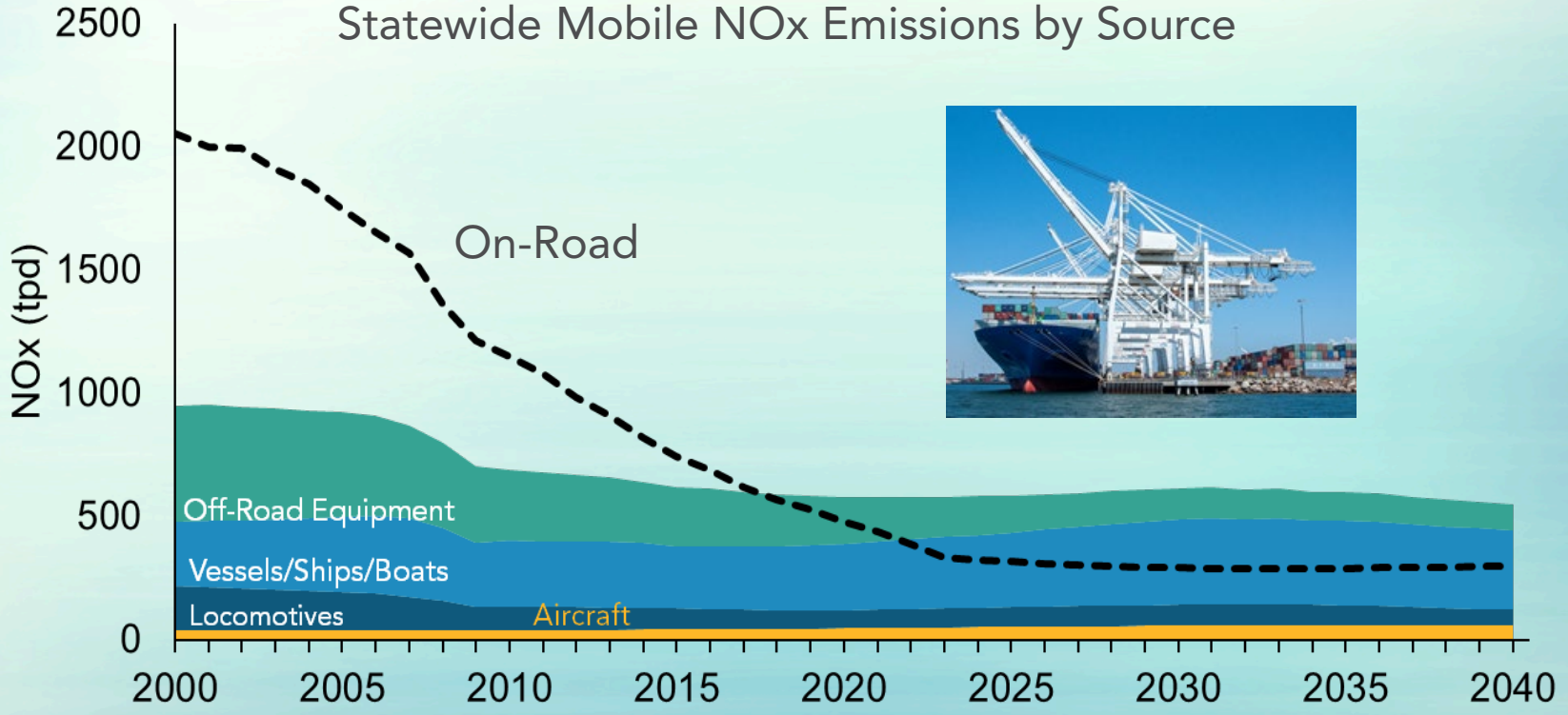
Future Measures for Ocean-Going Vessel Emissions Reductions

Potential Future Measures for Reducing Emissions from OGVs

Goal of future measures for ocean-going vessels (OGV) is to further reduce emissions while transiting, maneuvering, or anchoring in California waters and docking at berth in California seaports



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Source: CEPAM 2019 Summer emissions; OGVs includes emissions up to 100 nautical miles

Regulatory History

- Statewide OGV emissions (up to 100 nautical miles) are projected to make up 35.4% of mobile source NOx emissions in 2037, up from 17.4% in 2017. (Source: CEPAM 2019 Annual Average)
    - Majority of emissions from OGVs occur while vessels are in transit
- CARB has two main regulations designed to reduce emissions from OGVs:

Vessel Clean Fuel Regulation	At Berth Regulation
Requires use of low sulfur (<0.1%) distillate fuels in CA waters;	Requires certain vessel types to connect to shore power or use alternative technologies to reduce emissions while at berth
Primarily targets DPM, PM2.5 and SOx emissions	Primarily targets NOx, DPM, PM2.5, ROG, and GHG emissions

- Expanded At Berth Regulation adopted in August 2020

CARB

Regulatory History (cont.)

- Additional reductions are needed to achieve federal air quality standards and reduce health impacts in portside communities
- OGVs are largely regulated on an international level by the International Maritime Organization (IMO)
  - IMO's primary focus is reducing NOx and GHG emissions
- Advocacy at the federal/international level is necessary to achieve further reductions from OGVs

Potential CARB Measures

- Incentive or regulatory measures could be pursed to achieve further emissions reductions from OGVs, including:
  - Cleaner engines or cleaner fuels than those required by EPA and IMO
  - At anchor emissions reductions
  - Sailing at slower speeds while in California waters
  - At berth emissions reductions from bulk and general cargo vessels

More Information

- **Staff Contact Information:**
  - Nicole Light Densberger, Marine Strategies Section
    Nicole.LightDensberger@arb.ca.gov
  - Angela Csondes, Manager, Marine Strategies Section
    Angela.Csondes@arb.ca.gov
  - Bonnie Soriano, Chief, Freight Activity Branch
    Bonnie.Soriano@arb.ca.gov

- **Useful Links:**
  - At Berth Regulation: https://www.arb.ca.gov/ports/shorepower/shorepower.htm
  - Clean Fuel Regulation: https://ww2.arb.ca.gov/our-work/programs/ocean-going-vessel-fuel-regulation
  - 2020 Mobile Source Strategy: https://ww2.arb.ca.gov/resources/documents/2020-mobile-source-strategy

CARB

Federal Actions Needed

Primarily Federally-Regulated Sources: Federal Action

On-Road Heavy-Duty Vehicles
On-Road Heavy-Duty Low-NOx Engine Standards (2016 SSS Measure)
On-Road Heavy-Duty Vehicle Zero-Emission Engine Standards

Locomotives:
More Stringent National Locomotive Emission Standards (2016 SSS Measure)
Zero-Emission Standards for Switch Locomotives
Address Locomotive Remanufacturing Loophole

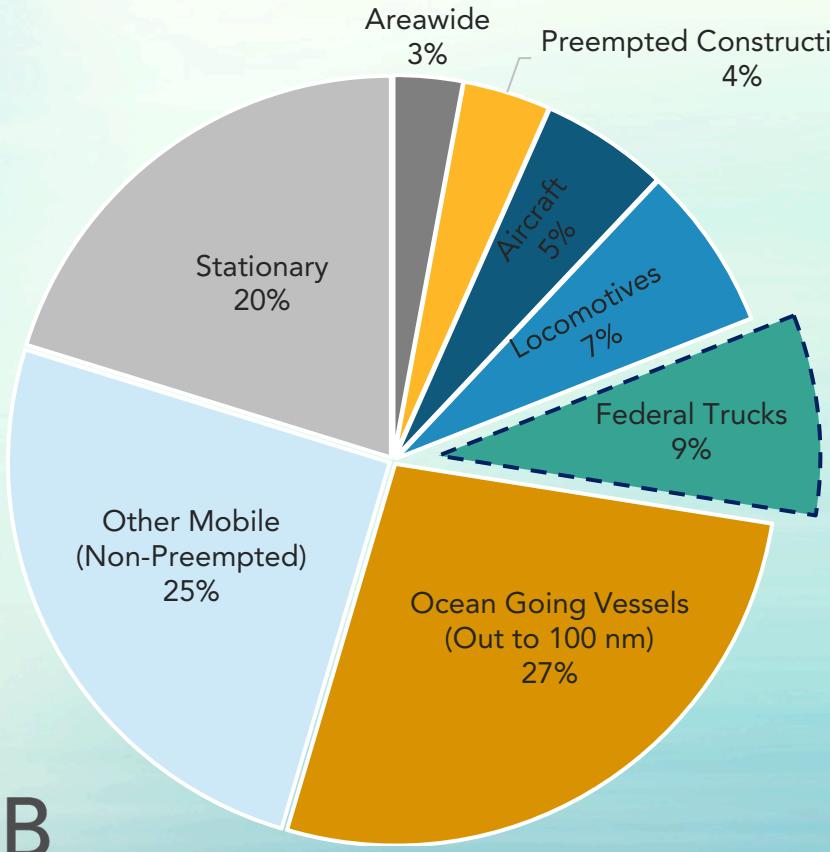
Off-Road Equipment:
Off-Road Equipment Tier V Standard for Preempted Engines
Off-Road Zero-Emission Standards Where Feasible

Aviation:
More Stringent Aviation Engine Standards
Cleaner Fuel and Visit Requirements for Aviation
Zero-Emission Airport On-Ground Operation Requirements

Ocean-Going Vessels:
More Stringent NOx and PM Standards for Ocean-Going Vessel Requirements (2016 SSS Measure)
Cleaner Fuel and Visit Requirements for Ocean-Going Vessels

Federally Certified Trucks

- Federally certified trucks are significant contributor to California NOx and diesel PM emissions



Federal trucks account for 9 percent of California NOx emissions in 2037

CARB

EPA' Clean Trucks Plan

- EPA last revised the NOx standards for on-highway heavy-duty trucks and engines in 2001- more than 20 years ago
- New technologies available today can help achieve the additional reductions needed to improve air quality and health in our communities
- By December 2022, EPA is planning to propose and finalize new stringent emissions standards to reduce NOx pollution from trucks starting in model year 2027.

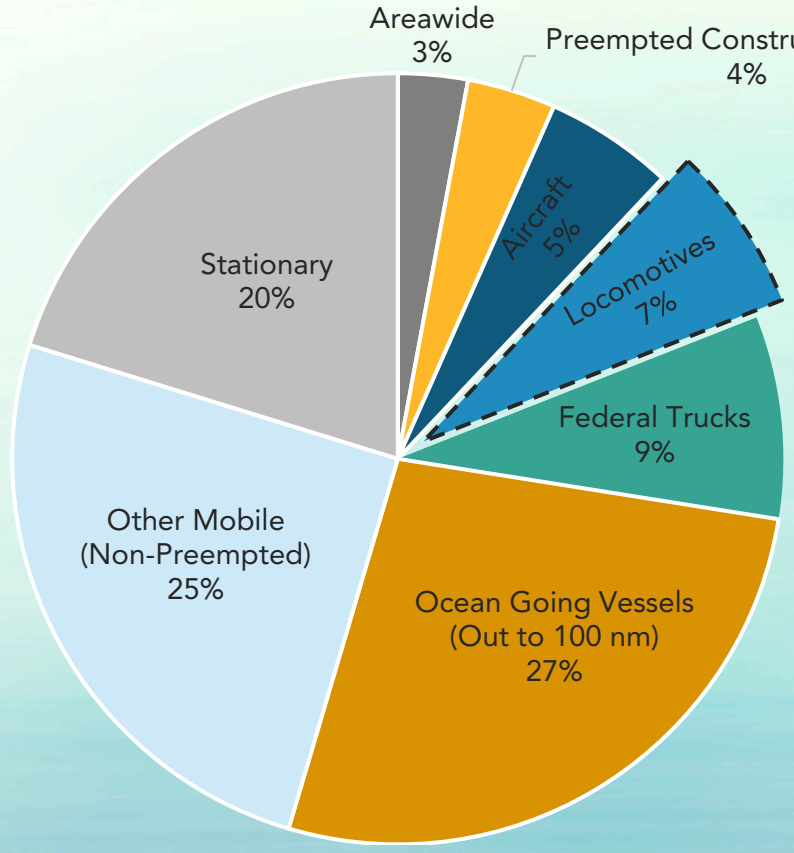
More info at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/clean-trucks-plan

Zero-Emission Heavy-Duty Vehicle Requirements By 2022

- Achieving long term clean air goals requires significant national level transformation to zero emission technology
- Heavy-duty truck manufacturers are already signaling a large-scale migration from gasoline and diesel engines to zero-emission technologies in their products
- CARB would request EPA to adopt national level zero-emission requirements similar to California's Advanced Clean Trucks regulation

Locomotives

Emissions from locomotives are significant contributor to regional ozone pollution and local air quality issues



Locomotives account for 7 percent of California NOx emissions in 2037

CARB

Federal Actions for Locomotives By 2022

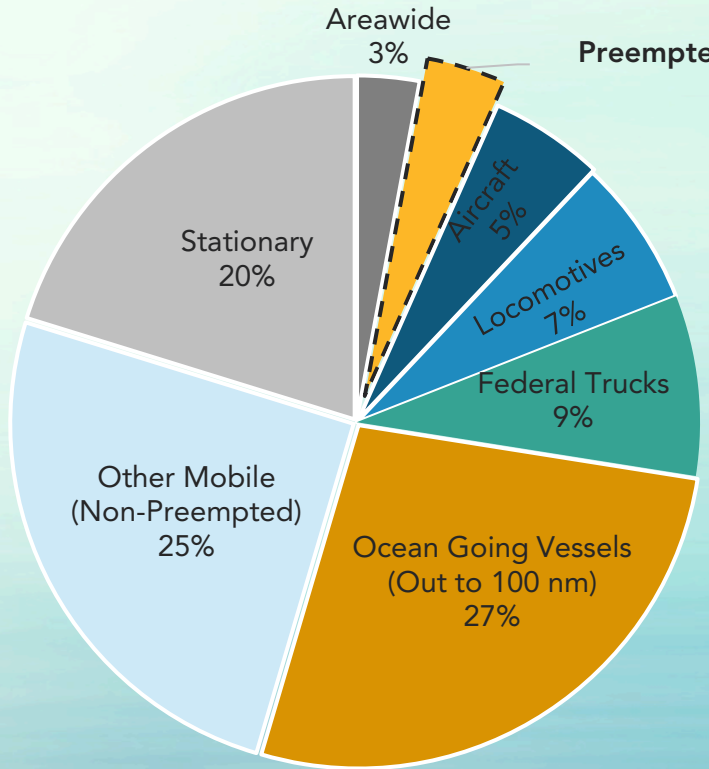
- EPA to adopt more stringent standards for new locomotives and require remanufactured locomotives to meet current standards as described in CARB's 2016 petition*
- EPA to establish zero emission standards for switchers and provide funding toward technology and infrastructure development for zero emission line-haul locomotives

*https://ww2.arb.ca.gov/resources/documents/petition-rulemaking-seeking-amendment-locomotive-emission-standards

CARB

Preempted Off-Road Engines

The Clean Air Act does not grant CARB the authority to set emissions standards for engines that are less than 175 hp and are used in construction or farm and fall under section 209, subsection (e)(1)(A) of the Clean Air Act.



Emissions from federally preempted off-road equipment account for 4 percent of California NOx emissions in 2037

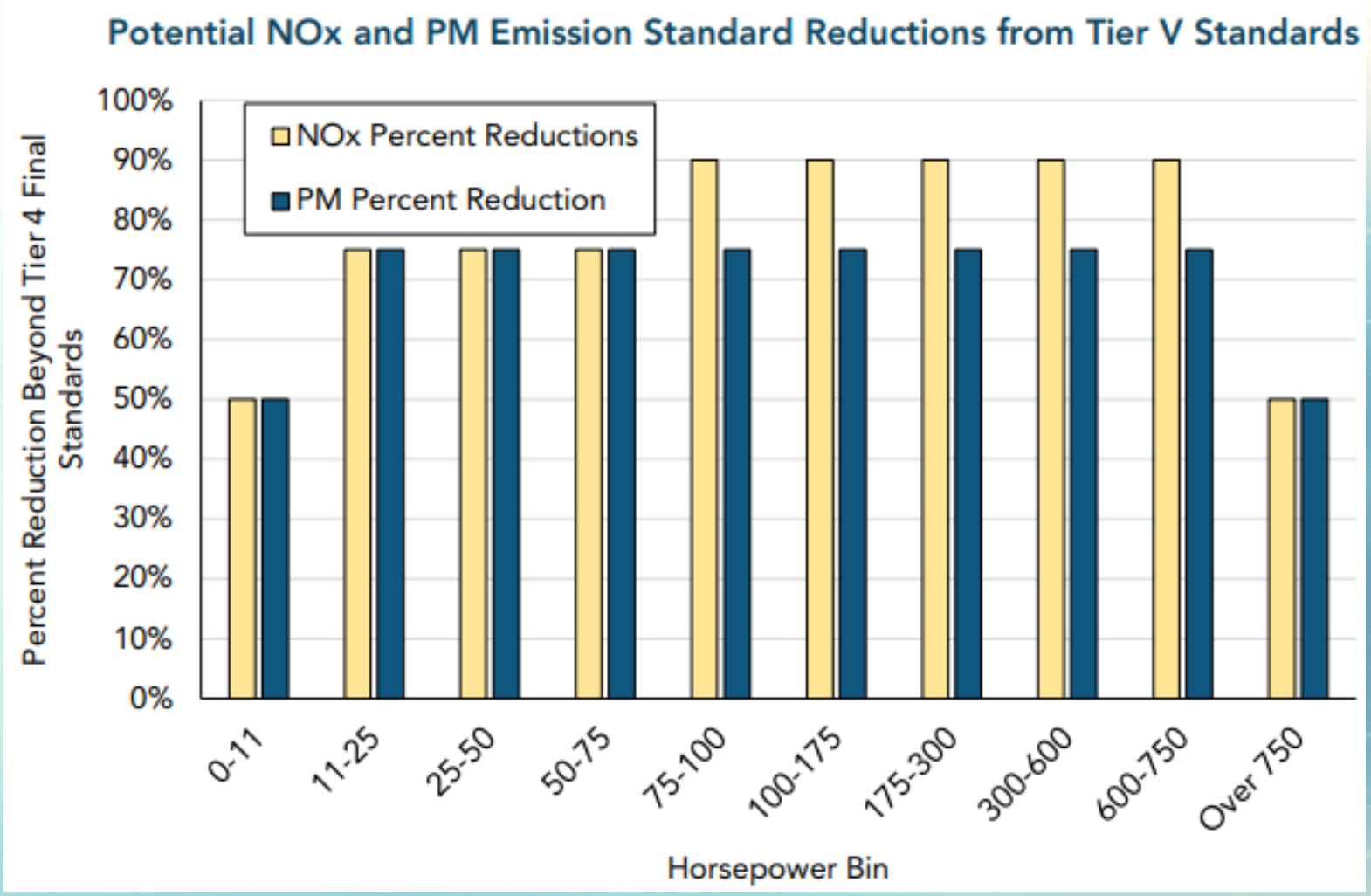
CARB

More Stringent Emission Standard for Off-Road Equipment By 2022

- EPA to adopt more stringent national level emissions standards for off-road engines (gasoline and diesel)
- EPA to establish national zero emission requirement for off-road engines where feasible
- EPA and U.S. DOE to prioritize federal technology demonstration funding to zero emission off-road equipment

Tier V Standards Reductions

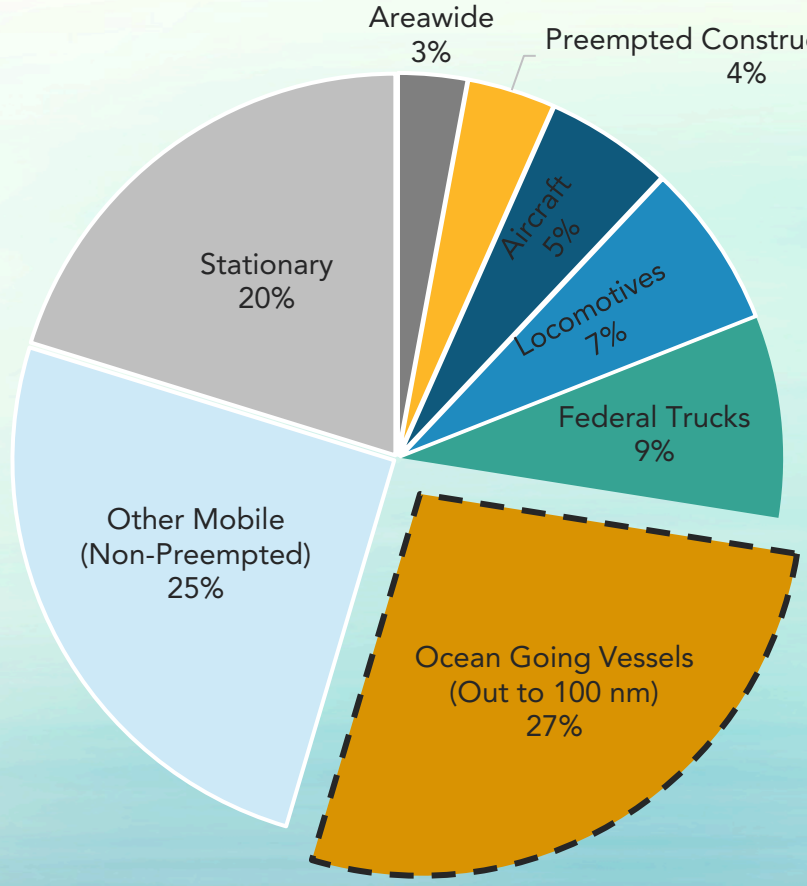
- Tier 5 standards could reduce NOx and PM by an additional 50 to 90 percent (2020 MSS)
- Initial CARB workshop on Tier V: Nov. 3, 2020



CARB

Marine Vessels

By 2037, Ocean Going Vessels (OGVs) will be the largest contributor to NOx emissions in California



OGVs account for 27 percent of California NOx emissions in 2037

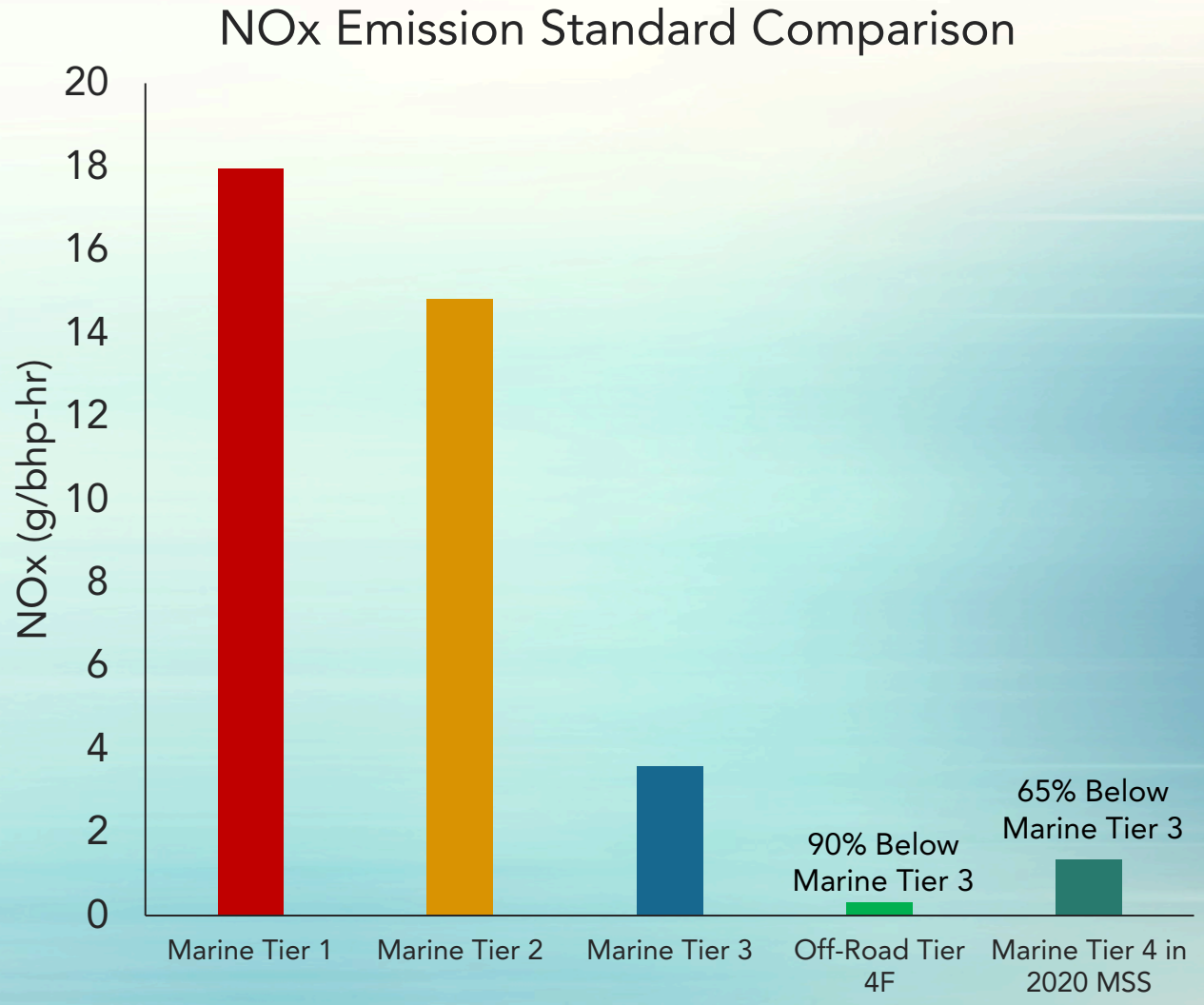
CARB

Actions to Reduce Emissions from Marine Vessels By 2023

- EPA to advocate in IMO for more stringent NOx and PM standards for marine engines
- EPA to establish clean fuel and clean vessel visit requirements for ocean going vessels at national level
- EPA to consider national level Vessel Speed Reduction (VSR) programs

Marine Vessel Standards

- Marine vessels standards for NOx significant behind on-road and off-road
- No PM standards currently



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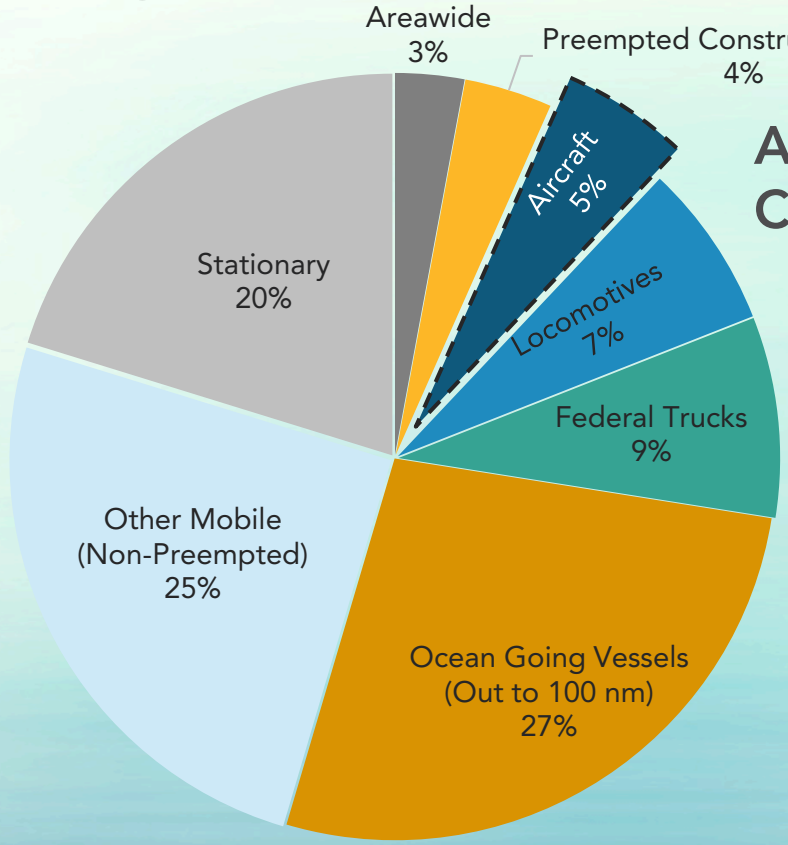
Aviation

Aviation is one of the very few sectors in California where NOx emissions are growing due to lack of technology forcing emission standards



Aircraft account for 5 percent of California NOx emissions in 2037

CARB

Cleaner Aviation Actions By 2023

- EPA should initiate public rulemakings for more stringent and technology forcing CO2 and criteria pollutant standards for new and in-service aircraft engines operated at US airports
- Promote/require zero-emission on-ground operations for aircrafts (e.g., ZE APUs, Taxi-bots)
- Establish mechanisms to incentivize cleanest aircrafts visiting U.S. airports

Moving Forward

Timing and Next Steps

2022 State SIP Strategy: 2nd Public Workshop	October 19, 2021
Release Draft 2022 State SIP Strategy	Winter 2022
Informational Update to the Board	Early Spring 2022
2022 State SIP Strategy: 3rd Public Workshop	Spring 2022
Release Proposed 2022 State SIP Strategy	Early Summer 2022
Board Consideration	Summer 2022

Contact Us!

- Austin Hicks, Air Pollution Specialist
  Austin.Hicks@arb.ca.gov
- Ariel Fideldy, Manager
  Ariel.Fideldy@arb.ca.gov
- General SIP Questions: SIPplanning@arb.ca.gov

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Questions and Comments?

Zoom:

Use "Raise Hand" feature, or type in "Q&A" box

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