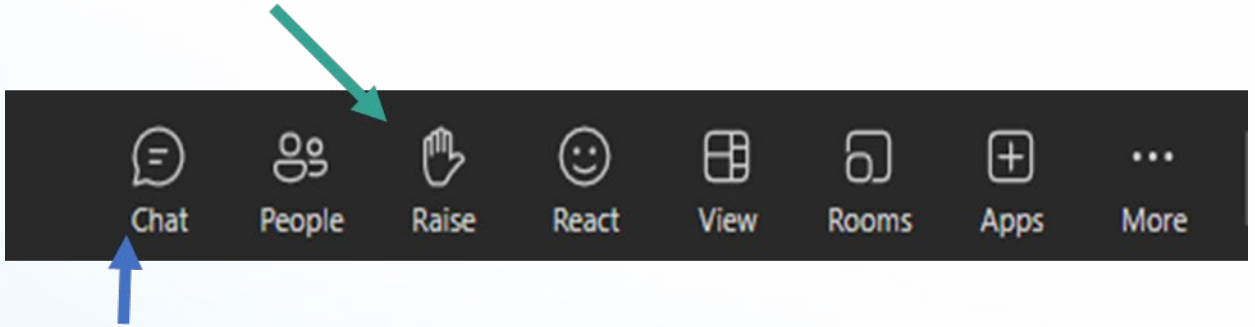
CALIFORNIA
AIR RESOURCES BOARD

Grant Orientation for Zero Emission Rail Operation (GO ZERO) Program

November 1, 2023

Housekeeping

- Participants will be able to ask questions at the end of the presentation by utilizing the "raise hand" feature, Staff will unmute participants as they are called on.



- Questions can also be put into the chat. Staff will answer questions during the Q&A portion at the end of the presentation.

- Presentation materials will be available after this webinar on the GO ZERO Webpage
  - https://ww2.arb.ca.gov/our-work/programs/grant-orientation-zero-emission-rail-operation-go-zero-program-0

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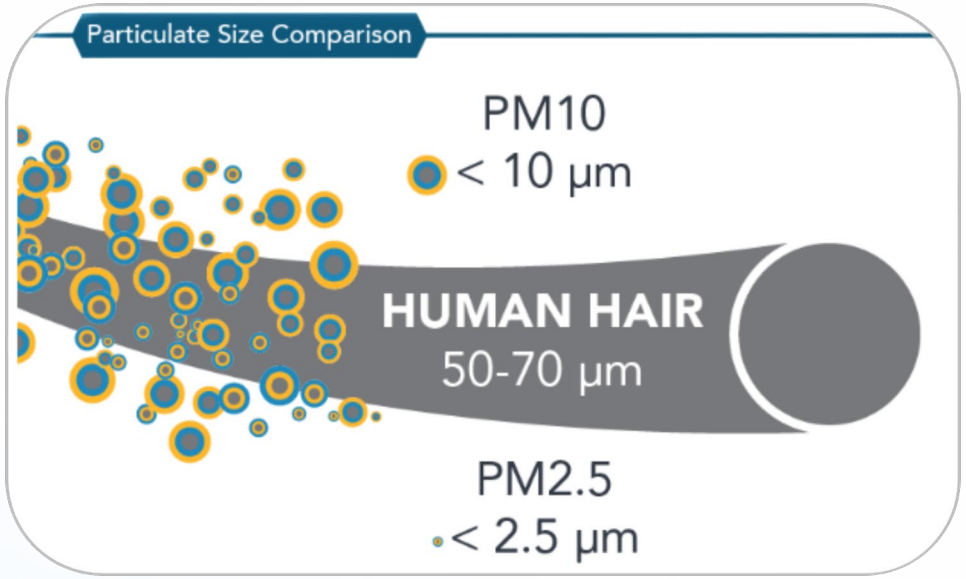
Agenda

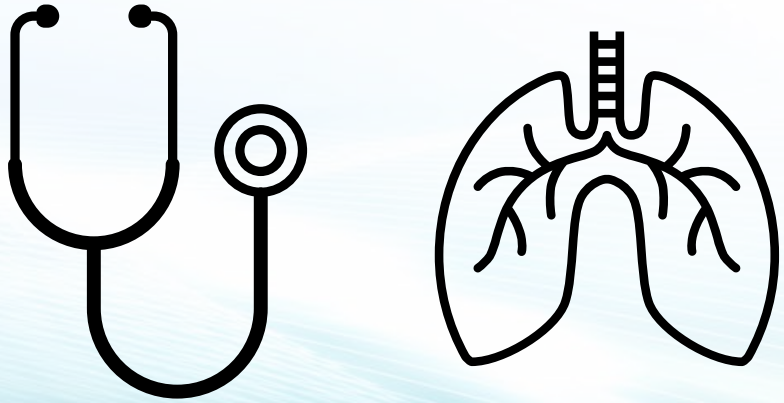
- Background
- Overview
- Process
- Consolidated Rail Infrastructure and Safety Improvements (CRISI)
- Volkswagen (VW) Mitigation Trust Funding
- Zero Emission (ZE) Equipment Overview
- Q&A

Health Risks and Impacts

Exposure to diesel exhaust/particulate matter of 2.5 microns or less (PM2.5) and oxides of nitrogen (NOx) can lead to:

- Acute respiratory symptoms
- Asthma exacerbations; emergency room visits for asthma
- Bronchitis; chronic obstructive pulmonary disease (COPD)
- Heart attacks
- Nervous system effects (e.g., cognitive deficits)
- Lost work days
- Premature death
- Increased risk for cancer





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Zero-Emission Operations

Locomotives
Still need ZE operations

TRUs
Transitioning to ZE

Truck Fleets
Transitioning to ZE

Forklifts
Transitioning to ZE

Cargo Handling Equipment
Transitioning to ZE

Drayage Trucks
Transitioning to ZE

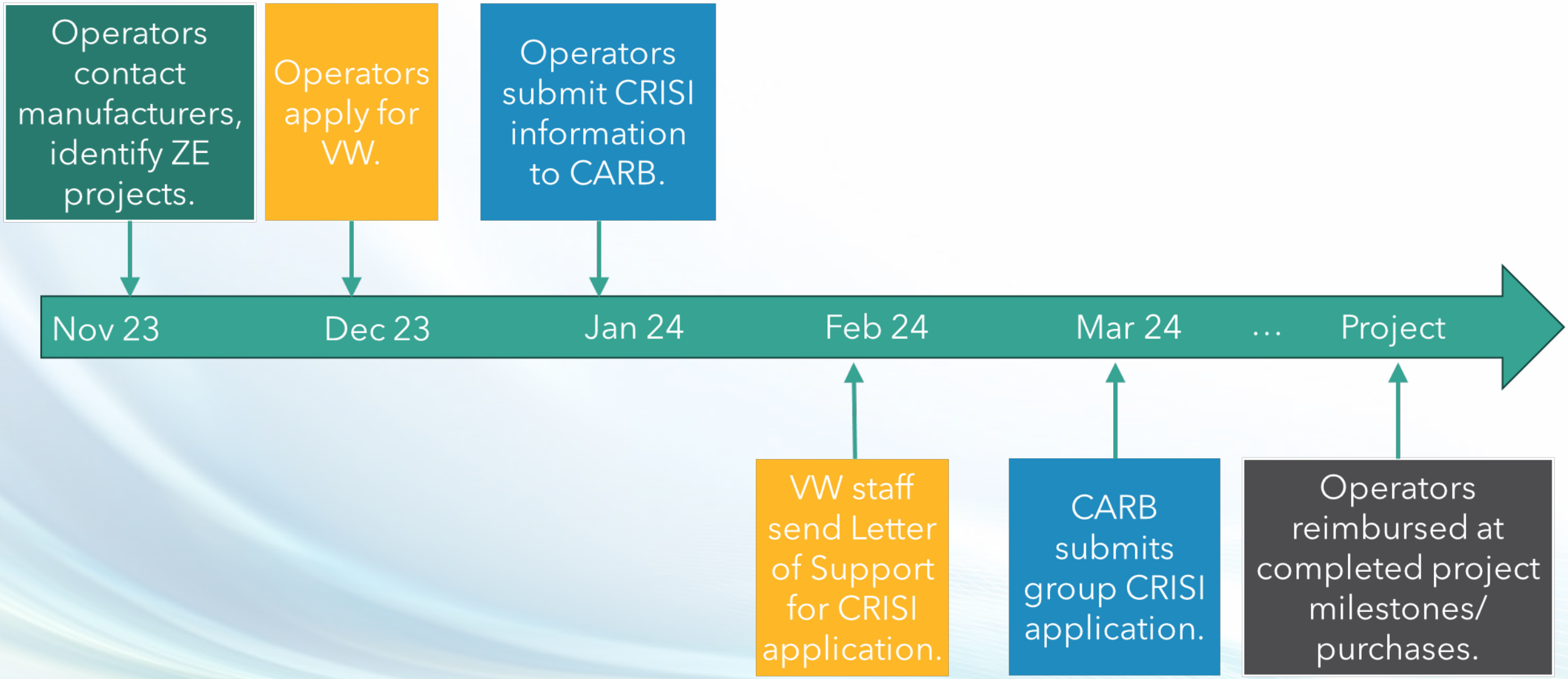
GO ZERO Program Overview

- GO ZERO program goal: assist operators in stacking funding opportunities for ZE rail equipment
- This year, GO ZERO will focus on:
  - State level: Volkswagen (VW) Mitigation Trust Funding
  - Federal Level: Consolidated Rail Infrastructure and Safety Improvements (CRISI)

California VW Mitigation Trust

U.S. Department of Transportation
Federal Railroad Administration

GO ZERO Anticipated Timeline



Mike Johnsen
Federal Railroad Administration
Senior Advisor on Climate and Sustainability

Consolidated Rail Infrastructure and Safety Improvements (CRISI) Overview

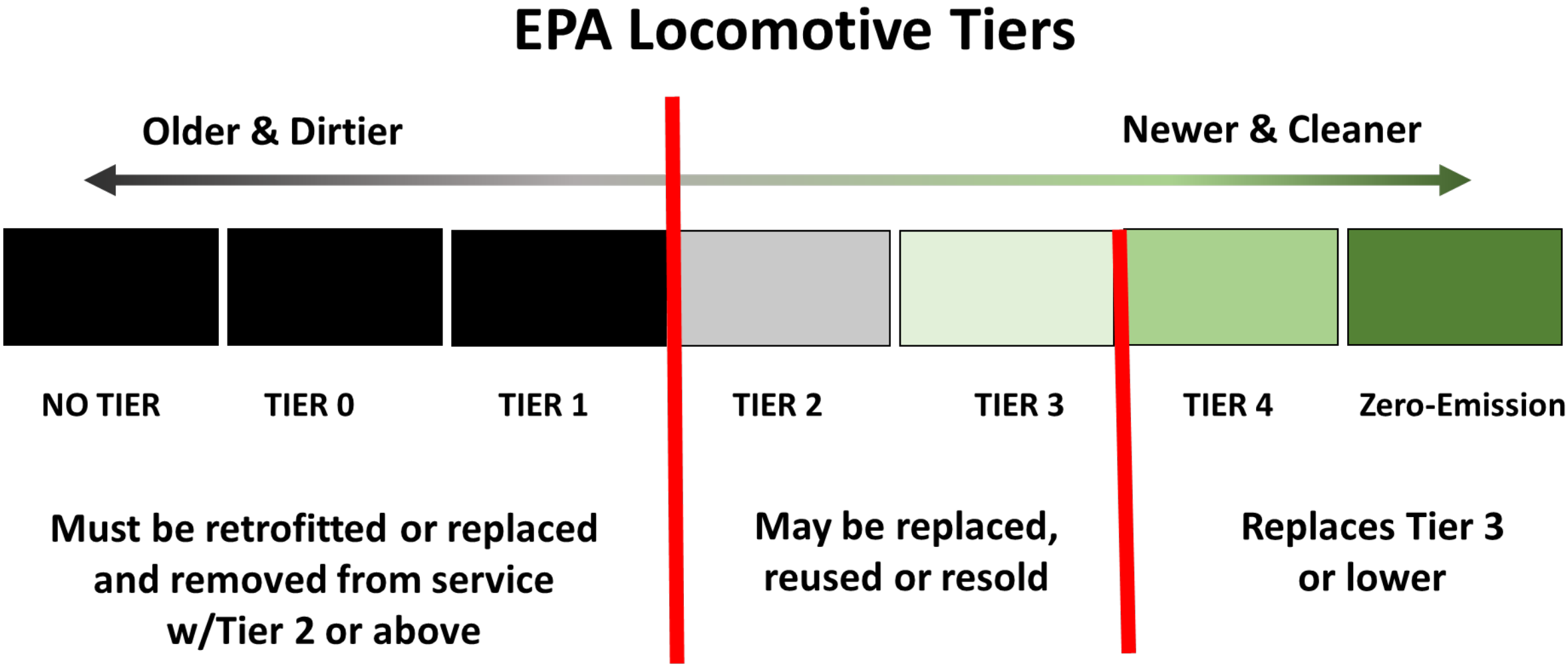
2022 CRISI Locomotive Rehab and Replacement Provision

Provision Details

The FY 2022 CRISI program contains the following provisions for grants affecting locomotives (49 U.S.C. 22907(c)16):

(16) Rehabilitating, remanufacturing, procuring, or overhauling locomotives, provided that such activities result in a significant reduction of emissions

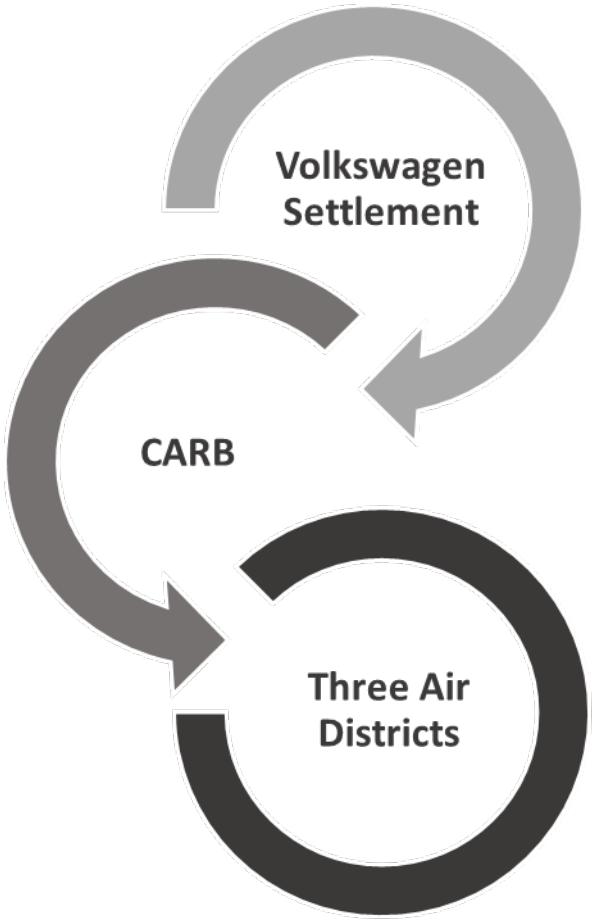
“Significant Reduction In Emissions” - FY 2022 Criteria



Ping Gui
South Coast Air Quality Management District
Program Supervisor, Science and Technology Advancement

Volkswagen (VW) Mitigation Trust Funding Overview

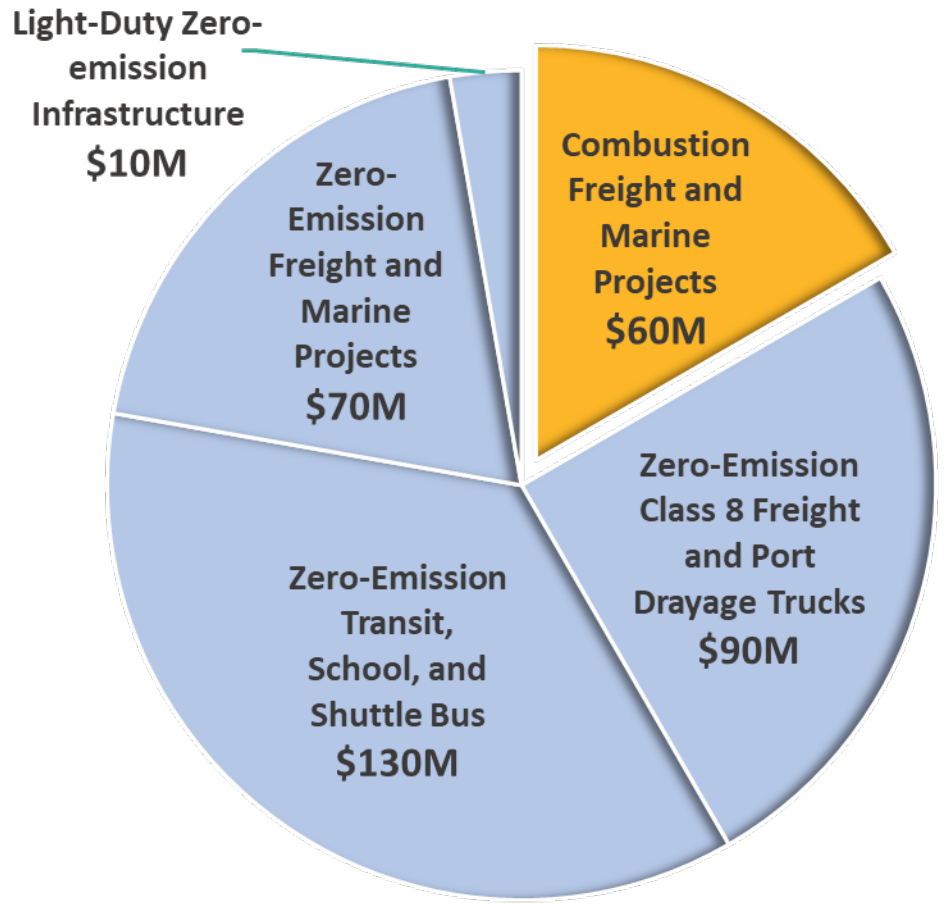
VW Mitigation Funds for California



- VW Mitigation Trust
- Consent Decree

- Lead Agency
- Beneficiary Mitigation Plan
- Five Funding Categories

- Program Administrators
  - South Coast AQMD
  - San Joaquin Valley APCD
  - Bay Area AQMD



Program Information

Statewide Solicitation

Web-based Application Portal

Third Party/ Consultant Assistance

No ‘work’ or Equipment Delivery Until Agreement Executed

Three Year Agreement Term

General Program Requirements

California VW Mitigation Trust

Operation

- Existing Equipment/Engine: Minimum 75% operation within CA during the past 12 months
- New Equipment: Minimum 75% operation within CA during the agreement term (3 years)

Inspections

- Old and new equipment/engine must be available for inspections

Compliance

- In compliance with applicable state and federal rules and regulations

Scrapping

- Old equipment/engine must be scrapped

Eligible Locomotives

California VW Mitigation Trust

Locomotives

Freight Switchers

Replace or Repower

Old Engine Tier

- Uncontrolled and Tier 0

Minimum Annual Operation

- 1,000 hours

Horsepower

- Old & New Engine: 1,006 to 2,300

Technology Option

Tier 4

Funding Table

Equipment Type	Baseline Technology*	Replacement Technology	Project Type	Maximum Incentive Percentage (of cost) – Non-Government	Maximum Incentive Percentage (of cost) – Government Only	Maximum Funding Cap
Freight Switcher Locomotive	Uncontrolled and Tier 0	Tier 4	Replacement	25%	100%	$1,350,000
			Repower	40%		

*Must comply with all applicable rules and regulations until time of replacement

Application Requirements

- Vendor Quote (Replacement/Repower Costs)
- Existing Equipment and Engine Information
- 12 Months Usage Records (Hours)
- Insurance Information
- Photos and Supporting Documentation

* https://xappprod.aqmd.gov/vw/combustion.html

Upcoming Program Changes

Increase maximum incentive amount to $1,620,000 for switcher locomotive or rail car mover

Funding Cap Increase

Stacking of funds with other CARB and State programs that do not claim NOx emission reductions

Stacking with State Funds

Scrapping of pre-Tier 4 switchers, replacing with Tier 4 or better technology, including zero-emission

Zero-Emission Switchers

Contact Information

For more information, please visit:
http://www.aqmd.gov/vw

South Coast AQMD VW Program Funding

(833) 894-7267

vwfunds@aqmd.gov

Staff available Tuesday to Friday from 7:30am to 5:30pm

Other Helpful Links

- CA VW Program Landing Page
- CARB VW Program Website
- Consent Decrees
- Beneficiary Mitigation Plan (BMP)
- California Air Districts

GO ZERO Program Benefits

- Streamlined Application Process
  - Coordinated with the Federal Rail Administration (FRA) and South Coast Air Quality Management District (SCAQMD)
- Compliance with the In-Use Locomotive Regulation
  - ZE locomotives earn Spending Account Credit until 2030.
  - ZE locomotives can be used towards an Alternative Compliance Plan or the Alternative Fleet Milestone Option.
- Time-sensitive opportunity
  - Next CRISI Notice of Funding Opportunity is expected to be open December 2023 or January 2024.
  - VW funding is first-come, first-serve.

VW and CRISI Grant Recipient Requirements

VW	CRISI
• Submit of a Work Statement and Deliverables document • Scrap the original equipment/engine • Operate new equipment at least 75% of the time within California • Annual usage reporting • Recordkeeping • Locomotives must be in service within 18 months* of contract execution (unless otherwise approved)	• Grant agreement: scope, schedule, budget, performance measures • Grant administration: meetings with FRA, quarterly progress and financial reports, invoice and deliverables review, etc. • Monitoring: routine monitoring, annual monitoring reviews/site visits • Final invoice: financial reconciliation • Final performance report: documentation of results, outcomes, public benefits.

*May change in future solicitations

Zero-Emission Equipment Overview

All data is provided by manufacturers. CARB did not verify accuracy of the data. Contact manufacturer directly for more details.
All models are battery electric.

Manufacturer / Model		Applicable Model	Application	Tractive Force (lbf)
AMPS Traction LLC / IS4-1200, IS4-2000, IS6-2300		4 axle GP-9 or similar platform	Industrial facilities, local and yard jobs	Starting: 80,000 / 120,000 Cont.: 60,000 / 90,000
IRT	ATLAS-SW	Repower SW (45')	Industrial, Switching, 35 Miles Regional Service Range	(SW1200) Starting: 74,400 Cont.: 57,040
	ATLAS-RP	Repower GP/SD/F Series (55-80')	Industrial, Switching, 100 Miles Regional Service Range	(GP20-ECO) Starting: 72,000 Cont.: 55,200
	ATLAS-KIT	Repower GenSet, GE, etc…	Industrial, Switching, 100 Miles Regional Service Range	(GenSet Loco) Starting: 79,500 Cont.: 60,950
Progress Rail Locomotive, Inc	EMD Joule® Switcher Locomotives	New & Repower options available	Switching, Local or Regional service	Starting: 65,000 - 135,000 Cont.: 66,000 - 93,500
	EMD Joule® Regional Locomotives	New	Regional & helper service	Starting: 200,000 - 225,000 Cont.: 155,000 - 180,000
Tractive Power Corporation / TP28/50E, TP56/70E, TP90E, TP130E			Industrial facilities	Starting: 28,000 - 130,000
Wabtec Corporation / FLXswitch		n/a	Local and yard jobs	Starting: 200,000 Cont.: 155,000

Zero-Emission Equipment Overview (cont.)

Manufacturer / Model		Usable Energy	Estimated Operation Time*		Cost
			US EPA Switcher Duty Cycle†	High Idle Duty Cycle‡	
AMPS Traction / IS4-1200, IS4-2000, IS6-2300		Model number reflects usable energy capacity in kWh	AMPS Traction calculates application specific runtimes for customer usage. Available upon request.		Starting at $3.5M (Locomotive Only / infrastructure separate)
IRT	ATLAS-SW	560 to 840 kWh	7-11 Hrs.	24-36 Hrs.	Loco: $2.7 M to $3.5 M Infra: 30K to $600 K
	ATLAS-RP	560 to 1,680 kWh	7-20 Hrs.	24-70 Hrs.	Loco: $2.7 M to $4.2 M Infra: $30 K to $900 K
	ATLAS-KIT	560 to 1,680 kWh	7-20 Hrs.	24-70 Hrs.	Loco: $2.7 M to $4.2 M Infra: $30 K to $900 K
Progress Rail Locomotive, Inc	EMD Joule® Switcher Locomotives	2.4 – 4 MWh	Through an energy analysis with the customer, Progress Rail will determine the battery storage size to support the customer's 24 hour operation.		Please contact manufacturer
	EMD Joule® Regional Locomotives	8 - 14.5 MWh			
Tractive Power Corporation / TP28/50E, TP56/70E, TP90E, TP130E		200 to 2,000 kWh	AMPS Traction calculates application specific runtimes for customer usage. Available upon request.		Based on customer needs and requirements.
Wabtec / FLXswitch		Standard 2.7 MWh nameplate capacity	~7 hrs	26-37 hrs	Varies with battery capacity and infrastructure need. Reach out for assessment.

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*Estimated operation time is based on two duty cycles, and assumes all auxiliary loads (air compressor, etc) and parasitic loads (cooling system, etc) are active full time.
†US EPA Switcher Duty Cycle is ~60% idle, ~25% notches 1-2, and ~15% notches 3-8 (time in mode).
‡High Idle Duty Cycle is 92% idle, and 8% notches 1-3 (time in mode).

Zero-Emission Equipment Overview (cont.)

Manufacturer / Model		Required Infrastructure	Charging/Refueling Time	Support Provided by Manufacturer
AMPS Traction / IS4-1200, IS4-2000, IS6-2300		Battery Charger	2-23 hrs (100 to 700 kW depending on customer requirements)	Will supply charger / installation at customers' expense
IRT	ATLAS-SW	Battery Charger	45 Min to 5 Hrs	Full turnkey support; actively engages utilities
	ATLAS-RP	Battery Charger	45 Min to 10 Hrs	Full turnkey support; actively engages utilities
	ATLAS-KIT	Battery Charger	45 Min to 10 Hrs	Full turnkey support; actively engages utilities
Progress Rail Locomotive, Inc	EMD Joule® Switcher Locomotives	Locomotive charging stations to be provided by Progress Rail.	The charger will be sized based on the customer's operational needs. Available options include 100, 700, & 1400 kW.	Equipment, installation instructions & support, ongoing service/support
	EMD Joule® Regional Locomotives			
Tractive Power Corporation / TP28/50E, TP56/70E, TP90E, TP130E		Battery Charger		
Wabtec / FLXswitch		•High Power: a wayside charger controller, pantograph & Transformer, possibly some electrical infrastructure upgrades •Low Power: a local 480 volt power supply	•2-3 hrs (2MW high power charger + stationary pantograph) •8-20 hrs (low power charging cable)	Installation support in some applications

Zero-Emission Equipment Overview (cont.)

Manufacturer	Contact
AMPS Traction LLC	Doug Bardwell doug@ampstraction.com (614) 602-2948
IRT	Mike Nicoletti mike@innovativerailtech.com (312) 438-7639
Progress Rail Locomotive, Inc	Gary Lawrence, Manager Locomotive Sales & Leasing glawrence@progressrail.com (318) 780-1260
Tractive Power Corporation	Frank Donnelly fwdonnelly@tractivepowercorp.com (604) 816-8553
Wabtec Corporation	Tony Adams, Region Sales Leader Tony.adams@wabtec.com

Required Actions from Operators

1. **Identify ZE Project**
   - Contact manufacturers (information on previous slide)
2. **Apply for VW:** https://vw.gms.aqmd.gov/
   - ASAP
   - (Optional) Request CARB staff to review application for completeness
3. **Submit CRISI Information to CARB:** locomotives@arb.ca.gov
   - Manufacturer, model, cost, project timeline
   - Baseline locomotive info
   - Location, Usage info (gallons)
   - Form available on GO ZERO webpage
   - Tentative deadline: January 8, 2024

Information available at:
https://ww2.arb.ca.gov/our-work/programs/grant-orientation-zero-emission-rail-operation-go-zero-program-0

Q&A

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