



Workshop:
**Criteria for Projects Targeted at Disadvantaged
Communities to Offset Legacy Engine Emissions
per Omnibus Regulation**

October 24, 2023

Zoom Webinar Logistics

- Telephone Call-in: (216) 706 - 7005
- Access Code: 400363
- 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

Outline

- Purpose of the Workshop
- Background
- Program Concepts
 - Project Plans
 - Project Types and Source Categories
- Approval Process
- Questions

Purpose of Workshop

- Present initial program concepts for projects targeted in disadvantaged communities to offset legacy engine emissions per Omnibus
- Seek feedback on the proposed concepts and on other possible source categories
- Request input on possible approaches for infrastructure projects and quantifying benefits of such projects

Background

- Omnibus Regulation set cleaner engine standards
- Legacy engine provisions provide transition flexibility
 - Limited number of legacy engine model year 2024 and 2025 sales
 - Legacy engine - certified to 0.20 grams per brake horsepower-hour (g/bhp-hr) for NO_x* while Omnibus standard is 0.05 g/bhp-hr
 - Sales limits apply:
 - 45% in 2024 model year
 - 25% in 2025 model year
 - Must certify at least one engine family to the Omnibus standards
 - Must offset emissions



Clean Truck Partnership

- Landmark agreement California Air Resources Board (CARB) and Manufacturers - Signed on July 5, 2023
- Agreement achieved various accomplishments
 - CARB commitment to provided additional transition flexibility
 - Manufacturers agreed to not sue or help others sue regarding the Omnibus and other heavy-duty regulations
- CARB also agreed to prepare Manufacturer Advisory Correspondence
 - Guidance on how to pursue projects targeted at disadvantaged communities
 - Such projects may include infrastructure projects aimed at facilitating use of heavy-duty zero-emission vehicles

Amendments to Omnibus Legacy Provisions

- Amendments to Omnibus, proposal released August 1, 2023
- Increase the allowed legacy engine % of total sales in 2024 and 2025 and extend legacy engine sales to model year 2026

Option	Applicability	2024 Cap	2025 Cap	2026 Cap
Option 1	All Classes	45%	25%	<u>10%</u>
Option 2	MHDD*	<u>60%</u>	<u>60%</u>	<u>0%</u>
	Other Classes	<u>15%</u>	<u>8%</u>	<u>0%</u>

- Allow engine manufacturers in model year 2024 to certify legacy engines prior to certification of Omnibus compliant engine family
- Allow carry-over deficits from 2024 to 2025 model year and offset with credits from the heavy-duty zero-emission averaging set without any applicable multipliers

Offset Hierarchy

- Omnibus requires that engine manufacturers offset legacy engine emissions deficits
- Offset hierarchy is as follows:
 - Heavy-duty zero-emission credits.
If insufficient then,
 - Credits from same averaging set.
If insufficient then,
 - projects targeted in disadvantaged communities.



Quantifying Legacy Engine Deficit

Equation:

$$\left(Std \frac{g}{bhp\ hr} - FTP\ FEL \frac{g}{bhp\ hr} \right) * CF \frac{bhp\ hr}{miles} * AUL\ miles * \frac{Mg}{1,000,000\ g}$$

Where:

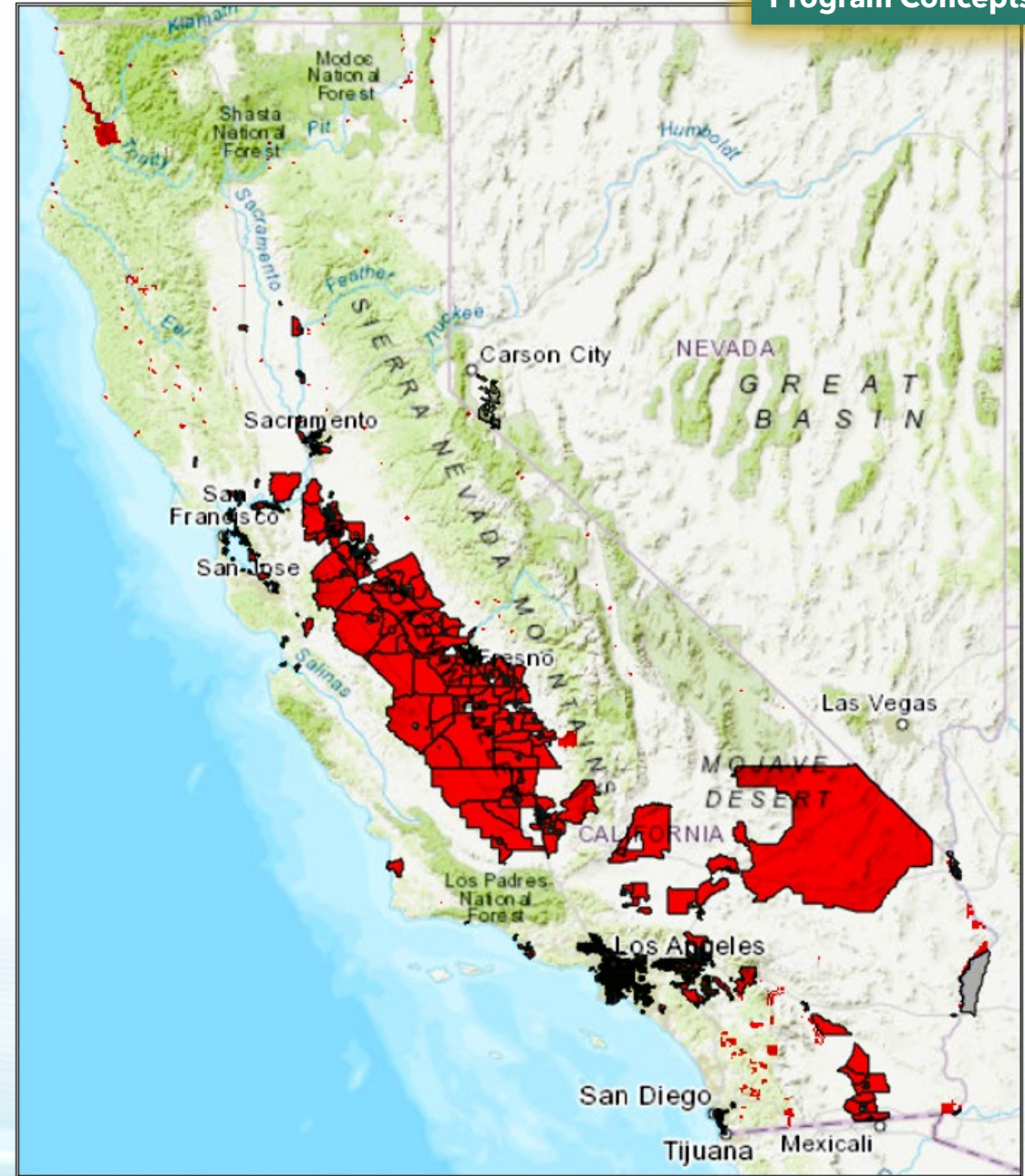
- *Std = Omnibus standard is 0.05 g/bhp-hr*
- *FTP FEL = the federal test procedure (FTP) cycle NOx or particulate family emission limit (FEL) for the engine family. In this case, we use the 0.2 g/bhp-hr legacy engine standard.*
- *CF = Transient cycle conversion factor is the total work of the legacy engine during the FTP transient cycle in bhp-hr/mile divided by 6.5 miles, the cycle length. This factor is engine family specific.*
- *AUL = applicable useful life*

Example: sale of one heavy heavy-duty vehicle with a 0.2 g/bhp-hr legacy engine

$$-0.33\ Mg = \left(\frac{0.05\ g}{bhp-hr} - \frac{0.2\ g}{bhp-hr} \right) * \frac{32.5\ bhp-hr}{6.5\ miles} * 435,000\ miles * \frac{Mg}{1,000,000g}$$

Disadvantaged Communities (DAC)

- CalEnviroScreen 4.0 cumulative burden score
- Designation based on 21 indicators
 - Pollution Burden such as air pollution, pesticides, and water quality
 - Population characteristics such as poverty, unemployment, and asthma rates
- Census tracts with 25% highest score
- Mapping tool available
 - Can enter address and determine if in DAC





Benefit Disadvantaged Communities

- Project must benefit a Disadvantaged Community
- California Climate Investments benefit criteria
 - Project must provide a direct and meaningful benefit to DAC
 - Vehicle, equipment and supporting infrastructure must be domiciled, registered, or operated a majority of time in DAC ($\geq 50\%$)
 - Buses (urban/transit and school) have lower benefit threshold, they must have at least one stop/station in DAC

Project Plan

- Manufacturers must submit plan for Executive Officer approval
- Projects will be considered on a **case-by-case** basis
- Plans must:
 - Include project description
 - Demonstrate that it will offset excess NOx and PM* emissions at 1.25 times
 - Show project will fully offset emissions within 5 years
 - Include a budget

Other Program Requirements

- Manufactures must provide information substantiating their attempts to purchase heavy-duty zero-emission credits
 - Must consider all manufacturers that certified heavy-duty zero-emission vehicles or powertrains with CARB
 - No credits available or denied a fair market offer to purchase such credits
 - Cost exceeds \$4,000 for enough NOx or PM credits to offset one medium heavy-duty legacy engine
- End of 5-years offset project period manufactures must submit information documenting that excess emissions have been offset

Potential Project Types

Infrastructure Projects

Public infrastructure that enables zero-emission technologies

Carl Moyer Like Projects

Locomotives, Marine Vessels, Off-Road, Light Duty Scrap, Lawn & Garden and more

On-Road Projects

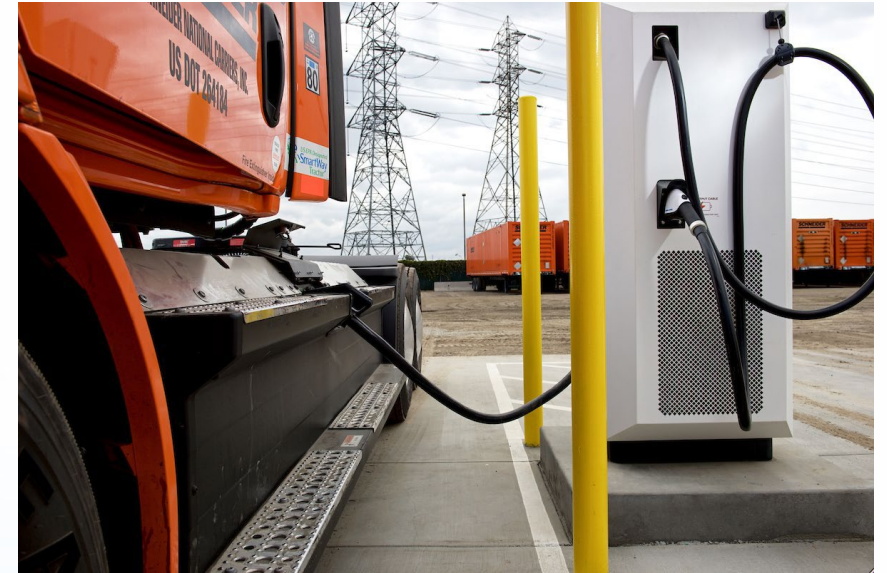
On-road vehicles not already credited or regulated, such as exempted sources

Other Projects Types

Other potential project types proposed

Infrastructure Projects

- On-Road Heavy Duty Infrastructure
 - Battery charging
 - Hydrogen fueling stations
- Other sectors such as off-road and shore power
- Infrastructure must be publicly accessible
- Project applicant must demonstrate a need for additional public charging in the project location



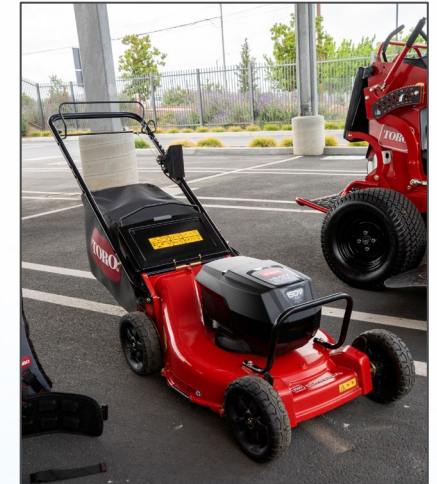
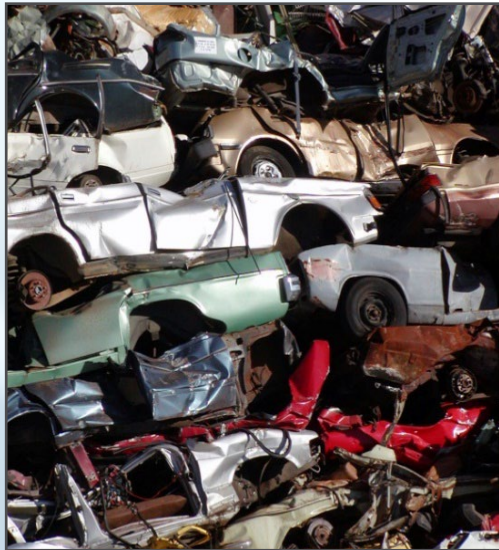
Infrastructure Calculator Methodology

Alternative Fuel Life-Cycle Environmental and Economic Transportation charging and fueling infrastructure calculator:

<https://afleet.es.anl.gov/infrastructure-emissions/public/>

- Used by California Energy Commission
- Methodology based on the displacement of conventional fuel with alternative sources
- Stand alone tool to estimate emission reductions from electric vehicle chargers and alternative fueling infrastructure
- Calculates tailpipe emission reductions
- Calculates criteria pollutants and greenhouse gas emission reductions based on:
 - Charger/station type
 - Vehicle mix such as light-duty and heavy-duty
 - Quantity of fuel the station is dispensing
- Tool provides default values that can be adjusted

Carl Moyer Source Categories



Using Carl Moyer Methods to Calculate Emission Reductions

- Carl Moyer Program
- Program administered by the local air district - [Contacts List](#)
- [Carl Moyer Guidelines](#)
 - Equations provided in Appendix C
 - Factors provided in Appendix D
 - [Sample calculations](#) are available
- Only apply NO_x and PM calculations - cost-effective calculation not applicable

Locomotive Example Calculation Using Moyer

Equation:

$$NOx \text{ emission reductions (Mg/year)} = \left(EF_{bl} \frac{g}{bhp \text{ hr}} - EF_{re} \frac{g}{bhp \text{ hr}} \right) * FCR \frac{bhp \text{ hr}}{gal} * activity \frac{gal}{year} * PL * OP \text{ CA} * \frac{Mg}{1,000,000 \text{ g}}$$

Where:

- EF_{bl} or EF_{re} = *NOx emission factor for baseline or reduced engine (grams/brake horsepower hour)*
- FCR = *fuel consumption rate (brake horsepower hour / gallon)*
- $Activity$ = *annual usage (gallons / year)*
- $OP \text{ CA}$ = *operation in California (%)*

Example:

Replace 1971 uncontrolled switcher locomotive with Tier 4; Activity - 40,000 gallons/year; Operation in CA - 100%; Cost ~\$3.5 million.

$$\left(\frac{16.36 \text{ g}}{bhp-hr} - \frac{1.22 \text{ g}}{bhp-hr} \right) * \frac{15.2 \text{ bhp-hr}}{gal} * \frac{40,000 \text{ gal}}{year} * 1 * \frac{Mg}{1,000,000 \text{ g}} = 9.21 \text{ Mg/year NOx}^*$$

**annual emission reductions can be multiplied by the 5 year project life to calculate total emission reductions*

On-Road Heavy-Duty Vehicles

- On-Road Opportunities
- Replacement must be at least 0.1 g/bhp-hr or cleaner
- Old vehicle must be scrapped
- Half the useful life usage or 5 years
- Advanced Clean Fleet/Truck and Bus exempt vehicles such as:
 - Emergency Vehicles (CVC §165)
 - Military tactical vehicles (Title 13, CCR, §1905)
 - School Buses (CVC §545(a))
 - Dedicated Snow Removal Vehicles
- Emission benefits calculation based on legacy engine provisions - slide above
 - Engine emission standards (Title 13, CCR, §1956.8)

On-Road Example Calculation

Equation:

$$\left(BL \frac{g}{\text{bhp} - \text{hr}} - RE \frac{g}{\text{bhp} - \text{hr}} \right) * CF \frac{\text{bhp} - \text{hr}}{\text{miles}} * \frac{\text{AUL miles}}{2} * \frac{\text{Mg}}{1,000,000 g}$$

Where:

- *BL* = baseline engine standard
- *RE* = replacement engine standard - 0.1 g/bhp-hr or cleaner
- *CF* = Transient cycle conversion factor is the total work of the legacy engine during the FTP transient cycle in bhp-hr/mile divided by 6.5 miles, the cycle length. This factor is engine family specific.
- *AUL* = applicable useful life.

Example:

Replace a model year 1994 medium heavy-duty dedicated snow removal vehicle with 0.05 g/bhp-hr engine.

$$1.51 \text{ Mg } NO_x = \left(\frac{5.0 g}{\text{bhp} - \text{hr}} - \frac{0.05 g}{\text{bhp} - \text{hr}} \right) * \frac{3.3 \text{ bhp} - \text{hr}}{\text{miles}} * \frac{185,000 \text{ miles}}{2} * \frac{\text{Mg}}{1,000,000 g}$$

Other Project Types

- Other projects will be considered on a case-by-case basis, such as:
 - [Supplemental Environmental Projects](#)
 - Community-based projects proposed and implemented by community or air district
 - Funded as part of enforcement settlement
 - Provides preapproved project list
 - Indoor air quality such as gas stove replacements may achieve NO_x reductions
 - AB 617 Community Emission Reduction Program projects requested by communities



Concept for Approval Timeline

- Executive Officer has discretion to approve or deny
- Proposed project review period
 - Initial review for completeness: 15-30 days
 - Final review for approval: 45-60 days

Questions

- Do you have comments on the proposed project types or calculation methods?
- What other types of projects or programs might be considered for legacy engine offsets?
- Should infrastructure projects be allowed for other source categories, such as off-road and shore power?
- What other eligibility criteria should be required for zero-emission infrastructure projects, beyond the proposed publicly accessible and demonstrated need requirements?

Contact Slide

- For questions on this workshop topic, please contact lead staff Neva Lowery, Air Pollution Specialist at: neva.lowery@arb.ca.gov
- For questions on the larger Omnibus program please contact the HD Low NOx Program at: lownox@arb.ca.gov
- If you are interested in receiving automatic email updates on Low NOx development activities, please subscribe at: [Subscribe](#)