



Zero-Emission On-Road Medium- and Heavy-Duty Strategies

The [Governor's Executive Order N-79-20](#)¹ requires that by 2035, all new cars and passenger trucks sold in California will be zero-emission vehicles. Under the order, the California Air Resources Board (CARB) is mandated to develop and propose strategies to achieve 100% zero-emissions from medium and heavy-duty on-road vehicles in the State by 2045 where feasible and by 2035 from drayage trucks. While CARB will work out details on how to achieve this goal during the public outreach process, many of CARB's existing programs and ongoing work focus on advancing and increasing adoption of zero-emission technologies in on-road applications. CARB, with our stakeholder partners, has developed a range of programs that focus on rapid adoption of the cleanest available commercial technologies to innovative demonstration projects supporting commercialization. These highly effective programs support early cost-effective actions that have consistently delivered air quality and climate benefits in an achievable timeframe, creating economic opportunities for individuals and businesses.

Incentives

Incentives are critical for supporting the advancement and wide-scale deployment of zero-emission technologies while simultaneously providing immediate emission reductions to help meet our air quality and climate goals. Traditional, monetary incentives from federal, state and local sources may be used to demonstrate and assess feasibility of zero-emission technologies in various applications or to increase adoption of those technologies before required. Additionally, regulatory programs can provide strong incentives for businesses to develop or adopt zero-emission technologies in order to generate credits, which may be used for compliance or have monetary value (e.g., the Low Carbon Fuel Standard). Below are examples of traditional incentive programs that provide funding for zero-emission technologies:

- [Carl Moyer Program](#): Once commercialized, the Carl Moyer Program increases the deployment of clean technologies for early fleet and equipment turnover by providing incentives for replacing existing vehicles and equipment with the

¹ Executive Order N-79-20: [gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf](https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf)

cleanest available. This program also includes the Voucher Incentive Program which provides funding opportunities for fleet owners with 10 or fewer vehicles to replace their older on-road heavy-duty diesel vehicles.

- [Community Air Protection Incentives for On-Road Heavy-Duty Vehicles](#): Since 2017, the California Legislature budgeted significant funding to support Assembly Bill (AB) 617 (C. Garcia, Chapter 136, Statutes of 2017) with incentives directed by local air districts, focusing on advanced technologies where feasible, to improve air quality in communities of concern.
- [Low Carbon Transportation Program](#): This program focuses on advancing technologies through zero-emission demonstration projects and supports deployment of on-road zero-emission technologies. This program supports many of CARB's on-road demonstration projects focused on advancing zero-emission technology in on-road applications where continued support is necessary for commercialization. Also supported is the [Hybrid & Zero-Emission Truck & Bus Voucher Incentive Program \(HVIP\)](#). HVIP accelerates adoption of cleaner, more-efficient trucks and works directly with dealers to apply the incentive at time of purchase.
- [Truck Loan Assistance Program](#): The program helps small-business fleet owners affected by CARB's In-Use Truck and Bus regulation to secure financing for upgrading their fleets with newer and cleaner trucks.
- [Volkswagen Environmental Mitigation Trust](#): This trust provides funding primarily for "scrap and replace" projects for the heavy-duty sector, including freight trucks, transit, shuttle, school buses and other freight vehicles and equipment.

Regulations

When developing new or amending existing regulations, CARB's goal is to obtain emission reductions to meet federal air quality standards, minimize negative health effects in the State's most impacted and disadvantaged communities, and to lessen climate impacts. CARB collaborates closely with stakeholders to ensure regulations are technologically feasible and cost-effective. These regulations can require manufacturers to develop and commercialize zero-emission technologies as well as increase or accelerate user adoption of those technologies. CARB also sets certification standards through new engine and vehicle emission control regulations, and the development of zero-emission certification standards are critical for the widespread deployment of zero-emission technologies through regulations and incentive programs. Below are some of the regulations that CARB currently has in place or under development to accelerate the deployment and adoption of zero-emission technologies in on-road applications:

- [Innovative Clean Transit](#): This regulation transforms the landscape of transit buses to be zero-emission and demonstrates the results as the beachhead technologies for the entire heavy-duty vehicle sector. All public transit agencies must gradually transition to a 100% zero-emission bus fleet by 2040. By 2026,

50% of large and 25% of small transit agencies' new bus purchases must be zero-emission buses. By 2029, 100% of large and small transit agencies' new bus purchases must be zero-emission buses.

- [Zero-Emission Airport Shuttle](#): This regulation promotes the development and use of zero-emission airport ground transportation. Vehicles like airport shuttles that operate on fixed routes, have stop-and-go operations, maintain low average speeds, and in a central location are ideal candidates for targeting zero-emission technologies. By end of 2027, an airport shuttle fleet must have 33% of its shuttles be zero-emission. By end of 2035, 100% of its shuttles must be zero-emission.
- [Zero-Emission Powertrain Certification](#): This regulation established a heavy-duty zero-emission powertrain standard and certification process that will help reduce variability in the quality and reliability of heavy-duty electric and fuel cell vehicles, ensure information regarding these vehicles and their powertrains are effectively and consistently communicated to purchasers, and accelerate progress towards greater vehicle reparability. This certification process will be required by the Zero Emission Airport Shuttle regulation starting in model year 2026 and the Advanced Clean Trucks regulation starting in model year 2024.
- [Advanced Clean Trucks](#): This regulation will accelerate a large-scale transition of zero-emission medium and heavy-duty vehicles from Class 2b to Class 8. Manufacturers who certify Class 2b-8 chassis or complete vehicles with combustion engines would be required to sell zero-emission trucks as an increasing percentage of their annual California sales from 2024 to 2035. By 2035, zero-emission truck/chassis sales would need to be 55% of Class 2b – 3 truck sales, 75% of Class 4 – 8 straight truck sales, and 40% of truck tractor sales.
- [Advanced Clean Fleets](#): This proposed regulation has a goal of accelerating the deployment of zero-emission medium and heavy-duty trucks in order to achieve a zero-emission California truck and bus fleet by 2045 where feasible, and significantly earlier for some market segments, such as last mile delivery and drayage applications.
- [Zero Emission Transport Refrigeration Unit \(TRU\)](#): This proposed regulation will transition truck TRUs to zero-emission, impose a stricter diesel particulate matter (PM) emission standard for newly manufactured TRUs in the remaining categories, require the use of lower global warming potential refrigerant and include facility reporting requirements.