July 14, 2025

Liane Randolph, Chair
California Air Resources Board
1001 I Street
Sacramento, CA 95814

RE: Comments on Proposed Amendments to the Advanced Clean Trucks Regulation and the Zero-Emission Powertrain Certification Test Procedure

Dear Chair Randolph, Board Members, and CARB Staff,

With federal leadership absent on sustainable and equitable transportation, California's leadership is more vital than ever. The state must continue to drive innovation, establish clear market signals, and provide feasible pathways for industry to transition toward zero-emission goods movement. On behalf of the Union of Concerned Scientists (UCS), the Natural Resources Defense Council (NRDC), and our organizations' combined millions of supporters nationwide, we thank you for the opportunity to provide input on these consequential amendments to the Advanced Clean Trucks Rule (ACT).

Ensuring ACT Delivers on its Goals

Five years after its adoption, ACT remains a foundational policy for advancing a cleaner, more efficient, and cost-effective freight system. Its design offers a practical and impactful approach to reducing air and climate pollution from medium- and heavy-duty vehicles (MHDVs) and achieving federal air quality standards. Additionally, increasing the availability of zero-emission MHDVs is a vital step toward improving public health in communities near freight hubs and corridors. ACT provides covered manufacturers with technologically feasible and highly flexible pathways to gradually scale zero-emission MHDV offerings over the next decade while sending strong market signals that have catalyzed infrastructure investment.

We recognize that additional flexibilities may be necessary to address slower-than-expected sales of zero-emission tractor trucks in some states. Unfortunately, some truck manufacturers have actively sabotaged progress by spreading misinformation, manipulating dealer networks, and manufacturing a false sense of crisis to delay stronger pollution standards and protect their profits. [1, 2] These actions threaten public health, hinder climate progress, and undermine the innovation needed for a sustainable freight system.

[1] Ortiz, Guillermo A. 2024. "New Analysis Indicates Truck Makers Are Manufacturing a False Crisis." *Natural Resources Defense Council* (blog). October 23. https://www.nrdc.org/bio/guillermo-ortiz/truckmakers-are-manufacturing-false-crisis.
[2] Cooke, Dave. 2024. "Trucking Industry Disinformation Will Cost Lives." *The Equation* (blog). October 30. https://blog.ucs.org/dave-cooke/trucking-industry-disinformation-will-cost-lives/.

We recognize the need for interstate pooling among Class 7-8 tractor group credits to better manage market fluctuations and assist states with less mature markets. By adopting these flexibilities, additional states may be interested in pursuing ACT adoption and implementation. However, **CARB must maintain strong guardrails around these flexibilities, implementing them in a limited and targeted fashion,** to ensure the preservation of much-needed air quality, climate, and economic benefits of the rule. By balancing robust safeguards with additional flexibility, these amendments can bolster ACT's stability and effectiveness.

As written**, we have significant concerns with the proposed changes to Section 1963.3(c)(3).** Our analysis suggests that the proposed credit conversion rates substantially overvalue the emission reduction benefits of smaller MHDVs. Additionally, the static cap on upward credit fungibility may severely limit, or even eliminate, requirements for the sale of zero-emission Class 7-8 tractor trucks in most ACT states.

ACT Must Ensure Right-Sized Deployments of NZEVs

While battery-electric technology is expected to dominate deployments of zero-emission vehicles (ZEVs), limited applications of other technologies such as near-zero-emission vehicles (NZEVs) may be required for niche duty cycles. ACT should ensure that NZEVs are deployed in limited use cases where they represent the best available technology. As written, ACT would allow credit generations for Class 2b-3 NZEVs, even as battery-electric models have approached 30 percent of the market for Class 2b-3 MDVs in states like California and Washington in recent Model Years (MY).[3] ACT should avoid overvaluing NZEV credits, particularly where fully zero-emission technologies are viable and growing.

Proposed language under Section 1963.2(b)(2) would lower the minimum all-electric range (AER) for NZEVs from 75 miles to 45 miles beginning with MY 2030. For previous MYs, AER is determined under California's Phase 2 Greenhouse Gas Standards and increases between 10 and 15 miles each year.[4] We suggest that, at the least, AER be set at *no less than 50 miles* for MYs 2030-2032, mirroring the previous increase in AER under Phase 2, followed by a second increase for MYs 2033-2035 that reaches ACT's original requirement of 75 miles.

Additionally, we suggest that CARB analyze alternative NZEV standards for vehicles with low-mileage, high-energy demand duty cycles. Vehicles such as hydro excavators, certain on-road construction vehicles, and other specialty vehicles may be better aligned with NZEV standards based on typical duty cycle or the energy density of a zero-emission fuel source, rather than AER, potentially allowing for lower emissions during operation.

ACT must also ensure strict accountability for NZEVs under the rule. Analyses of NZEVs in the light- and medium-duty sectors have shown that these vehicles operate in all-electric modes far less often than anticipated by manufacturers and regulators when determining fuel economy, further reducing their emission reduction potential compared to analogous battery-electric models.[5, 6, 7] CARB has acknowledged this issue among NZEVs previously and requested that federal regulations take more conservative approaches when estimating their benefits.[8] Although it is reasonable to assume that commercial fleets operating NZEVs may have stronger economic motivations to better utilize a vehicle's AER, non-commercial NZEV sales among Class 2b-3 vehicles may also apply to ACT. We strongly recommend that CARB

[3] Wilson, Sam. 2025. *Ready for Work 2.0: On the Road to Clean Trucks.* Cambridge, MA: Union of Concerned Scientists. https://doi.org/10.47923/2025.15779.

[4] California Air Resources Board. 2021. "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles." https://ww2.arb.ca.gov/sites/default/files/2022-09/Phase%202%202019%20version_0.pdf

[5] European Commission. 2024. "Commission report under Article 12(3) of Regulation (EU) 2019/631 on the evolution of the real-world CO2 emissions gap for passenger cars and light commercial vehicles and containing the anonymised and aggregated real-world datasets referred to in Article 12 of Commission Implementing Regulation (EU) 2021/392." https://climate.ec.europa.eu/document/download/b644dafe-1385-4b56-98d9-21e7e9f3601b_en?filename=report.pdf.

[6] Isenstadt, Aaron, Zifei Yang, Stephanie Searle, John German. 2022. *Real-World Usage of Plug-in Hybrid Electric Vehicles in the United States.* Washington, DC: International Council on Clean Transportation. https://theicct.org/wp-content/uploads/2022/12/real-world-phev-us-dec22.pdf.

[7] Center for Biological Diversity, Conservation Law Foundation, Environmental Law & Policy Center, Natural Resources Defense Council, Public Citizen, Sierra Club, and the Union of Concerned Scientists. 2023. Letter to EPA Re: Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles, Docket ID No. EPA-HQ-OAR-2022-029.

[8] California Air Resources Board. 2023. Letter to EPA Re: Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles, Docket ID No. EPA-HQ-OAR-2022-029.

avoid overvaluing NZEV sales under the rule and survey commercial fleets to determine if NZEVs are being utilized to their fullest potential and under the best scenarios.

Proposed Credit Fungibility Expansion May Stall Zero-Emission Tractor Truck Sales

The proposal to allow manufacturers to convert up to 1,000 non-tractor credits to tractor credits under Section 1963.3(c)(3) could significantly undermine zero-emission tractor truck sales in both California and 177 states. While pooling alone may be insufficient to ensure programmatic viability and some upward credit fungibility for surplus non-tractor credits may be necessary, particularly in states with small markets for tractor trucks, ACT must be designed such that deployments of zero-emission tractor trucks continue to grow even as additional flexibilities come online. **Under the current proposal, many states could see no sales of zero-emission tractor trucks whatsoever.**

Our concerns are evidenced by an analysis of anticipated ACT credit balances in California and 177 states for MYs 2027 and 2028. Under a conservative scenario where manufacturers evenly split Class 2b-3 deficits between ACC and ACT and zero-emission MHDV sales grow at a business-as-usual rate, nearly all ACT states are estimated to have surplus non-tractor credit balances that far exceed tractor deficits (See Table 1). Even after the discounted rate of 80 percent for non-tractor credits applied to tractor deficits, the balance of surplus non-tractor credits exceeds tractor deficits by several orders of magnitude in most ACT states estimated to have surplus non-tractor credits. The current proposal may very well undermine ACT's goal of increasing availability and sale of zero-emission tractor trucks.

Table 1: Estimated ACT Tractor Credit Deficits and Surplus ACT Non-Tractor Credits (MYs 27-28)[9]

	MY2027		MY2028	
State	Tractor Credit Deficit	Non-Tractor Credit Surplus after 20% discount	Tractor Credit Deficit	Non-Tractor Credit Surplus after 20% discount
CA	-4,387.4	87,891.3	-6,025.4	93,577.2
CO	-351.2	9,624.0	-482.3	9,142.2
MA	-277.0	3,582.2	-380.4	1,870.3
MD	-360.2	9,341.3	-494.7	8,835.6
NJ	-1,023.6	4,334.5	-1,405.8	545.8
NM	-100.8	-330.8	-138.4	-1,238.3
NY	-789.2	3,989.1	-1,083.9	-736.4
OR	-942.5	4,222.8	-1,294.3	3,161.0
RI	-35.2	37.2	-48.4	-357.7
VT	-55.7	601.5	-76.5	328.8
WA	-983.9	19,950.5	-1,351.2	21,161.6

Furthermore, the proposed conversion rate of a flat 80 percent for non-tractor groups credits converted to tractor group credits among all vehicle types **vastly overestimates the credit value of Class 2b-3 MHDVs compared to Class 7-8 tractor trucks when considering the significantly higher pollution contributions of tractor trucks**. Our understanding of the proposed language suggests that a surplus credit generated from the sale of a zero-emission Class 2b-3 vehicle, valued at 0.80 credits, could be converted to a Class 7-8 tractor group credit at the rate of 80 percent of its original

[9] Our analysis of future ACT credits and deficits is based on national MHDV registrations of Class 2b-8 vehicles from 2021-2024, including private, public, and commercial vehicles. Data were provided by S&P Global Mobility and modeling was completed by the Union of Concerned Scientists. Our assumptions account for an even split of Class 2b-3 deficits between ACT and ACC by manufacturers, which we see as a conservative scenario, with an annual market growth rate of 3 percent among all vehicle classes. Annual growth of ZEV sales for each ACT group is calculated as the absolute value of the average of the previous three MYs ZEV market share added to the previous MY ZEV sales share. Deficit exemptions under Section 1963.1(a)(1) are applied at a rate of 6 percent of overall estimated MY26 Class 7-8 tractor truck sales in California only.

value, resulting in 0.64 credits under the tractor group after conversion or roughly 3.9 Class 2b-3 ZEVs per ICE tractor deficit.

These conversion rates must take differing emissions rates among vehicle types into consideration – we strongly suggest that CARB restructure credit conversion rates under this section using EMFAC emission rates. For example, **EMFAC shows that running NOx emission rates for a diesel Class 8 tractor truck are over *24 times higher* on a mile-per-mile basis compared to a gasoline Class 2b vehicle** (See Table 2). Given that MHDVs are the largest contributor to NOx emissions nationwide, a precursor to ground-level ozone, credit conversion rates must properly account for differing emissions among vehicle types. Additionally, the conversion rates must also consider where and how different vehicles operate. Tractor trucks operating in and around freight hubs are primary contributors to poor air quality in adjacent communities – allowing high rates of Class 2b-3 group credits to be converted to Class 7-8 tractor truck group credits may undermine the benefits this rule provides to the communities where relief is needed the most.

Table 2: Comparing EMFAC Running Emissions Estimates by Fuel Type: MY2024 Class 2b Vehicle and Class 8 Tractor Truck[10]

Vehicle Type	Fuel Type	NOx (g/mi)	$PM_{2.5}$ (g/mi)	CO_2 (g/mi)
Class 2b Vehicle	Gasoline	0.0319	0.0011	610.34
Class 8 Tractor Truck	Diesel	0.7698	0.0115	1,420.61
	Comparison (g/mi)	***24x NOx***	***10.6x $PM_{2.5}$***	***2.3x CO_2***

In addition to correcting the conversion rates, **we propose that CARB restructure this flexibility by employing a dynamic, market-based ceiling on upward credit fungibility, rather than a static number.** A dynamic approach to this flexibility can guarantee non-zero zero-emission tractor sales, ensuring continued and expanded zero-emission tractor availability and preserving the market signals for infrastructure development inherent to ACT, while also ensuring programmatic stability and additional flexibility for covered parties.

For example, a dynamic ceiling that meets these goals could take the following approach:

- For years where 999 or fewer Class 7-8 tractor trucks are sold in the state among all manufacturers, tractor manufacturers may offset a net deficit balance for the Class 7-8 tractor group with surplus non-tractor credits up to three-quarters of that MY's requirement for the Class 7-8 tractor group under Table A-1 ZEV Sales Percentage Schedule.
- For years where 1,000 or more Class 7-8 tractor trucks are sold in the state among all manufacturers, tractor manufacturers may offset a net deficit balance for the Class 7-8 tractor group with surplus non-tractor credits up to one-quarter of that MY's requirement for the Class 7-8 tractor group under Table A-1 ZEV Sales Percentage Schedule.
- Surplus non-tractor credits may be converted to Class 7-8 tractor credits at the following rates:
    - Class 2b-3 ZEV: 25 percent of their original value
    - Class 4-8 Straight Truck ZEV: 80 percent of their original value
    - Class 2b-3 NZEVs: Ineligible for credit conversion
    - Class 4-8 Straight Truck NZEV: 40 percent of their original value

This idea, although not thoroughly analyzed at this time, may allow for additional flexibility in states with smaller markets for Class 7 and 8 tractor trucks while better preserving the vital requirements for zero-emission Class 7 and 8 tractor truck deployments in states with stronger markets. We would welcome a conversation with CARB staff to discuss

[10] Comparison using EMFAC2025 (v2.0.0) Emission Rates (California; Statewide; Annual CY2025) for diesel-fueled T7 POLA Class 8 and LHD1 Public vehicle types. Accessed July 7, 2025. https://arb.ca.gov/emfac/emissions-inventory/bab108135706bbeccc5114689efa7eb002ccffab.

concepts for more dynamic and protective approaches to the ceiling for upward credit fungibility and credit conversion rates.

Safeguarding Accountability Around Credit Retirement

We recognize that the proposed flexibilities under Section 1963.3(c)(3) may warrant corresponding changes to ACT's credit retirement order under Section 1963.3(c)(1) and (2). However, we have some concerns that the proposed language may reduce accountability among covered parties and potentially provide additional value to credits generated through the sale of NZEVs. We request that the credit retirement methodology be structured to provide the greatest value to ZEV sales.

Regarding accountability, we would request that any deviations from the retirement methodology under Section 1963.3(c)(2) be subject to approval by CARB staff in addition to the reporting requirements under Section 1963.4 and for such plans to be made publicly available as much as possible. Staff approval would help to promote accountability among covered parties by adding a layer of review and reducing potential loopholes for bad actors to exploit.

ACT should prioritize non-combustion vehicles at every point possible. Although MHDV NZEV models are not widely available today, unchecked flexibilities for NZEVs may influence their increased deployment in situations where they may not be the best available feasible technology for emission reductions. In all cases, flexibilities for NZEV credits should be limited and closely monitored by CARB staff to influence the sale and availability of ZEV models.

Protecting Public Health while Strengthening ACT

ACT has already proven to be a cornerstone for commercial vehicle electrification. Between 2019 and 2023, states that had adopted ACT saw a much greater share of zero-emission commercial MHDV registrations than non-ACT states.[11] Even so, rates of ZEV sales vary significantly among ACT states and those with lagging sales, particularly among zero-emission Class 7-8 tractor trucks, have experienced or are anticipated to experience some programmatic instabilities.

CARB's proposal to allow manufacturers to transfer surplus credits to states with net deficits may provide greater programmatic stability as zero-emission MHDV markets continue to develop, particularly in smaller states, and allow ACT states ahead of the game in infrastructure deployments to see additional sales of zero-emission MHDVs. Additionally, we anticipate that these additional flexibilities may influence the adoption of ACT in additional states, further strengthening the program and expanding the availability of zero-emission MHDVs.

We support an approach that includes guardrails such as only allowing transfers from states with surplus credits to states with net deficit credits and structuring the pooling allowance with limited percentages that gradually decline through 2035. However, like our concerns regarding Section 1963.3(c)(3), we are concerned that the proposed language would allow manufacturers to address Class 7-8 tractor group deficits with converted Class 2b-3 group surpluses from another state. Even if our concerns around the upward credit fungibility discounts were addressed, **allowing pooling among Class 2b-3 group credits converted to Class 7-8 tractor credits may slow the transition to zero-emission tractors in and around the communities that need air pollution relief the most**.

We also must highlight that, rather than using the rule's built-in flexibilities, manufacturers have imposed arbitrary sales quotas on dealers—requiring the purchase of electric trucks before allowing access to diesel models, even when suitable electric alternatives exist. This practice, known as *ratioing*, has led to steep declines in truck sales and created an artificial crisis falsely attributed to ACT compliance. Manufacturers have also refused to participate in the ACT credit market, despite having access to surplus and early action credits, and have inflated electric truck prices in the U.S. compared to international markets.[12] These actions violate the spirit of the Clean Trucks Partnership and appear designed to pressure regulators into weakening pollution standards.

[11] Wilson, Sam. 2025. *Ready for Work 2.0: On the Road to Clean Trucks.* Cambridge, MA: Union of Concerned Scientists. https://doi.org/10.47923/2025.15779.

CARB must hold manufacturers accountable for these tactics. Regulatory flexibilities should not reward bad-faith behavior or allow industry actors to externalize the costs of noncompliance onto the public. The movement of goods through our freight system should not come at the expense of climate and public health.

Credit pooling, if not carefully managed, could result in fewer sales of zero-emission trucks in some areas, diminishing local air quality benefits even if statewide emissions targets are met. As such, we request that CARB work closely with relevant agencies and stakeholders, particularly organizations that represent communities experiencing environmental injustices, to understand and respond to the impacts of pooling using the data provided under Section 1963.4(d) and other relevant information.

Conclusion

We appreciate CARB's continued leadership in advancing clean transportation and thank you for the opportunity to provide input on these critical amendments. With thoughtful adjustments and strong safeguards, the ACT rule can continue to drive innovation, protect public health, and ensure a just and equitable transition to zero-emission freight.

Sincerely,

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