

May 28, 2020

Mary Nichols, Chair
California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

RE: Proposed amendments to the draft Advanced Clean Trucks standard

Dear Chair Nichols and Members of the Board,

We write in strong support of changes proposed to the draft "Advanced Clean Trucks" standard. These modifications include increasing annual sales targets for electric vehicles across all heavy-duty vehicle categories; beginning Class 2b pickup truck electrification targets in 2024 rather than 2027; and continuing to increase electric vehicle sales targets through 2035 rather than 2030.

We estimate that the latest proposal will result in the sale of 100,000 electric trucks by 2030 and 300,000 by 2035.¹ This is twice the number of electric trucks that would have been sold in California by 2035 under the previous draft.

Adoption of the proposed Advanced Clean Trucks standard is needed to take the electric truck industry from one marked by press releases and pilot projects to one of wide-scale production. As of last fall there were 20 manufacturers making or intending to make (within the next two years) 32 different models of electric trucks in categories subject to this policy;² however, sales of electric trucks remain modest and limited beyond those aided with state funding.

A manufacturer's sales standard is a proven strategy to increase the sales of electric vehicles. California's "Zero-Emission Vehicle" standard requires automakers to sell electric passenger vehicles and is a major reason for the state's disproportionate adoption of electric vehicles. Despite having 11 percent of the country's vehicles, roughly 50 percent of the 1 million-plus electric and plug-in electric cars sold in the US have been in California.³

The Advanced Clean Trucks standard will complement other critical policies that are enabling electrification of vehicles in California. Such policies include the state's Low Carbon Fuels Standard, which reduces electricity costs for trucks by approximately \$0.09 to \$0.14 per kWh today and \$0.07 to \$0.12 per kWh in 2030, depending on the fuel efficiency improvements of the electric vehicle compared with a diesel vehicle.⁴ The Advanced Clean Trucks standard will also support more than \$700 million in charging infrastructure investments for heavy-duty electric vehicles that have been approved and made by

¹ Based on CARB's estimate of annual truck sales and a 1 percent annual growth in sales. See O'Dea, J. 2020. "The Biggest Step To-Date on Electric Trucks." The Equation (blog). April 29. Online at <https://blog.ucsusa.org/jimmy-odea/the-biggest-step-to-date-on-electric-trucks>.

² O'Dea, J. Availability of Electric Trucks and Buses in the United States as of November 2019. Cambridge, MA: Union of Concerned Scientists. Online at www.ucsusa.org/sites/default/files/2019-12/Ready%20for%20Work_appendix.pdf.

³ O'Dea, J. 2019. "How Can We Get More Electric Trucks on the Road?" The Equation (blog). April 23. Online at <https://blog.ucsusa.org/jimmy-odea/how-can-we-get-more-electric-trucks-on-the-road>.

⁴ O'Dea, J. 2019. Ready for Work: Now Is the Time for Heavy-Duty Electric Vehicles. Cambridge, MA: Union of Concerned Scientists. Online at www.ucsusa.org/resources/ready-work.

the California Public Utilities Commission and California Energy Commission.⁵ CARB's Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) has already awarded funding for over 2,700 electric trucks as of last month.⁶ For reference, we estimate the new Advanced Clean Trucks proposal will result in the sale of 4,000 electric trucks in the first year of the policy's implementation (model year 2024) out of roughly 75,000 total sales.

The Advanced Clean Trucks standard will accelerate technology cost declines and spur the transition to zero-emission vehicles in a market dominated by internal combustion technology. The policy's most recent amendments reflect written and oral comments from dozens of environmental, labor, health, and community organizations; businesses; state legislators; and CARB Board Members calling for stronger sales targets.⁷

While the amendments to the draft Advanced Clean Trucks standard represent a major step towards vehicle electrification, significant work will remain in transitioning heavy-duty vehicles from diesel to battery and fuel cell electric technologies. The 300,000 electric trucks estimated to be sold by 2035 would represent 15 percent of the 1.9 million total trucks estimated to be on the road in California at that time.⁸ Analysis by researchers at Lawrence Berkeley National Laboratory indicates that electric trucks should comprise 20 percent of the state's heavy-duty vehicle fleet by 2030 to be consistent with the state's goal of carbon neutrality by 2045.⁹

We recommend three actions CARB should take to ensure the electrification of trucks beyond adoption of the Advanced Clean Trucks standard. First, CARB should formally commit to timelines for transitioning trucks in California to electric technologies. Initial timelines were laid out in a recent public workshop and are critical to sending a clear signal that most, if not all, trucks in the state will be electric within the next 20 years.¹⁰

Second, CARB must expeditiously pursue standards for the electrification of truck fleets, similar to policies passed for transit buses and airport shuttle buses. These fleet standards should be consistent with long-term electrification targets related to the first recommendation.

⁵ Portillo, P., et al. 2020. Letter to California Air Resources Board Chair Mary Nichols, March 16. Online at https://static1.squarespace.com/static/5d8d2f30b86647459c7d643c/t/5eb23e2d6c7bd55578b1be4e/1588739631065/ACT+Coalition+Electric+Truck+Charging+Infrastructure+Letter_3-16-20.pdf.

⁶ Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project. 2020. Program Numbers. Online at www.californiahvip.org/tools-results/#program-numbers.

⁷ (a) California Air Resources Board. 2019. Comment Log for Proposed Advanced Clean Trucks Regulation. Online at <https://www.arb.ca.gov/lispub/comm/bccommlog.php?listname=act2019>.

(b) California Air Resources Board. 2019. Transcript of the December 12 Meeting of the California Air Resources Board. Online at https://ww3.arb.ca.gov/board/mt/2019/mt121219.pdf?_ga=2.267111182.1867290213.1590610114-2041466267.1568674228.

⁸ Today, there are 1.7 million Class 2b-8 vehicles registered in California and in vehicle categories subject to the Advanced Clean Trucks standard. With an annual growth of 1 percent, this population will grow to roughly 1.9 million vehicles in 2035.

⁹ McCall, M. and A. Phadke. 2019. Clean Trucks Standards Consistent with Carbon Neutrality are Economically and Environmentally Compelling. Berkeley, CA: Lawrence Berkeley National Laboratory. Online at www.arb.ca.gov/lispub/comm/bccomdisp.php?listname=act2019&comment_num=108&virt_num=97.

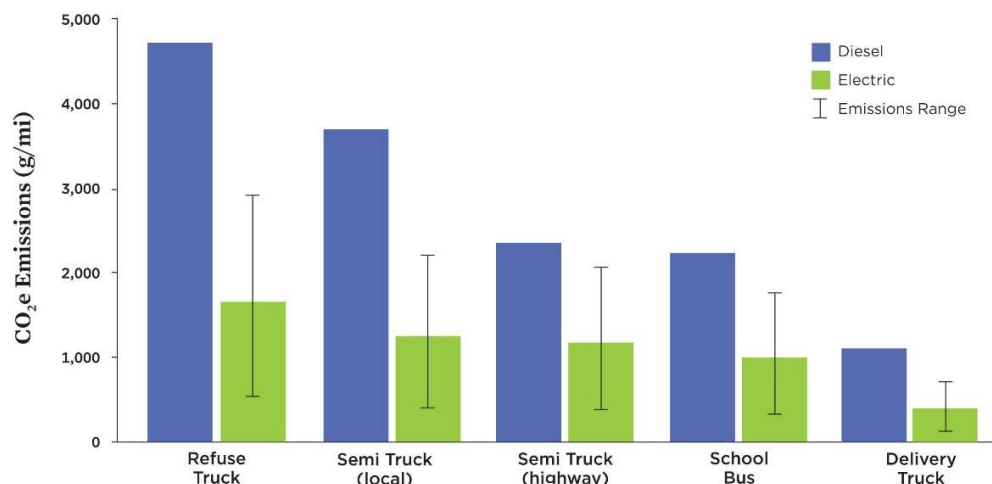
¹⁰ California Air Resources Board. 2020. "Proposed Advanced Clean Truck Sales Regulation: Potential Modifications." Online at https://ww2.arb.ca.gov/sites/default/files/2020-02/200220presentation_ADA_0.pdf.

Third, CARB should use its position as a leader in truck electrification to share lessons learned with public agencies and fleets outside of California. Increasing adoption of electric trucks outside of the state will bolster innovation, expand model availability, and decrease costs beyond what is driven by the California market alone. We support CARB’s efforts in developing a memorandum of understanding with other states to accelerate electric truck deployments.¹¹

As in California, heavy-duty vehicles disproportionately contribute to air pollution and global warming emissions at the national level. Despite making up 10 percent of vehicles, Class 2b-8 heavy-duty vehicles contribute 45 percent of NO_x, 57 percent of direct PM_{2.5}, and 28 percent of global warming emissions from on-road sources in the US.¹²

In addition to zero tailpipe emissions, battery electric trucks have 44 to 79 percent lower life cycle global warming emissions compared to diesel when charged on the average US grid mix (2016) and 68 to 88 percent lower emissions when charged on the California grid mix (2016), depending on the vehicle application (e.g., long-haul semi-truck vs. local delivery truck).¹³

Life Cycle Global Warming Emissions for Different Battery Electric Heavy-Duty Vehicles on the Average US Grid (generation-weighted) in 2016



All types of battery electric heavy-duty vehicles – no matter the grid mix they are charged on in the US (represented by the emissions range) – have lower life cycle global warming emissions than the comparable diesel vehicle. Emissions associated with charging heavy-duty vehicles in California are near the bottom of the range bars shown, with California’s grid having emissions greater only than the AKMS (Alaska) and the NYUP (upstate New York) grid regions.¹⁴

¹¹ California Air Resources Board. 2019. “California and Seven States Commit to Faster Transition to Zero-Emission Trucks and Buses.” Online at <https://ww2.arb.ca.gov/news/california-and-seven-states-commit-faster-transition-zero-emission-trucks-and-buses>.

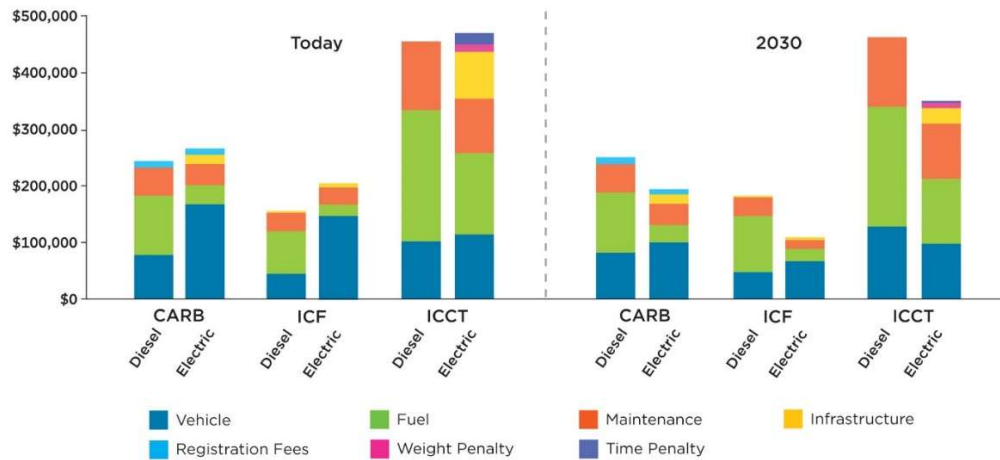
¹² O’Dea, Ready for Work.

¹³ O’Dea, Ready for Work.

¹⁴ O’Dea, Ready for Work.

There is also a growing consensus that electric trucks are becoming cost competitive with diesel technologies today and will offer measurable savings with continued decreases in battery costs over the next 10 years. Vehicle applications with the highest annual mileages are expected to benefit from electrification the most due to the significant fuel and maintenance savings electrification can provide over diesel.

Total Cost Comparisons, Class 6 Delivery Trucks



A recent survey of studies examining the total cost of owning electric trucks, including those by the California Air Resources Board (CARB), ICF, and the International Council on Clean Transportation (ICCT) indicates that electric trucks are becoming cost competitive with diesel technologies today and will offer measurable savings within the next 10 years. For consistency across studies, the cost estimates above do not include financial incentives for charging infrastructure or vehicle purchases, nor do they include the significant fuel savings discussed above from California’s Low Carbon Fuel Standard.¹⁵

The environmental and economic benefits of electric trucks underscore the importance of adopting the amended Advanced Clean Trucks standard. If passed, this proposal will be the most significant policy for electric trucks to-date anywhere. We applaud CARB for taking this first step and for staff’s effort in seeing this policy through a rigorous regulatory process. We also call attention to actions needed beyond this single policy to achieve healthy air in communities burdened by vehicle pollution and to minimize the effects of global warming. UCS will continue to vigorously support such efforts.

Sincerely,

Jimmy O’Dea, Ph.D.
 Senior Vehicles Analyst
 Union of Concerned Scientists

¹⁵ Including financial incentives for vehicle purchases and charging infrastructure, as well as fuel savings from the Low Carbon Fuel Standard, the total cost of ownership of electric trucks and buses is lower than diesel today for 19 of 20 vehicle scenarios examined across three different studies (CARB, ICF, and ICCT). The scenarios include several types of delivery trucks, semi-trucks, transit buses, and school buses. See O’Dea, Ready for Work, and citations within.