

May 1, 2024

Clerk of the Board
California Air Resources Board (CARB)
1001 I Street
Sacramento, CA 95814

Re: Proposed Amendments to the Advanced Clean Trucks Regulation

Chair Randolph and Members of the Board:

Tesla appreciates the opportunity to submit these brief comments regarding the recently proposed “Amendments to the Advanced Clean Trucks Regulation and the Zero-Emission Powertrain Certification Test Procedure” issued on March 26, 2024.¹ The Advanced Clean Trucks (ACT) regulation is a cornerstone policy to reduce the significant public health and welfare impacts of medium and heavy-duty truck emissions through the transition away from conventional engines and reliance on fossil fuels. Accordingly, as provided below, Tesla continues to support the need for, and scope of, the ACT and Advanced Clean Fleets programs.

I. Background

Tesla’s mission is to accelerate the world’s transition to sustainable energy. Moreover, Tesla believes the world will not be able to solve the climate change crisis without directly reducing air pollutant emissions - including carbon dioxide and other greenhouse gases - from the transportation and power sectors.²

To accomplish its mission, Tesla designs, develops, manufactures, and sells high-performance fully electric vehicles and energy generation and storage systems, installs, and maintains such systems, and sells solar electricity.³ Consistent with this effort, recently, Tesla was ranked as the world leader in the transition to vehicle electrification.⁴

Specific to the trucking sector, in 2017, Tesla introduced the Tesla Semi - a Class 8 truck designed from the ground up to be the most efficient and safest truck on the market. The Tesla

¹ CARB, Amendments to the Advanced Clean Trucks Regulation and the Zero-Emission Powertrain Certification Test Procedure (March 26, 2024) *available at* <https://ww2.arb.ca.gov/rulemaking/2024/advancedcleantucks>

² See, Tesla, Master Plan Part 3 (Apr. 5, 2023) *available at* https://www.tesla.com/ns_videos/Tesla-Master-Plan-Part-3.pdf

³ See, Tesla, Impact Report 2022 (Apr. 24, 2023) *available at* https://www.tesla.com/ns_videos/2022-tesla-impact-report-highlights.pdf

⁴ See, ICCT, The Global Automaker Rating 2022: Who Is Leading the Transition to Electric Vehicles? (May 31, 2023) *available at* <https://theicct.org/publication/the-global-automaker-rating-2022-may23/>

Semi represents an opportunity to have an outsized impact on reducing GHG, particulate matter (PM), and (nitrogen oxides) NO_x emissions from goods movement and transportation. The Semi comes in two models with ranges of 300 and 500 miles respectively and demonstrates that an all-electric truck can meet virtually any duty cycle when paired with the Semi charging system that Tesla is developing.

Combination trucks – of which the vast majority are semi-trucks – in the U.S. account for just 1.1% of the total fleet of vehicles on the road. As EPA has recognized, because combination trucks have high fuel consumption due to their weight and heavy utilization, they account for approximately 25% of all U.S. vehicle GHG emissions.⁵ Accordingly, rapidly electrifying the heavy-duty truck segment is an essential part of transitioning the world to sustainable energy.

With both the U.S. and E.U. having approved higher weight allowances for electric heavy-duty trucks, Tesla expects battery electric vehicle (BEV) payloads to be at least as high as they would be for a diesel truck. In the E.U., electric semi-trucks are permitted to be 2 tons (~4,400 pounds) heavier than diesel equivalents, and in the U.S. the allowance is 0.9 tons (2,000 pounds). As described at Tesla's Semi delivery event, when fully loaded, the Tesla Semi has demonstrated achieving five hundred miles of range and done so through aerodynamics and highly efficient motors and being able to reach an efficiency of less than 2 kWh/mile.⁶ Indeed, recent use and deployment of the Tesla Semi in California have demonstrated that Class 8 BEV technology is available and capable of addressing freight fleet needs.⁷

II. Tesla Employees' Public Health and Welfare Are Adversely Impacted by California's Harmful Air Quality and ACT Will Significantly Reduce Tailpipe Air Pollution to Assist in Addressing this Problem.

Tesla is the largest manufacturing employer in California, employing tens of thousands of people across the state. It thus has a unique interest not only in the manner in which this regulation affects the products it produces, but in the protection of its workforce as well.

Tesla manufactures and assembles vehicles, its advanced 4680 lithium-ion battery cells, and battery packs at its factories in Fremont, CA.⁸ The Tesla Design Studio is located in Hawthorne, CA, and the company also produces Megapack, a utility-scale grid storage battery, at its factory

⁵ 88 Fed. Reg. 25926, 25928 (Apr. 27, 2023).

⁶ Tesla, Tesla Semi Delivery Event (Dec. 1, 2022), available at <https://digitalassets.tesla.com/tesla-contents/image/upload/IR/Tesla-Semi-Delivery-Event>

⁷ See, NACFE, RunOnLess, PepsiCo (Aug. 3, 2023) (featuring the Tesla Semi) available at <https://runonless.com/roled-profiles/pepsico/>

⁸ See, Inside EVs, Tesla 4680 Cell Production Ramping Quickly, Won't Impact Cybertruck (Oct. 20, 2022) available at <https://insideevs.com/news/617588/tesla-4680-cell-ramp-wont-impact-cybertruck-other-models/>

in Lathrop, CA.⁹ In 2021, Tesla’s investment in California helped deliver \$10.4 billion (\$28.5 million per day) to California’s gross state product.¹⁰

Like most Californians, Tesla employees are impacted by the state’s poor air quality.¹¹ This is especially true of Tesla employees who live in serious and severe non-attainment areas like the San Francisco metro area and the Central Valley.¹² Not only do these California residents regularly confront the health impacts associated with these harmful levels of air pollution, as climate change accelerates these impacts are only forecast to increase. This “climate penalty” is already negating some of the progress California’s policies have made to combat dangerous levels of, *inter alia*, ground level ozone and fine particulate matter.¹³ Indeed, a recent study found that the “climate penalty” has directly impacted California, and that:

In California alone, the average number of Green Days seen across the state has decreased from 136 to 93 (-32%), and the average number of Yellow Days has decreased from 200 to 146 (-27%). Subsequently, the average number of Orange Days has increased from 15 to 55 (+267%), Red Days increased from 10 to 16 (+60%), Purple Days increased from 1 to 17 (+1,600%), and Maroon Days from 3 to 38 (+1,167%).¹⁴

The study further found that “[p]laces like California’s Central Valley, the San Francisco metro area, and much of Southern California are all expected to experience poor air quality up to 3 months’ worth of days in a bad year.”¹⁵ Indeed, as EPA has previously explained “[c]limate change is expected to increase regional ozone pollution, with associated risks in respiratory illnesses and premature death.”¹⁶

⁹ Tesla, Megapack available at https://www.tesla.com/en_eu/megapack

¹⁰ IHS Markit, The Economic Contributions of Tesla to the California Economy, 2018–2021 (October 2022) (detailing Tesla’s positive economic impact in California) available at <https://www.tesla.com/blog/teslas-california-footprint>

¹¹ See, EPA, Research on Health effects from Air Pollution (last visited Feb. 26, 2024) (“Decades of research have shown that air pollutants such as ozone and particulate matter (PM) increase the amount and seriousness of lung and heart disease and other health problems.”) available at <https://www.epa.gov/air-research/research-health-effects-air-pollution#:~:text=Decades%20of%20research%20have%20shown,disease%20and%20other%20health%20problems>

¹² See, CARB, Waiver Request Support Document at 35-36; See also, EPA, Green Book, California Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants available at https://www3.epa.gov/airquality/greenbook/anayo_ca.html

¹³ Atmospheric Environment, Characterizing changes in extreme ozone levels under 2050s climate conditions: An extreme-value analysis in California (Nov. 11, 2022) available at [https://www.sciencedirect.com/science/article/pii/S2590162122000491#:~:text=Our%20results%20show%20increases%20in,ppb%20across%20California%20ppb%20\(Fig.](https://www.sciencedirect.com/science/article/pii/S2590162122000491#:~:text=Our%20results%20show%20increases%20in,ppb%20across%20California%20ppb%20(Fig.)

¹⁴ 1 First Street., Atrocious Air (Feb. 12, 2024) available at <https://firststreet.org/research-library/atrocious-air>

¹⁵ Id.

¹⁶ EPA, Endangerment Finding, 74 Fed. Reg. 66496, 66525 (Dec. 15, 2009) (“There is now consistent evidence from models and observations that 21st century climate change will worsen summertime surface ozone in polluted regions of North America compared to a future with no climate change.”); (While ozone “is a local or regional air pollution problem, the impacts of global climate change can nevertheless exacerbate this local air pollution problem.”)

Furthermore, California’s peer-reviewed Fourth Climate Change Assessment found that state-specific impacts of climate change have continued and intensified since 2009.¹⁷ The average summer temperatures in California have risen by approximately 3 degrees F (1.8°C) since 1896, with more than half of that increase occurring since the early 1970s.¹⁸ The state is likely to experience further warming by more than 2 degrees F more by 2040, more than 4 degrees F by 2070, and by more than 6 degrees F by 2100.¹⁹ The Assessment also projects that environmental conditions will continue to worsen into the future. Among other consequences, the study indicates that heat-related illnesses and deaths will increase, and more severe wildfires, more frequent and longer droughts, rising sea levels, increased flooding, and more extreme weather events will all uniquely and increasingly impact the state.²⁰ Notably, droughts in California are among the climate-related impacts linked to increased ground level ozone exposure in the state.²¹

As a result, the anticipated emission reductions from ACT are necessary to address these extraordinary conditions and to contribute to the state’s efforts to attain the State and National Ambient Air Quality Standards (NAAQS) for criteria air pollutants. The need for the program’s air quality gains is especially acute to address the burden of air pollution throughout the State’s overburdened communities near roadways and other high traffic areas and reduce statewide GHG emissions by at least 85% below 1990 levels to achieve the State’s goal of carbon neutrality by 2045.²²

III. Comments on the Proposed Amendments

As noted above, medium and heavy-duty vehicles comprise only a small percentage of vehicles on U.S. roads, they account for approximately a quarter of GHG emissions from the transportation sector²³ and disproportionately contribute to emissions of NOx and particulate

¹⁷ See California Fourth Climate Change Assessment, Statewide Summary Report (2019), *available at* https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf

¹⁸ Scripps/UC San Diego, Climate Change in California, (last visited Feb., 22, 2024) *available at* <https://scripps.ucsd.edu/research/climate-change-resources/faq-climate-change-california>

¹⁹ Id.

²⁰ Cal. Dep’t of Nat. Res., California’s Fourth Climate Change Assessment: Key Findings (Aug. 27, 2018) *available at* <https://www.climateassessment.ca.gov/>

²¹ Environmental Research, Drought and ozone air quality in California: Identifying susceptible regions in the preparedness of future drought (Jan. 1, 2023) *available at* <https://www.sciencedirect.com/science/article/abs/pii/S0013935122017881>

²² Office of Governor Gavin Newsom, California Releases World’s First Plan to Achieve Net Zero Carbon Pollution (Nov. 16, 2022) *available at* <https://www.gov.ca.gov/2022/11/16/california-releases-worlds-first-plan-to-achieve-net-zero-carbon-pollution/>

²³ Environmental Protection Agency, 88 Fed. Reg. at 26047.

matter.²⁴ The impacts of both climate change and poor air quality fall most heavily on already disadvantaged communities²⁵, making the transition to zero emission technologies an environmental justice and equity imperative.

The importance of the ACT in advancing these interests cannot be overstated given that it has now been adopted not only in California but by 10 other states. Collectively the states that have adopted the ACT account for over 26% of the medium and heavy-duty vehicle registrations across the country.²⁶ While periodic revisions to the ACT may be appropriate and necessary, in making such revisions, Tesla strongly encourages CARB to maintain the stringency of the regime to the greatest extent possible. It is through this lens that Tesla views the current set of revisions that are before the Board and in that spirit that we offer these comments.

A. It is appropriate to reflect the 100% sales requirement in Section 1963.1(c).

Tesla supports the codification of the 100% sales requirement into section 1963.1(c), specifically Table A-1 which provides the sales percentage schedule by weight class. The proposed change appropriately captures the 100% ZEV sales requirement that was adopted alongside the Board's approval of the Advanced Clean Fleets Regulation in 2023.

As evidenced by the substantial investments Tesla is making to enable volume production of the Tesla Semi, Tesla believes that the future of goods movement is electric, not only as a matter of good public policy, but recognizing the economic advantages that BEVs, once being produced at scale, offer compared to conventional trucks coupled with the raft of supportive policies at both the state and federal levels. With respect to the economic advantage of BEVs, Tesla projects that its Semi will have energy costs that are half those of diesel, provide over \$200,000 in fuel savings, and have a two-year payback period.²⁷ Another manufacturer has found that BEVs could save fleets up to 80% on energy costs and 60% on repair.²⁸ Yet another found that the benefits of electrifying heavy-duty truck fleets are significant with recent studies showing that operating costs for electric trucks can be between 14 and 52 percent lower and repair costs around 40 percent lower than their combustion-powered counterparts.²⁹ CARB has found that battery-electric vehicles appear cost

²⁴ EPA, Heavy-Duty 2027 and Beyond: Clean Trucks Proposed Rulemaking (March 2022) at 2. *available at* <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1014874.pdf><https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1014874.pdf>

²⁵ UN Environmental Programme, Young and old, air pollution affects the most vulnerable (Oct. 16, 2018). *available at* <https://www.unep.org/news-and-stories/blogpost/young-and-old-air-pollution-affects-most-vulnerable#:~:text=Since%20children%20are%20still%20growing,of%20conditions%20such%20as%20asthma>

²⁶ See <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/states-have-adopted-californias-vehicle-regulations>

²⁷ See Tesla, Semi *available at* <https://www.tesla.com/semi><https://www.tesla.com/semi>

²⁸ Utility Dive, Lion Electric: EVs save transport firms 80% on energy, 60% on repair costs compared to diesel (Mar. 17, 2021) *available at* https://www.utilitydive.com/news/Lion-Electric-trucking-total-cost-of-ownership-diesel/596835/?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202021-03-17%20Utility%20Dive%20Newsletter%20%5Bissue:33047%5D&utm_term=Utility%20Dive

²⁹ Argonne National Lab, Comprehensive Total Cost of Ownership Quantification for Vehicles with Different Size Classes and Powertrains (April 2021) *available at*

competitive with the established combustion technologies by 2025 in many use cases.³⁰ Real world demonstrations have also proven this out.³¹ Tesla expects that BEV deployment will follow a S curve leading to a much more rapid pace of adoption over the next decade. Indeed, many manufacturers have rapidly placed innovative technology across major portions of their new vehicle offerings in only a few model years. BEV technology will continue to follow similar paths, and deployment has already been shown to outperform the traditional S curve.³²

B. Additional language prohibiting double counting is reasonable to safeguard stringency and integrity.

Tesla supports the proposed language that further clarifies how ZEVs count toward compliance under the Advanced Clean Cars (ACC), Advanced Clean Cars II (ACCI), and Advanced Clean Trucks regulations are to be treated across the respective regimes. Given the eligibility of Class 2b-3 vehicles to be counted across multiple frameworks, the additional proposed language in section 1963.2(i) is helpful and maintains the collective integrity of the ACC, ACCII, and ACT by preventing double counting.

C. The ability to accumulate deficits should be further tempered.

Tesla recognizes that CARB has made certain commitments to the Engine Manufacturers Association (EMA) per the agreement CARB and EMA entered into in July of 2023.³³ Among those, CARB committed to proposing modifications to section 1963.3(b) to lengthen the number of years a manufacturer has to make up a deficit from one year to three years.³⁴ Consistent with this, the proposed changes to the ACT include language pursuant to which an entity with a deficit at the end of a give model year is given the next three model years to make up that deficit. However, if a manufacturer has a net deficit balance at the end of a given model

<https://publications.anl.gov/anlpubs/2021/05/167399.pdf><https://publications.anl.gov/anlpubs/2021/05/167399.pdf>

³⁰ CARB, Draft Advanced Clean Fleets Total Cost of Ownership Discussion Document (Sept 9, 2021) available at https://ww2.arb.ca.gov/sites/default/files/2021-08/210909costdoc_ADA.pdfhttps://ww2.arb.ca.gov/sites/default/files/2021-08/210909costdoc_ADA.pdf; See also, Transport & Environment, Why the future of long-haul trucking is battery electric (Feb. 18, 2022) available at https://www.transportenvironment.org/wp-content/uploads/2022/02/2022_02_battery_electric_trucks_HDV_factsheet.pdf

³¹ North American Council for Freight Efficiency, Electric Trucks Have Arrived: Documenting A Real-World Electric Trucking Demonstration (Feb. 2, 2022) available at <https://nacfe.org/wp-content/uploads/edd/2022/01/RoL-Report-Executive-Summary-FINAL.pdf>

³² Ark Investment, Electric Vehicles Are Outperforming the Traditional S-Curve Dynamics (July 2, 2019) available at <https://ark-invest.com/articles/analyst-research/ev-growth-outperforming-the-traditional-s-curve-dynamics/>

³³ CARB and Truck Manufactures Agreement available at https://ww2.arb.ca.gov/sites/default/files/2023-07/Final%20Agreement%20between%20CARB%20and%20EMA%202023_06_27.pdf

³⁴ *Ibid.* Appendix C – Emission Warranty Information Reporting, In Use Compliance, Advanced Clean Trucks and Advanced Clean Fleet Regulatory Implementation Efforts, See section B.

year, they must reduce that deficit balance to below 30% of the amount of the deficit accumulated in that model year by the end of the next model year.³⁵

While Tesla appreciates the moderating impact of the 30% limit in terms of the degree to which this amendment would allow very large deficits to be accumulated, Tesla remains concerned that as drafted it will have an unacceptably significant effect on near term production of BEVs and delay the availability of these vehicles. As an initial matter, the proposed language will, by design, give manufacturers more leeway to delay production of ZEVs and/or reduce their need for compliance credits, thereby reducing near-term progress in lowering emissions from the medium and heavy-duty segment. Allowing more deficit accumulation will necessarily and negatively impact credit pricing in the near term, impairing the economics for those manufacturers, like Tesla, that have taken action to scale up their production of these vehicles.³⁶ Frankly, given how long the ACT has been “on the books” with lead time well in advance of any compliance obligation, it is hard to see a justification, outside of the confines of the settlement agreement with EMA, to weaken the near-term obligations of OEMs pursuant to the ACT as codified in 2021.

It is important to keep in mind the context within which these reforms are being pursued. While some manufacturers are moving forward with plans to rapidly increase their production of medium and heavy duty BEVs, few, if any, manufacturers are currently producing at scale and per unit costs remain relatively high. Furthermore, decisions already made by CARB have greatly limited access to funding that could help defray the costs of these vehicles to make them more attractive in the near-term to fleet operators that will ultimately need to adopt them.³⁷ The Advanced Clean Fleets regulation, while theoretically establishing a demand floor, represents only a modest demand driver over the next several years, even before considering the various off-ramps that subject fleets may invoke to delay compliance.³⁸ In this context, the opportunity to generate and sell excess ACT compliance credits is a critical element in the value proposition for those manufacturers that have in part relied on the stability of ACT framework to justify the substantial outlay of capital needed to scale their manufacturing operations. By conceding to the demands of conventional vehicle manufacturers, CARB undermines those investments.

³⁵ Appendix A-1 Proposed Regulation Order, Proposed Amendments to the Advanced Clean Trucks Regulation and the Zero-Emission Powertrain Certification Test Procedure, Section 1963.3.(b).

³⁶ “Continuing Our Investment in Nevada”, Tesla Blog Post, January 24, 2023; <https://www.tesla.com/blog/continuing-our-investment-nevada>

³⁷ For example, CARB has greatly limited the ability of larger fleets to access HVIP funding through various changes adopted to the program, including program rules pursuant to which fleets with more than 50 vehicles will be ineligible for HVIP funding as of January 1, 2025.

³⁸ Notably one of those off-ramps is “Vehicle Delivery Delay Extension”, highlighting the knock-on effects that providing OEMs greater latitude to accumulate deficits will have by making the need to invoke this off ramp that much more probable.

While the agreement with EMA is driving these amendments, Tesla is concerned about the precedent of reopening of the ACT and the signals it sends in terms of the state's commitment to the targets set therein. To mitigate the adverse impacts, Tesla encourages CARB to further moderate the degree to which OEMs may accumulate deficits by amending and reducing the percentage limit included in the proposed language such that if an OEM accumulates a deficit in a given model year, the manufacturer needs to reduce that deficit balance to below 20% of the amount of the deficit accumulated in that model year by the end of the next model year. Tesla further asks that CARB expressly commit that ongoing deficits by OEMs under the ACT shall not be used as a pretext to reopen the ACT and further weaken the ACT targets.

Thank you for your consideration,

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