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Submitted electronically via https://ww2.arb.ca.gov/applications/public-comments

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

RE: Tesla Comments on CARB's Proposed Low Carbon Fuel Standard Amendments (Dec. 19, 2023)

Dear Chair Randolph and Members of the Board:

Pursuant to the California Air Resources Board's (CARB's) Proposed Low Carbon Fuel Standards (LCFS) Amendments (Dec. 19, 2023), Tesla respectfully submits the following comments. Tesla incorporates by reference its written comments in response to previous 2022 Scoping Plan and LCFS workshops and presentations.[1] [2] [3]

Tesla continues to support CARB and the state of California in defending the state's authority to implement the LCFS. In response to the Proposed Regulation Order and Initial Statement of Reasons (ISOR) released on December 19, 2023, Tesla provides comments highlighting, inter alia, amendments that support the maintenance of programmatic stringency, enhance public benefits and infrastructure investments, modernize the program and ease administrability.

To provide an understanding of the level of importance of each of our suggested amendments, our comments are divided into three sections. The sections are: Section II) Essential Amendments (changes that Tesla believes to be essential to LCFS stabilization and success), Section III) High-priority Amendments (changes Tesla believes will significantly improve the adoption of EVs and result in emissions reductions sought), and Section IV (Amendments that should be included if time permits though could be completed in a future regulatory cleanup). These three levels of prioritization are based upon a view of where EV (all classes) adoption stands, economic influences, the influence CARB's programmatic decisions have on other US states, balancing the need to finalize new regulations with CARB Staff resource availability and other considerations.

I. Background

a. Tesla's Mission and its California Manufacturing Footprint

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

[1] https://ww2.arb.ca.gov/form/public-comments/submissions/3796
[2] https://www.arb.ca.gov/lists/com-attach/4195-scopingplan2022-BmVcO1IMAyMGYwBv.pdf
[3] https://www.arb.ca.gov/lispub/comm2/iframe_bccomdisp.php?listname=lcfs-wkshp-feb23-ws&comment_num=111&virt_num=98

- including carbon dioxide and other greenhouse gases - from the transportation and power sectors.[4] 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.[5] Consistent with this effort, in May, 2023, Tesla was ranked as the world leader in the transition to vehicle electrification.[6]

Tesla currently produces and sells four fully electric, zero emissions light-duty vehicles (ZEVs): the Model S sedan, the Model X sport utility vehicle (SUV), the Model 3 mid-sized sedan, and the Model Y mid-sized SUV. As an EV-only manufacturer, as the U.S. Environmental Protection Agency (EPA) recognized in its *2023 Automotive Trends Report*, Tesla had by far the lowest carbon dioxide emissions (0 g/mi) and highest fuel economy (120 miles per gallon) of all large vehicle manufacturers in MY 2022.[7] Additionally, in December 2022, Tesla initiated delivery of its Tesla Semi Class 8 day cab truck[8] and in December 2023, delivery of its electric pickup truck, the Cybertruck.[9]

Tesla is the largest manufacturing employer in California and employs more than 42,500 people in state. California is home to both Tesla's global design headquarters in Hawthorne, as well as its global engineering headquarters in Palo Alto. Tesla manufactures and assembles vehicles, advanced 4680 lithium-ion battery cells, and battery packs at its factories in Fremont, CA.[10] It also produces Megapack, a utility-scale grid storage battery, at its factory in Lathrop, CA.[11] In 2021 alone, Tesla's investment in California helped deliver $10.4 billion ($28.5 million per day) to California's gross state product.[12]

Importantly, Tesla is not only a manufacturer but is also continuing to grow its large network of retail stores, vehicle service centers, collision centers, and electric vehicle charging stations to accelerate and support the widespread adoption of electric vehicles (EV).[13] Tesla has over 60 stores and galleries and over 45 Service Centers in California. Tesla also operates the country's largest and most reliable public EV charging network. Since 2012, Tesla has invested heavily in siting, building, operating, and maintaining charging infrastructure. In 2013, Tesla had just eight Supercharger Stations in North

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

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

[6] 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/

[7] EPA, The 2023 EPA Automotive Trends Report, Greenhouse Gas Emissions, Fuel Economy, and Technology Since 1975 (Dec. 2023) at 11-14, *available at* https://www.epa.gov/automotive-trends/download-automotive-trends-report#Full%20Report

[8] See, Tesla, Tesla Semi Delivery Event (Dec. 1, 2022) *available at* https://livestream.tesla.com/https://livestream.tesla.com/; See generally, Tesla, Semi: The Future of Trucking *available at* https://www.tesla.com/semihttps://www.tesla.com/semi

[9] Tesla, Cybertruck, *available at* https://www.tesla.com/cybertruck

[10] 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/

[11] Tesla, Megapack *available at* https://www.tesla.com/en_eu/megapack

[12] 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

[13] See, 86 Fed. Reg 43726, 43799 (Aug. 10, 2021) ("Electrification of the vehicle fleet is likely to affect both the number and the nature of employment in the auto and parts sectors and related sectors, such as providers of charging infrastructure.").

America. Today, Tesla owns and operates the largest DCFC network in the world, known as the Tesla Supercharging network.[14] In California, Tesla has 440 Tesla Supercharger locations with over 6,600 charging stalls.

b. Tesla's Class 8 Truck – the Tesla Semi

Tesla's first heavy duty vehicle, a Class 8 truck, is designed from the ground up to be the most efficient and safest truck on the market. The Tesla Semi will 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 – account for just 1.1% of the total fleet of vehicles on the road in the U.S.. As EPA recognizes, 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.[15] Accordingly, rapidly electrifying the heavy-duty truck segment is an essential part of transitioning the world to sustainable energy.

On December 1, 2022, Tesla announced delivery of its first Semi trucks and has subsequently deployed a fleet of the vehicles with PepsiCo.[16] Since unveiling the Tesla Semi, a significant number of fleets with substantial freight needs have placed reservations for the truck, indicating broad industry demand for heavy-duty electric vehicles.[17] These fleets will be deploying the Tesla Semi in a wide range of applications, including but not limited to, manufacturing, retail, grocery and food distribution, package delivery, dedicated trucking, rental services, intermodal, drayage, and other applications. Companies with operations throughout North America representing every major trucking sector and category of the economy have reserved the Tesla Semi, ranging from food service to logistics to retail.[18]

The reason for this strong interest is clear – the economics of electrified heavy-duty vehicles are compelling for end-users, particularly sophisticated and economically rational operators. Tesla estimates that the time to recoup the investment in a Tesla Semi, given the operational savings it provides customers compared to a conventional Class 8 truck, will be approximately two to three years (Class 8 diesel trucks have a 15-year average lifetime). With the per mile operational costs being so much cheaper than diesel trucks, economic minded operators will maximize the use of their electric trucks and quickly expand the number of electric trucks in their fleets.

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[14] See, Tesla, Supercharger *available at* https://www.tesla.com/supercharger
[15] 88 Fed. Reg. at 25928.
[16] Freightwaves, Tesla delivers fleet of Semi trucks to Pepsi facility in California (April 13, 2023) *available at* https://www.freightwaves.com/news/tesla-delivers-fleet-of-semi-trucks-to-pepsi-facility-in-california
[17] See e.g., Yahoo Finance, Tesla Gets Order for 150 Semi Trucks from Canadian Company as It Prepares for 'Volume Production' (Nov. 5, 2020) *available at* https://finance.yahoo.com/news/tesla-gets-order-150-semi-072938525.html; The Street, Walmart Triples-Down on Tesla Semi Reservations (Sept. 29, 2020) *available at* https://www.thestreet.com/tesla/news/walmart-triples-down-on-tesla-semi-reservations; Business Insider, Tesla has a new customer for its electric Semi — here are all the companies that have ordered the big rig (Apr. 25, 2018) *available at* https://www.businessinsider.com/companies-that-ordered-tesla-semi-2017-12
[18] See EPA, Greenhouse Gas Emissions Standards for Heavy-Duty Vehicles: Phase 3, Draft Regulatory Impact Analysis (Draft RIA) (April 2023) at 52-59.

Tesla has set an annual Semi North American production goal of 50,000.[19] This production rate will represent a level of approximately 20% of 2022 Class 8 domestic annual sales.[20]

c. BEV Deployment Growth Necessitates Stringency and Continued Programmatic Support of All BEV Classes, including Light-Duty and Heavy-Duty

In the ISOR, CARB recognizes that the increasing deployment and market share of electric vehicles and the accompanying buildout of EV charging enable the ability to strengthen the CI reduction benchmarks of the LCFS.[21] Tesla believes the path of EV adoption can support even further reductions in both the CI reduction benchmarks and a greater near-term step down in 2025.

As the agency should be aware, numerous manufacturers have announced increased EV production goals that encompass rapid deployment between now at 2030.[22] These announcements have continued

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[19] See Canary Media, Elon Musk finally delivers on the long-awaited Tesla Semi truck (Dec. 1, 2022) *available at* https://www.canarymedia.com/articles/electric-vehicles/elon-musk-finally-delivers-on-the-long-awaited-tesla-semi-truck

[20] See Transport Topics, December Class 8 Sales Reach All-Time High (Jan. 13, 2023) (2022 Class 8 sales at 254,206 vehicles) *available at* https://www.ttnews.com/articles/december-class-8-truck-sales-reach-all-time-high#:~:text=They%20also%20were%20the%20highest,compared%20with%20221%2C889%20in%202021.

[21] See CARB, Staff Report: Initial Statement of Reasons (Dec, 19, 2023) at 14-17 *available at*

[22] See e.g., Reuters, At least 50% of Aston Martin car sales should be electric by 2030, says CEO (Oct. 19, 2021) *available at* https://www.reuters.com/business/autos-transportation/least-50-aston-martin-car-sales-should-be-electric-by-2030-says-ceo-2021-10-19/; Reuters, BMW investing $1.7 bln to build electric vehicles in U.S. (Oct. 19, 2022) *available at* https://www.reuters.com/business/autos-transportation/bmw-investing-17-bln-build-electric-vehicles-us-2022-10-19/; CNBC, Ford ups EV investments, targets 40% electric car sales by 2030 under latest turnaround plan (May 26, 2021) *available at* https://www.cnbc.com/2021/05/26/ford-ups-ev-investments-targets-40percent-electric-car-sales-by-2030-under-latest-turnaround-plan.html; Honda, Honda Announces Next Steps in Preparation for U.S. EV Production (March 15, 2023) *available at* https://global.honda/newsroom/news/2023/c230315aeng.html; Automotive Dive, Hyundai to invest $85B in EVs by 2030 (June 22, 2023) *available at* https://www.automotivedive.com/news/Hyundai-85-billion-Investor-Day-CEO-electric-vehicle-Ioniq-Kia-Genesis-batteries/653693/?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202023-06-22%20Automotive%20Dive%20%5Bissue:51564%5D&utm_term=Automotive%20Dive; Reuters, Jaguar Land Rover boosts investment to catch up in EV race (Apr. 20, 2023) *available at* https://www.reuters.com/business/autos-transportation/jaguar-land-rover-plans-invest-15-bln-pounds-electric-push-2023-04-19/?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiosgenerate&stream=top; Reuters, Kia Corp to produce electric vehicles in the U.S. from 2024, reports say (Sept. 19, 2022) *available at* https://www.reuters.com/business/autos-transportation/kia-corp-produce-electric-vehicles-us-2024-reports-2022-09-20/; Mazda, Mid-Term Management Plan Update and Management Policy up to 2030 (Nov. 22, 2022) *available at* https://newsroom.mazda.com/en/publicity/release/2022/202211/221122a.html; Reuters, Mercedes-Benz foresees EV-only production lines within a few years (Feb 21, 2022) *available at* https://www.reuters.com/business/autos-transportation/mercedes-benz-foresees-ev-only-production-lines-within-few-years-board-member-2022-02-21/; Reuters, Mitsubishi Motors to sell only EVs, hybrids by mid-2030s (March 10, 2023) *available at* https://www.reuters.com/business/autos-transportation/mitsubishi-motors-electrify-100-its-fleet-by-2035-yomiuri-2023-03-10/?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiosgenerate&stream=top; Bloomberg, Nissan Speeds Up Electric Transition Plans With New Targets (Feb. 26, 2023) *available at* https://www.bloomberg.com/news/articles/2023-02-27/nissan-speeds-up-electric-transition-plans-with-new-

to expand with Toyota, Hyundai, JLR, and Subaru, among others, recently announcing new commitments on BEVs.[23] As of the fall of 2023, automakers and battery manufacturers had committed $115 billion to expand the production of EVs and batteries inside the U.S. and across North America.[24]

While some in the fossil fuel industry along with manufacturers struggling to efficiently produce electric vehicles have suggested a retrenchment on EV deployment, any such pronouncements have been flat wrong.[25] In late 2023, the U.S. Energy Information Administration's (EIA) figures reported EV sales were 17.7% of U.S. sales already outpacing the anticipated market share projected by EPA for MY 2026.[26] While the entire U.S. vehicle market was up 13% YoY over 2023, the EV market was up almost 50%

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targets?cmpid=BBD022723_hyperdrive&utm_medium=email&utm_source=newsletter&utm_term=230227&utm_campaign=hyperdrive#xj4y7vzkg; Quartz, Stellantis posted a record year driven by a 41% rise in electric vehicles sales (Feb 22, 2023) *available at* https://qz.com/stellantis-2022-results-electric-vehicles-fiat-new-500-1850144027?utm_source=cbnewsletter&utm_medium=email&utm_term=2023-02-23&utm_campaign=Daily+Briefing+23+02+2023; Automotive Dive, Subaru has a more aggressive EV plan (Aug. 3, 2023) *available at* https://www.automotivedive.com/news/subaru-aggressive-ev-plan-electric-vehicles-hybrid-2030/689807/?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202023-08-03%20Automotive%20Dive%20%5Bissue:53237%5D&utm_term=Automotive%20Dive.

[23] See e.g., Toyota, Toyota Unveils New Technology That Will Change the Future of Cars (June 13, 2023) available at https://global.toyota/en/newsroom/corporate/39288520.html?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiosgenerate&stream=top; Reuters, Hyundai Motor Group to invest $18 bln in South Korean EV industry by 2030 (Apr. 11, 2023) (expanding annual EV production in Korea to 1.51 million units and global volume to 3.64 million units by 2030 *available at* https://www.reuters.com/business/autos-transportation/hyundai-motor-group-invest-18-bln-ev-industry-skorea-by-2030-2023-04-11/; Reuters, Jaguar Land Rover boosts investment to catch up in EV race (Apr. 20, 2023) (Investing $19 billion over the next five years in BEVs) *available at* https://www.reuters.com/business/autos-transportation/jaguar-land-rover-plans-invest-15-bln-pounds-electric-push-2023-04-19/?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiosgenerate&stream=top; Electrek, Subaru suddenly breaks electric following tripled annual profits, promises 4 crossover EVs in US (May 11, 2023*) available at* https://electrek.co/2023/05/11/subaru-electric-tripled-annual-profits-promises-4-crossover-ev-us/

[24] Alliance for Automotive Innovation, "Alliance for Automotive Innovation Reports New U.S. Electric Vehicle Data" (Sept. 25, 2023), *available at* https://www.autosinnovate.org/posts/press-release/2023-q2-get-connected-press-release; See also, Atlas Public Policy, U.S. Investments in Electric Vehicle Manufacturing (2023) (January 2023) (Projecting $210 billion to be invested in the United States by 2030, more than in any other country.) *available at* https://atlaspolicy.com/u-s-investments-in-electric-vehicle-manufacturing-2023/

[25] Bloomberg, Reports of an Electric Vehicle Slowdown Have Been Greatly Exaggerated (Dec. 5, 2023) *available at* https://www.bloomberg.com/news/articles/2023-12-05/reports-of-an-electric-vehicle-slowdown-have-been-greatly-exaggerated?cmpid=BBD120523_hyperdrive&utm_medium=email&utm_source=newsletter&utm_term=231205&utm_campaign=hyperdrive

[26] Energy Information Administration, Electric Vehicles and Hybrids Grow to a Record-High 18% of U.S. Light-duty Vehicle Sales (Nov. 27, 2023) *available at* https://www.eia.gov/todayinenergy/detail.php?id=61004#:~:text=Sales%20of%20hybrid%2C%20plug%2Din,to%20data%20from%20Wards%20Intelligence; See also, EPA, EPA Finalizes Greenhouse Gas Standards for Passenger Vehicles, Paving Way for a Zero-Emissions Future (Dec. 20, 2021) *available at* https://www.epa.gov/newsreleases/epa-finalizes-greenhouse-gas-standards-passenger-vehicles-paving-way-zero-emissions

YoY.[27] BloombergNEF predicts a 32% YoY growth rate for 2024.[28] These results are consistent with other projections of rapid EV sales growth. A recent study published in the Proceedings of the National Academies of Science (PNAS) found that consumer valuation of increased range and lower prices will lead EVs to being the majority of vehicles sold by 2030.[29] Some analysts predict that by 2026 60% of new models will be EVs.[30] Still other analysts project that EVs could even account for 90% of sales by 2027.[31]

Most importantly in terms of light-duty EVs, Veloz's Q4 2023 EV Market Report shows that in 2023,[32] California recorded the highest EV share of total car sales, with 25 percent of all vehicles sold being EVs – nearly three times the national average.[33] Further, California's recent adoption of the ACC II rule, setting a 100 percent ZEV sales standard by 2035, will also accelerate BEV adoption. Tesla also expects the deployment of medium- and heavy-duty EVs to scale rapidly. The depth and pace of electrification technology deployment that has already occurred and will be accelerated through market forces and numerous other state and federal policies is impressive. Electric truck deployment, like other technologies, will follow an S curve leading to a rapid pace of adoption in 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.[34] BEV technology will continue to follow similar paths, and deployment has already been shown to outperform the traditional S curve.[35]

The BEV market is dynamic and changing rapidly. One recent report published two months *before* passage of the Inflation Reduction Act (IRA) found that revenue from the electric truck market was growing at a compound annual growth rate of 54%.[36] In another example, NREL has found economics will drive much faster adoption with ZEV sales possibly reaching 42% of all medium- and heavy-duty trucks by 2030.[37] It even projects out a scenario where ZEV sales reach >99% by 2045, and 80% of the

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[27] BloombergNEF, Electrified Transport Market Outlook 4Q 2023: Growth Ahead (Jan. 4, 2024) *available at* https://about.bnef.com/blog/electrified-transport-market-outlook-4q-2023-growth-ahead/
[28] Id.
[29] Proceedings of the National Academies of Science, Technology advancement is driving electric vehicle adoption (May 30, 2023) available at https://www.pnas.org/doi/10.1073/pnas.2219396120
[30] Automotive News, Car Wars study: By 2026, 60% of new models will be EV, hybrid (June 30, 2022) (citing a Bank of America Merrill Lynch Car Wars study predicting automakers will launch roughly 245 new models over the next four years.) *available at* https://www.autonews.com/sales/car-wars-study-2026-60-new-models-will-be-ev-hybrid?utm_source=dont-miss&utm_medium=email&utm_campaign=20220630&utm_content=hero-headline
[31] Ark Invest, Sales of Gas-Powered Vehicles Could Collapse 85% In the Next Five Years (Nov. 21, 2022) *available at* https://ark-invest.com/newsletters/issue-343/
[32] See https://www.veloz.org/q4-2023-data-shows-a-29-percent-year-over-year-increase/
[33] InsideEVs, California Tops US EV Adoption: 25% EV Share Of Total Sales In H1 2023 (Sept. 27, 2023) *available at* https://insideevs.com/news/688779/california-tops-us-ev-adoption-25-percent-share-total-sales-h1-2023/
[34] See e.g. Hula, et al, Analysis of Technology Adoption Rates in New Vehicles, *SAE International* (April 1, 2014) *available at* https://www.epa.gov/sites/default/files/2016-10/documents/2014-01-0781_0.pdf
[35] 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/
[36] Charged, New Reports Analyze US Electric Truck Market and Global Off-Highway EV Market (June 16, 2022) *available at* https://chargedevs.com/newswire/new-reports-analyze-us-electric-truck-market-and-global-off-highway-ev-market/?utm_source=ChargedEVs.com+Email+Newsletter+Opt-in&utm_campaign=c0d41568d2-Daily+Headlines+RSS+Email+Campaign&utm_medium=email&utm_term=0_6c05923d39-c0d41568d2-343935020
[37] NREL, Decarbonizing Medium- & Heavy-Duty On-Road Vehicles: Zero-Emission Vehicles Cost Analysis (March 8, 2022) *available at* https://www.nrel.gov/docs/fy22osti/82081.pdf

sector transitions to ZEVs by 2050, reducing CO2 emissions by 69% from 2019.[38] A new analysis views the heavy-duty haul market as 50% electrifiable right now.[39] Still other analyses have found that most "market segments have the potential to be fully mature by 2025, with EV models available from multiple companies, including the majority of major OEMs that currently have 90% market share of the in-use fleet."[40] Further, it is predicted the pace of electrification in the truck sector will increase rapidly over the next decade.[41] Recent sales suggest this pace of adoption is already occurring.[42]

These estimates do not take into account the BEV sales impacts that will result from California's newly adopted Advanced Clean Fleets (ACF) program. [43] ACF will require last mile delivery and yard trucks to transition to ZEVs by 2035, work trucks and day cab tractors must be zero-emission by 2039, and sleeper cab tractors and specialty vehicles must be zero-emission by 2042.[44] Moreover, the ACF rule has accelerated the rate of BEV deployment under the original ACT rule to embrace an end to combustion truck sales in 2036.[45] In California, the original ACT rule is estimated to require the deployment of 100,000 heavy-duty ZEVs in 2030 and 300,000 by 2035.[46]

Finally, CARB should consider the role that new federal incentives may play in deployment of heavy-duty electric vehicles. Federally, numerous heavy-duty electrification grants, demonstration programs, incentives, and infrastructure incentives were included in the Infrastructure Investment and Jobs Act of

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[38] Id.

[39] NACFE, Charting the Course for Early Truck Electrification (May 2022) *available at* https://rmi.org/insight/electrify-trucking/?mc_cid=09f3d727f2&mc_eid=544476f6c1 (Analysis shows that approximately 65 percent of medium-duty trucks and 49 percent of heavy-duty trucks — are regularly driving short enough routes that they could be replaced with electric trucks that are on the market today) ; See also, NACFE, Electric Trucks Have Arrived: The Use Case For Heavy-Duty Regional Haul Tractors (May 2022) *available at* . https://nacfe.org/heavy-duty-regional-haul-tractors/?mc_cid=09f3d727f2&mc_eid=544476f6c1

[40] MJ Bradley, Medium- & Heavy-Duty Vehicles: Market Structure, Environmental Impact, and EV Readiness (Aug. 11, 2022) at 6 *available at* https://www.mjbradley.com/reports/medium-heavy-duty-vehicles-market-structure-environmental-impact-and-ev-readiness

[41] See, Wood Mackenzie, US electric truck sales set to increase exponentially by 2025 (Aug. 10, 2020) *available at* https://www.woodmac.com/press-releases/us-electric-truck-sales-set-to-increase-exponentially-by-2025/ (finding there were just over 2,000 electric trucks on US roads at the end of 2019 and project this to grow to over 54,000 by 2025); BNEF, EV Outlook 2021 (heavy-duty electric trucks become economically attractive in urban duty cycles by the mid-2020s. Megawatt-scale charging stations and the emergence of much higher energy density batteries by the late 2020s result in battery electric trucks becoming a viable option for heavy-duty long-haul operations, especially for volume-limited applications.) *available at* https://bnefhttps://bnef.turtl.co/story/evo-2021/page/3/2?teaser=yes

[42] Fleet Owner, Pace of heavy EV sales quickens with two recent deals (Mar. 22, 2022) *available at* https://www.fleetowner.com/emissions-efficiency/electric-vehicles/article/21237583/pace-of-heavy-ev-sales-quickens-with-two-recent-deals

[43] 88 Fed. Reg. at 25973.

[44] California Air Resources Board, Advanced Clean Fleets Regulation Summary *available at* https://ww2.arb.ca.gov/resources/fact-sheets/advanced-clean-fleets-regulation-summary

[45] CARB, California approves groundbreaking regulation that accelerates the deployment of heavy-duty ZEVs to protect public health (April 28, 2023) *available at* https://ww2.arb.ca.gov/news/california-approves-groundbreaking-regulation-accelerates-deployment-heavy-duty-zevs-protect#:~:text=The%20Advanced%20Clean%20Fleets%20rule%20includes%20an%20end%20to%20combustion,accelerated%20benefits%20for%20California%20communities.

[46] CalMatters, California Mandates Zero-exhaust Big Rigs, Delivery Trucks (July 6, 2020) *available at* https://calmatters.org/environment/2020/06/california-zero-emission-trucks/

2021.[47] The IRA also has established programs, such as the Clean Heavy-Duty Vehicles Program, to address climate change by reducing GHG emissions and improve the air quality through the acquisition and use of zero-emission vehicles.[48] The program directs EPA to award a total of $1 billion through grants and rebates to eligible recipients (e.g., states and municipalities) to replace existing heavy-duty vehicles with clean zero-emission vehicles and develop zero-emission vehicle infrastructure. The funding can be applied to up to 100% of the incremental costs of replacing an eligible heavy-duty vehicle with a zero-emission vehicle. It can also be used for other activities such as purchasing, installing, operating, and maintaining infrastructure needed to fuel or maintain zero-emission vehicles. The federal government also recently launched its Commercial Clean Vehicle Credit providing up to $40,000 per truck in tax credits.[49]

CARB should ensure it utilizes the universe of manufacturers' significant public EV deployment commitments in implementing a stringent LCFS, and the agency can mitigate any retrenchment in those commitments by maintaining an adequate light-duty Clean Fuel Rewards program as discussed in Section II.c.i. below.

II. Essential Amendments to Reinvigorate the LCFS Program and Support Light through Heavy Duty BEV Deployments

a. Tesla Supports Strong Program Stringency (30% minimum by 2030)[50]

Tesla applauds CARB's long-term vision of setting a 90% reduction target by 2045. This cements California as the clear leader in the transportation decarbonization policy space, with the farthest-forward decarbonization target of any transportation decarbonization program globally. It also sets California on a path to reach Net Zero by 2045, as envisioned by Executive Order B-55-18.

The compliance curve, step change, and auto acceleration mechanisms must all work in unison, and Tesla encourages CARB to increase the stringency of the 2030 target beyond 30% if our below recommended changes to the step-change and auto acceleration mechanism are not implemented.

b. Correcting The Supply-Demand Imbalance Necessitates a Regulatory Step Change of at least 12%

As discussed earlier, the current LCFS market is not functioning in a sustainable manner. There is simply a glut of credits on the market that has driven down pricing, making the LCFS less supportive of electrification efforts in California. As a near term solution to address these issues, CARB should implement a step change of at least 12%, implemented as quickly as possible.

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[47] See, DOE, Alternative Fuel Data Center, Bipartisan Infrastructure Law (Infrastructure Investment and Jobs Act of 2021) *available at*. https://afdc.energy.gov/laws/infrastructure-investment-jobs-act

[48] Inflation Reduction Act of 2022, P.L. 117-169 (Aug. 16, 2022), Section 60101.

[49] https://www.irs.gov/credits-deductions/commercial-clean-vehicle-credit#:~:text=Businesses%20and%20tax%2Dexempt%20organizations,powered%20by%20gas%20or%20diesel)

[50] See UC Davis Updated fuel Portfolio Scenario Modeling to inform 2024 Low Carbon Fuel Standard Rulemaking here. Updated Fuel Portfolio Scenario Modeling to Inform 2024 Low Carbon Fuel Standard Rulemaking (escholarship.org)

In the past year of reported data, the actual CI reduction has gone from -13.11% (against a -10% target) in Q4 2022 to -15.61% (against a -11.25% target) in Q3 2023, resulting in the differential between target and actual increasing from -3.11% to -4.36%. A simple linear extrapolation of this trend would result in a CI differential of -6.41% by Q1 of 2025.[51] However a response to adopt a 7% step change would not result in a declining credit bank or be reflected in a substantive credit price stabilization. The combination of continued EV adoption with the diesel pool approaching 100% justifies a significant step change of at least 12%.

The step change should be increased in stringency to adjust for the change being proposed by CARB in this rulemaking to the diesel benchmark from 100.45 gCO2e/MJ to 105.76 gCO2e/MJ. Because the diesel credit pool is now more than 50% renewable, an increase in the diesel benchmark results in more overall credit generation per gallon consumed in the whole pool. Going forward, in the absence of limits to first generation biofuels, it is widely expected that the renewable content of the diesel pool will continue increasing until it approaches 100%. This increase in renewable content will amplify the effects of this benchmark change. We recommend CARB model these effects and increase the step change stringency correspondingly.

Just as speed to implementation of the rule changes is critical to health of the program, so too is speed to implementation of the step change. The difference between a 2024 implementation and a 2025 implementation could result in a bank size growing millions of MT higher. Such a large bank increase could require years to rebalance, lowering demand for newly generated credits during that period. By allowing such a large supply and demand imbalance and the creation of such a large total bank, many smaller credit-generating companies who have been critical to the success of the program thus far could experience financial hardship, potentially resulting in lower credit generation in future years as they slow or cease operation. Further, delaying a step change, to use a BEV analogy, sends a message to participants that California is taking its foot off the accelerator, engaging regenerative breaking. This effectively implies that the state leading the climate fight in the U.S. feels it has done enough near-term and is willing to sacrifice additional emissions reductions and reinvestment when it is critically needed.

c. EV Automaker Contributions to Emissions Reductions Are Deserving of Base Credit Allocations to Revitalize the Clean Fuel Reward (CFR) Program as the CFR was Envisioned

In addition to Tesla's investments noted above in the introduction and Section II, it is expected that Automakers will invest more than $500B globally throughout the electrification value chain.[52] As similarly mentioned in a joint response filed by Tesla and others to the 2022 Scoping Plan, automakers enjoy comparatively strong relationships with consumers and act as primary distributors of information regarding the consumer and environmental benefits of EVs. Automakers also guide consumer preferences by providing compelling EV products, which are primarily responsible for the emissions reductions associated with EV adoption. Despite this significant and unique role in the transition to EVs,

[51] Using actual CI reduction calculation methodology from Figure 1 of the LCFS dashboard: https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard;Using reported actual data from the LCFS Quarterly Data Spreadsheet: https://ww2.arb.ca.gov/resources/documents/low-carbon-fuel-standard-reporting-tool-quarterly-summaries

[52] See Auto OEMs to Invest US$515 Billion in EV-Related Technologies and Upgrades…here. https://www.prnewswire.com/news-releases/auto-oems-to-invest-us515-billion-in-ev-related-technologies-and-upgrades--but-supply-chain-challenges-remain-301550827.html

EV automakers may only generate limited incremental LCFS credits, and only if other stakeholders have not already registered to generate such credits. Furthermore, the value of the incremental credits structurally depreciates as improvements are made to the carbon intensity of California's electric grid. This existing structure provides a weak and diminishing incentive for EV manufacturers to make additional allocations to- or investments in- California based on LCFS, and it does not reflect the relative contributions of EV manufacturers in the transition to EVs. As such, CARB should establish a structure that shifts base credit generation for residential EV charging to automakers for the purpose of implementing a functional CFR Program, creating a more inclusive program in which the roles of different stakeholders are more evenly balanced while still ensuring programmatic goals are met. Such a change would reward EV manufacturers for the use of their products—a powerful complement to the existing ZEV sales mandate and an incentive to invest in more capable and desirable EVs.

Tesla continues to support the reinvestment of LCFS electrification credit revenue back into the program to support further electrification. CARB LCFS regulations provide utilities a relatively diverse menu of base credit spending categories which historically included offering a light-duty (LD) Clean Fuel Reward (CFR) program. Far from "bankrupt," by Tesla's estimates, the CFR program has in excess of $420M[53] in LCFS credits intended for LD EV incentives held by utilities today. CARB should provide EV automakers with base credit allocations to revitalize the CFR program, touched upon further below. Lastly, CARB should consider requiring all clean fuel providers (E.G. hydrogen producers or Biofuels Producers) to reinvest funds generated through the sales of LCFS generated credits back into CA LCFS efforts as only electricity is required to reinvest and track today.

i. Revitalize the Light Duty California Clean Fuel Reward (CFR) Program with Efficient and Sustainable Modifications including EV Manufacturer Base Credit Allocations

CARB staff's proposal to fundamentally change the CFR program from one that supports on the hood incentives for LD vehicles to one focused on medium and heavy-duty vehicles was an unexpected change to the program that was not discussed in any of the preliminary workshops. It is fundamentally problematic to utilize base credits from residential light duty EV charging to fund medium and heavy-duty programs. While the CFR program was obviously flawed, Tesla believes that it can be salvaged, improved, and turned into a consistent pool of funds to support on the hood incentives for light duty electric vehicles. Automakers have decades of experience administering incentives. CARB should welcome EV manufacturers willing participation to create CFR programmatic efficiencies and recognize that the proposal to abandon the LD CFR and reallocate funding to MHD is premature, particularly with extensive existing MHD incentive support. Moving these funds into supporting medium and heavy-duty vehicles that are "exempted from Advanced Clean Fleets regulation"[54] as CARB intends, will essentially provide additional funds for the same pool of vehicles that are currently supported by CARB's HVIP Program, which currently has over $480M of funding available.[55] Further, these truck fleets (unlike California's light duty EV drivers), will already be getting base credits for fleet charging that will reduce their total cost of ownership.

[53] $450,540,222 in total program costs reported for 2020, 2021, and 2022: https://cleanfuelreward.com/reporting;
[54] Appendix E: Purpose and Rationale of Proposed Amendments for the Low Carbon Fuel Standard Requirements at 14.
[55] See https://californiahvip.org/funding/

That said, the CFR program was not as effective as it could have been. Automakers know more about their delivery plans than anyone and can leverage that knowledge to plan ahead, creating a revitalized LCFS program. By granting base credit revenue to EV manufacturers, administrative efficiencies can be gained, creating a program that relies on lower administrative fees and provides on-the-hood incentives. Having completed substantive and ongoing analysis to understand why the CFR failed and how it could have succeeded (and can succeed) if established with EV manufacturers as the credit recipient, Tesla is confident that a revitalized program could remain solvent, support an incentive for all line makes, including new market participants, and continue to support consumer decisions to purchase LD EVs in pursuit of LCFS goals. Tesla supports the continuation of the LD Clean Fuel Rewards Program with EV manufacturers responsible for operationalizing the program through receipt of non-holdback credits similarly to how utilities are receiving those now.

Should CARB establish a similar CFR MHD program or reallocate funds intended for LDV to MHD as proposed, Tesla recommends that CARB provide the Executive Officer with the authority to adjust any MHD program including credit allocation. The challenging history of the CFR is long and creating flexibility to correct course when expectations and outcomes do not match is essential. CARB has presented no support or justification as to why a CFR for MHD vehicles will not face the same problems that the LD CFR experienced when funded simply through the utilities use of credits. In order for a MHD CFR focused program to succeed, the way this program is funded needs to be reimagined.

d. Implement Rule Changes in 2024, Being Careful to Not Sacrifice Stringency

With a supply and demand imbalance of over 6 million MT per year, as of the last reported data,[56] the speed in which CARB implements new rules is of vital importance to market participants. With actual reductions in carbon emissions exceeding 15%,[57] surpassing expectations since 2020, and seeing LCFS credit prices fall since that time from ~$200 to a low of $57 so far this year,[58] delaying a stringency increase and step-change will likely continue to suppress credit values, market confidence and investment in clean fuels in California. While every quarter delay matters, Tesla encourages CARB staff to continue to focus on rules that correct near-term credit pricing in support of reinvestment in emissions reducing efforts.

e. Improve the Automatic Acceleration Mechanism (AAM)

The inclusion of an Automatic Acceleration Mechanism (AAM) is an important and welcome step towards balancing the safeguards in the program. The program already includes multiple safeguards to help rebalance the program if it is underachieving its targets, including a Credit Clearance Market, Advanced Credits, Carryback Credits, and Accumulated Deficits. The AAM is an important counterbalance safeguard for times when the program is overachieving its targets.

During times of program overachievement, the AAM, as currently envisioned, requires two full years to take effect.

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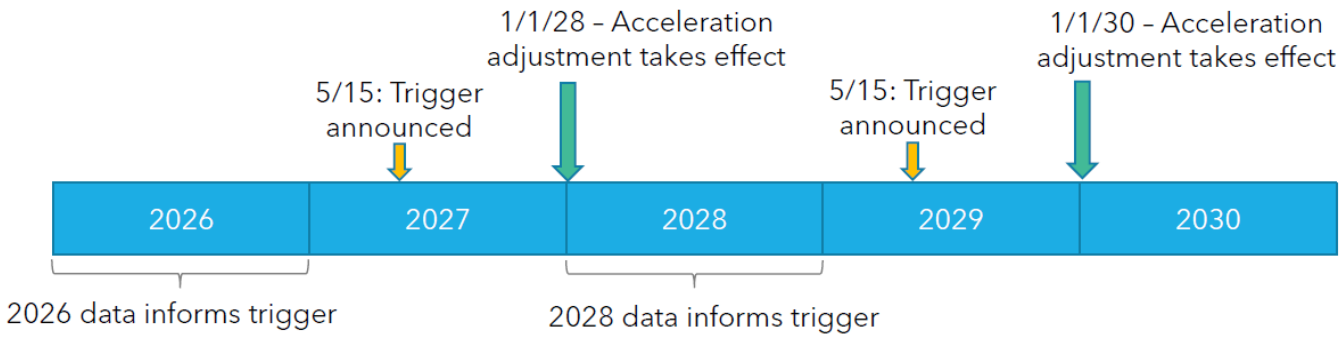
[56] https://ww2.arb.ca.gov/resources/documents/low-carbon-fuel-standard-reporting-tool-quarterly-summaries
[57] https://ww2.arb.ca.gov/resources/documents/low-carbon-fuel-standard-reporting-tool-quarterly-summaries
[58] See California Low Carbon Fuel Standard Credit Price from July 2020 through February 13, 2024, https://www.neste.com/investors/market-data/lcfs-fuel-standard-credit-price



The current draft rule also sets the AAM's first year of implementation as 2027, with benchmark changes taking effect in 2028 at the earliest. Tesla's primary ask is for the first year of AAM implementation should be in 2026, using 2025 data for the trigger, with the changes to the benchmark being implemented in Q3 of 2026 if triggered.

III. High Priority Amendment Recommendations

a. Update the Light Duty BEV Energy Efficiency Ratio (EER) and Provide a Pathway for OEM-Specific EERs

CARB should also use this rulemaking as an opportunity to update the Energy Efficiency Ratio (EER) for Light Duty Battery Electric Vehicles (LD BEV). The current 3.4 EER was adopted by CARB in 2011 and has not been updated in the 13 years since. As described in the 2011 Initial Statement of Reasons (ISOR) (Appendix A, Page 67),[59] the 3.4 EER was an average of the EERs of two vehicle comparisons. The first was a PHEV-to-ICE comparison between a 2011 Chevy Volt compared to a 2011 Chevy Cruze (93 MPGe combined fuel economy / 28.3 MPG combined fuel economy = 3.29 EER). The second was a BEV-to-ICE comparison between a 2011 Nissan Leaf and a 2011 Nissan Versa (99 MPGe combined fuel economy / 28.4 MPG combined fuel economy = 3.49 EER). The fuel economy numbers can be viewed on www.fueleconomy.gov. The 28.3 MPG fuel economy for the Chevy Cruze was presumably a simple average of the automatic transmission versions of the three engine trims offered. The 28.4 MPG fuel economy for the Nissan Versa was presumably a simple average of the automatic transmission versions of the two engine trims offered. Given the immense change in EV adoption in recent years, and the remarkable improvements in the efficiency of EVs today, it is simply inappropriate to use an EER that is 13 years old. As an illustrative example, a 2024 Hyundai Ioniq 6 has a 140 MPGe, which is a 40% improvement on the 2011 Nissan Leaf.

If CARB were to keep the 2011 (existing) EER methodology and simply update the calculation using the most current version of the cars included in that calculation, the EER would rise from 3.4 to 3.8. However, for the first comparison between a PHEV and ICE vehicle, CARB chose the Chevy Volt and Chevy Cruze; unfortunately, General Motors ceased production of both vehicles in 2019.[60] In leu of

[59] https://ww3.arb.ca.gov/regact/2011/lcfs2011/lcfs2011.htm
[60] https://www.cbsnews.com/news/chevy-volt-discontinued-chevrolets-last-volt-rolls-off-the-assembly-line/

these vehicles, CARB would need to add another comparison. A similar comparison can be done between the 2024 Prius Prime, which achieves a 127 MPGe combined fuel economy,[61] and the conventional ICE 2024 Toyota Corolla (both are classified as compact cars), which achieves a 28.5 MPG combined fuel economy across the simple weighted average of the automatic transmission versions of the two non-hybrid engine trims. This is a PHEV-to-ICE EER of 4.46. Nissan continues to sell the Leaf and the Versa. The Nissan Leaf energy efficiency has improved from 99 MPGe in 2011 to 111 MPGe for the 2024 model year.[62] The Nissan Versa energy efficiency has improved from 28.4 MPG in 2011 to 35 MPG for the automatic transmission version of the only engine trim.[63] This translates to an EER of 3.17 for BEV-to-ICE. Using the simple average of the BEV and PHEV EERs, we arrive at an overall Light Duty EER of 3.8. Another apt comparison would be the Hyundai Ioniq 6 and the Hyundai Elantra. As stated earlier, the Ioniq 6 gets 140 MPGe, while the Elantra's weighted average of the automatic transmission versions of the two non-hybrid engine trims is 35 MPG. This is a BEV-to-ICE EER of 4. Using a sales-weighted BEV-to-ICE ratio would likely result in an EER over 4.0.

California would not be alone in modernizing its EERs for LD BEVs. Canada's Clean Fuel Regulations use a 4.1 EER for light duty EV Charging. This was calculated based on the ratio of the sales-weighted average efficiencies of electric vehicles to the sales-weighted fuel efficiency of the ICEVs in the same class, with efficiency data came from the 5-cycle testing procedure.[64] The Netherlands' Energy Transport Regulation currently uses an EER of 4.0.[65] The European Union recently passed the third version of its Renewable Energy Directive (REDIII). This directive increases the targets for EU member states transportation GHG reductions and guides them to use a 4.0 EER.[66] Updating the EER is important to ensure that electric vehicle charging is properly credited and continues to be incentivized appropriately. Utilizing a higher EER can support a steeper step change and a steeper compliance curve for this program.

In addition, CARB should allow an OEM to submit an application for an EER based upon that OEM's real-world fleet. CARB has created a precedent for this by approving the Lime scooter Tier 2 pathway which included a company-specific EER factor.[67] Allowing OEMs to submit applications for company-specific EERs would better reflect the actual efficiency of electric vehicles in the market and allow those vehicles to be properly credited. This would also incentivize each OEM to focus on improving vehicle efficiency.

b. Update the Medium and Heavy-Duty BEV Energy Efficiency Ratio

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[61] https://www.fueleconomy.gov/feg/Find.do?action=sbs&id=47501
[62] https://www.fueleconomy.gov/feg/Find.do?action=sbs&id=46973
[63] https://www.fueleconomy.gov/feg/Find.do?action=sbs&id=47236
[64] Page 86 of the Specifications for Fuel LCA Model CI Calculations, https://data-donnees.az.ec.gc.ca/data/regulatee/climateoutreach/carbon-intensity-calculations-for-the-clean-fuel-regulations/en/Resources/?lang=en
[65] https://www.rijksoverheid.nl/documenten/kamerstukken/2022/12/22/beantwoording-kamervragen-over-wijziging-van-de-stimuleringsfactoren-in-de-regeling-energie-vervoer
[66] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023L2413&qid=1699364355105
See also, https://www.europarl.europa.eu/doceo/document/ITRE-AM-729929_EN.pdf
[67] https://ww2.arb.ca.gov/sites/default/files/classic/fuels/lcfs/fuelpathways/comments/tier2/b0467_cover.pdf

While not quite as dated, the current 5.0 EER for Heavy Duty battery electric vehicles is also due for an update. This EER was set during the 2018 rulemaking and the methodology for calculating this EER is described in the ISOR Appendix H, Section E.[68] Unlike the Light Duty EER calculation, which was based on just two vehicle comparisons, the MHD EER calculation is based on an analysis of a number of papers comparing the efficiency of transit buses, drayage trucks, parcel trucks, and many other MHD vehicle types. Tesla believes this more comprehensive EER methodology is preferable and encourages CARB to update the MHD EER based on the current state of vehicle efficiency research.

In the current EER table (Table 5) CARB has Light and Medium Duty electric vehicles lumped together into a single EER and Heavy Duty EERs as another single EER. Light Duty vehicles are defined as vehicles with a GVWR of 8,500 pounds or less, while Medium Duty Vehicles are defined as vehicles with a GVWR between 8,501 and 14,000 pounds. Anything over 14,001 pounds GVWR is classified as Heavy Duty. This combining of Light and Medium duty in the EER table conflicts with the combining of Medium and Heavy Duty in the Fast Charge Infrastructure (FCI) program. As part of the EER update, Tesla encourages CARB to either create a separate EER for Medium and Heavy Duty BEVs or allow for OEM-specific EERs.

c. Remove the Unnecessary Third Party Verification for Non-Residential EV Charging

Proposed section 95501 of the amendments includes a proposal to expand third party verification for EV charging transactions. While Tesla appreciates the intent of CARB staff's proposal, it is unnecessary to create a separate third-party verification program regime for non-residential electricity transactions related to EV charging. Commercial EV charging infrastructure transactions fall under the purview of the CA Department of Agriculture, Division of Measurement Standards (DMS), under its state weights and measures program. CA DMS is responsible for verifying the accuracy of commercial EV charging infrastructure in California. This includes both a field verification process carried out by the CA counties as well as type evaluation program. It is unnecessary for LCFS to add additional verification requirements given the accuracy of commercial EV charging transaction is already regulated and verified in CA. We therefore recommend that no additional third-party verification is necessary for EV charging transactions.

d. Amendments to the Medium and Heavy-Duty Fast Charge Infrastructure Program

Tesla agrees that medium and heavy duty FCI pathways are important for accelerating the transition of electrifying trucking in California. Tesla supports CARB's inclusion of a HD-FCI pathway in the proposed amendments and appreciates CARB's inclusion of depot charging as an eligible pathway. Initial Tesla Semi customers will initially be focused on charging infrastructure located in the internal depots. These trucks utilize "hub and spoke" operations or go through other internal depots during their operations. The cost of infrastructure is one of the main determining factors for how many trucks a customer is willing to purchase. The HD-FCI will incentivize customers to build out the necessary charging infrastructure to support their fleet transitioning to electric trucks on an expedited timeline.

i. Remove Geographic Restrictions for MHD FCI

[68] https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2018/lcfs18/apph.pdf

The geographic restrictions included in the proposed amendments for the HD FCI should be removed. There are limited locations in California with the power available to support truck charging at scale. Given the cost, and more importantly, the time constraints that come with bringing new capacity to power constrained locations, charging developers must be able to locate their locations where it makes the most sense from a business perspective. Alternatively, CARB should change the one mile from the corridor limit to five miles. This will at least expand the number of suitable charging locations to develop.

CARB's justification for including the restriction to within one mile of a major freight corridor is to "bring cleaner air for communities living adjacent to these areas currently heavily impacted by diesel truck pollution." Siting medium and heavy-duty chargers is a balancing act between land costs, availability of land near freeways, availability of land without zoning restrictions, and, perhaps most importantly, the challenge in finding 5 MW or more of grid capacity where the local utility is willing to install interconnects on a quick timeline. Because the Venn diagram overlap of these needs is already small, we do not believe CARB should be adding additional geographic restrictions to further limit the number of qualifying sites. Limiting eligible charging locations will only serve to slow down that process and subject all communities, including Environmental Justice communities to continued diesel pollution.

Different trucks have different driving patters – class 4 trucks might deliver milk to grocery stores early in the morning and then sit charging for the rest of the day; this would best be served by slower chargers in the location where these trucks are parked most of the time. Class 8 trucks might be traveling all day long, with multiple driving shifts between the ports and warehouses; this would best be served by fast chargers along a major freight corridor. Some trucks will be fleet vehicles while others will be driven by independent-owner operators. Trying to overlay a "one size fits all" geographic restriction on MHD-FCI will only serve to slow the deployment of these chargers.

ii. Eliminate or Increase the 10 Charger Per Site Limit for MHD FCI

For MHD-FCI sites, CARB is proposing limits of no more than 10 charging posts per site. This artificial limitation should be removed. Charging developers that are focused on the medium and heavy-duty truck sector are developing sites that are far bigger than 10 posts for good reason.[69] In order to support

[69] See e.g., Bloomberg News, Tesla Wants to Build a Semi Truck-Charging Route From Texas to California (August 1, 2023), (describing a proposal for charging infrastructure that included at least 12 chargers per site) *available at* https://www.bloomberg.com/news/articles/2023-08-01/tesla-semi-truck-charging-route-pitched-at-100-million?embedded-checkout=true; Canary Media, Big electric-truck charging depots are coming soon to California (January 26, 2024) (an overview of three truck charging depots being built by WattEV, including two in the Central Valley which will have a combined 192 chargers and a third site in Blythe with 66 chargers),*available at* https://www.canarymedia.com/articles/ev-charging/big-electric-truck-charging-depots-are-coming-soon-to-california; (Forum announcing a new charging depot in Port of Long Beach with 25 chargers) Forum Mobility Announces New Charging Depot for Electric Drayage Trucks in the Port of Long Beach (November 30, 2023) *available at* https://www.prnewswire.com/news-releases/forum-mobility-announces-new-charging-depot-for-electric-drayage-trucks-in-the-port-of-long-beach-302001230.html; TerraWatt Infrastructure Accelerates Rollout of EV Fleet Charging Solutions Across Inland Empire (October 10, 2023), (Terrawatt announcing two sites capable of charging over 500 trucks utilizing 40MW of power) *available at* https://www.prnewswire.com/news-

the transition to truck electrification being driven by policy and regulations in California, it is vitally important that there are large charging depots available to truck operators. These charging sites can support fast charging for regional and long-haul trucking but can also serve other truck operations where operators are able to sit and charge for longer periods of time. These charging locations will make electric trucking possible for companies looking to electrify longer routes, as well as smaller operators who are unable to accommodate charging in their depots. If CARB is unwilling to remove this limitation entirely, Tesla suggests increasing the charger post number to 100 or at least remove or increase the limitation for shared depots and fleet depots which will be the majority of initial charging developments in the coming years.

iii. Increase 10 MW Limit to 15 MW per Site with Exceptions up to 24 MW

For the same reasons stated above that the 10 charger per site limit should be removed, CARB should also remove the overall site capacity limit of 10 MW. 10 MW is simply not enough power to support the charging stations needed to meet California's electric truck deployment goals. CARB should increase the 10 MW cap for sites to at least 15 MW and allow an exception by the Executive Officer for up to 24 MW for sites.

iv. Raise 2.5% cap for MHD FCI to 5%

The MHD-FCI program is limited to 2.5% of the previous quarter deficits. At today's deficit levels, this would fall dramatically short of the charging requirements in the state. Additional support is needed to attract the scale of private capital required, particularly at this nascent stage of the market.

We suggest increasing the 2.5% cap, particularly in the early years of the program. As truck and charging infrastructure deployments grow, CARB might consider reducing the cap in a future rulemaking. Tesla supports increasing the cap to 5% to provide the support necessary to begin to build a charging network that will enable the market to take off. Solving the chicken-and-egg infrastructure problem by using FCI to provide assurances to MHD infrastructure developers in advance of vehicle adoption is critical to the success of ACF, ACT, and the Scoping Plan. Encouraging the early adopters (e.g., shared depots and some fleets) to build the infrastructure to accommodate full electrification is critical even if the initial vehicle deployments are lower. This will help expedite the time frame for increasing the fleet's adoption rate of electric trucks. In the near future, turnaround time for new electric truck orders will be measured in weeks and the lack of infrastructure will delay adoption. Helping fleets move early will allow them to quickly add to their fleet after gaining comfort with the technology.

i. Harmonize Hydrogen and EV Charging CIs for Capacity Credits

CARB currently gives preferential treatment to hydrogen stations, despite showing no signs of commercial success, over electric vehicle charging stations when assigning the CI for capacity credits. Hydrogen stations utilizing the HCI pathway receive a CI of the "Company-wide weighted average CI for dispensed hydrogen during the quarter or 0 g/MJ, whichever is greater" while electric vehicle charging

releases/terawatt-infrastructure-accelerates-rollout-of-ev-fleet-charging-solutions-across-inland-empire-301951648.html

stations utilizing the FCI receive a CI of the "California average grid electricity carbon intensity" regardless of whether the EV charging company is utilizing 0 CI RECs for the rest of their charging.

CARB should treat Hydrogen and EV charging equally by either giving hydrogen HRI capacity credits a CI of the last reported industry average, or by allowing EV charging FCI capacity credits to be generated off of a 0 CI if the company is using REC matching for the rest of their charging.

ii. Ownership Clarification

Tesla suggests that CARB clarify that "private MHD-FCI stations" includes fleets owned by entities in the government, private and non-profit sectors.

e. Amendments to the Light Duty Fast Charge Infrastructure (FCI) Program

The light duty FCI program has played an important role in driving the expansion of electric vehicle charging infrastructure throughout California. It has been key driver of making the economics of charging station development pencil out by providing developers with some incentives before utilization picks up. This has made certain charging locations economic to build months or years ahead of when they would have been built without this support. Importantly, as utilization grows at these locations, dependence on this program wanes as they move to base credit generation. As California seeks to dramatically expand its charging infrastructure to support its EV growth trajectory, it is critically important that this program remains robust and effective. Tesla offers the below comments on amendments to this program.

i. CARB should Maintain a 2.5% Light Duty FCI Cap, Removing the 0.5% Cap Change

CARB is proposing reducing the total amount of available FCI credits from 2.5% of deficits to 0.5%. Tesla believes that it is too early to declare "mission accomplished" on light duty electric vehicle charging. In the technology adoption life cycle, we are now past the early adopters and into the mainstream of car buyers. These buyers tend to be more risk-adverse and more concerned with the availability of reliable charging infrastructure. It is crucial that we continue to maintain a positive charging experience for these mainstream customers so that we can continue to advance the full electrification of the transportation sector. Light Duty FCI credits continue to play an important role in solving in the "chicken and the egg" problem of the tension between EV vehicle deployment and EV charger deployment. The CEC modeling of ACC2 shows a need for 83,000 DCFC in public locations by 2035 which is a daunting increase from the 10,000 public DCFC today and is significantly more than what a 0.5% cap can incentivize. CARB should keep the 2.5% cap in place to ensure continued incentives flow to charging infrastructure developers to build new chargers ahead of demand.

ii. Remove Geographic Restrictions and Station Size Limitations

CARB is proposing additional geographic restrictions for LD-FCI projects, where "station must be located in California in a low-income or disadvantaged community, or at least 10 miles from the nearest direct current fast charger open to the public with a nameplate capacity equal to or greater than 150 kW."[70]

[70] APPENDIX A-1 Proposed Regulation Order Proposed Amendments to the Low Carbon Fuel Standard Regulation at 105.

CARB's logic for these geographic restrictions is to "help fill refueling gaps in the State."[71] However, these amendments effectively limit LD FCI stations to rural areas because there are very few non-rural locations that are not located ten miles from an existing DCFC station. This amendment is operationally unworkable, requiring real time checking of federal maps (e.g., Alternative Fuel Data Center) on a daily, monthly, or even quarterly basis to see if the planned station remains within ten miles of some other public DCFC station.

Given the need for charging throughout California, CARB should remove all geographic limitations on this program. If our recommendation for no geographic restrictions is not acceptable, we recommend the new LCFS use United States Treasury Department and Internal Revenue Service (IRS) guidance on station eligibility for the 30C alternative fuel vehicle fueling property tax credit, which was designed to support the deployment of EV charging infrastructure in non-urban (rural) communities across the US and updated in the Inflation Reduction Act.[72] The U.S. Department of Energy has also published a clear mapping tool that shows which census tracts meet IRS definition of non-urban census tracts.[73] Compared to having a 10 mile from existing DCFC as a way to encourage DCFC in rural areas, the federal definition of non-urban census tracts is easily understood, stable, and remains in effect through 2030 until the Census Bureau updates determinations of urban and non-urban areas.[74]

CARB is also proposing to reduce the maximum site limit from 6 MW to 1 MW and adding a cap on the number of charging posts at a site to 4. Tesla believes that CARB should not add these additional restrictions. Tesla's largest location in Coalinga, California has 168 charging posts with a capacity of 16 MW. Charging companies have the best data to make informed business decisions about where to deploy new chargers and often the optimal decision is to add new chargers to an existing location which customers already find convenient, rather than adding a new site somewhere else. Adding restrictions on the size of the site and number of posts will result in suboptimal charger placement. Charging providers should continue to be incentivized to identify where charging infrastructure will be needed and build ahead of the demand with the support of the capacity credits. If charging is only built when needed, it is the customer who suffers because they are forced to wait for charging at chargers that are busy while new relief charging is being developed.

The 6 MW cap was implemented because CARB was worried that charging companies would build "white elephant" projects where they deployed dozens of chargers in whatever location was the cheapest to build, rather than in locations that were convenient for drivers. This concern has proven to be unfounded, as thousands of chargers have been built all over California in locations that are best optimized for both cost and customer convenience. This policy has directly enabled California's charging infrastructure to have a fighting chance to stay ahead of demand and ensure California EV drivers are able to live, travel and work throughout California. It is, therefore, unnecessary to add additional size and geographic restrictions today.

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[71] Appendix E: Purpose and Rationale of Proposed Amendments for the Low Carbon Fuel Standard Requirements at 37.
[72] https://www.irs.gov/pub/irs-drop/n-24-20.pdf
[73] https://experience.arcgis.com/experience/3f67d5e82dc64d1589714d5499196d4f/page/Page/
[74] https://www.irs.gov/pub/irs-drop/n-24-20.pdf

Note: in the draft regulation CARB incorrectly listed the section for amendment as "Subsection 95486.2(b)(1)(E)1" – it should be "Subsection 95486.2(b)(2)(E)(1)".

f. Tesla Supports Efforts to Protect Against Fraud in Biofuel Markets

CARB is proposing additional guardrails to the use of crop-based feedstocks in the production of biofuels. Tesla supports efforts to remove palm oil as a qualifying feedstock and requirements to track crop-based and forestry-based feedstocks to their point of origin.

Tesla is involved in the European fuel credit markets, such as the German THG program and Netherlands HBE program, and has seen how the flood of allegedly fraudulent biofuels into the European Union has caused the prices of those programs to fall, harming companies who are producing actual carbon reductions. One study found that imported used cooking oil represented 80% of consumption and that "a large share of these imports could be fraudulent" sourced from "repurposed virgin palm oil."[75] With the European Union now investigating those allegedly fraudulent sources of biofuels, there are concerns that these feedstocks will flow to other biofuels markets with less stringent safeguards. California is a leader in transportation decarbonization and as such we hope CARB will work with EU regulators as well as other North American regulators with LCFS programs to harmonize biofuel feedstock verification and tracking requirements to prevent these allegedly fraudulent biofuels from flowing to whichever LCFS program has the most lax regulations.

g. Book-and-Claim Accounting for Hydrogen Could be Catastrophic and Requires Further Analysis prior to Implementation

CARB is proposing rules which would allow Book-and-Claim Accounting for hydrogen injected into pipeline systems. Tesla is concerned that CARB has not fully taken into account the potential detrimental effects on our climate from such a provision. Hydrogen itself is a greenhouse gas with a global warming potential 33 times that of carbon dioxide on a 20 year timeframe.[76] As opposed to simply putting renewable electrons directly into a battery electric vehicle for motive power, hydrogen production from electrolysis uses that renewable electricity to split water and produces hydrogen, a greenhouse gas, some of which inevitably leaks into the atmosphere, furthering climate change. Because hydrogen is the smallest molecule, it is more susceptible to leakage than any other greenhouse gas. Leakage of hydrogen into the atmosphere during production, storage, distribution, and dispensing counteracts some of the potential carbon reductions. We hope that CARB staff will further study this issue and release a full analysis of the impacts of such a decision before it is implemented.

IV. Technical Amendment Improvements to Modernize the Policy if Time Allows:

a. Reduce Geofencing Radius for Incremental Credit for Residential Charging

CARB Guidance Document 19-03 sets a geofencing radius of 220 meters (M) around all registered non-residential EV charging FSEs, using a 4 decimal point prevision. Within that 220 meter radius, automakers are not allowed to apply incremental crediting to home charging. This is an issue in dense

[75] https://www.transportenvironment.org/discover/biofuels-from-unsustainable-crops-to-dubious-waste/
[76] https://www.gov.uk/government/publications/atmospheric-implications-of-increased-hydrogen-use

locations like cities where home charging takes place near registered non-residential EV chargers. With thousands of non-residential EV chargers deployed across the state, these geofencing radii have begun morphing into a patchwork that has nearly blotted out entire cities.

Tesla recommends CARB update the geofence radius from 220M to 20M at most. Improvements in GPS systems since adoption of the 220M radius provide assurance that double counting will not take place. A 2021, MIT Technology review revealed that "Once the signals are processed by a receiver, GPS is generally accurate to within five to 10 meters. Now the system is in the middle of a years-long upgrade to GPS III, which should improve its accuracy to one to three meters (see chart)."[77] The review goes on to recognize that additional accuracy, down to the centimeter, may be possible with the assistance of ground-based augmentation. Without fully knowing where ground-based augmentation may be in use to create higher accuracy, Tesla urges CARB to adopt a conservative radius of 20 meters at this time.

b. Smart Charging Provision Modifications

The current LCFS regulations include a pathway for generating incremental credits by using smart charging. This pathway is designed to incentivize shifting electricity use for EV charging to the times when marginal greenhouse gas emission rates of grid electricity are lower than the average emission rate. Tesla believes that this pathway is important for the continued acceleration of grid decarbonization. California has hit some key grid decarbonization milestones in the past few years, with the entire grid operating on 100% renewable electricity for brief periods throughout the day. As we ramp up renewables further, we will need companies to utilize the smart charging pathway to help flatten the Duck Curve.[78]

We encourage CARB to explore regulatory changes that would encourage more companies to utilize the Smart Charging pathway. One change could be to allow companies offering whole home renewable power systems with solar, storage, and EV charging to combine the systems to act as a virtual power plant, using the rooftop solar to charge the home storage battery during the day and discharging the home storage into the EV at night to lower grid pull during high emissions periods. We look forward to a future when more homes have such integrated systems and can be combined to provide grid services and time-shifting carbon reduction. Another change could be to allow for the use of hourly RECs, matched to offset specific carbon reductions against the hourly grid carbon intensity, rather than being matched against the yearly average carbon intensity. This would encourage the development of hourly RECs and would create a market that would put a price on hourly grid carbon intensity and incentivize investment in grid assets that reduce emissions during the highest intensity hours.

c. Repayment of Accumulated Deficits with a 10% Interest Rate

The current LCFS regulation[79] requires obligated parties to repay accumulated deficits with an interest rate of 5% applied. Given the higher interest rates we are seeing now, this low rate may incentivize

[77] See MIT Technology Review located here, https://www.technologyreview.com/2021/02/24/1017805/hyper-accurate-global-positioning-available-worldwide/#:~:text=Once%20the%20signals%20are%20processed,three%20meters%20(see%20chart).
[78] https://www.energy.ca.gov/sites/default/files/2022-10/CEC-500-2022-013.pdf
[79] §95485(c)(5)(A)

some obligated parties to hold off on purchasing credits as the interest rate applied to these deficits would be below their cost of capital. Tesla recommends increasing this interest rate to 10%.

Conclusion

In conclusion, Tesla supports CARB adopting a stringent standard, at least 30% by 2030 with at least a 12% step change and an effective AAM in 2026 that limits implementation delays. Further, Tesla believes that the CFR Program should continue to support LD EV deployment and would remain solvent and create efficiency if base credits were allocated to EV automakers to support the program. While Tesla supports alterations to LD through MHD FCI crediting, overall, FCI regulations for electrification should generally mirror those provided to hydrogen producers. Lastly, we urge CARB to modernize the regulations through updates to EERs and others. Section IV changes are necessary to support scientific integrity however could be postponed should CARB have insufficient resources to make these changes while getting the regulations adopted and enforceable in 2024.

Respectfully submitted,

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