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October 19, 2022

Submitted via-regulations.gov

Docket Management Facility
U.S. Department of Transportation
National Highway Traffic Safety Administration
1200 New Jersey Avenue, SE
West Building Ground Floor
Room W12-140
Washington, DC 20590-00101

RE: *National Highway Traffic Safety Administration, Notice of Intent to Prepare an Environmental Impact Statement for Model Years 2030 and Beyond New Medium- and Heavy-Duty Fuel Efficiency Improvement Program Standards, Docket No. NHTSA–2022–0076, 87 Fed. Reg. 57248 (Sept. 19, 2022).*

To Whom It May Concern:

Pursuant to the National Highway Traffic Safety Administration's (NHTSA) *Notice of Intent to Prepare an Environmental Impact Statement for Model Years 2030 and Beyond New Medium- and Heavy-Duty Fuel Efficiency Improvement Program Standards, Docket No. NHTSA–2022–0076, 87 Fed. Reg. 57248 (Sept. 19, 2022).* Tesla, Inc. (Tesla) submits the following comments in response to the agency's notice.

Tesla encourages NHTSA to utilize the NEPA process to ensure that its range of alternatives include options recognizing the rapid pace of electrification that is occurring in medium-duty and heavy-duty vehicle sectors. To that end, in setting standards for Model Year (MY) 2030 and beyond, NHTSA's environmental impact statement (EIS) should identify a preferred alternative that sets the standards at a level of stringency that will result in vehicle deployment that exceeds 2030 goals established in President Biden's Executive Order 14037 and ensures meeting the country's long-term decarbonization goals.[1]

Additionally, NHTSA's NEPA review should fully recognize the oil savings, emissions reductions, and public health and welfare benefits that will accrue from establishing stringent medium-duty and heavy-duty standards for MY 2030 and beyond. To facilitate the agency's "hard look" review, Tesla provides the following scoping comments and reference citations.

I. **Tesla 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 (CO2) and other GHGs—from the transportation and power sectors.

[1] President Biden, E.O. 14037, Strengthening American Leadership in Clean Cars and Trucks (Aug. 5, 2021), *available at* 86 Fed. Reg. 43583 (Aug.10, 2021). See also, White House, The Long-Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050 (Nov. 2021) ("To reduce emissions to net-zero by 2050 we will need to ensure that zero-emission vehicles dominate new sales for most types of vehicles by the early 2030s.").

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. Tesla currently produces and sells four fully electric, zero emissions vehicles (ZEVs): The Model S sedan, the Model X sport utility vehicle (SUV), the Model 3 sedan, and the Model Y mid-sized SUV. In addition, Tesla has announced plans to produce the Semi (Class 8 truck) later this year, and the Cybertruck (pickup truck) in 2023. As an EV-only manufacturer, EPA recognized in its *2021 Automotive Trends Report* that Tesla had by far the lowest carbon dioxide emissions (0 g/mi) and highest fuel economy (119 miles per gallon equivalent) of all large vehicle manufacturers in MY 2020.[2]

Tesla is also deeply committed to ensuring the U.S. remains a leader in advanced manufacturing.[3] All Tesla vehicles sold in North America are manufactured in the U.S. In 2022, the Tesla Model Y ranked as the most American-made car, based on overall contributions to the U.S. economy, and the Model 3 ranked just below as the second most American made car on the market.[4] NHTSA similarly confirms that 100% of the vehicle, engine, and transmission assembly in each Tesla vehicle sold in the U.S. occurs in the U.S.[5] In addition, Tesla's U.S. supply chain continues to expand and spans across more than 40 states, including Alabama, Georgia, Ohio, Indiana, and Michigan.[6]

In the U.S., Tesla conducts vehicle manufacturing and assembly operations at its factory in Fremont, CA, and produces electric drive trains and manufactures advanced battery packs, as well as Tesla's energy storage products, at its Gigafactory Nevada in Sparks, NV. Tesla also builds and services highly automated, high-volume manufacturing machinery at its facility in Brooklyn Park, MN, and operates a tool and die facility in Grand Rapids, MI.[7] Tesla produces solar energy and vehicle charging products, including manufacturing of its DC-fast charging equipment for heavy duty vehicles, at its Gigafactory New York in Buffalo, NY.

In the spring of 2022, Tesla began production of Model Y vehicles at its newest vehicle and advanced battery manufacturing facility in Austin, TX. The project will invest over $10B in factory development and create 20,000 new jobs.[8] Upon full completion, the Gigafactory Texas will produce Tesla's new Cybertruck and Model Y crossover, and manufacture Tesla's new, advanced 4680 lithium-ion battery cell and battery packs.[9] Globally, by 2030, Tesla aims to sell 20 million electric vehicles per year.[10]

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[2] EPA, The 2021 EPA Automotive Trends Report, Greenhouse Gas Emissions, Fuel Economy, and Technology Since 1975 at 13 (Nov. 2021) (preliminary MY 2021 at 125.7 miles per gallon).
[3] See generally, Tesla, Impact Report 2021 (May 6, 2022).
[4] Cars.com, Cars.com's American-Made Index Adds Tesla to Exclusive List of Multiyear Chart-Toppers, Model Y Nabs No. 1 (June 21, 2022); See also, Cars.com, Tesla Model 3 Snags No. 1 Spot on Cars.com's 2021 American-Made Index®; First All-Electric Vehicle to Top the List in Its 16-Year History (June 23, 2021);, American University, Kogod School of Business, 2021 Made in America Index (Oct. 15, 2021) (Finding in 2021, each of Tesla's vehicles - the Model S, 3, X and Y - ranked in the top 10 and Tesla was the only manufacturers to have representation from its entire portfolio in the top 10.).
[5] NHTSA, Technical Support Document: Proposed Rulemaking for Model Years 2024-2026 Light Duty Vehicle Corporate Average Fuel Economy Standards (Aug. 2021) at 96, Table 2-6.
[6] See e.g., AutoNews, Suppliers Starting to Set Stage for Tesla in Texas (Sept. 5, 2021).
[7] See Tesla, Manufacturing: Build a Sustainable Future.
[8] See, e.g., KXAN/Austin Business Journal, Musk teases huge job number at Austin-area Tesla factory (Dec. 20, 2021); Reuters, Musk says Tesla's Texas factory is $10 bln investment over time (Dec. 15, 2021).
[9] See Tesla, Tesla Battery Day Presentation (Sept. 22, 2020).
[10] Tesla, Impact Report 2020 (Aug. 10, 2021) at 2.

Currently, Tesla has more than 65,000 employees in the U.S. and has infused billions of dollars in economic activity and created thousands of direct and indirect jobs in states like California,[11] Nevada,[12] Texas, Utah, and New York.[13]

The company is also investing in its growing network of retail stores, vehicle service centers, and electric vehicle charging stations to accelerate and support the widespread adoption of its ZEV products. Since 2012, Tesla has invested heavily in siting, building, and operating EV charging infrastructure. In 2013, Tesla had just eight Supercharger Stations in North America. As of September 2022, this global network has grown to include over 4,280 Supercharger Stations with almost 39,000 individual connectors.[14] In 2021, Tesla opened 912 new Supercharger locations around the world – an average of two and half new locations every day.[15] Tesla's charging network also includes over 14,000 Destination Charging locations and over 28,000 Destination Charging connectors worldwide that replicate the convenience of home charging by providing hotels, resorts, and restaurants with Tesla Wall Connectors.[16] Tesla is committed to continue expanding these networks to provide a convenient and seamless charging experience for our customers.

A. Tesla Full Electric Class 8 Truck – the Tesla Semi[17]

In 2017, Tesla introduced the Tesla Semi to the world. A Class 8 truck designed from the ground up to be the most efficient and safest truck on the market. The Tesla Semi represents an opportunity to have an outsized impact on reducing NOx and GHG emissions from goods movement and transportation. The Semi comes in two models with ranges of 300 and 500 miles respectively and will demonstrate that an all-electric truck can meet virtually any duty cycle when paired with the megawatt charging system that Tesla and the industry 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. That said, because combination trucks have high fuel consumption due to their weight and heavy utilization, they account for approximately 18% of all U.S. vehicle emissions. 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 the payload to be at least as high as it 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

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[11] See, e.g., IHS Markit, The Economic Contribution of Tesla in California (May 2018) (Tesla infusing over $4 billion into the California economy in 2017 alone).

[12] See, e.g. Nevada Governors Economic Office of Economic Development, Tesla Compliance Audit and Transferable Tax Credit Certificate (July 1, 2018 - June 30, 2019), (Sept 15, 2021) at Appendix A (showing almost $5B in total capital investment from Oct 2014 – June 2019).

[13] See, e.g. WIVB, Tesla officially exceeds Buffalo hiring requirement (Feb. 1, 2022)(reporting more than 2,200 jobs in New York State and cumulative investment and spend in New York State of over $1B between Jan 1, 2015 and Dec. 31,2021); See generally, DOE, FASB, National Blueprint For Lithium Batteries 2021–2030 (June 7, 2021) at 10 ("With the increasing electrification of the U.S. transportation sector, growth in employment associated with EVs has already been demonstrated, with electric hybrids, plug-in hybrids, and all EVs supporting 198,000 U.S. employees in 2016, and 242,700 U.S. employees by 2019.").

[14] See Tesla, Supercharger; See also, Tesla, Q2 2022 Update (July 20, 2022) at 6.

[15] See InsideEVs, Tesla: In 2021 Supercharging Uptime Improved To 99.96% (May 10, 2022).

[16] See Tesla, Destination Charging.

[17] See Tesla, Semi.

(2,000 pounds). When fully loaded, the Tesla Semi should be able to achieve over 500 miles of range, achieved through aerodynamics and highly efficient motors and be able to reach an efficiency of less than 2 kWh/mile.[18]

Tesla anticipates its EPA certification for the Tesla's Semi will fall into the following two GHG Class 8 subcategories:

- Class 8 Mid-Roof Day Cab, at Phase II, as the Cab height is 128.6" (between 121" to 147" as a specified group in 40 C.F.R. §1037.106), *and*
- Class 8 High Roof Day Cab, at Phase II, as the Cab height is 159.45" (over 148" as a specified group in the 40 C.F.R. §1037.106)

While most heavy trucking journeys are shorter than 500 miles, Tesla wants long-distance hauling to be sustainable. Tesla also plans to design and produce a long-haul, sleeper cab version of the Semi in the future.

Since unveiling the Tesla Semi in late 2017, a significant number of fleets with substantial freight needs have placed reservations for the truck, indicating broad industry demand for heavy-duty electric vehicles.[19] 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. The first delivery of the Tesla will take place by the end of the calendar year.[20]

The reason for this strong interest is clear – the economics of electrified heavy-duty vehicles are incredibly 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.

II. No Action Alternative Baseline & Range of Alternatives

In defining the "preferred alternative" for analysis, NHTSA must focus on the Energy Policy & Conservation Act's (EPCA) requirement that new MY 2030 and beyond standards truly reflect the "maximum feasible" level of fuel economy and prioritize EPCA's overarching purpose of energy conservation. In setting the "maximum feasible" standards, NHTSA must fully consider the utilization of electric vehicles in the medium- and heavy-duty sectors.[21]

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[18] Id.

[19] See e.g., Yahoo Finance, Tesla Gets Order For 150 Semi Trucks from Canadian Company As It Prepares For 'Volume Production' (Nov. 5, 2020); The Street, Walmart Triples-Down on Tesla Semi Reservations (Sept. 29, 2020); 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).

[20] Reuters, PepsiCo confirms Tesla Semi truck deliveries to start in December (Oct. 7, 2022).

[21] Compare 49 U.S.C. §32902(k) and 49 U.S.C. §32902 (h) (placing certain limitations on the use of dedicated vehicles in establishing the passenger vehicle standards).

It follows that NHTSA's baseline must take into consideration the Environmental Protection Agency's (EPA) plans for soon to be finalized heavy duty emissions standards,[22] California's Advanced Clean Truck rule,[23] and the recently passed federal legislation – Bipartisan Infrastructure Law[24] and the Inflation Reduction Act[25] - supportive of expansive vehicle electrification. To that end, Tesla supports NHTSA's decision to include CARB's Advanced Clean Truck (ACT) program in the baseline of the no action alternative. ACT has been adopted and EPA is the process of finalizing the grant of a waiver for the program.[26] The ACT regulation will drive significant emission reductions and medium- and heavy-duty vehicle electrification through MY 2035.[27] Additionally, five states – Massachusetts, New Jersey, New York,[28] Oregon, and Washington – have already adopted the standards starting in MY 2025. Several additional states are expected to adopt the rule starting in MY 2026. In California alone, the ACT rule is estimated to require the deployment of 100,000 heavy-duty ZEVs in 2030 and 300,000 by 2035.[29] If the seventeen states[30] that have adopted the current California light duty ZEV standards also adopt California's ACT rule, it is estimated that 1 in 8 trucks sold in 2030 will be electric.[31]

Consistent with the requirements of EPCA, NHTSA must also define "action alternatives" that identify and analyze technology-forcing alternatives reflective of the rapid and recent advances in vehicle technology. In evaluating "technological feasibility," NHTSA should consider any technologies that are capable of being implemented in the relevant model year(s) under consideration, and not limit its consideration to technologies which are currently in commercial use. As the D.C. Circuit has made clear, "technological feasibility" simply means "capable of being carried out." *NRDC v. Herrington*, 768 F.2d 1355, 1392 (D.C. Cir. 1985). Under this definition, the Government cannot simply exclude even non-marketed prototypes as not "technologically feasible" on a blanket basis. Id. at 1403. NHTSA has applied this definition in the EPCA context, explaining that "the agency is not limited in determining the level of new standards to technology that is already being commercially applied at the time of the rulemaking, a consideration which is particularly relevant" for a rule extending for multiple years.[32] This is not a new interpretation: NHTSA has previously explained that "'[t]echnological feasibility' means whether a particular method of improving fuel economy can be available for commercial application in the model year for which a standard is being established."[33] Indeed, courts have described EPCA as a "technology forcing" statute that contained mandatory fuel economy standards because "market forces . . . may not be strong enough to bring about the necessary fuel conservation which a national energy policy demands." *Center for Auto Safety v. Nat'l Highway Traffic Safety Admin.*, 793 F.2d 1322, 1339 (D.C. Cir. 1986) (quoting Senate Report); see also *Green Mountain Chrysler Plymouth Dodge Jeep v. Crombie*, 508 F. Supp. 2d 295, 358 (D. Vt. 2007) ("EPCA . . . was a technology-forcing statute"). Thus, NHTSA's evaluation of

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[22] Environmental Protection Agency (EPA), Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards, Docket ID No EPA-HQ-OAR-2019-0055, 87 Fed. Reg. 17414 (March 28, 2022).
[23] See 13 Cal. Code Reg. § 1963, et seq.
[24] Infrastructure Investment and Jobs Act. Pub. L. 117-58 (Nov. 15, 2021).
[25] Inflation Reduction Act, Pub. L. 117–169 (Aug. 16, 2022).
[26] See, Environmental Protection Agency's (EPA), *California State Motor Vehicle Pollution Control Standards; Heavy- Duty Vehicle and Engine Emission Warranty and Maintenance Provisions; Request for Waiver of Preemption; Opportunity for Public Hearing and Public Comment,* 87 Fed. Reg. 35760 (June 13, 2022).
[27] 87 Fed. Reg. at 17597; See also, CARB Advanced Clean Trucks Fact Sheet (Aug. 20, 2021).
[28] See, ICCT, Benefits of Adopting California Medium- and Heavy-Duty Vehicle Regulations In New York State (May 27, 2021).
[29] CalMatters, California Mandates Zero-exhaust Big Rigs, Delivery Trucks (July 6, 2020).
[30] CARB, States that have Adopted California's Vehicle Standards under Section 177 of the Federal Clean Air Act (updated to include New Mexico's recent adoption of the standards).
[31] Union of Concerned Scientists, We Can Electrify One in Three Heavy Duty Trucks by 2030: Here's How. (Mar. 22, 2022).
[32] 77 Fed. Reg. 62624, 62668 (Oct. 15, 2012).
[33] 73 Fed. Reg. 24352, 24363 (May 2, 2008).

technological feasibility should naturally include an evaluation of advanced or cutting-edge vehicle technologies, including the potential levels of ZEV deployment resulting from any proposed alternative.

Accordingly, Tesla asserts that NHTSA's range of alternatives for MY 2030 and beyond MD and HD fuel economy standards should include alternatives that result in ZEV sales and deployment in each Class 3-8 category that meet or exceed ACT and President Biden's goal of expanding "the use of new transportation technologies—including a rapid expansion of zero-emission vehicles—in as many applications as possible across light-, medium-, and heavy-duty applications."[34] NHTSA should recognize that the President's Executive Order 14307, long-term climate strategy, and CARB's ACT[35] were finalized prior to adoption of the Bipartisan Infrastructure Law , the Inflation Reduction Act, and numerous new industry analyses and announcements.[36]

Further, NHTSA should recognize that the acceleration in ZEV adoption means that internal combustion engine (ICE) vehicle sales have already peaked globally in 2017 and are now in permanent decline. Indeed, Bloomberg New Energy Finance predicts that by 2025 passenger ICE sales will be 19% below this 2017 peak.[37] Other recent analyses predict rapid declines in ICE vehicle production.[38]

In its recent regulatory proposal, the EPA assumed a ZEV sales share of only 1.5% in key heavy-duty market segments in 2027.[39] This assumed baseline is woefully low and cuts against many projections. Indeed, as EPA indicates, the BEV market is dynamic and changing rapidly.[40] For example, NREL has found economics will drive must faster adoption with ZEV sales possibly reaching 42% of all medium- and heavy-duty trucks by 2030.[41] It even projects out a scenario where ZEV sales reach >99% by 2045, and 80% of the sector transitions to ZEVs by 2050, reducing CO2 emissions by 69% from 2019.[42] A new analysis views the heavy-duty haul market as 50% electrifiable right now.[43] The firm ACT Research forecasted a 26% sales share of heavy-duty ZEVs nationwide in 2030.[44] Yet, another found that by 2030 25% of the global fleet will be electric.[45] 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

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[34] White House, The Long-Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050 (Nov. 2021) at 31.

[35] Additionally, five states – Massachusetts, New Jersey, New York,[35] Oregon, and Washington – have already adopted the standards starting in MY 2025. Several additional states are expected to adopt the rule starting in MY 2026.

[36] See e.g., Automotive News, Intelligence Report: 2030 Electric Vehicle Race (June 30, 2022); Bloomberg, America's Electric Vehicle Selection Is About to Get a Lot Wider (Jan. 12, 2022); ClimateWire, EV models will double in 2022 as electric trucks proliferate (Jan. 6, 2022).

[37] BNEF, EV Outlook 2022 (May 31, 2022).

[38] See e.g., Wards Auto, Experts See Gains in Vehicle Electrification, Fuel Economy (Aug. 15, 2022) (Fifty powertrain experts surveyed by Automotive Futures expect the share of the U.S. market held by spark-ignition vehicles in 2025 and 2030 to fall to 60% and 38%, respectively, from current levels)

[39] 87 Fed. Reg. at 17458; 87 Fed. Reg. at 17601.

[40] 87 Fed. Reg. at 17595.

[41] NREL, Decarbonizing Medium- & Heavy-Duty On-Road Vehicles: Zero-Emission Vehicles Cost Analysis (March 8, 2022).

[42] Id.

[43] NACFE, Charting the Course for Early Truck Electrification (May 2022) (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).

[44] HDT Truckinginfo, ACT: Third of Class 4-8 Vehicles to be Battery-Electric in 10 Year (June 4, 2021).

[45] Fleet Owner, Disruption in trucking technology (Jan. 13, 2020).

fleet."[46] Further, it is predicted the pace of electrification will increase rapidly over the next decade.[47] Recent sales suggest this pace of adoption is already occurring.[48]

These predictions all pre-date the passage of the Inflation Reduction Act (IRA) – which provides extensive support for domestic battery cell and module manufacturing as well as investment tax credit incentives for commercial fleet purchasers.[49] Numerous new analyses have indicated the IRA's passage will substantially hasten the deployment of medium- and heavy-duty ZEVs.[50]

III. Scope of Expected Beneficial Impacts from Accelerating Electric Vehicle Deployment

In its notice, NHTSA requests comments provide, *inter alia*, citations to relevant articles to frame the scope of the agency's analysis.[51] In response to this request, Tesla provides the following information.

A. Oil Savings Benefits of Electrification

Congress passed EPCA in 1975 "to provide for improved energy efficiency of motor vehicles[.]" 42 U.S.C. § 6201(5). Although EPCA has been amended, its energy conservation goal has remained intact, and NHTSA is required to consider it in its rulemaking. *Center for Biological Diversity v. NHTSA,* 538 F.3d 1172, 1205 (9th Cir. 2008) ("[E]nergy conservation is the fundamental purpose of [EPCA] and an explicit statutory factor that NHTSA 'shall' consider."). The Act is intended to guide long-term agency policy of oil savings and energy conservation. *See Center for Auto Safety v. NHTSA*, 793 F.2d 1322, 1340 (D.C. Cir. 1986) ("It is axiomatic that Congress intended energy conservation to be a long term effort that would continue through temporary improvements in energy availability."); *Ophir v. City of Boston*, 647 F. Supp. 2d 86, 93 (D. Mass. 2009) ("Over the long term, the EPCA was designed to 'decrease dependence upon foreign imports, enhance national security, achieve the efficient utilization of scarce resources, and guarantee the availability of domestic energy supplies at prices consumers can afford.'") (quoting S. Rep. No. 94–516, at 117 (1975) (Conf. Rep.)). Achievement of these Congressional goals requires a steady increase in fuel economy standards over time; as Congress acknowledged, the need for "movement toward better mileage" to be "given a high enough priority year after year. . . lies at the heart of the need for this legislation." S. Rep. No. 94–179, at 8 (1975).

Accordingly, in its environmental review, NHTSA should consider how more stringent MY 2030 and beyond standards that facilitate the greater deployment of ZEVs will contribute to reducing the nation's oil dependency. While released before the finalization of the Inflation Reduction Act and CARB's ACC II regulations, the following

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[46] MJ Bradley, Medium- & Heavy-Duty Vehicles: Market Structure, Environmental Impact, and EV Readiness (Aug. 11, 2022) at 6.

[47] See, Wood Mackenzie, US electric truck sales set to increase exponentially by 2025 (Aug. 10, 2020) (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.)

[48] Fleet Owner, Pace of heavy EV sales quickens with two recent deals (Mar. 22, 2022).

[49] See Inflation Reduction Act, Pub. L. 117–169 (Aug. 16, 2022) (Sections 13502 and 13403 respectively).

[50] See e.g., ERM, EDF Memo IRA Supplemental Assessment: Analysis of Alternative Medium- Heavy-Duty ZEV Business-As-Usual Scenarios (Aug 19, 2022); ERM, EDF Memo: Analysis of Alternative Medium- Heavy-Duty ZEV Business-As-Usual Scenarios (May 16, 2022); RMI, The Inflation Reduction Act Will Help Electrify Heavy-Duty Trucking (Aug. 25, 2022); Wired, The Climate Bill Will Electrify More Delivery Vans and Trucks (Aug. 25, 2022); Transport Dive, Federal incentives needed for 'wholesale shift' to medium- and heavy-duty electric trucks: report (Aug. 2, 2022).

[51] 87 Fed. Reg. at 57252.

articles, papers, and studies highlight how electrification of the transport sector, consistent with EPCA's goals, will reduce oil consumption and demand:

- U.S. Energy Information Administration, Changes in prime supplier sales of motor gasoline since 2020 differ significantly by state (Apr. 6, 2022) (Comparisons show states like California, with increasingly higher shares of BEV, have lower gasoline sales per capita and less gasoline sales per 1,000 miles of VMT compared with historical averages . For example, prime supplier sales of gasoline per 1,000 miles of VMT were 10% lower in 2021 than the 2015–19 average in California, even though total VMT per capita in the state was only 6% less than average), *available at* https://www.eia.gov/petroleum/weekly/archive/2022/220406/includes/analysis_print.php?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiosgenerate&stream=top (last visited Sept. 12, 2022).

- Bloomberg, Electric Vehicles Are Going to Dent Oil Demand—Eventually (Dec. 9, 2021) (By the middle of the century, oil demand could be 21 million barrels less per day from electric vehicle deployment compared to an entirely internal combustion engine global vehicle fleet.) *available at* https://www.bloomberg.com/news/articles/2021-12-09/peak-oil-demand-is-coming-but-not-so-soon (last visited Sept. 12, 2022).

- S & P Global, EV Impact: Electric vehicle growth to sever oil from key market (Sept 22, 2021) *available at* https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/ev-impact-electric-vehicle-growth-to-sever-oil-from-key-market-66514990 (last visited Sept. 12, 2022).

- IHS Markit, IHS Markit: GM Aspirations to End Sales of Gasoline-Powered Light Vehicles by 2035 Latest Sign that Peak Gasoline Demand from Light Vehicles Has Already Come and Gone (Feb. 17, 2021) (Estimating that by 2025 light PEVs will displace about 0.9-1.1 MMb/d of world oil demand. Adding in electric buses and two-wheelers, oil displacement by electricity in road transportation could hit 1.5 MMb/d, which would be equivalent to about 1.4% of our projected level of total world oil demand in 2025.) *available at* https://news.ihsmarkit.com/prviewer/release_only/id/4628477 (last visited Sept 12, 2022).

- U.S. Department of Energy, FOTW #1203, Sept 13, 2021: Light-Duty Plug-In Electric Vehicles Displaced 500 Million Gallons of Gasoline in the U.S. in 2020 (Sept. 13, 2021) (Gasoline displacement in the United States due to light-duty plug-in electric vehicles reached an estimated high of 500 million gallons in 2020. All-electric vehicles (EV) displaced a greater portion than plug-in hybrid electric vehicles (PHEV) in 2020, accounting for about three-quarters of the total. Cumulatively from 2011 to 2020, light-duty plug-in electric vehicles have displaced 1.9 billion gallons of gasoline in the U.S.) *available at* https://www.energy.gov/eere/vehicles/articles/fotw-1203-sept-13-2021-light-duty-plug-electric-vehicles-displaced-500 (last visited Sept. 12, 2022).

- Bloomberg, Goldman Sees Oil Demand Peak in Transportation 5 Years Out (April 15, 2021) *available at* https://www.bloomberg.com/news/articles/2021-04-15/goldman-sees-oil-demand-peaking-for-transportation-in-five-years#xj4y7vzkg (last visited Sept. 12, 2022).

B. Reducing Greenhouse Gas Emissions and the Climate Change Benefits of Electrification

Developing stringent MY 2030 medium- and heavy-duty vehicle standards are critical to meeting the President's long-term decarbonization goal of net-zero greenhouse gas emissions by 2050.[52] To that end, standards that facilitate rapid deployment of electric vehicles are the key component to decarbonizing the transportation sector.[53] Further, numerous studies show that the medium- and heavy-duty trucking sector must rapidly decarbonize beginning this decade to meet the U.S. commitments. A recent ICCT study found that a 2030 target of 45% zero-emission sales in the U.S. heavy-duty vehicle sector is compatible with limiting warming to less than 2°C.[54] Even more is needed to ensure that the protective limiting of overall warming to 1.5°C is reached.[55] Another recent analysis found that if 70% of the Class 8 regional haul tractors in the U.S. and Canada were electrified, it would result in the avoidance of almost 29 MMT CO2e annually.[56] Other analyses indicate reaching net zero emissions requires 100% ZEV sales in the heavy- duty sector by no later than 2045.[57]

As NHTSA assesses the benefits of stringent MY 2030 and beyond standards for reducing GHG emissions and addressing the impacts of climate change, Tesla supports the agency using the current interim federal social cost of carbon (SCC) as a starting point.[58] However, NHTSA should recognize that numerous peer reviewed studies have found that the current SCC significantly underestimates the costs and impacts of climate change. One recent, peer-reviewed study found that the actual social cost of carbon is more than three times that of the interim SCC estimate.[59] Other peer reviews have come to similar conclusions about the SCC's underestimation.[60] In response, the agency should adjust its analysis accordingly.

Further, in fully assessing the impact stringent MY 2030 and beyond fuel economy standards will have on meeting the administration's GHG reduction goals, NHTSA should utilize, *inter alia*, the following studies and citations. These studies are indicative of a significant body of analysis highlighting the environmental benefits of light duty standards that result in significantly greater deployment of electric vehicles:

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[52] White House, The Long-Term Strategy of The United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050 (Nov. 2021) at 4.

[53] See e.g., World Health Organization, COP26 Special Report on Climate Change and Health (Oct. 12, 2021) (To meet the goals of the Paris agreement, there needs to be a rapid global shift away from vehicles powered by an internal combustion engine, such as through bans on new sales of petrol and diesel vehicles by 2030 and bans on their use in highly populated areas, such as city centers, by 2025.); UNFCCC, Nationally determined contributions under the Paris Agreement; Synthesis report by the secretariat (Feb. 26, 2021) at 32 (In terms of specific technologies that Parties intend to use for achieving their adaptation and mitigation targets, the most frequently identified were energy efficient appliances and processes, renewable energy technologies, low- **or zero-emission vehicles** and hydrogen technologies)(emphasis added).

[54] ICCT, Emissions Reduction Benefits of a Faster, Global Transition to Zero-Emission Vehicles (Mar. 8, 2022).

[55] Id.

[56] NACFE, HD Regional Haul Tractors (Dec. 15, 2021).

[57] Energy Innovation, The Cost of Delays (Feb. 3, 2020); See also, McKinsey, Climate math: What a 1.5-degree pathway would take (April 30, 2020); WHO, COP26 Special Report on Climate Change and Health (Oct. 12, 2021).

[58] See 87 Fed. Reg. at 57251; See also, White House, Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990 Interagency Working Group on Social Cost of Greenhouse Gases, United States Government (Feb. 2021).

[59] Resources for the Future, Social Cost of Carbon More Than Triple the Current Federal Estimate, New Study Finds (Sept. 1, 2022)(finding that every additional ton of carbon dioxide emitted into the atmosphere costs society $185—far higher than the current federal estimate of $51 per ton.)

[60] See e.g., Stern, et al., National Bureau of Economic Research, The Economics of Immense Risk, Urgent Action and Radical Change: Towards New Approaches to the Economics of Climate Change (Feb. 15, 2021).

- Tesla, 2021 Impact Report (May 6, 2022) at 56-79 (Providing analysis detailing how Tesla electric vehicles (EV) are more sustainable than internal combustion engine (ICE) vehicles, and showing among other metrics, how Tesla vehicles' all-in emissions per mile are significantly lower than ICE vehicles and, unlike ICE vehicles, will continue to become cleaner over time.) *available at* https://www.tesla.com/ns_videos/2021-tesla-impact-report.pdf (last visited Sept. 12, 2022).

- Transport & Environment, Addressing the heavy-duty climate problem (Sept. 16, 2022) (study modeling the CO2 targets required if all trucks and buses in the E.U. are to be zero emissions by 2050) *available at*: https://www.transportenvironment.org/discover/addressing-the-heavy-duty-climate-problem/ (last visited Oct. 17, 2022) .

- Union of Concerned Scientists, Driving Cleaner: Electric Cars and Pickups Beat Gasoline on Lifetime Global Warming Emissions (July 25, 2022) available at https://www.ucsusa.org/sites/default/files/2022-07/driving-cleaner-report_0.pdf (last visited Sept. 12, 2022).

- Carbon Brief, A faster shift to electric vehicles (EVs) in the US would avoid around 10% of the global cropland expansion expected over the next 30 years, according to a new study (July 18, 2022) (study concluding that the 100% electric vehicle sales scenario would result in between 417m tonnes of CO2 equivalent (MtCO2e) and 551MtCO2e being saved in total out to 2050, in addition to the benefits of taking fossil fuel-powered vehicles off the road.) *available at* https://www.carbonbrief.org/electric-cars-sales-in-the-us-could-prevent-one-tenth-of-global-cropland-expansion/?utm_campaign=Daily%20Briefing&utm_content=20220719&utm_medium=email&utm_source=Revue%20newsletter (last visited Sept. 12, 2022).

- Dimanchev, et al. The 4Ds of Energy Transition: Decarbonization, Decentralization, Decreasing Use and Digitalization, Electric Vehicle Adoption Dynamics on the Road to Deep Decarbonization (July 15, 2022) (highlighting that published pathways indicate that the passenger vehicle fleet must be primarily comprised of zero-emission vehicles by 2050, in a future consistent with keeping global warming below 2 or 1.5 °C. With the average lifetime of internal combustion cars in the U.S. is 16 years, achieving a ZEV share consistent with 1.5°C pathways would require a combination of a relatively early ban by around 2030 and an average non-ZEV lifetime shorter than 10 years.) *available at* https://onlinelibrary.wiley.com/doi/10.1002/9783527831425.ch8 (last visited Sept 12, 2022).

- Bloomberg New Energy Finance, Net-Zero Road Transport By 2050 Still Possible, As Electric Vehicles Set To Quintuple By 2025 (June 1, 2022) (finding that be on n track for a net-zero global fleet by 2050, zero-emission vehicles need to represent 61% of global new passenger vehicle sales by 2030, 93% by 2035, and the last ICE vehicle of any segment needs to be sold by 2038.) *available at* https://about.bnef.com/blog/net-zero-road-transport-by-2050-still-possible-as-electric-vehicles-set-to-quintuple-by-2025/?utm_source=Email&utm_campaign=596500&utm_medium=Newsletter&utm_content=BNEFMonthInReviewJune&tactic=596500&pchash= (last visited Sept. 12, 2022).

- IPPC, AR6 Climate Change 2022: Mitigation of Climate Change (April 4, 2022) at 2-78 (Electric vehicles (EVs) powered by clean electricity can reduce GHG emissions and such policies are important for spurring adoption of such vehicles and GHG emission reductions); at 10-41 (BEVs manufactured and operated can lower emission by 85% compared to ICE vehicles) *available at*

https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_FullReport.pdf (last visited Sept. 12, 2022).

- ICCT, Emissions reduction benefits of a faster, global transition to zero-emission vehicles (March 2022) *available at* https://theicct.org/wp-content/uploads/2022/03/Accelerated-ZEV-transition-wp-final.pdf?utm_source=ICCT+mailing+list&utm_campaign=01b4a8f70d-lately_from_feb2018_COPY_01&utm_medium=email&utm_term=0_ef73e76009-01b4a8f70d-510835924 (last visited Sept 12, 2022).

- Woody, et al., The role of pickup truck electrification in the decarbonization of light-duty vehicles *Environmental Research* (March 1, 2022) (For sedans, SUVs, and pickup trucks finding HEVs and BEVs have approximately 28% and 64% lower cradle-to-grave life cycle emissions, respectively, than ICEVs resulting in a lifetime BEV over ICEV GHG emissions benefit of approximately 45 tonnes CO_2e for sedans, 56 tonnes CO_2e for SUVs, and 74 tonnes CO_2e for pickup trucks) *available at* https://iopscience.iop.org/article/10.1088/1748-9326/ac5142 (last visited Sept. 12, 2022).

- Wolfram, et al., Nature Communications, Pricing indirect emissions accelerates low—carbon transition of US light vehicle sector (Dec. 8, 2021) (Total indirect emissions from electric vehicles pale in comparison to the indirect emissions from fossil fuel-powered vehicles. This is in addition to the direct emissions from combusting fossil fuels — either at the tailpipe for conventional vehicles or at the power plant smokestack for electricity generation — showing electric vehicles have a clear advantage emissions-wise over conventional vehicles.) available at https://www.nature.com/articles/s41467-021-27247-y (last visited Sept. 12, 2022)

C. Reducing Criteria Air Pollutants and the Benefits of Electrification

As the Intergovernmental Panel on Climate Change (IPCC) has recently recognized, transitioning away from internal-combustion vehicles mitigates GHG emissions, improves air quality, and lowers risks of respiratory illnesses.[61] NHTSA's environmental review of MY 2030 and beyond medium- and heavy-duty standards should also assess how stringent standards that promote accelerated electrification will also provide significant public health benefits. Among the numerous analyses the agency should consider during its NEPA review are the following:

- American Lung Association, Delivering Clean Air: Health Benefits of Zero-Emission Trucks and Electricity (Oct. 4, 2022) (finding that by moving to zero-emission trucks and power, the public health benefits in U.S. counties with major trucking routes could reach: $735 billion in public health benefits due to cleaner air, 66,800 fewer premature deaths, 1.75 million fewer asthma attacks, and 8.5 million fewer lost workdays) *available at*: https://www.lung.org/clean-air/electric-vehicle-report#truck (last visited Oct. 17, 2022).

[61] International Panel on Climate Change (IPCC), AR 6 Climate Change 2022: Impacts, Adaptation and Vulnerability (Feb. 28, 2022) at 7-120; See also international Energy Agency (IEA), Global EV Outlook 2021 (April 29, 2021) (EVs can reduce reliance on oil-based fuels and, if running on low-carbon power, can deliver significant reductions in greenhouse gas emissions. Plus, with zero tailpipe emissions, EVs are well suited to help solve air pollution issues.).

- The International Council on Clean Transportation (ICCT), Benefits of Adopting California Medium- And Heavy-Duty Vehicle Regulations (Sept 27, 2022) (providing state by state benefits of implementing the ACT regulations) available at: https://theicct.org/benefits-ca-multi-state-reg-data/ (last visited Oct. 17, 2022).

- Alxeeff, et al., Association between traffic related air pollution exposure and direct health care costs in Northern California, *Atmospheric Environment*, (Aug 11. 2022) (For the five-year study period, an increase of NO2 levels of about 6 parts per billion was linked to a 22 percent jump in emergency room costs and a 5 percent boost in outpatient expenses amounting to hundreds of dollars annually) *available at* https://www.sciencedirect.com/science/article/abs/pii/S1352231022003363 (last visited Sept. 12, 2022).

- Lee, at al., Managing upstream oil and gas emissions: A public health-oriented approach, *Journal of Environmental Management* (May 15, 2022) (Oil and natural gas are the largest primary global energy sources, and upstream gas emissions from these fuels can impact global climate change and local public health) available at https://www.sciencedirect.com/science/article/pii/S0301479722003395 (last visited Sept. 12, 2022).

- American Lung Association, Zeroing in on Healthy Air: A National Assessment of Health and Climate Benefits of Zero-Emission Transportation and Electricity (Mar. 30, 2022) (finds that switching to electric cars and trucks and clean electricity could save 110,000 lives and bring $1.2 trillion in public health benefits across the U.S., plus more than $1.7 trillion in climate benefits, over the next 30 years.) available at https://www.lung.org/clean-air/electric-vehicle-report (last visited Sept. 12, 2022).

- Choma, et al, Health benefits of decreases in on-road transportation emissions in the United States from 2008 to 2017, *Proceedings of the National Academies of Science* (Dec. 21, 2021) (Health impacts of air pollution from transportation remain a major public health problem in the United States with several studies estimating roughly 17,000 to 20,000 deaths/year attributable to it in recent years, the vast majority from fine particulate matter ($PM_{2.5}$) *available at* https://www.pnas.org/doi/10.1073/pnas.2107402118#:~:text=We%20estimate%20total%20benefits%20of,would%20have%20occurred%20in%202017. (last visited Sept. 12, 2022).

- Liu, et al., *Environmental Health Perspectives*, Disparities in Air Pollution Exposure in the United States by Race/Ethnicity and Income, 1990–2010 (Dec. 15, 2021) (For all years and pollutants, the racial/ethnic group with the highest national average exposure was a racial/ethnic minority group.) *available at* https://ehp.niehs.nih.gov/doi/10.1289/EHP8584 (last visited Sept. 12, 2022).

- Patten et al., The Effects of Chronic Exposure to Ambient Traffic-Related Air Pollution on Alzheimer's Disease Phenotypes in Wildtype and Genetically Predisposed Male and Female Rats, *Environmental Health Perspectives* (May 10, 2021) *available at* https://ehp.niehs.nih.gov/doi/10.1289/EHP8905 (last visited Sept. 12, 2022).

- Lipsitt, et al., Spatial analysis of COVID-19 and traffic-related air pollution in Los Angeles, *PubMed* (Mar. 22, 2021) *available at* https://pubmed.ncbi.nlm.nih.gov/33812043/ (last visited Sept. 12, 2022).

Conclusion

In sum, as NHTSA scopes and embarks on its environmental review of MY 2030 and beyond medium- and heavy-duty vehicle standards, Tesla urges the agency to consider the significant new developments in the pace of electrification within the light-duty, medium-duty, and heavy-duty vehicle sectors. These new technical advances support the implementation of stringent fuel economy standards that will lower our dependence on foreign energy sources, reduce dangerous carbon pollution, and provide health-related benefits from significant reductions in tailpipe air pollution. And, as Tesla exemplifies, continual improvement in the stringency of the standards will drive significant new, long-term investment in domestic manufacturing, the deployment of critical infrastructure, and the creation of jobs.

Sincerely,

Joseph Mendelson
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