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SUBMITTED ONLINE

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Attention: Docket No. NHTSA–2021–0054

Re: Draft Supplemental Environmental Impact Statement for Model Year 2024–2026 Corporate Average Fuel Economy Standards (August 2021).

Environmental Defense Fund (EDF) respectfully submits the following comments on the National Highway Traffic Safety Administration's (NHTSA) Draft Supplemental Environmental Impact Statement for Model Year 2024–2026 Corporate Average Fuel Economy Standards (August 2021) ("Draft SEIS" or "DSEIS"). EDF supports the Agency's proposal to strengthen the fuel economy standards that were weakened by the previous administration. We offer recommendations for how the Agency can improve its Final SEIS.

I. NHTSA underestimates emissions under the No Action Scenario

NHTSA continues to assume that manufacturers will utilize fuel saving technology whenever the CAFE model projects that the value of its fuel savings over 2.5 years exceeds the cost of the technology. This causes the CAFE model to project large degrees of over-compliance, especially for less stringent sets of CAFE standards. This has consistently produced a bias in NHTSA's analysis against more stringent standards.[1] NHTSA should clearly identify the first introduction of each fuel-saving technology and its use across the new vehicle fleet over time (available from EPA's Automotive Trends Reports for recent model years). The incremental effectiveness of this technology and vehicle usage are already available in the CAFE model inputs. Technology costs are also available from the inputs to the CAFE model. Adjustments to technology costs for learning and inflation would have to be made, with which the agency is very familiar, as it already performs such adjustment into the future. Historical fuel prices are readily available. If NHTSA would do this, they would find, for example, that variable valve timing was introduced by Porsche in 1958 and later Honda in 1989 and was still not used on 100 percent of applicable

[1] For example, fleetwide fuel economy in 2030 under the current standards exceeds that required by nearly 4 mpg. Compliance Report from the CAFE Model output published by NHTSA, line 991. *See* Comments of Environmental Defense Fund on National Highway Traffic Safety Administration's and Environmental Protection Agency's Proposed Rule: The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks, 83 Fed. Reg. 42,986 (Aug. 24, 2018) at 71-80, Docket ID EPA-HQ-OAR-2018-0283-5775 ("EDF 2020 Rule Comments").

vehicle models by 2015, a full 27-57 years later.[2] As a result of underestimating the No Action Scenario emissions, the Agency also underestimates the emissions reductions that would result from each of the alternatives. We urge the Agency to address this in advance of the final rulemaking.

II. NHTSA ignores the impact of the proposal on gasoline prices

We could find no discussion of the impact of gasoline consumption on gasoline prices in the Notice of Proposed Rulemaking (NPRM) or the Technical Support Document (TSD) for this rule. The Parameters_0000000.xlsx file used in NHTSA's CAFE Model only shows a single set of fuel prices for all control scenarios. Thus, it appears that NHTSA is implicitly assuming that reduced gasoline consumption will not lead to reduced gasoline prices, contrary to basic economic principles.

In June 2020, Union of Concerned Scientists (UCS) provided NHTSA with the results of using the Energy Information Administrations' (EIA) 2019 National Energy Modeling System (NEMS) to project fuel supply, consumption, and prices under the Augural CAFE standards and the SAFE 2 standards.[3] This modeling showed that more stringent CAFE standards reduced gasoline prices significantly and had a sizeable impact on the cost-benefit of the SAFE 2 rule. NHTSA apparently ignored this information when developing its current proposal.

Further, NHTSA ignores the gasoline price projections made by EIA using its 2018 NEMS model, which is cited elsewhere in the TSD (page 569). NHTSA cites the NEMS runs to justify its finding that more stringent CAFE standards will not reduce domestic production of crude oil. NHTSA ignores the fact that these same NEMS runs find that changing CAFE standards affects gasoline prices significantly. The reduced gasoline prices expected as a result of the proposal will increase projected net and consumer benefits substantially and we urge NHTSA to reflect this benefit in the final rulemaking.

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[2] Perusal of the 2015 MY baseline fleet used by EPA in its analysis for the Proposed and Final Determinations shows Ford, GH and VW continuing to use engines with variable valve timing, after excluding engines with more advanced controls, such as turbocharged engine and those with cylinder deactivation.

[3] Union of Concerned Scientists, Petition for Reconsideration of NHTSA's Final Rule—The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks, available at https://www.edf.org/sites/default/files/content/05_Union_of_Concerned_Scientists_Part_II_Petition_to_NHTSA_6-12-20.pdf ("UCS Reconsideration Petition"). See also Proof Brief of Public Interest Organization Petitioners at 22-26, *Competitive Enterprise Institute v. NHTSA, et. al.*, (D.C. Cir. No. 20-1145), *available at* https://www.edf.org/sites/default/files/content/49_NGOs_Opening_Brief_01-14-21.pdf.

III. NHTSA should apply a rebound rate of zero to electric vehicles

In the DSEIS, NHTSA applied the same 15 percent rebound rate to gasoline vehicles and battery electric vehicles (BEVs).[4] BEVs have much lower fuel costs per mile than gasoline or diesel fueled vehicles. Thus, NHTSA is projecting that a switch to BEVs, which occurs to a significant extent in their modeling, will dramatically increase total national VMT by cars and light trucks. However, NHTSA cites no evidence to support this assumption. None of the situations evaluated by the rebound studies cited by NHTSA, including that performed by the Volpe Center, evaluated the effect of vehicle electrification on VMT. Absent any evidence that consumers will drive their BEVs more than the gasoline vehicles that they replace, we strongly suggest that NHTSA assume that the rebound rate is zero for BEVs until sound and relevant studies of this effect become available.

IV. NHTSA underestimates the impact of reduced gasoline consumption on domestic refinery emissions

NHTSA's finding that gasoline exports would increase as a result of the proposed standards is flawed. The Agency assumes that the proposed CAFE standards would result in increased exports that represent 50 percent of the reduction in U.S. gasoline consumption. This conclusion is based on a finding that 100 percent of the reduced gasoline production for U.S. consumption experienced by refineries in the central part of the country (likely PADDs 2, 3, and 4) would continue to be produced and exported.[5]

NHTSA bases this conclusion on an historic increase in gasoline exports that occurred between 2009 and 2018.[6] NHTSA further supports this premise with projections of increased exports of refined petroleum products shown in Figure 6-6 of the TSD, which uses the Reference Case from AEO2019.[7]

These sources provide limited justification for NHTSA's assumption of an increase in exports of refined petroleum products. First, Figure 6-6 shows that gasoline exports comprised a small portion of the increase in all refined product exports. Second, NHTSA is claiming that the only cause of the increase in historical gasoline exports or projected total refined products is due to a reduction in gasoline consumption. Drawing such a conclusion from historical data and a single set of projections is not appropriate and requires a thorough assessment of all factors that could be affecting exports. For example, NHTSA states that the increase in gasoline exports through 2019 went to Mexico and Latin America. NHTSA does not examine current or future gasoline production or consumption in these countries, or the levels and sources of gasoline imports to these countries to determine that additional exports commensurate with its assumptions are possible or likely. In basing their claim on a single set of NEMS projections, NHTSA also

[4] EDF believes the rebound rate of 15% for gasoline and diesel engines is inflated and we support the comments on rebound rates submitted to the docket by the coalition of Environmental, Advocacy and Science groups.
[5] TSD at 567.
[6] TSD at 567, Figure 6-9.
[7] TSD at 564, Figure 6-6.

ignores the fact that analogous projections are available that explicitly estimate the impact of CAFE standards on refined fuel exports using EIA's NEMS model.

EIA and UCS have both performed analyses using multiple runs of EIA's NEMS model to explicitly quantify the impact of CAFE standards on the exports of refined petroleum products that contradict NHTSA's findings here.[8] Elsewhere in the TSD, NHTSA cites 2018 NEMS runs made by EIA to justify their finding that more stringent CAFE standards will not reduce domestic production of crude oil.[9] These 2018 NEMS runs showed a very inconsistent effect of relaxed CAFE standards on exports. On average, refined product exports increased by 4 percent of the increase in gasoline consumption from 2020 to 2050 due to flat 2020 CAFE standards relative to the Augural standards.[10] This effect is 10 times smaller than that claimed by NHTSA (50 percent) and in the opposite direction.

More recent projections (previously provided to NHTSA) using NEMS 2019 show the same results.[11] These NEMS 2019 runs again showed a very inconsistent effect of relaxed CAFE standards on refined product exports. On average, refined product exports increased by 7 percent of the increase in gasoline consumption from 2020 to 2050 due to SAFE 2 CAFE standards relative to the Augural standards. This effect is 7 times smaller than that claimed by NHTSA and again in the opposite direction of that claimed by NHTSA. Thus, NHTSA has no sound basis on which to project 30 or more years of continued increase in gasoline exports.

Therefore, NHTSA should modify its projection to conclude that the proposal will have no impact on gasoline exports.

V. NHTSA should update upstream emission factors for crude oil

In Section 5.2.2 of the TSD, NHTSA describes in great mathematical detail how it broke down upstream gasoline emissions from GREET into four segments: 1) crude oil production, 2) crude oil distribution, 3) refining, and 4) gasoline distribution. This was done so that NHTSA could eliminate portions of these emissions because they occur overseas. Nowhere does NHTSA mention adjusting the mix of crude oils from the average mix of crude oils used in the U.S., which is the default assumption in GREET.

Finding that 100 percent of the crude oil saved due to the proposal would be in the form of reduced crude oil imports eliminated the reduction in criteria pollutant emissions (e.g., NOx, SOx, PM) from these activities from consideration in the proposal. However, while NHTSA eliminates the criteria pollutant emissions from crude oil production and transportation from consideration in the rule, it includes the GHG emissions from these activities, since the specific location of GHG emissions does not affect the location of its eventual environmental impact. NHTSA clearly shows in the DSEIS that "well-to-tank GHG emissions for gasoline and diesel from oil sands petroleum is more than twice as high as the U.S. average GHG emissions for all

[8] UCS Reconsideration Petition at 13-15.
[9] TSD at 569.
[10] Table 11 for the 2018 AEO reference case analysis and Table 11 for the case which held CAFE standards constant into the future at their 2020 levels (No New Efficiency Requirements).
[11] UCS Reconsideration Petition at 13-15.

gasoline and diesel."[12] These oil sands are located in Canada and roughly half of imported crude oil comes from Canada, where crude oil production is dominated by shale oil.[13] Thus, the GHG emissions from the reduction in crude oil production due to the proposal should include a weight much higher than that assumed by GREET (5.1%).[14] This inconsistency underestimates the GHG emissions that would be reduced by the proposal. NHTSA's upstream emission factors used in the CAFE model should be increased to be consistent with its assumption that the crude oil saved by the proposal will be 100 percent crude oil imported into the U.S.

VI. NHTSA should account for emissions in the U.S. associated with crude oil imports

NHTSA cites a study that estimates the impact of marine vessel emissions on the health of U.S. residents.[15] However, NHTSA goes on to assume that all emissions occur "overseas" when it applies its finding that 100 percent of the crude oil saved due to the proposal is in the form of reduced crude oil imports. This is tantamount to saying that crude oil imports can enter the U.S. without any physical transport mechanism (e.g., ocean-going tanker, barge, pipeline, rail). NHTSA must account for the portion of the shipment of imported crude oil that occurs on U.S. soil or within established distances from our borders where emissions still affect U.S. ambient air quality. GREET includes the transportation distances assumed for each type of crude oil.[16] The countries providing the U.S. with crude oil are well known from published EIA data.[17] Emission Control Areas (ECAs) within 200 miles of U.S. shores have been established based on air quality modeling analysis.[18] This would include ECAs around Alaska when crude oil is shipped out of Alaska should NHTSA find that some of the crude oil saved due to the proposal will affect domestic oil production as well as imports. Finally, GREET does not appear to address lightering emissions, where crude oil is off-loaded to smaller oil tankers which can enter ports that cannot accept the largest oil tankers. NHTSA should include these lightering emissions in its assessment of the proposal. The state of Texas, for example, has conducted a detailed analysis of lightering emissions off its coasts which could be used for such an assessment.[19]

VII. NHTSA's description of lithium battery recycling is outdated

The DSEIS states that, "EV lithium-ion batteries pose significant environmental challenges in solid waste management, particularly for regions with aggressive recycling goals such as California and New York. Rapid expansion of EV adoption would create large battery waste flows for solid waste infrastructure not designed for reuse and recovery of lithium-ion battery

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[12] DSEIS at 8-4 and supported by Figures 6.2.1-1 and 6.2.1-2.
[13] U.S. Imports by Country of Origin, https://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbbl_m.htm
[14] Cell G25 of the Inputs worksheet of GREET.
[15] TSD at 545.
[16] GREET, Inputs worksheet, line 28.
[17] U.S. Imports by Country of Origin, https://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbbl_m.htm
[18] https://www.epa.gov/regulations-emissions-vehicles-and-engines/designation-north-american-emission-control-area-marine
[19] https://www.tceq.texas.gov/assets/public/implementation/air/am/contracts/reports/ei/582177209724-20170630-environ-OceanGoingTankerVesselLighteringEmissionsGulfMexico.pdf

materials."[20] The study cited is more than five years old and does not reflect the current state of battery recycling. Tesla is already working on recycling lithium from lithium batteries.[21] While NHTSA concludes that 20-70 percent of battery material could potentially be recycled in the 2040-2050 timeframe, Tesla indicates that it is already aiming for 92 percent recyclability for its current battery recycling program.[22] Tesla has also developed a technology that avoids the use of cobalt though the use of a silicon-based lithium battery.[23] Ford Motor Company and Redwood Materials recently announced they are working together to build out battery recycling and a domestic battery supply chain for electric vehicles. Redwood's recycling technology can recover, on average, more than 95 percent of the elements like nickel, cobalt, lithium and copper so they can be reused in a closed loop with Redwood moving to produce anode copper foil and cathode active materials for future battery production.[24] In the Final SEIS, NHTSA should update the agency's analysis to reflect the latest information and developments on battery production and recycling.

VIII. Natural gas and methane leaks

Section 6.2.2 of the DSEIS reviews the emissions related to the production of natural gas. It states that natural gas can be used directly in vehicles, as well as in the production of electricity. This is true. However, natural gas is also used in refineries, especially to provide heat for process units, in the production of hydrogen used to split heavier hydrocarbon molecules into lighter ones (cracking) and in removing contaminants, such as sulfur, nitrogen, metals, etc. (hydrotreating).[25] The same GREET model used by NHTSA as a source of emission factors in this section clearly shows substantial volumes of natural gas used in crude oil production and refining.[26] NHTSA should make this clear in its analysis.

The chapter also provides basic information on the sources of natural gas tracked by GREET. It does not describe if or how methane leaks are included in GREET emission estimates. Because NHTSA uses GREET to estimate upstream emissions for gasoline and electricity, it is critical that NHTSA provide detailed information on the assumptions it uses.

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[20] Hendrickson, T.P., O. Kavvada, N. Shah, R. Sathre, and C.D. Scown. 2015. Life-cycle implications and supply chain logistics of electric vehicle battery recycling in California. Environmental Research Letters. 10(1):014011. doi:10.1088/1748-9326/10/1/014011. Available at: http://iopscience.iop.org/article/10.1088/1748-9326/10/1/014011/pdf.

[21] Jill Ettinger, *EV Batteries Are a Recycling Nightmare, Tesla Says It's Found a Solution*, ETHOS (aug. 23, 2021), https://the-ethos.co/tesla-ev-batteries-recycling/.

[22] *Id.*

[23] Nick Flaherty, *Tesla moves to cobalt-free silicon battery cell with a new form factor*, EENEWS POWER MANAGEMENT (Sept. 23, 2020), https://www.eenewspower.com/news/tesla-moves-cobalt-free-silicon-battery-cell-new-form-factor

[24] Ford, Ford, Redwood Materials teaming up on closed loop battery recycling, U.S. supply chain (Sept. 22, 2021), https://media.ford.com/content/fordmedia/fna/us/en/news/2021/09/22/ford-redwood-materials-battery-recycling.html

[25] https://www.digitalrefining.com/article/1000557/natural-gas-fuels-the-integration-of-refining-and-petrochemicals#.YXS1YPrMJPY

[26] GREET, Petroleum worksheet, rows 48, 91, 110, and 127.

Methane emissions are the second largest source of GHG emissions in the U.S. and worldwide, following emissions of carbon dioxide.[27] Therefore, it is important that NHTSA quantify the methane emissions from natural gas and crude oil production and distribution (i.e., emission factors) to be used to estimate the environmental impacts of the proposal.

Thank you for your consideration of these comments.

Respectfully submitted,

Environmental Defense Fund

[27] https://www.epa.gov/ghgemissions/overview-greenhouse-gases, https://www.epa.gov/gmi/importance-methane