DEPARTMENT OF ENERGY

10 CFR Part 474

[EERE-2021-VT-0033]

RIN 1904-AF47

Petroleum-Equivalent Fuel Economy Calculation

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Notice of proposed rulemaking; request for comment.

SUMMARY: The U.S. Department of Energy ("DOE") proposes to revise its regulations regarding procedures for calculating a value for the petroleum-equivalent fuel economy of electric vehicles (or "EVs") for use in the Corporate Average Fuel Economy (CAFE) program administered by the Department of Transportation (DOT). This Notice of proposed rulemaking ("NOPR") also grants a petition for rulemaking submitted by the Natural Resources Defense Council (NRDC) and Sierra Club and responds to comments submitted on that petition.

DATES: DOE will accept comments regarding this NOPR on or before [**INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER***]. See section IV, "Public Participation," for details.

ADDRESSES: Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at *www.regulations.gov*. Follow the instructions for submitting comments. Alternatively, interested persons may submit comments, identified by RIN 1904-AF47, by any of the following methods:

Federal eRulemaking Portal: *www.regulations.gov/docket/EERE-2021-VT-0033*. Follow the instructions for submitting comments.

Email: pefpetition2021vt0033@ee.doe.gov. Include the RIN 1904-AF47 in the subject line of the message.

Postal Mail: U.S. Department of Energy, 1904-AF47, 1000 Independence Avenue, SW., Washington, DC 20585. If possible, please submit all items on a compact disc ("CD"), in which case it is not necessary to include printed copies.

Hand Delivery/Courier: U.S. Department of Energy, Attention: Kevin Stork, 1000 Independence Avenue, SW., Room 5G-030, Washington, DC 20585. If possible, please submit all items on a CD, in which case it is not necessary to include printed copies.

No telefacsimilies (faxes) will be accepted. For detailed instructions on submitting comments and additional information on the rulemaking process, see section IV, Public Participation, for details.

Docket: The docket, which includes *Federal Register* notices, comments, and other supporting documents/materials, is available for review at *www.regulations.gov*. All documents in the docket are listed in the *www.regulations.gov* index. However, some documents listed in the index, such as those containing information that is exempt from public disclosure, may not be publicly available.

The docket web page can be found at the *www.regulations.gov* webpage associated with RIN 1904-AF47. The docket webpage contains simple instructions on how to access all documents, including public comments, in the docket. See Public Participation for information on how to submit comments through *www.regulations.gov*.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION:

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I. Introduction

In an effort to conserve energy through improvements in the energy efficiency of motor vehicles, Congress, in 1975, passed the Energy Policy and Conservation Act (EPCA), Pub. L. 94-163. Title III of EPCA amended the Motor Vehicle Information and Cost Savings Act (15 U.S.C. 1901 *et. seq.*) (the Motor Vehicle Act) by mandating fuel economy standards for automobiles produced in, or imported into, the United States. This legislation, as amended, requires that every manufacturer meet applicable specified corporate average fuel economy (CAFE) standards for their fleets of light-duty vehicles under 8,500 lbs. that the manufacturer manufactures in any model year.[1] The Secretary of Transportation (through the National Highway Traffic Safety Administration, or NHTSA) is responsible for prescribing the CAFE standards and enforcing the penalties for failure to meet these standards. (49 U.S.C. 32902). The Administrator of the

[1] The relevant provisions of the CAFE program, including DOE's establishment of equivalent petroleum-based fuel economy values were transferred to Title 49 of the U.S. Code by Pub. L. 103-272 (July 5, 1984). *See* 49 U.S.C. 32901 *et seq*. The authority for DOE's establishment of equivalent petroleum-based fuel economy values was transferred to 49 U.S.C. 32904(a)(2)(B).

Environmental Protection Agency (EPA) is responsible for calculating a manufacturer's CAFE value. (49 U.S.C. 32902 and 32904)

On January 7, 1980, President Carter signed the Chrysler Corporation Loan Guarantee Act of 1979 (Pub. L. 96-185). Section 18 of the Chrysler Corporation Loan Guarantee Act of 1979 added a new paragraph (2) to section 13(c) of the Electric and Hybrid Vehicle Research, Development, and Demonstration Act of 1976 (Pub. L. 94-413). Part of the new section 13(c) added paragraph (a)(3) to section 503 of the Motor Vehicle Act. That subsection, now codified at 49 U.S.C. 32904(a)(2), provides that, if a manufacturer manufactures an electric vehicle,[2] the Administrator of EPA must include in the calculation of average fuel economy the equivalent petroleum-based fuel economy values determined by the Secretary of Energy for various classes of electric vehicles. (49 U.S.C. 32904(a)(2)(B)) The Secretary of Energy must review those values each year and determine and propose necessary revisions based on the following factors:

> (i) The approximate electrical energy efficiency of the vehicle, considering the kind of vehicle and the mission and weight of the vehicle.
>
> (ii) The national average electrical generation and transmission efficiencies.
>
> (iii) The need of the United States to conserve all forms of energy and the relative scarcity and value to the United States of all fuel used to generate electricity.
>
> (iv) The specific patterns of use of electric vehicles compared to petroleum-fueled vehicles.

Id.

[2] For purposes of paragraph (a)(2) of 49 U.S.C. 32904, EPCA defines an "electric vehicle" as "a vehicle powered primarily by an electric motor drawing electrical current from a portable source."

Section 18 of the Chrysler Corporation Loan Guarantee Act of 1979 further amended the Electric and Hybrid Vehicle Research, Development and Demonstration Act of 1976 by adding a new paragraph (3) to section 13(c) that directed the Secretary of Energy, in consultation with the Secretary of Transportation and the Administrator of the Environmental Protection Agency, to conduct a seven-year evaluation program of the inclusion of electric vehicles in the calculation of average fuel economy. In May 1980, as required by section 503(a)(3) of the Motor Vehicle Act, DOE proposed a method of calculating the petroleum-equivalent fuel economy of electric vehicles utilizing a "petroleum equivalency factor" or "PEF" in a new 10 CFR part 474 on May 21, 1980. 45 FR 34008. The rule was finalized on April 21, 1981, and effective May 21, 1981. 46 FR 22747. The seven-year evaluation program was completed in 1987, and the calculation of the annual petroleum equivalency factors was not extended past 1987.

DOE published a proposed rule for a permanent PEF for use in calculating petroleum-equivalent fuel economy values of electric vehicles on February 4, 1994 (59 FR 5336) and obtained oral and written comments from interested parties. Following consideration of comments, DOE's own internal re-examination of the assumptions underlying the proposed rule, and existing regulations for other classes of alternative fuel vehicles, DOE decided to modify the PEF calculation approach proposed in 1994. The 1994 proposed rule was withdrawn, and DOE proposed a modified approach in a July 14, 1999, notice of proposed rulemaking (1999 NOPR). 64 FR 37905. DOE published a final rule on June 12, 2000, amending 10 CFR part 474 (June 2000 Final Rule). 65 FR 36985. The PEF adopted by DOE in the 2000 Final Rule is based, in part, on the existing regulatory approach at 49 U.S.C. 32905, which provides procedures determining the petroleum-equivalent fuel economy of non-EV alternative fueled vehicles.[3] The

[3] 49 U.S.C. 32905 prescribes procedures for determining the petroleum-equivalent fuel economy of non-EV alternative fuel vehicles. Under section 32905, the petroleum equivalent fuel economy of E85 and M85

calculation procedure converts the measured electrical energy consumption of an electric vehicle into a raw gasoline-equivalent fuel economy value, and then divides this value by 0.15 to arrive at a final petroleum-equivalent fuel economy value which may then be included in the calculation of the manufacturer's corporate average fuel economy. 65 FR 36985, 36987. DOE also included a provision for DOE to review part 474 five years after the date of publication of the June 2000 Final Rule to determine whether any updates and/or revisions are necessary. *See* 10 CFR 474.5. DOE has not updated part 474 since the June 2000 Final Rule.

On October 22, 2021, DOE received a petition for rulemaking from the Natural Resources Defense Council (NRDC) and Sierra Club (Petitioners) requesting that DOE update its regulations at 10 CFR part 474. In their petition, the Petitioners propose that DOE should update its regulations for calculating the PEF for electric vehicles. Petitioners assert that the data underlying the current regulation are outdated, resulting in higher imputed values of fuel economy for electric vehicles. The Petitioners assert that with this higher imputed value, a smaller number of Evs enable fleetwide compliance at lower real-world average fuel economy across an automaker's overall fleet. The Petitioners assert that the PEF should be based upon statutory factors at 49 U.S.C 32904, rather than the existing regulatory approach based upon 49 U.S.C. 32905. The Petitioners requested that DOE review the PEF calculation and approach and work with NHTSA to ensure PEF regulations support the goals of the CAFE program (as described by the Petitioners). DOE published notice of receipt of the petition on December 29, 2021 and solicited comment on the petition and whether DOE should proceed with a rulemaking. 86 FR 73992. DOE received 10 comments on the petition from interested stakeholders.

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powered vehicles is determined by dividing the measured fuel economy value by a fuel content factor of 0.15. Section 32905 extends this approach to gaseous fueled vehicles (*e.g.,* compressed natural gas), whereby a conversion factor is applied, and the resulting figure divided by 0.15 to obtain the petroleum equivalent fuel economy.

In light of the petition and supporting comments, and for reasons discussed later in this document, DOE grants the petition from NRDC and Sierra Club and is undertaking this proposed rulemaking to update part 474. DOE agrees with the Petitioners that the inputs upon which the calculations and PEF values in current part 474 are based are outdated, and the technology and market penetration of electric vehicles has significantly changed since part 474 was last updated in the 2000 Final Rule. As discussed further in section II of this document, DOE is proposing to update part 474 and the PEF values to reflect these changes in accordance with the statutory factors in 49 U.S.C. 32904(a)(2)(B).

II. Discussion of the Proposed Rule

A. *Review Factors*

In accordance with 49 U.S.C. 32904, DOE has reviewed the current PEF value and approach in 10 CFR part 474. DOE's approach used to calculate the current PEF value is described in the June 2000 Final Rule. 65 FR 36987-36988. As discussed previously, in reviewing the PEF value, DOE must consider four factors, as enumerated in 49 U.S.C. 32904:

a. Energy efficiency of the electric vehicle,

b. National average electricity generation and transmission efficiency,

c. The need of the United States to conserve all forms of energy and the relative scarcity and value to the United States of all fuel used to generate electricity, and,

d. Driving patterns of electric vehicles compared to those of gasoline vehicles.

DOE reviewed the methodology used to develop the current PEF value and its approach in light of these factors and has tentatively concluded that some inputs should

be updated to reflect more recent data, and that some components of the derived PEF value are not relevant to today's vehicles. DOE addresses its consideration of the statutory factors and DOE's conclusions in the following sections.

1. Energy efficiency of the electric vehicle

In the June 2000 Final Rule, DOE established a methodology to measure the energy consumption of an EV in terms of gallons of gasoline based upon the electricity consumption quantified by using the Highway Fuel Economy Driving Schedule (HFEDS) and Urban Dynamometer Driving Schedule (UDDS) test cycles established by EPA at 40 CFR parts 86 and 600. *See* 10 CFR 474.3 and 474.4. Obtaining the value of electric efficiency (measured in Watt-hours per mile) is critical to translating the electrical energy efficiency of the EV into a petroleum-equivalent fuel economy using the PEF equation. *See*, *e.g.*, Example 1 of appendix A in 10 CFR part 474. DOE is proposing not to amend the testing requirements and use of the resulting value in the PEF equation. DOE believes the current methodology provides an accurate measure of the electrical energy efficiency of the relevant EV during typical use and is appropriately utilized in the PEF equation. DOE requests comment on its proposal not to amend the testing methodology under 10 CFR 474.4 and use of the resulting value for purposes of the PEF equation.

Additionally, the June 2000 Final Rule incorporated an accessory factor into the PEF calculation. This factor was added to the PEF calculation to account for petroleum-fueled on-board accessories, such as cabin heaters, defrosters, or air-conditioning. These accessories were envisioned as an approach to avoid low energy-density and/or low power-density limitations of battery technology at the time.[4] No EVs currently produced include such accessories, nor are future EVs likely to include them. Petroleum-fueled on-

[4] For example, in the mid-1990s, the experimental Ford Ecostar vehicle, a two-door, small van, included a diesel-powered heater while being powered primarily by a sodium-sulfur battery with notable power density limitations and a very high operating temperature.

board accessories are distinct from gasoline consumption in plug-in hybrid electric vehicles, which are rated for fuel economy separately for charge-depleting and charge-sustaining modes of operation, with a fuel economy weighted according to the expected percentage of driving attributed to each mode. In this NOPR, DOE proposes to set this factor equal to 1.00 in its calculation. DOE may adjust this factor in the future if market conditions merit updates. DOE requests comment on its proposal to set the accessory factor at 1.00.

2. National average electricity generation and transmission efficiency

To compare electricity and gasoline on an equivalent basis it is necessary to consider the full energy-cycle energy efficiency from the point of primary energy production through end-use to power a vehicle for both gasoline and electricity. This approach is necessary because electricity is generated upstream of the vehicle and stored onboard whereas conventional vehicles convert fuel to useful energy onboard the vehicle. Assessing the full energy cycle of electricity and conventional fuel requires a holistic approach to address energy conservation when energy losses occur at different stages of an energy cycle for different energy products and fuels, such as electricity and gasoline. In the June 2000 Final Rule, DOE included a term for expressing the relative energy efficiency of the full energy cycles of gasoline and electricity, the gasoline-equivalent energy content of electricity factor, which included factors to account for average fossil-fuel electricity generation efficiency, average electricity transmission efficiency, and petroleum refining and distribution efficiency. 65 FR 36987.

DOE agrees with the Petitioners that the inputs to account for the generation and transmission efficiency factor should be updated to reflect the most recent data. Therefore, DOE is proposing to update the inputs for generation and transmission efficiencies and relative grid mix projections to account for updated data and recent

policy changes. Further description of DOE's proposed changes may be found in section II.B of this document. DOE requests comment on its proposal concerning the generation and transmission efficiency factor.

3. Need of the U.S. to conserve energy and relative scarcity and value of fuels

In handling the consideration of scarcity of resources, DOE focuses on the primary energy sources used to power conventional, hybrid-electric, and battery-electric vehicles – such as crude oil, natural gas, fissile nuclear material, sunlight, water, and wind – and considers their potential scarcity implications. Some energy sources are mined or otherwise produced (crude oil, natural gas, coal, uranium); others, such as sunlight and wind, are captured passively. Some sources are finite with energy resource depletion as a societal concern (*e.g.,* the fossil resources). Other primary energy sources are renewable and are not subject to resource depletion (*e.g.,* solar or wind energy). Yet other primary energy sources, such as uranium, are naturally abundant on a global basis, though not necessarily abundant domestically.[5]

In the 1999 NOPR and June 2000 Final Rule, DOE concluded that scarcity did not appear to be a concern and should not be a guiding factor in the PEF at that time. DOE arrived at this conclusion after conducting research on the issue based on comments received on the 1994 NOPR that were critical of DOE's prior consideration of scarcity. 64 FR 37907. In the 1994 NOPR, DOE included a scarcity factor as an intermediate factor that used a complex approach to quantify the relative scarcity and value of all fuels used to generate electricity in the United States. This proposed scarcity factor was based

[5] The most recent "Red Book" assessment of uranium resources, periodically published jointly by the OECD Nuclear Energy Agency and the International Atomic Energy Agency, concludes that conventional uranium resources are sufficient "to support even the most aggressive scenarios of growth in nuclear generating capacity. However, the majority of this in-ground uranium cannot be brought to the market without improved market conditions. Unattractive market conditions also slow uranium exploration investment, which, in turn, can affect further delineation of additional identified resources in the short term." (NEA (2020), Uranium 2020: Resources, Production and Demand, OECD Publishing, Paris, p.72). The same study assesses unconventional uranium resources, such as that in sea water, as "almost inexhaustible" (Ibid., p. 38.)

on estimates of the U.S. share of world reserves of fossil fuels and estimated rates of depletion of world reserves. The scarcity factor was derived by determining the U.S. percent and numeric share of the world reserve market and calculating the rate at which the United States is depleting each fuel source's reserves. These values were then normalized to obtain the relative scarcity value for each fuel source. 59 FR 5338-5339. Nevertheless, DOE re-examined the scarcity issue in response to these comments, which led to DOE's removal of the scarcity factor from the 1999 NOPR and June 2000 Final Rule.

While DOE did not expressly incorporate scarcity in the 1999 NOPR and the June 2000 Final Rule, DOE added the current 1.0/0.15 fuel-content factor, in part, to help address scarcity issues by rewarding electric vehicles' benefits to the Nation relative to petroleum-fueled vehicles, in a manner consistent with the regulatory treatment of other types of alternative fueled vehicles and the authorizing legislation. *Id*. at 65 FR 36988. DOE explained that it chose the 1.0/0.15 ratio for the fuel-content factor (1) for consistency with existing regulatory and statutory procedures for alternative fuel vehicles under 49 U.S.C. 32905, (2) to provide similar treatment of all types of alternative fueled vehicles, and (3) for simplicity and ease of use in calculating the PEF. In the July 1999 NOPR, DOE examined 49 U.S.C. 32905, which prescribes procedures for determining the petroleum-equivalent fuel economy of non-EV alternative fueled vehicles. DOE noted that two of the most common light-duty liquid alternative fuels at that time were M85 (85 percent methanol and 15 percent unleaded gasoline by volume) and E85 (85 percent ethanol and 15 percent unleaded gasoline by volume)[6]. Under section 32905, the petroleum equivalent fuel economy of E85 and M85 powered vehicles is determined by

[6] These percentages are nominal values not usually seen in practice. The percentage alcohol can vary widely due to gasoline volatility requirements. E85, for example, is typically a mixture of between 51% and 83% ethanol with the balance being gasoline. With specialized gasoline blendstocks 85% ethanol blending is possible. M85 fuel and vehicles are no longer available in the U.S.

dividing the measured fuel economy value by 0.15. DOE also noted that section 32905 extends this approach to gaseous fueled vehicles (*e.g.*, compressed natural gas), whereby a conversion factor is applied, and the resulting figure divided by 0.15 to obtain the petroleum equivalent fuel economy. DOE commented in the July 1999 NOPR that the true energy efficiency of both liquid and gaseous fueled alternative fuel vehicles is intentionally and substantially overstated by the methods specified in section 32905, since only 15 percent of their actual energy consumption is accounted for in determining their petroleum-equivalent fuel economy, and that the use of the 0.15 factor for both vehicle types provides a similar regulatory treatment to both types of alternative fuel vehicles. DOE then determined to include the 1.0/0.15 factor into its PEF calculation, noting that this would be the most equitable approach among alternative fuel vehicles and that all alternative fuel types help the Nation avoid having all its transportation "eggs" in the petroleum "basket." *Id.* DOE noted, however, that EVs would still enjoy favorable regulatory treatment under DOE's proposal because EVs are exempt from caps on the amount alternative fuel vehicles are allowed to contribute to raising a manufacturer's overall fleet fuel economy. *Id.* at 65 FR 36989.

Consistent with the requirements of section 32904, in this proposed rule, DOE has considered the need of the United States to conserve all forms of energy and the relative scarcity and value to the United States of all fuel used to generate electricity.[7] DOE recognizes the need of the nation to conserve all forms of energy, and more specifically, finite resources such as fossil fuels, including petroleum consumed by ICE vehicles. Supply and demand of fossil fuels can change rapidly and be subject to market constraints. In contrast, DOE notes that current and future sources of electricity generation are and will be in relative abundance, most notably due to recent market and

[7] DOE also explored a "scarcity approach" based on proved reserves of primary energy resources to deriving the PEF value but is not proposing to use that approach due to significant uncertainties and typically high volatility in proved reserves data. *See* section II.D.5 of this document.

policy changes (*e.g.*, the Infrastructure Investment and Jobs Act (Pub. L. 117-58) and the Inflation Reduction Act (117-169)) resulting in, and likely to further result in, growth and reliance on renewable sources of electricity generation which are not subject to resource depletion like fossil fuels.[8] See section II.B of this document for further discussion of these policy changes. DOE has preliminarily determined that there is a need to conserve finite energy resources, such as petroleum, given their limited nature and susceptibility to changing market constraints. Oil and petroleum fuels are a global market, and the nation is exposed to fluctuations in that global market. That the United States may produce more petroleum in a given period does not in and of itself protect the nation from the exposures it faces on the global market. Accordingly, the nation must conserve petroleum to guard against the exposures it faces in the global market. Moreover, DOE believes the current and future addition of renewable generation sources onto the grid allows for greater conservation of the finite resources, as renewable generation replaces those sources on the grid for use in electrified end uses, such as EVs. In this proposed rule, DOE is proposing changes to the PEF calculation (described more in this section) to address the need of the nation to conserve energy and the relative scarcity of fuels used to generate electricity consistent with these determinations.

As part of its review of the need to conserve all forms of energy and relative scarcity of fuels used to generate electricity, DOE reconsidered the inclusion of the fuel-content factor in the PEF equation and determined that the fuel-content factor is no longer warranted in deriving the PEF value. As noted previously, DOE added the current 1.0/0.15 fuel-content factor, in part, to help address scarcity issues by rewarding electric vehicles' benefits to the Nation relative to petroleum-fueled vehicles, in a manner consistent with the treatment of other types of alternative fueled vehicles. For the

[8] DOE notes that, for purposes of this proposed rule, DOE views scarcity and the need to conserve energy mainly as a consideration of depletion of energy resources (*e.g.*, fossil fuels), and has not necessarily considered other concerns, such as environmental impacts, in reviewing this factor.

following reasons DOE believes the fuel content factor no longer accurately addresses the need to conserve energy and relative scarcity issues and is no longer appropriate for use in the PEF derivation:

- *The fuel content factor does not accurately represent current EV technology or market penetration.*

With the fuel content factor, the current PEF value is not representative of current EV technology, capabilities, and market penetration, and leads to overvaluation of EVs in determining CAFE fleet compliance that is not related to their actual fuel saving capabilities. Since the 2000 Final Rule, EV technology has matured substantially and the market share of EVs is now significant and growing. For example, sales of both plug-in hybrid-electric vehicles (PHEVs) and battery-electric vehicles (BEVs) combined in the United States have increased significantly in the past decade (from 18,000 per year in 2011 to over 600,000 per year in 2021),[9] while there have also been significant advances in driving range and available charging infrastructure.[10] Over the past 20 years, electrification technology for light-duty vehicles has seen significant advances in performance, efficiency, and cost reduction. Twenty years ago, battery electric vehicles were not generally available for mass-market sale in all U.S. markets, with models being limited to a handful of low-production vehicles generally only offered in California (such as the Toyota RAV4 EV, Chevrolet S-10 EV, and Ford Ranger EV) to meet state ZEV regulations[11], or the GM EV-1, which could only be leased in select markets. Vehicles of this era were capable of less than 100 miles of range[12] and charging power was typically

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[9] *See* Gohlke, David, Yan Zhou, Xinyi Wu, and Calista Courtney. "Assessment of Light-Duty Plug-in Electric Vehicles in the United States, 2010 – 2021." Argonne National Laboratory technical report ANL-22/71. November 2022. Available at *https://www.osti.gov/biblio/1898424*.

[10] In 2021, the sales-weighted range for new BEVs was 290 miles— which is the highest value to date that it has ever been. Additionally, there are 49,509 public EV charging stations in the United States in the AFDC database. *Id*.

[11] *https://www.cnn.com/interactive/2019/07/business/electric-car-timeline/index.html*

[12] *https://www.fueleconomy.gov/feg/Find.do?action=sbs&id=19296*

limited to 6.6kW[13] to 8kW.[14] Sales volumes were low, with the first-generation RAV4 EV selling a total of 328 units over six years of production.[15] Battery technology has improved significantly from early lead-acid and nickel-based chemistries, seeing energy density improve by more than four times, from 28 Wh/kg[16] to nearly 120 Wh/kg,[17] and pack costs reduced by 90% since 2008.[18] Vehicles with DC fast charging capability have begun to penetrate the market at an increasing rate,[19] with charge power levels of 150kW+ being common.[20] Recent trends in market penetration of plug-in electric vehicles (PHEVs and BEVs) suggest that demand for these vehicles is rapidly increasing, with monthly sales reaching 7.4% of all light-duty sales,[21] and with 32 BEV models available across eight manufacturers in September of 2022,[22] 14 with a range of 300 miles or greater.[23]

As zero-emission transportation policies have begun to be implemented across the world, some U.S. states have taken action to transition the light-duty vehicle fleet to zero-emissions technologies. In 2022, California finalized the Advanced Clean Cars II rule[24] that will require all new light-duty vehicles sold in the state to be zero-emission by 2035,

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[13] *https://www.thedrive.com/tech/38331/the-toyota-rav4-ev-was-a-breakthrough-electric-crossover-20-years-before-that-was-a-thing*
[14] *https://www.motortrend.com/features/mercedes-benz-eqxx-gm-ev1-feature/*
[15] *https://www.thedrive.com/tech/38331/the-toyota-rav4-ev-was-a-breakthrough-electric-crossover-20-years-before-that-was-a-thing*
[16] *http://www.evchargernews.com/CD-A/gm_ev1_web_site/specs/specs_specs_top.htm*
[17] *https://ev-database.org/car/1555/Tesla-Model-3*
[18] *https://www.energy.gov/eere/vehicles/articles/fotw-1272-january-9-2023-electric-vehicle-battery-pack-costs-2022-are-nearly*
[19] *https://electrek.co/2022/07/08/fastest-charging-evs/*
[20] *Rapid charging electric vehicles - EV Database (ev-database.org) (https://ev-database.org/uk/compare/rapid-charging-electric-vehicle-quickest#sort:path~type~order=.fastcharge_speed~number~desc|range-slider-range:prev~next=0~600|range-slider-towweight:prev~next=0~2500|range-slider-acceleration:prev~next=2~23|range-slider-fastcharge:prev~next=0~1100|range-slider-eff:prev~next=150~500|range-slider-topspeed:prev~next=60~260|paging:currentPage=0|paging:number=9)*
[21] *https://www.energy.gov/eere/vehicles/articles/fotw-1275-january-30-2023-monthly-plug-electric-vehicle-sales-united-states*
[22] *https://evadoption.com/ev-models/bev-models-currently-available-in-the-us/*
[23] *https://www.energy.gov/eere/vehicles/articles/fotw-1253-august-29-2022-fourteen-model-year-2022-light-duty-electric*
[24] California Air Resources Board, "California moves to accelerate to 100% new zero-emission vehicle sales by 2035," Press Release, August 25, 2022. Accessed on Nov. 3, 2022 at *https://ww2.arb.ca.gov/news/california-moves-accelerate-100-new-zero-emission-vehicle-sales-2035*

with New York, Massachusetts, and Washington state following suit. Internationally, countries that have set a target of 100 percent light-duty zero-emission vehicle sales by 2035 represent at least 25 percent of today's global light-duty vehicle market,[25] and in late 2022 the European Union approved a measure to phase out sales of internal combustion engine (ICE) passenger vehicles in its 27 member countries by 2035.[26]

Additionally, recent Federal policy changes such as the Inflation Reduction Act[27] and the Infrastructure Investment and Jobs Act[28] provide significant incentives for EVs and other alternative fueled vehicles (as well as additional sources of non-petroleum energy) that make the current fuel-content factor redundant for purposes of incentivizing manufacture of such vehicles and conserving the energy resources of the nation.[29]

Over the past several years, automakers have increasingly incorporated a higher degree of electrification in their vehicle powertrains. All indications are that this trend will accelerate in the future. The diversity of partially- and fully-electrified vehicle offerings is increasing,[30] with combined offerings of PHEVs and BEVs nearly doubling from 31 models in 2016 to 60 models in 2021[31] and expected to double again between

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[25] International Energy Agency, "Global EV Outlook 2022," p. 57, May 2022. Accessed on November 18, 2022 at *https://iea.blob.core.windows.net/assets/e0d2081d-487d-4818-8c59-69b638969f9e/GlobalElectricVehicleOutlook2022.pdf*

[26] Reuters, "EU approves effective ban on new fossil fuel cars from 2035," October 28, 2022. Accessed on Nov. 2, 2022 at *https://www.reuters.com/markets/europe/eu-approves-effective-ban-new-fossil-fuel-cars-2035-2022-10-27/*

[27] Pub. L. 117-169 (2022).

[28] Pub. L. 117-58 (2021).

[29] *See also* Executive Order 14037, "Strengthening American Leadership in Clean Cars and Trucks" (August 5, 2021). 86 FR 43583.

[30] Muratori, Matteo, et al., "The rise of electric vehicles – 2020 status and future expectations," Progress in Energy, v3n2 (2021), March 25, 2021. Available at *https://iopscience.iop.org/article/10.1088/2516-1083/abe0ad*.

[31] See *Fueleconomy.gov* website: *https://fueleconomy.gov/feg/pdfs/guides/FEG2016.pdf pp.31-35 and https://fueleconomy.gov/FEG/pdfs/guides/FEG2021.pdf* pp. 40-46.

2022 and 2024.[32] Recent announcements from GM,[33] VW,[34] Honda,[35] Ford,[36] and Stellantis,[37] further attest to the trend of increasing electrification.

As used in the PEF value determination, the fuel content factor is not representative of this current EV technology nor current market penetration, but is instead based upon the fuel content of non-EV alternative fuel vehicles, which have significantly different technologies and penetration in the current market. As described more below in this section, counter to the need of the nation to conserve energy, including the fuel content factor in the PEF determination can lead to increased petroleum consumption. Moreover, as noted throughout this document, incentives for EV production and EV infrastructure have changed markedly since 2000, and DOE believes that treating EVs similarly to other alternative fuel vehicles in DOE's PEF rule is no longer appropriate.

- *The fuel content factor allows for continued production of inefficient ICE vehicles, thereby encouraging increased petroleum usage.*

Applying the current PEF value and equation to EVs results in miles per gallon equivalent ratings significantly higher than a similar ICE vehicle. For example, applying the PEF to the current EV version of the Kia Niro results in a rating of 394.3 miles per gallon equivalent. The Hyundai Kona, a very similar ICE vehicle,[38] is rated at 41.2 miles per gallon.

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[32] *https://www.visualcapitalist.com/the-number-of-ev-models-will-double-by-2024/*
[33] General Motors, "General Motors, the Largest U.S. Automaker, Plans to be Carbon Neutral by 2040," Press Release, January 28, 2021.
[34] Volkswagen Newsroom, "Strategy update at Volkswagen: The transformation to electromobility was only the beginning," March 5, 2021. Available at *https://www.volkswagen-newsroom.com/en/stories/strategy-update-at-volkswagen-the-transformation-to-electromobility-was-only-the-beginning-6875*.
[35] Honda News Room, "Summary of Honda Global CEO Inaugural Press Conference," Available at *https://global.honda/newsroom/news/2021/c210423eng.html*.
[36] Ford Motor Company, "Superior Value From EVs, Commercial Business, Connected Services is Strategic Focus of Today's 'Delivering Ford+' Capital Markets Day," Press Release, May 26, 2021.
[37] Stellantis, "Stellantis Intensifies Electrification While Targeting Sustainable Double-Digit Adjusted Operating Income Margins in the Mid-Term," Press Release, July 8, 2021.
[38] There is no ICEV version of the Kia Niro so the Hyundai Kona is used in the example.

This approach demonstrates how the current PEF value leads to overvaluation of EVs in determining fleetwide CAFE compliance, which allows manufacturers to maintain less efficient ICE vehicles in their fleet by utilizing a few EV models to comply with the CAFE standards. As noted in the Petition, "excessively high imputed fuel economy values for EVs means that a relatively small number of EVs [could] mathematically guarantee compliance without meaningful improvements in the real-world average fuel economy of automakers' overall fleets." 86 FR 73995. This runs counter to the need of the nation to conserve energy, particularly petroleum. Encouraging adoption of EVs can reduce petroleum consumption but giving too much credit for that adoption can lead to increased net petroleum use because it enables lower fuel economy among conventional vehicles, which represent by far the majority of vehicles sold. Moreover, contrary to the original intent behind the fuel content factor, "excessively high imputed fuel economy values for EVs" can also act as a disincentive to manufacturers to produce additional EVs if manufacturers can achieve CAFE compliance with a relatively small number of EVs.

As DOE stated in the 1999 NOPR, the "true energy efficiency of both liquid and gaseous fueled alternative fuel vehicles is intentionally and substantially overstated by the methods specified in 49 U.S.C. 32905" (*i.e.,* the 1.0/015 fuel content factor). With current EV technology, using those same methods for the PEF calculation overstates the PEF value and encourages increased consumption of petroleum, which is counter to the need of the nation to conserve energy.

- *The current fuel content factor lacks legal support.*

The basis for the current fuel content factor is attached to statutory provisions not pertinent to EVs. As noted, the 1.0/0.15 fuel content factor is based on that same factor for non-EV alternative fuel vehicles under section 32905. Section 32905 does not apply

that factor to EVs, nor do the relevant provisions of section 32904. Accordingly, while DOE sought to treat EVs the same as other alternative fuel vehicles by using the same fuel content factor in the 2000 Final Rule, there is no basis in 32905 or 32904 to do so. While DOE could potentially utilize a fuel content factor under the four factors of section 32904, that is not the basis for the current 1.0/0.15 fuel content factor.

For the foregoing reasons, DOE proposes to remove this factor from the PEF determination. DOE requests comment on its treatment of the need of the Nation to conserve energy and relative scarcity and value of fuels. DOE requests comment on its proposal to remove the fuel-content factor from its derivation of the PEF value.

4. Driving patterns of electric vehicles compared to those of gasoline vehicles

In the June 2000 Final Rule, DOE established a driving pattern factor to account for the statutory criterion in 49 U.S.C. 32904(a)(2)(B)(iv). The purpose of the driving pattern factor is to recognize the fact that electric vehicles may be used differently than gasoline vehicles, primarily due to their shorter range and longer "refueling" times. However, then-existing EPA regulations did not make driving-pattern-based adjustments to the fuel economy of various classes of gasoline vehicles when calculating a manufacturer's CAFE value, even though gasoline-powered vehicles are also used in a large variety of different ways. 64 FR 37908. Therefore, DOE set the driving pattern factor at 1.00 because it believed that EVs offer capabilities like those of conventional gasoline-powered vehicles. 65 FR 36987.

DOE continues to believe that current EVs are equivalently capable vehicles that are likely to be used similarly to gasoline-powered or hybrid-electric vehicles. In addition, the deployment of a national charging network, enabled by the DOT's National Electric Vehicle Infrastructure program along with additional private investment, will

help meet the President's goal of 500,000 chargers[39] and ensure vehicles can match the utility and driving demands of an ICE vehicle. Therefore, DOE is not proposing a change to the driving pattern factor and proposes to continue setting this factor at 1.00. DOE may adjust this factor in the future if market conditions merit updates.[40]

DOE requests comment on its proposal to keep the driving pattern factor at a value of 1.00.

B. *Discussion of DOE analysis of PEF and new approach*

To compare electricity and gasoline on an equivalent basis, DOE considers the full energy-cycle energy efficiency from the point of primary energy production through end-use to power a vehicle for both gasoline and electricity. DOE does not consider the conversion efficiency from primary energy to electricity for renewable energy sources.[41] That is, renewable energy sources are treated as effectively 100% efficient. For fossil and nuclear energy, DOE considers the energy required to mine or otherwise produce the primary energy as part of the life-cycle energy. However, in this analysis, DOE treats nuclear electricity generation as effectively 100% efficient – that is, DOE does not use the thermal efficiency of steam to electricity in nuclear power plants – because like solar and wind, there is no practical, aggregate resource-availability limitation for nuclear materials. On the other hand, fossil energy sources used to generate electricity are large but finite and are non-renewable. DOE considers the combustion efficiency of electric generation as part of the full energy lifecycle. Renewable gaseous fuel burned for

[39] FACT SHEET: Biden-Harris Administration Announces New Standards and Major Progress for a Made-in-America National Network of Electric Vehicle Chargers - The White House.
[40] An example of a situation in which an EV might merit application of the driving factor would be a low-range EV, sometimes called a "neighborhood electric vehicle", which lacks full range and functionality of a passenger car.
[41] Note that while the conversion equipment has varying efficiency, this should be reflected in the cost of the electricity and use of renewables, such as solar or wind, does not effectively diminish the available resource.

electricity, though expected to be a small contributor to renewable electricity, are treated similarly to fossil natural gas with respect to combustion efficiency.

Energy conversion and transmission efficiencies are derived from Argonne National Laboratory's GREET model (*https://greet.anl.gov*). The GREET® (Greenhouse gases, Regulated Emissions, and Energy use in Technologies) model has been developed by Argonne National Laboratory with the support of DOE. GREET is a life-cycle analysis tool, structured to systematically examine the energy and environmental effects of a wide variety of transportation fuels and vehicle technologies in major transportation sectors (i.e., road, air, marine, and rail) and other end-use sectors, and energy systems. Development of GREET has been supported by multiple offices of DOE, DOT, and other agencies over the past 28 years. It is a widely used life-cycle analysis model for vehicle technologies and transportation fuels and has more than 50,000 registered GREET users worldwide. It has been used in regulation development and evaluation by DOE, EPA, DOT, and California Air Resources Board. Conversion and transmission efficiency values from GREET have been incorporated into a spreadsheet-based PEF calculation tool that implements the calculation and allows use of various projections of electric generation. (The PEF calculation tool is included in the docket for this rule.)

After setting the driving pattern and accessory factors to 1.00 and removing the fuel-content factor as described previously, the remaining PEF equation is simply the gasoline-equivalent energy content of electricity on a full life-cycle basis. The units of the PEF remain the same (Wh/gal-equivalent) and the CAFE calculation would be conducted as before.

Although DOE will conduct the required annual reviews, consistent with 42 U.S.C. 32904(a)(2)(B) (discussed more in following sections), the Department does not anticipate that the result of that review will be particularly significant at least as compared to the revisions proposed today. The primary factor that would change the

PEF calculation is a change in projected grid mix. However, DOE believes the grid mix projections that DOE has considered in this proposed rule provide the best projections available, and DOE believes it unlikely that grid mix projections would deviate so significantly from the projected values as to result in significant changes in the PEF value in a given year, particularly for the dates for which this proposed rule would take effect (*i.e.*, model years 2027-2031).

DOE is proposing that the new PEF take effect with model year 2027 vehicles. NHTSA's next CAFE regulation is expected to cover the model years 2027-2031.[42] The proposed PEF value would be the applicable PEF for calculating electric vehicle fuel economy in those model years,[43] subject to DOE's annual reviews. In order to calculate a PEF usable in the next CAFE regulation, DOE calculations consider a forward-looking approach based on projections for the electricity generation grid in the future. As such, the average of the annually calculated value of the PEF, based on calendar-year projections for the electric grid, [44] will be applied for model years 2027 through 2031 over the entire CAFE compliance period. Having a fixed value for the CAFE standards period improves the ability of DOT to determine CAFE standards that are "the maximum feasible average fuel economy level" and provides greater certainty to stakeholders from year to year. DOE requests comment on this approach.

Grid mix projections

An important variable impacting the value of the PEF under the new approach is the mix of electricity sources. DOE considered numerous projections available in 2022

[42] NHTSA last finalized CAFE standards for model years 2024-2026 in May 2022. In accordance with 49 USC 32902, NHTSA will propose standards for MYs 2027 and beyond in an upcoming notice.
[43] In accordance with 49 U.S.C. 32904, the Administrator of the Environmental Protection Agency is responsible for measuring manufacturer's fuel economy levels in each model year.
[44] DOE used grid projections based on calendar years, which do not perfectly align with the model years used for CAFE compliance. However, DOE believes that the impacts of the calendar and model year differential is negligible for purposes of calculating the PEF value.

and selected the projection model 2021 Electrification 95 by 2050, Standard Scenario, from the National Renewable Energy Laboratory (NREL),[45] in which the United States achieves 95% renewable generation of electricity by 2050 and increasing electrification economy-wide.[46] This projection accounts for the anticipated improvements in generation efficiency of electricity generating units. Transmission efficiency is not expected to improve over this time and thus remain constant in this projection. DOE selected this projection to better account for recent policy changes with respect to renewable energy penetration and electrification, such as the Inflation Reduction Act[47] and the Infrastructure Investment and Jobs Act.[48] DOE believes the NREL 95 by 2050 model provides a projection more representative of the likely future grid mix after these recent policy changes become impactful, particularly with the likelihood that these changes will result in a substantial addition of renewable resources onto the grid.

DOE also considered several scenarios from the Annual Energy Outlook (AEO) 2022 as developed by the Energy Information Administration (EIA) – *i.e.*, the reference case and the low-renewables-cost case. While DOE generally regards AEO as one of the best available projections for future grid mix and energy prices, the AEO 2022 cases (prepared in early 2022) are not representative of more recent policy changes (*e.g.*, the Inflation Reduction Act), and therefore do not fully address DOE's current expectations for the development of the grid due to subsequent developments. DOE notes that the PEF value using the AEO 2022 model is fairly close to the proposed PEF value using the

[45] DOE used the 2021 version of the NREL 95 by 2050 projection scenario. The 2022 versions of these scenarios were made available in December of 2022. See *https://www.nrel.gov/news/program/2022/the-2022-standard-scenarios-are-now-available.html*. DOE will consider the 2022 version of the NREL scenarios in the final rule.
[46] The specific scenario is the Electrification 95 by 2050 scenario in the Standard Scenarios 2021 dataset publicly available at *https://scenarioviewer.nrel.gov/*
[47] Pub. L. 117-169 (2022).
[48] Pub. L. 117-58 (2021).

NREL 95 by 2050 projection.[49] Ultimately, this proposed rule uses the 95 by 2050 model because DOE believes it is more representative of the most recent policy changes affecting grid mix projections, particularly the likely addition of more renewables into the grid mix in the near term. DOE is aware that AEO 2023 is expected to be published in the Spring of 2023 and may be more reflective of recent policy changes than AEO 2022. DOE will consider AEO 2023 for possible use in the final PEF rule.

DOE also considered more renewable-aggressive grid mixes, such as the NREL Standard Scenarios 2021 Electrification 95 by 2035 scenario. However, DOE determined that the NREL 95 by 2035 scenario is a slight outlier for the MY2027-2031 period DOE is targeting in this proposed rule, primarily given lack of lead time (despite recently created statutory incentives) for grid mix improvements, and also given DOE's analysis suggesting that a PEF value using the 95 by 2035 scenario would be 10-15 percent higher than the PEF value using any of the other grid projection scenarios considered. These facts indicated to DOE that a more conservative approach (that still accounted for recent policy changes) would be more appropriate in this time frame, and thus, DOE chose the NREL 95 by 2050 scenario for the grid mix assumptions on which the current proposal is based. DOE notes that DOE will review the PEF value annually and can adjust the grid mix inputs if renewable generation increases at a faster or slower pace than DOE anticipates, although the agency does not anticipate that the result of that annual review will be particularly significant – at least as compared to the revisions proposed today.

DOE requests comment on its selection of grid mix forecast and welcomes comments on alternative forecasts for the electricity grid mix.

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[49] Over the MY2027-2031 period, AEO22 Reference Case value would be 21,808 Wh/gal vs. the proposed value of 23,160 Wh/gal using the NREL 95-by-2050 Scenario. These represent values 26.6% and 28.2% of the current PEF value of 82,049 Wh/gal, respectively. For a 2022 Kia Niro using the 2029 grid mix projections this represents a difference of 6.5 MPGe (104.8 MPGe vs. 111.3 MPGe, respectively).

PEF Value

In consideration of all factors in the analysis and those described above, the proposed PEF for the anticipated period 2027-2031 is 23,160 Wh/gal. The following discussion describes how DOE arrived at this value.

For a process, GREET defines efficiency as the ratio of energy product output(s) to energy input(s) (including energy in both processing fuels and feedstock). The energy outputs and inputs for facilities (such as electric power plants and petroleum refineries) are obtained from agency statistics such as EIA and EPA databases. The reciprocal of efficiency is defined as the energy intensity of this process. Using efficiency factors developed for the GREET model, DOE determined that crude oil production and transportation has an efficiency of 93.96%, that gasoline refining has an efficiency of 87.01%, and that gasoline transportation and distribution has an energy efficiency of 99.52%.[50] Multiplying these three terms to get an overall well-to-tank efficiency of 81.36%. That is, the total energy, including the energy used to produce, transport, and distribute gasoline and the energy content of gasoline is 1/0.8136 = 1.2291 times greater than the useable energy in the final product.

For electricity, using the Electrification 95 by 2050 projection model described previously, DOE calculates an annual PEF value. As discussed previously, DOE is proposing to retain the PEF value for the period covered by the applicable CAFE standard, the most recent of which covers 2027 to 2031. To simplify compliance with the CAFE standard, DOE takes an average value of the PEF over the covered period to apply for the entire period. DOE will review the PEF annually to determine if updates are

[50] The GREET model includes efficiencies for electricity generation and transmission as well as petroleum production, refining, and distribution, and comparable processes for other alternative fuels such as biofuels, that enable full-cycle comparisons of the pathways from primary energy source through end-use in vehicles, often called “well-to-wheels” analysis.

needed based on changes to the grid mix and/or market conditions for EVs. DOE requests comment on this approach.

The following table shows the relative forecast generation share of the grid mix for nine different fuels in 2029[51] using the Electrification 95 by 2050 projection model. The fraction of electricity generated by source under the projection is labeled the Generation Share, efficiencies for production and generation for each source are listed, and the required input of that source of energy to produce that amount of electricity is labeled Energy Input Required. Energy Input Required is calculated as:

$$Energy\ Input\ Required = \frac{Generation\ Share}{Production\ Efficiency * \ Generation\ Efficiency}$$

Weighted Generation Efficiency Based on Fraction of Generation Source (2029 Projected Electric Mix)				
Fuel	Generation Share 2029[52] (fraction of delivered electricity)	Production Efficiency[53]	Generation Efficiency	Energy Input Required
Natural gas	0.3102	91.81%	47.34%	0.7137
Coal	0.1376	97.90%	34.55%	0.4068
Oil	0.0094	88.41%	31.92%	0.0332
Biomass	0.0003	97.54%	21.65%	0.0016
Nuclear	0.1602	97.40%	100%	0.1644
Solar	0.1554	100%	100%	0.1554
Wind	0.1569	100%	100%	0.1569
Hydroelectric	0.0631	100%	100%	0.0631
Geothermal	0.0069	100%	100%	0.0069

[51] DOE uses the 2021 Electrification 95 by 2050 Standard Scenario projected grid mix for 2029, the midpoint year of the 2027 to 2031 CAFE compliance period, to illustrate its calculation of the PEF value because the average value over the 2027-2031 period under DOE's proposed methodology is within 3/100 of 1% of the calculated PEF value in 2029. DOE notes that the change in PEF values under the proposed methodology is approximately linear over the compliance period.

[52] Generation share taken from NREL 2021 Standard Scenario Electrification 95-by-2050.

[53] Efficiencies from GREET. "Production" in this table includes efficiencies producing the raw material and transport to the electricity generation facility. "Generation" includes conversion of the limited resources into electricity, *e.g.,* by combustion, heating a boiler, and turning a turbine. Several non-fossil resources are treated as100% efficient – due to lack of scarcity, as explained in the text.

Total	1.000			1.7021

The sum of the Generation Shares is 1.0. Summing the Energy Input Required yields the total required energy given the generation mix, as a fraction of energy generated. Thus, the table indicates that for every 1.0 units of output energy as electricity, 1.702 units of input energy are required (averaged across generation mix), for an electricity efficiency of 58.75% at the plant gate (*i.e.*, 1/1.702 = 0.5875). This is further multiplied by the electricity transmission and distribution efficiency of 95.14%, yielding a total electricity efficiency of 55.89%, meaning that one Watt-hour of electricity delivered to the user requires roughly 1.7892 Wh of primary energy (1 / .5589 = 1.7892).

The energy content of a gallon of gasoline is 115,000 British Thermal Units (Btu). With a standard conversion factor of 3.412 Btu/Wh, the same gallon of gasoline can be said to have an energy content of 33,705 Wh. By a similar calculation as was used for full-cycle electricity, delivering one gallon of gasoline to a consumer requires starting with 22.91% more energy. Thus, a gallon of gasoline is equivalent to 141,347 Btu over a full fuel cycle.

The PEF can then be calculated as the ratio of full-cycle efficiencies of gasoline and electricity: (141,347 Btu/gal) / (6.105 Btu/Wh) = 23,153 Wh/gal[54]

Proposed process for reviewing PEF on an annual basis

The value of the PEF will be annually reviewed and updated, if needed, based on changes in the various factors impacting it. 49 U.S.C. 32904(B). At this time, DOE intends to keep the factor stable over the period of the standard setting years, unless there

[54] The calculated value for 2029 in the spreadsheet model DOE uses results in 23,154 Wh/gal. The difference of 1 Wh/gal, or four one-thousandths of a percent, is due to rounding.

is a compelling reason to change the factor as a result of this review. DOE does not anticipate that the result of that review will be particularly significant, at least as compared to the revisions proposed today. The primary factor that would change the PEF calculation is changes to the projected grid mix. However, DOE believes the grid mix projections considered in this proposed rule provide the best projections available at the time of drafting, and DOE believes it unlikely that grid mix projections would deviate so significantly from the projected values as to result in significant changes in the PEF value in a given year, particularly for the years affected by this proposed rule (*i.e.*, model years 2027-2031). DOE requests comment on other considerations for DOE's review of the PEF value.

To this end, DOE is also proposing to delete section 10 CFR 474.5. Section 474.5 currently states that DOE will review part 474 every five years to determine whether any updates and/or revisions are necessary, and publish notice of DOE's review, findings, and any resulting adjustments to part 474 in the *Federal Register*. DOE will review the PEF value annually, subject to its statutory requirements, and should DOE determine a change may be needed to the PEF value, DOE will engage in the rulemaking process to revise part 474. DOE also intends to seek stakeholder input for its annual reviews through available methods (*e.g.*, requests for information). If a stakeholder believes the PEF value should be changed in a given year, stakeholders may always petition DOE to address such change. DOE requests comment on its proposal to delete §474.5.

Example PEF Calculation

To demonstrate the PEF calculation in accordance with 10 CFR part 474 (*i.e.*, the PEF value divided by the combined energy consumption value) and provide a real-world example, DOE considered how the fuel economy of different powertrains would compare, using both the current PEF value of 82,049 Wh/gal and the proposed PEF value

of 23,160 Wh/gal for the CAFE regulatory period of 2027-2031 (using data from 2022 vehicle models). DOE compared the rated fuel economy for five BEVs and five PHEVs to their most-comparable internal combustion engine vehicle (ICEV) and hybrid electric vehicles (HEV). The table below shows the unadjusted, combined fuel economy for each vehicle. As shown in the table, BEVs would still have a fuel economy much greater than conventional gasoline-fueled vehicles for CAFE calculations. In all cases, the fuel economy across powertrains rises from ICEV to HEV to PHEV to BEV. In the left column, the vehicles being compared on a given row are identified. The column headings indicate which vehicle listed in the left column is intended, and for plug-in vehicles, under which PEF value the MPG-eq was calculated.

Comparison of Various MY2022 Powertrain Options Using Current and New PEF Values						
Vehicles	**2022 ICEV (MPG)**	**2022 HEV (MPGe)**	**2022 PHEV (MPGe)**		**2022 BEV (MPGe)**	
			Current PEF (82,049 Wh/gal)	**Proposed PEF (23,160 Wh/gal)**	**Current PEF (82,049 Wh/gal)**	**Proposed PEF (23,160 Wh/gal)**
VW Tiguan ICEV vs. VW ID.4 BEV	34.3				380.6	107.4
RAV4 ICEV vs. RAV4 HEV vs. Prime PHEV	37.5	55.8	127.4	75.6		
Jeep Wrangler ICEV vs. Wrangler 4xe PHEV	31.4		47.9	35.5		
Kia Niro HEV vs. PHEV vs. BEV		71.1	113.6	79.6	390.6	110.3
Hyundai Kona ICEV vs. BEV	43.2				426.5	120.4
Nissan Versa ICEV vs. Nissan Leaf BEV	48.7				374.4	105.7
Ford F150 ICEV vs. HEV	25.9	31.2			237.7	67.1

vs. Lightning BEV						
BMW 330i ICEV vs. 330e PHEV	40.2		66.6	50.2		
Chrysler Pacifica ICEV vs. PHEV	29.2		88.2	59.5		

C. *Responses to Comments Received on the NRDC and Sierra Club Petition for Rulemaking*

This section summarizes the comments received on DOE's December 28, 2021, request for public comments on the 2021 NRDC and Sierra Club petition.

Comments of the Alliance for Automotive Innovation

The Alliance for Automotive Innovation (Auto Innovators) requested that DOE take careful consideration in determining whether to grant the petition to update the PEF for electric vehicles. Auto Innovators noted that the PEF is included in the calculation of the maximum feasible standards for fleet-average fuel economy. Therefore, Auto Innovators requested that the PEF be updated in concert with CAFE standards, with a lead-time of at least 18 months. Auto Innovators also requested that the docket supporting the prior PEF rulemaking be made available for electronic public viewing.

In general, Auto Innovators requested an increase in the PEF if it is changed, counter to the requests of other commenters. Auto Innovators noted that EPA greenhouse gas (GHG) standards treat electric vehicles as having zero tailpipe emissions[55], due to their lack of tailpipe emissions. For greater harmonization between the EPA GHG standards and the NHTSA CAFE standards, Auto Innovators suggests a higher PEF that

[55] DOE notes that commenter's statement seems to ignore non-tailpipe emissions that are accounted for by EPA, such as AC refrigerant.

would result in fuel economy approaching an equivalent to a zero-tailpipe emission value. Auto Innovators asserts that inclusion of a fuel content factor is within DOE's "statutory considerations." Auto Innovators noted that updating factors relating to electricity generation and transmission while maintaining the fuel content factor of 6.67 (or 1.0/0.15) would increase the overall PEF value.

Auto Innovators stated that Congress's intent has been to incentivize the use of alternative fuel vehicles. They suggest that an increased value for the PEF would result in higher sales of electric vehicles that would substitute for petroleum-fueled vehicles, as automakers would have a greater regulatory incentive to sell the electric vehicles.

DOE Response

As noted previously, the Department agrees that values for electricity generation and transmission efficiencies, along with petroleum refining and transportation, should be updated, which would increase the value defined as the gasoline-equivalent energy content of electricity in the June 2000 rulemaking. However, DOE is proposing to remove the fuel-content factor from the PEF calculation because it artificially inflates the PEF value such that the current PEF value is not reflective of current EV efficiency or market penetration. While DOE could potentially include a fuel-content factor under one or more factors of section 32904(a)(2)(B), DOE does not believe a fuel-content factor is necessary to include in the PEF calculation at this time. While the reasons for including the factor in the 2000 Final Rule may have been compelling at that time, DOE believes they no longer justify inclusion of the fuel-content factor because of current EV technology and market penetration. This is particularly true in light of recent policy changes, such as the Inflation Reduction Act, that greatly incentivize the production and use of EVs and growth of EV infrastructure (e.g., charging stations), enabled both by the Bipartisan Infrastructure Law investment of $7.5B along with private investment to

support the President's goal of a national charging network of 500,000 chargers.[56] These policy changes will act as a far greater incentive for EVs than the fuel-content factor, while continued inclusion of the fuel-content factor to artificially inflate the PEF could hinder continued increases in combustion engine fuel economies under the CAFE standards. Moreover, DOE notes that the EPA regulations for greenhouse gases are separate from the DOT regulations for fuel economy, and while it may be desirable for the two sets of regulations to be harmonized with each other to the extent appropriate for regulatory simplification, the regulations ultimately have different purposes.

With respect to the effective date of the proposed PEF changes, DOE notes that 49 U.S.C. 32904(a)(2)(b) requires DOE to review and propose necessary revisions to the PEF annually. While an immediate update of the PEF would be possible, DOE agrees that this would lead to a sudden change in the compliance determination under the CAFE standards. Such a quick change in the compliance determination could be problematic given the lead times necessary for manufacturers in creating CAFE compliant models. DOE notes that the Auto Innovators' suggested lead time of 18 months before the model year for which CAFE standards are prescribed is based upon the requirements of 49 U.S.C. 32902(a). Section 32904(a)(2) does not contain a requirement for a similar compliance lead time. Nevertheless, DOE is establishing the PEF consistent with the period covered by the next round of CAFE standards for the reasons stated above.

Additionally, in response to the Auto Innovators request, DOE has included the prior rulemaking docket (EE-RM-99-PEF) in the docket for this NOPR.

Comments of the American Biogas Council

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[56] FACT SHEET: Biden-Harris Administration Announces New Standards and Major Progress for a Made-in-America National Network of Electric Vehicle Chargers - The White House

The American Biogas Council supports granting the petition to update the PEF for electric vehicles. Specifically, the American Biogas Council urges the DOE review the PEF annually and propose necessary revisions based on the latest available data.

DOE Response

The agency agrees with the assessment of the American Biogas Council that update and continual review is important. The agency believes that the approach to reviewing the PEF described above balances the lead time necessary for automakers to plan their automotive fleets with the latest available data.

Comments of the American Council for an Energy-Efficient Economy

The American Council for an Energy-Efficient Economy (ACEEE) supports granting the petition to update the PEF for electric vehicles. ACEEE believes the inclusion of the fuel-content factor (6.67 multiplier – or 1.0/0.15) in the PEF is unacceptable. ACEEE notes that DOE should consider how to factor renewable electricity generation into the calculation of grid generation efficiency, and how to incorporate carbon intensity and the time of day in which EVs are charged and the resultant effect on energy sourcing into the PEF, if this is appropriate. ACEEE also notes that the national average for electricity consumption may not be appropriate. Additionally, ACEEE urges DOE to propose necessary revisions based on the latest available data, and to consider how changes in grid composition and technology have changed and may change in the near future.

DOE Response

The Department agrees with ACEEE's assessment that updating and continual PEF review is important. DOE is proposing to consider updated values for the lifecycle energy consumption of both electricity and petroleum and is proposing an updated value for the PEF that does not include a fuel-content factor of 6.67. Moreover, DOE's

proposed methodology considers renewable energy generation as 100 percent efficient, while also utilizing a grid projection scenario that better accounts for the likely increase in renewable generation placed on the grid due to recent policy changes such as the Inflation Reduction Act. DOE also notes that the national average electrical generation and transmission efficiencies is a factor specified in section 32904. 42 U.S.C. 32904(a)(2)(B)(ii). While DOE acknowledges that charging times of EVs may impact the grid mix in a given region, DOE has used national grid mix projections based on the factor in section 32904. Therefore, DOE has not incorporated carbon intensity or effects on energy sourcing based on the time of day during which EVs are likely to be charged. DOE believes such considerations may introduce complexity into the PEF methodology that could create confusion and uncertainty for stakeholders, particularly during DOE's annual review process. Moreover, ACEEE did not provide or point to any information that might inform the inclusion of such considerations into the PEF methodology. However, DOE welcomes comments and information that could allow for the clear and consistent use of considerations such as carbon intensity and charging time of day in the PEF methodology.

Comments of the American Petroleum Institute

The American Petroleum Institute supports granting the petition to update the PEF for electric vehicles. The American Petroleum Institute requests that DOE update the PEF based on the latest available data. Specifically, the American Petroleum Institute suggests that the calculation of the PEF should not include a fuel content factor and should be updated with a well-to-wheels lifecycle analysis, considering both the energy and greenhouse gas (GHG) impacts of electric and conventional vehicles.

DOE Response

As described previously, DOE agrees with eliminating the fuel-content factor. In this NOPR, the agency uses a lifecycle approach for electricity and petroleum as the primary regulatory option for the PEF. The preferred lifecycle approach is one that is based on total energy content, including upstream energy usage, and based on updated input data. DOE's PEF methodology does not explicitly account for lifecycle GHGs. As discussed in section D.3 of this document DOE explored a GHG-related alternative, but ultimately determined not to use such alternative. Further, as discussed previously, DOE must base the PEF value on the factors of section 32904(a)(2), which do not explicitly reference GHGs or lifecycle GHGs. DOE requests comment and information on inclusion of lifecycle GHG emissions in the PEF calculation methodology and data in support of using such an approach.

Comments of the International Council on Clean Transportation

The International Council on Clean Transportation (ICCT) supports updating values used to calculate the PEF for electric vehicles. ICCT suggests that DOE use the latest values for electricity generation efficiency, transmission and distribution loss, petroleum refining, and distribution efficiency. Additionally, ICCT suggests that DOE consider electricity generation sources other than fossil fuels.

DOE Response

The Department agrees with the ICCT on the need to use values that represent today's electricity and petroleum markets. As suggested, DOE uses values derived from the GREET model by Argonne National Laboratory for many of the inputs noted. As non-fossil fuels now comprise approximately 40% of the national electricity generation[57] and are forecast to have higher market penetration in the future, DOE also considers all

[57] Derived from EIA, "Electric Power Monthly, November 2022", (published January 2023), Table 1.2.A. *https://www.eia.gov/electricity/monthly/current_month/january2023.pdf.*

sources of electricity in determining electricity generation efficiency, rather than only using fossil fuels.

Comments of the NRDC and Sierra Club

NRDC and Sierra Club submitted public comments supplementing their initial petition for rulemaking and reiterating their request to the petition for rulemaking to update the PEF for electric vehicles. In this comment, they note that the input values determining the PEF are out of date and that DOE has the obligation to review these values over time. NRDC and Sierra Club claim that maintaining a fuel content factor undermines the goals of the CAFE program and that the existence of the fuel content factor is inconsistent with statute.

DOE Response

The agency agrees that the input values for determining PEF are out of date and should be updated. While DOE recognizes that a fuel-content factor is not specified in section 32904 as it is in section 32905, DOE believes that such a factor could be considered within one of the four enumerated factors in section 32904(a)(2)(B). As suggested in the June 2000 Final Rule, the fuel content factor can be taken to, in part, represent the requirement to consider "the relative scarcity and value to the United States of all fuel used to generate electricity" (49 U.S.C. 32904(a)(2)(iii)). However, as noted above, DOE proposes an updated methodology where the fuel content factor is no longer included in the PEF calculation.

In their mathematical examples of the impacts of various PEF factors, NRDC and Sierra Club suggest that 33,705 Wh/gallon could be used as the appropriate value for the PEF, as this is the energy content contained in one gallon of gasoline used in the Monroney window sticker for consumer understanding. However, use of this value neglects upstream inefficiencies of gasoline refining and distribution and of electricity

generation and transmission. Accordingly, DOE is proposing the PEF value of 23,160 Wh/gal.

Comments of Tesla

Tesla supports granting the petition to update the PEF for electric vehicles. Tesla supports stringent CAFE standards for light-duty vehicles for efficiency gains.

DOE Response

For the reasons described previously, DOE is proposing an updated PEF value which is more reflective of current EV technology and market penetration.

Comments of state-level and municipal governments

The States of California, Delaware, Hawaii, Illinois, Maine, Maryland, Michigan, Minnesota, Nevada, New York, Oregon, Rhode Island, and Vermont; the Commonwealth of Pennsylvania; the District of Columbia; and the Cities of Los Angeles, New York, and Oakland (collectively, "the governments") support granting the petition to update the PEF for electric vehicles. The governments note that the current PEF undermines the congressional intent of the CAFE program to conserve energy and incentivize production of electric vehicles. The governments' request that DOE reevaluate the expression of the need to conserve energy and the relative scarcity and value of fuel used for electricity in the PEF, replacing the existing fuel- content factor. The governments also note that data are available to inform DOE's consideration of the use of electric vehicles compared to petroleum-fueled vehicles.

DOE Response

The agency agrees with the governments on the need for updated inputs in the PEF methodology and has addressed those updates in this proposed rule. DOE notes that different metrics for considering scarcity and value were evaluated in order to develop

DOE's preferred approach for the PEF. DOE acknowledges that there is considerably more data available today regarding the increased use and evolving technology surrounding EVs. These changes are reflected, in part, by DOE's removal of the fuel-content factor and update of grid mix projections reflective of recent policy changes. However, as previously noted , DOE is maintaining the driving pattern factor at 1.00 because DOE continues to believe that current EVs are fully capable vehicles which are likely to be used similarly to gasoline-powered or hybrid-electric vehicles. DOE also notes that with the proposed lower value for PEF, there is little incentive for an automaker to develop an electric vehicle that would not be used in a manner consistent with conventional gasoline-fueled vehicles in order to maximize its average fuel economy.

Comments of anonymous members of the public

Members of the public can comment without being publicly identified. Two comments were received this way. Each of the commenters requested that DOE grant the petitioners' request to update the PEF and use updated values as appropriate.

DOE Response

The Department agrees with the commenters on the need for updated values and appreciates the input of the public in the regulatory rulemaking process.

D. Alternative Approaches for Calculation of PEF

Section II.C of this document presents the DOE rationale for the selection of 23,160 Wh/gal as the updated value of the PEF for CAFE calculations for the 2027-2031 CAFE regulatory period. DOE considered other approaches to determining the PEF value based upon the four factors enumerated in section 32904, particularly the transmission

and generation efficiency factor and the scarcity factor. DOE briefly describes below the alternative approaches it considered.

1. Approach based on the current electricity generation mix

A calculation for PEF similar to that proposed but based on the generation mix in 2020 yields a PEF of 20,136 Wh/gal, about 13% lower than the proposed value of 23,160 Wh/gal.[58] DOE views this value as an appropriate comparison of the relative energy today, but notes that a typical vehicle sold today will be expected to be on the road for well over a decade, at which point the PEF value would not account for improvements in overall grid efficiency as the grid decarbonizes. In particular, in the latter part of this decade, during which the revised PEF is expected to apply, the grid mix is likely to be significantly different from today's grid mix. In contrast, the proposed PEF value and DOE's proposed review approach would better account for the electricity generation mix of models sold throughout the CAFE compliance period and over the course of the vehicle's useful life. Accordingly, DOE did not pursue the approach based on current generation mix.

2. Approach based on fossil energy consumption.

As the renewables that are on the grid are not scarce in the same way as physical combustion fuels, DOE considered an approach which only accounts for fossil fuel in the calculation of the electrical grid efficiency, ignoring the electricity generated by renewable and nuclear sources. This is different than the proposed approach, which

[58] DOE used 2020 generation mix data for this alternative because it was the most recent available data at the time the analysis was undertaken. While there has been some change in grid mix since that time, DOE believes it is a relatively small difference in the context of comparing the current (2023) grid to a notional future projected grid mix used in the calculation of the new PEF value.

includes current and projected renewable generation in the projected grid mixes used in DOE's methodology. See section II.B of this document.

In 2020, fossil fuel combustion supplied 60% of U.S. electricity. Following the same methodology in section II.C of this document, the PEF value would be 25,702 Wh/gal based on the 2020 grid, and 34,020 Wh/gal, averaged from 2027-2031. However, as the electric grid decarbonizes, this metric would rapidly increase and present a problem of artificially amplifying the PEF value like the current PEF value. With a highly renewable grid, automakers would be able to use electric vehicles in their fleet to improve their average fuel economy rather than improving the fuel economy of conventional gasoline-fueled vehicles, leading to a likely increase in national fuel consumption, counter to the goals of both EPCA and the CAFE program. Accordingly, DOE did not pursue this approach based on fossil energy consumption.

3. Approach based on equivalent greenhouse gas emissions.

It is the policy of the Biden Administration to confront the global climate crisis and exert leadership in addressing climate change impacts. See Executive Order 14008, 86 FR 7619 (Feb. 1, 2021) ("Tackling the Climate Crisis at Home and Abroad"). This can be accomplished in part by reducing emissions of greenhouse gases. As most electricity-related emissions are from fossil fuel combustion, the greenhouse gas equivalent approach that DOE considered is very similar to the approach based on fossil energy consumption. Like that approach, DOE does not consider this to be an ideal approach as the PEF value would eventually diverge from the actual generation mix as the grid decarbonized. Moreover, this approach also deviates from the approach of the CAFE standards, which are designed to maximize feasible average fuel economy, while EPA regulates emissions of greenhouse gases from light-duty vehicles.

4. Approach based on the relative scarcity of each energy carrier

For purposes of this proposal, DOE considered energy scarcity to be a matter of primary energy availability. Scarcity can then be measured in terms of proved reserves, which is a measure of working inventory. By comparing total annual consumption with the quantity of proved reserves, we can estimate the number of years of each energy source available in the United States, comparing electricity sources with petroleum. Using the NREL Electrification 95 by 2050 projection, DOE calculates a PEF value of 105,039 Wh/gallon over the 2027-2031 regulatory period using this approach. This number is much higher than the proposed PEF, owing to the relative scarcity of domestically produced oil, at 6.1 years, compared to other fuels used to generate electricity.[59] Such a high value for the PEF – 28% higher than the current level – would likely increase total petroleum usage, as automakers could produce less efficient gasoline-fueled vehicles and still meet CAFE standards by selling a small number of EVs.

Using proved reserves of resources also has significant drawbacks that make them unsuitable for use in calculating the PEF. First, future reserves are very difficult to predict as they are subject to commodity price fluctuations. Second, proved reserves change over relatively small timeframes[60], making this a source of regulatory uncertainty for automakers. Further, the amount of proved reserves are ill-defined for renewable energy. Therefore, DOE did not pursue this alternative.

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[59] The United States had 44,418 million barrels of proved reserves of crude oil plus lease condensate at the end of 2021. In 2021, the U.S. consumed 19.9 million barrels of petroleum-derived products per day. At this usage rate, the United States has reserves of 6.1 years of petroleum. Citations: Proved Reserves of Crude Oil and Natural Gas in the United States, Year-End 2021 (eia.gov) Table 6 (*https://www.eia.gov/naturalgas/crudeoilreserves/pdf/usreserves_2021.pdf* see page 19); U.S. Product Supplied for Crude Oil and Petroleum Products (eia.gov) Data Tables (*https://www.eia.gov/dnav/pet/pet_cons_psup_dc_nus_mbblpd_a.htm*)

[60] Proved reserves reported by EIA were up more than 16% between the end of 2020 and the end of 2021. Compare these values at: *https://www.eia.gov/naturalgas/crudeoilreserves/pdf/usreserves_2021.pdf*, Table 6.

III. Procedural Issues and Regulatory Review

A. Review Under Executive Orders 12866 and 13563

Executive Order ("E.O.") 12866, "Regulatory Planning and Review," 58 FR 51735 (Oct. 4, 1993), as supplemented and reaffirmed by E.O. 13563, "Improving Regulation and Regulatory Review," 76 FR 3821 (Jan. 21, 2011), requires agencies, to the extent permitted by law, to (1) propose or adopt a regulation only upon a reasoned determination that its benefits justify its costs (recognizing that some benefits and costs are difficult to quantify); (2) tailor regulations to impose the least burden on society, consistent with obtaining regulatory objectives, taking into account, among other things, and to the extent practicable, the costs of cumulative regulations; (3) select, in choosing among alternative regulatory approaches, those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity); (4) to the extent feasible, specify performance objectives, rather than specifying the behavior or manner of compliance that regulated entities must adopt; and (5) identify and assess available alternatives to direct regulation, including providing economic incentives to encourage the desired behavior, such as user fees or marketable permits, or providing information upon which choices can be made by the public. DOE emphasizes as well that E.O. 13563 requires agencies to use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible. In its guidance, the Office of Information and Regulatory Affairs ("OIRA") within the Office of Management and Budget (OMB) has emphasized that such techniques may include identifying changing future compliance costs that might result from technological innovation or anticipated behavioral changes. For the reasons stated in the preamble, this proposed regulatory action is consistent with these principles.

Section 6(a) of E.O. 12866 also requires agencies to submit "significant regulatory actions" to the OIRA for review. OIRA has determined that this proposed

action constitutes a significant regulatory action within the scope of section 3(f)(1) of E.O. 12866. Accordingly, pursuant to section 6(a)(3)(C) of E.O. 12866, Accordingly, this action was subject to review by OIRA.

B. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires the preparation of an initial regulatory flexibility analysis (IRFA) for any rule that by law must be proposed for public comment, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. As required by E.O. 13272, *Proper Consideration of Small Entities in Agency Rulemaking,* 67 FR 53461 (Aug. 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the potential impacts of its rules on small entities are properly considered during the rulemaking process. (68 FR 7990). The Department has made its procedures and policies available on the Office of General Counsel's web site: *www.energy.gov/gc/office-general-counsel.*

The proposed rule would revise DOE's regulations on electric vehicles regarding procedures for calculating a value for the petroleum-equivalent fuel economy of (EVs for use in the CAFE program administered by DOT. While the PEF value is an important part of the CAFE compliance calculation, its use and the weight given to it are determined by NHTSA's implementation of the CAFE standards program. Moreover, the downstream effects, including effects on small manufacturers, are ultimately determined by NHTSA's implementation of the CAFE program. Because this proposed rule would not directly regulate small entities but instead only amends a factor used to calculate compliance with DOT's CAFE standards, DOE certifies that this proposed rule would not have a significant economic impact on a substantial number of small entities,

and, therefore, no regulatory flexibility analysis is required.[61] *Mid-Tex Elec. Co-Op, Inc. v. F.E.R.C.*, 773 F.2d 327 (1985). The method for earning credits applies equally across manufacturers and does not place small entities at a significant competitive disadvantage. Accordingly, DOE did not prepare an IRFA for this proposed rulemaking. DOE's certification and supporting statement of factual basis will be provided to the Chief Counsel for Advocacy of the Small Business Administration for review under 5 U.S.C. 605(b).

C. Review Under the Paperwork Reduction Act of 1995

The proposed rule would impose no new information or record keeping requirements. Accordingly, OMB clearance is not required under the Paperwork Reduction Act. (44 U.S.C. 3501 *et seq*).

D. Review Under the National Environmental Policy Act of 1969

DOE is analyzing this proposed regulation in accordance with the National Environmental Policy Act of 1969 ("NEPA") and DOE's NEPA implementing regulations (10 CFR part 1021). DOE's regulations include a categorical exclusion for amending an existing rule or regulation that does not change the environmental effect of the rule or regulation being amended. 10 CFR part 1021, subpart D, appendix A5. DOE anticipates that this rulemaking qualifies for categorical exclusion A5 because it is a rulemaking that is amending an existing rule or regulation that does not change the environmental effect of the rule or regulation being amended, no extraordinary circumstances exist that require further environmental analysis, and it otherwise meets the requirements for application of a categorical exclusion. *See* 10 CFR 1021.410. While the PEF value is an important aspect of the CAFE compliance calculation, in and of itself

[61] DOE notes that passenger vehicle manufacturers that manufacture fewer than 10,000 vehicles per year can petition NHTSA to have alternative CAFE standards. *See* 49 U.S.C. 32902(d).

DOE's rulemaking to set the PEF value does not result in environmental effects. The use of and the weight given to the PEF value are determined by NHTSA, and any environmental effects would be from NHTSA's implementation of the CAFE standards program. Thus, DOE concludes that this action does not result in an environmental effect. DOE will complete its NEPA review before issuing the final rule.

E. Review under Executive Order 13132

Executive Order 13132, "Federalism," 64 FR 43255 (Aug. 10, 1999), imposes certain requirements on agencies formulating and implementing policies or regulations that preempt State law or that have federalism implications. The Executive order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and to carefully assess the necessity for such actions. The E.O. also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. (*See* 65 FR 13735.) DOE examined this proposed rule and determined that it would not preempt State law and would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of Government. No further action is required by E.O. 13132.

F. Review Under Executive Order 12988

With respect to the review of existing regulations and the promulgation of new regulations, section 3(a) of E.O. 12988, "Civil Justice Reform," 61 FR 4729 (Feb. 7, 1996), imposes on Federal agencies the general duty to adhere to the following

requirements: (1) eliminate drafting errors and ambiguity; (2) write regulations to minimize litigation; and (3) provide a clear legal standard for affected conduct, rather than a general standard and promote simplification and burden reduction. Section 3(b) of E.O. 12988 specifically requires that executive agencies make every reasonable effort to ensure that the regulation: (1) clearly specifies its preemptive effect, if any; (2) clearly specifies any effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct, while promoting simplification and burden reduction; (4) specifies its retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of E.O. 12988 requires executive agencies to review regulations in light of applicable standards in section 3(a) and section 3(b) to determine whether they are met, or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, the proposed rule would meet the relevant standards of E.O. 12988.

G. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA) (Pub. L. 104-4) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and tribal governments and the private sector. For a proposed regulatory action likely to result in a rule that may cause the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector of $100 million or more in any one year (adjusted annually for inflation), section 202 of UMRA requires a Federal agency to publish a written statement that estimates the resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a) and (b)). The section of UMRA also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and tribal governments on a proposed "significant

intergovernmental mandate" and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect small governments. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under UMRA (62 FR 12820) (also available at *www.energy.gov/gc/office-general-counsel*). This proposed rule contains neither an intergovernmental mandate nor a mandate that may result in the expenditure of $100 million or more in any year by State, local, and tribal governments, in the aggregate, or by the private sector, so these requirements under the Unfunded Mandates Reform Act do not apply.

H. Review Under the Treasury and General Government Appropriations Act of 1999

Section 654 of the Treasury and General Government Appropriations Act of 1999 (Pub. L. 105-277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. This proposed rule would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

I. Review Under Executive Order 12630

DOE has determined, under E.O. 12630, "Governmental Actions and Interference with Constitutionally Protected Property Rights," 53 FR 8859 (Mar. 18, 1988), that this proposed rule would not result in any takings which might require compensation under the Fifth Amendment to the United States Constitution.

J. Review Under the Treasury and General Government Appropriations Act, 2001

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516, note) provides for agencies to review most disseminations of information to the public under guidelines established by each agency pursuant to general

guidelines issued by OMB. OMB's guidelines were published at 67 FR 8452 (February 22, 2002), and DOE's guidelines were published at 67 FR 62446 (October 7, 2002). DOE has reviewed the proposed rule under the OMB and DOE guidelines and has concluded that it is consistent with applicable policies in those guidelines.

K. Review Under Executive Order 13211

Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," 66 FR 28355 (May 22, 2001), requires Federal agencies to prepare and submit to OIRA, a Statement of Energy Effects for any proposed significant energy action. A "significant energy action" is defined as any action by an agency that promulgated or is expected to lead to promulgation of a final rule, and that: (1) is a significant regulatory action under E.O. 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy, or (3) is designated by the Administrator of OIRA as a significant energy action. For any proposed significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use should the proposal be implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use. The proposed rule would amend a factor used to calculate compliance with DOT's CAFE standards but does not meet the second criterion. Additionally, OIRA has not designated this proposed rule as a significant energy action. Accordingly, the requirements of E.O. 13211 do not apply.

IV. Public Participation

DOE will accept comments, data, and information regarding this proposed rule on or before the date provided in the **DATES** section at the beginning of this proposed rule.

Interested parties may submit comments, data, and other information using any of the methods described in the **ADDRESSES** section at the beginning of this document.

Submitting comments via www.regulations.gov. The *www.regulations.gov* web page will require you to provide your name and contact information. Your contact information will be viewable to DOE General Counsel staff only. Your contact information will not be publicly viewable except for your first and last names, organization name (if any), and submitter representative name (if any). If your comment is not processed properly because of technical difficulties, DOE will use this information to contact you. If DOE cannot read your comment due to technical difficulties and cannot contact you for clarification, DOE may not be able to consider your comment.

However, your contact information will be publicly viewable if you include it in the comment itself or in any documents attached to your comment. Any information that you do not want to be publicly viewable should not be included in your comment, nor in any document attached to your comment. Otherwise, persons viewing comments will see only first and last names, organization names, correspondence containing comments, and any documents submitted with the comments.

Do not submit to *www.regulations.gov* information the disclosure of which is restricted by statute, such as trade secrets and commercial or financial information (hereinafter referred to as Confidential Business Information (CBI)). Comments submitted through *www.regulations.gov* cannot be claimed as CBI. Comments received through the website will waive any CBI claims for the information submitted. For information on submitting CBI, see the Confidential Business Information section below.

DOE processes submissions made through *www.regulations.gov* before posting. Normally, comments will be posted within a few days of being submitted. However, if large volumes of comments are being processed simultaneously, your comment may not

be viewable for up to several weeks. Please keep the comment tracking number that *www.regulations.gov* provides after you have successfully uploaded your comment.

Submitting comments via email, hand delivery/courier, or postal mail. Comments and documents submitted via email, hand delivery/courier, or postal mail also will be posted to *www.regulations.gov*. If you do not want your personal contact information to be publicly viewable, do not include it in your comment or any accompanying documents. Instead, provide your contact information in a cover letter. Include your first and last names, email address, telephone number, and optional mailing address. The cover letter will not be publicly viewable if it does not include any comments.

Include contact information each time you submit comments, data, documents, and other information to DOE. If you submit via postal mail or hand delivery/courier, please provide all items on a CD, if feasible, in which case it is not necessary to submit printed copies. No telefacsimiles (faxes) will be accepted.

Comments, data, and other information submitted to DOE electronically should be provided in PDF (preferred), Microsoft Word or Excel, WordPerfect, or text (ASCII) file format. Provide documents that are written in English, and that are free of any defects or viruses. Documents should not contain special characters or any form of encryption and, if possible, they should carry the electronic signature of the author.

Campaign form letters. Please submit campaign form letters by the originating organization in batches of between 50 to 500 form letters per PDF or as one form letter with a list of supporters' names compiled into one or more PDFs. This reduces comment processing and posting time.

Confidential Business Information. Pursuant to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email, postal mail, or hand delivery/courier two well-marked copies: One copy of the document marked “confidential” including all the

information believed to be confidential, and one copy of the document marked “non-confidential” that deletes the information believed to be confidential. Submit these documents via email or on a CD, if feasible. DOE will make its own determination about the confidential status of the information and will treat it according to its determination.

It is DOE's policy that all comments, including any personal information provided in the comments, may be included in the public docket, without change and as received, except for information deemed to be exempt from public disclosure.

V. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this Notice of proposed rulemaking and request for comment.

List of Subjects in 10 CFR Part 474

Corporate average fuel economy, Electric (motor) vehicle, Electric power, Energy conservation, Fuel Economy, Motor vehicles, Research.

Signing Authority

This document of the Department of Energy was signed on March 28, 2023, by Francisco Alejandro Moreno, Acting Assistant Secretary for Energy Efficiency and Renewable Energy, pursuant to delegated authority from the Secretary of Energy. That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document upon publication in the *Federal Register*.

Signed in Washington, DC, on March 29, 2023.

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Treena V. Garrett
Federal Register Liaison Officer,
U.S. Department of Energy

For the reasons stated in the preamble, DOE is proposing to amend part 474 of Chapter II of Title 10 of the Code of Federal Regulations as set forth below:

PART 474—ELECTRIC AND HYBRID VEHICLE RESEARCH, DEVELOPMENT, AND DEMONSTRATION PROGRAM; PETROLEUM-EQUIVALENT FUEL ECONOMY CALCULATION

1. The authority citation for part 474 continues to read as follows:

Authority: 49 U.S.C. 32901 *et seq*.

2. Amend §474.3 by revising paragraph (b) and adding paragraph (c) to read as follows:

§474.3 Petroleum-equivalent fuel economy calculation.

* * * * *

(b) The value of the petroleum-equivalency factor for electric vehicles is 23,160 Watt-hours per gallon.

(c) The value of the petroleum-equivalency factor for electric vehicles in paragraph (b) of this section is effective for model year 2027 and later model year electric vehicles.

§474.5 [Removed and Reserved]

3.Remove and reserve §474.5.

4. Appendix A to part 474 is revised to read as follows:

Appendix to Part 474 - Sample Petroleum-Equivalent Fuel Economy Calculations

Example 1:

An electric vehicle is tested in accordance with Environmental Protection Agency procedures and is found to have an Urban Dynamometer Driving Schedule energy consumption value of 265 Watt-hours per mile and a Highway Fuel Economy Driving

Schedule energy consumption value of 220 Watt-hours per mile. The vehicle is not equipped with any petroleum-powered accessories. The combined electrical energy consumption value is determined by averaging the Urban Dynamometer Driving Schedule energy consumption value and the Highway Fuel Economy Driving Schedule energy consumption value using weighting factors of 55 percent urban, and 45 percent highway:

combined electrical energy consumption value = (0.55 * urban) + (0.45 * highway) = (0.55 * 265) + (0.45 * 220) = 244.75 Wh/mile

The value of the petroleum equivalency factor is 23,160 Watt-hours per gallon, and the petroleum-equivalent fuel economy is:

(23,160 Wh/gal) ÷ (244.75 Wh/mile) = 94.63 mile/gal (or, mpg)

[FR Doc. 2023-06869 Filed: 4/10/2023 8:45 am; Publication Date: 4/11/2023]