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NORTH CAROLINA
Environmental Quality

October 26, 2018

Docket ID Nos. NHTSA–2018–0067/
EPA-HQ-OAR-2018-0283

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Acting Administrator Andrew Wheeler
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EPA Docket Center (EPA/DC)
1200 Pennsylvania Ave. NW
Washington, DC 20460

Subject: Comments on Proposed Rulemaking and Draft Environmental Impact Statement for "The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks"

Dear Deputy Administrator King and Acting Administrator Wheeler:

The North Carolina Department of Environmental Quality (NCDEQ), with input from the North Carolina Department of Transportation, is providing comments on the joint National Highway Transportation and Safety Administration (NHTSA)/U.S. Environmental Protection Agency (EPA) (collectively, the "Agencies") Proposed Rulemaking for "The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks" published in the *Federal Register* (FR) on August 24, 2018 (83 *FR* 42986). The NCDEQ is also providing comments on the July 2018 Draft Environmental Impact Statement (DEIS) that NHTSA released for public comment in support of this rulemaking (Docket No. NHTSA-2017-0069).

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The NCDEQ protects North Carolina's environment and natural resources by providing science-based environmental stewardship for the health and prosperity of all North Carolinians in administering regulatory and public assistance programs aimed at safeguarding the state's air, water, land resources, coastal fisheries, and the public's health. As the lead agency charged with implementing the Clean Air Act, the NCDEQ is committed to protecting and improving ambient air quality for the health, benefit and economic well-being of all North Carolina's citizens.

In the interest of the health and welfare of North Carolina's citizens, environment and natural resources we offer the following comments starting with the acknowledgment that:

1. Anthropogenic greenhouse gas (GHG) emissions contribute to climate change;
2. North Carolina is already experiencing the effects of climate change;
3. EPA has a legal obligation to control GHG emissions from onroad mobile sources;
4. The light-duty vehicle sector accounts for a significant proportion of total anthropogenic carbon dioxide (CO_2) in North Carolina and the nation; and
5. Relaxation of the existing and augural corporate average fuel economy (CAFE) and CO_2 standards for light-duty vehicles would:
    - Have significant negative impacts on North Carolina's success with further reducing GHG emissions to mitigate climate change impacts in the state, and
    - Significantly increase North Carolina's risk for exceeding the ozone National Ambient Air Quality Standards (NAAQS) for which it is currently attaining statewide.
    - Backslide on future emission reductions relied upon in North Carolina State Implementation Plans.

For these reasons, we oppose the proposed rulemaking to relax the CAFE and CO_2 standards. The NCDEQ requests that the Agencies maintain the existing CAFE and CO_2 standards, finalize the augural CAFE standards for model years 2021-2025, and maintain the California GHG emissions standards waiver for light-duty vehicles.

The Agencies' analysis underestimates the costs and public health impacts and inflates the benefits of the regulatory alternatives considered in the proposed rulemaking and DEIS. Alternative (1), the Agencies' preferred alternative, would require no average annual fleet-wide increase in fuel economy for cars and light trucks for model years 2021 through 2026 and would revise the model year 2021 average from 46.7 miles per gallon (mpg) to the model year 2020 level of 36.9 mpg. EPA is also proposing to revise the CO_2 standards previously set for model years 2021–2025, set model year 2026 standards equal to model year 2025 standards, and withdraw the California waiver for GHG standards. Based on our review of the proposed rulemaking and supporting documentation, the NCDEQ has determined that the Agencies' analysis supporting the relaxation of the CAFE and CO_2 standards is fatally flawed in several areas. As documented in our comments, the Agencies base their analysis of regulatory alternatives on modeling assumptions that contain many deficiencies that are counter to historical records.

Climate change is already impacting our state. The proposed rule would contribute further to the harmful effects of climate change in North Carolina that impact every sector of our economy. North Carolina is already incurring significant transportation and infrastructure costs due to climate change impacts. Large numbers of North Carolina's coastal railways, ports, airports, and water and energy supply systems are at low elevations and are therefore vulnerable to the effects of sea level rise and increased frequency and intensity of weather events. Additional climate impacts would include increased drought, flooding, heat waves, and hurricanes that result in huge economic damages to homes, businesses, and natural and built infrastructure. Associated with these impacts are increased social/health costs (e.g., waterborne disease outbreaks, foodborne illnesses, compromised drinking water quality, and increased mosquito populations). Thus, keeping the existing and augural CAFE standards and existing CO_2 standards for light-duty vehicles in place is critical for mitigating climate change impacts in North Carolina.

The proposed rule would also place North Carolina and other states at significant risk for exceeding the ozone and particulate matter of aerodynamic diameter or 2.5 microns or less (PM2.5) NAAQS. Indeed, many states' State Implementation Plans, including North Carolina's, incorporate the significant emissions reductions projected to occur because of the vehicle emissions standards the Agencies now seek to relax. North Carolina has achieved significant success implementing federal, state, and local control programs to achieve statewide attainment with all the NAAQS. Based on our review of the Agencies' analysis, relaxing the light-duty vehicle standards would increase ozone precursor emissions that would place our urban areas at risk for exceeding the current ozone NAAQS.

The NCDEQ provides detailed comments in Attachment 1 to this letter addressing our concerns about the rulemaking. Our comments address (1) the NCDEQ's commitment to mitigate climate change impacts on North Carolina, (2) the potential impact of relaxing the existing standards on North Carolina's air quality and State Implementation Plans, (3) the flawed assumptions used to support revising the standards, (4) the failure of the Agencies to adequately address relevant statutory requirements, and (5) underestimation of the social costs of carbon.

Thank you for the opportunity to comment on this proposed rulemaking and DEIS supporting the proposed rulemaking. I trust that the comments will be considered as the Agencies move forward to address this important air pollution and environmental matter. If you have any questions regarding our comments, please contact Sushma Masemore, at (919) 707-8700 or sushma.masemore@ncdenr.gov.

Sincerely,

Sheila C. Holman,
Assistant Secretary for the Environment

Attachment

cc: Michael Abraczinskas, Director, NCDAQ
Bill Lane, NCDEQ
Asher Spiller, NC Attorney General's Office
Chairman J.D. Solomon, NCEMC
NCEMC Air Quality Committee

Attachment

North Carolina Department of Environmental Quality's Comments on Proposed Rulemaking and Draft Environmental Impact Statement for "The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks"

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List of Acronyms

Acronym	Definition
AEO	Annual Energy Outlook
BTS	Bureau of Transportation Statistics
CAA	Clean Air Act
CAFE	Corporate Average Fuel Economy
CO_2	Carbon Dioxide
DEIS	Draft Environmental Impact Statement
EIA	Energy Information Administration
EISA	Energy Independence and Security Act
EPA	U.S. Environmental Protection Agency
EPCA	Energy Policy and Conservation Act
EV	Electric Vehicle
FR	Federal Register
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
LDV	Light-duty Vehicle
LT	Light Truck
MOVES	Motor Vehicle Emissions Simulator
mpg	miles per gallon
MVEB	Motor Vehicle Emission Budget
NAAQS	National Ambient Air Quality Standard
NC	North Carolina
NCDAQ	North Carolina Division of Air Quality
NCDEQ	North Carolina Department of Environmental Quality
NCEM	North Carolina Division of Emergency Management
NEPA	National Environmental Policy Act
NGPL	Natural Gas Plant Liquids
NHTSA	National Highway Traffic Safety Administration
NOx	Oxides of Nitrogen
NPRM	Notice of Proposed Rulemaking
OMB	Office of Management and Budget
PC	Passenger Car
PM2.5	Particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers
PRIA	Preliminary Regulatory Impact Analysis
SAFE	Safer Affordable Fuel-Efficient
SIP	State Implementation Plan
SO_2	Sulfur Dioxide

Acronym	**Definition**
U.S.	United States
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
VPOP	Vehicle Population

I. Introduction/Overview

In 2012, the U.S. Environmental Protection Agency (EPA) set carbon dioxide (CO_2) standards for model years 2017–2025, while the National Highway Traffic Safety Administration (NHTSA) set final corporate average fuel economy (CAFE) standards for model years 2017–2021, and set forth ''augural'' CAFE standards for model years 2022–2025, consistent with EPA's CO_2 standards for those model years.[1] In the proposed rulemaking and Draft Environmental Impact Statement (DEIS), these standards were used as the baseline against which NHTSA/EPA (collectively, "the Agencies") evaluated eight alternatives that retain the existing standards through model year 2020, but significantly relax the standards for model years 2021 through 2025.[2] Alternative (0) (the baseline or no-action alternative) represents the most stringent CAFE and CO_2 standards for 2021–2025. Alternative (1) is the least stringent alternative and Alternative (8) is the next most stringent alternative relative to Alternative (0). Under Alternative (1), the CAFE and CO_2 standards for model years 2021–2026 would be based on model year 2020 standards. Under Alternative (8), model year 2020 standards would be increased by 2 percent per year for passenger cars and 3 percent per year for light trucks for model years 2021-2026. In addition, EPA is proposing to withdraw the waiver that allows California to set greenhouse gas (GHG) emissions standards independent of federal standards.

Alternative (1), the Agencies' preferred alternative, would require no average annual fleet-wide increase in fuel economy for cars and light trucks for model years 2021 through 2026 and would revise the model year 2021 average from 46.7 miles per gallon (mpg) to the model year 2020 level of 36.9 mpg. EPA is also proposing to revise the CO_2 standards previously set for model years 2021–2025, and set model year 2026 standards equal to model year 2025 standards. A key premise supporting selection of the proposed preferred alternative, relative to the baseline alternative, is that increased vehicle affordability will lead to increased driving of newer, safer, less fuel-efficient vehicles. That foundational premise is based on the following assumptions.

- Technologies exist to comply with the current standards for 2021-2025 but are too expensive.
- The preferred alternative will not require these expensive technologies so vehicles will be cheaper.
- Because vehicles will be cheaper more new vehicles and larger new vehicles will be purchased. These newer cars will be safer and cleaner.
- Less fuel-efficient vehicles will make it more expensive to drive farther.
- Higher fuel costs to consumers will decrease vehicle miles traveled (VMT).
- New vehicles are safer than old vehicles, and large vehicles are safer than smaller vehicles; therefore, more new vehicles and large vehicles will result in a safer vehicle fleet. Newer vehicles will result in lower emissions with no noticeable impact to net emissions of smog-forming or other "criteria" or toxic air pollutants.
- Newer vehicles will result in lower fatalities.

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[1] NHTSA's ''augural'' CAFE standards for model years 2022–2025 were not final in 2012 because Congress prohibits NHTSA from finalizing new CAFE standards for more than five model years in a single rulemaking.
[2] The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Year 2021–2026 Passenger Cars and Light Trucks, Draft Environmental Impact Statement, July 2018, Docket No. NHTSA-2017-0069.

Based on our review of the proposed rulemaking and supporting documentation, the North Carolina Department of Environmental Quality (NCDEQ) believes that the analysis that the Agencies claim supports the relaxation of the CAFE and CO_2 standards is flawed in several areas. As documented in our comments, the Agencies base their analysis of regulatory alternatives on modeling assumptions that contain many deficiencies as clearly demonstrated by the historical record. In this attachment, the NCDEQ provides detailed comments addressing the proposed rule's (1) negative impact on the NCDEQ's commitment to mitigate climate change impacts on North Carolina, (2) negative impact of relaxing the existing standards on North Carolina's air quality and State Implementation Plans (SIPs), (3) flawed assumptions used to support revising the standards, (4) failure to adequately address relevant statutory requirements, and (5) underestimation of the social costs of carbon.

II. Greenhouse Gas and Climate Impacts

The proposed rule would have major harmful effects on climate change in North Carolina as these effects can touch on every sector of our economy and have already impacted our State. In their DEIS, NHTSA attempts to disguise the impacts of its proposed action via a vast quantity of ever-rising cumulative GHG emissions, arguing that the proposed rule will result in emissions increases that would only nominally reduce the projected year 2100 rise in temperature and sea-level.[3] This characterization fails to highlight how large a contribution the light-duty vehicle (LDV) sector makes to total GHG emissions, and ignores the importance of reducing these emissions as an important interim step to tackling this major issue.

While NHTSA's 2012 draft and final EIS also included similar large-scale analyses, that was in the context of conservatively framing essential GHG emissions reductions from the proposed 2012 standards against a massive global environmental issue; it was not in the context of attempting to minimize GHG emissions *increases* as part of an action contrary to statutes directing protection of the environment.[4,5] The courts have already rejected the contention that agencies need not take incremental steps to address climate change because their contribution to that problem is relatively small.[6] This principle is especially important here, where NHTSA proposes not just to do nothing to address a developing global environmental issue, but rather proposes to rollback standards that are already in place to help address it.

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[3] The DEIS begins by asserting that the No Action Alternative would result in a world in which the global mean surface temperature rises by a colossal 6.27 degrees Fahrenheit by 2100, and global sea level rises by 30.03 inches. It then uses those high figures as assumptions to minimize the GHG changes from the proposed rollback. For example, it concludes that global mean surface temperature would increase by only 0.005 degrees Fahrenheit, and sea levels would rise only 0.02 inch, compared to the No Action Alternative (see page S-15).

[4] Corporate Average Fuel Economy Standards Passenger Cars and Light Trucks Model Years 2017-2025, Draft Environmental Impact Statement, November 2011, Docket No. NHTSA-2011-0056.

[5] Corporate Average Fuel Economy Standards Passenger Cars and Light Trucks Model Years 2017-2025, Final Environmental Impact Statement, July 2012, Docket No. NHTSA-2011-0056.

[6] See Mass v. EPA, 549 U.S. 497, 524 (2007) ("Agencies, like legislatures, do not generally resolve massive problems in one fell regulatory swoop…. They instead whittle away at them over time, refining their preferred approach as circumstances change and as they develop a more nuanced understanding of how best to proceed…. And reducing domestic automobile emissions is hardly a tentative step.")

A. Light-Duty Vehicle Sector Emissions

NHTSA estimates that the preferred alternative would increase CO_2 emissions by 7,400 million metric tons by year 2100 when compared to the augural standards.[7] Their DEIS concludes that the proposal would, "to a small degree, increase the impacts and risks of climate change," that the effects would be "small, occur on a global scale, and would not disproportionately affect the United States," and that global warming "could be further exacerbated to a very small degree under the Proposed Action…compared to the No Action Alternative."

It is important to emphasize that the transportation sector represents over a third of the nation's GHG emissions, the largest of any single sector. Because LDVs account for approximately 60 percent of total U.S. CO_2 emissions from this sector, these vehicles account for approximately 3 percent of total global GHG emissions, representing one of the largest single targets for GHG emission reductions in the world. The importance of this sector is mirrored in North Carolina, where gasoline and diesel highway vehicles accounted for 36 percent of total net 2017 GHG emissions in North Carolina.[8]

The Intergovernmental Panel on Climate Change (IPCC) recently calculated that the world could emit no more than 420 billion tons of CO_2 to retain a two-thirds chance of limiting the global average temperature increase to 1.5 degrees Celsius. The IPCC further estimated that the budget is being depleted by approximately 42 billion tons of CO_2 per year, such that the carbon budget will be exhausted in 10 years at the current emissions rate. Despite the dramatic reductions necessary to achieve climate stabilization, the Agencies have instead proposed an action that would increase CO_2 emissions by 8 billion tons between 2021 and 2026. Even assuming these emission estimates are accurate (NCDEQ believes that the technical flaws in NHTSA's analyses are likely to greatly understate the true emissions increase), the proposed roll-back constitutes a significant use of the remaining carbon budget. The overwhelming scientific consensus finds that continual progress towards a near-zero GHG emissions economy by mid-century is necessary to avoid significant climate change impacts. In the face of this stark reality, the Agencies propose to roll-back the primary emission reduction program for the single-largest sector for GHGs in the nation. Slamming the brakes on reductions in GHG emissions from U.S. LDVs for over half a decade would deal the fight against climate change a very substantial blow.

B. Risks of Climate Change Impacts on North Carolina

The effects of climate change have already been felt throughout much of our State. North Carolina is already incurring transportation and infrastructure costs due to climate change impacts. Some of North Carolina's coastal railways, ports, airports, and water and energy supply systems are at low elevations and are therefore vulnerable to the effects of sea level rise and more frequent hurricanes.[9] The North Carolina Department of Transportation is raising the

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[7] NHTSA, DEIS, July 2018, at page S-18 and Appendix D-18.
[8] North Carolina Department of Environmental Quality, Division of Air Quality, "North Carolina Greenhouse Gas Inventory, DRAFT (1990-2030), October 2018.
[9] EPA, What Climate Change Means for North Carolina, supra note 150.

roadbed of U.S. Highway 64 across the Albemarle-Pamlico Peninsula by four feet, which includes 18 inches to account for sea level rise.[10]

North Carolina sits within a frequent hurricane path, making its coastal region especially vulnerable to hurricanes and inland flooding that has occurred with increased frequency/intensity in recent years. According to the 2014 National Climate Assessment report by the U.S. Global Change Research Program, the number of Category 4 and 5 hurricanes in the North Atlantic and the amount of rain falling in very heavy precipitation events have increased over recent decades, and further increases are projected. The report stated that the Southeast has been affected by more billion-dollar disasters than any other region. In 2016, Hurricane Matthew had devastating impacts on eastern North Carolina, killing at least 27 people and causing some $1.5 billion in damage from which the state is still recovering.[11] In 2018, Hurricane Florence recently caused 40 deaths and extensive flooding in North Carolina during a time when the state was still recovering from Matthew.[12, 13] Tropical Storm Michael hit North Carolina three weeks after Hurricane Florence, causing an additional 3 deaths and flooding in areas already flooded by Hurricane Florence.

With approximately 3,375 miles of shoreline and because of eastern North Carolina's low-lying topography, our State is particularly vulnerable to the effects of sea-level rise.[14] The North Carolina Coastal Resources Commission's Science Panel predicts sea levels will rise by 1.9 to 10.6 inches at different locations along North Carolina's coast by 2045.[15] The North Carolina Division of Emergency Management (NCEM) predicts that in the next century, 9 percent of the land area in the 20 coastal counties will experience inundation.[16] NCEM also predicts sea level rise could cause the regulatory floodplain to expand by 350 square miles, causing the loss of 5,000 buildings worth $923 million, and adding 24,000 buildings to the floodplain.[17] Another study predicts that 13 North Carolina communities will face chronic inundation from sea level rise by 2035 and that a further 36 communities will experience chronic inundation by 2100.[18]

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[10] U.S. Global Change Research Program, National Climate Assessment (2014), https://nca2014.globalchange.gov/report/regions/southeast.
[11] Federal Emergency Management Agency, Six Months Following Hurricane Matthew, Volunteers Work for North Carolina Progress (April 6, 2017), https://www.fema.gov/news-release/2017/04/06/six-months-following-hurricane-matthew-government-partners-volunteers-work.
[12] ABC 7, Hurricane Florence Death Toll Now at 39 in North Carolina (October 2, 2018), https://abc11.com/weather/hurricane-florence-death-toll-now-at-39-in-north-carolina/4244283/.
[13] The News and Observer, Florence did $13 billion in damage, Cooper estimates as NC braces for new hurricane, https://www.newsobserver.com/news/politics-government/article219788795.html.
[14] NOAA Office for Coastal Management, Shoreline Mileage of the United States, https://coast.noaa.gov/data/docs/states/shorelines.pdf.
[15] N.C. Coastal Resource Commission Science Panel, North Carolina Sea-Level Rise Assessment Report: 2015 Update to 2010 Report and 2012 Addendum (March 31, 2015), https://files.nc.gov/ncdeq/Coastal%20Management/documents/PDF/Science%20Panel/2015%20NC%20SLR%20Assessment-FINAL%20REPORT%20Jan%2028%202016.pdf.
[16] North Carolina Department of Public Safety, North Carolina Emergency Management Geospatial and Technology Management, North Carolina Sea Level Rise Impact Study: Final Study Report (June 2014).
[17] North Carolina Department of Public Safety, North Carolina Emergency Management Geospatial and Technology Management, North Carolina Sea Level Rise Impact Study: Final Study Report (June 2014).
[18] Union of Concerned Scientists, When Rising Seas Hit Home: Fact Sheet: North Carolina Faces Chronic Inundation (July 2017), https://www.ucsusa.org/sites/default/files/attach/2017/07/when-rising-seas-hit-home-northcarolina-fact-sheet.pdf.

Heat waves and extended droughts caused by climate change can make a forest more prone to wildfires, creating another major risk to North Carolinians' health.[19] Between October and November of 2016, 30 fires, including some set by arson, scorched 80,000 acres in drought-stricken western North Carolina counties. The smoke produced by the worst rash of fires on record in North Carolina carried particle pollution that reached dangerous levels. State air quality officials detected 24 instances of code orange air quality conditions during the fires, 11 instances of code red, 2 in code purple and 2 in code maroon. State firefighting costs were estimated to be over $50 million. More frequent and severe fires are linked to climate change, and their effects on this vital part of North Carolina's economy must be recognized.

Climate change also harms North Carolina's agriculture sector, which is largely based in the eastern part of the state, and contributed $84 billion to North Carolina's economy in 2016.[20] Increasingly severe droughts cause crop failures, and higher temperatures reduce livestock productivity.[21] Saltwater intrusion from sea level rise can make soils too salty for native plants to grow, impacting crop yields.[22] North Carolina's forestry industry would suffer similar impacts from saltwater intrusion, and increasingly severe and frequent hurricanes would damage North Carolina's forestlands. One study in North Carolina predicted that forest damages rise by $500 million for every increase in category level of hurricane.[23]

North Carolina's tourism industry, which generated $22.9 billion in visitor spending in 2016, is also at risk.[24] Tourism is threatened by loss of beach areas due to sea level rise and decrease in demand for coastal travel due to unpredictable weather patterns.[25] The lost recreation value due to climate change-induced sea-level rise to local beach-goers is projected to be $93 million a year by 2030 and $223 million a year by 2080 for the southern North Carolina beaches. Furthermore, annual spending by non-local North Carolina residents on beach trips is estimated to drop by 16 percent by 2030 and by 48 percent by 2080.[26]

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[19] NC Department of Health and Human Services, Division of Public Health, North Carolina Climate and Health Profile (March 2015), http://epi.publichealth.nc.gov/oee/climate/ClimateAndHealthProfile.pdf.

[20] Brian Long, Today's Topic: Economic impact of NC agriculture, agribusiness increases to $84 billion, In the Field, N.C. Dep't of Agriculture and Consumer Services (June 7, 2016), http://info.ncagr.gov/blog/2016/06/07/todays-topic-economic-impact-of-nc-agriculture-agribusiness-increases-to-84-billion/

[21] EPA, What Climate Change Means for North Carolina (August 2016), available at https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-nc.pdf.

[22] N.C. Department of Environmental Quality, Division of Coastal Management, Sea Level Rise, https://deq.nc.gov/about/divisions/coastal-management/coastal-management-hot-topics/sea-level-rise (last visited Jan. 4, 2018).

[23] University of Maryland, Center for Integrative Environmental Research, Economic Impacts of Climate Change on North Carolina (Sept. 2008), available at http://cier.umd.edu/climateadaptation/North%20Carolina%20Economic%20Impacts%20of%20Climate%20Change%20Full%20Report.pdf.

[24] North Carolina Tourism Generates Record Employment and Visitor Spending in 2016, Economic Development Partnership of North Carolina (May 8, 2017), https://edpnc.com/north-carolina-tourism-generates-record-employment-visitor-spending-2016/.

[25] University of Maryland, Economic Impacts of Climate Change on North Carolina, supra note 15.

[26] Impacts of Global Warming on North Carolina's Coastal Economy, a joint study by Department of Economics, East Carolina University, Department of Economics and Finance, University of North Carolina at Wilmington, Duke University, Nicholas School of the Environment, and Department of Economics, Appalachian State University, Boone, NC, http://bipartisanpolicy.org/wp-content/uploads/sites/default/files/NC%20Climate_0.pdf.

Finally, climate change harms North Carolina's tremendous ecological resources, such as its coastal estuaries. North Carolina's coastal estuaries perform essential functions, including filtering pollutants and supporting fisheries.[27] Disruption of these important resources from storm damage and salt water intrusion negatively impacts fisheries and depletes water quality.

III. Impacts to Commitments and Reductions Under Current State Implementation Plans

The Agencies' analysis in the proposed rule, DEIS, and Preliminary Regulatory Impact Analysis (PRIA) fails to acknowledge and address the air quality impacts associated with setting aside the baseline (no-action) alternative. The impact of relaxing the fuel economy standards is especially significant with respect to state and local agency obligations to keep current SIPs for ozone and particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers (PM2.5) maintenance and nonattainment areas under Part A, Section 110 of the Clean Air Act (CAA).

The North Carolina Department of Environmental Quality (NCDEQ) requests that the Agencies take the time to perform the technical analyses needed to:

- Quantify the emissions impact of the proposed alternatives relative to the baseline alternative using EPA methods states are required to follow in developing federally approved SIPs;
- Perform air quality modeling to evaluate the impacts of changes to emissions on all ozone and PM2.5 nonattainment/maintenance areas;
- Quantify the resource impacts on state and local agencies associated with revising their SIPs to incorporate the revised standards into the baseline emissions inventory and motor vehicle emission budgets (MVEBs); and
- For areas predicted to exceed the ozone and/or PM2.5 standards, evaluate the economic impacts associated with reclassifying areas from maintenance to nonattainment and the consequences of missing CAA deadlines for attaining the standards.

Once the Agencies have completed these analyses, NCDEQ requests that the results be released for public review and comment and that these comments be thoughtfully addressed by the Agencies before finalizing the rule.

A. SIP Deficiency and Impact on Agency Resources

Relaxing a core federal emissions control program included in a SIP (such as the current (2017-2021) and augural (2022-2025) CAFE standards) could trigger an obligation for States to revise their SIPs.

Indeed, many states' SIPs, including North Carolina's, incorporate the emissions reductions projected to occur as a result of the vehicle emissions standards the Agencies' now seek to roll back. Revising SIPs to address the Agencies' rollback of vehicle emissions standards would be a labor-intensive and time-consuming process. First, Motor Vehicle Emissions Simulator

[27] *N.C. Department of Environmental Quality, Sea Level Rise, supra note 151.*

(MOVES) modeling would need to incorporate changes to the fleet size, fleet age distribution, fleet mix of vehicle types, VMT by vehicle type, and VMT growth rates to reflect the relaxed CAFE standards. An increase in oxides of nitrogen (NOx) or volatile organic compound (VOC) emissions might require the state to prepare a CAA Section 110(l) noninterference demonstration to show that the emissions increases would not interfere with on-going attainment and maintenance of the national ambient air quality standards (NAAQS). If an area is designated nonattainment, the state may be required to identify offsetting emissions reductions from other emissions sources and adopt emissions control measures to ensure that the offsetting emission reductions are enforceable. The state air quality agency might also need to develop new motor vehicle emissions budgets through a consultation process with its federal, state, and local transportation and air quality partners.

If the SIP is revised and the Section 110(l) noninterference demonstration is developed, states would need to provide the public the opportunity to comment on these items and address any comments received prior to submitting the final SIP revision package to EPA for review and approval. EPA would also then need to provide the public with the opportunity to comment on the SIP revision and noninterference demonstration. Based on NCDEQ's experience, it can take up to two years to complete all requirements for preparing a final SIP revision submittal to EPA without involving revisions to any rules. If NCDEQ needed to adopt a new rule or revise existing rules to offset any increase in emissions, this would add six to twelve months to the schedule. Then, EPA has up to 18 months to act on a SIP revision. Thus, the overall process can take upwards of three years to complete.

NCDEQ has included the current and augural CAFE standards in its projection-year modeling for Charlotte maintenance area for the 1997 and 2008 8-hour ozone standards. It would be a significant burden on NCDEQ to revise these SIPs. NCDEQ estimates one to two full-time-equivalent staff positions for completing the SIP revision for submittal to EPA, which is a significant burden on our air agency. NCDEQ requests that the Agencies evaluate the impact of the rulemaking on state and local air agency resources.

B. Offsetting Emission Increases if an Area Violates a NAAQS

The NCDEQ is also concerned that relaxing the CAFE standards would cause the Charlotte maintenance area to exceed the current 2015 8-hour ozone NAAQS and place the area into nonattainment status. The increase in emissions would have a deleterious effect on public health. If the area were to slip into nonattainment, this would have severe consequences for the area economically as well. The Charlotte area has made significant strides in complying with the ozone NAAQS. However, its current design value (based on monitoring data for 2015-2017) is 70 parts per billion. During the 2018 ozone season, the area exceeded the standard three times; had it exceeded the standard a fourth time it would have become a nonattainment area. The Charlotte area cannot afford significant increases in NOx emissions associated with the relaxation of the CAFE standards.

Although the DEIS predicts that NOx and VOC emissions for the Charlotte maintenance area will decline under the preferred alternative relative to the baseline CAFE standards, NCDEQ believes that modeling is flawed. NCDEQ's analysis indicates that in fact NOx and VOC

emissions will increase under the preferred alternative (see section II.D.5 below for additional details).

Should the Charlotte area exceed the 2015 ozone standard and be designated nonattainment, the NCDEQ would have to include in the SIP enforceable control measures to offset the emissions increases and demonstrate that future-year emissions would remain below base year emissions levels. NCDEQ knows from experience that it is very difficult to find additional NOx emissions reductions in the Charlotte area because the majority of emissions are associated with onroad vehicles—the emissions of which North Carolina has no authority to control. NCDEQ must rely on federal controls such as the current and augural CAFE standards to maintain compliance with the ozone NAAQS while providing for economic growth in the area.

IV. NHTSA Modeling Analysis

A. Energy Conservation - Annual Energy Outlook (AEO) Forecast

Under Energy Policy and Conservation Act of 1975 (EPCA) of 1975, as amended by the Energy Independence and Security Act (EISA) of 2007, NHTSA is required to set maximum feasible passenger car and light-duty truck CAFE standards for every model year. When deciding maximum feasible average fuel economy, NHTSA must consider "technological feasibility, economic practicability, the effect of other motor vehicle standards on fuel economy, and the need of the nation to conserve energy. "The need of the United States to conserve energy," specifically, means "the consumer cost, national balance of payments, environmental, and foreign policy implications of our need for large quantities of petroleum, especially imported petroleum."[28]

Section 3.1 of the PRIA and Section 3.3 of the DEIS provide discussions of NHTSA's analysis of the need for the U.S. to conserve energy. This analysis relies on energy projections from the Energy Information Administration's (EIA) AEO. As outlined in the following two subsections, there are two major problems with their analysis.

1. Analysis Reflects Impacts of Model Year 2021-2025 CAFE Standards

The DEIS relies on the CAFE model's projections of energy consumption and supply, which are based on forecasts from the most recent (2018) AEO.[29] Based on these AEO projections, "NHTSA tentatively concludes that the need of the U.S. to conserve energy may no longer function as assumed in previous considerations of what CAFE standards would be maximum feasible."[30] However, NHTSA admits that the AEO forecast assumes fleet-wide compliance with the current (Alternative (0)) CAFE standards (as well as EPA's existing GHG standards for model years through 2025): "the forecast decline in energy use by passenger cars and light trucks reflects the impacts under the No Action Alternative."[31] NHTSA further concedes that

[28] 42 Fed. Reg. 63184, at 63188 (Dec. 15, 1977).
[29] NHTSA, DEIS, pg. 2-18.
[30] 83 Fed Reg. 42986, at 43216 (August 24, 2018).
[31] NHTSA, DEIS, pg. 3-8.

"fuel economy improvements required by previously promulgated CAFE standards for passenger cars and light trucks have had a **substantial impact** on the forecast extent of U.S. dependence on petroleum imports."[32] NHTSA acknowledges U.S. dependence on foreign oil is decreasing because of the current standards, and then relies on that reduced dependence to relax the current standards. This makes no sense; NHTSA must perform its analysis without this obviously inappropriate assumption.

2. Analysis Reflects Use of Unrepresentative Data

In Section 3.1 of the PRIA, a table is included that displays EIA historical and forecast data on the production and net imports of petroleum and other liquids. These data are used to support their assertion that "the United States has significantly increased oil production capabilities in recent years, to the extent that the U.S. is currently producing enough oil to satisfy nearly all of its energy needs and is projected to continue to do so, or become a net energy exporter. This has added new stable supply to the global oil market and reduced the urgency of the U.S. to conserve energy."[33] Table 1 presents key production and net import data from this table in the PRIA. Based on these data, the Agencies conclude that "the U.S. is projected to become a net exporter of petroleum and petroleum products by 2030."[34]

Table 1. NHTSA Representation of U.S. Petroleum Production and Supply (million barrels/day)

Year	Domestic Petroleum and Other Liquids Production	Net Imports of Petroleum and Other Liquids	U.S. Consumption of Petroleum and Other Liquids	Net Imports as a Share of U.S. Consumption
1975	10.0	5.8	16.3	35.8%
1985	10.6	4.3	15.7	27.3%
1995	8.3	7.9	17.7	44.5%
2005	6.9	12.5	20.8	60.3%
2015	12.8	4.7	19.5	24.1%
2016	12.4	4.8	19.7	24.4%
2017	13.1	4.2	19.9	21.1%
2020	17.9	2.3	20.3	11.5%
2025	18.9	0.7	19.7	3.4%
2030	19.4	-0.2	19.2	-0.9%
2035	19.7	-0.6	19.1	-3.2%

Source: PRIA, Table 3-1.

With respect to the need for CAFE standards, Table 1 provides a valuable measure for domestic versus import fuel sources to the extent that these data characterize our nation's use of foreign oil to produce fuel for passenger vehicles. The EIA defines "petroleum and other liquids" as "all petroleum including crude oil and products of petroleum refining, natural gas liquids, biofuels,

[32] Ibid. They further elaborate that "The EPA greenhouse gas emissions standards and NHTSA CAFE standards in the 2018 AEO forecast (and, thus, the No Action Alternative) result in a 63.6 percent forecast increase from 2016 to 2040 in the average miles per gallon achieved by all passenger cars and light trucks in use, as older, less efficient vehicles are replaced by more efficient vehicles."
[33] NHTSA/EPA, PRIA, page 111.
[34] Ibid.

and liquids derived from other hydrocarbon sources (including coal-to-liquids and gas-to-liquids)." Because "other liquids" include large quantities of products consumed in other sectors of the economy, their inclusion may be inappropriate for analyses meant to target petroleum used to produce passenger vehicle fuels. For example, the two major natural gas plant liquids (NGPLs) produced in the U.S. -- ethane and propane (accounting for more than two-thirds of all production) are not used to produce gasoline or diesel fuel, while other NGPLs that offer such uses account for only about one-quarter of NGPL production.[35] With respect to the forecast period, the EIA states that "in the Reference case, NGPL production nearly doubles between 2017 and 2050, supported by an increase in global petrochemical industry demand." Figure 1 shows that a huge majority of the historical and projected increase in NGPL is from ethane and propane, which are not used to produce passenger vehicle fuel. As indicated in Figure 2, AEO's Reference Case projects a significant decrease in U.S. liquids consumption, at the same time that it forecasts a large increase in exports. These figures demonstrate a large increase in net imports for NGPL unrelated to petroleum used in the passenger vehicle market. All of this extraneous information obscures what is happening with petroleum supplied for the passenger fuel market. It needn't be this way. As we described in the following, NCDEQ has compiled data from official federal government sources, which better characterize the role of relevant foreign oil imports in the United States.

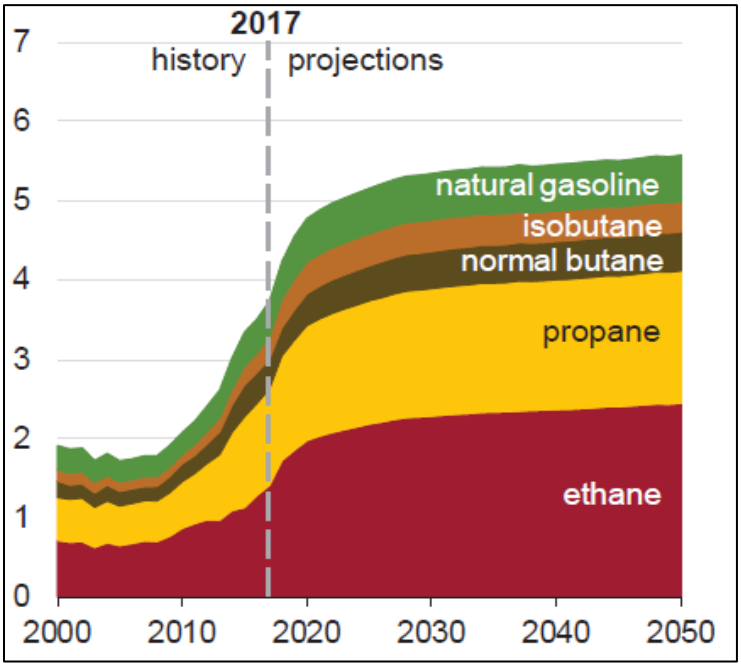

Figure 1. Production of Natural Gas Plant Liquids in U.S. by Product (million barrels/day)

[35] From EIA, AEO 2018 (https://www.eia.gov/outlooks/aeo/pdf/AEO2018.pdf): "Ethane is used almost exclusively for petrochemicals, while approximately 40% of propane is used for petrochemicals, and the remainder is used for heating, grain drying, and transportation. Approximately 60% of butanes and natural gasoline is used for blending with motor gasoline and fuel ethanol, and the remainder is used for petrochemicals and solvents."

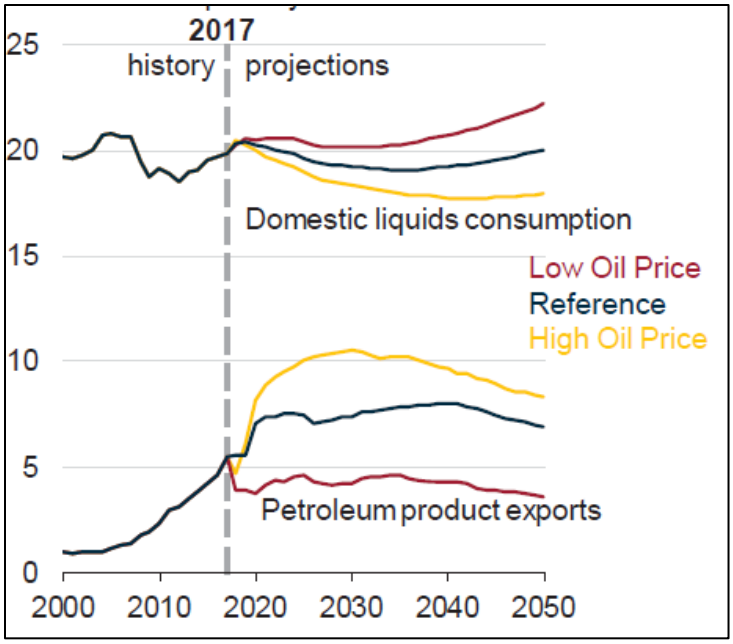

Figure 2. U.S. Liquids Consumption and Exports (million barrels/day)

As compiled from AEO 2018, Table 2 displays a comparison of projected U.S. total crude oil supply and exports. These forecasts are more relevant to assessing the need for U.S. energy conservation in the context of the CAFE program.[36] This table, which also displays analogous data for "petroleum and other liquids", demonstrates the huge disparity between the proportion of total crude oil supply that is forecast to be exported (7 percent in 2035) and the total petroleum and other liquids supply that is forecast to be exported (48 percent in 2035).

Table 2. Total U.S. Supply and Exports of Crude Oil and Total Petroleum and Other Liquids (million barrels/day)

Year	U.S. Total Crude Oil Supply	U.S. Exports of Crude Oil	% of Total Crude Oil Supply Exported	U.S. Total Petroleum and Other Liquids Supply	U.S. Exports of Petroleum and Other Liquids	% of Total Petroleum and Other Liquids Supply Exported
2017	16.42	0.97	5.9%	20.03	5.49	32.3%
2020	17.76	0.75	4.2%	20.22	7.79	38.5%
2025	17.46	0.93	5.3%	19.64	8.39	42.7%
2030	17.14	1.15	6.7%	19.21	8.59	44.7%
2035	17.43	1.24	7.1%	19.04	9.13	48.0%

Sources: AEO 2018 Table 11.

Table 3 characterizes crude oil production, consumption, and net imports in the U.S. for select historical/forecast years compiled from EIA sources. This table indicates that EIA expects a drop in net imports of crude oil, but this drop is very small compared to the projected drop in

[36] Further evidence of their relevancy is that the Strategic Petroleum Reserve, which was founded by the 1975 EPCA to support our country's energy security, stores only crude oil.

petroleum and other liquids, which results in U.S. net exports by 2030. This information shows that EIA is projecting that more than a third of all crude oil consumed in the U.S. will be from foreign sources throughout the forecast period.

Table 3. U.S. Crude Oil Production and Consumption (million barrels/day)

Year	U.S. Crude Oil Production	Net Imports of Crude Oil	U.S. Consumption of Crude Oil	Net Imports as a Share of U.S. Consumption
1975	8.4	4.1	12.5	32.8%
1985	9.0	3.2	12.0	26.7%
1995	6.6	7.1	13.7	51.8%
2005	5.2	10.1	15.3	66.0%
2015	9.4	6.9	16.3	42.3%
2016	9.8	7.3	16.1	45.3%
2017	9.4	6.8	16.2	42.0%
2020	10.0	6.4	17.0	37.6%
2025	11.4	6.0	16.5	36.4%
2030	11.7	5.4	16.0	33.8%
2035	11.9	5.6	16.2	34.6%

Sources: EIA historical data from https://www.eia.gov/dnav/pet/pet_sum_crdsnd_k_a.htm; EIA forecast data from AEO 2018, Table 11.

Table 4 summarizes a comparison of the EIA forecasts selected by the Agencies in the PRIA (based on "petroleum and other liquids" data) and those selected by the NCDEQ as better characterizing our country's use of foreign petroleum (based on crude oil data).

Table 4. Comparison of 2035 Petroleum Forecasts Relative to 2017: PRIA versus DEQ

Forecast Component	PRIA Table	NCDEQ Table
U.S. Petroleum Production	50% increase	27% increase
U.S. Petroleum Exports as Share of U.S. Production	48% increase	7% increase
U.S. Petroleum Net Imports as Share of U.S. Consumption	Shift from net importer to net exporter status by 2030	35% decrease

Further contradicting the assertions in the PRIA that the U.S. will be "producing enough oil to satisfy nearly all of its energy needs" is a set of AEO 2018 forecast expenditures for imported crude oil and petroleum products. The AEO 2018 projects these expenditures to nearly double in constant dollar terms over the analysis period: from a 2017 baseline value of $123.5 billion (in 2017 dollars) to $232.94 billion in 2035 (also in 2017 dollars).[37]

The analyses provided in the DEIS and PRIA to support NHTSA's review of the need to conserve fuel are deeply flawed. When these analyses are replaced with more valid data, there is no support for NHTSA's conclusion that "the U.S. is currently producing enough oil to satisfy nearly all of its energy needs and is projected to continue to do so." As demonstrated by the official government energy forecasting entity (EIA), even under the assumption that the current

[37] AEO 2018, Table 11. Note also that these expenditures continue to increase throughout the AEO forecast period, which ends in 2050.

standards are not rolled-back, the nation is projected to consume about the same level of crude oil throughout the forecast analysis period, and that more than a third of all oil supplied will be obtained via imports from foreign sources. These findings clearly demonstrate the continued need for the nation to conserve energy as required under EPCA/EISA.

B. Vehicle Sales Assumptions

With regards to the LDV sales projections incorporated into the DEIS, NCDEQ has multiple concerns. First, the DEIS provides insufficient information to assess the validity of the modeling for the number of new vehicle sales in each analysis year. Second, there are significant questions raised related to the specification of the vehicle sales estimation model with respect to inclusion of vehicle transaction price as an explanatory variable, to the exclusion of all other vehicle attributes, including the one that is the target of this regulation--vehicle fuel efficiency. Finally, NCDEQ's analysis of the estimated vehicle sales projections with actual historical values, and comparison of these projections to sales forecasts developed by the EIA, raises serious questions about the ability of this new model to accurately forecast vehicle sales.

1. The Agencies Have Failed to Provide Necessary Information to Evaluate the Validity of Vehicle Sales Modeling

Section 8.6.2 of the PRIA discusses how NHTSA estimated new vehicle sales. This section focuses on the equation that is used to project new vehicle sales on a quarterly basis using the following information:

- Vehicle sales in the previous quarter;
- Vehicle sales in the quarter before the previous quarter;
- Growth in gross domestic product;
- Labor force participation rate;
- Labor force participation rate in the previous quarter; and
- Change in new vehicle transaction price.

Although the PRIA is generally clear as to the coefficients included in this new vehicle sales equation, it is silent on the source for the input values that were used to forecast sales.[38] The NCDEQ identified a vehicle sales forecast equation in NHTSA's July 2018 draft documentation of their CAFE model. Section S5.4 of this report provides a similar equation for estimating vehicle sales. Unlike the equation specified in the PRIA, however, this equation includes a <u>lagged</u> price variable – representing the average price increase from the model year prior vehicle relative to a vehicle from two model years earlier. In addition, the coefficients for two of the parameters are of different signs as summarized in Table 5. Of particular note -- the price change variable actually has a <u>positive</u> coefficient in the CAFE model (albeit this price change

[38] The NCDEQ identified gross domestic product and labor force participation values by year in the "Economic Values" worksheet of a CAFE model input parameters file cited in NHTSA's draft CAFE model documentation report. However, the documentation does not specifically state that these inputs are used in the vehicle sales estimation model, and provides no information as to their source (per page 144 of the CAFE model documentation: "The Economic Values worksheet contains an estimate of the magnitude of the "rebound effect", as well as the rates used to compute the economic value of various direct and indirect impacts of CAFE and CO_2 standards, and the discount rate to apply when calculating present value of benefits.")

variable is lagged in the CAFE model). Given the contradictions in this information, the NCDEQ concludes that the available information is insufficient for properly evaluating the vehicle sales model and is not a credible basis to support relaxing the existing CAFE and CO_2 standards.

Table 5. Comparison of Coefficients in Vehicle Sales Models: PRIA and CAFE Model Documentation

Parameter	Coefficient in PRIA	Coefficient in CAFE Documentation
Intercept	0.4145	0.5090738477
Previous Model Year Industry Sales	0.6116	0.6117051252
Two Model Years Previous Industry Sales	0.2068	0.2047812576
Gross Domestic Product	0.1435	0.1488134968
Current Model Year Labor Force Participation	0.00033	0.0002292395
Previous Model Year Labor Force Participation	-0.00316	0.0002292395
Price Increase Between Vehicle from Two Model Years Previous and One Model Year Previous*	-0.00017	0.0001719814

* The price change variable is described as the change in current model year vehicle price in the PRIA.

2. Identification of Variables Included in Vehicle Sales Estimation Model

NCDEQ believes that it is likely that the vehicle sales estimation model is improperly specified with respect to new vehicle attributes. As part of interagency review of NHTSA's draft vehicle sales projections, EPA commented on including only vehicle fixed costs in estimating the effects of the augural standards on new vehicle sales:

> "On the one hand, the standards reduce operating costs; all else equal, that change should make new vehicles more attractive and increase sales. On the other hand, the standards increase technology costs; all else equal, that change should discourage new vehicle sales. Which effect dominates has been subject of a great deal of controversy. A key variable is the role of fuel economy in consumer purchases, measured either in payback period (the number of years of fuel savings that people consider when buying a new vehicle) or discount rate (how people discount the lifetime of future fuel savings). EPA has reviewed this literature, as has the National Academy of Sciences; in both cases, the finding was a very wide range, and no consensus, in the literature."

In the PRIA, NHTSA itself acknowledged the problematic nature of modeling the effects of price changes and other vehicle attributes on sales:

> "Developing a procedure to predict the effects of changes in prices and attributes of new vehicles is complicated by the fact that their sales are highly pro-cyclical – that is, they are very sensitive to changes in macroeconomic conditions – and also statistically "noisy," because they reflect the transient effects of other factors such as consumers' confidence in the future, which can be difficult to observe and measure accurately. At the same time, their average sales price tends to move in parallel with changes in economic growth; that is, average new vehicle prices tend to be higher when the total number of new vehicles sold is increasing and lower when the total number of new sales decreases (typically during periods of low economic growth or recessions).

> The historical series of new LDV sales exhibits cyclic behavior over time that is most responsive to larger cycles in the macro economy. And although average transaction prices for new vehicles have been rising steadily since the recession ended, prices are not yet at historical highs when adjusted for inflation. The period of highest inflation-adjusted transaction prices occurred from 1996-2006, when the average transaction price for a new LDV was consistently higher than the price in 2015.
>
> Estimating the sales response to changes in average prices at the level of total new vehicle sales likely fails to address valid concerns about changes to the quality or attributes of new vehicles sold – both over time and in response to price increases resulting from CAFE standards. However, attempts to address such concerns would require significant additional data, new statistical approaches, and structural changes to the CAFE model over several years."

Table 6 displays annual LDV sales in the U.S. since 1980 with the years identified in the PRIA with the highest transaction prices shaded in grey. Despite these high prices, these years have many of the highest number of vehicle sales in the last 40 years. These data, in concert with the above statements, raise further questions about the validity of sales modeling that includes transaction price as the only vehicle characteristic that affects sales. NCDEQ does not think this model is an appropriate basis for this rule change.[39]

Table 6. U.S. Light-Duty Vehicle Sales: 1980-2017

Year	Vehicle Sales	Year	Vehicle Sales	Year	Vehicle Sales	Year	Vehicle Sales
1980	11,469	1990	14,137	2000	17,812	2010	11,773
1981	10,790	1991	12,530	2001	17,473	2011	13,048
1982	10,542	1992	13,107	2002	17,138	2012	14,779
1983	12,296	1993	14,186	2003	16,967	2013	15,883
1984	14,483	1994	15,398	2004	17,299	2014	16,860
1985	15,720	1995	15,117	2005	17,445	2015	17,846
1986	16,318	1996	15,456	2006	17,049	2016	17,866
1987	15,162	1997	15,498	2007	16,460	2017	17,551
1988	15,778	1998	15,967	2008	13,493		
1989	14,833	1999	17,415	2009	10,602		

Source: Bureau of Economic Analysis.

[39] NCDEQ also wants to highlight that the PRIA includes a measure of the purchase's partial valuation of fuel economy in other aspects of their impact analysis. PRIA, pg. 502: "Manufacturers have repeatedly indicated to the agencies that new vehicle buyers are only willing to pay for fuel economy-improving technology if it pays back within the first 2-3 years of vehicle ownership. NHTSA has therefore incorporated this assumption (of willingness to pay for technology that pays back within 30 months) into today's analysis." NCDEQ notes that we do not agree that this measure fully reflects how consumers value future fuel savings or the co-benefits of fuel-efficient/zero emission vehicles.

3. Comparison of NHTSA Vehicle Sales Projections with Historical Record and EIA Forecasts

The NCDEQ compared vehicle sales projections to both the available historical record and to forecasts developed by the EIA. Each year the EIA develops vehicles sales projections in support of the AEO. The current set of AEO projections, which were released in February of this year, include the effects of the current standards in their Reference Case. As a Side Case, EIA also developed vehicle sales projections that assume that the joint CAFE/GHG emissions standards are not increased beyond those effective in model year 2021 for LDVs.[40] In this Side Case, the CAFE/GHG emissions standards are held constant at model year 2021 levels through model year 2050, although the fuel economy of new LDVs continues to rise modestly over time as a result of economic, consumer, and other factors. While this Side Case does not exactly match the preferred Safer Affordable Fuel-Efficient (SAFE) rule alternative, it should be viewed as a valuable point of comparison.

Table 7 presents a comparison of the actual historical LDV sales in 2016 and 2017 versus those projected in the AEO 2018 and the PRIA. This table clearly shows that the AEO 2018 projections are in-line both in magnitude and direction with the historical record, while the PRIA projections are not.

Table 7. Comparison of Light-Duty Vehicle Sales Estimates in Historical Period (values in thousands)

Year	Actual*	AEO 2018 Reference Case	PRIA
2016	17,866	17,465	16,339
2017	17,551	17,090	16,833

* Source: Bureau of Economic Analysis.

Table 8 displays comparisons of the projected vehicle sales under the current standards in the AEO 2018 and the PRIA over the 2018-2032 period.[41] This table shows the PRIA estimates significantly more new vehicle sales than the AEO 2018 in each year. In cumulative, over the 2018-2032 period, the PRIA projects an additional **9 million** new vehicle sales under the current standards. The NCDEQ was unable to perform a review of the analytic assumptions and modeling techniques reflected in the AEO 2018 projections, but it has no reason to doubt their accuracy, especially since, as shown above, it has been much closer to predicting reality than the PRIA. Therefore, the inability of the PRIA to accurately model vehicle sales in the historical period, and the large discrepancy in their projections relative to those developed by the EIA, casts doubt on the validity of the vehicle sales projections incorporated in the DEIS.

[40] NCDEQ notes that this case also assumes that efficiency standards for residential and commercial major end-use equipment are not increased in 2018, but we assume that this assumption has no effect on LDV sales.
[41] The NCDEQ notes that this comparison ends in 2032 because we were able to only find new vehicles sales data up through 2032 in the SAFE vehicle regulatory record (AEO 2018 provides vehicle sales forecasts through 2050).

Table 8. Comparison of Light-Duty Vehicle Sales Estimates in Forecast Period (values in thousands)

Year	PRIA	AEO 2018 Reference Case	Additional Sales in PRIA
2018	17,195	17,089	106
2019	17,484	17,060	424
2020	17,657	16,991	666
2021	17,745	16,598	1,146
2022	17,766	16,623	1,143
2023	17,751	16,760	991
2024	17,747	16,805	941
2025	17,744	16,878	866
2026	17,762	17,033	729
2027	17,768	17,110	657
2028	17,835	17,252	583
2029	17,883	17,303	580
2030	17,906	17,410	496
2031	17,963	17,470	493
2032	18,024	17,417	606
Cumulative	**299,400**	**290,354**	**9,046**

The NCDEQ compared the AEO 2018 new vehicle sales projections under the Reference Case (including current standards) and a Side Case that holds CAFE/GHG LDV emission standards at model year 2021 levels (while allowing modest rises in fuel economy due to economic/consumer factors). While this Side Case does not exactly match the preferred SAFE Vehicle Rule alternative, it provides a reasonable point of comparison. Although there are some years where the number of vehicles sold is higher under the Side Case than with the current standards in place, the EIA projects about 209 thousand **more** vehicles sold between 2018 and 2032 under the current standards than the Side Case. This provides further evidence undermining NHTSA's forecast of more than 1 million new additional vehicles sold between these years under the preferred Alternative (0) relative to the current standards.

C. Vehicle Scrappage Assumptions

Along with predicting new vehicle sales, the CAFE model calculates vehicle scrappage rates, which predict the rate at which cars are removed from the fleet due to collisions, damage, end of useful life, etc. Scrappage estimates are combined with sales estimates to predict the numbers and ages of LDVs in the national fleet in future years. These fleet data are then used to estimate future environmental and vehicle fatality impacts. The NCDEQ finds fundamental problems with the structure of the vehicle scrappage model. The modeling is contrary to basic economic theory, and appears to have been built to support the implausible outcome that the existing standards will (1) raise new vehicle prices, which will (2) substantially decrease new vehicle sales, yet (3) substantially increase the total vehicle fleet. Used vehicles are produced from new vehicles, and if there are fewer new vehicles, there will be fewer used vehicles in the long run.

All logic points to a larger total vehicle fleet under a rollback, not the smaller fleet NHTSA's vehicle scrappage model predicts.

As noted in the Notice of Proposed Rulemaking (NPRM), the Agencies project that for every new vehicle not sold under the existing/augural standards, there will be two-to-four old vehicles not scrapped, thereby creating a vehicle fleet that would be nine million vehicles larger under the existing/augural standards by 2035.[42] This projection defies common sense, is not supported by economic theory or the best available data. Indeed, Table 9 shows that the Agencies' modeling projects much higher fleet totals under the current/augural standards than are forecast in the latest (2018) AEO. Unlike NHTSA's scrappage model, the 2018 AEO produces results that are consistent with economic theory, and similar to elasticity values reported in the literature. Also unlike the scrappage model, AEO 2018 projects growth in the vehicle fleet that appears reasonable when compared to historical evidence, which shows that LDV fleet growth in the post-Great Recession period has averaged 1.5 million vehicles per year, and never exceeded growth of 4.8 million vehicles in any given year.[43]

Furthermore, when combined with the exaggerated price increases the Agencies assume will result from compliance with the existing/augural standards, the scrappage model produces a fleet that is significantly older than under the proposed standards. The net effect of these issues is that the agencies project that the existing/augural standards will result in a fleet that is both larger and older than that which is predicted by other government projections. This leads to overestimation of the predicted pollutant emissions and the subsequent air quality related environmental and health impacts for the augural standard. It also results in overestimation of fatality rates under the existing/augural standards. By overstating the negative effects of the current standards, the benefits of the proposed standard are unrealistically inflated. NCDEQ observes that the Agencies' estimates of the total LDV fleet (and associated VMT) are implausible, and are directly contrary to Office of Management and Budget (OMB) requirements that "benefits and costs reported in regulatory analyses must be defined and measured consistently with economic theory."

Table 9. Comparison of AEO 2018 versus SAFE Rule Estimates of Total Light-Duty Vehicle Fleet under Current/Augural Standards (million vehicles)

Year	AEO 2018	SAFE Rule	Difference
2017	242	234	-8
2018	244	240	-4
2019	245	245	0
2020	247	250	3
2021	248	256	8
2022	249	262	13
2023	250	269	19
2024	251	275	24

[42] 83 FR 43098, at 43099, August 24, 2018
[43] Bureau of Transportation Statistics, Table 1-11, https://www.bts.gov/content/number-us-aircraft-vehicles-vessels-and-other-conveyances, accessed October 2018.

Year	AEO 2018	SAFE Rule	Difference
2025	252	281	29
2026	253	287	34
2027	255	292	37
2028	256	297	41
2029	258	302	44
2030	259	306	47
2031	260	310	50
2032	262	313	51
2033	263	317	54
2034	264	320	56
2035	264	322	58
2036	265	325	60
2037	266	327	61
2038	267	329	62
2039	268	331	63
2040	269	332	63
2041	270	334	64
2042	272	335	63
2043	273	337	64
2044	274	339	65
2045	276	341	65
2046	278	343	65
2047	279	345	66
2048	281	347	66
2049	282	349	67
2050	284	352	68

D. Review of CAFE Model Vehicle Fleet and Emissions Data

The CAFE modeling completed for the proposed rulemaking and DEIS predicted national LDV fleet characteristics for the baseline alternative and each of the eight alternatives modeled and generated corresponding estimates of pollutant and GHG emissions. The fleet characteristics predicted include vehicle population (VPOP), VMT, vehicle fleet age, and fuel fractions (breakdown of fleet makeup by fuel type). The fleet characteristics for the augural and proposed CAFE standards were reviewed, along with the possible net impacts on emissions for Mecklenburg County, North Carolina, which is in a maintenance area for the 1997 and 2008 ozone NAAQS and is a representative urban area county in our state.

1. Vehicle Population

VPOP is an important input to the MOVES2014a model for estimating LDV emissions. The NCDEQ compared LDV VPOP data from three sources: VPOP calculated by the CAFE model, default VPOP data used in the MOVES2014a model, and actual VPOP data downloaded from the Bureau of Transportation Statistics (BTS). Only 2007-2017 LDV VPOP data are available from BTS. As shown in Figure 3, from 2000 through 2017, the MOVES2014a VPOP data matches well with the BTS data; however, VPOP estimates calculated from the CAFE model are significantly lower than the BTS and MOVES2014a data. The CAFE model and MOVES2014a data are very similar in 2020. However, after 2020, future VPOP projected by the CAFE model is significantly higher than the MOVES2014a model. The NCDEQ requests that the Agencies explain why the CAFE model fails to accurately represent historical VPOP data. In addition, the CAFE model's estimate of VPOP in future years is driven by new LDV sales and old LDV scrappage rates which, as previously discussed, is not supported by independent federal government source, the BEA.

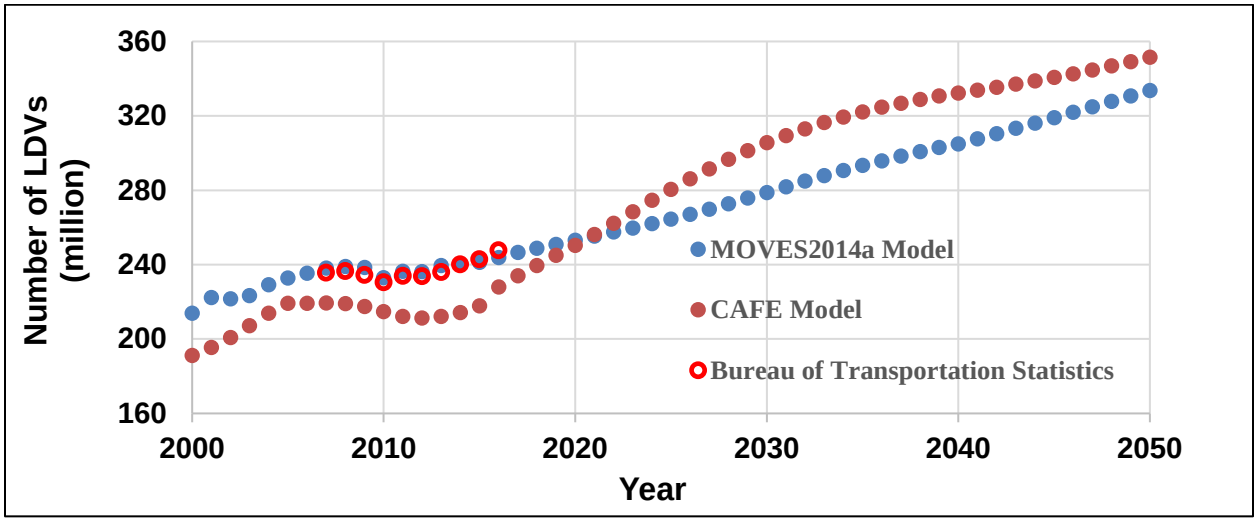

Figure 3. Vehicle population from CAFE model output[44]

2. Rebound Effect on VMT

As part of the modeling of the costs and benefits of the proposed rollback of 2021-2025 standards, the Agencies incorporated an estimate of the so-called "rebound effect." Economic theory and empirical research suggest that when consumers switch from a less energy-efficient product to a more energy-efficient product that satisfies the same consumer demand, they will increase their use of the product. In the context of this proposed rule, the "rebound effect" is the term used for how an increase in a vehicle's fuel economy results in increased VMT (or

[44] CAFE model data were downloaded from NHTSA's website, "2018 NPRM for Model Years 2021-2026 Passenger Cars and Light Trucks, Central Analysis," https://www.nhtsa.gov/corporate-average-fuel-economy/compliance-and-effects-modeling-system, MOVES database, and BTS data were downloaded from the BTS website, "Section 1.B - Vehicle, Aircraft, and Vessel Inventory, Table 1-11 - Number of U.S. Aircraft, Vehicles, Vessels, and Other Conveyances," https://www.bts.gov/topics/national-transportation-statistics.

alternatively, how a decrease in fuel economy will result in decreased VMT). In both 2012 and 2016, the Agencies' analysis of the literature led them to conclude that an estimate of 10 percent should be used to represent the rebound effect with respect to increasing fuel efficiency standards.[45] Put simply, this means that each 10 percent increase in fuel efficiency is expected to result in a 1 percent increase in VMT (and vice-versa). The Agencies now assert that the rebound effect is double the value they used just two years earlier (i.e., 20 percent). This new estimate ultimately drives much of the new analysis asserting that the current/augural standards will lead to substantial increases in emissions, fatalities, congestion, and other costs. NCDEQ questions the evidence in support of this much higher estimate.

This section describes our concerns with the approach that the Agencies used to support the 20 percent estimate of the rebound effect. In summary, unlike the work used to support the setting of fuel efficiency standards in 2012 and 2016, the Agencies are now using an "average" value calculated from studies of questionable methods and relevancy. This approach fails to appropriately weight the estimates to reflect their robustness, nor their applicability to the setting of future fuel efficiency standards in the U.S., and therefore, yields a rebound estimate of questionable utility for estimating the costs and benefits of such standards.

Use of Studies from Outside the U.S.

Of the 15 recent rebound effect estimates described in the proposed rule (cited in Table II-44 at 83 Federal Register (FR) 43101, August 24, 2018), six are based on studies that rely on data from outside the U.S.[46] Given that the EPA/NHTSA vehicle standards are specific to the U.S., a sensible approach would be to focus on those studies that examine the rebound effect in the U.S. rather than in other places. This is especially true given that these other places face very different market conditions (more compact land uses/more available substitutes to meet travel demand, and much higher fuel costs than in the U.S.) These conditions suggest that consumers in the U.S. would be less sensitive to changes in the relative cost of vehicle travel than consumers in these other places.

Use of Measured Data versus Survey Estimates

To measure the effect on VMT, some studies rely on household survey estimates, while others rely on actual odometer readings. The Agencies treat these two kinds of studies as equivalent. A proper analysis would have placed more import on studies that use data from odometer readings, which are inherently more accurate than self-reported estimates obtained from household surveys.

Use of Data from Single (and Unrepresentative) Year

Unlike multi-year studies, single-year studies have difficulty in controlling for factors that influence the rebound effect (i.e., they are limited by modeling the effects contributing to the effect in only one year). In addition, most of the recent single-year studies are based upon the 2009 National Household Travel Survey. The use of these data is particularly problematic because of the unique circumstances encountered in 2009, which included the effects of the

[45] See for example, EPA/NHTSA, 2016 Draft TAR, page 10-10.

[46] European Union: Anjovic and Haas (2012); Germany: Frondel and Vance (2013), Switzerland: Weber and Farsi (2014); Great Britain: Stapleton et al. (2016, 2017); Canada: Barla et al. (2009); and Denmark: DeBorger (2016).

Great Recession and huge fluctuations in fuel prices (from $3.30/gallon in March 2008 to $4.10 gallon in summer of 2008, followed by a decline to ~$1.70/gallon in early 2009).

By contrast the studies that analyze time-series data in the U.S. are more robust in terms of analyzing information over multiple price conditions for gasoline, over varied economic conditions, and over different vehicle fuel efficiency levels, and, are therefore more appropriate for setting future national vehicle standards. This literature has tended to show that the rebound effect has been decreasing over time as vehicle fuel economy has improved and that the rebound effect tends to decrease as income increases (because the cost of fuel becomes relatively less important).

Equal Weighting of Fuel Price and Fuel Efficiency Studies

Many of the studies that the Agencies cite in their analysis of the rebound effect reflect the estimation of the responsiveness of VMT changes to fuel price changes. There is a debate in the literature, however, with respect to whether consumers react the same way to a change in fuel economy as they do to a change in fuel price—even if, as a matter of economics, the net result is the same. The discrepancy has been attributed to the frequent reminders of the price of fuel when filling up the tank. Because the rebound effect has generally been shown to be smaller for changes in fuel economy than for changes in fuel prices, reliance on fuel price studies will tend to overstate the actual rebound effect for a change in fuel economy. The NCDEQ thus recommends that studies that measure driving response to changes in fuel economy, the variable of interest, should be weighted more heavily that studies that measure changes in fuel price.

These above concerns were all raised by EPA during interagency review of the draft proposed rule. In material transmitted via a June 2018 email, EPA recognized that not all studies are equal, and that simply averaging them was not a sensible way of determining the rebound effect when making policy.[47] Instead, EPA favored relying on studies that are based on data sets that are more recent, that are more national than local, that are multi-year rather than single year, and that are more reliable because they are based on objective odometer readings. EPA also specifically stated its preference for studies that avoid relying on NHTSA data collected in 2009 due to the unique circumstance posed by the Great Recession and asserted that the most recent, reliable studies "find a rebound effect lower than 20 percent." NHTSA provided no answer for why it continued to adhere to this approach despite these cogent criticisms from its partner agency in this process.

3. Vehicle Fleet Age

Figure 4 compares historical (1995-2016) national average fleet age for passenger cars (PC) and light trucks (LT) published by the BTS against the projected (2017-2050) average PC and LT fleet age calculated using the CAFE model for the baseline (Alt0) and preferred (Alt1) alternatives. The CAFE model projection yields a dramatically different average fleet age than any observed in recent history. For example, in 2015 and 2016, the average age of the national PC and LT fleet was about 11.5-11.6 years. However, in 2017, the CAFE model estimates the average fleet age for PCs and LTs will be about 8.5 and 9.7 years, respectively. The CAFE

[47] Email from Charmley, William to Chandana Achanta, Chad Whiteman, and Jim Laity, June 18, 2018, "Subject: Material for today's Light-duty GHG NPRM discussion," see pp. 27-31.

model predicts the average fleet age for PCs to peak in 2038 at 9.8 years under the baseline alternative and decline to 9.3 years in that year under the preferred alternative. For LTs, the CAFE model predicts the average fleet age to peak in 2050 at 10.0 years under the baseline alternative and decline to 9.8 years under the preferred alternative.

The CAFE model assumptions clearly do not match the real world. The CAFE model results are driven by the assumption that consumers will replace older PCs and LTs with new vehicles at a much higher rate than has historically occurred. In addition, because of the high fleet turnover rate assumptions used in the model, in the same calendar year, older (and "dirtier") cars will generate a higher fraction of VMT under the baseline alternative relative to the preferred alternative. This high VMT turnover rate results in significantly understating baseline criteria air pollutant emissions. The questionable assumption of a lower vehicle age under the preferred alternative further exacerbates this phenomenon.

NCDEQ disagrees with the Agencies' modeling assumptions for both the baseline and preferred alternative. The Agencies assume that these behaviors will drastically change in ways unsupported by historical evidence. This is an unrealistic assumption and the NCDEQ requests that the Agencies reconsider its proposal after it has had a chance to evaluate it on the basis of more accurate modeling.

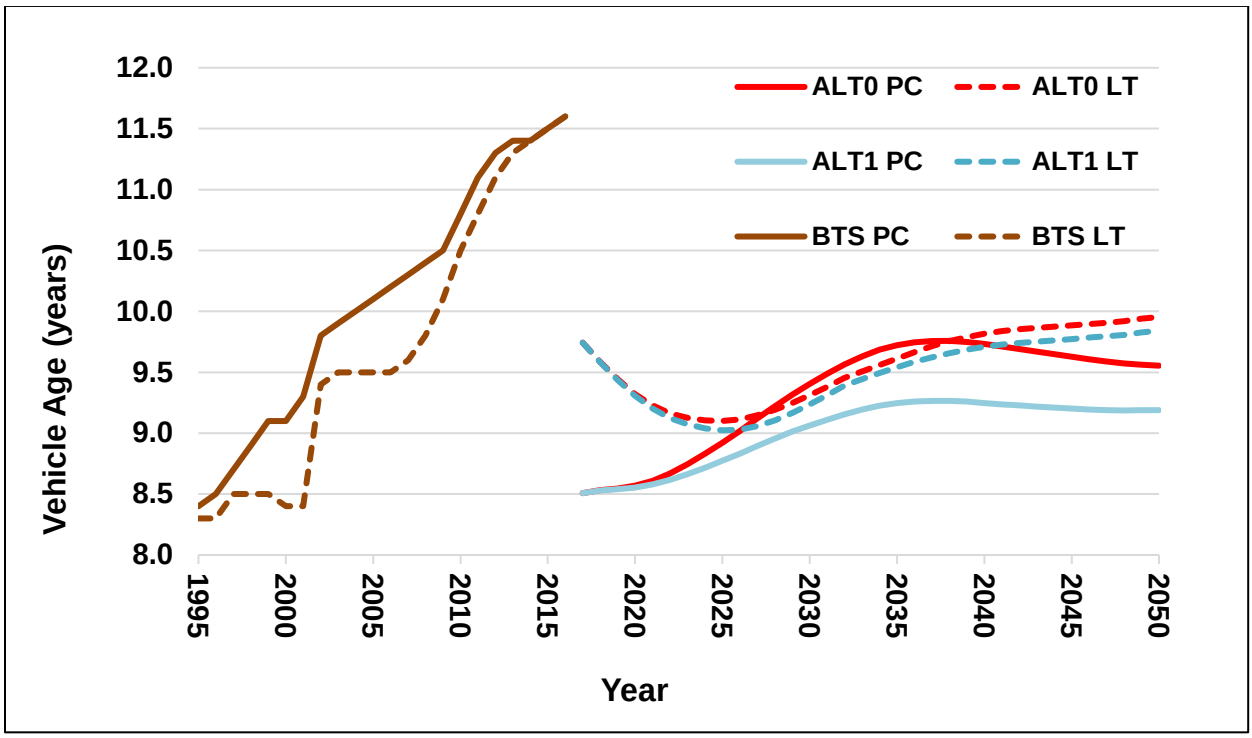

Figure 4. National average fleet age for passenger cars (PC) and light trucks (LT) calculated by CAFE model for the baseline (Alt0) and preferred (Alt1) alternatives and Bureau of Transportation Statistics (BTS) data.[48]

[48] Data were downloaded from https://www.nhtsa.gov/corporate-average-fuel-economy/compliance-and-effects-modeling-system, central analysis, output_CAFE, CAFE (the uploaded data is 6/5/2018). National averaged fleet

4. Electric Vehicle (EV) Fuel Fractions

The Agencies' preferred and seven other alternatives would remove incentives for automobile manufacturers to continue to develop EVs for sale in the U.S. by removing the California waiver and relaxing the augural CAFE standards. As is discussed in the DEIS, the EV market has been and continues to develop in the U.S. and globally.[49] Both Morgan Stanley and Bloomberg forecast EV sales to exceed internal combustion engine vehicle sales by 2038.[50] Unfortunately, U.S. EV sales are significantly lagging sales in other world markets such as China and Europe. North Carolina is doing its part to support the EV market. From 2018 through 2024, North Carolina will be using a portion of the Volkswagen Settlement funds to invest about $14 million on zero emission vehicle infrastructure statewide.[51]

NCDAQ requests that the Agencies evaluate options for further developing the EV market in the U.S., including providing incentives and expanding compliance flexibilities to automobile manufacturers. Otherwise, weakening of the augural standards would not only result in adverse impacts to public health and environmental protection but also would lead to reduced market opportunities for EV manufacturing/technology/component supply companies in U.S., as well as more reliance on foreign sources of oil.

5. Emissions Modeling

Based on MOVES2014a modeling analyses conducted by the NCDEQ, we believe that the fleet changes predicted by the CAFE modeling would lead to emissions increases that would interfere with the ability of some ozone maintenance areas to meet transportation conformity budgets and maintain compliance with the NAAQS. To evaluate these concerns, NCDEQ compared transportation conformity emissions data to LDV emissions results from emissions modeling EPA conducted for the baseline and preferred alternative using vehicle fleet characteristics from the CAFE modeling for Mecklenburg County, NC. Fleet data and emissions were scaled from the national to the county level for comparison to recent transportation conformity emissions modeling results and to MOVES modeling results using the augural and proposed CAFE standard fleet data. Comparisons focused on 2035 LDV emissions in Mecklenburg County, NC, which is part of the Charlotte-Gastonia-Rock Hill, NC-SC maintenance area for the 2008 ozone NAAQS. The maintenance area has MVEBs for the ozone precursors NOx and VOC, which must be met as part of transportation conformity determinations.

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age for PC and LT reported by the Bureau of Transportation Statistics, https://www.bts.gov/topics/national-transportation-statistics (table_01_26_1.xlsx).

[49] See DEIS, Section 8.3.3 (Other Past, Present, and Reasonably Foreseeable Future Actions), pages 8-3 through 8-14.

[50] See DEIS, Section 8.3.3.2 (Recent Plug-In Electric Vehicle Market Forecasts and Potential Decline in Electric Vehicle Costs), pages 8-8 through 8-10.

[51] See the NCDAQ website at https://deq.nc.gov/about/divisions/air-quality/motor-vehicles-and-air-quality/volkswagen-settlement for information on North Carolina's Volkswagen Mitigation Plan.

Methods

Transportation Conformity Based Modeling for Mecklenburg County
MOVES2014a model input data for a recent transportation conformity emissions analysis served as the basis for these comparisons. The data included VPOP and vehicle age distribution data based on recent vehicle registration data from the North Carolina Department of Transportation. VPOP and vehicle age distribution were projected to 2035 using EPA tools and procedures approved for SIP and transportation conformity emissions inventory development. VMT and speed data from travel demand modeling, based on local road network and socioeconomic data, were provided by the Charlotte Regional Transportation Planning Organization. Default MOVES2014a model fuel fraction data were used for this analysis.

MOVES2014a Modeling using CAFE Model Fleet Data for Mecklenburg County
To evaluate the potential county level emissions impacts of the fleet changes predicted by the CAFE model, MOVES2014a emissions modeling for Mecklenburg County using CAFE model fleet data was performed. National level 2035 fleet information for the augural and proposed CAFE standard modeling were obtained from CAFE model output data[52] and formatted to generate MOVES2014a inputs for VPOP, VMT, vehicle age distribution, and fuel fractions. National VPOP and VMT were then downscaled to Mecklenburg County level using EPA MOVES2014a default national and county level VPOP and VMT data. Since the CAFE model output data do not include vehicle speed information, the transportation conformity modeling speed data were used in the CAFE fleet modeling runs. All other input data unrelated to vehicle fleet characteristics (i.e., meteorological data, fuel supply and formulations) were kept consistent for all modeling runs.

Comparison of Fleet-related Input Data

As noted previously, the DEIS predicts that implementation of the augural and proposed CAFE standards would cause significant changes to LDV fleet characteristics (VPOP, VMT, vehicle age distribution, and fuel fractions) that would impact future onroad mobile source emissions. Differences between the transportation conformity and CAFE model fleet data are examined below.

VPOP
Table 10 shows the differences between the transportation conformity and CAFE mode VPOP input data. Relative to our transportation conformity analysis, large LDV fleet population increases are predicted for both the augural and proposed CAFE standards, with a significant shift in fleet makeup from passenger cars to higher-emitting light trucks.

VMT
Table 11 shows the differences between the transportation conformity and CAFE mode VMT input data. Significant shifts in VMT from passenger cars to light trucks are predicted for both the augural and proposed CAFE standards, consistent with the predicted increases in the light truck populations. However, overall VMT is predicted to decrease by 19% to 20%, despite the large increases in VPOP predicted.

[52] https://www.nhtsa.gov/corporate-average-fuel-economy/compliance-and-effects-modeling-system

Table 10. Comparison of 2035 Fleet Vehicle Population (VPOP) Data

Fleet Data Source	VPOP			Percent Difference from Transportation Conformity Fleet Data		
	Passenger Car	Light Truck	Total			
Transportation Conformity, Mecklenburg County, 2035	800,407	116,277	916,685	Passenger Car	Light Truck	Total
Augural CAFE Standard	701,009	591,440	1,292,449	-12%	409%	41%
Proposed CAFE Standard	696,110	587,316	1,283,425	-13%	405%	40%

Table 11. Comparison of Fleet Annual Vehicle Miles Traveled (VMT)

Fleet Data Source	Annual VMT			Percent Difference from Transportation Conformity Fleet Data		
	Passenger Car	Light Truck	Total			
Transportation Conformity, Mecklenburg County, 2035	13,440,555,996	2,119,569,053	15,560,125,049	Passenger Car	Light Truck	Total
Augural CAFE Standard	6,595,092,928	6,389,234,615	12,984,327,542	-51%	201%	-20%
Proposed CAFE Standard	6,522,973,702	6,068,073,294	12,591,046,996	-51%	186%	-19%

Vehicle Age Distribution

Figure 5 shows the overall LDV age distribution for the three fleet data sets. The augural standard fleet data show a higher fraction of older vehicles than for the proposed standard, but both show a larger proportion of older vehicles than the transportation conformity fleet data. The transportation conformity data also show a much larger fraction of newer vehicles (less than 10 years old). Based on the VPOP data, the newer vehicles in the transportation conformity fleet would include a higher percentage of lower-emitting passenger cars and therefore would not necessarily produce more emissions than the fewer new vehicles in the augural and proposed standard fleets.

Fuel Fractions

The fuel fraction input data for the MOVES20104a model specifies the fractions of vehicles in the fleet powered by four fuels (gasoline, diesel fuel, ethanol, and electricity). Fuel fractions for the augural and proposed CAFE standard fleets do not account for predictions of large scale EV adoption, and only show EV fractions by 2035 of 1.6 percent for passenger cars and 0.4 percent for light trucks. Modeling of the transportation conformity fleet data used the default MOVES2014a fuel fraction data. The MOVES2014a default data also has not been updated to reflect projections of growth of the EV fleet. Therefore, the modeling results below provide a comparison of emissions from the fleets in which internal combustion engine vehicles have not been replaced by EVs. Subsequently, the differences in emissions noted below primarily result

of differences in VPOP, VMT, and vehicle age distribution data and do not reflect significant differences in fuel fractions.

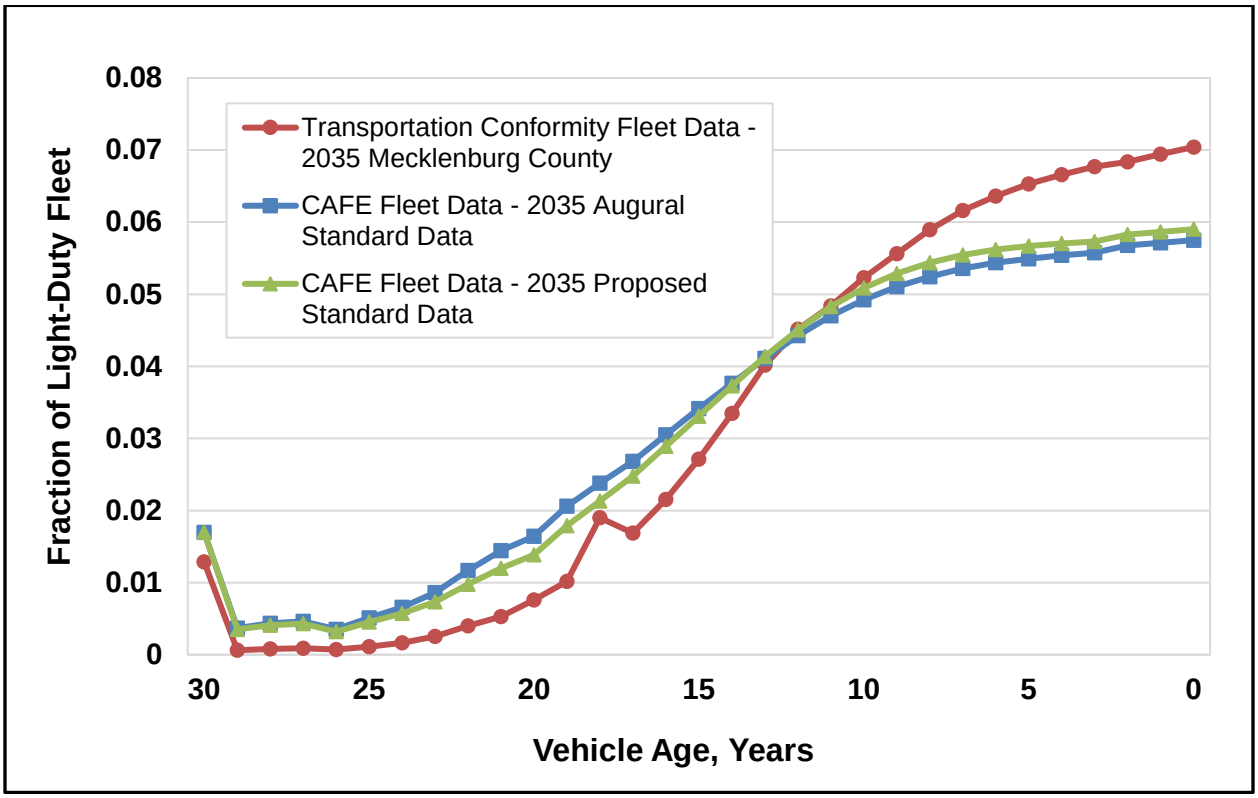

Figure 5. Comparison of LDV Age Distributions for Mecklenburg County, NC

Review of Annual Emissions Results

Figure 6 shows 2035 annual LDV NOx emissions modeling results for Mecklenburg County for NCDAQ's transportation conformity analysis, and for the augural and proposed CAFE standards. For both the augural and proposed CAFE standards, NOx emissions are significantly higher (83 percent and 74 percent) than the transportation conformity modeling results. MOVES2014a modeling results using the CAFE model fleet data are also significantly higher (47 percent and 40 percent) than the transportation conformity modeling results, but less than the emissions results presented in the DEIS based on the CAFE model fleet assumptions. The differences in NOx emissions from the transportation conformity modeling results, which are based on EPA-approved emissions inventory development practices, raise questions about the accuracy of the CAFE model fleet data and corresponding emissions data. Based on the above comparisons of CAFE model-based VPOP, VMT, vehicle age distributions, and fleet fuel fractions with NCDAQ values, the NCDEQ questions the accuracy of the fleet data that the Agencies used to estimate emissions impacts associated with the baseline and preferred alternatives.

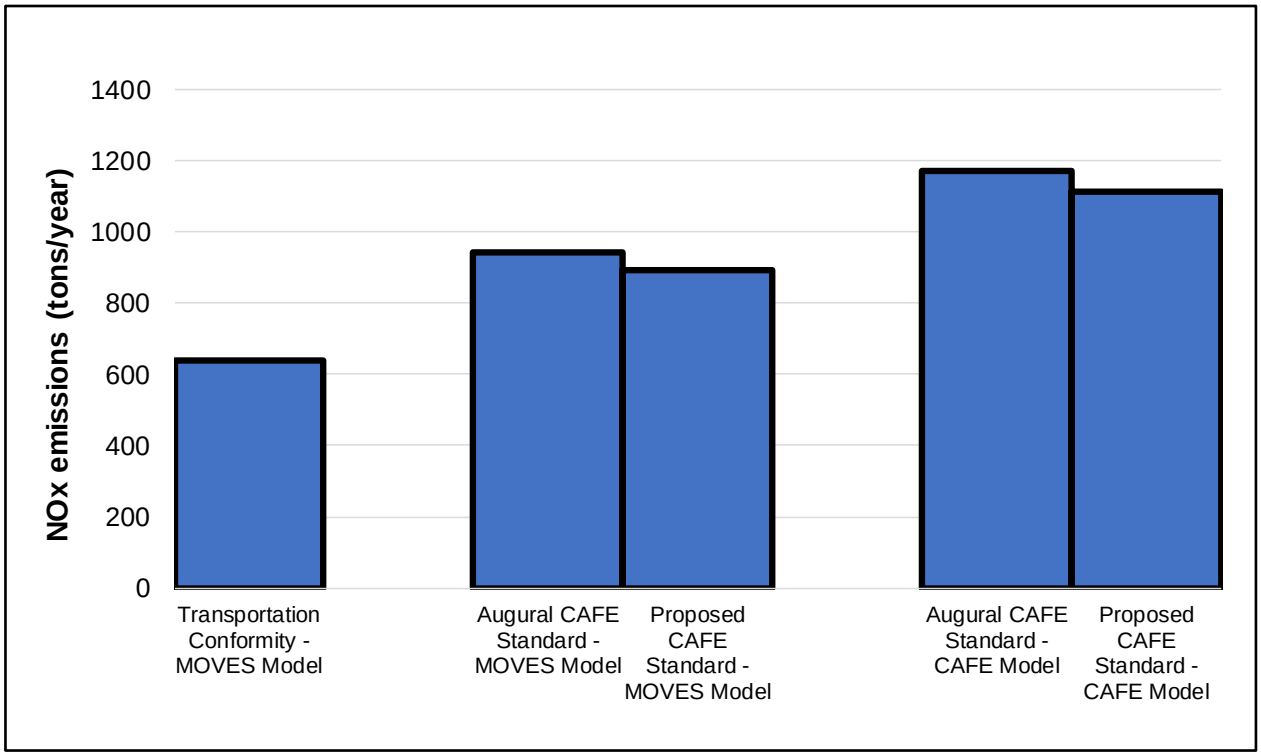

Figure 6. Annual Light-Duty Vehicle NOx emissions for Mecklenburg County, NC – 2035

Review of Summer Weekday Emissions Results

To compare emissions modeling results in more detail, MOVES2014a modeling runs were repeated for a summer weekday which is the time period for which emissions modeling for transportation conformity and ozone SIPs must be developed. Figures 7 and 8 show the NOx and VOC emissions modeling results, respectively. Results using the augural (Alt 0) and proposed (Alt 1) CAFE standard fleet data are again much higher than the transportation conformity (TC) modeling results (48 percent and 39 percent for NOx, 70 percent and 57 percent for VOC). Figure 8 shows that the CAFE model fleet data result in VOC emissions at or above the MVEB for the maintenance area, which would lead to problems demonstrating transportation conformity.

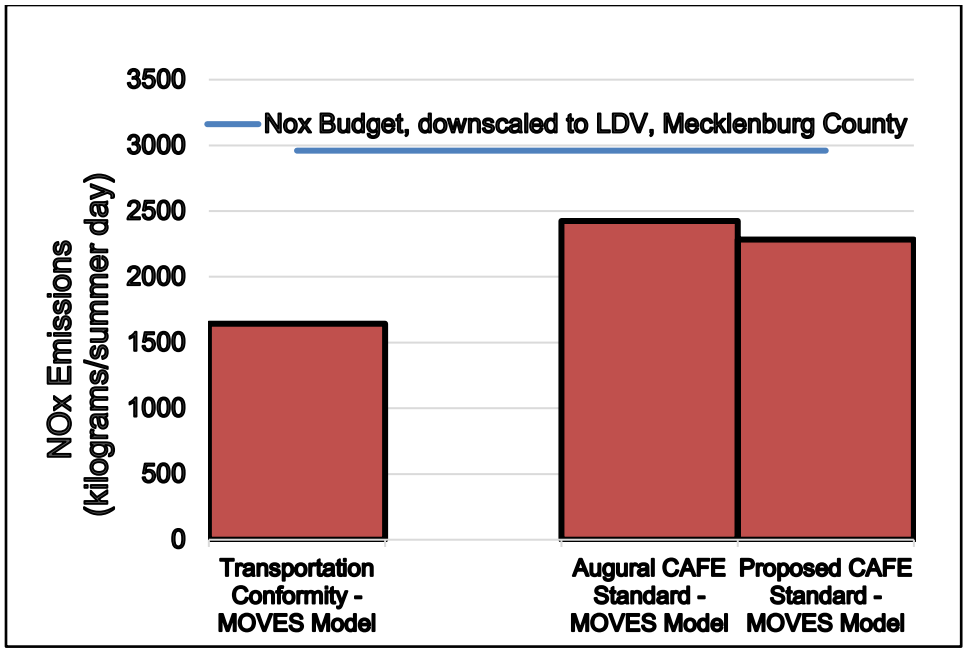

Figure 7. Summer day Light-Duty Vehicle NOx emissions for Mecklenburg County, NC – 2035

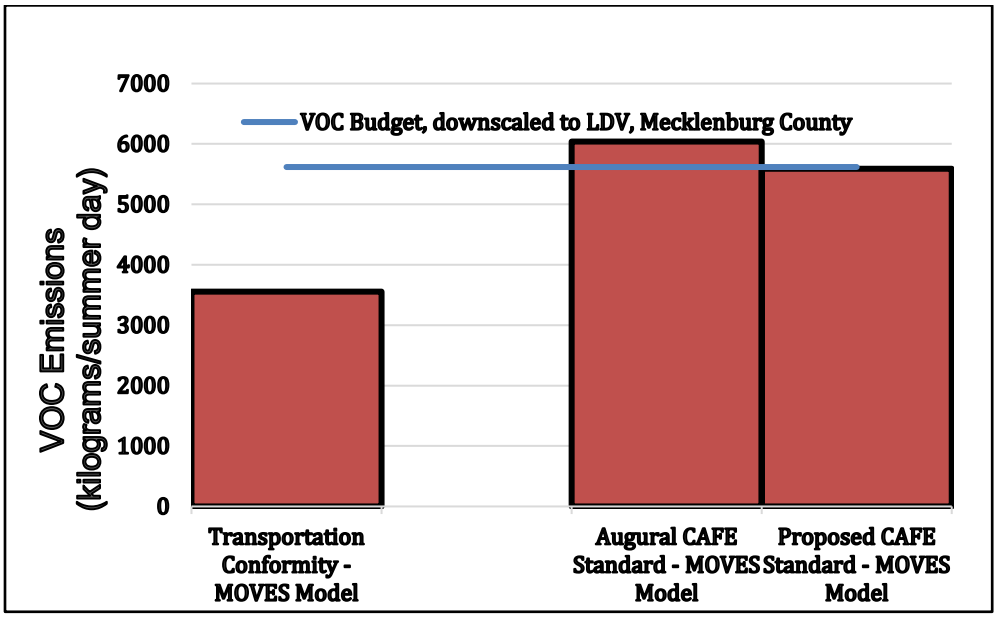

Figure 8. Summer day Light-Duty Vehicle VOC emissions Mecklenburg County, NC - 2035

Further analysis of the summer day emissions modeling results shows that most of the excess emissions from the CAFE fleet data modeling are attributable to older vehicles in the fleet. Figures 9 and 10 show a comparison of NOx and VOC emissions by vehicle model year, respectively. For each pollutant, emissions from all three model runs are similar for vehicles of the 10 latest model years (2026 through 2035). However, the emissions for the augural and proposed standards show large increases relative to the TC modeling for model years 2025 and older.

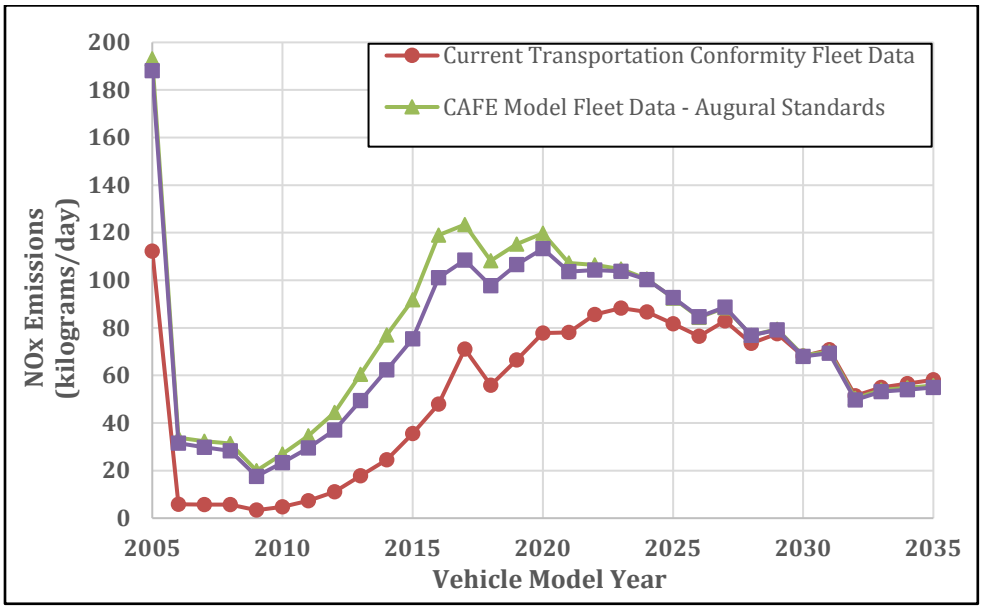

Figure 9. Comparison of Light-Duty Vehicle NOx Emissions by Model Year

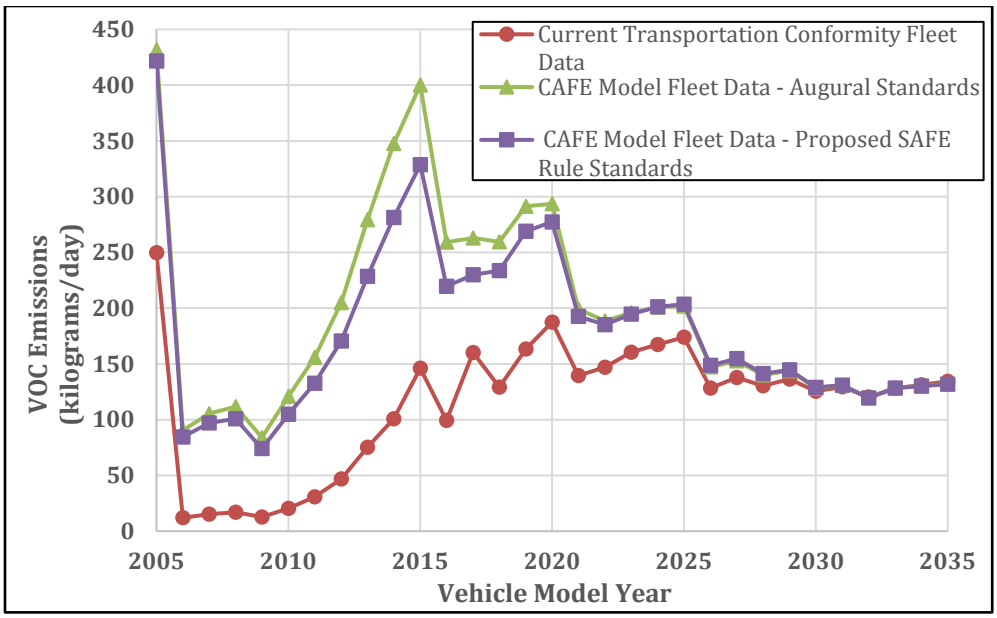

Figure 10. Comparison of Light-Duty Vehicle VOC Emissions by Model Year

Conclusions

The results demonstrate that the methods the Agencies used to estimate emissions for maintenance/nonattainment areas need to be refined to more accurately reflect the impacts of the augural standards (and by extension, the relative impacts of the proposed rollback). Many of the issues are associated with flawed assumptions about the fleet characteristics expected to occur under the augural standards. Other issues are associated with EPA's failure to use its own MOVES2014a emissions model to estimate emissions impacts. The information presented previously in our comments and the case study for Mecklenburg County, NC leads the NCDEQ to the following conclusions:

- The CAFE model fleet VPOP data that the Agencies used to estimate emissions impacts for both the augural standard and proposed CAFE standards substantially overestimates the fleet size and percentage of light trucks in future LDV fleets.
- The CAFE model fleet VMT data that the Agencies used to estimate emissions impacts for both the augural standard and proposed CAFE standards overestimates the percentage of VMT driven by light trucks and underestimates the total VMT in future LDV fleets.
- The CAFE model fleet vehicle age distribution data that the Agencies used to estimate emissions impacts for both the augural standard and proposed CAFE standards overestimates the number of older vehicles in future LDV fleets.
- The fleet fuel fraction data that the Agencies used to estimate emissions impacts associated from both the augural standard and proposed CAFE standards underestimate the growth of the EV fraction of the fleet causes an overestimation of future emissions. An accurate estimate of EV growth is necessary to properly characterize future light duty fleets.
- The net effect of the deficiencies in the CAFE model fleet data causes a significant increase in emissions associated with the augural standards due to the inaccurate characterization of the future fleet as significantly older than NCDAQ data support (as well as including an excessive percentage of larger light trucks, and not including enough EVs). Our analysis indicates that the CAFE model fleet data are too flawed to be used for the evaluation of the augural and proposed standard effects on emissions.

E. Issues with the Evaluation of Air Quality Impacts

For all CAFE standard options considered, the DEIS presents estimates of annual emissions of several criteria and mobile source air toxic pollutants for some but not all nonattainment and maintenance areas for the NAAQS.[53] Emissions were estimated for three future years, 2025, 2035, and 2050. These emissions estimates were derived for each option by first estimating nationwide emissions of each pollutant under that option and then allocating the emissions to the

[53] The appendices to the draft EIS present emissions impacts for nonattainment and maintenance areas for most but not all the NAAQS. For example, for North Carolina, emissions impacts are listed for the Charlotte maintenance area for the 2008 8- hour ozone NAAQS. It also includes emissions impacts for the Charlotte, Raleigh-Durham, and Winston-Salem 1971 8-hour carbon monoxide NAAQS. However, EPA failed to present emissions impacts for the 1997 8-hour ozone NAAQS for the Charlotte, Raleigh-Durham, Rock Mount, and Great Smokey Mountain National Park maintenance areas and the 1997 annual PM2.5 maintenance areas Hickory and Greensboro/Winston-Salem/High Point Areas.

county level based on the fraction of national VMT in each county. Subcounty level emissions, for counties only partially covered by a nonattainment/maintenance area, were then calculated based on the fraction of county human population within the partial county areas (which assumes that per capita VMT is constant throughout the county). The county and subcounty level emissions were then aggregated to the nonattainment/maintenance area level, and comparisons of emissions from all CAFE standard options, relative to the current standards, were provided.

This approach provides a very limited assessment of the air quality impacts on nonattainment/maintenance areas because it ignores geospatial aspects of the impacts. First, it does not properly account for the variability within the nonattainment/maintenance area of the localized parameters that influence emissions. Second, it does not address the effects of localized emissions changes on pollutant concentrations at monitoring locations.

The nonattainment/maintenance area emissions estimates provide at best a generalized view of changes in emissions due to revision in the CAFE standards. It is acknowledged in the DEIS that the approach does not account for local variability of several parameters affecting vehicular emissions. These parameters include fleet size, fleet age distribution, fleet mix of vehicle types, VMT by vehicle type, and VMT growth rates.

While all these parameters in combination can have effects on emissions, the lack of variation in VMT growth between counties, both spatially and temporally, is perhaps the most significant deficiency in estimating future year emissions. The DEIS states that "EPA's estimate of county-level VMT allocation is constant over time, which introduces some uncertainty into the nonattainment-area-level VMT estimates for future years." This causes problems due to the general geographic makeup of a nonattainment/maintenance area, which is typically centered around a large urban county or area and includes less urbanized surrounding areas. Ambient monitoring of criteria pollutants occurs throughout the area. Growth in the central urban area typically is much greater than in the surrounding areas. However, surrounding counties, especially along transportation corridors leading to or through the central urban area, can also have high growth. This growth along transportation corridors concentrates the effects of emissions increases in those areas. Localized emission increases in future years could increase pollutant concentrations at monitoring locations in the high growth areas, jeopardizing attainment and maintenance of compliance with ambient air quality standards. Estimates of the future emissions impacts are inaccurate without proper evaluation of these localized VMT growth effects.

In addition to problems with localized emissions impacts, the DEIS does not address the most significant impact on nonattainment/maintenance of ambient air quality standards–the effect on ozone and PM2.5 concentrations. Ozone concentrations are dependent on both NOx and VOC concentrations, and while direct PM2.5 emissions from LDVs may not greatly impact PM2.5 concentrations, secondary PM2.5 formation from NOx, VOC, sulfur dioxide (SO_2), and other precursors may have a significant effect. Transport of ozone and PM2.5 from upwind areas outside of a nonattainment/maintenance area can also significantly affect local measured concentrations. Without comprehensive air quality modeling to go along with the evaluation of changes to vehicular emissions, the full impact of the proposed changes to CAFE standards cannot be accurately quantified.

The NCDEQ is concerned about the completeness of the Draft EIS since it does not incorporate photochemical modeling. Both Agencies concur that they did not have sufficient time to conduct the modeling, which leads the NCDEQ to believe that many of the conclusions in the Draft EIS are rushed and inadequate.[54] This type of modeling is essential to perform an in-depth analysis of the potential air quality impacts of the preferred alternative or the other proposed alternatives to our state. While the NCDEQ understands that photochemical modeling will be included in the Final EIS, we strongly believe that the inputs and results should be readily available for public comment before the EIS and rulemaking are finalized.

V. National Environmental Policy Act (NEPA) Reviews and Concerns Regarding Modeling for Highway Projects

The proposed changes to the CAFE standards also have the potential to undermine many of the assumptions in various NEPA documents across the United States. As of October 7, 2016, the EPA required utilizing EPA's MOVES2014 model (or a subsequent revision) for transportation conformity determinations,[55] and as such, the modeling results were incorporated into various NEPA documents. This version of MOVES incorporates projections for the current CAFE and CO_2 standards, and changing baseline assumptions for the standards has the potential to undermine the integrity of completed NEPA analyses.

VI. Selection and Analysis of Range of Alternatives

Under NEPA, as noted in the proposed rulemaking, the purpose of an EIS is to "provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment."[56] NEPA requires that agencies develop alternatives to a proposed action based on the action's purpose and need. In accordance with EPCA/EISA, the purpose of the rulemaking as stated in the DEIS is to revise/establish the CAFE standards for model years 2021–2026, passenger cars and light trucks at "the maximum feasible average fuel economy level that the Secretary of Transportation decides the manufacturers can achieve in that model year." EPCA requires that NHTSA consider the four statutory factors of "technological feasibility, economic practicability, the effect of other motor vehicle standards of the Government on fuel economy, and the need of the United States to conserve energy" when determining the maximum feasible levels that manufacturers can achieve in each model year. In addition, the agency has the authority to consider other relevant factors, such as the effect of the CAFE standards on motor vehicle safety.

The DEIS for the rulemaking does not fully satisfy the requirements of NEPA in the following ways.

- First, NHTSA has not analyzed a reasonable range of alternatives. NHTSA has only analyzed a range of alternatives with fuel economy stringencies that are less than the current

[54] PRIA page1339,
[55] 79 FR 60343.
[56] 40 Code of Federal Regulations 1502.1.

standards. In doing so NHTSA improperly narrowed the range of alternatives by not considering standards that are more stringent than the baseline Alternative (0) standards. Alternatives that exceed the stringency of the current standards are consistent with EPCA's purpose "to conserve energy supplies through energy conservation programs, and, where necessary, the regulation of certain energy uses and to improve the fuel economy of motor vehicles."[57] NHTSA recognizes that more stringent alternatives are possible but justifies not analyzing more stringent CAFE standards on its balancing of EPCA's four supplementary statutory factors. Without elaborating on how that balancing prevents the selection and analysis of alternatives that are more stringent than the current standards, NHTSA only states "that such an alternative would, after careful balancing of EPCA's four statutory factors, fall well outside the range of the maximum feasible level."[58]

- Second, NHTSA appears to have narrowed the range of alternatives by its inputs to the CAFE model to justify a predetermined result of fuel economy standards that are less stringent than the current standards. The model assumptions appear to result in an overestimation of the VMT and resultant tailpipe emissions resulting from the current standards, and underestimate the impacts of climate change by use of only the domestic social cost of carbon. NHTSA should have begun the NEPA analysis with a range of reasonable alternatives, including more stringent standards, and then evaluated the complete environmental, economic, and social costs and benefits of each alternative.
- Third, the DEIS also omits consideration that California currently has in place LDV GHG emissions standards in-place which have also been adopted by several other states. The DEIS does not account for the possibility that the waiver of preemption for the California standards is not withdrawn and that these standards remain in-place. The potential for the current California program to remain in-place, and the potential for it to remain in place, should be included in the analysis.

Because of these omissions, the proposed rulemaking and DEIS does not fully address the requirements of NEPA in a transparent manner that provides appropriate context for decision makers.

VII. CAA Section 177 (New Motor Vehicle Emission Standards in Nonattainment Areas)

Section 177 of the CAA authorizes States to choose to adopt California's vehicle emissions standards in lieu of federal requirements. States are not required to seek EPA approval before adopting California's standards. There are 12 such "Section 177 States.[59]

EPA's proposed withdrawal of the waiver of preemption for California's GHG standards would preclude states from exercising their authority to be more stringent than federal requirements to address air quality issues and is contrary to cooperative federalism. Although not an opt-in state for the GHG standards, in the past, as a sovereign state, North Carolina adopted California's standards to address specific motor vehicle contributions to air quality issues. For example, North Carolina used this provision in an attainment SIP for ozone to close a gap in timing

[57] 42 U.S.C. 6201.
[58] DEIS, page 2-11.
[59] https://www.transportpolicy.net/standard/us-section-177-states/

associated with EPA's implementation of the federal heavy-duty diesel vehicle emissions standards to ensure NOx emissions reductions included in the SIP were federally enforceable. EPA's proposal would deprive states of a valuable tool for addressing needed reductions from the mobile sector in the absence of meaningful federal mobile source GHG emissions reduction requirements.

VIII. The Agencies Underestimate the Social Costs of Carbon

The Agencies grossly underestimates the social cost of carbon by relying on a number that is dramatically lower than any that was used in hundreds of regulatory proceedings at the federal level through January 2017. The Agencies admit that the reduction in its social cost of carbon calculation is primarily due to its decision to calculate on a domestic rather than a global basis. Note that this decision is a dramatic change because the global social cost of carbon is larger than the domestic social cost of carbon by a factor of about seven. The NCDEQ previously submitted comments on EPA's proposed rulemaking for "Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units."[60] The following summarizes NCDEQ's key points regarding the Agencies' estimation of the social cost of carbon in the Proposed SAFE Rule:

(1) By calculating the social cost of carbon on a domestic rather than a global basis, the Agencies fail to account for the global effects of carbon pollution that impact the U.S. and its citizens. By using a domestic social cost of carbon, the Agencies fail to consider the welfare of 9 million U.S. citizens living abroad, including military personnel.

(2) By omitting any analysis of the global social cost of carbon, the Agencies failed to adhere to OMB's Circular A-4, which instructs under the "Scope of Analysis" section that "where you choose to evaluate a regulation that is likely to have effects beyond the borders of the United States, these effects should be reported separately."[61] By omitting any global social cost of carbon calculation, the Agencies are not following the OMB guidance that they cite in support of use of a domestic social cost of carbon.[62] The Agencies are therefore concealing from the public the impact of switching from a global social cost of carbon that has been used in multiple past rulemakings and recently been upheld by the Court in the context of domestic regulations developed under EPCA.[63]

(3) The Agencies' domestic social cost of carbon omits important spillover effects on U.S. corporations. The negative effects of global climate change impact U.S. corporations both directly (through assets they own in other countries) and indirectly (through disruptions of market supply chains).

(4) The Agencies' analysis uses a discount rate of 3 percent and 7 percent, whereas the best available science and majority of experts agree that the discount rate should be closer to 2

[60] Comments on Proposed Rulemaking - Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, April 26, 2018, EPA Docket ID No. EPA-HQ-OAR-2017-0355.
[61] Office of Management and Budget, Circular A-4, September 17, 2003, pg. 14.
[62] PRIA at page 1068: "Circular A-4 states that analysis of economically significant proposed and final regulations should focus on benefits and costs that accrue to citizens and residents of the United States. We follow this guidance by adopting a domestic perspective in our central analysis."
[63] Reilly, Amanda, "Court rules for DOE, upholding Obama's social cost of carbon," E&E News, August 9, 2016, https://www.eenews.net/stories/1060041382.

percent. A recent report from the Council of Economic Advisors found that evidence supports a rate lower than 3 percent as the norm for the consumption rate of discount, which it suggested should be at most 2 percent given historical trends and expected future conditions.[64]

(5) Even if a domestic social cost of carbon number were appropriate (which it is not), the most recent, peer-reviewed, scientific analysis published in a top journal indicates that $48 per ton of CO_2 is the best estimate of such a U.S. domestic value—far higher than the $1 to $7 range used to justify the proposed rulemaking.[65]

The Agencies should withdraw the DEIS, conduct a new analysis with the best scientifically available information, and recirculate a revised DEIS for review and comment.

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[64] "Discounting for Public Policy: Theory and Recent Evidence on the Merits of Updating the Discount Rate, Council of Economic Advisers Issue Brief," January 2017.

[65] Ricke, K., Drouet, L., Caldeira, K. and Tavoni, M., 2018. "Country-level social cost of carbon." Nature Climate Change, 8, pp. 895–900, published September 24, 2018, https://www.nature.com/articles/s41558-018-0282-y?utm_source=Nature_community&utm_medium=Social_media_advertisingCommunity_sites&utm_content=BenJoh-Nature-MultiJournal-Social_Sciences-Global&utm_campaign=MultipleJournals_USG_SOCIAL.