Giving Back Half the Gains

Macroeconomic Impacts of the Proposed Rollback in Federal Vehicle Standards

Prepared for Union of Concerned Scientists

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EXECUTIVE SUMMARY

The National Highway Traffic Safety Administration (NHTSA) and U.S. Environmental Protection Agency (EPA) published a Notice of Proposed Rulemaking (NPRM) in the Federal Register on August 24, 2018. The NPRM—named The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rules for Model Years 2021–2026 Passenger Cars and Light Trucks—would amend existing greenhouse gas and Corporate Average Fuel Economy (CAFE) standards by flat-lining them after 2021. The result would be an average new-vehicle fuel economy of less than 30 miles per gallon for passenger cars and light trucks.[1] On the other hand, the clean vehicle standards currently on the books would continue increasing after 2021 and ultimately require an average new-vehicle fuel economy of about 36 miles per gallon for model year 2025 vehicles.[2]

In March of this year, Synapse Energy Economics, Inc. (Synapse) prepared a report, "Cleaner Cars and Job Creation"—henceforth referred to as the "Cleaner Cars Analysis"—that compared the macroeconomic impact of implementing the existing clean vehicle standards for model years 2017–2025 relative to a 2016-technology baseline in which the vehicle standards remain fixed at 2016 levels.[3] The analysis found that nationwide employment would increase by more than 100,000 in 2025 and more than 250,000 in 2035 under the existing clean vehicle standards relative to the 2016-technology baseline. The analysis also found that the existing clean vehicle standards would increase annual gross domestic product (GDP) by $13.6 billion in 2025 and $16.1 billion in 2035 relative to the 2016-technology baseline.

We have extended our Cleaner Cars Analysis to explore the macroeconomic impacts of the proposed rollback of the standards (henceforth called the flat-lined standards), relative to the same 2016-technology baseline. We then compared the employment and GDP impacts of the proposed flat-lined standards with the employment and GDP impacts of the existing clean vehicle standards. We found that the proposed flat-lined standards will generate 60,000 fewer job-years in 2025 and over 120,000 fewer

[1] NHTSA and EPA. *The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks*, p. 42,989. https://www.gpo.gov/fdsys/pkg/FR-2018-08-24/pdf/2018-16820.pdf. New-vehicle average fuel economy is expected to reach 37 mpg under the flat-lined standards, or the equivalent of less than 30 miles per gallon in the real-world driving.

[2] EPA. Final Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicles Greenhouse Gas Emissions Standards under the Midterm Evaluation, p. 5. January 2017. https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100QQ91.pdf.

[3] Allison, A., J. Hall, F. Ackerman. 2018. *Cleaner Cars and Job Creation: Macroeconomic Impacts of Federal and State Vehicle Standards.* Synapse Energy Economics for UCS, NRDC, ACEEE. http://www.synapse-energy.com/sites/default/files/Cleaner-Cars-and%20Job-Creation-17-072.pdf.

job-years in 2035 than the existing clean vehicle standards.[4] Furthermore, the proposed flat-lined standards will reduce GDP by $8 billion in both 2025 and 2035 when compared to the existing clean vehicle standards.[5]

We present additional details on our modeling assumptions and results in the sections below. We conclude that the proposed flat-lined standards are expected to reduce the positive impacts on the U.S. economy that would be generated under the existing clean vehicle standards compared to the 2016-technology baseline.

1. ASSUMPTIONS

1.1. Differences from Cleaner Cars Analysis

The Cleaner Cars Analysis analyzed the GDP and employment benefits of the existing clean vehicle standards relative to a 2016-technology baseline. Our current analysis uses the same modeling framework as the Cleaner Cars Analysis but is updated to analyze the impacts of the proposed flat-lined standards compared to the 2016-technology baseline. By using the same modeling framework and the same 2016-technology baseline, we can compare the relative benefits of the proposed flat-lined standards compared to the existing clean vehicle standards.

We have maintained most of our modeling inputs and assumptions from our Cleaner Cars Analysis both for the purposes of consistency and because we believe those assumptions are reasonable and accurate. We encourage interested readers to review the initial report for a more detailed discussion of our modeling.

We do update three key inputs in our current modeling efforts to reflect the proposed flat-lined standards—gross price premiums, fuel economy standards, and zero emission vehicle (ZEV) compliance levels:

- **Gross price premium.** We use gross price premiums for compliance with CAFE standards (also known as compliance costs) that were developed in a modified version of the Volpe model by the Union of Concerned Scientists. The Volpe model was modified to better align with the EPA OMEGA results presented in the 2016 Technical Assessment Report (TAR).[6] The gross price premiums represent the average, per-vehicle,

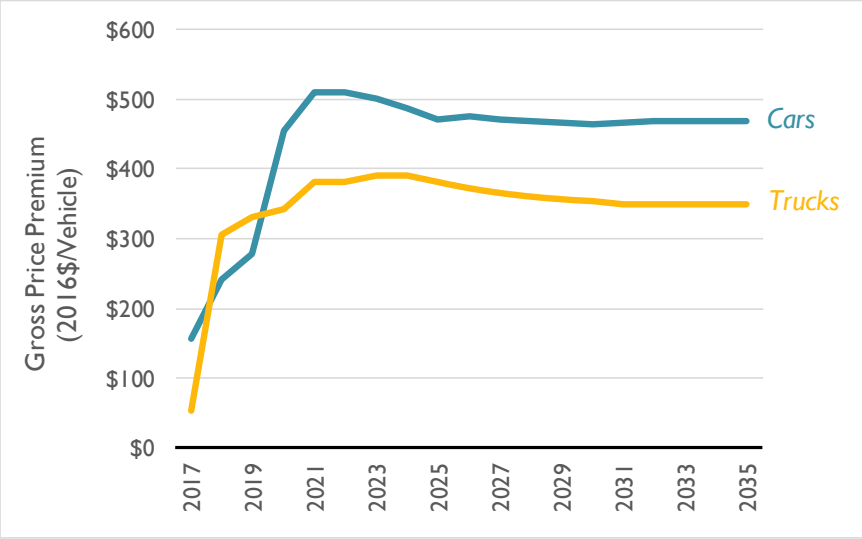
[4] Throughout this report, employment impacts are reported in terms of job-years, where one job-year represents one job that lasts for one year. Since we exclusively report employment impacts on an annual basis, these results can also be thought of in terms of a change in the average number of jobs in a given year.

[5] Here and throughout this report, all dollar figures are in constant 2016 dollars, unless otherwise noted.

[6] The modifications to the Volpe model have been outlined by the Union of Concerned Scientists in comments submitted on the TAR. See https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-4016.

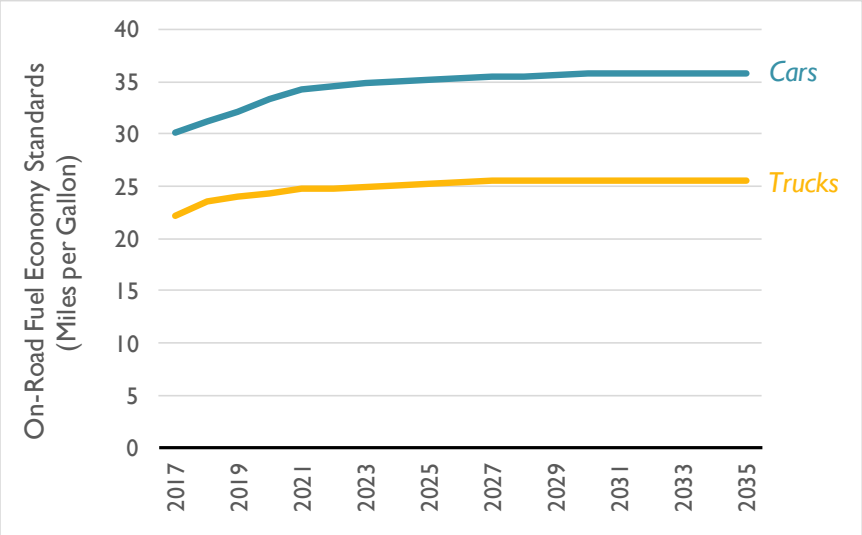
incremental cost of a vehicle that complies with the proposed flat-lined standards, relative to the 2016-technology baseline vehicle that complies with the 2016 vehicle standards. The gross price premiums for the proposed flat-lined standards are included in Figure 1.

Figure 1. Light-duty vehicle gross price premiums, proposed flat-lined standards relative to 2016-technology baseline



- **Proposed flat-lined fuel economy standards.** We use fuel economy standards developed in the same modified version of the Volpe model. The model allows for initial undercompliance of standards and future overcompliance, which results in (1) levels of compliance in the early years that are slightly under the flat 2020 standards and (2) levels of compliance in the later years that are slightly higher than the flat 2020 standards. The on-road proposed flat-lined standards for cars increase to 35.7 miles per gallon in 2030 and then plateau. Similarly, for light trucks they increase to 25.6 miles per gallon in 2030 and then plateau. The proposed flat-lined fuel economy standards are included in Figure 2.

Figure 2. Proposed flat-lined on-road fuel economy standards



- **ZEV Compliance.** We assume in our analysis that state ZEV requirements are eliminated in the proposed rollback, due to the included recession of state authority. Therefore, we model the increase in technological investments from the proposed flat-lined standards as going entirely towards internal combustion engine vehicles.

1.2. Differences from NPRM Analysis

There are several key assumptions in our analysis that differ from those used in the EPA and NHTSA's NPRM analyses. These differences are explained below, as well as our rationale for including these differing assumptions and inputs in our modeling.

- **Rebound effect:** The rebound effect describes how an increase in driving can occur in response to an increase in fuel efficiency that causes operational energy costs to decrease. We assume a rebound effect of 10 percent with respect to vehicle travel, whereas the NPRM uses a rebound effect of 20 percent.[7] We maintain the 10 percent rebound effect for consistency with the Cleaner Cars Analysis and because it is in line with the value used in previous agency filings.[8]

[7] NHTSA and EPA. *The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks*, p. 43,104.

[8] NHTSA, EPA, and California Air Resources Board. *Draft Technical Assessment Report: Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards for Model Years 2022-2025*, pp. 10-20.

- **Fuel prices.** We use the fuel price projections from the U.S. Energy Information Administration's Annual Energy Outlook (AEO) 2018.[9] The NPRM uses fuel price projections from AEO 2017.

- **Vehicle Miles Traveled (VMTs).** The Preliminary Regulatory Impact Analysis includes new VMT schedules for passenger cars and light trucks.[10] The new VMT schedules show fewer miles being traveled at every vehicle age compared to the VMT schedules in the TAR. We use the VMT schedules from the TAR for consistency with the Cleaner Cars Analysis.

- **Price Elasticity of Demand.** Our modeling assumes a price elasticity of demand of -1.0 for new vehicle purchases. That is, we assume that when the cost of a new vehicle increases by 1 percent, demand for new vehicle purchases will decrease by 1 percent. The NPRM does not explicitly state what it uses for a price elasticity of demand. Due to the ambiguity of the NPRM, and for consistency with the Cleaner Cars Analysis, we maintain a price elasticity of demand of -1.0.

2. RESULTS

We use the IMPLAN model to project the GDP and employment impacts of the proposed flat-lined standards over the period from 2017 through 2035, relative to the 2016-technology baseline.[11,12] We encourage interested readers to refer to the Cleaner Cars Analysis for a more detailed discussion on our macroeconomic modeling.

Figure 3 summarizes the GDP results of our macroeconomic modeling of the proposed flat-lined standards relative to the 2016-technology baseline in comparison to our Cleaner Cars Analysis modeling results of the existing clean vehicle standards relative to the same 2016-technology baseline. Under the proposed flat-lined standards, annual GDP increases relative to the 2016-technology baseline add up to $5.5 billion in 2025 and $8.4 billion in 2035. This is roughly $8 billion less than the GDP increases under the existing clean vehicle standards in both 2025 and 2035. Put differently, the proposed flat-lined standards will roughly halve the GDP increases generated under the existing clean vehicle standards.

[9] U.S. Energy Information Administration. AEO 2018. Table 12: Petroleum and Other Liquids Prices. Available at https://www.eia.gov/outlooks/aeo/excel/aeotab_12.xlsx.

[10] NHTSA and EPA. *Preliminary Regulatory Impact Analysis: The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Year 2021-2026 Passenger Cars and Light Trucks*, pp. 971 and 973.

[11] We acknowledge that 2017 is now a past year with historical data; however, we maintain the focus of analysis on 2017–2035 for consistency with the Cleaner Cars Analysis.

[12] This study, like the Cleaner Cars Analysis, used the 2015 IMPLAN national data set.

Figure 3. Existing clean vehicle and proposed flat-lined standards GDP impacts compared to 2016-technology baseline

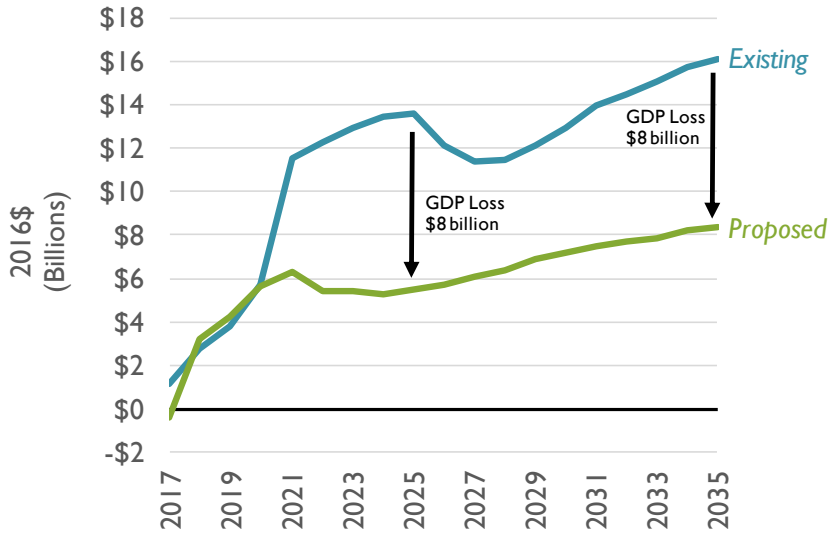


Figure 4 presents the aggregate employment results of the proposed flat-lined standards relative to the 2016-technology baseline in comparison to the aggregate employment results of the existing clean vehicle standards relative to the same 2016-technology baseline. We find that the proposed flat-lined standards result in national employment increases relative to the 2016-technology baseline of approximately 60,000 job-years in 2025 and nearly 140,000 in 2035. This is over 60,000 fewer job-years than created by the existing clean vehicle standards in 2025 and more than 120,000 fewer than from the existing clean vehicle standards in 2035. Like the GDP impacts, the proposed flat-lined standards will roughly halve the employment increases expected under the existing clean vehicle standards.

Figure 4. Existing clean vehicle and proposed flat-lined standards employment impacts compared to 2016-technology baseline

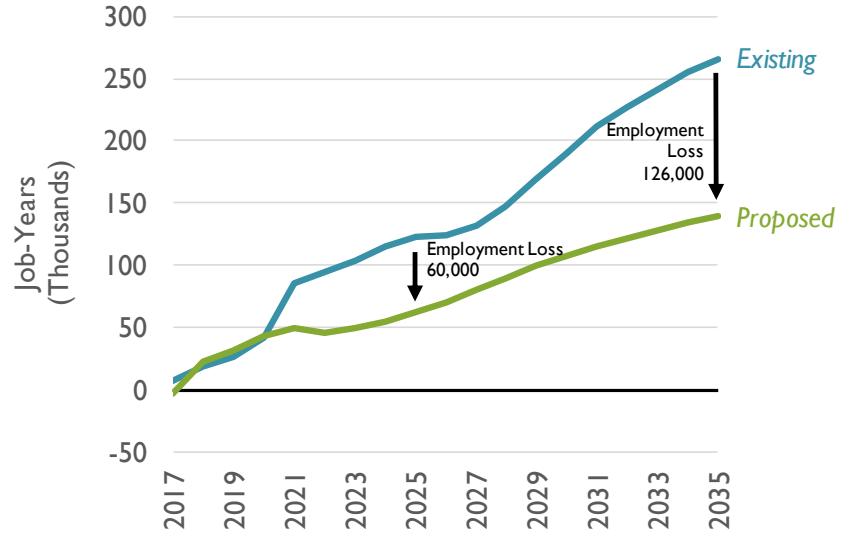


Table 1 presents the macroeconomic results from the two sets of standards broken out by category of initial expenditure for 2025 and 2035. These results show that the proposed flat-lined standards again roughly halve the impacts of the existing clean vehicle standards for each spending category:

- Impacts on new vehicle expenditures decrease from $43 billion to $19 billion in 2035;
- Fuel savings are roughly halved from $89 billion to $43 billion in 2035; and
- Generic re-spending impacts decrease from $33 billion to $17 billion in 2035.

Table 1. Changes in spending, GDP, and employment relative to 2016-technology baseline

Spending Category	Spending Change (2016 $Billion)		GDP Impact (2016 $Billion)		Employment Impact (Thousand Job-Years)	
	2025	2035	2025	2035	2025	2035
Proposed Flat-Lined Standards						
New Vehicle Purchase	$16	$19	$18	$22	148	179
Fuel Purchase	-$21	-$43	-$17	-$36	-137	-281
Generic Re-spending	$4	$17	$5	$22	51	241
Total	***-$1***	***-$6***	***$5***	***$8***	***62***	***139***
Existing Clean Vehicle Standards						
New Vehicle Purchase	$38	$43	$43	$48	347	385
Fuel Purchase	-$39	-$89	-$33	-$75	-256	-590
Generic Re-spending	$2	$33	$3	$43	32	470
Total	***$2***	***-$13***	***$14***	***$16***	***122***	***265***
Difference (Existing less Proposed)[13]						
New Vehicle Purchase	-$22	-$24	-$25	-$26	-199	-206
Fuel Purchase	$18	$47	$15	$39	119	309
Generic Re-spending	$1	-$16	$2	-$21	19	-229
Total	***-$3***	***$7***	***-$8***	***-$8***	***-60***	***-126***

These results suggest that the proposed flat-lined standards will reduce both spending on the auto industry and generic re-spending but will increase spending benefitting the petroleum industry when compared to the existing clean vehicle standards.

3. CONCLUSION

The proposed rollback of the existing clean vehicle CAFE standards would result in a reduction in consumer fuel savings, which leads to a reduction in spending on generic consumer goods and services.

[13] Differences may not sum due to rounding.

The proposed flat-lined standards would also result in a reduction in technological investment in the auto industry.

Our modeling results indicate that the proposed flat-lined standards will have a positive macroeconomic impact on the petroleum industry, but only at the expense of the benefits from the existing clean vehicle standards on the auto industry and the general U.S. labor market. In aggregate, the proposed flat-lined standards are expected to have negative repercussions for the U.S. economy.

Importantly, this study, like the Cleaner Cars Analysis, focuses exclusively on macroeconomic indicators, and only examines core mechanisms by which vehicle standards impact those indicators. This study does not account for social or economic impacts associated with the public health and environmental benefits of the proposed flat-lined standards, both of which we can expect to be negative when compared with the existing clean vehicle standards. Our findings lead us to conclude that the proposed rollback of the existing clean vehicle standards will reduce the long-term positive macroeconomic benefits expected to be generated through the existing clean vehicle standards.