Testimony of Dr. Dave Cooke, Sr. Vehicles Analyst, Union of Concerned Scientists, to the Environmental Protection Agency's Science Advisory Board—May 31, 2018

My name is Dr. Dave Cooke, Senior Vehicles Analyst of the Union of Concerned Scientists. The Union of Concerned Scientists is an organization which works to ensure that policy is based on the best available science, so I very much appreciate the opportunity to speak with you today.

EPA has a responsibility under the Clean Air Act to control the emissions of harmful pollutants, including smog-forming nitrogen oxides and greenhouse gases like carbon dioxide. Recent regulatory actions taken by the agency are not based on the best available data, putting these critical protections at risk. I urge the Science Advisory Board to exercise its authority to correct these failings and review these actions to address these shortcomings and ensure that the administration is upholding its legal obligations to safeguard human health and the environment.

The focus of my work at UCS is on emissions from both light- and heavy-duty vehicles, so my testimony focuses on the shortcomings in the administration Mid-Term Review of Light-Duty Vehicle Standards and its Glider Vehicle Regulation. However, many of the shortcomings in these rules apply across a number of the administration's recent actions, including an over-reliance on industry comments and ignoring large amounts of publicly funded data and analysis from the EPA itself.

Mid-term Evaluation

With respect to the Mid-term Evaluation, I agree with many of the concerns raised by the SAB Workgroup, including that the agency's final determination "relied extensively on public comment without…validation" and did not account for any direct or indirect impacts on emissions or public health.[1] However, there are a number of specific flaws which bear further scrutiny.

In the description of the planned EPA action provided to the SAB (2060-AT77), the agency describes in detail a wide assortment of peer-reviewed literature and analysis which were intended to inform the Midterm Evaluation.[2] Not a single one of the 25 peer-reviewed publications[3] or the 6 additional peer-reviewed reports[4] identified by EPA as relevant to the mid-term evaluation were cited by the Administrator in the Final Determination. Results from the agency's transparent, publicly available, and peer-reviewed ALPHA and OMEGA models were completely ignored—in fact, the only mention of EPA's modeling is analysis provided by the Alliance of Automobile Manufacturers and Global Automakers which the Administrator claimed "rais[ed] several technical issues" in "several new studies" despite multiple EPA meetings responding to the critiques and a thorough EPA memo rebutting the analysis uploaded to the docket in November 2017,[5] all of which was again ignored by the Administrator in the Final Determination.

This, of course, outlines the fundamental flaw with the Administrator's Final Determination—a complete and total disregard for analytic reasoning. As scientists and experts on this Board are well aware, when faced

---

[1] SAB Work Group Recommendations on the Fall 2017 Semi-Annual Regulatory Agenda, p. B-18.
[2] *Ibid.*, pp. B-12—B-16.
[3] Full list available at https://www.epa.gov/regulations-emissions-vehicles-and-engines/midterm-evaluation-light-duty-vehicle-greenhouse-gas#publication.
[4] Full list detailed in SAB Work Group, pp. B-13, B-15—B-16: EPA-420-R-15-006, EPA-420-R-16-018, EPA-420-R-15-012, report on EPA's ALPHA model response surface equation, report on consumer willingness to pay for vehicle attributes, and content analysis of professional auto reviews.
[5] Memo to the docket from Kevin Bolon, EPA, November 24, 2017, regarding stakeholder meeting with Auto Alliance and Global Automakers and their contractor, Novation Analytics, and EPA Technical Response to Assertions of 'ALPHA-to-OMEGA Bias'. EPA-HQ-OAR-2015-0827-10988

with competing sets of conclusions, analytic rigor and critical thought must be exercised to determine where the truth lies. No such analysis is provided in the Final Determination—instead, it reads like a third grader's book report, summarizing large chunks of public comment verbatim without any substantive explanation of the material, despite acknowledgement of contradictory evidence there-in. This is in extreme contrast to the Final Determination filed in 2017—in 2017, the agency finalized a 33-page determination accompanied by 174 pages of responses to comments on a 268-page proposal based on 719 pages of technical support. On April 2, 2018, the Administrator finalized a 38-page determination with no accompanying justification, based largely upon responses to a 3-page proposal with, again, no accompanying technical data.

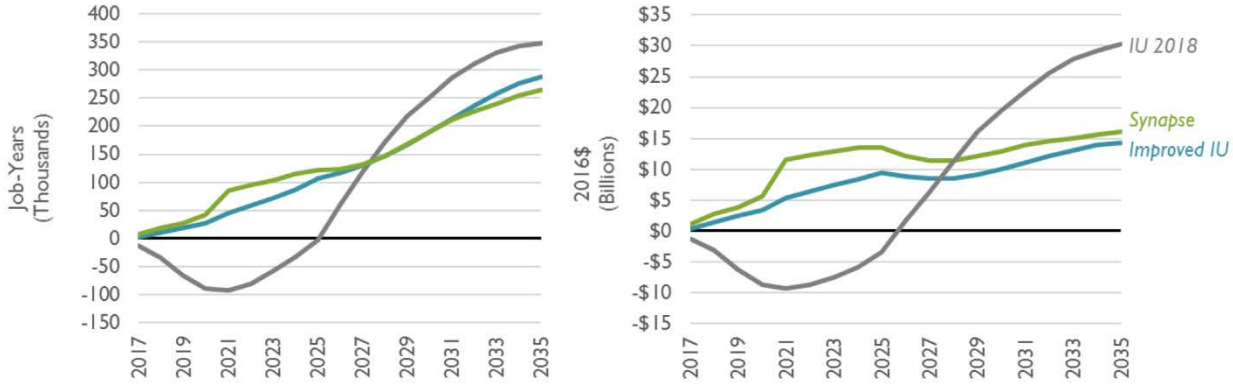

FIGURE 1. (left) Jobs and (right) Gross Domestic Product resulting from the macroeconomic modeling of 2017-2025 state and federal emissions standards (Allison, Hall, and Ackerman 2018). The gray line is based upon the assumptions used in the REMI modeling by Indiana University (Carley, et al. 2017); the blue line incorporates the assumptions of the total-cost-of-ownership modeling in Carley et al. 2017 ignored in their macroeconomic analysis; and the green line reflects updated technical costs and increased valuation of fuel savings by consumers, as described in Allison, Hall, and Ackerman 2018.

Perhaps this example best underscores the superficiality of the Administrator's Final Determination: the ***only*** peer-reviewed report cited by the Administrator in his Final Determination was misrepresented, as noted by the authors of the report.[6] Contrary to both the industry-funded Trinity Consulting/NERA report and the deeply flawed study by the Center for Automotive Research claiming potential losses of more than 1 million jobs which the Administrator pointed to in the Final Determination, despite extensive criticism and responses by EPA technical staff and public commenters, the economic analysis by IU concludes that while there may be some short-term impacts related to both state and federal vehicle emissions regulations, the long-term benefits in both jobs and GDP significantly outweigh any short-term losses. Furthermore, even more recent analysis shows that even those short-term impacts are overstated, since they are largely the results of inconsistencies between two models used in the report, including assumptions that consumers ignore fuel savings completely when purchasing a vehicle and that consumers do not finance their vehicle purchases (Figure 1).[7] This most recent report was submitted to the agency as part of the OIRA review process of the Final Determination under Executive Order 12866[8] and was summarily ignored by the agency in its Final Determination.

---

[6] The report in question is Carley, et al., 2017. Authors responded to the citation in the Final Determination in a letter to Administrator Pruitt on May 3, 2018, uploaded to the docket as EPA-HQ-OAR-2015-0827-11416.
[7] Allison, A., J. Hall, and F. Ackerman. 2018. Cleaner Cars and Job Creation: Macroeconomic impacts of federal and state vehicle standards. Online at http://synapse-energy.com/cleaner-cars-and-job-creation.
[8] Meeting with the Office of Management and Budget, March 30, 2018. Attendees: Jim Laity, Scott Burgess, Kim Olson, Mary Fitzpatrick (OMB); Mike Olechiw, Jeff Alson, Tad Wysor (EPA); Dave Cooke, Alyssa Tsuchiya (UCS); Ann Mesnikoff (ELPC); Alice Henderson, Martha Roberts (EDF); Margarete Strand (Public Citizen); Ben Longstreth, Luke Tonachel (NRDC); and Alejandra Nunez (Sierra Club).

This and many other shortcomings are why the Science Advisory Board should review the fundamentally flawed technical basis for the Administrator's Final Determination, ensuring that the Final Determination and any potential ensuing regulatory activity are based upon rigorous and thorough analysis of the best available data, not simply liberal quotation of public comments.

The Board has raised a number of issues which will require more careful scrutiny and which I would like to briefly touch upon:

- Rebound effect: To assess this, the EPA commissioned an independent, peer-reviewed report by Kenneth Small and Kent Hymel which briefly discusses the literature and presents updated empirical estimates of the short- and long-term rebound effect.[9]
- Fleet turnover: Assessing fleet turnover inherently relies upon modeling of consumer choice, which has historically been found to yield very little predictive capability, with one recent analysis even indicating that the best year-to-year predictor is simply last year's relative marketshare rather than any complex model.[10] Moreover, both EPA and NHTSA have examined the potential for such inclusion in the past and have also found little evidence of predictive potential, noting that "the model's predictions are unlikely to be as precise as is suggested from the model output,"[11] and found only at most short-term (2-3 model years) forecasting of market response, with difficulty predicting longer-term responses due to the need for projecting changes in household characteristics.[12]
- High octane fuels: While the technical evidence suggests that co-optimizing fuels and engines has the potential to cost-effectively enhance overall system efficiency, particularly matching fuel octane and octane sensitivity to high compression ratio engines, realizing these benefits requires significant coordinated changes in engine design, fuel production, and fuel distribution infrastructure. As such, while implementing these coordinated changes is feasible, it will take at least a decade and is therefore not realistic within the 2025 timeframe. While initial elements of the system may be deployed sooner, for example selling compatible cars, realizing the potential emissions benefits of a co-optimized system will not be achieved until the vehicles, fuels and fuel distribution infrastructure are in place.[13]
- Modeling: As noted earlier, the Final Determination did not utilize EPA's ALPHA and OMEGA models. The ALPHA model is an open source, accessible, and peer-reviewed full-vehicle simulation model, and according to the National Research Council, "the use of full vehicle simulation modeling…contributed substantially to the value of the Agencies' estimates of fuel consumption and costs, and [the committee] therefore recommends the continue to increase the use of these methods to improve their analysis."[14] The OMEGA model is built upon the ALPHA model, and its public accessibility adds additional transparency to the rulemaking process as well as itself provides additional value as the basis for policy research.[15] At the same time, EPA staff continues to improve

---

[9] EPA-420-R-15-012
[10] C. Grace Haaf, Jeremy J. Michalek, W. Ross Morrow and Yimin Liu, "Sensitivity of Vehicle Market Share Predictions to Discrete Choice Model Specification," *J. Mech. Des* 136(12), 121402 (Oct 20, 2014). Online at http://dx.doi.org/10.1115/1.4028282.
[11] EPA. 2012. *Consumer Vehicle Choice Model Documentation.* EPA-420-B-12-052, p. 3.
[12] Jim Tamm, "NHTSA's Recent Activities on Light-Duty Fuel Economy," presentation to the National Research Council, Washington, DC, June 23, 2014.
[13] Farrell, John, John Holladay, and Robert Wagner. "Fuel Blendstocks with the Potential to Optimize Future Gasoline Engine Performance: Identification of Five Chemical Families for Detailed Evaluation." Technical Report. U.S. Department of Energy, Washington, DC. 2018. DOE/GO-102018-4970.
[14] National Research Council Committee on the Assessment of Technologies for Improving Fuel Economy of Light Duty Vehicles, Phase 2. 2015. *Cost, Effectiveness, and Deployment of Fuel Economy Technologies for Light-Duty Vehicles*. National Academies Press: Washington, DC. Online at https://www.nap.edu/catalog/21744/cost-effectiveness-and-deployment-of-fuel-economy-technologies-for-light-duty-vehicles.
[15] For example, Lutsey, N., et al. 2017. https://www.theicct.org/publications/US-2030-technology-cost-assessment

these resources.[16] It is paramount that the agency continue to utilize peer-reviewed, transparent, and publicly available models in order to justify its regulatory actions.

Glider Regulation

Of course, the Final Determination is not the only action where the Administrator has substituted industry comment for hard evidence. In its proposal to allow the sales of glider vehicles, EPA relied upon technical data that is questionable not just for its conclusions, but for its flawed methodological approach and compromised pedigree.

While EPA claims that the basis for its action on glider kits is legal in nature, it repeatedly refers to data submitted by the petitioning industry in support of its assessment, never once attempting to validate the information submitted by the petitioners nor referring at any point in the proposed repeal to the numerous other comments which conflict with the assertions made by the petitioners. This alone is concerning, for many of the same reasons raised above regarding the Administrator's Final Determination. However, it is even more troubling considering the provenance of the study itself.

The Tennessee Tech study liberally quoted by the Administrator in the agency's proposal was funded by Fitzgerald Trucks, one of the petitioners; it was conducted at Fitzgerald's facilities, using Fitzgerald's proprietary test procedures rather than any of the many widely established regulatory and industry-certified tests; and it was conducted by a research team at Tennessee Tech that included "no qualified, credentialed engineer."[17] The principal investigator for the project withdrew himself from the study,[18] citing numerous concerns including how results were misrepresented for political purposes and later noting that the study in question included examples of "falsification by omission," a "violation of research principles."[19] In fact, members of the faculty recommended that a graduate student involved in the study no longer complete a thesis on the work, citing concerns over handling of the data.

The repeated referral of the Administrator to the Tennessee Tech study is made even more perplexing by the test data provided by the agency to the docket affirming its conclusions on the impacts of these vehicles, yielding NOx emissions up to 40 times greater and particulate matter emissions up to 450 times greater than modern heavy-duty trucks.[20] These results are largely consistent with EPA's estimates of the emissions from these vehicles when the heavy-duty vehicle regulations were finalized[21] as well as separate and independent testing by the California Air Resources Board.[22] My own analysis of EPA's test data indicates that it is likely Fitzgerald has tampered with the emissions controls of these engines to an extent that they do not even meet the standards which the engines were originally designed to meet.[23]

A further shortcoming in the proposed glider repeal is the lack of an impact assessment. Given the technical data indicating the high levels of pollution posed by these vehicles, it is expected that repealing this

---

[16] See, for example, the report on EPA's ALPHA model response surface equation, under peer-review.
[17] According to the head of Tennessee Tech University's engineering department, as quoted in Halper, E., "EPA used disavowed research to justify putting dirtier trucks on the road," *Los Angeles Times*, May 29, 2018.
[18] Letter from Dr. Benjamin Mohr to Philip Oldham re: withdrawal as principle investigator, January 25, 2018.
[19] Letter from Dr. Benjamin Mohr to Dr. Bharat Soni re: Violation of Tennessee Tech Policy 780 Misconduct in Research, January 27, 2018.
[20] Chassis Dynamometer Testing of Two Recent Model Year Heavy-Duty On-Highway Diesel Glider Vehicles. EPA-HQ-OAR-2014-0827-2417.
[21] Appendix A, Section 14, Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles -Phase 2: Response to Comments for Joint Rulemaking. EPA-420-R-16-901.
[22] California Air Resources Board Comments on Proposed Repeal of Emission Requirements for Glider Vehicles, Glider Engines, and Glider Kits. EPA-HQ-OAR-2014-0827-4831.
[23] Union of Concerned Scientists Comments Regarding the Repeal of Emission Requirements for Glider Vehicles, Glider Engines, and Glider Kits. EPA-HQ-OAR-2014-0827-4878.

provision of the heavy-duty regulations would result in significant adverse health impacts—in the proposed repeal, the agency even notes that "some benefits for children's health…would be lost." It is critical that EPA conduct a thorough analysis of the health and emissions impacts of this repeal, including impacts on low-income and vulnerable communities most likely to be adversely impacted by pollution along heavily-trafficked truck routes. It should also take into consideration that the current levels of glider deployment more closely represent a floor than a ceiling, since it is likely that manufacturers and/or assemblers who have either exited the glider market or not yet participated may choose to enter the glider market as a way to provide low-cost trucks to circumvent the addition of complex and expensive pollution controls required of conventional heavy-duty trucks, thus leading to an increase in marketshare for glider vehicles.

Conclusion

Recent regulatory activity by EPA has ignored significant technical data, relying significantly upon extensive repetition of industry comments without any external validation. The Science Advisory Board should review these actions and ensure that the EPA is upholding its mission to protect public health and the environment.