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VIA ELECTRONIC SUBMISSION

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Attn: Docket No. NHTSA-2018-0067
Docket No. NHTSA-2017-0069
Docket No. EPA-HQ-OAR-2018-0283

RE: SUPPLEMENTAL COMMENT OF ENVIRONMENTAL PROTECTION NETWORK TO ADD RELEVANT TECHNICAL ASSESSMENT AND SUPPORTING DATA TO THE ADMINISTRATIVE RECORD

The Environmental Protection Network (EPN) is an organization comprised of over 400 EPA alumni volunteering their time to protect the integrity of U.S. Environmental Protection Agency (EPA), human health and the environment. We harness the expertise of former EPA career staff and confirmation-level appointees to provide an informed and rigorous defense against current Administration efforts to undermine public health and environmental protections.

EPA experts continue to release new technical assessments and other research related to light-duty vehicle emissions, as detailed below. These materials demonstrate important developments in greenhouse gas emission-reduction technology that must be brought to bear in the current rulemaking as well as further demonstrate EPA's technical, engineering expertise in evaluation and assessment of control of vehicle emissions and fuel efficiency. EPA's failure to docket its own assessments before the close of the comment period precluded meaningful public comment on these materials.[1] Not only does failure to docket these materials violate standard administrative law principles to consider all pertinent evidence, but failure to docket these assessments as soon as possible after their availability violates the Clean Air Act (CAA).[2] To the extent any final rule fails to address, explain, analyze, and

[1] *See* 5 U.S.C. § 553(b); 42 U.S.C. § 7607(d)(3); Executive Order 12,866 § 6(a)(3)(E).
[2] CAA section 307 (b) (4) (B) (i).

incorporate the findings of EPA's assessments, it would arbitrarily fail to address highly relevant information.[3] It would also reflect an unlawful delegation to NHTSA of EPA's duty to rely on its own expertise in setting GHG vehicle emission standards.[4]

EPA's National Center for Advanced Technology ("NCAT") regularly conducts assessments of "the effectiveness of advanced low emission and low fuel consumption technologies for a broad range of key light-duty vehicles, engines and transmissions" sold both in the U.S. and global markets.[5] The Center uses state-of-the-art testing equipment, certified to industry standards, to assess vehicle carbon dioxide emissions and fuel economy performance, generate detailed engine and transmission efficiency maps, and identify key control system interactions, all of which are critical inputs to the complete vehicle simulations with the ALPHA tool.[6] That data is also used to develop inputs to the OMEGA model, which was developed by EPA experts to provide critical and highly credible assessments in order to inform EPA's analysis and help establish the technical foundation for the past and future Clean Car Standards.

These assessments regarding achieved efficiency/emissions performance and projected opportunities for further improvement are of "central relevance" to the process of setting appropriate greenhouse gas emission standards for light-duty vehicles.[7] For example, EPA and NHTSA extensively detailed the importance of assessing technology effectiveness for both agencies' compliance models in the Joint Final Technical Support Document accompanying the 2012 Final Rule.[8] The data contained in the test packages described below is essential to understand the operation of emission-reduction technologies that are being deployed in automaker fleets, and to develop baselines for EPA's vehicle simulation tool that projects the effectiveness of forthcoming technologies.[9] EPA staff publishes peer-reviewed technical papers, including the ones described below, to explain the results of the agency's benchmarking tests to the broader technical community.[10] The use of benchmarking studies has been an important part of EPA's process for developing and reviewing greenhouse gas emission and fuel economy standards.[11]

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[3] Motor Vehicle Manufacturers Ass'n v. State Farm Mutual Automobile Insurance Co., 463 U.S. 29, 43 (1983).
[4] *See* Comments of Center for Biological Diversity, Conservation Law Foundation, Environmental Defense Fund, Earthjustice, Environmental Law and Policy Center, Natural Resources Defense Council, Public Citizen, Inc., Sierra Club, and Union of Concerned Scientists on the SAFE Rule, Appendix A Section III(A) (Oct. 26, 2018), https://www.regulations.gov/document?D=EPA-HQ-OAR-2018-0283-5070.
[5] EPA, Benchmarking Advanced Low Emission Light-Duty Vehicle Technology, https://www.epa.gov/vehicle-and-fuel-emissions-testing/benchmarking-advanced-low-emission-light-duty-vehicle-technology (last visited Apr. 28, 2019).
[6] *Id.*; *see also* EPA & NHTSA, Joint Technical Support Document: Final Rulemaking for 2017-2025 Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards at 5-24, EPA-420-R-12-901 (Aug. 2012) (explaining that EPA recently upgraded its testing infrastructure at the National Vehicle and Fuel Emissions Laboratory, which is where NCAT is located).
[7] 42 U.S.C. § 7607(d)(4)(B)(i).
[8] EPA & NHTSA, Joint Technical Support Document, Section 3.3: "How did the agencies determine effectiveness of each of these technologies?" (Aug. 2012).
[9] *See* EPA, Technical Support Document: Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation, Section 2.3.3, at 2-231, EPA-420-R-16-021 (Nov. 2016) (describing in detail how EPA conducted vehicle benchmarking and used the results to support its Midterm Evaluation and Proposed Determination).
[10] *See id.* at 2-232.
[11] See, e.g. i*d.* Section 2.3.4.1.8.1, at 2-303.

Moreover, EPA is explicitly obligated under Clean Air Act Section 307(d)(4)(B)(i) to docket these documents "as soon as possible after their availability."[12] Yet it appears that the agency has totally and inexplicably failed to include these assessments in the rulemaking docket. EPA's failure to docket these documents is contrary to CAA Section 307(d)(4)(B)(i). EPA adhered to this requirement in past rulemakings by adding its technology benchmarking assessments to the administrative record for the Clean Cars rulemakings, and updating the docket regularly as such additional reports were published.[13]

The Environmental Protection Network submits the following relevant technology assessments conducted by EPA staff into the administrative record, plus the underlying supporting data.[14] These studies refute a number of inaccurate statements and positions taken by the agencies on important technology issues in the NPRM, and they provide important technical support for retaining the current level of the GHG and CAFE standards and rejecting their proposed relaxation. The agencies must comprehensively address, explain, analyze, and incorporate these studies as part of their analysis for any final rule and must fully justify and explain whether and how they rely on these studies in a final rule.

1. Kargul, J., Stuhldreher, M., Barba, D., Schenk, C. et al., "Benchmarking a 2018 Toyota Camry 2.5-Liter Atkinson Cycle Engine with Cooled-EGR," SAE Technical Paper 2019-01-0249, 2019, doi:10.4271/2019-01-0249 and the backup data to the assessment found in https://www.epa.gov/sites/production/files/2019-04/2018-toyota-2.5l-a25a-fks-engine-tier3-fuel-test-data-package-dated-04-08-19.zip.

Among other highly relevant information, this assessment indicates that the benchmarked 2018 Toyota Atkinson cycle engine with cooled exhaust gas recirculation (CEGR) has the highest efficiency for a non-hybrid engine yet demonstrated. The benchmarked values were generally consistent with Toyota's own estimates, as well as EPA's estimates using the Alpha simulation tool (14). The assessment and backup materials include multiple engine maps documenting precise performance. There were no recorded issues with delay of catalyst light-off, belying an undocumented assertion in the PRIA (242). In addition, the assessment notes that this performance could be further improved by addition of cylinder deactivation (CDEAC), either continuous or partial discrete. The assessment indicates how either could be added, and estimates performance by a number of means (benchmarking of the technology in other engines, using manufacturer Tula Technical data, and by other engineering analysis (19-20)). This analysis belies the cursory dismissal of the Atkinson-CEGR-CDEAC package in

[12] 42 U.S.C. § 7607(d)(4)(B)(i).
[13] *See, e.g.*, SAE Article: Nissan's new 2012 hybrid system aims for 1.8-L efficiency with a 3.5-L V6 (Feb. 15, 2010), https://www.regulations.gov/document?D=EPA-HQ-OAR-2010-0799-0034 (published in EPA's Light-Duty Phase 2 rulemaking docket on Oct. 13, 2010); EPA National Center for Advanced Technology, 2014 Ram 1500 HFE 845RE Transmission Test Report (June 14, 2016), https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-0667 (published in EPA's Mid-Term Evaluation docket on July 26, 2016); EPA National Center for Advanced Technology, 2013 Chevrolet Malibu 6T40 Transmission Test Report (June 14, 2016), https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-0666 (published in EPA's Mid-Term Evaluation docket on July 26, 2016).
[14] All of these records, are published on EPA's website: https://www.epa.gov/vehicle-and-fuel-emissions-testing/benchmarking-advanced-low-emission-light-duty-vehicle-technology.

the PRIA at 303. In addition, Mazda utilizes partial discrete CDEAC on one of its 2018 sedan models (19), belying the PRIA's undocumented surmise that the technology could only be used on full-size pickups due to noise/harshness/vibration issues (PRIA 303).

2. https://www.epa.gov/vehicle-and-fuel-emissions-testing/barba-d-benchmarking-2018-toyota-camry-25-liter-atkinson-cycle.

Confirms consistency of EPA estimates and Toyota estimates for performance of 2018 Toyota Atkinson cycle engine with CEGR.

3. Stuhldreher, M., Kargul, J., Barba, D., McDonald, J. et al., "Benchmarking a 2016 Honda Civic 1.5-liter L15B7 Turbocharged Engine and Evaluating the Future Efficiency Potential of Turbocharged Engines," SAE Int. J. Engines 11(6):1273-1305, 2018, doi:10.4271/2018-01-0319. Engine data is published at https://www.epa.gov/sites/production/files/2019-02/2016-honda-1-5l-l15b7-engine-tier-2-fuel-test-data-package-02-04-19.zip.

The assessment extends the Honda engine maps for the same engine, and further explains how performance of the engine can be further enhanced by the addition of full continuous CDEAC, CEGR, advanced boosting and use of Miller cycle. Many of these combinations are arbitrarily disallowed by the CAFE model.[15]

4. Schenk, C. and Dekraker, P., "Potential Fuel Economy Improvements from the Implementation of cEGR and CDA on an Atkinson Cycle Engine," SAE Technical Paper 2017-01-1016, 2017, doi:10.4271/2017-01-1016. Engine test data at https://www.epa.gov/sites/production/files/2019-03/2016-mazda-2-5-l-turbo-skyactiv-g-engine-tier-2-fuel-test-data-package-dated-03-13-19.zip.

The assessment investigates potential GHG improvements when adding CEGR and CDEAC to an Atkinson cycle engine with a 14:1 geometric compression ratio. Cooled EGR and CDEAC are known means to mitigate combustion knock and improve fuel efficiency, particularly in boosted engines. The paper explains how and why both can be used to enhance performance of the Atkinson cycle engine. At high load, cEGR can reduce or eliminate the need for enrichment that would otherwise be needed for knock and temperature control. By reducing the tendency to knock, cEGR can be used to maintain best BTE combustion phasing for improved efficiency. cEGR can also improve fuel efficiency at part-load conditions by reducing pumping work. Though cEGR displaces fresh air in the cylinder, boost can be increased to maintain the desired power. Cylinder deactivation is a known method for reducing part-load CO_2 emissions that is already in use. Deactivating one or more cylinders at light- to mid-loads can reduce pumping losses by increasing the load, throttle angle, and intake manifold pressure of the operating cylinders. The paper acknowledges that NVH issues are one of the limiting factors for this approach but can be dealt with by limiting operating modes when cylinders are deactivated, or by adding NVH mitigation hardware. The proposal inaccurately and

[15] See generally Comments of ICCT App. 3 at I 14-17 (EPA-HQ-OAR-2018-0283-5456).

dismissively rejects this combination of technologies without addressing these means of adding cEGR and CDEAC to high-compression engines. See 83 FR at 43038.

Respectfully submitted,

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