POET
900 7th St. NW, Suite 820
Washington, D.C. 20001
Ph: (605) 965-2200
poet.com

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Joel Creswell
Department of Ecology
Climate Pollution Reduction Program Manager
P.O. Box 47600
Olympia, WA 98504-7600

Submitted electronically via: https://aq.ecology.commentinput.com/?id=BsWVfdFPa

RE: POET COMMENTS ON WA ECOLOGY'S PREPROPOSAL STATEMENT OF INQUIRY REGARDING AMENDMENTS TO THE CLEAN FUELS PROGRAM RULE.

Dear Mr. Creswell:

As the world's largest producer of low carbon biofuel and a global leader in sustainable bioproducts, POET appreciates the opportunity to provide comments on the Department of Ecology's ("Ecology") Preproposal Statement of Inquiry regarding amendments to the Clean Fuels Program Rule. POET enthusiastically supports Washington's Clean Fuel Standard ("CFS"), and welcomes the State's leadership in promoting the production and use of sustainable aviation fuels ("SAF").

We respectfully urge Ecology to develop rules that will recognize and incentivize biofuel producers for investments in sustainable farming and carbon reducing practices and technologies to facilitate bioethanol-to-jet fuel pathways for SAF. Although Ecology has indicated that it is not now considering amending its Tier 2 WA-GREET model and land use change factors, we believe that certain simple changes to the model, including the incorporation of a credit mechanism to incentivize climate smart agricultural practices, are critical to the the Clean Fuels Program as a whole and to development of a SAF market in Washington State.

We further encourage Ecology to align with the State of Oregon in adopting a rule that allows credit-generating fuel producers to adjust their credit balances to account for operational data that shows changes in the carbon intensity of their fuel pathways.[1]

POET also urges Ecology to adopt amendments that would promote investment in renewable process energy, including amendments to allow for indirect accounting for the use of renewable energy in low carbon fuel production.

[1] *See* OAR 340-253-0450.

I. About POET

POET creates plant-based alternatives to fossil fuels that unleash the regenerative power of agriculture and cultivate opportunities for America's farm families. Founded in 1987 and headquartered in Sioux Falls, POET operates 34 bioprocessing facilities across eight states and employs more than 2,200 team members. With a suite of bioproducts that includes POET Distillers Grains, POET Distillers Corn Oil, POET Purified Alcohol, and POET Biogenic CO_2, POET nurtures an unceasing commitment to innovation and advances powerful, practical solutions to some of the world's most pressing challenges. Today, POET holds more than 80 patents worldwide and continues to break new ground in biotechnology, yielding ever-cleaner and more efficient renewable energy. POET is also a leading champion for nationwide access to E15, a renewable fuel blend made with 15% bioethanol.

Through technological innovation, investments in carbon capture and renewable energy, and programs to reduce on-farm emissions, POET is steadily lowering the carbon intensity ("CI") of its fuel to meet the ambition of Washington's Clean Fuel Standard as it grows and evolves. We see the potential for biothenol to become a net-zero carbon liquid fuel on a life-cycle basis, operating to further decarbonize on-road transportation and serving as a feedstock for the next-generation fuels that will power the aviation industry and other hard-to-electrify sectors of the economy. But POET cannot realize this vision without appropriate regulatory incentives, grounded in the best available science, that recognize and reward further investments in the decarbonization of our fuel.

As set forth below, we recommend that Ecology adopt program amendments to further decarbonize the production of biofuel, and improve the administration of Washington's Clean Fuels Program.

II. Ecology Should Recognize Bioethanol Climate and Health Benefits.

Bioethanol offers significant air quality and GHG emissions reduction benefits compared to petroleum-based gasoline. To achieve Washington's emissions reduction and air quality goals, Ecology must ensure that bioethanol continues to play a central role in the Clean Fuels Program.

Multiple studies show that blending bioethanol into the transportation fuel supply results in significantly lower lifecycle GHG emissions compared to petroleum-based gasoline. Specifically, studies show that emissions reductions attributable to bioethanol range from 41 to 46 percent compared to emissions associated with petroleum-based gasoline. According to the Department of Energy's Argonne National Laboratory ("ANL"), typical corn ethanol provides a 44 percent GHG reduction compared to gasoline.[2] Similarly, researchers affiliated with Harvard University, MIT, and Tufts University conducted a meta-analysis showing that corn ethanol as of 2021 offers

[2] Lee, Uisung et al., *Retrospective Analysis of the U.S. Corn Ethanol Industry for 2005–2019: Implications for GHG Emission Reductions*, Biofpr Vol. 15 Issue 5, at 1328 (May 4, 2021) https://doi.org/10.1002/bbb.2225.

an average GHG reduction of 46 percent compared to gasoline ("Scully study").[3] For comparison, the average CI of pure gasoline is approximately 96 gCO2e/MJ.[4]

According to the USDA, from 2011 to 2019, the average CI of ethanol fuel has decreased by approximately 25 percent.[5] This decrease can be attributed to (a) market-driven changes in corn production that lowered the intensity of fertilizer and fossil fuel use on farms; (b) more efficient use of natural gas and electricity at ethanol production facilities; and (c) improvements in land use change analyses based on hybrid economic-biophysical models that account for land conversion, land productivity, and land intensification.[6] In other words, older assessments using inexact data overestimated bioethanol's CI, and bioethanol has improved in environmental performance over time. As a result, more recent studies demonsrate that bioethanol provides much more significant emissions reductions than previously understood.[7]

In addition to GHG benefits, a recent analysis from leading national experts found air quality and public health benefits associated with higher biofuel blends in gasoline, including reductions in particulate matter ("PM"), carbon monoxide ("CO"), and total hydrocarbons ("THC").[8] This study was the first large-scale analysis of data from light-duty vehicle emissions that examines real-world impacts of bioethanol-blended fuels on regulated air pollutant emissions. The study found that CO and THC emissions were significantly lower for higher bioethanol fuels for port fuel injected engines under cold-start conditions. The study found no statistically significant relationship between higher bioethanol blends and nitrogen oxides ("NOx") emissions. With regard to PM, studies show that emissions decrease by 15 – 18% on average for each 10% increase in ethanol content under cold-start conditions.[9] A 2022 University of California Riverside ("UC") study assessing the impact of E15 on air pollutant emissions for model year vehicles 2016 to 2021 was consistent with these results, finding that replacing E10 with E15 reduced PM emissions by 18%, with cold-start emissions being reduced by 17%.[10] Analyses by professors at Tufts

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[3] Scully, Melissa et al., *Carbon Intensity of Corn Ethanol in the United States: State of the Science*, ENVIRNOMENTAL RESEARCH LETTERS, at 16 (March 10, 2021) https://iopscience.iop.org/article/10.1088/1748-9326/abde08

[4] *Id*.

[5] U.S. Dep't of Agriculture, *The California Low Carbon Fuel Standard: Incentivizing GHG Mitigation in the Ethanol Industry*, at 1 (Nov. 2020) https://www.usda.gov/sites/default/files/documents/CA_LCFS_Incentivizing_Ethanol_Industry_GHG_Mitigation.pdf.

[6] *Id.* at 2.

[7] A 2022 study by Lark, et al., estimates a higher LUC value for corn starch bioethanol. This higher estimate is an outlier, and rebuttals were published by Environmental Health & Engineering, https://www.pnas.org/doi/10.1073/pnas.2213961119, and the U.S. Department of Energy, https://greet.es.anl.gov/publication-comment_environ_outcomes_us_rfs. *See* Lark, Tyler et al., *Environmental Outcomes of the US Renewable Fuel Standard*, PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (PNAS) (2022), https://doi.org/10.1073/pnas.2101084119.

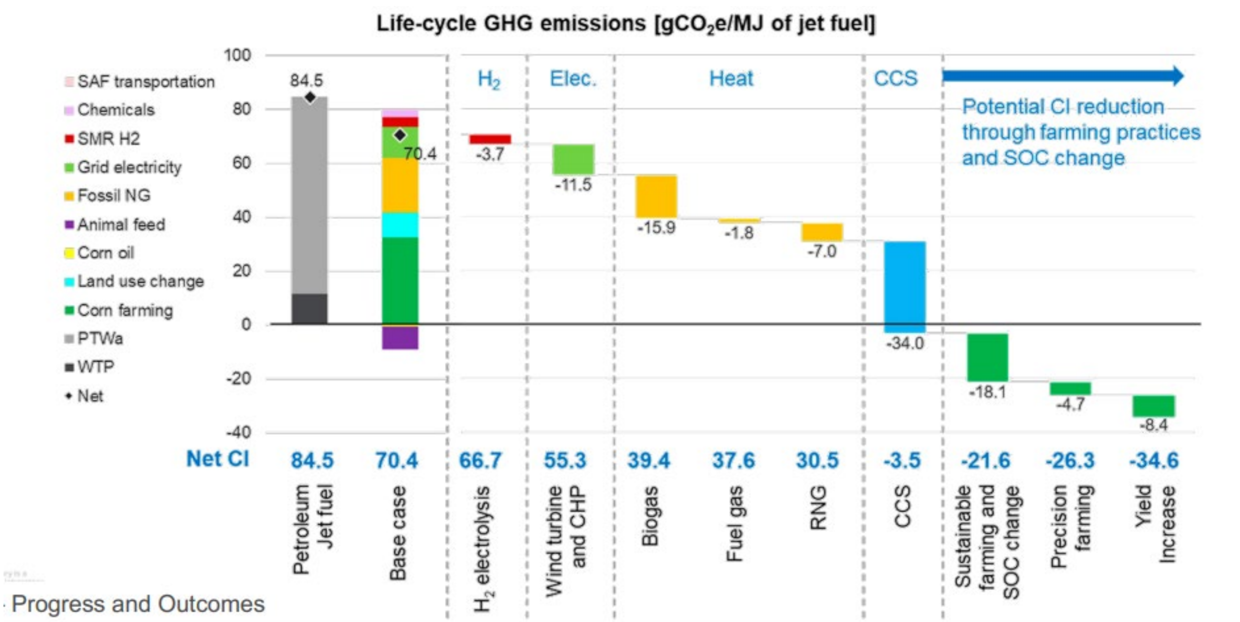
[8] *See* Kazemiparkouhi, Fatemeh et al., *Comprehensive US Database and Model for Ethanol Blend Effects on Regulated Tailpipe Emissions*, SCIENCE OF THE TOTAL ENVIRONMENT, at 15 (March 2022), https://www.sciencedirect.com/science/article/pii/S0048969721065049?via%3Dihub.

[9] *Comprehensive US Database and Model for Ethanol Blend Effects on Regulated Tailpipe Emissions* at 5, 11, 13.

[10] Karavalakis, Georgios et al., *2022 Comparison of Exhaust Emissions Between E10 CaRFG and Splash Blended E15. Final Report,* prepared for Riverside, California Air Resources Board, Growth Energy Inc./Renewable Fuels Association, and USCAR., at 22-23, 36 (June 2022), https://ww2.arb.ca.gov/sites/default/files/2022-07/E15_Final_Report_7-14-22_0.pdf

University show that the associated health benefits may be most significant in disadvantaged communities in areas of high traffic density and congestion.[11]

Bioethanol's current CI is a ceiling — not a floor. As the Scully study notes, "[m]arket conditions that favor greater adoption of precision agriculture systems, retention of soil organic carbon, and demand for co-products from ethanol production may [further] lower the CI of corn ethanol."[12] And under the federal Inflation Reduction Act, biofuel producers like POET are incentivized to make investments in carbon-reducing technologies, including carbon dioxide capture and utilization strategies, and investments in low-carbon process energy that have the potential to drastically lower the CI of every gallon of ethanol we produce. As the ANL chart below shows, through investment and innovation, bioethanol has the ability to become a zero-carbon fuel.[13]



Because of the GHG and air quality emissions reductions associated with bioethanol, incentives to increase bioethanol blending into Washington's fuel supply advance the State's decarbonization and air quality goals. As bioethanol producers continue to reduce lifecycle emissions, bioethanol will continue to drive the emissions reductions Washington needs to decarbonize and improve air quality.

III. Ecology Should Revise the WA-GREET Model to Align with ANL and Provide Incentives that Allow Bioethanol to Serve as a Feedstock for SAF

As noted above, recent analysis performed by DOE's Argonne National Laboratory demonstrates the possibilities for deep decarbonization at biorefineries and points towards net-zero SAF

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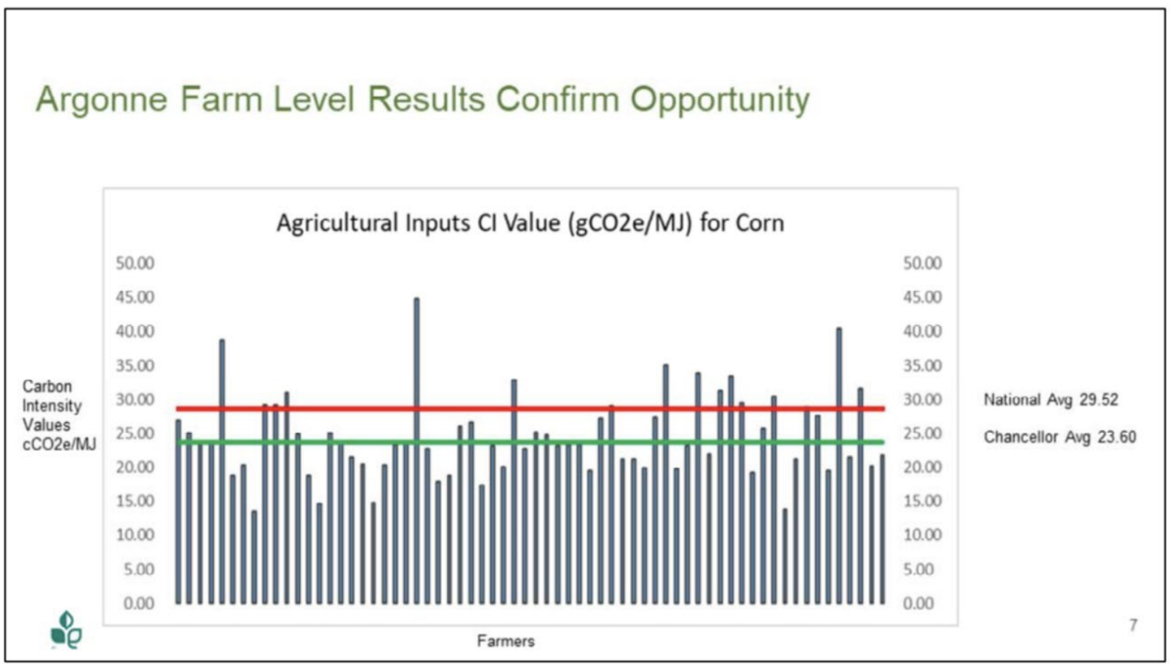
[11] *See* Appendix A, Tufts University Department of Civil and Environmental Engineering, *Air Quality and Public Health Comments to RFS* (Feb. 3, 2022) at 3-4.
[12] Scully study at 17.
[13] Argonne National Laboratory, *DOE Bioenergy Technology Office (BETO) 2023 Project Peer Review, Life Cycle Analysis of Biofuels and Bioproducts and GREET Development*, at 18 (April 4, 2023), https://www.energy.gov/sites/default/files/2023-05/beto-16-project-peer-review-dma-apr-2023-wang.pdf.

production.[14] But POET and other bioethanol producers need regulatory incentives to drive the investments necessary to achieve these goals. Further biofuel decarbonization also depends upon fuel lifecycle modeling based upon the best-available science.

a. Ecology Should Incentivize Sustainable Low Carbon Farming Practices

The current Tier 2 WA-GREET model does not recognize or incentivize carbon reductions that could be achieved through the adoption of climate smart agricultural practices. As we have previously discussed with the agency, Ecology can encourage reduced agricultural GHG emissions by scoring the CI of biofuels based upon site-specfic agricultural inputs. By boosting the credit value of bioethanol arising from lower carbon feedstock, Washington can reward farmers for engaging in advanced tillage and fertilizer management practices, and incentivize the agricultural supply chain to reduce its overall carbon footprint.

In recent years, POET has worked with the Farmers Business Network and Argonne National Labs to create Gradable, a pilot program to encourage sustainable farming, validate data inputs and calculate CI scores for agricultural inputs. Gradable conducetd a trial involving sixty-four area farms supplying corn to POET's Chancellor, South Dakota plant. The on-farm data collected and analyzed as part of that trial resulted in a 25% reduction in GHG emissions from corn cultivation and farm energy use compared to the assumptions embedded in California's GREET model.



These results illustrate that CI values are highly sensitive to different agronomic practices, even within the same area with similar soil types and weather patterns, further suggesting that if farmers had the incentive to engage in such practices, widespread adoption of low-CI farming practices could result in significant CI reductions.

[14] *Id*.

POET encourages Ecology to consider including a pathway for "indentity-preserved" feedstocks (*i.e.* those used by renewable fuel producers because of their verifiably lower CI characteristics) in its CFS proposed rule, and looks forward to further discussions with the agency regarding the practical considerations surrounding farm data collection and verification.

b. Ecology Should Revisit The ILUC Penalty Assigned to Corn Ethanol

The Washington GREET model adopts an indirect land use change ("ILUC") penalty for corn ethanol production (19.8g/MJ) inconsistent with Argonne's GREET model (7.4g/MJ) and the weight of the scientific evidence on this issue.[15] Notably, the model used to determine the CI of fuel under Canada's newly adopted Clean Fuel Regulations ("CFR") does not assess an ILUC penalty at all,[16] and Oregon's Clean Fuels Program adopts an ILUC penalty (7.6g/MJ) close to the range of central estimates established by current scientific research.[17]

Biofuel producers and the aviation industry are now aligned in the view that Argonne's GREET model is an important tool for evaluating the lifecycle carbon intensity of biofuels that may be used as feedstock's for the production of sustainable aviation fuel. In a letter to the United States Treasury Department signed by Boeing and every major U.S. airline, a broad coalition of sustainable aviation fuel stakeholders encouraged Secretary Yellen to integrate Argonne's model into regulations that will govern federal tax incentives for the production of SAF.[18] Among other things, the letter explains that "Argonne GREET allows users to account for climate smart and regenerative feedstock production practices," and touts Argonne's model as "a well-settled, durable, and predictable framework for assessing program eligibility and risk."[19]

POET urges Ecology to reevaluate the modified Washington GREET model to align more closely with Argonne's model, and to adopt a land use change penalty in alignment with Argonne and the larger scientific consensus on this issue.

POET is aware that Ecology's preproposal states that the agency is "not considering amending" "the Tier 2 WA-GREET model, and other land use factors." But we are cognizant that the rulemaking is intended to align the CFS with Engrossed Substitute Senate Bill 5447, which promotes the production and use of low-carbon alternative jet fuels. These issues are inextricably linked: by assigning corn ethanol an unreasonably high ILUC penalty and failing to credit on-farm carbon reductions, Washington's GREET model, as currently constituted, <u>does not</u> promote the production of alternative jet fuel from corn ethanol.

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[15] Scully study at 15 ("LUC emission estimates from ANL and USDA (including a prediction for 2022) from the last decade fall within our estimated range of −1.0–8.7 $gCO_2e\ MJ^{-1}$. Estimates from CARB (19.8 $gCO_2e\ MJ^{-1}$) and EPA (26.3 $gCO_2e\ MJ^{-1}$ predicted for 2022) fall outside our range, resembling LUC values from LCAs prior to 2011 (figure 1), and are based on modeling approaches that do not represent current best practices.").
[16] *See* Canada's Fuel Lifecycle Assessment Model available at https://www.canada.ca/en/environment-climate-change/services/managing-pollution/fuel-life-cycle-assessment-model.html.
[17] *See* OAR-253-8010 (Table 10).
[18] *See* Letter to the Hon. Janet Yellen re: Sustainable Aviation Fuel (SAF) Credit Eligibility dated Nov. 1 2023 available at https://growthenergy.org/wp-content/uploads/2023/11/SAF-Modeling-Innovator-Letter-11.1.23-1.pdf.
[19] *Id.* at 1-2.

We ask Ecology to reconsider the scope of its rulemaking, and to focus on modeling and program enhancements that will drive further carbon reductions in the bioethanol production process, and ultimately pave the way for SAF development.

IV. Ecology Should Follow Oregon in Adopting A System to Adjust Credit Balances Based Upon Operational Carbon Intensity Data

Ecology's Preproposal states that the upcoming rulemaking may consider changes to "harmonize the rule with Oregon and/or California low carbon or clean fuel program requirements." On that front, we encourage Ecology to adopt Oregon's approach to credit reconciliation based on operational carbon intensity data. Under Oregon's rules, if the Oregon Department of Environmental Quality ("DEQ") determines that a bioprocessing plant "in full commercial production for more than 24 months" has a different carbon intensity (higher or lower) than its approved provisional carbon intensity, it is authorized to "replace the certified carbon intensity with the operational carbon intensity in the Oregon Fuels Reporting System and adjust the credit balance accordingly."[20] In the event that the operational carbon intensity is higher than the provisionally certified carbon intensity, DEQ takes action automatically; in the event that the operational carbion intensity is lower than the certified carbon intensity, DEQ is authorized to review a petition from the fuel producer, and approve an appropriate CI reduction and credit balance adjustment.[21] These rules are logical and fair, ensuring that credits are commensurate with the actual operational CI of the low carbon fuel supplied to Oregon transportation system. Notably, California is currently proposing a similar change to its rules to align more closely with Oregon's approach.[22] Ecology should follow suit here.

V. Ecology Should Allow for Book and Claim Accounting or Low CI Power Used in Bioethanol Production

Washington Clean Fuel Standard regulations do not allow for the use of indirect accounting mechanisms to demonstrate production of bioethanol using low-CI process energy. Ecology should remove this regulatory barrier. POET recommends that Ecology should allow producers to demonstrate use of low-CI process energy through means such as power purchase agreements and book and claim accounting. Recognition of off-site renewable energy production as a means to reduce GHG emissions is common in carbon markets. Ecology should use its authority to encourage more renewable energy use in the transportation supply chain, not just with respect to certain fuel types. This would incentivize the generation of low-CI energy through large-scale renewables projects, thereby reducing the transportation sector's lifecycle GHG emissions.

VI. CONCLUSION

POET appreciates the opportunity to comment and looks forward to working with Ecology to make the CFS a continued success for the State of Washington. If you have any questions, please contact me at Josh.Wilson@POET.com or (202) 756-5612.

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[20] *See* OAR-340-253-050 (d) and (e).

[21] *See id.*

[22] *See* CARB's 2024 Proposed Amendment to § 95488.10(b) ("Credit True Up after Annual Verification") available at https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2024/lcfs2024/lcfs_appa1.pdf

Sincerely,

Joshua P. Wilson
Senior Regulatory Counsel

APPENDIX A

Tufts University School of Engineering
Department of Civil and Environmental Engineering

February 3, 2022

Docket Number: EPA-HQ-OAR-2021-0324

Comments of Drs. Fatemeh Kazemiparkouhi,[1] David MacIntosh,[2] Helen Suh[3]
[1] Environmental Health & Engineering, Inc., Newton, MA
[2] Environmental Health & Engineering, Inc., Newton, MA and the Harvard T.H. Chan School of Public Health, Boston, MA
[3] Tufts University, Medford, MA

We are writing to comment on issues raised by the proposed RFS annual rule, the Draft Regulatory Impact Analysis (December 2021; EPA-420-D-21-002), and the supporting Health Effects Docket Memo (September 21, 2021; EPA-HQ-OAR-2021-0324-0124), specifically regarding the impact of ethanol-blended fuels on air quality and public health. We provide evidence of the air quality and public health benefits provided by higher ethanol blends, as shown in our recently published study[1] by Kazemiparkouhi et al. (2021), which characterized emissions from light duty vehicles for market-based fuels. Findings from our study demonstrate ethanol-associated reductions in emissions of primary particulate matter (PM), nitrogen oxides (NOx), carbon monoxide (CO), and to a lesser extent total hydrocarbons (THC). Our results provide further evidence of the potential for ethanol-blended fuels to improve air quality and public health, particularly for environmental justice communities. Below we present RFS-pertinent findings from Kazemiparkouhi et al. (2021), followed by their implications for air quality, health, and environmental justice.

Summary of Kazemiparkouhi et al. (2021)

Our paper is the first large-scale analysis of data from light-duty vehicle emissions studies to examine real-world impacts of ethanol-blended fuels on regulated air pollutant emissions, including PM, NOx, CO, and THC. To do so, we extracted data from a comprehensive set of emissions and market fuel studies conducted in the US. Using these data, we (1) estimated composition of market fuels for different ethanol volumes and (2) developed regression models to estimate the impact of changes in ethanol volumes in market fuels on air pollutant emissions for different engine types and operating conditions. Importantly, our models estimated these changes accounting for not only ethanol volume fraction, but also aromatics volume fraction, 90% volume distillation temperature (T90) and Reid Vapor Pressure (RVP). Further, they did so

[1] https://doi.org/10.1016/j.scitotenv.2021.151426

under both cold start and hot stabilized running conditions and for gasoline-direct injection engines (GDI) and port-fuel injection (PFI) engine types. Key highlights from our paper include:

- ***Aromatic levels in market fuels decreased by approximately 7% by volume for each 10% by volume increase in ethanol content*** (Table 1)**.** Our findings of lower aromatic content with increasing ethanol content is consistent with market fuel studies by EPA and others (Eastern Research Group, 2017, Eastern Research Group, 2020, US EPA, 2017). As discussed in EPA's Fuel Trends Report, for example, ethanol volume in market fuels increased by approximately 9.4% between 2006 and 2016, while aromatics over the same time period were found to drop by 5.7% (US EPA, 2017).

  We note that our estimated market fuel properties differ from those used in the recent US EPA Anti-Backsliding Study (ABS), which examined the impacts of changes in vehicle and engine emissions from ethanol-blended fuels on air quality (US EPA, 2020). Contrary to our study, ABS was based on hypothetical fuels that were intended to satisfy experimental considerations rather than mimic real-world fuels. It did not consider published fuel trends; rather, the ABS used inaccurate fuel property adjustment factors in its modeling, reducing aromatics by only 2% (Table 5.3 of ABS 2020), substantially lower than the reductions found in our paper and in fuel survey data (Kazemiparkouhi et al., 2021, US EPA, 2017). As a result, the ABS's findings and their extension to public health impacts are not generalizable to real world conditions.

Table 1. Estimated market fuel properties

Fuel ID	EtOH Vol (%)	T50 (^oF)	T90 (^oF)	Aromatics Vol (%)	AKI	RVP (psi)
E0	0	219	325	30	87	8.6
E10	10	192	320	22	87	8.6
E15	15	162	316	19	87	8.6
E20	20	165	314	15	87	8.6
E30	30	167	310	8	87	8.6

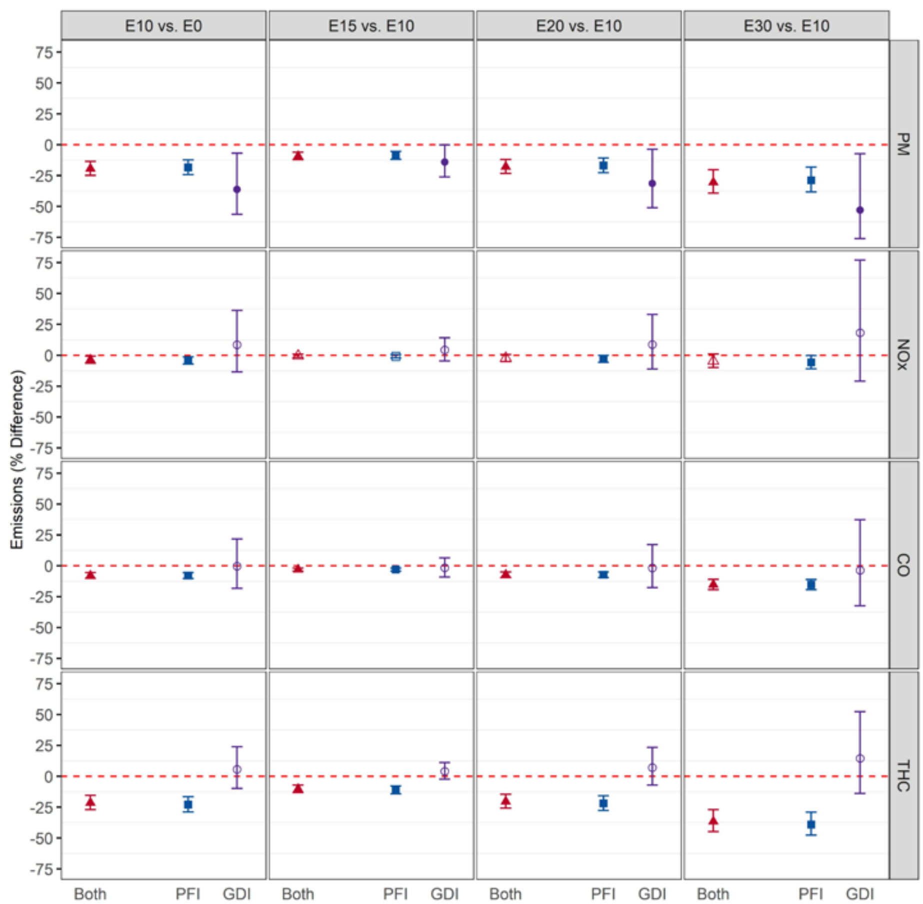
Abbreviations: EtOH = ethanol volume; T50 = 50% volume distillation temperature; T90 = 90% volume distillation temperature; Aromatics=aromatic volume; AKI = Anti-knock Index; RVP = Reid Vapor Pressure.

- ***PM emissions decreased with increasing ethanol content under cold-start conditions.*** Primary PM emissions decreased by 15-19% on average for each 10% increase in ethanol content under cold-start conditions (Figure 1). While statistically significant for both engine types, PM emission reductions were larger for GDI as compared to PFI engines, with 53% and 29% lower PM emissions, respectively, when these engines burned E30 as compared to E10. In contrast, ethanol content in market fuels had no association with PM emissions during hot-running conditions.

  Importantly, our findings are consistent with recent studies that examined the effect of ethanol blending on light duty vehicle PM emissions. Karavalakis et al. (2014), (2015), Yang et al. (2019a), (2019b), Schuchmann and Crawford (2019), for example, assessed the influence of different mid-level ethanol blends – with proper adjustment for aromatics – on the PM emissions from GDI engines and Jimenez and Buckingham (2014) from PFI engines. As in our study, which also adjusted for aromatics, each of these recent studies found higher ethanol blends to emit lower PM as compared to lower or zero ethanol fuels.

Together with these previous studies, our findings support the ability of ethanol-blended fuels to offer important PM emission reduction opportunities. **Cold start PM emissions have consistently been shown to account for a substantial portion of all direct tailpipe PM emissions from motor vehicles**, with data from the EPAct study estimating this portion to equal 42% (Darlington et al., 2016, US EPA, 2013). The cold start contribution to total PM vehicle emissions, together with our findings of emission reductions during cold starts, suggest that a **10% increase in ethanol fuel content from E10 to E20 would reduce total tailpipe PM emissions from motor vehicles by 6-8%.**

Figure 1. Change (%) in cold-start emissions for comparisons of different ethanol-content market fuels[a]



[a] Emissions were predicted from regression models that included ethanol and aromatics volume fraction, T90, and RVP as independent variables

- **NOx, CO and THC emissions were significantly lower for higher ethanol fuels for PFI engines under cold-start conditions**, but showed no association for GDI engines (Figure 1). CO and THC emissions also decreased under hot running conditions for PFI and for CO also for GDI engines (results not shown). [Note that NOx emissions for both PFI and GDI engines were statistically similar for comparisons of all ethanol fuels, as were THC emissions for GDI engines.] These findings add to the scientific evidence demonstrating emission reduction benefits of ethanol fuels for PM and other key motor vehicle-related gaseous pollutants.

Implications for Public Health and Environmental Justice Communities

The estimated reductions in air pollutant emissions, particularly of PM and NOx, indicate that increasing ethanol content offers opportunities to improve air quality and public health. As has been shown in numerous studies, lower PM emissions result in lower ambient PM concentrations and exposures (Kheirbek et al., 2016, Pan et al., 2019), which, in turn, are causally associated with lower risks of total mortality and cardiovascular effects (Laden et al., 2006, Pun et al., 2017, US EPA, 2019, Wang et al., 2020).

The above benefits to air quality and public health associated with higher ethanol fuels may be particularly great for environmental justice (EJ) communities. EJ communities are predominantly located in urban neighborhoods with high traffic density and congestion and are thus exposed to disproportionately higher concentrations of PM emitted from motor vehicle tailpipes (Bell and Ebisu, 2012, Clark et al., 2014, Tian et al., 2013). Further, vehicle trips within urban EJ communities tend to be short in duration and distance, with approximately 50% of all trips in dense urban communities under three miles long (de Nazelle et al., 2010, Reiter and Kockelman, 2016, US DOT, 2010). As a result, a large proportion of urban vehicle trips occur under cold start conditions (de Nazelle et al., 2010), when PM emissions are highest. Given the evidence that ethanol-blended fuels substantially reduce PM, NOx, CO, and THC emissions during cold-start conditions, it follows that ethanol-blended fuels may represent an effective method to reduce PM health risks for EJ communities.

Summary

Findings from Kazemiparkouhi et al. (2021) provide important, new evidence of ethanol-related reductions in vehicular emissions of PM, NOx, CO, and THC based on real-world fuels and cold-start conditions. Given the substantial magnitude of these reductions and their potential to improve air quality and through this public health, our findings warrant careful consideration. Policies that encourage higher concentrations of ethanol in gasoline would provide this additional benefit. These policies are especially needed to protect the health of EJ communities, who experience higher exposures to motor vehicle pollution, likely including emissions from cold starts in particular, and are at greatest risk from their effects.

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