POET
1400 K Street NW, Suite 905
Washington, D.C. 20005
Ph: (605) 965-2200
poet.com

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Adam Saul
Department of Ecology
Climate Pollution Reduction Program
PO Box 47600
Olympia, WA 98504-7600

Submitted electronically via: https://ecology.commentinput.com/?id=HreYsPb4D

RE: POET COMMENTS ON WASHINGTON'S DEPARTMENT OF ECOLOGY'S CLEAN FUEL STANDARD RULEMAKING

Dear Mr. Saul:

POET appreciates the opportunity to participate in Washington's Department of Ecology's ("Ecology") Clean Fuel Standard ("CFS") Rulemaking. POET has participated actively in past rulemakings through the submission of comments and engagements with Ecology's staff, and POET looks forward to continuing its positive relationship with Ecology throughout the new CFS rulemaking process.

I. POET Overview

POET's vision is to create a world in sync with nature. As the world's largest producer of biofuel and a global leader in sustainable bioproducts, 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 35 bioprocessing facilities across nine states and employs more than 2,600 team members. With a suite of bioproducts including 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 140 patents worldwide and continues to break new ground in biotechnology, yielding ever cleaner and more efficient renewable energy. Through technological innovation, investments in carbon capture and renewable energy, and programs to reduce on-farm emissions, POET is steadily lowering the CI of its fuel to meet the ambition of Ecology's CFS as it continues to grow and evolve. We see the potential for bioethanol to become a net-zero carbon liquid fuel on a lifecycle 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.

II. Low-CI Bioethanol is Critical to Meeting Washington's CI-Reduction Goals

The stated purpose of the CFS is to "curb carbon pollution from transportation, the largest source of greenhouse gas emission in Washington, by reducing these emissions from the production and supply of transportation fuels."[1] Ecology opened the current rulemaking with the goal of updating the CFS to implement Second Substitute House Bill 1409 (SSHB 1409), which sets an ambitious new compliance curve through 2038.[2] The rulemaking also arises in the context of Washington's commitment to become a major sustainable aviation fuel (SAF) hub.[3] Washington's GHG reduction goals and ambition to lead the nation in SAF production requires policymaking that incentivizes decarbonization across the entire transportation fuel sector. Washington cannot realize its goals without requiring significant CI-lowering contributions from all forms of clean fuels, including bioethanol.

Recent rulemakings in Washington have focused primarily on electrification of the transportation sector. But electricity as an alternative transportation fuel is limited by the adoption of electric vehicles, which has proceeded more slowly than predicted and may be slowed further by changes in federal policy. Internal combustion engine vehicles relying on liquid fuels will remain in the state's transportation fuel mix for decades to come. Low-CI bioethanol is critical to reducing carbon emissions associated with internal combustion engine vehicles and advancing Washington's carbon-reduction goals during this transition.

High volumes of low-CI bioethanol are readily available to meet Washington's GHG-reduction goals, and the volume is likely only to increase with continued expansion of E15 nationwide.[4] And more bioethanol means lower-CI gasoline. Given current investments in existing technology and practices, including renewable process energy, carbon capture and sequestration, and climate-

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[1] https://ecology.wa.gov/air-climate/reducing-greenhouse-gas-emissions/clean-fuel-standard
[2] https://ecology.wa.gov/regulations-permits/laws-rules-rulemaking/rulemaking/wac-173-424-455-clean-fuels-program
[3] *See* S.B. 5447; S.B. 5601; https://governor.wa.gov/news/2025/making-things-happen-sustainability-and-jobs-port-walla-walla-secures-state-support-ramp-sustainable; https://ecology.wa.gov/about-us/who-we-are/news/2025/june-16-new-incentives-for-clean-aviation-heavy-duty-trucking-proposed-in-updates-to-clean-fuel-s.
[4] On Oct. 2, 2025, California became the final state to officially approve the use of E15. *See* *http://gov.ca.gov/2025/10/02/governor-newsom-signs-bill-expanding-fuel-options-to-cut-gas-prices/*.

smart agriculture, bioethanol production is on a path to becoming a net-zero CI liquid fuel type in the near short term.[5]

Moreover, bioethanol is a recognized SAF feedstock for the alcohol-to-jet pathway, and producers like POET are well positioned to supply low-CI ethanol for this emerging market, which cannot develop based solely upon waste-based feedstocks.[6] Policymaking to increase the supply of low-CI bioethanol to Washington is essential to any effort to lead in the SAF space.

Bioethanol is, and will almost certainly remain, the most consistent low-carbon fuel alternative available in Washington for the foreseeable future. Rather than relying solely upon potential advancements in electrification, Washington should embrace deeply decarbonized bioethanol to help achieve its CI-reduction and SAF-hub goals. Washington can do this by recognizing and relying on accurate and up-to-date science and by incentivizing farmers and producers to invest in available decarbonization methods.

III. Ecology Should Incorporate Climate-Smart Agricultural Practices into the CFS

POET encourages Ecology to recognize and incorporate the carbon-emissions reductions available through the adoption of climate-smart agricultural ("CSA") practices into the WA-GREET4.0 model.

Over the past few years, new research has been published demonstrating the clear decarbonization potential of implementing CSA practices in ethanol supply chains. For example, in September 2024, former U.S. Department of Energy Secretary Ernest Moniz published a paper adding to this body of research and quantifying the carbon reductions the U.S. ethanol industry can achieve by leveraging climate-smart feedstocks.[7] The study demonstrates that CSA practices have the potential to drive dramatic reductions in the carbon intensity of ethanol.[8] Indeed, CSA practices, many of which are ready for widespread adoption, can reduce the CI of corn ethanol by nearly 60%.[9] Further advances in the use of low-carbon fertilizers can achieve additional CI reductions of 20%.[10]

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[5] Moniz, Ernst et al., *A Strategic Roadmap for Decarbonizing the U.S. Ethanol Industry,* EFI FOUNDATION at 7 (Sept. 2024) ("Moniz Study") https://efifoundation.org/foundation-reports/a-strategic-roadmap-for-decarbonizing-ethanol-in-the-united-states/.

[6] *See, e.g.,* https://ptqmagazines.digitalrefining.com/Decarbonisation-Technology-August-2025/6/, https://www.resources.org/common-resources/the-promise-of-ethanol-to-jet-for-sustainable-aviation-fuel-in-the-united-states/.

[7] *See* Moniz Study at pp. 2-7, 28-42.

[8] *See id.* at pp. 7, 36-40.

[9] *Id.* at p. 4.

[10] *Id.*

		CI Reduction Potential	Cost	Feasibility: Widespread Adoption	Feasibility: Readiness for Adoption
Corn Yield Improvement		.7%	< zero	High	Near Term
Climate Smart Ag Practices	No-Till Farming	6%	< zero	High	Near Term
	4R Nitrogen Management	4%	< zero	High	Near Term
	Enhanced Efficiency Fertilizers	4%	< zero	Medium	Near Term
	Cover Crops	45%	\$24 to \$64/tCO_2	Medium	Near Term
Use Low-Carbon Fertilizers	Blue Ammonia-Based Fertilizers	10%	\$29 (with 45Q) to \$100/tCO_2	Medium	Mid Term
	Green Ammonia-Based Fertilizers	10%	\$0 (with 45Z) to \$526/tCO_2	Medium	Mid Term
Use Renewable Diesel in Farm Machinery		<4%	\$127 to 139/tCO_2	Medium	Near Term
Use Renewable Diesel for Corn Transport		<2%	\$127 to 139/tCO_2	Medium	Near Term

The practices identified in the Moniz study are not new; indeed, many are being implemented now. In 2021, for example, an estimated 7.2% of farms used cover cropping, up from 1.8% in 2011.[11] In 2022, an estimated 38% of cropland in the U.S. employed no-till farming practices, up slightly from 35% in 2012.[12] And in 2024, approximately 27% of U.S. farms or ranches were estimated to use precision agriculture.[13] While early deployment of these techniques is promising, widespread CSA adoption requires price signals to incentivize farmers to reduce the CI of their crops.

In current state, Washington's CFS program does not recognize CI reductions for feedstocks grown using CSA practices. Because of this, biofuel producers are not incentivized to pay a premium to farmers employing CSA practices, and in turn farmers are not incentivized to invest the resources necessary to implement those CSA practices. As noted in a recent study published in the journal Science, [14] accounting for CSA in biofuel policies would encourage adoption of CSA practices at a much higher rate compared to current conservation programs and offer an opportunity to develop "supply chains and protocols that could support broader implementation of mechanisms for promoting climate-smart practices for food, feed, and fiber."[15]

In its responses to comments in the previous CFS rulemaking, Ecology explained it was paying attention to CSA updates but noted what it viewed as a significant burden associated with the administration, quantification, and verification of emissions reductions.[16] Much of the hard work, however, has already been completed. As part of its recent Inflation Reduction Act § 40B SAF Guidance, the Treasury Department adopted a GREET model that incentivizes SAF production

[11] *Id.* at p. 37.
[12] *Id.*
[13] *Id.*
[14] *See* M. Khanna, B. Basso, J. O'Hara, D. Zilberman, G. Hochman, *Climate-smart biofuel policy as a pathway to decarbonize agriculture*, SCIENCE (Aug. 14, 2025) ("Khanna Study") *available at*: https://www.osti.gov/pages/servlets/purl/2586442.
[15] *Id.* at p. 688.
[16] https://apps.ecology.wa.gov/publications/documents/2514090.pdf at pp. 96-97.

from corn ethanol.[17] Treasury's guidance recognizes that no-till farming, planting cover crops, and applying enhanced efficiency nitrogen fertilizer are all climate smart agricultural practices that help reduce carbon intensity (CI) for crop-based feedstocks such as corn.[18] Adding to Treasury's guidance, the USDA published a CSA interim final rule on January 15, 2025, adopting a Feedstock Carbon Intensity Calculator (USDA FD-CIC) that would allow biofuel producers to verify, quantify, and calculate the emissions associated with a range of agricultural practices.[19] Last month, the Treasury released a notice of proposed rulemaking on the 45Z Clean Fuel Production tax credit, explaining that it expected the final version of the USDA FD-CIC to be integrated into the 45ZCF-GREET model to properly calculate CI scores for biofuels made from feedstocks grown using CSA.[20] The FD-CIC will provide Ecology with the framework it needs to verify, quantify, and calculate the emissions associated with CSA, thus significantly reducing the burden on the agency itself.

The most-recent and best-available science continues to demonstrate CSA's carbon-reduction opportunities, and two consecutive federal administrations have been developing a framework for calculating the CIs of biofuels produced using feedstock grown with CSA. Through simple changes in its WA-GREET model, Ecology can create a price signal that rewards farmers for lowering the carbon intensity of their operations, thus speeding the transition to low-CI transportation fuel and helping Washington meet its net-zero and SAF-hub goals. POET urges Ecology to do so.

IV. Ecology Should Update the WA-GREET Model to Adopt the Argonne National Laboratory's Greet Model's ILUC Penalty for Corn Ethanol.

Rather than evaluate on-farm emissions using known techniques, several programs—including Washington's CFS—rely instead on a default ILUC penalty that does not consider farming practices occurring after cropland is developed and often overestimates the CI of corn as a feedstock.[21] As a result, various default ILUC scores have been suggested based on often outdated and conflicting science. Indeed, Washington currently enforces an ILUC penalty of 19.8 gCO_2e/MJ for corn ethanol, mirroring the outdated value established more than 15 years ago by California under its LCFS. This penalty significantly overstates the actual land-use impacts associated with corn ethanol and reflects a modeling approach that no longer aligns with current

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[17] *See* U.S. Department of Treasury, Notice 2024-37, § 40B SAF Credit Guidance (April 30, 2024) (§ 40B Guidance) *available at* https://www.irs.gov/pub/irs-drop/n-24-37.pdf.

[18] *Id.*

[19] *See* U.S. Department of Agriculture, 7 CFR Part 2100, RIN 0503-AA82, [Docket No. USDA-2024-0003], Technical Guidelines for Climate-Smart Agriculture Crops Used as Biofuel (January 15, 2025) *available at* https://www.usda.gov/sites/default/files/documents/7CFR2100_FINAL_1_15.pdf.

[20] *See* Notice of Proposed Rulemaking and Public Hearing, Section 45Z Clean Fuel Production Credit, https://www.federalregister.gov/documents/2026/02/04/2026-02246/section-45z-clean-fuel-production-credit

[21] *See* Khanna Study at p. 687.

scientific understanding. A more appropriate ILUC value is the 6.10 gCO2e/MJ value reflected in Argonne National Laboratory's ("ANL") most recent GREET model. POET urges Ecology to adopt the ANL's 6.10 gCO2e/MJ ILUC penalty.

ANL developed the GREET model to accurately score lifecycle GHG emissions for renewable fuels, such as corn ethanol, and establish CI values for the full range of factors that impact the production and use of biofuels. One such factor is the ILUC penalty, which is designed to account for GHG emissions, if any, attributable to land use changes driven by different types of crop-based biofuel demand. This feature of the GREET model has been continuously revised *downward* for corn ethanol. ANL regularly updates the GREET model with the most recent information reflecting the best available science.[22] In the latest version of the R&D GREET model, published on December 19, 2025, ANL assigns corn ethanol an ILUC penalty of 6.1 gCO_2e/MJ.[23] This modeling adjustment reflects a downward adjustment of 2.5 gCO2e/MJ from the 8.6 gCO2e/MJ ILUC penalty incorporated into the 2023 R&D GREET Model.[24]

Other biofuels programs have adopted ILUC penalties more closely aligned with ANL GREET. For example, Oregon's version of the GREET model used to established CIs for its Clean Fuel Program assigns corn ethanol an ILUC penalty of 7.6 gCO_2e/MJ.[25] Other programs, such as Canada's Clean Fuel Regulations, do not assess an ILUC penalty at all.[26] These programs reflect a growing understanding that ILUC penalties for corn ethanol have decreased significantly over the past 15 years. In fact, a 2021 study analyzed 26 published estimates of ILUC values for corn ethanol since 2008 and found that ILUC estimates had declined from values exceeding 100 gCO_2e/MJ in 2008, to generally below 10 gCO_2e/MJ in more recent modeling. The authors concluded that the best estimate of ILUC for corn ethanol is 3.9 gCO_2e/MJ.[27] Notably, the authors analyzed ILUC penalties published by CARB and the EPA, and they determined those higher

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[22] *See* H. Kwon, X. Liu, S. Kar, H. Cai, M. Wang, *Expansion of Carbon Calculator for Land Use and Land Management Change from Biofuels Production (CCLUB) to Address Induced Land Use Changes and Other Indirect Effects of Clean Fuel Production for R&D GREET 2024,* https://greet.anl.gov/publication-cclub_update_2024.
[23] *Id.* at 8-9 (Table 4).
[24] *See* X. Liu, H. Cai, M. Wang, H. Kwon, *Updates to Carbon Calculator for Land Use and Land Management Change from Biofuels Production (CCLUB) for the GREET Model*, at 3 (Table 1) (Dec. 2023), https://greet.anl.gov/publication-cclub_update_2023.
[25] Or. Admin. R. 253-8010 (2025), (Table 10), https://secure.sos.state.or.us/oard/viewSingleRule.action?ruleVrsnRsn=321685.
[26] *See* Canada's Fuel Lifecycle Assessment Model, https://www.canada.ca/en/environment-climate-change/services/managing-pollution/fuel-life-cycle-assessment-model.html.
[27] *See* Scully, Melissa et al., *Carbon Intensity of Corn Ethanol in the United States: State of the Science*, ENVIRONMENTAL RESEARCH LETTERS, at 7 (Mar. 10, 2021) https://iopscience.iop.org/article/10.1088/1748-9326/abde08.

ILUC values were based upon "modeling approaches that do not represent best practices" and, for CARB's model, relied on emissions assumptions not based on solid scientific reasoning.[28]

Last year, on January 15, 2025, the U.S. Treasury Department adopted a model (45ZCF-GREET) intended for use in the implementation of the federal 45Z Clean Fuel Production Credit, §45Z(B)(1)(B)(ii) and §45Z(B)(1)(B)(iii)(II) of the Inflation Reduction Act.[29] The original 45ZCF-GREET model assigned to corn ethanol an ILUC penalty of 5.8 gCO2e/MJ.[30] Even more recently, however, the U.S. Treasury Department's 45Z released an updated proposed rulemaking removing the ILUC penalty and proposing to incorporate CSA into the GREET model.[31] This change reflects the growing understanding of the uncertainty around ILUC scoring and the emissions-reduction opportunities of CSA.

Recent research regarding the ethanol industry and ILUC also rebuts the common concern that farmers are incentivized to increase their overall land use to grow more corn for ethanol production, showing instead that farmers have become more efficient on the land already in use for growing crops. For example, the Moniz Study found that since 2001 overall land use for food crops has stayed relatively even while yields have increased dramatically.[32] In fact, the Moniz Study found that "land used for planting U.S. food crops has *decreased by 2.1%* from 2001 to 2024, while the yield has *increased by 25.1%*," indicating "that increased corn ethanol production has not affected other food crops' production and land use."[33] The graph below from the Moniz Study further demonstrates that increases in corn ethanol production have been primarily driven by yield improvements:[34]

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[28] *Id.* ("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.")

[29] *See* Guidelines to Determine Life Cycle Greenhouse Gas Emissions of Clean Transportation Fuel Production Pathways Using 45ZCF-GREET, https://www.energy.gov/sites/default/files/2025-01/45zcf-greet_user-manual.pdf.

[30] *Id.* at 26, Table 9b.

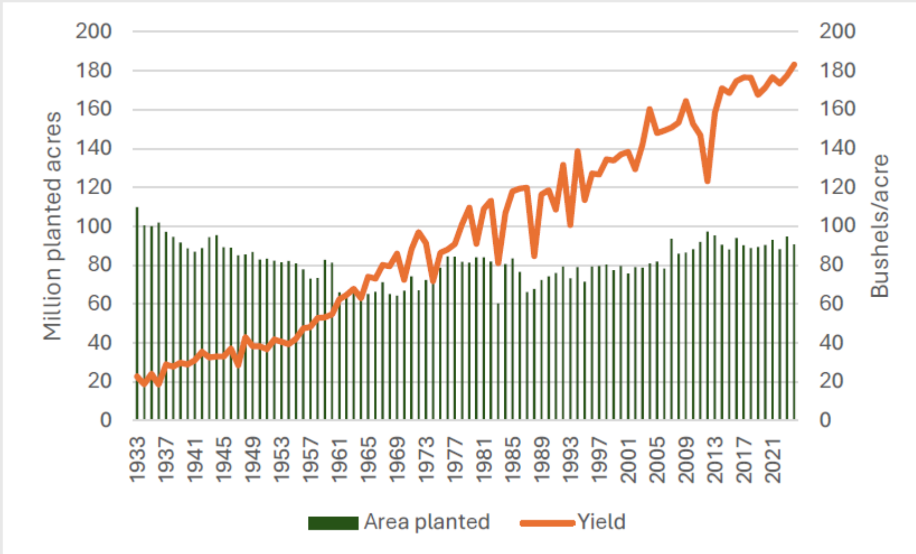
[31] *See* Notice of Proposed Rulemaking and Public Hearing, Section 45Z Clean Fuel Production Credit, https://www.federalregister.gov/documents/2026/02/04/2026-02246/section-45z-clean-fuel-production-credit

[32] *See, e.g.,* Moniz, Ernest, et al., *A Strategic Roadmap for Decarbonizing the U.S. Ethanol Industry,* EFI FOUNDATION at 2, 20-22 (Sept. 2024) https://efifoundation.org/foundation-reports/a-strategic-roadmap-for-decarbonizing-ethanol-in-the-united-states/.

[33] *Id.* at 20 (emphasis added).

[34] *Id.* at 21.

Figure 3. Corn productivity increase – U.S. corn acreage and average yield



Corn yields have steadily increased over the years, despite consistent planted acres, indicating significant productivity gains in corn production. Data from: U.S. Department of Agriculture National Agricultural Service "Quick Stats": corn acreage and corn planted.

Not only does corn used for ethanol production already coexist with other staple grains without affecting their production or land use, but ethanol production actually complements the overall U.S. food supply. Indeed, dried distillers grains ("DDGs"), a main byproduct of ethanol production, are used as a high-protein animal feed for livestock, displacing other feeds and thus minimizing the land needed to grow additional food for livestock.[35]

The best available science, the most recent research, and the consensus across modern models establishes an ILUC penalty of around 6.1 gCO_2e/MJ or less for corn ethanol. Likewise, the same information establishes that California's, and therefore Washington's, ILUC penalty of 19.8 gCO_2e/MJ for corn ethanol is not supported and is widely considered an outlier, appearing instead to reflect policy choices to minimize biofuel crediting in their programs and prioritize crediting associated with electric vehicles, a priority likely to face significant headwinds in view of the current federal administration's approach to climate policy. If Washington is to succeed in the ambitious SAF goals and new CI-reduction goals required for the CFS, it will need low-CI ethanol to play a major role. And for low-CI ethanol to help achieve Washington's goals, Ecology should

[35] *Id.* at 20-21.

align the ILUC penalty for corn ethanol with the R&D GREET model and move away from California's value that no longer stands up to scientific scrutiny.

V. Ecology Should Allow Biofuel Producers to Rely on Book-and-Claim Accounting for Renewable Electricity

Book-and-claim accounting for electricity used to produce low-CI fuel is an effective policy tool that encourages the development of renewable electricity projects. Because renewable electricity providers typically supply their electricity to the grid where it is combined with non-renewable electricity, there is no way to accurately track the renewable electricity reaching a specific purchaser. Book-and-claim accounting addresses this issue by allowing purchasers to claim the amount of electricity purchased from a renewable energy provider without showing they physically received it, ultimately supporting renewable electricity development and the gradual decarbonization of the electric grid. Without book-and-claim accounting, however, biofuel producers can only claim the lower CI associated with the use of renewable electricity if there is a direct connection between the renewable electricity generator and the biorefinery.

In its responses to comments during the last CFS rulemaking, Ecology rejected the request that it allow biofuel producers to rely on book-and-claim accounting for renewable electricity without any explanation.[36] POET urges Ecology to reconsider its decision. The additionality and regionality requirements incorporated into the CFS through the most recent rulemaking and available to providers of electricity as fuel, marine fuel, and SAF can be applied similarly to producers of bioethanol. Moreover, the IRA's 45Z tax-credit program is already driving bioethanol decarbonization through its allowance of biofuel producers to claim the benefits of book-and-claim accounting, which in turn is driving investment in renewable electricity development. Similar guardrails around deliverability, additionality, and temporal matching exist under the federal program, all of which Washington could incorporate to ensure biofuel producers are promoting new, additional reductions in GHG emissions. Book-and-claim accounting is a readily available way for biofuel producers to lower the CI of their biofuels, helping Washington meet its CI-reduction and SAF-hub goals.

VI. CONCLUSION

POET appreciates the opportunity to comment and looks forward to working with Ecology to make the Clean Fuel Standard a continued success for Washington. If you have any questions, please contact me at Paul.Townsend@POET.com or (605) 756-5612.

Sincerely,

Paul W. Townsend
Regulatory Counsel

[36] https://apps.ecology.wa.gov/publications/documents/2514090.pdf at p. 60.