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America's Ethanol Supporters

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March 15, 2022

The Honorable Jennifer Granholm
Secretary
U.S. Department of Energy
1000 Independence Avenue SW
Washington, DC 20585

Dear Secretary Granholm:

I write to you in response to a recently released study by Tyler Lark, et al., from the University of Wisconsin-Madison and elsewhere that reviewed the environmental impacts of ethanol from corn. The authors claim this study was partially funded by the U.S. Department of Energy (DOE) and make significant and misleading errors in the study's assumptions and conclusions. We urge the Department to correct the record on this study to ensure more widely accepted science is used to achieve our nation's climate goals.

A wide range of agencies and researchers have reached positive environmental conclusions for corn-based ethanol, including the U.S. Department of Agriculture[1], the California Air Resources Board[2], and the Oregon Department of Environmental Quality[3]. The DOE's own Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies (GREET) model has been tracking corn-ethanol's lifecycle analysis impacts since 1996, and has drawn starkly contrasting conclusions to the Lark study. Last May, DOE's Argonne National Lab, which runs GREET, said "for the United States, biofuels like corn ethanol can play a critical role in reducing our carbon footprint."[4] In its most recent iteration, GREET shows that corn ethanol has roughly 40 percent lower carbon emissions than traditional petroleum gasoline.[5]

[1] "The greenhouse gas benefits of corn ethanol—assessing recent evidence," Biofuels. Jan Lewandrowski, Jeffrey Rosenfeld, Diana Pape, Tommy Hendrickson, Kirsten Jaglo, Katrin Moffroid (2020). 11:3, 361-375, DOI: 10.1080/17597269.2018.1546488.
[2] "Data Dashboard: Low Carbon Fuel Standard." California Air Resources Board. May 2020. https://ww3.arb.ca.gov/fuels/lcfs/dashboard/dashboard.htm.
[3] "2021 Illustrative Compliance Scenarios." ICF for the Oregon Department of Environmental Quality. July 2021. https://www.oregon.gov/deq/ghgp/Documents/cfpIlluCompScenD.pdf
[4] "Corn ethanol reduces carbon footprint, greenhouse gases." Argonne National Laboratory news release, https://www.anl.gov/article/corn-ethanol-reduces-carbon-footprint-greenhouse-gases
[5] "Life-Cycle Greenhouse Gas Emission Reductions of Ethanol with the GREET Model", https://afdc.energy.gov/files/u/publication/ethanol-ghg-reduction-with-greet.pdf

In addition, a January 2021 study by Environmental Health and Engineering, Inc. (EH&E) found that ethanol reduces greenhouse gas (GHGs) emissions by 46%[6] compared to traditional gasoline. Improvements in ethanol's carbon scores can be attributed to the related efficiencies in land use and biorefineries. Corn growers are producing stronger yields with less acreage, and our ethanol plants can obtain more gallons per bushel of corn. In fact, total cropland has fallen from 470.8 million acres of cropland in 1978 to 391.9 million acres by 2012[7]. Moreover, yields of corn have increased dramatically over the last 50 years, increasing from 72.4 bushels per acre in 1970, to 172 bushels per acre in 2020. In the last 10 years, corn yields have increased by 20%, while land planted for corn has remained steady.[8]

Unfortunately, the Lark study does not appropriately take these compelling scientific analyses into account and uses non-public data sets to create incredibly high carbon penalties. A memo by Pieter Booth, a principal with Net Gain Ecological Services, that provides a preliminary rebuttal to the Lark study, is attached. Mr. Booth carefully examines many of the flaws in this study, but this excerpt encapsulates many of his concerns:

> "The authors characterize as fact numerous modeled results, giving the reader a misleading impression of false confidence in the conclusions which are drawn from highly uncertain models embedded with extensive assumptions that may or may not reflect the real-world."

Growth Energy specifically asks that DOE make clear that this research is both inconsistent with and subordinate to the DOE's GREET model, and that the Department did not specifically fund this study, but instead, provided a grant related to the broader work of dedicated bio-energy crops performed at the University of Wisconsin. Further, we ask the Department to evaluate if this work violated the $115 million award provided by DOE to run from 2017-2022.

Failing to address this research's inconsistencies and departure from mainstream science and could have negative consequences in our nation's quest to decarbonize the transportation sector—both on the ground and in the air. According to recent research by the Rhodium Group[9], our industry's contributions in reaching net-zero emissions targets and decarbonizing the transportation sector will be necessary. The ethanol industry is continually finding new ways to innovate and reduce emissions throughout its production cycle, including by creating new applications for hard-to-decarbonize industries like aviation. We must rely on the best and most

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[6] "Carbon Intensity of corn ethanol in the United States: State of the science," *Environmental Health & Engineering, Inc.*. Melissa Scully, Gregory Norris, Tania Alarcon Falconi, and David MacIntosh (March 2021). https://iopscience.iop.org/article/10.1088/1748-9326/abde08

[7] "Cropland, 1945-2012, by State: The sum of cropland used for crops, cropland idled, and cropland used for pasture," U.S. Department of Agriculture's Economic Research Service. August 2017, https://www.ers.usda.gov/data-products/major-land-uses/

[8] "Crop Production Historical Track Records," National Agricultural Statistics Service. April 2021, https://www.nass.usda.gov/Publications/Todays_Reports/reports/croptr21.pdf

[9] "Closing the Transportation Emissions Gap with Clean Fuels." The Rhodium Group, https://rhg.com/research/closing-the-transportation-emissions-gap-with-clean-fuels/

widely accepted science to achieve our climate goals and attain net-zero emissions by 2050. The Lark study is an off-base distraction from the work ahead of us.

Thank you for your attention in this matter and do not hesitate to reach out with any questions.

Sincerely,

Emily Skor
CEO, Growth Energy

Enclosure

Growth Energy Supplemental Comments on EPA's Proposed Renewable Fuel Standard Program: Renewable Fuel Standard Annual Rules

Docket # EPA-HQ-OAR-2021-0324

Exhibit 1

Net Gain
ECOLOGICAL SERVICES

PRELIMINARY COMMENTS ON THE PUBLICATION BY LARK ET AL. 2022 TITLED *ENVIRONMENTAL OUTCOMES OF THE US RENEWABLE FUEL STANDARD*

Prepared For: Growth Energy
Date: March 4, 2022
Author: Pieter Booth, Principal
Net Gain Ecological Services

This memorandum provides Net Gain's preliminary observations regarding *Environmental Outcomes of the US Renewable Fuel Standard* published by Lark et al. (2022).[1] The work described in this paper appears to be the same as that presented at an American Association for the Advancement of Science meeting on February 15, 2019. The August 2019 Ramboll report previously submitted to the docket for this rulemaking as part of Growth Energy's comment letter (ID: EPA-HQ-OAR-2021-0324-0521) discusses the presentation material at Section 3.4. We briefly summarize below a few key issues with the study's attribution of adverse environmental impacts to the Renewable Fuel Standard (RFS) based on a preliminary, limited review. These include:

- The study importantly neglects to evaluate the relationship between oil prices and corn prices.
- The study fails to adequately explain and evaluate uncertainties associated with its use of a "Business as usual" scenario absent the RFS as a counterfactual.
- With respect to land use change modeling, the study purports to correct for grave deficiencies in one of the author's prior work by applying "recommended practices," but does not explain how those practices were applied. Further, it is not possible to evaluate some of the data sets themselves as they are non-public, thus limiting third party reviewers' abilities to evaluate the validity of the conclusions the authors draw.
- The authors characterize as fact numerous modeled results, giving the reader a misleading impression of false confidence in the conclusions which are drawn from highly uncertain models embedded with extensive assumptions that may or may not reflect the real-world.

The Effect of the RFS on Corn Prices

The paper by Lark et al. (2022) is an ambitious effort to establish quantitative causal linkages between enactment of the RFS as a policy to a variety of environmental outcomes using a series of interlinked models. The approach, and the results presented rest on the assumption that the price of corn is heavily influenced by increased demand for ethanol due to the RFS. The discussion of the econometric model in the supplemental material to the publication states that the modeling controlled for important factors other than the RFS that likely affected the price of corn, but it makes no mention of the price of oil. Figures 1 and 2 below show nominal prices of West Texas Intermediate crude and

[1] Lark, T., N. Hendricks, A. Smith, and H. Gibbs. 2022. Environmental outcomes of the U.S. Renewable Fuel Standard. Proceedings of the National Academy of Sciences, February 14, 2022. https://doi.org/10.1073/pnas.2101084119. This paper is referenced as "forthcoming" in National Wildlife Federation's comment to Docket#: EPA-HQ-OAR-2021-0324 submitted February 4, 2022 at p.3 (ID: EPA-HQ-OAR-2021-0324-0464).

corn for the latest 20-year period (the shaded areas on the graphs show periods of US recessions) and demonstrates that corn prices track very closely to the price of oil.

Figure 1. West Texas Intermediate Crude Price ($/barrel).

Figure 2. U.S. Corn Price ($/bushel).

Given the importance of oil in the agricultural sector, neglecting to consider this relationship appears to be an important omission.

Use of a Counterfactual to Estimate Impacts

The authors attempted to construct the counterfactual case; that is, simulate what the world would have looked like without the RFS (called the "Business as Usual" scenario). It is well understood that the greater the difference between the simulated counterfactual case and available empirical data, the more the counterfactual depends upon model assumptions and inferences. The authors state that "For all estimates, we compare outcomes under the 2007 RFS to a business-as-usual (BAU) counterfactual scenario in which ethanol production satisfies only the volume required by the initial 2005 version of the policy…". The effects of the RFS reported by the authors are therefore based on their comparison between an interpretation of actual conditions (e.g., land use change) and a manufactured counterfactual situation which may or may not reflect a realistic alternative state. In our opinion, the authors do not adequately explain the underlying uncertainty such approaches engender.

Measurement of Land Use Change

In addition to the price of corn, the authors rely on estimates of land use change (both changes in crop rotation as well as changes from other uses such as grassland to agriculture for biofuels feedstock). Regarding the ability to "measure" land use change, the paper implicitly recognizes many problems with spatial data interpretation and state that land use change was mapped at the field level using the updated recommended practices. Although data sources are identified, the specific data sets used are not disclosed. The "recommend practices" alluded to are those developed by the lead author to correct for demonstrated deficiencies in some of his previous work on land use change and there is no description of how the"recommended practices" were applied.

The authors rely on at least some data sets that are not publicly available, therefore limiting the ability of a third party to replicate their work. For example, the authors state that their analysis relies on a database built using field boundary data from USDA Common Land Unit (CLU) among other data sources. The CLU database is confidential and not available to the general public.[2]

Additional Comments

The paper starts out by making it clear that the research being presented is the result of extensive data selection, manipulation and analysis; development and application of numerous models; and development and application of links between models. The paper is therefore presenting modeled, or estimated results based on a complex and interrelated set of mathematical models, each with underlying sets of assumptions and uncertainties. Although the authors purport to have propagated the uncertainties inherent in each modeling step, it cannot be ascertained from the material presented whether the overall uncertainty is appropriately reported.

In the Results and Discussion sections, the tone of the presentation changes in a misleading and irresponsible manner such that results are presented as fact, providing a casual reader with the impression that the effect may have been measured and not modeled. Examples of such statements include the following:

- "the RFS stimulated 20.8 billion L (5.5 Bgal) of additional annual ethanol production";
- "the increase in corn prices relative to other crops increased the area planted to corn on existing cropland by an average of 2.8 Mha per year";
- "the RFS decreased abandonment by 0.4 Mha [0.1, 0.6]…"', and so forth for nitrogen and phosphorous pollution, erosion, and GHG emissions.

All of these are modeled results, the validity of which rely on complex underlying assumptions with associated uncertainties, and these weaknesses are not adequately acknowledged by the authors. It is also misleading and irresponsible of the authors to suggest that there is a link between the RFS and potential impacts to threatened and endangered species when they present no information to support these claims. See, for example, the following statement: "Erosion losses from crop fields can also degrade soil quality over time (50, 51), contribute to enhanced GHG emissions in waterways (52), and impair water quality and aquatic habitat (53, 54) including that of threatened and endangered species (55, 56)". These are merely very general and well-known potential adverse effects of agriculture and and are presented with no context whatever in relation to the RFS).

In our opinion, the potential policy and environmental implications of the research presented in this paper demand that the research be subjected to the highest level of review covering all aspects of the modeling effort with the goal of developing a scientific consensus regarding the environmental tradeoffs inherent in the production of biofuels.

[2] The USDA Web site states the following regarding CLU data: "CLU is not in the public domain. Section 1619 of the Food, Conservation, and Energy Act of 2008 (Farm Bill), only allows the sharing of this data to individuals or organizations (governmental or non-governmental) certified by FSA as working in cooperation with the Secretary of Agriculture. Users of the data must be providing assistance to USDA programs, and must require access to CLU data to complete that work."

For further discussion of these issues, see August 2019 Ramboll Report at Section 3.4, which is included in Growth Energy's comment letter (ID: EPA-HQ-OAR-2021-0324-0521) at Exhibit 3.[3]

[3] See Exhibit 2 to Net Gain, *Analysis of EPA's Proposed Rulemaking for 2020, 2021, and 2022 RVOs, Regarding Land Use Change, Wetlands, Ecosystems, Wildlife Habitat, Water Resource Availability, and Water Quality* (Feb. 3, 2022).