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Comments on

Environmental Protection Agency's Proposed Rule:
RFS Pathways II and Technical Amendments to the RFS 2 Standards,
78 Fed. Reg. 36042 (June 14, 2013)
EPA-HQ-OAR-2012-0401

I. INTRODUCTION

As national environmental and development organizations, we are pleased to provide joint comments on Environmental Protection Agency (EPA) Docket No. EPA-HQ-OAR-2012-0401 "RFS Pathways II and Technical Amendments to the RFS 2 Standards" that was published in the Federal Register at 78 Fed. Reg. 36042 on June 14, 2013.

Representing millions of members, our groups share a focus on fighting global warming, protecting human health, preserving natural habitats, and advocating for clean energy. Ensuring that the biofuels promoted in the Renewable Fuel Standard (RFS) are socially- and environmentally-beneficial is important to achieving these goals. In addition to these joint comments, individual organizations will submit more detailed comments concerning areas specific to their expertise.

The comments submitted here focus on EPA's proposal to "allow[] butanol made from corn starch using a combination of advanced technologies to meet the 50% GHG emissions reduction needed to qualify as an advanced renewable fuel." 78 Fed. Reg. at 36058/1. EPA's proposed decision would qualify corn starch butanol as an "advanced biofuel" per section 211 (o)(1)(B) of the Clean Air Act provided the fuel is produced at "dry mill fermentation facilities that use natural gas and biogas from an on-site thin stillage anaerobic digester for process energy with combined heat and power (CHP) producing excess electricity of at least 40% of the purchased natural gas energy of the facility." *Id*.

Our groups are supportive of efforts to produce biofuels in cleaner, more energy-efficient ways, but we have significant concerns about production pathways that could lead to an expansion in the amount of corn starch used and corn acreage needed to make biofuels. EPA indicates that it "does not believe the advanced butanol process for converting corn into butanol will materially affect the total amount of corn used for biofuels and modeled as part of the RFS2 final rule," 78 Fed. Reg. at 36058/2, but we are less certain.

For reasons described below, our groups think new corn starch butanol production could cause an increase in the total amount of corn used for biofuels. An increase in the amount of corn used to make biofuels would likely exacerbate the social and environmental challenges already associated with corn ethanol production, such as rising food prices and food price volatility, the loss of grasslands, wetlands, forests and other natural habitats, soil erosion and depletion, water pollution, and greenhouse gas emissions. In other words, the production of corn starch butanol could contribute to the same set of problems that led Congress to cap the amount of corn starch ethanol that can be used under RFS to comply with the program's annual volume requirements. *See* CAA §211(o)(2)(B)(i).

Moreover, assuming (as we do) that commercial-scale production corn starch butanol could cause the total amount of corn used for biofuels to increase, EPA has not analyzed the lifecycle GHG emissions that would occur under such a scenario—especially the "significant indirect emissions such significant emissions from land use change" that are likely to result from an increase in corn demand. *See* CAA §211(o)(2)(H). Absent that analysis, the Agency has neither a technical basis for determining that corn starch butanol has lifecycle GHG emissions "that are at least 50 percent less than baseline lifecycle greenhouse gas emissions," *see* CAA §211(o)(2)(B)(i), nor the legal authority to qualify corn starch butanol as an "advanced biofuel."

II. EPA MUST NOT ALLOW CORN STARCH BIOFUEL PRODUCTION, OR CORN ACREAGE, TO EXPAND

A. EPA'S PROPOSED APPROVAL OF A CORN STARCH BUTANOL PATHWAY COULD CAUSE AN INCREASE IN THE TOTAL AMOUNT OF CORN USED TO PRODUCE BIOFUEL

EPA believes that the advanced butanol process for converting corn into butanol will not materially affect the total amount of corn used for biofuels—and, consequently, that "the existing agricultural sector modeling analyses for corn as a feedstock remain valid for use in estimating the lifecycle impact of renewable fuel produced using the advanced butanol pathway"—because "the technologies to produce corn butanol are primarily being targeted at retrofitting existing corn ethanol facilities." 78 Fed. Reg. at 36058/2-3. We think that assertion is flawed, for the following reasons.

First, decisions made by biofuel companies—including, in this case, GEVO Incorporated—to begin producing "advanced biofuel" (*i.e.*, corn starch butanol) instead of conventional "renewable biofuel" (*i.e.*, corn starch ethanol) are not tied to any decrease in demand for corn starch ethanol. To the contrary, one company's exit from the corn starch ethanol market creates an opportunity for other companies to increase their production of corn ethanol and claim the D6 RINs that GEVO currently generates. Therefore, the amount of corn used to make corn ethanol will not decrease, and any corn that is used to make butanol could be additive to that amount.

Second, if EPA allows the "advanced butanol pathway" to generate D5 "advanced biofuel" RINs, GEVO, Butamax and other companies that pursue the pathway will gain access to a larger portion of the overall RFS market. The butanol that these companies plan to produce at its retrofitted butanol facilities will be more valuable than the ethanol currently being produced; it would make sense, therefore, for such companies to take advantage of that increased value by expanding their production volume.

B. EXPANDED PRODUCTION OF CORN STARCH BIOFUEL AND CORN ACREAGE WILL CAUSE A RANGE OF NEGATIVE SOCIAL AND ENVIRONMENTAL IMPACTS

An increase in the amount of corn used to make biofuel is likely to exacerbate many of the problems already associated with the production of corn ethanol, including increases in food prices and food price volatility and the loss of habitat.

[1] Increase in Food Prices and Food Price Volatility

The debate over the effect of biofuels on food prices has intensified in the context of growing food price volatility, including dramatic spikes in the prices of basic food commodities. The diversion of a large and increasing share of US corn to ethanol production has drawn particular attention—deservedly so, since corn is one of the key staple food crops in the world and the primary source of calories and nutrients for nearly 1 billion people worldwide. Corn is also one of the most widely used feed crops for animals, so its availability and price have direct impacts on the price of dairy products, eggs, and meat. The US is at once the world's largest producer and exporter of corn, so changes in US corn supply and use quickly affect prices worldwide.

The upward pressure of biofuels expansion on agricultural commodity prices occurs on a number of related levels:

- The direct impact as food and feed crops are diverted for use as fuel.
- The scarcities and higher prices that result from the diversion of land from other crops into the higher-priced biofuel crop. For example, when a large amount of land is converted from growing soybeans to corn due to high corn prices, which in turn pushes up soybean prices.
- The increase in prices for food crops that serve as dietary substitutes for high priced biofuel crops. For example when demand for wheat increases as corn prices increase, leading to a decline in the use of corn as food or feed and an increase in the use of wheat.
- The rise in the value of agricultural land. Biofuel expansion increases land values, creating both practical and speculative incentives to buy land. The recent wave of "land grabs" in developing countries by resource-poor governments and international financial investors is the most worrisome expression of this trend.
- The decline in inventories of key food staples due to increased demand from biofuels, such that global markets (and prices) are more vulnerable to both sudden

drops in supply or increases in demand. For example, weather-related crop failures are on the rise and are expected to increase in frequency and severity with climate change, leading to supply shocks (and concurrent price increases) that will be amplified throughout the markets if inventories remain low.

- The rise in speculative buying and selling in agricultural commodities markets. Large amounts of investment money flowed into commodities markets after the 2007 financial crisis made other types of investments more risky. Low inventories, partly due to biofuels, make such speculation more profitable for financial investors who gain from short-term price movements. This contributes to price volatility.

There is widespread agreement that biofuels expansion worldwide is a major contributor to increases in agricultural commodity prices through the direct diversion of food and feed crops to fuel uses and through competition for land to grow energy-related crops. Most estimates of the share of food price increases that should be attributed to biofuels expansion are in line with those summarized in a recent report from the National Academy of Sciences. Researchers synthesized the conclusions of 11 studies that examined the 2007/8 food price spikes, finding that between 20% and 40% of the increase in commodity prices was attributable to biofuels expansion internationally. National Research Council, *Renewable fuel standard: Potential Economic and Environmental Effects of US Biofuel Policy.* 2011. This conclusion is consistent with the majority of studies in the field, including studies that incorporate data from 2009-11. *See* Wise, Timothy A. (2012). *The Cost to Mexico of US Corn Ethanol Expansion.* Global Development and Environment Institute Working Paper No. 12-01.

There is broad consensus that US ethanol expansion has been an important contributor to global food price increases, by accelerating the consumption of corn feedstocks and intensifying competition for land in the US and internationally. Growth in the amount of US corn used to produce ethanol has accelerated dramatically over the past 12 years. At 13.8 billion gallons, US ethanol production today is nearly 9 times what it was in 2000, while the share of US corn going to ethanol has risen from 5% to over 40%.

By expanding the use of corn to make biofuel and opening a new category of RFS mandates to corn-based biofuel, EPA's proposed decision to qualify corn starch butanol as an "advanced biofuel" would exacerbate the negative effect that the RFS has had on US and global food prices and food price volatility if overall corn feedstocks used for fuel are not capped, regardless of whether that fuel is used for the RFS or not.

[2] Loss of Habitat

The RFS is driving the conversion of native and planted grasslands, wetlands, and trees and forests. Between 1986 and 2006, US corn plantings did not exceed 81 million acres. Then in 2007, when the RFS was passed, corn acreage spiked to almost 95 million acres. In 2013, USDA expects that farmers planted 97.3 million acres of corn, which is 224,000 more acres than 2012. Similarly, USDA estimates that in 2013 farmers planted 77.8 million acres of soybeans, the largest soybean acreage ever. Driven in large part by the RFS, increasing cropland acreage is coming in large part from the conversion of grasslands and wetlands,

and these conversions are occurring on a staggering scale. Using Landsat mapping data from the USDA, the Environmental Working Group found that between 2008 and 2011, 23 million acres of grasslands and wetlands were converted to grow crops, particularly corn, soybeans and winter wheat.[1]

Especially devastating for wildlife is the concentration of grassland conversions in the Prairie Pothole Region. In 2013, geographers Christopher Wright and Michael Wimberly used the National Agricultural Statistics Service (NASS) Cropland Data Layer (CDL), FSA cropping data, soil and wetland maps, and found that there is a concentration of grassland conversion within the western Corn Belt, particularly in the eastern counties of North and South Dakota, and areas of Iowa outside of its core corn belt.[2] Wright and Wimberly further isolated counties where rates of conversion from grasslands exceeded reductions in CRP acreage, suggesting increased risk that the grasslands being converted were native prairie, and found concentrations of these 'excess' conversions in eastern South Dakota, outside the core corn belt in Iowa, and in eastern North Dakota. Lastly, Wright and Wimberly overlaid aerial imagery with cropping, soil and wetland data to also reveal that high rates of grassland conversions are occurring on and near the very kinds of marginal and sensitive lands that the EPA, in its original RFS2 rules, rightly interpreted the RFS2's renewable biomass definition as intended to protect. Though Wright and Wimberly found important state-level differences, they conclude that "in aggregate, conversion has been concentrated on more marginal lands characterized by high erosion potential, shallow soils, poor drainage, and less suitable climates for corn/soy production."

Importantly, the western corn belt largely overlaps the Prairie Pothole Region, which has a high frequency of wetlands interspersed in grasslands. The combination of wetland and grassland in the Prairie Pothole Region provides the nesting habitat to a majority of the country's ducks, and many species of shorebirds. Wright and Wimberly found that in North and South Dakota, 80% of the grassland conversion is occurring within 500m of wetlands, which removes nesting habitat as well as degrades water quality by increasing sedimentation and nutrient runoff.

In addition to having disproportionately high impact on grassland-breeding waterfowl and birds, grassland conversions are occurring on native prairies. In fact, USDA's own data indicate that in response to recent high crop prices, over 15% of farms expanded cropland by plowing up land that hadn't previously been cultivated. In 2011, USDA Economic Research Service (ERS) released an assessment of changes in cropping patterns and landuse in response to bioenergy markets called "The Ethanol Decade."[3] Based on Agricultural Resource Management Surveys (ARMS) of farmers, the focus of the report was how farmers changed their cropping practices between 2006 and 2008 in response to the increasing price of corn.[4] The ARMS' results indicated three main ways that farms

[1] http://static.ewg.org/pdf/plowed_under.pdf
[2] http://www.pnas.org/content/110/10/4134.full.pdf+html
[3] http://www.ers.usda.gov/publications/eib-economic-information-bulletin/eib79.aspx
[4] The National Agricultural Statistics Service (NASS) and Economic Research Service (ERS) conduct the annual Agricultural Resources Management Survey (ARMS). Each year, a portion of ARMS

expanded crop production acreage—expanding farm size through consolidation (acquiring additional land), double cropping, and cultivating land that was previously idled or uncultivated. Cultivating previously uncultivated land, the surveys revealed, represented a significant source of increased corn and soy cropland.

> In the 2008 ARMS, farm operators were asked directly about expanding cropland into previously uncultivated acreage. About 16 percent of 2008 corn and soybean farms brought new acreage into production between 2006 and 2008. The uncultivated land brought into production by these farms accounted for approximately 30 percent of the average farm's expansion in total harvested acreage. Most acreage conversion came from uncultivated hay.

Though the previously uncultivated land brought into cultivation prior to December 19, 2007 would not be excluded from the RFS' renewable biomass definition, the conversions of land in 2008 would be excluded. The USDA's survey data clearly established that 1) a significant percentage of farmers (16% of corn and soybean farmers) were converting previously uncultivated land to increase corn production, and 2) that these conversions amounted to a very significant amount of cropland (about 30% of the average corn and soybean farm's expanded cropland). These data document that a significant acreage of previously uncultivated land was converted to crop production in 2008—land that would be ineligible for RFS2 biofuels feedstock production. Lastly, we are hearing anecdotally (but only have preliminary data) about the clearing of trees and forests for cropland, particularly corn, from upper Midwest and plains states to Georgia. The clearing of trees and forests for biofuel production will obviously add significantly to the carbon emissions of the biofuels. And depending on the location, origin and size of the cleared forests, the feedstocks grown on cleared forestland would not be eligible as renewable biomass under the RFS.

The fact that significant amounts of the new cropland came from recently-plowed native grasslands casts grave doubt on the EPA's so-called aggregate compliance approach to enforcing the RFS' renewable biomass definition, as our groups have argued repeatedly. Growing additional corn for a new corn-starch based advanced biofuel pathway would increase the likelihood that feedstocks would be improperly grown on recently-converted grasslands and would exacerbate the negative effect that the RFS has had on habitat conservation in the US. In fact, because many farmers already converted much of the easily convertible cropland, including pastures and CRP acres coming out of contract, it is likely that additional new cropland will be plowed up native prairies. And importantly, the lower GHG emissions of the proposed corn-based butanol pathway does not take into account the carbon emissions from converted forests and trees, which will be significantly higher than from the conversion of existing croplands.

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targets specific commodities. In 2008, the ARMS included questions related to bioenergy feedstock growth that targeted corn and soybean farmers, and also included questions related to crop acreage between 2006 and 2008.

Unfortunately, the deleterious impacts of expanding corn acreage for biofuels aren't limited to wildlife habitat and native grasslands—in the form of leaching nutrients and sedimentation, they ripple downstream, flowing into many Americans' drinking water and eventually out into the Gulf of Mexico.[5] This spring and summer, as last year's drought has given way to drenching rains in some key corn-producing areas, the water quality impacts of record-high corn and soybean plantings have been especially pronounced. Rivers in Iowa, which provide drinking water to Des Moines and other cities, have record levels of nitrate that leached off farmers' fields and has to be removed with expensive techniques to make the water safe to drink. Experts who monitor the hypoxic or 'dead' zone in the Gulf of Mexico predict a possible record-setting dead zone this year. These mounting direct and downstream effects of our current cropping practices and cropland acreage do not call for creating additional drivers of corn production through approval of a new corn-based advanced biofuel pathway.

C. EXPANDING CORN FEEDSTOCKS EVEN FOR "ADVANCED BIOFUEL" IS CONTRARY TO CONGRESS'S INTENT

By explicitly barring corn starch ethanol from qualifying as an "advanced biofuel," CAA §§211(o)(1)(B)(i) and (ii)(II), Congress attempted to address many of the concerns it had around the 2007 Energy Independence and Security Act's five-fold expansion of the 2005 RFS. Although some of these concerns pertained to the ethanol conversion process (*e.g.*, its poor energy return on energy invested ratio), Congress also worried about the social and environmental consequences of using a resource-intensive food crop to make fuel. This is illustrated by the fact that Congress placed firm limits on corn ethanol but allowed other forms of ethanol access to the advanced and cellulosic pools. Moreover, the Congressional limitation was not purely driven by corn ethanol's technological maturity. Indeed, Congress allowed sugarcane ethanol to access the advanced tier—even though it is a technology that Brazil had been using for decades. Congress's intent is also evident in the statements that members of both chambers of Congress made during a number of hearings held prior to the enactment of EISA, some of which are outlined below.

[1] Corn-kernel Biofuels' Impact on Food Prices

- Sen. Pete Dominici: "We need to avoid unintended consequences as we develop a domestic industry in this area. […] We must balance the use of cropland to produce

[5] The National Oceanic and Atmospheric Administration estimates that the Gulf of Mexico's "dead zone" will reach record size in 2013, with many researchers pointing to corn ethanol production as "the primary culprit." Todd Masson, "Corn ethanol responsible for this year's dead zone, researchers say," New Orleans Times-Picayune (July 10, 2013) (http://www.nola.com/outdoors/index.ssf/2013/07/ethanol_responsible_for_this_y.html). It goes without saying an increase in Midwestern corn cultivation—regardless of whether the corn is used to make ethanol or butanol—will exacerbate this problem.

food and feed and also fuel. Today, U.S. ethanol production relies heavily on corn." He goes on to explain that the bill includes "several provisions to lessen the negative impacts, if we can, that relate to various industries"; the bill specified that corn-kernel based biofuel should be considered "conventional" biofuel. – (April 12, 2007 Hearing "Biofuels for Energy Security and Transportation Act of 2007", http://www.gpo.gov/fdsys/pkg/CHRG-110shrg36418/pdf/CHRG-110shrg36418.pdf)

- Sen. Lisa Murkowski: "In testimony earlier in the year we heard that it is probably not possible for the United States to produce more than 15 billion gallons of ethanol from corn kernels without having huge impacts on farm land allocation, crop selection and having even larger impacts on farm prices. I'm glad [the] bill caps aid at the 15 billion-gallon level for traditional corn-kernel-based ethanol production." (April 12, 2007 Hearing "Biofuels for Energy Security and Transportation Act of 2007", http://www.gpo.gov/fdsys/pkg/CHRG-110shrg36418/pdf/CHRG-110shrg36418.pdf)
- Sen. Saxby Chambliss: "The RFS is bidding corn and fuel grains away from traditional customers and beginning to affect the livestock and poultry industries." […] "as we discuss these issues, perhaps we should focus more on feedstocks that do not compete with animal agriculture, while at the same time promoting innovation." (January 10, 2007 Hearing "Agriculture and Rural America's Role in Enhancing National Energy Security", http://www.gpo.gov/fdsys/pkg/CHRG-110shrg34149/pdf/CHRG-110shrg34149.pdf)
- Sen. Tom Harkin: In response to concerns about corn starch based biofuels competing with feed production, "Initially, we certainly will need a lot of corn for ethanol production, but the development and implementation of cellulosic ethanol should start to balance things out." (January 10, 2007 Hearing "Agriculture and Rural America's Role in Enhancing National Energy Security", http://www.gpo.gov/fdsys/pkg/CHRG-110shrg34149/pdf/CHRG-110shrg34149.pdf)
- Rep. Darlene Hooley: "At what point are we driving up the food prices and how much land do you have to put in to really provide enough corn to produce enough fuel so it is a viable source?" (April 18, 2007 Hearing "Alternative Transportation Fuels: An Overview", http://www.gpo.gov/fdsys/pkg/CHRG-110hhrg40203/html/CHRG-110hhrg40203.htm)
- Rep. Charles Gonzalez: Highlighted "the question of food versus fuel" […] and underscored "the implications are great." (May 8, 2007, Hearing "Alternative Fuels: Current Status, Proposals for New Standards and Related Infrastructure Issues; http://www.gpo.gov/fdsys/pkg/CHRG-110hhrg40701/pdf/CHRG-110hhrg40701.pdf)
- Rep. Nick Lampson: "Concerns have been raised about further expansion of corn-based ethanol and its impact on food and feed supply and costs." […] "Clearly this all suggests that biomass sources for biofuel production must be diversified." (June 14, 2007 Hearing "A Path Toward the Broader Use of Biofuels", http://www.gpo.gov/fdsys/pkg/CHRG-110hhrg35999/pdf/CHRG-110hhrg35999.pdf)

[2] Corn-kernel Biofuels' Impact on Environment

- Hearing Charter: "Competition with food and feed supply, water and nutrient demand associated with corn production and continued questions about the energy balance of corn based ethanol production all suggest that biomass sources for biofuel production must be diversified." Dr. Thomas Foust of the National Renewable Energy Laboratory later supported this, explaining, "to move the ethanol industry to where we need it to be we would have to move corn grain as a primary feedstock resource, and we have to move into biomass." (June 14, 2007 Hearing "A Path Toward the Broader Use of Biofuels", http://www.gpo.gov/fdsys/pkg/CHRG-110hhrg35999/pdf/CHRG-110hhrg35999.pdf)
- Rep. Lynn Woosley. "I am particularly concerned when we talk about ethanol and corn ethanol about the land use issues." (June 14, 2007 Hearing "A Path Toward the Broader Use of Biofuels", http://www.gpo.gov/fdsys/pkg/CHRG-110hhrg35999/pdf/CHRG-110hhrg35999.pdf)
- Rep. Roscoe Bartlett: "I would submit that maybe we have gone backwards environmentally, because what we are going to do is to take land out of agriculture reserves that shouldn't be farmed, and we are going to put it into farming because there is a potential profit to be made by growing corn." (June 14, 2007 Hearing "A Path Toward the Broader Use of Biofuels", http://www.gpo.gov/fdsys/pkg/CHRG-110hhrg35999/pdf/CHRG-110hhrg35999.pdf)
- Rep. Ed Markey: "Biofuels offer an alternative to oil that could allow us to use grass to make a greener gas." He later explained that the key to addressing oil dependence and global warming through biofuels was by "unlocking the energy in the parts of plants currently considered too tough to use" and warned that that "we can't relentlessly pursue [biofuels] and lose sight of the larger goals that combat global warming, preserve clean air and water and protect wildlife and human health." (October 24, 2007 Hearing "The Gas is Greener: The Future of Biofuels", https://house.resource.org/110/gov.house.sgw.20071024.pdf)
- Rep. Jim Sensenbrenner: corn ethanol "seems to offer slight improvement in CO2 emissions but also seems to put more pressure on food prices, water supply and quality and land use." (October 24, 2007 Hearing "The Gas is Greener: The Future of Biofuels", https://house.resource.org/110/gov.house.sgw.20071024.pdf)
- Rep. John Hall: "If we are going to be growing more fuel crops we need a plan to make sure our soil and water resources can support that. What kind of strategies should we be devising should Congress, USDA, and EPA and others take to make that happen?" Dr. Susan Leschine of the University of Massachusetts responded, "Well, what we are talking about is diversifying biomass, sources of biomass which can be utilized for cellulosic ethanol production." (October 24, 2007 Hearing "The Gas is Greener: The Future of Biofuels", https://house.resource.org/110/gov.house.sgw.20071024.pdf)

In spite of the frequent references to "corn ethanol," it is clear that the Congress was mainly concerned about the use of corn kernels as a feedstock. That concern is echoed in the text of the statute. Coupled with the restrictions on agricultural land expansion (*see* CAA §211(o)(1)(I)) and the focus on ILUC emissions that result from food market disruptions

(*see* CAA §211(o)(1)(H)), the cap on corn starch ethanol in Section 211(o)(1)(B) implies that Congress was particularly interested in limiting the negative impact that biofuel-driven demand for corn would have food markets, habitat conservation, and climate change. Similarly, by disqualifying corn starch ethanol from consideration as an "advanced biofuel," Congress wanted to create space in the market for feedstocks other than corn.

Each of these concerns apply to corn starch butanol. Put differently, converting corn starch into butanol instead of ethanol does nothing to redress the concerns that Congress had about the use of corn as biofuel feedstock and the impact that usage would have on food prices, habitat conservation, climate change, or innovation. And, despite the apparent intent of Congress to ensure that the RFS would diversify away from biofuels solely produced from corn starch, the promise of this diversification has yet to be realized. However, this is no cause to open the RFS to even larger quantities of corn starch-based biofuels, especially if firm limits on corn based feedstocks are not also adopted.

D. EPA CANNOT RELY ON ITS EXISTING LIFECYCLE GHG ANALYSIS TO APPROVE NEW CORN STARCH BIOFUEL PRODUCTION PATHWAYS

EPA asserts that "[s]ince corn starch has already been evaluated as part of the RFS2 final rule, no new feedstock production modeling was required" to support the Agency's contention that the proposed "advanced butanol pathway" meets the 50% GHG reduction required of "advanced biofuels." 78 Fed. Reg. 36058/2. As discussed above, however, EPA's approval of corn starch butanol will likely cause an increase in the total amount of corn used to make biofuel if measures to contain the growth of corn feedstocks are not simultaneously taken. If corn feedstocks grow, the GHG emissions modeling for corn that EPA conducted during its development of the 2010 RFS implementation rule—which assumed the use of 5.5 billion bushels of corn—cannot be used to determine the GHG emissions associated with the production of biofuels from more than 5.5 billion bushels of corn.

As EPA knows, volume is a key parameter in lifecycle emissions modeling. The literature pertaining to lifecycle analyses makes it clear that an assessment of the direct or indirect lifecycle emissions associated with the production and use of specific volume of biofuel says very little about the direct and indirect lifecycle emissions associated with different volume of that fuel. For example, in a study of the modeling used to implement the European Union's comparatively modest biofuel mandate, Al-Riffai *et al.* wrote,

> If the underlying assumptions [about the size of the EU mandate] should change however, either because the mandated quantities turn out to be higher and/or because the model assumptions and parameters need to be revised, there is a real risk that ILUC could undermine the environmental

> viability of biofuels. Non-linear effects, in terms of biofuels volumes and behavioural parameters, pose a risk.[6]

Consequently, EPA cannot rely on the lifecycle analyses it performed in 2010 to allow sugarcane ethanol and other biofuels to generate RINs if those fuels are being produced and/or imported in volumes that differ substantially from what the Agency modeled. EPA has a duty to ensure that the biofuels used to comply with the RFS meet the lifecycle GHG reduction requirements established in EISA; specifically the Agency must ensure that the proposed "advanced butanol pathway" delivers lifecycle GHG emissions "that are at least 50 percent less than baseline lifecycle greenhouse gas emissions." CAA §211(o)(1)(B). The lifecycle analyses performed by EPA in 2010 cannot be used to make that determination in the likely event that corn starch butanol production causes total use of corn for biofuel to increase.

Incidentally, the same problem applies to EPA's proposed decision to allow advanced biofuels—especially sugarcane ethanol—to make up for the shortfall in cellulosic biofuels. As several of our organizations explained in comments provided to EPA in April 2013, filling the cellulosic void with sugarcane ethanol would drive a new increase in US corn ethanol production, as Brazilian consumers replace exported sugarcane ethanol with imported corn ethanol. Since EPA has not yet analyzed the lifecycle emissions associated with the increase in corn ethanol production that would occur if the United States began importing significantly larger volumes of sugarcane ethanol, the Agency cannot rely on the lifecycle emissions modeling it conducted in 2010 when allowing significantly larger volumes of food based non-cellulosic "advanced biofuels" to qualify for RINs.[7]

In addition, EPA cannot rely on the 2010 LCA because doing so would effectively assume that the use of thin stillage from corn to produce butanol will not impact the lifecycle accounting of biofuels made from corn kernels. That assumption is wrong. Thin stillage is a non-negligible component of Dry Distillers Grain and Solubles (DDGS), the corn ethanol by-product that is sold as feed to livestock producers and provides corn ethanol with a GHG reduction credit under EPA's LCA. Consequently, biobutanol production—which does not return the thin stillage to feed market, and thus does not displace corn production to the same extent as ethanol production—results in GHG emissions that are not accounted for under EPA's current LCA. A full lifecycle analysis would be necessary to ensure full accounting.

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[6] Perrihan Al-Riffai, *et al*. *Global Trade and Environmental Impact Study of the EU Biofuels Mandate* 71 (2010) (study carried out for the Directorate General for Trade of the European Commission).
[7] *See, e.g.,* comments on EPA's proposed 2013 Renewable Fuel Standards submitted by Clean Air Task Force (EPA-HQ-OAR-2012-0546-0076), Union of Concerned Scientists (EPA-HQ-OAR-2012-0546-0073), and other organizations (EPA-HQ-OAR-2012-0546-0074)..

III. CONCLUSION

In summary, allowing butanol to expand corn starch demand through the advanced portion of the RFS is contrary to Congress' intent to limit the expansion of biofuel produced from corn kernels. EPA's current proposal is likely to result in greater use of corn in the RFS, which increases demand on corn. This results in higher crop and food prices of food here in the US and around the world, which applies pressure to convert more acres into corn and other crop production. As a result, to ensure that the proposed advanced biofuel pathway for corn-starch butanol would not lead to the use of feedstocks that do not meet the definition of renewable biomass and/or do not increase carbon emissions from land conversion, EPA needs to firmly cap the amount of corn starch that can be used to make RIN-eligible biofuels. For these reasons, we respectfully urge EPA to withdraw its proposal to qualify corn starch butanol as an "advanced biofuel."

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