Comments of the Biotechnology Industry Organization
September 25, 2009

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Notice of Proposed Rulemaking: implementation of changes to Renewable Fuel Standard under the Clean Air Act, as amended by Sections 201, 202, and 210 of the Energy Independence and Security Act of 2007

Docket ID No. EPA-HQ-OAR-2005-0161

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The Biotechnology Industry Organization ("BIO") would like to thank the Environmental Protection Agency ("EPA") for its work thus far on implementation of the Renewable Fuel Standard ("RFS2") as passed in the Energy Independence and Security Act of 2007 ("EISA") and for the opportunity to provide comments on the proposed rule as issued.

Listed below is a summary of BIO's primary areas of recommendation as solicited by the proposed rule and tabular index to their location within the BIO comments.

Greenhouse Gas Emissions Lifecycle Analysis Methodology

Emissions from Land Use Change

- Limitations of the current science underlying land use change, including assumptions about future crops yield and land constraint, causality, and the role of global land policies, impose a large range of uncertainty on lifecycle GHG calculations for biofuels.
- BIO urges EPA to fully acknowledge the extent of the uncertainty in estimation of emissions from land use change, and ensure that emerging biofuels technologies are not disqualified from participation in the RFS2 program unless clearly demonstrated to be out of compliance with the program's GHG performance requirements under the full range of reasonable assumptions for the pertinent methodology, including assumptions that have not been adopted in EPA's proposed methodology.

Technology Assessment

- EPA's framework for categorizing feedstock/conversion technologies for biofuels is too inflexible. EPA should allow individual producers to estimate their carbon footprint based on their own specific data.
- Technology innovation in the biofuels space is occurring at a rapid rate. In its final rule, EPA should allow biotechnology to aid the future biofuels industry in continuing to increase crop yields, decrease fertilizer inputs, increase drought tolerance and lower their carbon footprint.
- EPA should increase the transparency of the carbon intensity processes and reduce the time needed to certify pathways.
- The methodology tool that is ultimately used should have built in flexibility and encourage technology neutrality in order to account for future improvement and innovation.
- To facilitate the deployment of novel biofuel technologies, including algae-based fuels, EPA should expedite its life-cycle carbon analyses of these fuel pathways.

Relatability

- EPA should commit to revisit all aspects of the methodology considered in this rulemaking, if it is charged by Congress with the task of measuring lifecycle greenhouse gas emissions or emission reductions for any other purpose under a future regulatory regime, and expressly disclaim any intent to establish precedent in this rulemaking for how ILUC may be measured under a different regulatory program.

Baseline Comparison

- In comparing biofuels' GHG emissions to petroleum-based fuels' baseline emissions, biofuels should be credited for displacing and, therefore, directly reducing future gasoline and diesel production emissions.

Time Frame and Discount Rate

- BIO believes that the use of a long impact timeframe and low or zero discount rate is necessary to meet EPA's established criteria for GHG accounting.

Retrofit of Grandfathered Facilities

- BIO supports the EPA's basic approach on grandfathering of baseline volume of any renewable fuel.

Equivalency Values

- BIO supports EPA's approach on basing the equivalency values on the energy content and renewable content of each renewable fuel in comparison to denatured ethanol, consistent with the approach under RFS1.
- We agree that the existence of four standards under RFS2 does not obviate the value of standardizing for energy content, which provides a level playing field under RFS1 for various types of renewable fuels based on energy content.

Cellulosic Biofuels Waiver

- EPA should take great care in regulating the operational aspects of the cellulosic biofuel waiver. Failure to effectively use the waiver provision and structure the RIN allowances correctly will lead to market instability.
- Cellulosic RFS2 volumes should be set prudently and RIN allowances should not displace volumetric requirements for blending all biofuels. The purpose of the renewable fuel standard is to increase blending of renewable fuel; the waiver provision should be implemented to support that goal.

Biomass Definition

- Waste streams should specifically include municipal solid waste and construction and demolition waste.
- EPA should opt for the least onerous method of recordkeeping.
- Land use should allow for innovations that enhance land's carbon sequestration.
- EPA should include rangeland as agricultural land under RFS2.

Additional Impacts

- EPA should not seek to regulate corn fertilizer use by regulating biofuel manufacturers.
- EPA should take a more complete view of water impacts.

Contents

Introduction

The Biotechnology Industry Organization ("BIO") is pleased to comment on the Environmental Protection Agency's ("EPA") proposed rule to implement changes to the Renewable Fuel Standard ("RFS2") as amended by the Energy Independence and Security Act of 2007 ("EISA"). BIO is the world's largest biotechnology organization, providing advocacy, business development and communications services for more than 1,200 members worldwide. Our companies represent the entire value chain of biofuels and biobased products from dedicated energy crop and other feedstock producers, enzyme companies, commercial scale integrated biorefinery developers and large energy and oil companies.

We'd like to take this opportunity to commend EPA on the openness and inclusiveness of the rule drafting process to date. It is clear that this is a significant undertaking and BIO appreciates all of the work EPA has done and will continue to do to implement the RFS.

BIO supports the RFS2 volumes and believes that biofuels can and must contribute significantly to the objectives of reducing the carbon intensity of transportation fuels and reducing our reliance on petroleum and transportation fuels produced outside of the United States. A renewable low carbon transportation fuel future is not possible without biofuels. As such, BIO members are committed to achieving the vision of EISA and support a strong role for the EPA in implementing RFS2. A credible, enforceable and transparent final rule will go a long way towards minimizing uncertainty in our industry and easing our investment plans to make the RFS2 goals reality.

Greenhouse Gas Emissions Lifecycle Analysis Methodology

The methodology used to calculate the lifecycle greenhouse gas ("GHG") emission reduction thresholds required in Section 211 (o) of the Clean Air Act is a critical component of the RFS2 rulemaking being under taken by EPA. In this section, BIO will address several distinct issues with calculating those values both for the current proposed rule and future amendments to the rule that will be necessary as the renewable fuel industry matures and commercializes.

<u>Emissions from Land Use Change</u>

As has been discussed extensively in RFS2 hearings and other forums, the current EPA methodology for land use change emissions does not adequately account for several key variables including 1) efficiency gains in crop production for use in fuel and food from improved agricultural practices and higher performing crop varieties, 2) type of lands being converted and 3) elasticity of foreign land-use.

EFFECT OF CROP YIELDS AND ASSUMPTION OF LAND CONSTRAINT

The current model and data used in the model do not properly capture the effects of technology and yield advancement over time, resulting in an overestimation of the direct and indirect carbon emissions of biofuels.

Crop efficiency error can doubly impact biofuels in lifecycle GHG calculations by both overestimating the amount of land required for each gallon of fuel and then again for the land required to replace the food production purportedly lost due to biofuels production. BIO and its member companies have previously supplied EPA with yield projection data, and look forward to the incorporation of these data in revised estimates of lifecycle GHG emissions.

A recent analysis prepared for BIO for the California Air Resources Board's ("CARB") recent rulemaking to implement a Low Carbon Fuel Standard[1] demonstrates the sensitivity of economic equilibrium models to yield assumptions, and to the assumption that the planet is and will remain in a highly land constrained environment with respect to agricultural production.

The author examines the impact on land use of varying future yield assumptions of both first and second generation feedstocks. He finds that if yield improvements in first generation crops continue at the current historical rate, "the total amount of land required in the agricultural stock will begin to decline," if food demand also continues to increase along historical trends. "In other words," he continues, "historical trends in yield improvement are more than sufficient to offset growing demand from world population. To the extent that this demand declines, there is now room in the future for biofuels expansion that does not lead to new land clearing."

Thus, as the author points out in his analysis, under at least one scenario based on reasonable assumptions, "We are not necessarily locked into a future of land deficits," and thus the *a priori* assumption of land clearing built into the CARB/GTAP model – a critical assumption that drives all model outcomes – may be fundamentally flawed. To further quote the author, "The CARB/GTAP and Searchinger models for land use change are, in a way, based on circular reasoning. They set up conditions… which make it almost impossible to avoid indirect land use changes."

A similar criticism can be leveled against EPA's land use emissions model. The analysis demonstrates the fundamental shortcomings of economic equilibrium models, such as that used by CARB and EPA, and indicates that estimations of indirect land use change ("ILUC") impacts based on such models do not hold up under at least one reasonable alternative set of assumptions. Indeed, in at least one reasonable future scenario, the very existence of ILUC impacts may not be supported.

Even under scenarios in which future land is constrained, the author demonstrates that ILUC emissions are highly dependent on future yield improvements in both first and second generation crops, and that carbon debts can be dramatically reduced or eliminated. Taken together, these findings clearly argue the need for further review of ILUC methodology.

CAUSALITY

The EPA model is premised upon an assumption that U.S. consumption of biofuels causes land somewhere in the world to be converted to food cultivation to replace the acreage devoted to growing the biofuel feedstock. The rate of such conversion is open to considerable debate. Indeed, CARB peer reviewer John Reilly describes how ILUC modeling "requires a full model of the global economic system to separate out the partial effect of increased demand for biofuels on land use change."[2] This separation of the impact of one global economic factor, increased production of biofuels in the United States, on marginal land use around the world, is "highly confounded by simultaneous changes in demand [for food and land] abroad for other purposes and possible supply-side shocks."[3] As the reviewer concludes, separating out these multi-variable contributors to land-use change one from the other is not possible from available data.

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1 *Sustainable Biofuels: A Commonsense Perspective on California's Approach to Biofuels and Global Land Use*, J. Sheehan, April 2009. Attached as Appendix I.

2 Reilly comments at 5.

3 *Id.*

A paper published by the National Academy of Sciences in 2007 found that the complex factors that drive land use change globally "tend to be difficult to connect empirically to land outcomes, typically owing to the number and complexity of the linkages involved."[4] In a compendium of papers from a conference of 75 leading scientists in September 2008, under the auspices of the SCOPE workshop in Germany, the leading paper on land-use change concludes that "assessment of the GHG implications of land use and land conversion to biofuel crops is a very complex and contentious issue. A complete assessment of the GHG implications would require an accounting [of numerous international activities for which] the present assessment is limited due to the lack of data required to address all of these issues."[5] Thus, the best scientific assessment of indirect land-use change is that currently available global economic models are not robust, and that parameters and output calculations cannot be validated with available data.

ROLE OF GLOBAL LAND POLICIES

Beyond the limits of the science as it exists today, there are complex interactions in the global land system that will always make it difficult to sort out direct cause and effect relationships between biofuels. While these difficulties do not justify ignoring indirect land use effects, they do represent problems that must be dealt with in designing a policy for biofuels. They include:

- Local government policies that encourage land clearing
- Illegal land clearing
- Clearing of land for household energy needs and new housing
- Land clearing for timber

These factors may accelerate the encroachment of agriculture on forest lands. But we do not know how much less severe current rates of expansion of agriculture into forests would be if these factors were reduced or removed.

RFS driven biofuels demand on global agricultural land are miniscule compared to other land use factors. This does not mean that we can ignore the indirect land use effects of biofuels, since the goal ultimately for biofuels would be to play an even larger role in the energy supply. It does suggest, however, that current policies can be designed in such a way that they encourage investment in biofuels without immediate risk of severe land impacts. In the meantime, further analysis can be done to determine how and if policies for large scale deployment can be implemented to safeguard land resources and prevent unintended carbon emissions.

Regulating land use related emissions of carbon through biofuels may result in the premature stifling of a potentially important sustainable energy resource for transportation, while doing nothing to address the serious problems of unsustainable global land management that continue to

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4 Turner, B. L. II, E. Lambin, and A. Reenberg. 2007. "The Emergence of Land Change Science for Global Environmental Change and Sustainability." *Proceedings, National Academy of Sciences of the United States of America*, 104(52): 20666-20671.

5 Ravindranath, N.H., R. Mauvie, J. Fargione, J.G. Canadell, G. Berndes, J. Woods, H. Watson, J. Sathaye. "Greenhouse Gas Implications of Land Use Change and Land Conversion to Biofuel Crops." *Proceedings of the Scientific Community on Problems of the Environment* (SCOPE), Ch. 6, p. 112-13 (2009).

destroy valuable natural land resources and to contribute a tremendous amount of carbon to the atmosphere.

Unsustainable farm practices worldwide may be responsible for as much as 5 million hectares per year of lost agricultural land due to degradation and loss of performance. To put that number in context, this annual loss of land is equivalent to losing 1 to 2 billion gallons of annual ethanol production each year.

Given these considerations, BIO urges EPA to fully acknowledge the extent of the uncertainty in estimation of emissions from land use change, and ensure that emerging biofuels technologies are not disqualified from participation in the RFS2 program unless clearly demonstrated to be out of compliance with the program's GHG performance requirements under the full range of reasonable assumptions for the pertinent methodology, including assumptions that have not been adopted in EPA's proposed methodology.

Specifically, should a biofuel satisfy its GHG performance requirement under any reasonable set of assumptions under EPA's uncertainty analysis, it should be deemed to qualify.

Technology Assessment

TECHNOLOGY CATEGORIES

EPA's framework for categorizing feedstock/conversion technologies for biofuels is too inflexible. When it comes to biofuels production, variety and diversity are the rule. Thus, characterizing a given fuel producers' supply chain using generic technology assessments does not account for individual innovations and improved practices they may be using. For example, such an approach does not allow fuel producers to take credit for mitigation strategies that might address indirect land use impacts that are otherwise assumed to apply to them and to their cohorts in a given feedstock/technology box. ***EPA should allow individual producers to estimate their carbon footprint based on their own specific data.***

EVALUATION OF NEW TECHNOLOGIES

EPA should allow biotechnology to aid the future biofuels industry through technology innovation. Technology innovation in the biofuels space is occurring at a rapid rate. In its final rule, EPA should allow biotechnology to aid the future biofuels industry in continuing to increase crop yields, decrease fertilizer inputs, increase drought tolerance and lower their carbon footprint. The methodology tool that is ultimately used should have built in flexibility and encourage technology neutrality in order to account for future improvement and innovation.

It is impossible to predict what specific fuels/feedstocks will come online in the future for renewable fuel production. Therefore, EPA should develop a streamlined process for new fuels/feedstocks to include the following:

- Clear templates and models so that as funding decisions are being made investors and entrepreneurs can predict cost effectiveness and know if their new ideas will be covered and how.
- A rapid, case-by-case evaluation of new pathways, especially those with values near the category boundaries.

EPA should both increase the transparency of the carbon intensity ("CI") processes and reduce the time needed to certify pathways.
EPA should provide templates or tools to the public to initially self-assess the CI of a particular process. This tool should allow for decoupling of the integrated technologies of existing pathways. This decoupling will better allow component development or novel combinations of technologies (future and present) that maximize environmental benefits. By developing such a clear template, EPA would provide a consistent market signal to the biofuels industry and for commercial investors, helping to ensure the continued advancement in the biofuels sector.

To balance the needs of existing technologies and emerging technologies, we urge the EPA to consider provisions that both allow new technologies to quickly realize the benefit of their innovation and allow existing manufacturing sites the time needed to update their technology and practices. Where the modified values are associated with improved practices or new feedstocks on existing or new assets, the agency adoption of the new value should be immediate, on the order of 3 months or less, and fuels generated from these feedstocks or practices should be permitted to generate RINS during EPA life cycle review. This efficient mechanism would motivate continuous improvement in land use efficiency and production processes. For existing assets there should be an allowance of at least a two to three year notice period before new values are actually adopted for existing plants.

FEEDSTOCK SCENARIOS

EPA's final rule should allow for technology progression and feedstock neutrality.
We applaud the thorough analysis in the proposed rule of several potential feedstocks for cellulosic biofuels, including crop residues, municipal solid waste, and dedicated energy crops like switchgrass. However we believe that as technology progresses both cellulosic and non-cellulosic biomass feedstocks will evolve that are not currently contemplated. While acknowledging the urgency to promote deployment of low carbon fuels, it is critical that EPA avoids introducing regulatory mechanisms which discourage energy crops not dictated by government agencies.

In particular, we are concerned that the analysis overlooks the favorable economics of growing energy crops on marginal, pasture or fallow lands. Many energy crop candidates, like miscanthus or fast-growing tree species, have yields equal or superior to those EPA has modeled for switchgrass. And as EPA has noted, these perennial species require much lower inputs, making the economics highly competitive with pasture or fallow land.

We believe that a significant amount of cellulosic feedstock will come from fast-growing perennial species of trees and grasses, fundamentally altering EPA's analysis and significantly affecting assumptions concerning necessary acreage, states in which acreage for energy crops is available, the extent energy crops will displace food crop land, use of CRP land, and land use change impacts.

Several of these energy crops have been demonstrated today to produce the equivalent of over 1000 gallons per acre (using EPA's assumption of 94 gals/ton conversion rate). For example, Oak Ridge National Laboratory has determined that "[h]ybrid poplars (*Populus spp.*) are among the fastest-growing trees in North America and are well suited for the production of bioenergy (e.g., heat, power, transportation fuels)"[6]. Poplar trees can produce 4-10 bone dry tons per acre (BDT/ac), though it is worth noting that such yields are not reflective of a biofuels regime, and that yields can potentially be as high as 20-55 BDT/ac under optimal cultivation conditions.[7] In addition, the University of Illinois has conducted long term studies of miscanthus at multiple sites and measured current annual yields of 9-15 BDT/ac.[8]

We urge EPA to refine its analysis with these more accurate yield assumptions. The rapid evolution in feedstock development illustrated here highlights the need for an expedited process for evaluating new feedstocks in a timely fashion as the technology and these varieties will undoubtedly improve by 2022.

NOVEL BIOFUEL TECHNOLOGIES

BIO appreciates that EPA sees a vital role for novel biofuel technologies, such as algae-based fuels, in meeting the advanced biofuel mandate. In the proposed rule, EPA states that "[p]erhaps the feedstock with the greatest potential for providing large volumes of oil for production of biomass-based diesel is microalgae."[9] The EPA also recognizes that "algae can be cultivated on marginal land with low nutrient inputs" and that, besides biodiesel, "several companies are alternatively using algae for producing ethanol or crude oil for gasoline which could also contribute to the advanced biofuel mandate."[10]

To facilitate the deployment of novel biofuel technologies, including algae-based fuels, EPA should expedite its life-cycle carbon analyses of these fuel pathways. Further, EPA should take into account that within the set of algae-based fuels there are likely to be wide variations in LCAs because a variety of technological approaches to making the fuel and a variety of uses for the fuel will each yield a different LCA outcome.

Agency-sanctioned LCAs for algae-based fuels have crucial implications, not only for the renewable fuel standard as currently enacted, but also for the tax code, for government and private sector grant-making and investment decisions, and even for local land-use decisions on sites for fuel production facilities. With LCAs that carry the expertise and authority of the Agency, it will be more possible for algae-based fuel pioneers to win the regulatory and funding approvals required to move into cost-competitive commercialization.

Relatability

EPA should commit to revisit all aspects of the methodology considered in this rulemaking for future regulatory actions.

EPA should clarify in its final rule that its methodology for calculating lifecycle GHG emissions associated with renewable biofuels applies only to the EISA-mandated renewable fuel program

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6 Popular Poplars, Trees for many purposes, Oak Ridge National Laboratory, available at: http://bioenergy.ornl.gov/misc/poplars.html

7 Popular Poplars, Trees for many purposes, Oak Ridge National Laboratory, available at: http://bioenergy.ornl.gov/misc/poplars.html

8 Emily A. Heaton, Frank G. Dohleman and Stephen P. Long, "Meeting US Biofuel Goals with Less Land: The Potential of Miscanthus" Global Change Biology (2008) 14, 1–15; Frank G. Dohleman and Stephen P. Long, "More Productive Than Maize in the Midwest: How Does Miscanthus Do It?", Plant Physiology, August 2009, Vol. 150, pp. 2104–2115

9 NOPR, p. 24981

10 Ibid.

and will not create any precedent for future regulatory programs, such as under climate change legislation or a low carbon fuel standard. EPA recognizes that the Notice of Proposed Rulemaking ("NOPR") represents "the first lifecycle greenhouse gas performance requirements included in federal law."[11] These requirements relate only to the specific regulatory scheme created by EISA under which to be eligible as a renewable biofuel, advanced biofuel, biomass-based diesel fuel, or cellulosic biofuel, a renewable fuel must meet or exceed reductions in lifecycle GHG emissions relative to the prescribed baseline emissions for gasoline or diesel. The methodology has no other authorized function. Accordingly, EPA should clarify in its final rule that the adopted lifecycle methodology will only be used for making the threshold determinations of whether a particular renewable biofuel meets the prescribed reduction requirements to qualify for a specific category of renewable biofuels, as defined in EISA.

In its final rulemaking, EPA should make clear, in particular, that its lifecycle methodology is not adopted for use in calculating GHG emission reductions for offsets under future climate change legislation or for purposes of a low carbon fuel standard that might be applied under federal or state law. Whatever the outcome of the methodology in this rulemaking, it has only been developed to make calculations of whether a type of fuel meets or exceeds a target for lifecycle GHG emission reductions. This methodology is not nearly refined enough to justify its use in measuring, ton by ton, actual emission reduction levels. Given the substantial uncertainties in the NOPR's methodology for calculating lifecycle GHG emissions, it would be particularly inappropriate to apply the NOPR lifecycle methodology to calculate absolute levels of emissions or emission reductions that may have discrete per-ton economic value, as in the case of emission reduction offsets or a low carbon fuel standard of the type under development in California. Far greater precision and justification in measurement should be required of a methodology that assigns absolute, rather than relative, emission reduction levels to a particular type of fuel or a project-specific application of a type of fuel.

In this vein, ***EPA should also expressly disclaim any intent to establish precedent in this rulemaking for how ILUC may be measured or accounted for under a different regulatory program***, such as under pending climate change legislation that may recognize offset credits for projects or activities involving land use. EPA should commit to revisit all aspects of the methodology considered in this rulemaking, if it is charged by Congress with the task of measuring lifecycle GHG emissions or emission reductions for any purpose under a future regulatory regime. Not only will the scientific base of knowledge have expanded and additional data become available, but the rationale and implications of future regulatory programs may well be very different from those at stake in this proceeding. For these reasons, it is important that EPA dispel any suggestion or implication that its final rulemaking methodology represents precedent upon which it will rely in administering other programs that may come to require measurement of lifecycle GHG emissions or reductions in those emissions.

Baseline Comparison

EPA should take account of actual reductions in GHG emissions attributable to renewable biofuels displacement of gasoline and diesel in 2022. The purpose of EISA is plain: to mandate production of substantial volumes of renewable fuels that yield significant, measurable lifecycle GHG

[11] NOPR Preamble, § VI.A.1 at 270.

emission reductions relative to continued production of gasoline or diesel fuel. EISA is equally plain that the "lifecycle greenhouse gas emissions" used for this comparison are broadly defined to include "direct and significant indirect emissions … related to the full fuel lifecycle."[12] To determine lifecycle GHG emissions associated with each biofuel type, the NOPR adopts a dynamic perspective, measuring lifecycle GHG emissions for each type of renewable fuel in 2022, reflecting full implementation of the EISA mandates for substantial volumes of renewable fuel production in that year.[13] The lifecycle measurements for renewable fuels are also dynamic in the sense they reflect lifecycle emissions associated with production over a 30-year or 100-year time period.[14] By contrast, the NOPR adopts a static perspective for baseline gasoline and diesel fuels, using an invariant level of lifecycle GHG emissions fixed for all time by estimates of emissions in 2005. This results in a comparison of lifecycle GHG emissions across two different energy eras, which is tantamount to comparing apples and oranges.

BIO recognizes that EISA defines "baseline lifecycle greenhouse gas emissions" to be "the average lifecycle greenhouse gas emissions for gasoline or diesel sold or distributed as transportation fuel in 2005."[15] However, this provision does not require, as the NOPR seems to assume, that no account can be taken in the lifecycle analysis of the GHG emission reductions achieved by renewable biofuels through their displacement of gasoline and diesel fuels in 2022 and beyond. The NOPR uses the 2005 measure of GHG emissions associated with gasoline and diesel as an invariant baseline for lifecycle GHG emissions from 2005 to 2022 and then through to 2055. *See* NOPR Figure VI.B.5-1.[16] However, even with an invariant measure of the baseline gasoline and diesel emissions, there is nothing in the EISA definition of "lifecycle GHG emissions" that precludes EPA from measuring the direct and indirect emissions savings associated with renewable biofuels (*i.e*., the non-baseline fuels) by taking into account the higher levels of GHG emissions that will be saved by such fuels through their displacement of dirtier gasoline and diesel fuels in 2022.

The biofuel volumes mandated by EISA will displace the marginal volumes of gasoline and diesel in the US market, not the average. These marginal supplies are based on refining of much "heavier" crude oils that involve difficult, and GHG intensive extraction methods, like those used in oil extraction from Canadian tar sands. There is strong evidence that supply of these heavier crudes has increased in the last several years, even while overall crude oil consumption was flat to declining. This increase in share captured by the heavy crudes is evidenced in our crude oil imports – in 2005, heavy crudes, defined as those with an APO gravity of 25° or less, represented 34.8% of US crude imports; in 2008 these heavy crudes had grown to 36.8% of imports.[17]

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12 42 U.S.C. § 7545(o)(1)(H).

13 *See* NOPR Preamble, § VI.B.1 at 273. The NOPR methodology estimates aggregate emissions for each fuel type in 2022 under two scenarios: with and without EISA mandates. The difference in those two estimates is then divided by the estimated change in fuel volumes for each type of renewable fuel type in 2022, to yield normalized emissions, i.e., emissions per unit volume.

14 *See* NOPR Preamble, § VI.B.5.v at 297-304.

15 42 U.S.C. § 7545(o)(1)(C).

16 NOPR Preamble at 299.

17 According to the Department of Energy's Energy Information Agency

In particular, EPA should take into account that, by 2022, gasoline will be increasingly sourced from Canadian tar sands and Venezuelan heavy crude, as demonstrated in the statistics above.[18] These fuels will be among the incremental fuels displaced by EISA-mandated renewable biofuels in 2022. Accordingly, it is appropriate to include in the measure of "indirect" GHG emission reductions associated with renewable biofuels over their lifecycle beginning in 2022 the amount of emissions saved by displacing incremental (or weighted average) volumes of Canadian tar sands and Venezuelan heavy crude. EPA can take these emission reductions into account while retaining its static measure of the 2005 baseline for gasoline and diesel emissions. Rather, renewable biofuels that displace gasoline and diesel should be credited with emissions reductions attributable to any expected increase in the average emissions of the actual incremental volumes of gasoline and diesel that are displaced in 2022.

Biofuels should be credited for reducing gasoline and diesel production emissions.
EPA should credit renewable biofuels for reducing *production* emissions of gasoline and diesel that are displaced by renewable biofuel production. As a more general matter, the NOPR methodology improperly measures the direct and indirect emissions of renewable biofuels when determining whether a renewable biofuel meets the prescribed reduction in lifecycle emissions required of a renewable biofuel (20% reduction against the baseline), an advanced biofuel or biomass-based diesel (50% reduction against the baseline), or a cellulosic biofuel (60% reduction against the baseline). The purpose of the NOPR lifecycle methodology, and its only purpose, is to determine whether any particular type of renewable biofuel meets or exceeds the percentage reductions in lifecycle emissions compared to the emissions associated with gasoline or diesel production and combustion. As we will demonstrate through an example, the NOPR does not properly credit a renewable biofuel for the savings or reduction in GHG emissions associated with the displaced *production* of the baseline gasoline or diesel fuel.

The NOPR recognizes that lifecycle GHG emissions include both direct and indirect effects on GHG emissions from utilization of renewable biofuels. Indirect emissions effects include more than land use change. Indeed, EPA recognizes that measuring lifecycle GHG emissions thus includes both "*decreases and increases* [in emissions] associated with the different parts of the lifecycle emissions of various biofuels and the time frames in which these emission changes occur."[19]

The rationale in the NOPR for counting increases in GHG emissions from ILUCs attributable to the use of renewable biofuels applies with equal force to counting decreases in GHG emissions from the displacement of gasoline and diesel *production* attributable to the use of renewable biofuels. The stated rationale of the NOPR's lifecycle analysis is that "indirect or consequential impacts of biofuel production and use" must be accounted for.[20] Indeed, the displacement of gasoline and diesel *production* is more causally related to the production and use of renewable biofuels than are two prominently cited indirect emissions measured in the NOPR—"changes in

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[18] EPA recognizes that, independent of renewable fuels mandates, there are strong trends toward dirtier petroleum fuels. Indeed, EPA estimates the aggregate greenhouse gas impacts of the NOPR based on an assumption of substantial future imports of gasoline sourced from Canadian tar sands and Venezuelan heavy crude deposits. *See* NOPR Preamble, § VI.F at 346.

[19] NOPR Preamble, § II.A.3 at 25; § VI.A at 269.

[20] NOPR Preamble, § VI.A.2 at 271.

livestock emissions due to changes in agricultural commodity prices" and the "international impact of land use changes from increased biofuel feedstock production."[21]

The fact that a renewable biofuel's lifecycle GHG emissions are compared to baseline lifecycle GHG emissions does not mean that the direct emissions reductions attributable to the displacement of gasoline and diesel fuel *production* should not be counted as part of the lifecycle emission increases and decreases associated with each type of renewable biofuel. A simplified example makes clear the importance of properly crediting to a renewable biofuel reductions in gasoline and diesel *production* emissions when gasoline and diesel *production* is displaced by the renewable biofuel.

EXAMPLE

Assume that baseline emissions for gasoline and diesel are calculated to be 100 units, reflecting 80 units for tailpipe emissions and 20 units of emissions for production of gasoline and diesel. These are roughly the proportions calculated in the NOPR. EPA's methodology counts renewable biofuels as having zero tailpipe emissions, because the emissions from combustion of renewable biofuels are "offset by the uptake of CO_2 resulting from the growth of new biomass."[22] That is, although renewable biofuels emit 80 units of GHG emissions upon combustion, just as does gasoline of equivalent heat value, there is an offset of 80 units from land mass sequestration.

The entire thrust of the indirect land use measurements is to determine the indirect land use "penalty" supposedly associated with renewable biofuel production, which serves to offset the direct sequestration. There may also be a direct *production* penalty to the extent that "well to tank" emissions in producing a renewable biofuel exceed the 20 units of the "well to tank" emissions attributable to producing baseline gasoline and diesel. If these penalties cumulatively are too great, there is insufficient net reduction in lifecycle GHG emissions for a renewable biofuel to meet the standards of an advanced or cellulosic biofuel.

Thus, under the NOPR methodology, the test for qualifying a renewable biofuel as cellulosic biofuel can be stated as a formula:

$$80 - 80 + 20 + p + x \leq 40$$

where:

p = production penalty (or credit) for emissions in excess of 20 units (or less than 20), i.e. the *production* penalty (or credit) for the biofuel compared to the baseline assumption, and

x = the indirect land use change penalty (which is the sum of positive and negative indirect effects) for a renewable biofuel.

The NOPR methodology thus will count as cellulosic biofuel a renewable biofuel that has an indirect land use penalty (x) that is equal to or less than 20 – p. However, in the NOPR

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21 NOPR Preamble, § VI.A.1 at 270-71.

22 Draft Regulatory Impact Analysis, § 2.7 at 402.

methodology, no credit is given to the renewable biofuel for displacing the 20 units of *production* emissions of gasoline and diesel fuel. Were these indirect emission savings or reductions credited to the renewable biofuel, as they should be, the 20 units of displaced gasoline or diesel *production* emissions would be subtracted out and only the *production* penalty, p, would be counted against the renewable biofuel. Thus, under this approach, the test for qualifying a renewable biofuel as cellulosic biofuel should be expressed as the formula:

$$80 - 80 + 20 - 20 + p + x \leq 40$$

and the renewable biofuel will count as cellulosic biofuel if it has an indirect land use penalty (x) that is equal to or less than 40 – p.

EPA has two choices. It can count the reduction in emissions from the displacement of *production* of gasoline and diesel as an indirect emissions savings or reduction creditable to renewable biofuels or it can ignore such reductions in emissions. The NOPR methodology ignores these reductions, but without any justification or even explanation. It is clear that crediting the reduction in emissions from the displacement of *production* of gasoline and diesel as an indirect emissions reduction attributable to renewable biofuels is the correct approach. Renewable biofuels displace both tailpipe emissions (the 80 units) and the *production* emissions (the 20 units) attributable to gasoline and diesel. A renewable biofuel fails to achieve the 60 percent or more reductions in lifecycle emissions compared to the baseline, if the sum of the renewable biofuel's *production* penalty and the land use penalty exceeds 40 units. If the sum of the *production* penalty and the land use penalty do not exceed 40 units, the renewable biofuel plainly reduces lifecycle GHG emissions relative to the fixed baseline GHG emissions by at least 60 percent and should qualify as cellulosic biofuel.

The NOPR methodology is, thus, plainly flawed in not crediting a renewable biofuel with the indirect reduction in *production* emissions of gasoline and diesel that are displaced by the renewable biofuel. The alternative formula presented above properly compares lifecycle emissions from a renewable fuel to baseline lifecycle emissions. EPA should modify its methodology to explicitly count the displaced *production* emissions from gasoline and diesel in computing the lifecycle emissions savings of a renewable fuel.

Time Frame and Discount Rate

EPA's draft assessment[23] suggests that land use conversion attributed to biofuels results in a stream of emissions that change over time. Therefore, the time horizon over which emissions are analyzed and the application of a discount rate to value near-term versus longer-term emissions are critical factors.

EPA's draft rule highlights two options: a 30-year time period for assessing future GHG emissions impacts coupled with a 0% discount rate, which values equally all emission impacts regardless of time of emission impact; and a 100-year time period with a 2% annual discount of future emissions.

[23] 40 CFR Part 80 Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program; Proposed Rule, Federal Register, Vol. 74, No. 99, Tuesday, May 26, 2009, Proposed Rules, 24904- 25143, http://www.epa.gov/OMS/renewablefuels/rfs2_1-5.pdf

EPA establishes two necessary criteria for the accounting methods it is considering for the final rule: first, they must provide an estimate of renewable fuel lifecycle GHG emissions that is consistent over time; and second, they must also provide a common metric that allows for a direct comparison of biofuels to gasoline or diesel. ***BIO believes that the use of a long impact timeframe and low or zero discount rate is necessary to meet EPA's established criteria for GHG accounting.***

EPA has requested comments on a range of issues, including the most appropriate time periods for analysis of biofuels, and whether different time periods should be used for different types of renewable fuels; whether it is appropriate to include foregone sequestration in the GHG emissions estimates; and recommendations on how to improve assessment of the likely stream of GHG emissions after 2022 that will result from the EISA mandates.

EPA requests comments on the concept of discounting a stream of GHG emissions for the purpose of estimating lifecycle GHG emissions from transportation fuels as specified in EISA; and whether it is appropriate to discount GWP-weighted emissions. EPA also invites comments on whether using metrics such as the actual quantities of climate forcing gases in the atmosphere weighted by global warming potential (GWP) or cumulative radiative forcing should be used to evaluate emissions over time. Specifically, EPA seeks comment on an approach for comparing GHG emissions based on the time profile of the GHG emissions in the atmosphere, and whether this approach would be consistent with the legal definition of lifecycle GHG emissions in EISA.

TIME FRAME

EPA's draft rule suggests that for some biofuels, land use change can produce significant near-term GHG emissions; however, displacement of petroleum by those biofuels over subsequent years can "pay back" earlier land conversion impacts. Land conversion in the EPA's analysis contains three major components: a large initial release of emissions due to both land clearing with fire and biomass decay; moderate amounts of soil carbon released (and averaged) for approximately 20 years; and, foregone sequestration associated with forest clearing for approximately 80 years. EPA's draft rule also suggests that the lifecycle GHG emissions of a gallon of gasoline (or other fuel that is not charged with land use change) are unlikely to vary much from year to year.

EPA's Draft Regulatory Impact Analysis: Changes to Renewable Fuel Standard Program[24] notes in several places that "the treatment of emissions over time is not critical if international land use change emissions are excluded because the results without land use change are consistent over time. Therefore the overall lifecycle GHG results do not vary with time or discount rate assumptions." However, for biofuels that incur land use change penalties, a short timeframe does not allow emissions savings from the displacement of petroleum to "pay back" the potentially large initial emissions attributed from land use changes. The sensitivity analyses presented in the draft proposed rule and draft regulatory impact analysis indicate that the lifecycle emissions for biofuels can vary dramatically not only with the choice of timeframe, but also with different assumptions on land use change – for instance, whether pastureland is replaced, the length of

[24] http://www.epa.gov/OMS/renewablefuels/420d09001.pdf

foregone sequestration, and how foregone sequestration is calculated. Because calculating and applying land use change values contains a high degree of uncertainty, using a short timeframe may arbitrarily distort the lifecycle emissions of some biofuels by preventing them from fully paying back these attributed emissions.

The EPA's draft indicates that the agency does not believe it is appropriate to use the payback period for RFS2 compliance purposes. A short timeframe would make the payback period the key determinant in whether certain biofuels meet RFS2 compliance.

The definition of lifecycle GHG emissions contained in the law[25] specifies that the "mass values for all GHGs are adjusted to account for their relative global warming potential." According to the EPA presentation "Lifecycle Greenhouse Gas Emissions from Agricultural Sector and Land Use Change Impacts" at the Workshop on Lifecycle Greenhouse Gas Analysis for the Proposed Revisions to the National Renewable Fuels Standard Program, Session 3: Analysis of Greenhouse Gas Emissions from Land Use Change, June 10-11, 2009[26], "The Global Warming Potentials (GWPs) used to weight emissions are based on impacts over 100 years." To be consistent with the law's definition, a timeframe of at least 100 years should be used.

EPA has also requested comment on a proposal to consider the project timeframe of the law either separately from or as an alternative to the impact timeframe. Sec. 202 (ii) of PL 110–140 establishes procedures for determining the RFS2 standards for each class of biofuels in other calendar years. The language makes clear that the standard is not to be reduced from the levels achieved by 2022. Under the law, therefore, there appears to be no defined project timeframe.

DISCOUNT RATE

Office of Management and Budget guidelines require federal agencies to analyze the net present value of proposed regulatory changes through a cost-benefit analysis. EPA has previously considered the issue of applying discount rates to GHG emissions and has set forth a guidance document recommending using a range of consumption-based discount rates of 0.5% to 3%.

EPA's draft proposed rule indicates that it is difficult to compare the two very different emissions profiles of renewable biofuels and the petroleum baseline. The use of the net present value (NPV) analysis is intended to better enable the comparison. However, BIO believes that the analysis distorts the comparison.

As the sensitivity analyses presented in both the draft proposed rule and the draft regulatory impact analysis show, the choice of a discount rate can have dramatic effects on the calculated lifecycle emissions of biofuels. The choice of a discount rate has opposing effects for certain biofuels and the baseline. EPA notes that as the discount rate increases, the NPV of non-land use change emissions decrease, because a higher discount rate diminishes the relative valuation of emissions that occur in the future. On the other hand, the NPV of emissions from land use changes are less affected by the choice of discount rate because a large share of attributed international land use change emissions occur in the first year. Therefore, with higher discount rates, it takes

[25] PL 110–140—DEC. 19, 2007, http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_public_laws&docid=f:publ140.110.pdf

[26] http://client-ross.com/lifecycle-workshop/docs/3_EPA_GHG_Emissions_from_Ag_Impacts_6-10-09am.pdf

longer for the future benefits of biofuel production to payback earlier land clearing emissions. Because the effect of the discount rate is distorted by the inclusion of international land use change, which EPA's analysis shows contains a high degree of sensitivity to assumptions, BIO recommends the use of either no discount rate or the lowest possible discount rate (0.5%).

The use of the discount rate on petroleum emissions may be inconsistent with the terms of the law. Baseline lifecycle GHG emissions are defined as the average lifecycle GHG emissions for gasoline or diesel sold or distributed as transportation fuel in 2005. Discounting these emissions over time changes (lowers) the baseline.

Retrofit of Grandfathered Facilities

BIO supports the EPA's basic approach on grandfathering of baseline volume of any renewable fuel. This basic approach would provide an indefinite extension of grandfathering and deemed compliant status but with a limitation of the exemption from the 20% GHG threshold to a baseline volume of renewable fuel. This approach is similar to how EPA has treated small refiner flexibilities under our other fuel rules.

Additional options were proposed by EPA, the other approaches create significant complexity and administrative burdens to the overall program with little to no benefit. We recommend that the EPA keep the grandfathering of baseline volumes of renewable fuel simple to regulate and administer and thus simple to comply.

Equivalency Values

BIO supports EPA's approach on basing the equivalency values on the energy content and renewable content of each renewable fuel in comparison to denatured ethanol, consistent with the approach under RFS1. This would be consistent with other approaches such as non-liquid renewable fuels (biogas and renewable electricity) which continue to be valued based on the energy contained in one gallon of denatured ethanol and would not be changed under EISA. A straight volume approach would create a disincentive for the development of new renewable fuels that have higher energy content than ethanol because of the higher cost to incorporate more carbon into your base molecule. The use of energy-based equivalence values could thus provide a level playing field in terms of the RFS2 program's incentives to produce different types of renewable fuel from the available feedstocks. We agree that the existence of four standards under RFS2 does not obviate the value of standardizing for energy content, which provides a level playing field under RFS1 for various types of renewable fuels based on energy content.

Cellulosic Biofuel Waiver

Based on current estimates of anticipated cellulosic biofuels on-line production, it is expected the cellulosic biofuel volumes will be missed in years 2010 and 2011. In no way should a shortfall of production against these ambitious volume set by Congress be viewed as a failure. Understanding that the path to, and timing of, full commercial production would be unpredictable, Congress included in EISA an important tool – in the form of a waiver provision specific to cellulosic biofuels – to ensure smooth and realistic implementation of the program in the fuel market. It is important for the Administrator to properly implement the cellulosic waiver provision in order to foster continued growth of the cellulosic biofuels industry.

Failure to effectively use the waiver provision and structure the RIN allowances correctly will lead to market instability.

The proposed rule suggests using the EPA allowance mechanism in a manner that will eliminate the obligated party's need to use renewable fuel when they choose to comply with their cellulosic biofuel renewable volume obligations ("RVO") with EPA issued "paper" allowances. This could cause significant reductions in the volume of fuel required to satisfy the RFS2, would destabilize ethanol and fuel markets, and would increase the risk associated with investment in cellulosic biofuel production.

The final rule must limit the use of EPA-issued credits in order to maximize the achievement of key EISA policy objectives and not excuse obligated parties collectively from purchasing the full applicable volumes of advanced biofuel or renewable fuel.

Passage of EISA has prompted substantial investment in advanced biofuel production by major energy companies, which in turn has funded increased research, development and deployment efforts by small companies. Still, many advanced biofuel projects have been delayed or set aside due to unfavorable economic conditions and frozen investment markets; undeveloped feedstock supply chains; protracted site selection and permitting processes; and lagging implementation of federal support programs and regulatory rules.

Cellulosic RFS2 volumes should be set prudently and RIN allowances should not displace volumetric requirements for blending all biofuels.

RFS2 should be implemented in a manner fully consistent with accelerating deployment of a new generation of renewable fuel production technologies – which was a central objective of several provisions in EISA. Implementation of the waiver and credit provisions of Sec. 202(e)(2)(D) of EISA is of particular importance to achieving this Congressional objective. It is a key element in removing uncertainty and establishing market conditions that can help speed development, scale-up, and deployment of cellulosic biofuel technologies.

The market conditions resulting from the implementation by the EPA of the Sec. 202 waiver and credit provisions will have a profound effect upon the industry's ability to meet Congressional targets for production in the middle and later stages of this program. EPA's approach to this could enable and accelerate the deployment of cellulosic biofuel production technology. Alternatively, as explained above, if EPA does not properly implement this part of the program, it can destabilize the market for cellulosic biofuels and increase investment risk, delaying indefinitely the potential for these technologies to make significant contributions to the nation's fuel supply.

Congressional intent was to stimulate a stable market for cellulosic biofuels.

The central premise in creating the RFS2 was to alter market conditions that have long favored petroleum based fuels by failing to adequately value the policy benefits of clean, domestic, renewable fuel options. EISA contains several provisions that were developed in an effort to correct for these market failures. That law aims to establish a market for renewable fuel that is both stable and predictable, with additional incentives for advanced and cellulosic biofuels. The Congress articulated its intent that the RFS2 would reshape the market and enable renewable fuels that, in addition to reducing the negative consequences of energy use, would ultimately prove at least as attractive in the marketplace as petroleum.

Given that cellulosic biofuels were not commercially-available in 2007, when EISA was passed, the mandates for their use can only be read as a clear expression of Congressional intent to dramatically accelerate the development and deployment of this fuel. There are few, if any, analogous directives in Federal law of this type of support for a pre-commercial product. Such was the sense of Congressional urgency to facilitate development of a fuel with significant promise to address the parallel policy objectives of increasing energy security, reducing GHG emissions and expanding domestic economic productivity.

Recognizing that precise predictions about the speed of commercialization would be difficult, and the need, despite those uncertainties, to have the fuel market function in a reasonably orderly fashion, Congress included Sec. 202(e)(2)(D) to accomplish multiple objectives. Those objectives include:

- Ensuring that obligated parties are not forced to pay for fuel the cellulosic industry cannot produce;
- Establishing a sufficient availability of compliance options for cellulosic biofuel RVOs to ensure compliance strategies and requirements do not distort the fuel market;
- Ensuring a reasonably stable and predictable market for cellulosic biofuels during the period needed for the industry to become capable of the production levels targeted in EISA; and
- Through achievement of objectives 1-3, create an appealing market opportunity through the reduction of political and financial risks in order to unleash private sector resources necessary to accelerate the development, scale-up and deployment of cellulosic biofuel production technologies.

By implementing the cellulosic waiver and credit provisions consistent with the objectives described above, EPA will be able to satisfy each of those Congressional objectives.

<u>Benefit of EISA Approach</u>
The cellulosic biofuels targets in EISA changed the business case landscape. They are generating considerable investment and partnerships in the field. Since the passage of EISA, new private sector entities have been created, new research was spawned, and significant dollars are being spent to respond to the challenge of meeting these aggressive targets. Even if the industry cannot meet the early targets, this increased business activity is building an industry capable of meeting the later targets set by Congress.

In order to sustain the momentum gained in the cellulosic biofuels industry since the passage of EISA, the EPA must take care to implement the RFS2 in a manner that creates increased market demand for cellulosic biofuels. This will allow the industry to continue to gather speed toward full commercial scale production that will meet the objective of not less than 16 billion gallons of annual production capacity by 2022.

<u>EISA Provides Adequate Regulatory Flexibility</u>
Congress appropriately anticipated a degree of uncertainty in the speed of technology development and commercialization of cellulosic biofuels. When production does not meet the targets in EISA, the law provides market stability through a waiver mechanism (subparagraph 211(o)(7)(D) of the

Clean Air Act) tailored specifically to ensure smooth implementation of the cellulosic biofuels provisions of the RFS2.

The waiver should carefully calibrate the reduction of the cellulosic mandate as close as feasible to expected actual production levels to both ensure that continuous demand for the cellulosic biofuel that is produced, AND eliminate any mandate for the fuel industry to purchase a product that has not been produced

Trading of RINS

RINs should be allowed to trade separately from volume.

EPA has specifically sought out comments on this issue. We believe the advantages of allowing RINs to trade separately from volume, from the point of RIN generation, include greater RIN market liquidity and more effective use of RINs for compliance. We are therefore supportive of allowing RINs to trade separately from volume.

Biomass Definition

Waste streams should specifically include MSW and C&D waste.

As EPA has clearly recognized in its proposed rulemaking, waste streams are very cost-effective and abundant resources that, by EPA's own estimates, can significantly contribute toward meeting the advanced and cellulosic biofuel targets in the RFS. In particular, we request that EPA clearly specify that municipal solid waste ("MSW") and construction, demolition and disaster debris ("C&D") are eligible feedstocks under the RFS2 program.

By recognizing these waste streams as eligible feedstocks under the RFS2, the EPA would enable the implementation of near-commercial technologies and create large scale and sustainable supplies of advanced and cellulosic biofuels. This, in turn, would attract billions of dollars in investment, and create thousands of green jobs. Moreover, waste steams offer those states with few natural biomass resources the ability to produce biofuels locally to displace their own transportation fuel demand.

EPA should opt for the least onerous method of recordkeeping.

The EPA has appropriately recognized the enforcement issues associated with the EISA Renewable Biomass definition. The record keeping requirement on renewable fuel producers has the potential to become excessively onerous, and put the nascent industry at a competitive disadvantage versus other biomass-based industries.

Renewable Biomass, as defined in EISA and this rulemaking, serves as an input into many industries including pulp & paper and renewable electricity production. These other industries do not have restrictive definitions and record keeping requirements on their use of renewable biomass. In order for the renewable fuel industry to compete against these other industries for biomass feedstock, it will have to pay premiums to feedstock producers in order to incentivize the producer to supply material and share appropriate records. This puts the nascent renewable fuel industry at a competitive disadvantage in sourcing feedstock. For example, wood biomass is one of the largest potential sources of biomass to meet the RFS targets, and represents one of the few feedstock supply sources that are currently well developed offering one of the lowest risks of supply. This established supply chain however does not have established mechanisms for land origin tracking and relies on thousands of small forestry land holders for supply. The added cost and coordination required to obtain land certifications will cause these wood biomass suppliers to favor other outlets for biomass over biofuels.

In addition, as EPA itself recognizes, supervision and enforcement of the requisite record keeping is difficult and onerous to not only the renewable fuel producer but also to the regulatory body itself. Furthermore, there are several voluntary certification schemes developing in the industry, such as the Council for Sustainable Biomass Production (CSBP), that are defining sustainability standards for biomass production regardless of whether the material is used for fuel or power. Development of such voluntary schemes would be a more efficient and effective means of ensuring compliance.

For these reasons, we encourage EPA to adopt the least onerous approach, which we believe involves development and adoption of voluntary industry biomass sustainability standards.

Land use should allow innovations that enhance land's carbon sequestration.
We commend the EPA in following EISA's guidance on defining Renewable Biomass with the land use restrictions. However we are concerned that the land use restrictions may be too confining to currently known agricultural and forestry management practices. For instance, some forestry land owners are experimenting with inter-cropping of energy crops within the active forest plantation.

This type of land management encourages land productivity while also enhancing the carbon sequestration potential of the forest land. We are concerned that such innovative land management techniques may not be encouraged with the restriction on the type of land on which a crop must be grown. We urge the EPA to make a specific allowance for land use for both food as well as non-food biomass production innovations that would enhance the carbon sequestration profile of existing land.

EPA Should Include Rangeland as Agricultural Land under RFS2.
We would like to express concern over the proposed restrictions on the use of rangeland (discussed at pp. 24931 of the NOPR). The intent of Congress was to encourage the production of feedstocks that do not impair food production from lands suitable for agriculture (and to encourage new technologies both for developing suitable feedstocks as well as conversion processes). On this basis, the proposal to rule range lands ineligible does not make sense, as it would tend to intensify competition for lands better suited for food crop production.

Many renewable fuel technology developers are working on developing high-biomass crops (including perennials) that could be grown on marginal lands not favored for production agriculture. These crops offer the potential not only for increasing biomass production, but also (in the case of perennials) the sequestration of soil organic carbon in plants' root structure. To preclude the use of these sources of biomass under the RFS2 would clearly be contrary to the public interest in expanding the range of solutions to the challenge of meeting our liquid fuel needs from secure, domestic sources. Moreover, while there is no precise, commonly-accepted definition of rangeland, the amount of land that might be included in such a prohibition could be staggering. For example, USDA has published estimates that there may be as much as 800 million acres of "grazing land" in the United States – nearly one-third of the area of the lower 48 states.

As the word "rangeland" does not appear in EISA, Congress cannot be seen to have given EPA authority to remove such a vast amount of land from eligibility for biofuels production. It would be an unwarranted abuse of discretion for EPA to implement a blanket prohibition on the use of rangeland without explicit Congressional direction.

Additional Impacts

We commend the EPA for its foresight in considering the water quality and quantity impacts of its rulemaking. BIO considers water stewardship a key component of our environmental sustainability principles that guide our industry's technical and business decision making.

EPA should not seek to regulate corn fertilizer use by regulating biofuel manufacturers.
We are concerned at the prospect that EPA would invoke its Clean Air Act Section 211 (c) authority to regulate nutrient water pollution potentially attributable from the biofuel industry. The potential requirement that corn ethanol producers certify the feedstock they use is grown using advanced nutrient management techniques creates an unfair bias against the biofuel industry as a whole with regard to feedstock procurement. Corn, and all biomass feedstocks, have a multitude of potential end uses, including food, feed, power, and industrial chemicals. Placing a requirement only on corn supplied for ethanol puts the entire biofuel industry at a competitive disadvantage in procuring feedstocks. It would be counter to EPA's intent to put forth a rule that competitively disadvantages the biofuels industry against other users.

Instead of additional regulation to address this potential problem, the EPA could work with voluntary industry led sustainability certification organizations to include nutrient and water management principles in their criteria.

In addition, growers are working to better target their nutrient applications, and the fertilizer, equipment, and agricultural biotechnology industries are working to develop advanced technologies for nutrient management.

EPA should take a more complete view of water impacts.
EPA appropriately recognizes the non-agricultural sources of water quality and quantity impacts from biofuel production. In completing its Regulatory Impact Analysis, the EPA should however consider the water impacts of the fossil fuels these biofuels are displacing, as well as consider a more complete landscape of water management practices in the biofuels industry.

The biofuels industry is also making great strides in reducing its water needs. As EPA points out, most of today's corn ethanol production comes from non irrigated land and new corn ethanol plants use about half as much water than older designs thanks to increased recycling and process heat management. Cellulosic biofuel is expected to further reduce water requirements on a lifecycle basis. A recent study by May Wu at Argonne National Lab found that switchgrass-based cellulosic biofuels could have water use requirements in line with, or even lower, than all major sources of gasoline in the U.S.[27] Furthermore, crop genetics companies, many of whom are BIO members, are developing advanced varieties of corn and biomass crops, such as drought tolerant corn and energy crops that will improve production in dryland conditions or in the limited corn acreage that is irrigated.

The intent of Congress was to commercialize a low carbon renewable fuel industry. Clearly several details of the EPA's proposed rule on implementation of the RFS2 need to be reevaluated with a significant amount of additional input, and the goal of BIO's comments is to provide that additional input from the renewable biofuels industry to achieve those goals.

Conclusions

In summary, the recommendations from BIO for the proposed rule, No. EPA-HQ-OAR-2005-0161, are as follows:

Greenhouse Gas Emissions Lifecycle Analysis Methodology

Emissions from Land Use Change

- Limitations of the current science underlying land use change, including assumptions about future crops yield and land constraint, causality, and the role of global land policies, impose a large range of uncertainty on lifecycle GHG calculations for biofuels.
- BIO urges EPA to fully acknowledge the extent of the uncertainty in estimation of emissions from land use change, and ensure that emerging biofuels technologies are not disqualified from participation in the RFS2 program unless clearly demonstrated to be out of compliance with the program's GHG performance requirements under the full range of reasonable assumptions for the pertinent methodology, including assumptions that have not been adopted in EPA's proposed methodology.

Technology Assessment

- EPA's framework for categorizing feedstock/conversion technologies for biofuels is too inflexible. EPA should allow individual producers to estimate their carbon footprint based on their own specific data.
- Technology innovation in the biofuels space is occurring at a rapid rate. In its final rule, EPA should allow biotechnology to aid the future biofuels industry in continuing to increase crop yields, decrease fertilizer inputs, increase drought tolerance and lower the carbon footprint of agriculture.
- EPA should increase the transparency of the carbon intensity processes and reduce the time needed to certify pathways.
- The methodology tool that is ultimately used should have built in flexibility and encourage technology neutrality in order to account for future improvement and innovation.
- To facilitate the deployment of novel biofuel technologies, including algae-based fuels, EPA should expedite its life-cycle carbon analyses of these fuel pathways.

Relatability

- EPA should commit to revisit all aspects of the methodology considered in this rulemaking, if it is charged by Congress with the task of measuring lifecycle greenhouse gas emissions or emission

[27] M. Wu, M. Mintz, M. Wang, and S. Arora (2009) Consumptive Water Use in the Production of Ethanol and Petroleum Gasoline (ANL/ESD/09-1

reductions for any other purpose under a future regulatory regime, and expressly disclaim any intent to establish precedent in this rulemaking for how ILUC may be measured under a different regulatory program.

Baseline Comparison

- In comparing biofuels' GHG emissions to petroleum-based fuels' baseline emissions, biofuels should be credited for displacing and, therefore, directly reducing future gasoline and diesel production emissions.

Time Frame and Discount Rate

- BIO believes that the use of a long impact timeframe and low or zero discount rate is necessary to meet EPA's established criteria for GHG accounting.

Retrofit of Grandfathered Facilities

- BIO supports the EPA's basic approach on grandfathering of baseline volume of any renewable fuel.

Equivalency Values

- BIO supports EPA's approach on basing the equivalency values on the energy content and renewable content of each renewable fuel in comparison to denatured ethanol, consistent with the approach under RFS1.
- We agree that the existence of four standards under RFS2 does not obviate the value of standardizing for energy content, which provides a level playing field under RFS1 for various types of renewable fuels based on energy content.

Cellulosic Biofuels Waiver

- EPA should take great care in regulating the operational aspects of the cellulosic biofuel waiver. Failure to effectively use the waiver provision and structure the RIN allowances correctly will lead to market instability.
- Cellulosic RFS2 volumes should be set prudently and RIN allowances should not displace volumetric requirements for blending all biofuels. The purpose of the renewable fuel standard is to increase blending of renewable fuel; the waiver provision should be implemented to support that goal.

Biomass Definition

- Waste streams should specifically include municipal solid waste and construction and demolition waste.
- EPA should opt for the least onerous method of recordkeeping.
- Land use should allow innovations that enhance land's carbon sequestration.
- EPA should include rangeland as agricultural land under RFS2.

Additional Impacts

- EPA should not seek to regulate corn fertilizer use by regulating biofuel manufacturers.
- EPA should take a more complete view of water impacts.

In conclusion, BIO commends the EPA and the other government agencies that have provided input on this important rulemaking. The task is clearly essential and laborious and we have every confidence that the process from here to the final rule and through implementation will continue to be carried out with the intensity, intellect and fervor as the process to date has. However, at a time when a low carbon alternative to our current transportation fuel option is needed more than ever, there are many issues of concern that continue to be unresolved, the outcome of which have the potential for significant impact on many American industries, including technological advances for renewable fuels.

We thank you for your consideration of these comments.

Sincerely,

Brent Erickson
Executive Vice President
Industrial and Environmental Section
Biotechnology Industry Organization