Union of Concerned Scientists

Citizens and Scientists for Environmental Solutions

By E-Docket Submission

Mr. Robert Perciasepe
Acting Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, D.C., 20460

April 5, 2013

RE: U.S. Environmental Protection Agency's "Regulation of Fuels and Fuel Additives: 2013 Renewable Fuel Standards" 78 Fed. Reg. 9282 (February 21, 2013) [EPA-HQ-OAR-2012-0546]

Dear Acting Administrator Perciasepe:

Thank you for the opportunity to comment on this rule. The Union of Concerned Scientists (UCS) puts rigorous, independent science to work to solve our planet's most pressing problems. Joining with citizens across the country, we combine technical analysis and effective advocacy to create innovative, practical solutions for a healthy, safe, and sustainable future.[1] On behalf of our 400,000 members and supporters, we are pleased to provide comments on Environmental Protection Agency (EPA) Docket No. EPA-HQ-OAR-2012-0546 "Regulation of Fuels and Fuel Additives: 2013 Renewable Fuel Standard" that was published in the Federal Register on February 7, 2013.

UCS analysis shows that, if implemented properly, the Renewable Fuel Standard (RFS) is an important driver of both reducing the nation's oil use and the carbon intensity of its fuel supply.[2] Effective implementation of the RFS must take into account the impact the policy has directly and indirectly on agricultural systems and the environment. Fortunately, in crafting the RFS, Congress included a variety of mechanisms that provide flexibility to the policy. These mechanisms allow obligated parties to move compliance requirements from year to year and grant EPA the authority to adjust volumes in order to adapt to changing and unexpected circumstances.

The current rulemaking for the RFS, together with the next several rulemakings leading up to 2015, initiate a critical new phase of the RFS. Starting in 2013, the growth in volume mandates becomes increasingly discretionary, with the fastest growing share coming from EPA's decisions about whether to replace the shortfall in cellulosic biofuels with larger mandates for advanced biofuels. The decision not to reduce the advanced and conventional biofuel mandates in parallel with a reduction in the cellulosic

[1] For more information on UCS please visit our website at *http://www.ucsusa.org/*.
[2] Union of Concerned Scientists (UCS). 2010. The Billion Gallon Challenge: Getting biofuels back on track. Online at *http://www.ucsusa.org/assets/documents/clean_vehicles/The-Billion-Gallon-Challenge.pdf*.

mandate is *de facto* a discretionary enlargement of the advanced mandate, and should be evaluated as such. EPA must ensure that any discretionary enlargement of the volumetric targets for non-cellulosic advanced biofuels in 2013 and beyond is based on a thorough scientific understanding of the impacts of mandate levels beyond those analyzed as part of the 2010 rulemaking (EPA Docket No. EPA–HQ–OAR–2005–0161 "Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program").

This rulemaking provides EPA with the opportunity to determine whether the RFS continues to target 36 billion gallons of biofuels in 2022, or adopts a more judicious administration of the RFS policy framework, with a mandate floor that grows to 20 billion gallons in 2022 plus cellulosic biofuel production (hereafter referred to as the 20BG+ RFS). While EPA has the discretion to expand non-cellulosic advanced mandates beyond the levels analyzed in 2010, such a discretionary expansion must take into consideration all the goals and criteria set forth in section 211 (o)(2)(B)(ii) of the Clean Air Act, which include the impact on climate change, ecosystems, wildlife habitats, infrastructure, the price and supply of agricultural commodities and food prices. A discretionary expansion mayonly be made if the benefits outweigh the costs. Continuing to target 36 billion gallons of biofuels (36BG RFS) will lead to perverse environmental and economic consequences that are not in harmony with the climate, energy security, economic, and other goals of the RFS.

Therefore, EPA should:

- **Set the non-food cellulosic mandates at a level consistent with projected production for 2013 and limit the expansion of food-based advanced biofuels** by reducing the overall and advanced mandates by the same amount as any reduction in the cellulosic biofuel mandate.

- **Analyze the aggregate impact of any discretionary mandate growth on trade flows, food prices, converting native grasslands, and deforestation.** The EPA's 2010 determinations of greenhouse gas (GHG) benefits for non-cellulosic advanced biofuels including biodiesel made from soybean oil and animal fats, and ethanol made from sugar, are based on volume projections that assume that advanced volumes do not replace cellulosic mandates. Higher volume mandates will add additional demand to already strained markets for the underlying feedstocks and impact food and agricultural markets—and, by extension, land use—in a manner that is qualitatively different than what was modeled in 2010. Therefore, any decision to mandate higher levels requires new aggregate impact analysis.

- **Avoid additional shocks to global markets for vegetable oils and fats, including palm oil, resulting from a discretionary mandate expansion.** Because the primary U.S. production regions for corn and soybeans are still in the midst of a drought, prices remain high and stocks are low, so additional demand for soybean oil will be met indirectly by increased substitution of palm oil for other fats and oils elsewhere in the global marketplace. The net effect will not meet the 50% GHG reduction (accounting for significant indirect effects) requirement for advanced biofuel.

- **Limit volume mandates to minimize circular trade and fuel shuffling.** The Brazilian ethanol market is not in a position to support growing exports of sugar ethanol, and Brazilian

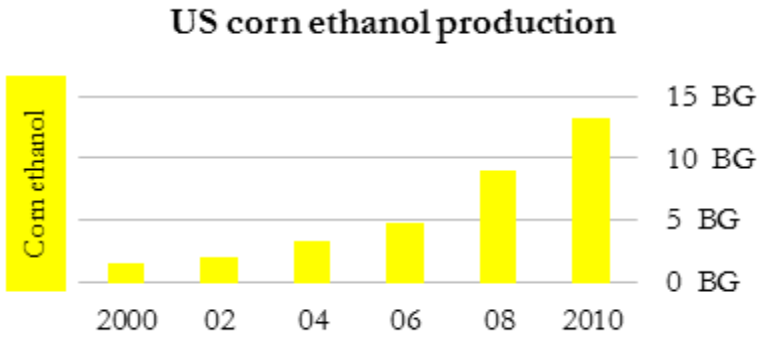
production is barely able to fulfill domestic demand. Under these circumstances, additional U.S. imports of sugarcane ethanol will not increase net production of advanced biofuels, but rather lead to counterproductive fuel shuffling with Brazilian markets substituting gasoline or U.S. corn ethanol for additional exports. The net effect will not meet the 50% GHG reduction (accounting for significant indirect effects) requirement for advanced biofuel.

- **Not raise discretionary mandates until infrastructure constraints have been resolved.** U.S. infrastructure is already stretched to assimilate the larger volumes of ethanol associated with RFS mandates of the 20BG+ RFS. A 36BG RFS would require an accelerated transition beyond E10 that would be counterproductive until current infrastructure constraints have been resolved.

- **Reevaluate its approach to aggregate compliance.** The current approach is already problematic, because it lacks data and methodology, and with the additional pressure put on U.S. cropland, it will get worse.

Background – Biofuels Phase 1: 2000 – 2010

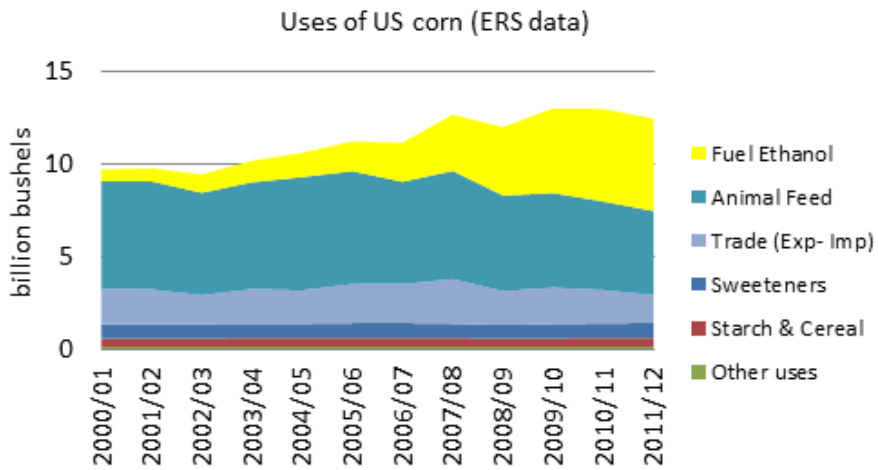
U.S. corn ethanol production expanded by more than 10 billion gallons between 2000 and 2010.



Data source: RFA Data; BG = billions of gallons[3]

With this growth, ethanol went from a minor user of corn in the 2000/2001 marketing year– at 6 percent it was smaller than corn used for sweeteners — to the single largest direct user of corn, consuming 40 percent of the crop in marketing year 2010/2011.

[3] Renewable Fuels Association (RFA). 2013. Statistics: Historic U.S. fuel ethanol production. Online at *http://www.ethanolrfa.org/pages/statistics*.

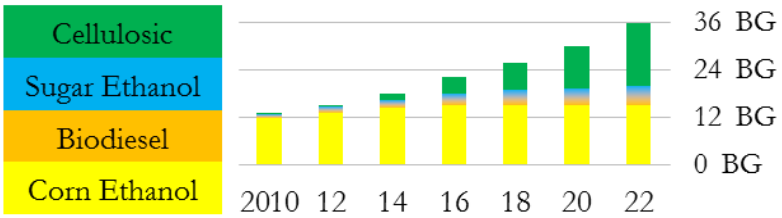


Data source: ERS Data[4]

The dramatic changes in the size of the US corn crop, along with rising prices of corn and related commodity crops, have led to land use changes and food price increases on a global scale, and triggered a global reaction against the wisdom, the environmental efficacy[5], and even the morality[6] of diverting such a large share of the corn crop to fuel.

The Decade Ahead for Biofuels

Depending on how the EPA administers the RFS going forward, the next decade could bring even larger changes to agriculture and food markets. The RFS mandates are poised to more than double over the next 10 years, growing from 15.2 billion gallons in 2012 to 36 billion gallons in 2022, a rate of expansion approximately twice as large as was observed between 2000 and 2010 (see this fact sheet[7] for details on the complex structure of the mandate).

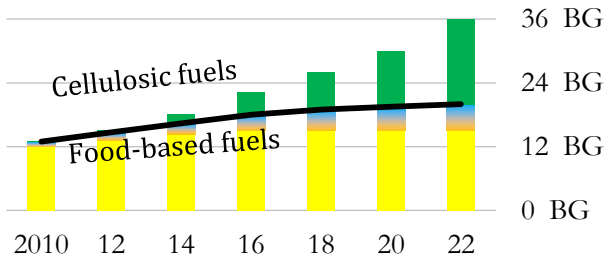


[4] United States Department of Agriculture (USDA). 2013. Feed Grains: Yearbook tables. Online at *http://www.ers.usda.gov/data-products/feed-grains-database/feed-grains-yearbook-tables.aspx#.UVMQrBek9mh*.
[5] Fargione, J., Plevin, R., and Hill, J., 2010. The Ecological Impact of Biofuels. Vol. 41. Annual Review of Ecology, Evolution, and Systematics. Online at *http://www.annualreviews.org/doi/abs/10.1146/annurev-ecolsys-102209-144720?journalCode=ecolsys&&*.
[6] Rosenthal, E. 2013. As demand grows, so do Guatemala's hunger pains. *New York Times*, January 5. Online at *http://www.nytimes.com/2013/01/06/science/earth/in-fields-and-markets-guatemalans-feel-squeeze-of-biofuel-demand.html?pagewanted=all&_r=1&*.
[7] Union of Concerned Scientists (UCS). 2012a. Advanced Biofuel Mandates: Critical decisions on food vs. fuel. Online at *http://www.ucsusa.org/assets/documents/clean_vehicles/RFS-Advanced-Mandate-Factsheet.pdf*.

Renewable Fuels Standard mandates; BG = billions of gallons

The RFS was designed to mitigate the competition between food and fuel by gradually shifting the growth of the mandates away from corn, sugar, vegetable oil, animal fat, and other food-related feedstocks, and toward cellulosic biofuels, made from inedible waste materials, agricultural residues like corn stalks, and environmentally friendly perennial crops.

Less than a quarter of the mandate growth between 2012 and 2022 — just five billion gallons — was intended to be produced from food-based fuels, and the rest was slated to come from cellulosic biofuels.



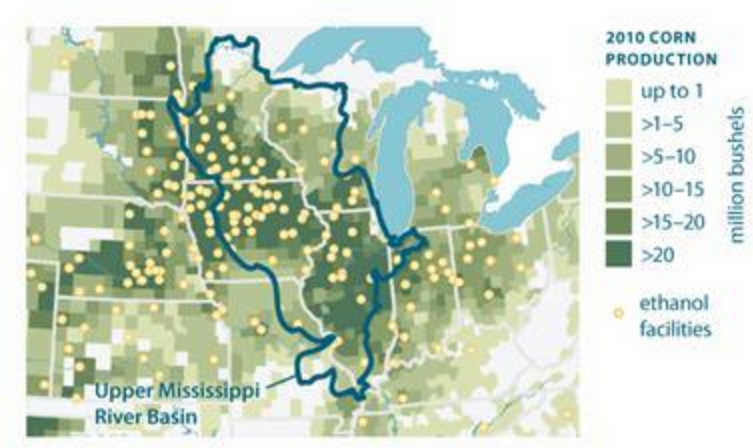
Renewable Fuels Standard mandates: Food-based vs. cellulosic biofuels; BG = billions of gallons

The Transition beyond Food-Based Biofuels

The importance of transitioning away from food-based biofuels has become increasingly clear. Expanded and more intense corn production results in increased fertilizer runoff, which pollutes surface and ground water throughout the Mississippi River basin[8] and is in large part responsible for the annual Gulf of Mexico Dead Zone[9] (more details in this blog[10] and report[11]).

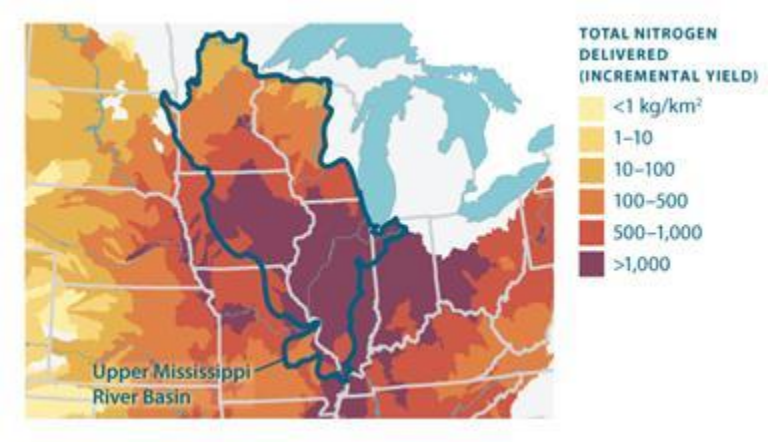
The below map shows where corn is grown in green, and where ethanol is produced with yellow dots.

[8] National Weather Association (NWAS). 2013. Mississippi River System. Online at *http://www.nwas.org/meetings/nwa2006/Broadcast/Kelsch/watersheds/media/graphics/unit_2/mississippi_river_system.jpg*.
[9] Gulf of Mexico Hypoxia. 2013. What is hypoxia? Online at *http://www.gulfhypoxia.net/*.
[10] Union of Concerned Scientists (UCS). 2011a. There's a corn ethanol "spill" every day. Online at *http://blog.ucsusa.org/there%E2%80%99s-a-corn-ethanol-%E2%80%9Cspill%E2%80%9D-every-day/*.
[11] Union of Concerned Scientists (UCS). 2011b. The Energy-Water Collision: Corn ethanol's threat to water resources. Online at *http://www.ucsusa.org/assets/documents/clean_energy/ew3/corn-ethanol-and-water-quality.pdf*.



Data source: NASS[12]

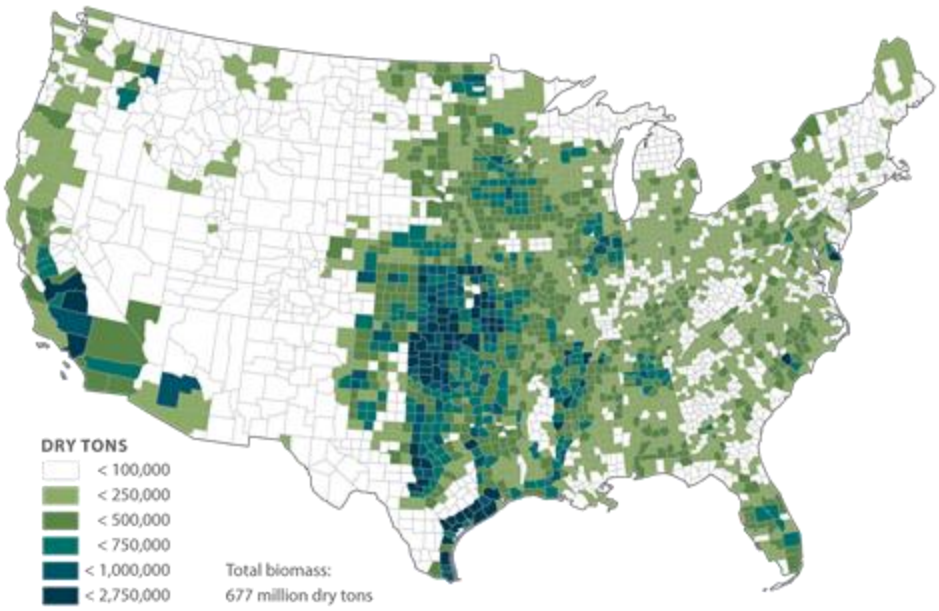
And this one shows where pollution from fertilizer is heaviest:



Data source: Alexander et al. 2008[13]

The good news is that biofuel production can responsibly continue to grow *if* we switch from corn to biomass as a source material or feedstock. Our recent analysis[14] confirms that biomass is available within the United States at levels consistent with supplying even more than 16 billion gallons of biofuel, and can do so in a manner that reduces water pollution and greenhouse gas emissions while improving the overall environmental footprint of our agricultural system. The map below (from our report[15]) illustrates the potential abundance of non-food based feedstocks across the U.S.

[12] United States Department of Agriculture (USDA). 2013. National Agricultural Statistics Service: Corn production and ethanol plant locations. Online at *http://www.nass.usda.gov/Charts_and_Maps/Ethanol_Plants/index.asp*.
[13] Alexander, R., et. al. 2008. Differences in phosphorus and nitrogen delivery to the Gulf of Mexico from the Mississippi River Basin. Online at *http://water.usgs.gov/nawqa/sparrow/gulf_findings/*.
[14] Union of Concerned Scientists (UCS). 2012b. Biomass Resource Assessment. Online at *http://www.ucsusa.org/assets/documents/clean_vehicles/Biomass-Resource-Assessment.pdf*.
[15] Id.



From building soil carbon to reducing pollution from corn farming, the case for shifting ethanol's reliance on corn to a system that relies on wastes, agricultural residues, and environmentally friendly perennial grasses gets stronger all the time.

Delayed Commercialization Means the EPA Has an Important Policy Decision to Make

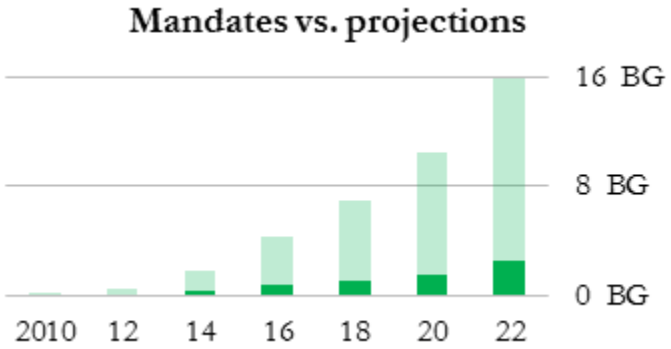
But while the environmental case for cellulosic biofuels is strong, the rate of commercial deployment is trailing the mandate levels by approximately five years.

INEOSBio Bioenergy center in Vero Beach Florida

KiOR Biorefinery, in Columbus Mississippi

The first commercial scale cellulosic biorefineries recently opened, and this is a major milestone, but it has taken longer than was anticipated when the RFS was enacted in 2007. The delay means that instead of reaching 100 million gallons per year in 2010, which is what was envisioned in 2007, it is likely to be at least 2015 before cellulosic biofuel production reaches this level. The rate of subsequent expansion will depend on the success of these first facilities, investor assessment of the markets and the durability of a supportive policy environment, including the RFS. However, even with robust commercialization of cellulosic biofuels beyond 2015, far less than 16 billion gallons of cellulosic biofuel will be available in 2022.

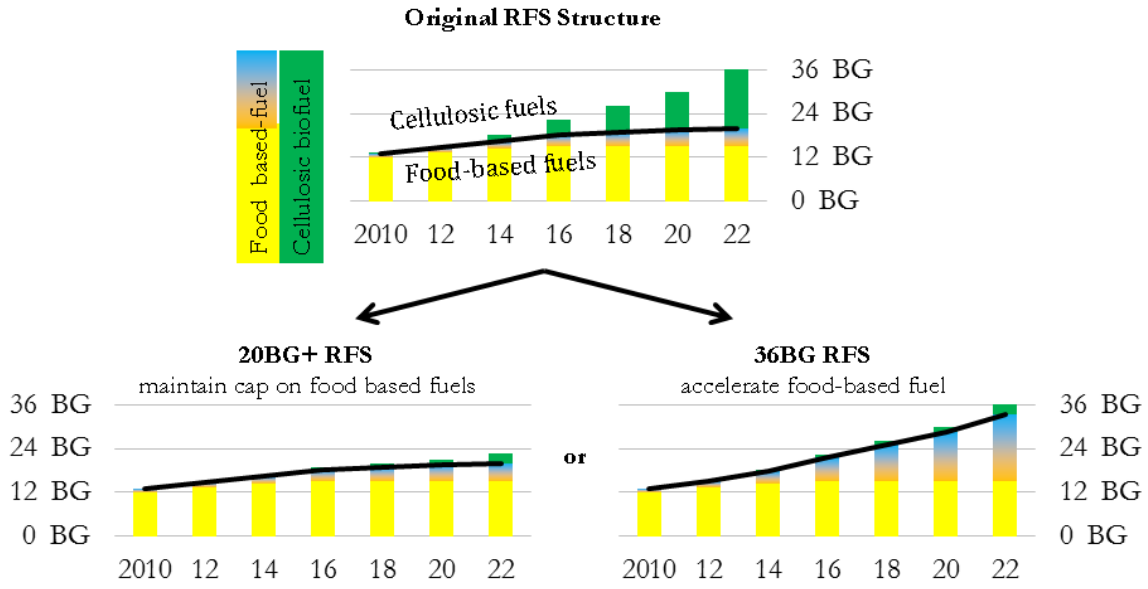
According to the Energy Information Administration's (EIA) Annual Energy Outlook for 2012 (AEO2012)[16], actual production levels will be closer to 2.5 billion ethanol equivalent gallons in 2022, leaving a cellulosic shortfall that will grow from almost a billion gallons in 2013 to more than 13 billion gallons in 2022.



Data source: EIA Data[17]

[16] Energy Information Administration (EIA). 2012a. Annual energy outlook 2012. Online at *http://www.eia.gov/forecasts/aeo/pdf/0383(2012).pdf*.
[17] Id.

In light of the delayed commercialization of cellulosic biofuels, the EPA faces an important decision. Adjust the overall advanced mandate by the amount of the cellulosic shortfall, resulting in a mandate of 15 billion gallons (BG) of conventional biofuel (mostly corn ethanol), 5 BG for food-based advanced biofuels (primarily sugarcane ethanol and vegetable oil biodiesel), and as much cellulosic biofuel as gets produced (the **20BG+ RFS**). Or, the EPA can keep the overall biofuel targets fixed at 36 BG, relying on food-based biofuels that qualify as advanced according to EPA's rules to replace the cellulosic shortfall (the **36BG RFS**).



The **20BG+ RFS** means avoiding additional pressure on food markets, and waiting until cellulosic biofuels scale up to meet make the 36 BG target. Trying to stick to the **36BG RFS** means accelerated conversion of food into fuel, making already tight markets for agricultural commodities even tighter.

The road ahead, the EPA holds the keys…

While the goal of replacing oil with lower carbon , domestically produced alternatives remains as salient today as it was in 2007, a careful examination of the EPA's choices reveals that in this case, moving faster is counterproductive. In fact, attempting to substantially replace the delayed cellulosic biofuel production will make the entire RFS untenable, leading to counterproductive trade flows and indirectly expanding production of food-based biofuels such as corn ethanol and palm oil that do not meet the GHG standards for the advanced biofuel category.

The decision before the EPA provides the agency with an opportunity to plot a new course forward for biofuels. The EPA must recognize that faster is not always better. Biofuels, especially non-food cellulosic biofuels, can help us to cut projected oil use in half over the next 20 years.[18] But to avoid dead ends on the way, our biofuel policy must consider all the other users of agricultural commodities, starting with food. The EPA's mandate targets must be based on a thorough analysis of the impact on agricultural

[18] Union of Concerned Scientists (UCS). 2012c. Half the Oil. Online at *http://halftheoil.org*.

trade flows, deforestation, and infrastructure. With smart implementation of existing law, the EPA can navigate these obstacles and set a course for a cleaner future.

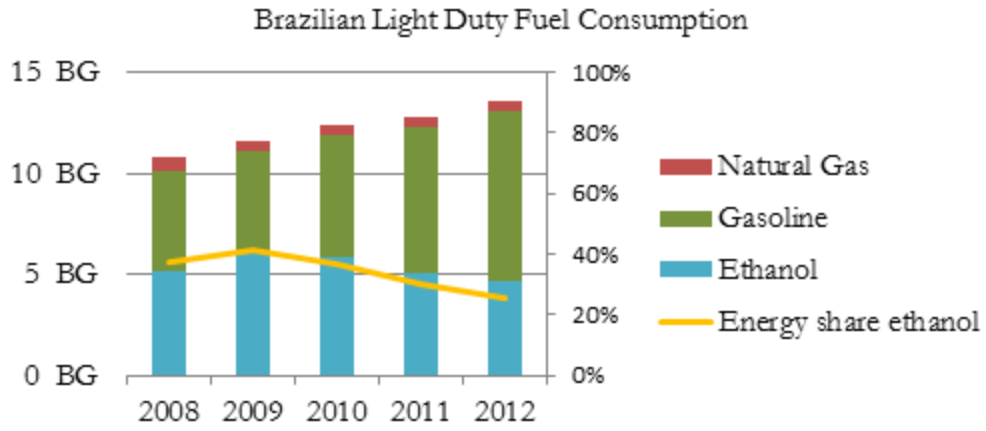
Impact of enlarging discretionary mandates if sugarcane ethanol is the primary compliance strategy

Brazil has had a very successful sugarcane ethanol program, and has the world's largest fleet of flex fuel vehicles (FFVs) that can run on either gasoline or ethanol, with a fuel distribution system to match. The U.S. also has several million FFVs on the road[19], but without coordinated fueling infrastructure, fuel pricing, and driver education, these cars have not used much ethanol to date. Recently, however, production of ethanol in Brazil has stalled.[20]

Data source: UNICA Data[21]; BG = billions of gallons

Meanwhile, although overall car ownership and fuel use is growing in Brazil, Brazilian drivers have been moving away from ethanol and toward gasoline. The reason for this is simple: with demand for ethanol exceeding supply, gasoline has been cheaper. The result is that even though Brazil has infrastructure (cars and fueling stations) capable of running on a high share of ethanol, the percentage of ethanol in Brazil's fuel supply has declined from 41 percent in 2009 to 26 percent in 2012.[22]

[19] United States Department of Energy. 2013. Alternative Fuels Data Center: Flexible fuel vehicles. Online at *http://www.afdc.energy.gov/vehicles/flexible_fuel.html*.
[20] Angelo, C., 2012. Growth of ethanol fuel stalls in Brazil. *Nature*, November 27 Online at *http://www.nature.com/news/growth-of-ethanol-fuel-stalls-in-brazil-1.11900.*
[21] Uniao Da Industria De Cana-De-Acucar. 2013. Online at *http://www.unica.com.br/*.
[22] Id.



Data source: UNICA Data[23]; BG = billions of gallons

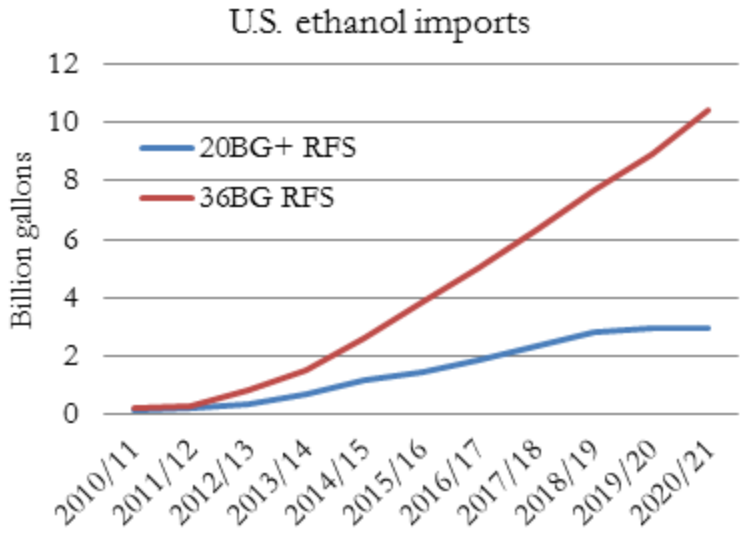
If the EPA fails to decrease the advanced mandate, sugarcane ethanol is one of the fuels that will need to fill the void left by cellulosic biofuel. US demand for Brazilian sugarcane ethanol would increase sharply, leading to the U.S. importing more sugarcane ethanol from Brazil while Brazil shifts their vehicles back to gasoline.

It would be a counterproductive outcome if Brazil, having built out the most flexible fueling infrastructure in the world, moves their fleet of FFVs back to gasoline while the U.S. struggles to use more ethanol than its current infrastructure is capable of distributing. Further, since global warming pollution is *global*, shifting where the sugarcane ethanol is consumed from Brazil to the U.S. will not meet the 50% GHG reduction required for advanced biofuels under the RFS.

Long-term implications for sugar ethanol

Looking further down the road, the picture gets even bleaker. In a recent paper, Meyer and Thompson looked into the consequences of different EPA decisions on the future of the RFS.[24] Two of the scenarios they modeled track with what we are calling the 36BG RFS and the 20BG+ RFS.[25] The first consequence of the 36BG RFS is enormous growth of sugarcane ethanol imports, primarily from Brazil.

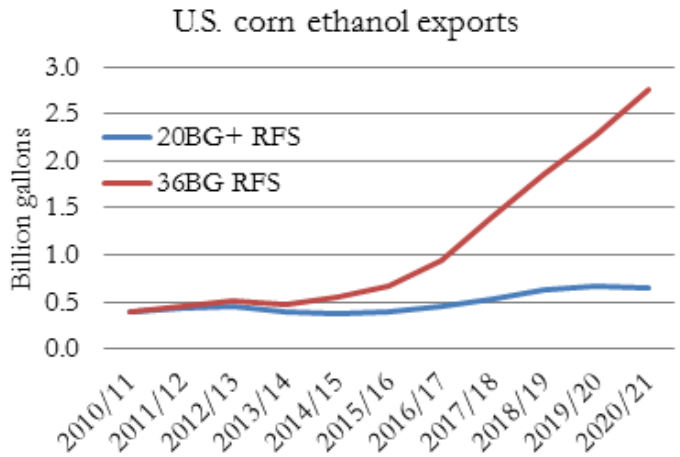
[23] Id.
[24] Meyer, S., Thompson, W. How Do Biofuel Use Mandates Cause Uncertainty? United States Environmental Protection Agency Cellulosic Waiver Options. 2012a. Vol. 34. Applied Economic Perspectives and Policy. Online at *http://aepp.oxfordjournals.org/content/34/4/570.abstract?sid=a6080642-551d-447d-909d-4a6f868094c4*.
[25] Union of Concerned Scientists (UCS). 2013. The Future of Biofuels in 10 Charts and Maps. Online at *http://blog.ucsusa.org/the-future-of-biofuels-in-10-charts-and-maps/*.



Data: Meyer and Thompson and additional data provided by the authors[26]

By 2021, their analysis suggests the U.S. would need to import more than 10 billion gallons of sugar ethanol. Since Brazilian ethanol production has never exceeded 8 billion gallons, this would require a very rapid growth of Brazilian ethanol production, and for the U.S. to import a very large share.

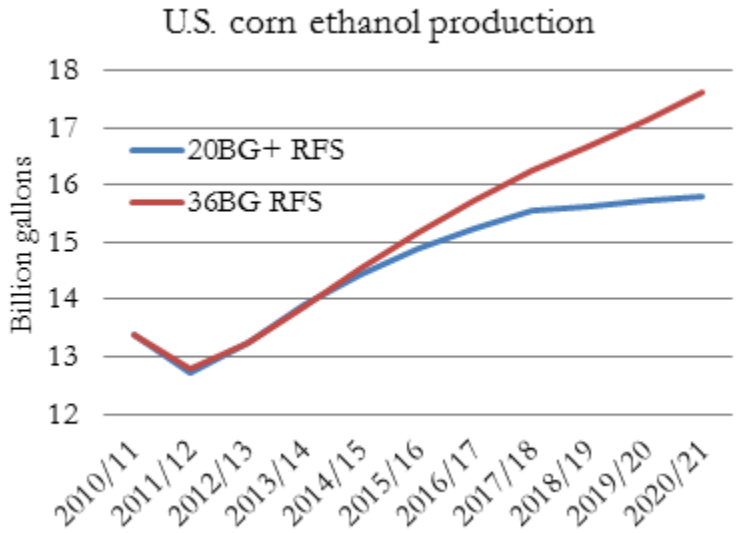
In fact, with Brazil exporting so much ethanol, Brazilians would need to import growing amounts of corn ethanol from the U.S. to meet their domestic demand for ethanol. The Meyer and Thompson analysis suggests corn ethanol exports would rise more than five-fold.



Data: Meyer and Thompson and additional data provided by the authors.[27]

[26] Meyer, S., Thompson, W. How Do Biofuel Use Mandates Cause Uncertainty? United States Environmental Protection Agency Cellulosic Waiver Options. 2012b. Vol. 34. Applied Economic Perspectives and Policy. Online at *http://aepp.oxfordjournals.org/content/34/4/570.abstract?sid=a6080642-551d-447d-909d-4a6f868094c4*.

The result for the U.S. agricultural system would be a de facto expansion of the corn ethanol mandate, which is capped at 15 billion gallons to limit the competition between ethanol and other uses of corn, as corn ethanol is exported to Brazil while the U.S. imports Brazilian sugarcane ethanol. Under the more sensible 20BG+ RFS, expanded use of corn for ethanol starts to taper off, reducing pressure on competing food uses of corn.



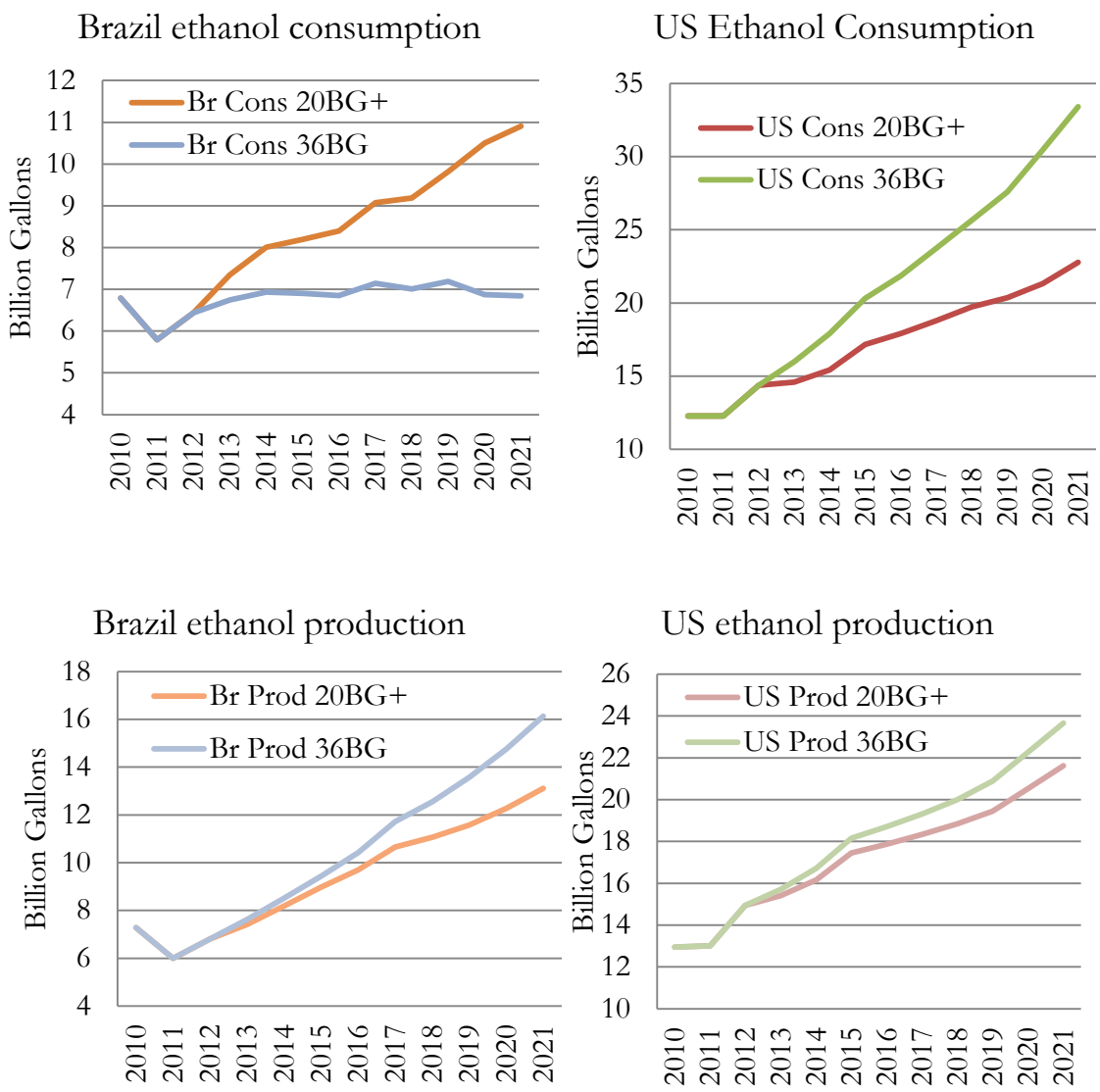
Data: Meyer and Thompson and additional data provided by the authors[28]

The world is watching

A related analysis was included in the OECD-FAO Agricultural Outlook 2012-2021.[29] The fact that the Organization for Economic Co-operation and Development and the Food and Agriculture Organization of the United Nations devoted an entire chapter of their global long-term outlook to biofuels, and about half of that to evaluating the future of the RFS, is an illustration of how profound the decisions facing the EPA are for the U.S. and the world.

Their analysis suggests that as the U.S. imports more ethanol in a 36BG RFS instead of a 20BG+ RFS, Brazil's internal use of ethanol will drop by more than 4 BG, and use in the rest of the world will also drop for a total decrease of 4.75 BG.

[27] Id.
[28] Id.
[29] Organization for Economic Co-operation and Development (OECD) and Food and Agriculture Organization of the United Nations (FAO) Agricultural Outlook 2012-2021. 2012a. Increased productivity and a more sustainable food system will improve global food security. Online at *http://www.oecd.org/site/oecd-faoagriculturaloutlook/*.



Data: OECD/FAO Ag Outlook 2012-2021, with additional data provided by the authors[30]

So of the 10.6 BG of imported ethanol in 2020/2021, 45 percent of it will not be new production, but reduced ethanol use in other countries, with the shortage made up by increased gasoline use. With circular ethanol trade between the U.S. and Brazil accounting for much of the remaining ethanol, the net result will be that just a third of the additional advanced ethanol used in the U.S. will be new advanced ethanol production, and the remainder will be indirectly replaced by gasoline and corn ethanol. If indirect impacts are considered, as is required by the RFS, the overall impact of a higher advanced mandate will not meet the GHG reduction targets required for advanced biofuels.

[30] Id.

Note that the growth in Brazilian ethanol production required to satisfy Brazilian domestic needs and adequate exports to support the 20BG+ RFS is already very aggressive, calling for production to double in a decade. This rate of growth matches the growth rates the Brazilian ethanol industry trade group, UNICA, advocates is achievable[31]. Arguably, doubling ethanol production in a decade is already unsustainably fast growth that will put pressure on other users of sugar and other users of land in Brazil. The EPA analysis performed in 2010 did not anticipate the stagnation of Brazilian ethanol production in the period 2008-2012, so when viewed in that light, the favorable lifecycle analysis for sugarcane ethanol is already based on assumptions that do not match the way events have unfolded. But be that as it may, current circumstance certainly do not justify using this dated analysis as the basis for advanced biofuel mandates that grow faster than were evaluated in 2010.

This is not just a problem in 2022. The circular trade in ethanol is well underway. The OECD/FAO projections show there is no future tipping point, but a divergence in future expectations depend on decisions made today. The Meyer and Thompson paper is aptly titled "How Do Biofuel Use Mandates Cause Uncertainty? United States Environmental Protection Agency Cellulosic Waiver Options."[32] The EPA's failure to articulate a strategy to address clearly implausible mandate levels is substantially increasing uncertainty in biofuels markets and agricultural markets on a global scale. The EPA should act expeditiously to resolve this uncertainty by laying out a rational for setting mandates at a levels that support reasonable growth rates in biofuels while protecting food markets.

Biodiesel: fuel from fat

Biodiesel is produced from a variety of sources of fats and oils, and production has expanded rapidly over the past few years. When made from a true waste, diverted from the waste stream, such as used cooking oil, biodiesel is a low impact, low-carbon fuel. However, when demand for biodiesel production exceeds the availability of low impact sources of fats and oils, serious problems can arise.

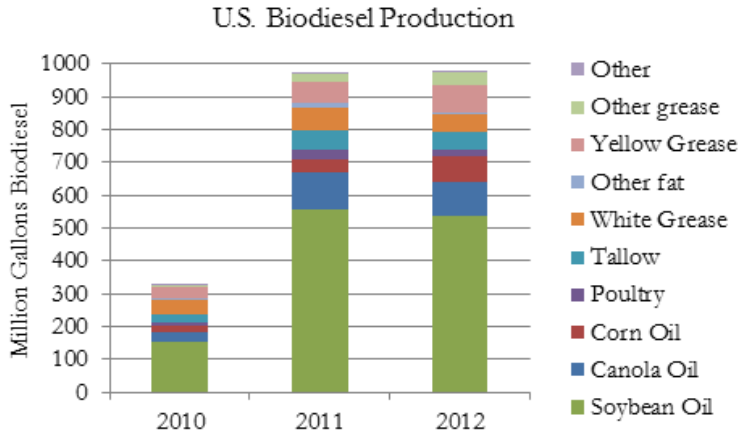
EPA has already expanded the biodiesel mandate for this year, from 1 billion gallons in 2012 to 1.28 billion gallons for 2013. This increase is already nearly as large as the 300 million gallon annual increase advocated by the National Biodiesel Board as consistent with available feedstocks[33]. But it looks increasingly likely that biodiesel could exceed the biodiesel mandate to also fill the cellulosic shortfall for

[31] UNICA data presented by Joel Velasco at the Energy Information Agency workshop on biofuels projections in Annual Energy Outlook on March 20, 2013.
http://www.eia.gov/biofuels/workshop/presentations/2013/pdf/presentation-08-020113.pdf

[32] Meyer, S., Thompson, W. How Do Biofuel Use Mandates Cause Uncertainty? United States Environmental Protection Agency Cellulosic Waiver Options. 2012b. Vol. 34. Applied Economic Perspectives and Policy. Online at *http://aepp.oxfordjournals.org/content/34/4/570.abstract?sid=a6080642-551d-447d-909d-4a6f868094c4*.

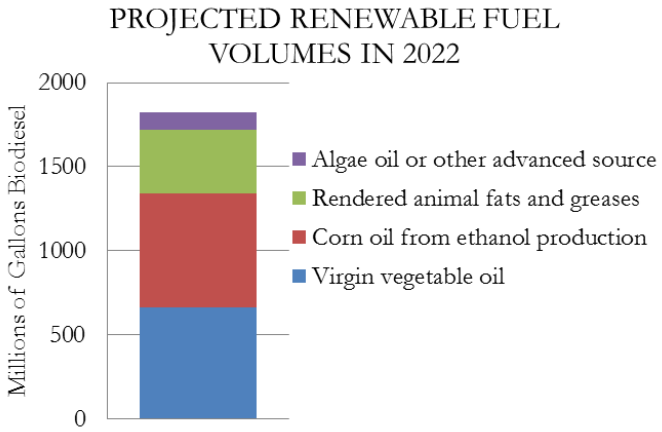
[33] Kruse, John R. March 11, 2011. Biodiesel Production Prospects for the Next Decade. IHS Global Insight. Submitted as part of comments to EPA by Larry Schafer, Senior Advisor, National Biodiesel Board (NBB) as part of EPA Docket EPA-HQ-OAR-2010-0133-0159.

this year[34], primarily because Congress included an extension of the $1/gallon biodiesel tax credit[35] as part of the fiscal cliff tax changes.



EIA Data[36]

The share of biodiesel coming from food grade vegetable oil is higher than what EPA assumed in the 2010 final rule. In fact, the quantity of virgin vegetable oil being used for biodiesel in the last two years already equals the 2022 projections, while the volumes for rendered animal fats and greases and for corn oil from ethanol extraction are running well behind the values EPA modeled in 2010.



Source EPA 2010 RFS Final Rule[37]

[34] Department of Agricultural and Consumer Economics, University of Illinois Urbana-Champaign. 2013. Domestic Biodiesel versus Brazilian Ethanol Revisited. Online at *http://farmdocdaily.illinois.edu/2013/01/domestic-biodiesel-versus-brazilian.html*.

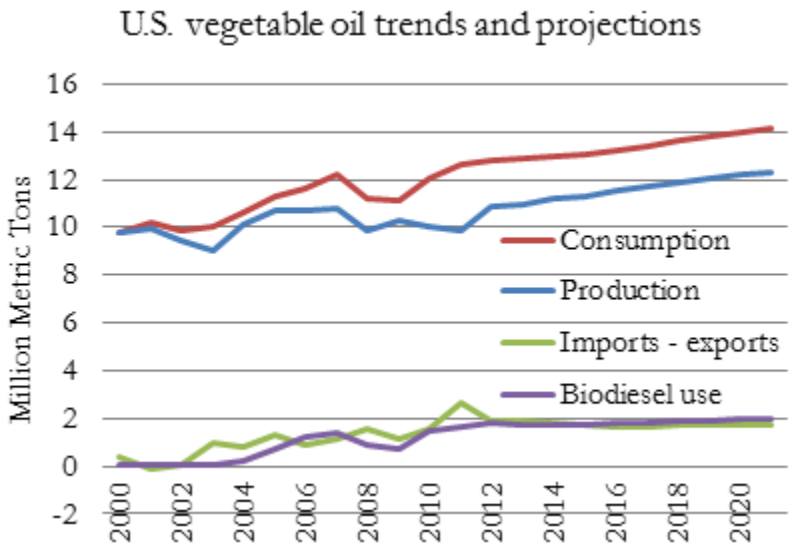
[35] Wald, M. 2013. Congress Renews Credit for Biodiesel Industry. *New York Times*. January, 3. Online at *http://www.nytimes.com/2013/01/04/business/energy-environment/congress-extends-incentives-for-biodiesel-industry.html?_r=0*.

[36] Energy Information Administration (EIA). 2012b. Monthly biodiesel production report. Online at *http://www.eia.gov/biofuels/biodiesel/production/*.

In this light, the expansion of the 2013 biodiesel mandate from 1 to 1.28 billion gallons is already likely to have a larger impact on agricultural markets than what was modeled in 2010, and relying on additional biodiesel to meet the discretionary advanced mandate is likely to tilt the balance of feedstocks even further toward food grade vegetable oils.

Where does the vegetable oil come from?

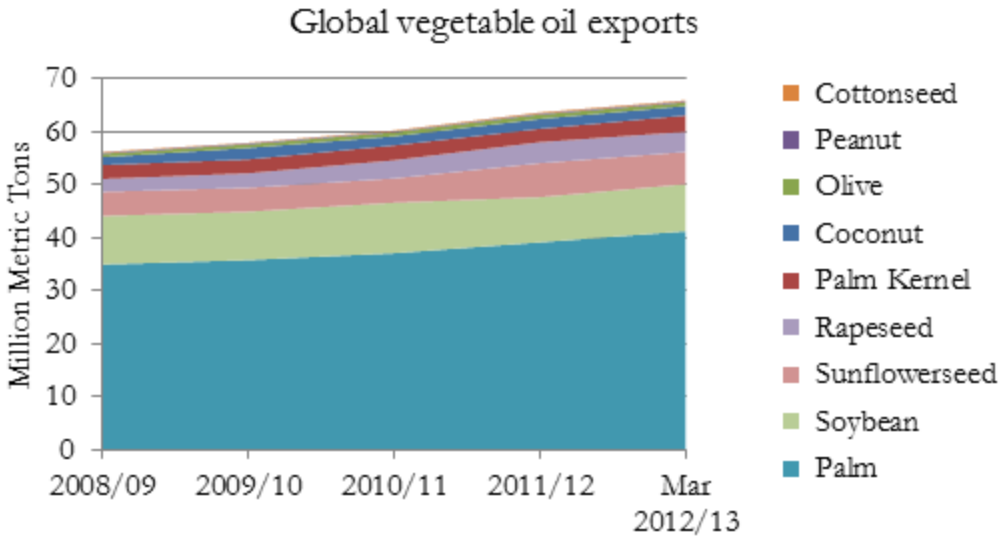
As the biodiesel mandate has grown, so too has the use of food grade vegetable oils such as soybean oil. When added up, food grade vegetable oils account for about two thirds of biodiesel production, with various other fats and oils making up the remainder. According to the projections from OECD and the FAO, the use of vegetable oil to make biodiesel in the U.S. over the last few years nearly matches an expanding gap between imports and exports, and this is a trend expected to continue (note that 2 million metric tons of vegetable oil is about enough to make about 550 million gallons of biodiesel). [38]



OECD-FAO Data[39]

If increased biodiesel use is leading to increased reliance on imported vegetable oil, we need to look overseas to see where the real impact lies. And the largest and fastest growing source of global vegetable oil exports is palm oil from Southeast Asia.

[37] Federal Register / Vol. 75, No. 58 / Friday, March 26, 2010. Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program. 14670-14904.
[38] Organization for Economic Co-operation and Development (OECD) and Food and Agriculture Organization of the United Nations (FAO) Agricultural Outlook 2012-2021. 2012b. Database - OECD-FAO Agricultural Outlook. Online at *http://www.oecd.org/site/oecd-faoagriculturaloutlook/*.
[39] Id.



USDA Foreign Agriculture Service Data[40]

The International Food Policy Research Institute (IFPRI) recently did an analysis of oil substitution in biodiesel markets and found that because demand for soybeans is largely driven by meal, 60% of soybean oil used to make biodiesel was replaced by other oils, especially palm oil. This led to lifecycle emissions for soy biodiesel similar to fossil diesel.[41] As volumes of vegetable oil based biodiesel grow larger, they are increasingly likely to outstrip the demand for meal, leading to a global imbalance that will be rectified indirectly by substitution of palm oil for the missing food grade vegetable oil. This analysis was reviewed by the International Council on Clean Transportation (ICCT) who found additional support for these conclusions.[42] UCS anticipates that ICCT will be submitting comments to this rule that show that the data supports the same argument with respect to U.S. biodiesel.

The long winding road to Southeast Asia

Palm oil is the cheapest, fastest growing source of vegetable oil in the world, and occupies an even larger share of the global vegetable oil trade. This makes it highly likely that whether or not palm oil is directly imported into the U.S., palm oil will ultimately replace the oils and fats used to make biodiesel.

[40] United States Department of Agriculture (USDA). 2013b. Foreign Agricultural Service: Major vegetable oils: world supply and distribution (commodity view). Online at *http://www.fas.usda.gov/psdonline/psdreport.aspx?hidReportRetrievalName=BVS&hidReportRetrievalID=533&hidReportRetrievalTemplateID=5*.

[41] Laborde, D., International Food Policy Research Institute (IFRPI). 2011. Assessing the Land Use Change Consequences of European Biofuel Policies. Online *at http://www.ifpri.org/publication/assessing-land-use-change-consequences-european-biofuel-policies*.

[42] International Council on Clean Transportation (ICCT). 2013. Vegetable oil markets and the EU biofuel mandate. Online at *http://www.theicct.org/vegetable-oil-markets-and-eu-biofuel-mandate*.

The area used for palm oil production has doubled in just a decade[43]. Since palm oil will ultimately be the source of oil that indirectly replaces the oils and fats required to fill an expanded biodiesel mandate, it is likely that expanding the advanced mandate will not only fail to achieve the 50% GHG emissions reduction requirement of advanced biofuels, but may also fail to reduce emissions at all. Palm oil is associated with a host of disquieting problems, mostly about draining peat swamps and cutting down forests to expand plantations, at great cost to orangutans, local people, and the global climate.[44] EPA also assessed the impact of palm oil biodiesel last year, and EPA's preliminary finding was that the lifecycle impacts of palm oil based biofuels do not even meet the minimum 20% threshold GHG reduction compared to gasoline) required for biofuels under the RFS. Moreover, UCS filed comments on this finding that argued EPA actually underestimated the impact.[45] In other words, palm oil is worse than corn ethanol and should not be allowed to indirectly fill an expanded advanced biofuel mandate.

Other fats and non-food grade oils

There are other sources of fats and non-food grade oils that can be made into biodiesel, and according to many lifecycle analyses including EPA's, these secondary products, or pseudo waste fats and oils, have a very favorable lifecycle emissions profile, largely because the feedstock was treated as a waste, and the direct and indirect production impacts of the feedstock were not included in the lifecycle. But it is important to realize this favorable lifecycle analysis implicitly rests on an assumption that the use of the waste will not lead to production of a replacement – such as palm oil - to satisfy demand for the current users. Demand from biodiesel markets has the potential to transform a low value waste into a high value product, and once that transformation has occurred, the justification for ignoring direct or indirect production impacts is no longer valid. The majority of the fats and oils being used to make biodiesel are not being diverted from a waste stream, but rather, can be used to make animal feed, oleochemicals, soaps, and detergents. In earlier rulemakings the American Cleaning Institute explained its concern that diversion of animal fats into biodiesel markets would lead its members, who are users of low cost fats, to substitute palm oil into their products.

Supply of most of the biodiesel feedstocks is relatively inelastic. The relevant industries are not going to significantly increase production of ethanol, meat, or fried food to expand production of corn oil, animal fat or yellow grease. Even soybeans are not a cost effective means of producing vegetable oil absent demand for the soybean meal. Expanded demand for biodiesel may somewhat increase the recovery and utilization of low value or waste oils, from ethanol plants or restaurants, for example. But beyond that limited response, the inelastic supply means that current users of these feedstocks will need to look to other sources to replace the material diverted to biodiesel production. And as noted earlier, palm oil is the largest, cheapest and fastest growing source of oil on the global market. Moreover, compared to

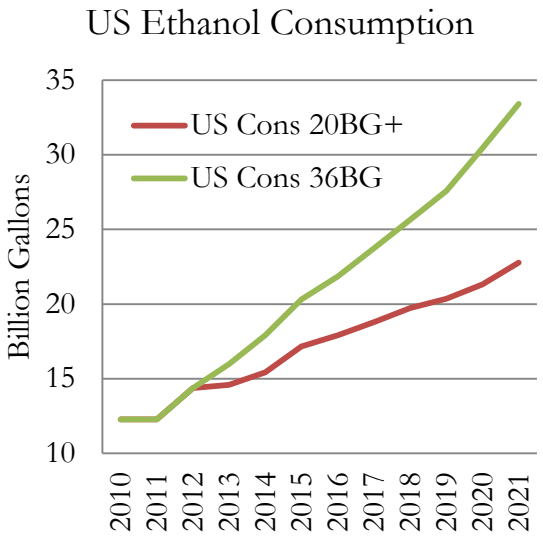
[43] Union of Concerned Scientists (UCS). 2012d. Recipes for Success: Solutions for deforestation-free vegetable oils. Online at *http://www.ucsusa.org/assets/documents/global_warming/Recipes-for-Success.pdf*.
[44] Ibid.
[45] Union of Concerned Scientists. 2012e. Joint science and environmental stakeholder comments on: Docket No. EPA–HQ–OAR–2011–0542: EPA's analyses of palm oil used as a feedstock under the Renewable Fuel Standard (RFS) program. Online at http://www.ucsusa.org/assets/documents/global_warming/EPA-palm-oil-comments-final.pdf.

soybean oil and other oilseeds, palm oil derives a much larger share of its value from the oil, as opposed to the meal. So when demand for fats and oils increases independently of additional demand for meat, that imbalance will favor increased production of palm oil to address the shortfall. This substitution of palm for biodiesel feedstocks may not be direct, so it is important to examine global markets for fats and oils in aggregate and to trace what impact additional demand for biodiesel is having on a global scale. EPA, therefore, should perform such an aggregate analysis to account for the significant indirect sources of GHG emissions, as required by the RFS.

The structure of the RFS biodiesel mandate makes it impractical for EPA to separately evaluate the competition and indirect impacts in each potential biodiesel feedstock, and does not allow EPA to separately administer different mandates for each feedstock. However that does not mean that there is no need to evaluate the impact of diverting these diverse feedstocks from current uses to biofuel use. Rather, EPA should consider the competing users of oils and fats *in aggregate* when setting mandate levels. In practical terms this means examining how much of the increased biodiesel feedstock is coming from increased waste recovery, and to what extent the additional demand for biodiesel is indirectly driving expansion of high carbon sources of vegetable oil, particularly palm oil. If the increased recovery of waste oils and availability of other low carbon feedstocks is not sufficient to support larger mandates without substantial indirect substitution of high carbon feedstocks, EPA should not make any discretionary increases in the biodiesel mandate, and should not count on these resources to help fill a discretionary enlargement of the advanced mandate. While our comments pertain to the discretionary enlargement beyond the 20BG+ RFS, even the lower 20BG+ RFS mandate levels will likely exhaust the low carbon biodiesel feedstock resources. The low carbon oils and fats are simply not available at a quantity consistent with the larger 36BG RFS, and if EPA ramps up demand too fast, the RFS will draw in damaging resources like palm oil that will undermine the long terms goals of the policy.

Infrastructure constraints

In deciding whether to make a discretionary expansion of the non-cellulosic advanced mandate, EPA should also consider the adequacy of the infrastructure to accommodate the fuel. The 20BG+ RFS will provide a robust market drive to move beyond the E10 blend wall, through RIN prices that can make E85 or drop-in biofuels more economically attractive. This is starting to happen now, as conventional RIN prices reflect the challenges associated with the blend wall, and provide compensation to actors who are able to overcome those challenges and effectively market higher ethanol blends. Under the 20BG+ RFS, the scale up of ethanol use beyond the blend wall will be significant, between 500 million and a billion additional gallons of ethanol a year over the next several years (depending on assumptions about biodiesel's share of the marketplace). For example, the OECD/FAO Agricultural Outlook, which forecasts biodiesel playing a minor role, projects that U.S. ethanol use will grow by 1 billion gallons a year on average between 2013 and 2021 under the 20BG+ RFS. Under the 36BG RFS, however, much faster increases of ethanol use will be needed, the OECD/FAO Outlook projects an increase of 2.2 billion gallons a year on average between 2013 and 2021.



Data: OECD/FAO Ag Outlook 2012-2021, with additional data provided by the authors[46]

The level of additional ethanol use associated with the 20BG+ RFS will require installation of additional blender pumps, and a process of customer education and attractive pricing to motivate increased E85 use. However, this level of additional use can be accommodated by increasing the E85 use of the existing flex fuel vehicle (FFV) fleet and gradually increasing the use of E15. The transition beyond the blend wall will also be buffered to some extent by the existing inventory of carry forward RINs held by obligated parties.

However, under the more aggressive biofuel ramp rates of the 36BG RFS, additional ethanol penetration would need to proceed more than twice as quickly as in the 20BG+ RFS. The rate of change in fueling and vehicle infrastructure required to accommodate such a rapid transition would rise so fast as to make an orderly adjustment to fuels beyond the blend wall difficult if not impossible. The risk of a disorderly collision with the blend wall may ultimately lead policy makers to revise the RFS, and this risk is creating unneeded uncertainty for the key economic actors in this area (automakers, fuel providers, gas station owners). This uncertainty makes it difficult for them to plan for long term investments. EPA can alleviate this uncertainty by clarifying its intention to use the flexibility it has to follow the 20BG+ RFS approach. Reducing the advanced mandate in line with the cellulosic shortfall will allow an orderly transition to higher blends, and will ultimately do more to achieve the long term oil saving and climate goals of the RFS than rushing to reach a 36BG RFS faster than the underlying infrastructure can accommodate without disruption.

[46] Organization for Economic Co-operation and Development (OECD) and Food and Agriculture Organization of the United Nations (FAO) Agricultural Outlook 2012-2021. 2012a. Increased productivity and a more sustainable food system will improve global food security. Online at *http://www.oecd.org/site/oecd-faoagriculturaloutlook/*.

The lack of plausible biofuel volumes projections complicates other key decisions.

The need for a forward looking roadmap on biofuels that is consistent with the realities of the current vehicle, infrastructure and feedstock marketplace affects many other areas. For example, the question of how to treat FFV's under the fuel economy and GHG standards will be more straightforward once EPA has laid out a more plausible path forward than current proposals have afforded[47]. While the 2014 volume rule may not be the appropriate forum for a long term revision of the RFS volume roadmap, it is important for EPA to promptly initiate a process to develop revised cellulosic and advanced volume targets for 2016-2022 based on best available data, analysis and stakeholder input.

Why act in 2013?

The 2013 RFS volume rulemaking provides the EPA an opportunity to send a strong signal to the biofuel industry, competing users of agricultural commodities and other affected industries about the future course of the RFS. Failure to adjust the advanced mandate in-line with the cellulosic mandate keeps the EPA on track towards a 36BG vision for the RFS in 2022 which is manifestly inconsistent with available feedstocks and competing uses, especially for food, as well as with the nations fueling and vehicle infrastructure. EPA should take the earliest opportunity to demonstrate to policy makers and the public that the agency intends to use the flexibility built into the RFS to address legitimate challenges related to competition between food and fuel and infrastructure constraints. By adopting this course, EPA can reaffirm the Administration's commitment to domestically produced low carbon fuels and reaffirm the strength of the RFS as a policy that can adapt to changing market circumstances and achieve the goals it was originally intended to accomplish.

Sincerely,

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Washington DC 20006-1232
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[47] UCS will be submitting additional comments on EPA's "Draft Guidance for E85 Flexible Fuel Vehicle Weighting Factor for Model Years 2016-2019 Vehicles Under the Light-Duty Greenhouse Gas Emissions Program" Docket ID No. EPA-HQ- OAR-2013-0120.