TALKING POINTS *Published February 4, 2014 · Updated February 4, 2014 · 10 minute read*

Q&A on EPA's Proposed Rule to Lower RFS Volumes

Ryan Fitzpatrick

On November 15, 2013, the Environmental Protection Agency (EPA) released a proposed rule that would drastically reduce the amount of biofuels required to be blended into the nation's fuel supply under the Renewable Fuel Standard. This effort by EPA undermines the climate and national security goals of the RFS, is likely to unravel the promising advanced biofuels industry, and is completely unnecessary from a policy perspective.

EPA's final rule is expected this spring and will inevitably be subject to a series of high-profile legal challenges. Since this topic will be of significant and sustained interest to agriculture, petroleum production, technology, clean energy, and investment groups (as well as the press), it will be useful for both policy and communications staff to be aware of the major implications associated with the rule. The following document offers responses to some of the most pressing questions associated with this debate. Definitions for words in ***bold*** can be found in the glossary at the end of the document.

Why are biofuels important in the first place?

- **Using biofuels instead of petroleum-based fuels lowers greenhouse gas emissions.**
    - Before a fuel can qualify for the ***Renewable Fuel Standard (RFS)***, EPA must conduct a rigorous analysis to ensure that the full lifecycle emissions of that fuel are at least 20% lower than those of its petroleum-based counterpart. ***Advanced*** and ***cellulosic*** biofuels must reduce emissions by 50% and 60%, respectively. [1]
    - EPA has verified that cellulosic biofuels have already been produced with 86% lower lifecycle emissions than gasoline. [2]
    - Argonne National Lab found that corn ethanol production results in a 19-48% decline in greenhouse gas emissions compared to gasoline, [3] and other studies have shown that corn ethanol can reach even higher reductions in greenhouse gas emissions – as much as 59% compared to gasoline. [4]
    - Developments in corn ethanol technology continue to make the ethanol production process cleaner and more efficient. In 2012, 9% less energy was needed to produce a gallon of ethanol than in 2008, and 1.4% more ethanol was produced from each bushel of corn. [5]
- **Domestic biofuels decrease U.S. reliance on imported petroleum.**
    - Domestic ethanol production displaced 8.6 billion gallons of gasoline in 2013. [6] That's roughly the amount of gasoline used in every vehicle in Washington, Oregon, Idaho, Montana, Wyoming, Utah and Colorado combined. [7]
- **Biofuels have economic benefits for American workers and fuel consumers.**

- Achieving the RFS production goals for advanced biofuels would result in the direct creation of 190,000 jobs in agriculture, construction, transportation, and R&D. [8]
- Meeting these advanced biofuels targets would also create $37 billion in direct economic benefits. [9]
- The RFS has helped bring the cost of domestic ethanol below that of gasoline in several markets. It also lowered overall gasoline demand, which subsequently lowered prices. [10]
- As a result, consumers saved between $0.50 and $1.50 per gallon of gasoline, totaling $700 billion to $2.6 trillion in savings. [11]

Hasn't the RFS failed to bring cellulosic and advanced biofuels to market

- **Thanks to the RFS, a variety of advanced biofuels are being produced at commercial levels, and cellulosic fuels began to hit the market in 2013.**
  - KiOR produced just under one million gallons of cellulosic drop-in fuels in 2013, its first full year of operation at its Columbus, MS facility with a total capacity of 13 million gallons per year (gpy). [12]
  - In July of 2013, INEOS Bio began producing cellulosic ethanol from plant waste at its Vero Beach, FL facility, which has a full capacity of 8 million gpy. INEOS plans to license its technology to other facilities in the U.S. and abroad. [13]
- **Several major companies have invested hundreds of millions of dollars into cellulosic ethanol plants that will begin production in 2014.**
  - Companies like Abengoa, [14] DuPont, [15] and POET-DSM [16] will begin operations of their first commercial cellulosic ethanol plants in 2014.
  - These three facilities alone will offer a combined capacity of 80 million gpy. That's enough to run every gasoline vehicle in New York State on E15 for an entire month. [17] [18]
- **The RFS provided certainty for investors who propelled these technologies out of the lab and into fuel tanks in just six years.**
  - This is an impressive feat. For context, it has taken three times as long to bring fuel cell vehicles from the demonstration phase to commercial availability. [19]

Are EPA's concerns about the "blend wall" and high RIN prices a sign that the RFS is bad policy, or was poorly written?

- **The blend wall is an entirely avoidable problem, and one that should come as a surprise to no one.**
    - When EPA released its final rule for the updated RFS program in 2009, the agency noted that the ***blend wall*** would be reached in 2013 or 2014. [20] They went on to say that, in order to meet the requirements, "we are going to need to see growth in ***FFV*** and ***E85*** infrastructure and increases in FFV E85 refueling rates." [21]
    - Auto manufacturers have responded by tripling the number of light-duty vehicle models that can run on E85. A total of 90 of these flex-fuel vehicle models are available in 2014, [22] and more than 15 million of these vehicles are on American roads. [23]
    - The statute's 2014 volumes can be reached without hitting the blend wall, even if no additional E85 stations opened. New stations, however, make compliance even easier. [24]
- **The RIN market—with its rising and falling prices—was created to help push past the blend wall.**
    - It was understood that, as we approached the 10% ethanol "blend wall", ***Renewable Identification Number (RIN)*** prices would rise. The oil industry then would be motivated to invest in the infrastructure needed to sell higher concentrations of ethanol (like E85) or lower the cost of these fuels to drive demand. [25]
    - By making these infrastructure investments, the oil industry could produce more of its own credits through additional ethanol blending, which would be cheaper than purchasing RINs from a shrinking market. [26]
    - While some companies chose to make investments to overcome the blend wall and avoid RIN costs, the industry as a whole has sought instead to dismantle the RFS altogether. [27]
    - Many oil companies who took steps to generate RINs by blending additional biofuels have actually *profited* from higher RIN prices. For example, Hess Corporation generated roughly $20 million each month by selling its excess RINs. [28]

Doesn't EPA regularly adjust the volumetric targets in the RFS? Isn't this a normal part of the process?

- **EPA's proposed rule is unprecedented and quite possibly exceeds the Agency's legal authority. Stick with us, this gets a little complicated…**
    - The RFS allows EPA to lower the requirements for cellulosic biofuels if production is expected to be below the required amount that year. It has used this legal flexibility several times.
    - If EPA lowers the cellulosic requirement, it has the *option* to make a reduction in the total renewable fuel volumes *up to* the amount of reduction in cellulosic fuels. However, its proposed rule lowers total renewable volumes for 2014 by much more than the cellulosic reduction.
    - The only way EPA could have the authority to make these additional reductions is by a determination that implementing the RFS as written would "severely harm the economy" or that there is "inadequate domestic supply" to meet the requirements. Though EPA leans heavily into the latter argument, it has little to support its claim.
        - With more than 14.9 billion gallons of production capacity, [29] the biofuels industry has demonstrated clearly that it can produce more than enough ethanol to meet 2014 requirements.
        - The U.S. is expected to enjoy record production levels of corn for the year ending in 2014, [30] and at prices roughly the same as when the updated RFS went into effect. [31] This further indicates ample and economical ethanol production for the coming year.
        - In order to use this statutory authority despite an abundance of available ethanol, EPA is attempting to redefine "supply" to also include the availability of distribution and fueling infrastructure.

EPA's proposed rule only reduces the requirements for corn ethanol, so it won't have any impact on cellulosic or other advanced biofuels, right?

- **EPA's proposal threatens investment in the biofuels sector at large.**
    - This surprising move from EPA has created uncertainty over how the Agency will decide to enforce the RFS in the future and whether the market for biofuels will

ever expand beyond the blend wall as intended. [32]

- Regulatory and market uncertainty of this type is likely to shrink investment in biofuels production [33] and research [34] —both for conventional and advanced fuels.

- **The proposal has already damaged one of the earliest entrants to the fledgling cellulosic market.**
  - KiOR, the first commercial producer of cellulosic ethanol in the U.S., was impacted almost immediately by EPA's proposed rule.
  - Falling RIN prices lessened the value of its product, undermined KiOR's already tenuous relationship with investors, and contributed to its decision to temporarily idle the plant. [35]

- **Companies and technologies paving the way for cellulosic fuels are closely tied to corn ethanol production.**
  - By the end of 2014, the majority of U.S. cellulosic ethanol production capacity will be in the hands of companies with substantial corn ethanol operations. These companies are taking advantage of existing ***feedstock*** supply chains, sourcing corn stover for cellulosic production in conjunction with the corn they source for conventional ethanol. Their cellulosic operations also benefit from existing infrastructure used for corn ethanol. [36]
  - The efficiency of tying their cellulosic and corn ethanol operations together allows these companies to produce cellulosic fuels at a profit—something that still eludes others in this sector. [37] They also have the potential to replicate their cellulosic production at dozens of additional corn ethanol facilities, creating scale that would drive down the cost of cellulosic technologies.
  - EPA's proposal would further reduce the already low revenue margins of cellulosic ethanol production and substantially increase the cost of production so that costs outweigh revenue.
  - Subsequently, investors will realize little to no return on investment to justify the risk of investing in these new technologies and therefore limit any chance of future development of cellulosic biofuels by any entity.

What happens now?

- EPA will issue a final rule in the spring of 201
  - If the total renewable fuel requirements in EPA's final rule are as low as what it suggested in its proposed rule, our analysis indicates that there will be no

expansion of cellulosic fuels in the U.S. for the foreseeable future.

- Even if EPA raises the total renewable fuel requirements somewhat higher than the levels in its proposed rule, any requirement short of the full statutory level is likely to have the same chilling effect on cellulosic and advanced biofuels investment

Glossary

Advanced Biofuel: A category of fuels in the RFS that must be made from non-corn feedstocks, and achieve a 50% reduction in lifecycle greenhouse gas emissions compared to petroleum fuels.

Blend Wall: The point at which no more ethanol can be added to the gasoline supply without bringing the ethanol-to-gas ratio above roughly 10% (the maximum fuel concentration for which many automakers will warranty their cars and light trucks). Blending additional ethanol beyond this point would require greater use of high concentration fuels like E85 and specialized vehicles like FFVs.

Cellulosic Biofuel: A fuel made from a feedstock comprised of cellulose, such as wood, crop residues, and switchgrass.

E85: A fuel comprised of up to 85% ethanol, with gasoline as the remainder. Specialized vehicles and distribution infrastructure are necessary for fuels with such a high concentration of ethanol.

Feedstock: The material used as an input in the biofuel production process. Feedstocks used to make biofuels include corn, algae, wood scraps, sugar cane, and animal fats.

Flex Fuel Vehicle (FFV): Vehicles specifically designed to run on fuel blends up to 85% ethanol.

Renewable Fuel Standard (RFS): A federal policy requiring increasing amounts of biofuels to be blended into the U.S. gasoline and diesel supply through 2022.

Renewable Identification Number (RIN): A unique number assigned to each gallon of biofuel that meets RFS qualifications. Blenders acquire RINs to demonstrate their compliance with the RFS

ENDNOTES

1. EPA includes in its assessment any emissions resulting from indirect land use changes, a highly contested topic in the academic community. See United States, Environmental Protection Agency, Office of Transportation and Air Quality, "EPA Lifecycle Analysis of Greenhouse Gas Emissions from Renewable Fuels," Regulatory Announcement, February, 2010. Accessed January 28, 2014. Available at: http://www.epa.gov/otaq/renewablefuels/420f10006.pdf.

2. United States, Department of Energy, Office of Energy Efficiency and Renewable Energy, "Ethanol Benefits and Considerations." Accessed January 28, 2014. Available at: http://www.afdc.energy.gov/fuels/ethanol_benefits.html.

3. Michael Wang, Jeongwoo Han, Jennifer B Dunn, Hao Cai, and Amgad Elgowainy, "Well-to-Wheels Energy Use and Greenhouse Gas Emissions of Ethanol from Corn, Sugarcane and Cellulosic Biomass for US Use," Article, *Environmental Research Letters*, December 13, 2012, p. 9. Accessed January 28, 2014. Available at: http://iopscience.iop.org/1748-9326/7/4/045905/article.

4. Adam J. Liska, Haishun S. Yang, Virgil R. Bremer, Terry J. Klopfenstein, Daniel T. Walters, Galen E. Erickson, and Kenneth G. Cassman, "Improvements in Lifecycle Energy Efficiency and Greenhouse Gas Emissions of Corn-Ethanol," Article, *Journal of Industrial Ecology*, January 21, 2009, p. 58. Accessed January 28, 2014. Available at: http://onlinelibrary.wiley.com/doi/10.1111/j.1530-9290.2008.00105.x/abstract.

5. Steffen Mueller and John Kwik, "2012 Corn Ethanol: Emerging Plant Energy and Environmental Technologies," Report, Energy Resources Center, University of Illinois at Chicago, April 29, 2013, p. 24. Accessed January 28, 2014. Available at: http://www.erc.uic.edu/staff/smueller.htm.

6. United States, Department of Energy, Energy Information Administration, "4-Week Avg U.S. Oxygenate Plant Production of Fuel Ethanol," Data Set. Accessed January 28, 2014. Available at: http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=w_epooxe_yop_nus_mbbld&f=4; See also United States, Department of Energy, Alternative Fuels Data Center, "Fuel Properties Comparison," Chart, p. 1. Accessed January 28, 2014. Available at: http://www.afdc.energy.gov/fuels/fuel_comparison_chart.pdf.

7. United States, Department of Energy, Energy Information Administration, "Motor Gasoline Consumption, Price, and Expenditure Estimates, 2012," Table. Accessed January 28, 2014. Available at: http://www.eia.gov/state/seds/data.cfm?incfile=/state/seds/sep_fuel/html/fuel_mg.html&sid=US.

8. "U.S. Economic Impact of Advanced Biofuels Production: Perspectives to 2030," Report, bio-era (Bio Economic Research Associates), February 2009, p. 11. Accessed January 28, 2014. Available at: http://www.bio.org/sites/default/files/EconomicImpactAdvancedBiofuels.pdf.

9. Ibid, p. 1.

10. "Renewable Fuels Standard Saves You $0.50 – 1.50 per Gallon," Article, Gas2, October 5, 2012. Accessed January 28, 2014. Available at: http://gas2.org/2013/10/05/renewable-fuels-standard-saves-0-50-1-50-per-gallon/.

11. Ibid.

12. "KiOR Provides Operational Update on Columbus Facility," Press Release, KiOR Inc., December 23, 2013. Accessed January 28, 2014. Available at: http://investor.kior.com/releasedetail.cfm?ReleaseID=815660.

13. Malik Singleton, "INEOS Bio's New Bio Technology Process Creates Fuel and Electricity From Waste," *International Business Times*, August 1, 2013, U.S. ed. Accessed January 28, 2014. Available at: http://www.ibtimes.com/ineos-bios-new-bio-technology-process-creates-fuel-electricity-waste-1367177.

14. "General Information," Abengoa Bioenergy, 2011. Accessed January 28, 2014. Available at: http://www.abengoabioenergy.com/web/en/2g_hugoton_project/.

15. "DuPont Nevada Site Cellulosic Ethanol Facility," DuPont Biofuel Solutions. Accessed January 28, 2014. Available at: http://biofuels.dupont.com/cellulosic-ethanol/nevada-site-ce-facility/.

16. "Project Liberty: A Decade of Cellulosic Research," POET-DSM. Accessed January 28, 2014. Available at: http://www.poetdsm.com/liberty.

17.

Third Way analysis based on data from the Energy Information Administration. See "Motor Gasoline Consumption, Price, and Expenditure Estimates, 2012."

18.

19. "Fuel Cell Electric Vehicles: The Road Ahead," Report, FuelCellToday, August 28, 2012. pp. 4-5. Accessed January 28, 2014. Available at: http://www.fuelcelltoday.com/analysis/surveys/2012/fuel-cell-electric-vehicles-the-road-ahead.

20. United States, Environmental Protection Agency, Office of Transportation and Air Quality, "Draft Regulatory Impact Analysis: Changes to Renewable Fuel Standard Program," Report, May, 2009. Accessed January 28, 2014. Available at: http://www.epa.gov/otaq/renewablefuels/420d09001.pdf.

21. United States, Environmental Protection Agency, Office of Transportation and Air Quality, "Renewable Fuel Standard Program (RFS2) Regulatory Impact Analysis," Report, February, 2010. Accessed January 28, 2014. Available at: http://www.epa.gov/otaq/renewablefuels/420r10006.pdf.

22. United States, Department of Energy, Office of Energy Efficiency and Renewable Energy, Alternative Fuels Data Center, "Light-Duty Vehicle Search," Database. Accessed January 28, 2014. Available at: http://www.afdc.energy.gov/vehicles/search/light?fuel_type_code=E85_GSLN.

23. "E85," Website, Renewable Fuels Association, April, 2013. Accessed January 28, 2014. Available at: http://www.ethanolrfa.org/pages/e-85.

24. Bruce Babcock and Sebastien Pouliot, "Feasibility and Cost of Increasing US Ethanol Consumption Beyond E10," Policy Brief, CARD Policy Briefs, Center for Agricultural and Rural Development, Iowa State University, January, 2014. Accessed January 28, 2014. Available at: http://www.card.iastate.edu/publications/synopsis.aspx?id=1217.

25. United States, Department of Energy, Energy Information Administration, "E85 Motor Fuel is Increasingly Price-Competitive with Gasoline in Parts of the Midwest," Article, September 19, 2013. Accessed January 28, 2014. Available at: http://www.eia.gov/todayinenergy/detail.cfm?id=13031; See also Babcock and Pouliot.

26. Babcock and Pouliot.

27. "Congress Should Repeal Unworkable Renewable Fuels Standard," Press Release, American Petroleum Institute, November 27, 2012. Accessed January 28, 2014. Available at: http://www.api.org/news-and-media/news/newsitems/2012/nov-2012/congress-should-repeal-unworkable-renewable-fuels-standard.aspx.

28. Geoff Cooper, "What Do Big Oil's Quarterly Earnings Say About the Real Impact of RINs on U.S. Gas Prices," Blog, The E-xchange, Renewable Fuels Association, August 1, 2013. Accessed January 28, 2014. Available at: http://www.ethanolrfa.org/exchange/entry/what-do-big-oils-quarterly-earnings-say-about-the-real-impact-of-rins-on-u/#_ftnref4.

29. United States, Nebraska State Energy Office, "Fuel Ethanol Facilities Capacity by State and by Plant," Table, January 14, 2014. Accessed January 28, 2014. Available at: http://www.neo.ne.gov/statshtml/122.htm.

30. United States, Department of Agriculture, National Agricultural Statistics Service, "Quick Stats," Database. Accessed January 28, 2014. Available at: http://quickstats.nass.usda.gov/results/4F1F515B-1E9A-348B-8D36-64D399234257?pivot=short_desc.

31. United States, Department of Agriculture, Economic Research Service, "Table 1 —Corn, sorghum, barley, and oats: Planted acreage, harvested acreage, production, yield, and farm price," Table, January 15, 2014. Accessed January 28, 2014. Available at: http://www.ers.usda.gov/data-products/feed-grains-database/feed-grains-yearbook-tables.aspx#26766.

32. Lynn Grooms, "EPA Proposal, Advanced Biofuels Industry's 'Worst Nightmare'," Blog, Farm Industry News, December 4, 2013. Accessed January 28, 2014. Available at: http://farmindustrynews.com/blog/epa-proposal-advanced-biofuels-industry-s-worst-nightmare.

33. Sarah Gonzalez, "Ethanol Producers Say RFS Uncertainty is Driving Investment Overseas," Article, Agri-Pulse, January 22, 2014. Accessed January 28, 2014. Available at: http://www.agri-pulse.com/Ethanol-producers-say-RFS-uncertainty-is-driving-investment-overseas-01-22-2014.asp; See also Benjamin Salisbury, Remarks, "RFS Volumes: Defining the Future of Advanced BioFuels," Third Way briefing, Russell Senate Office Building, Washington, D.C., November 19, 2013. Accessed January 28, 2014. Transcript available at: http://www.thirdway.org/events/131/transcript.

34. Deana Stroisch, "RFS Uncertainty Hurting Biofuels Research," Farm Week, January 20, 2014. Accessed January 28, 2014. Available at: http://farmweeknow.com/story-rfs-uncertainty-hurting-biofuels-research-0-107478.

35. Amanda Peterka, "First U.S. Cellulosic Plant Goes Idle as EPA Weighs Production Targets," Greenwire, Subscription, January 14, 2014. Accessed January 28, 2014. Available at: http://www.eenews.net/greenwire/stories/1059992869/search?keyword=peterka plant idle.

36. Andy Heggenstaller, “Developing Corn Stover as the Next Agricultural Commodity,” Ethanol Producer Magazine, May 10, 2012. Accessed January 28, 2014. Available at: http://www.ethanolproducer.com/articles/8771/developing-corn-stover-as-the-next-agricultural-commodity.

37. Kris Bevill, “How Cellulosic is Rising from Corn,” Ethanol Producer Magazine, July 10, 2012. Accessed January 28, 2014. Available at: http://www.ethanolproducer.com/articles/8930/how-cellulosic-is-rising-from-corn.