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Who Wins if the EPA Reverses Itself on the Write Down of the Renewable Mandate in 2014?

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There is on-going speculation about the possibility of some adjustment in the EPA's preliminary rule making for 2014 Renewable Fuel Standards (RFS), either in final rule making expected this summer or as a result of a legal challenge. A *farmdoc daily* article last week noted that the recent rise of D6 ethanol prices relative to D4 biodiesel prices indicates that RINs traders believe the odds of the EPA reversing the proposed write down of the renewable mandate for 2014 in final rulemaking have increased sharply. The purpose of today's article is to examine which biofuel— ethanol or biodiesel— would be the big winner if the EPA reverses itself on the write down of the renewable mandate for 2014.

We begin by briefly reviewing EPA rulemaking regarding the RFS. The RFS statutes require the EPA to establish biofuel volume requirements in four categories: cellulosic biofuel, biomass-based diesel, total advanced biofuel (which includes biomass-based diesel), and renewable fuel (ethanol). Of most interest for 2014 is the requirement for renewable fuel. EPA preliminary rulemaking established that requirement at 13.01 billion gallons, compared to the 2013 requirement of 13.8 billion gallons and the statutory requirement for 2014 of 14.4 billion gallons. The requirement was "rolled back" in recognition of the hurdles to blending quantities of renewable fuel in the domestic motor fuel supply beyond the E10 blend wall, variously estimated to be 13 to 13.2 billion gallons for 2014. The proposal has been the subject of heated debate since it was released and the EPA received over 15,000 comments before the official comment period ended on January 28, 2014. Biofuels groups have sent strong signals that they will mount a legal challenge if the final RFS rulemaking for 2014 includes the write down of the renewable mandate.

If the final EPA rulemaking for 2014 is revised to include renewable fuel quantities beyond the E10 blend wall, the additional requirements (referred to here as the "renewable fuel gap") could be met with a combination of increased quantities of higher ethanol blends (E15 or E85) or increased blending of advanced biofuels (particularly biomass-based diesel). For simplicity, we ignore the use of accumulated RINs stocks. Obligated parties under the RFS will seek to minimize the cost of filling the renewable gap by judicious use of these alternatives. The least-cost combination will depend on the blending economics of each alternative. For example, if blending biodiesel with petroleum diesel at the margin involves a smaller

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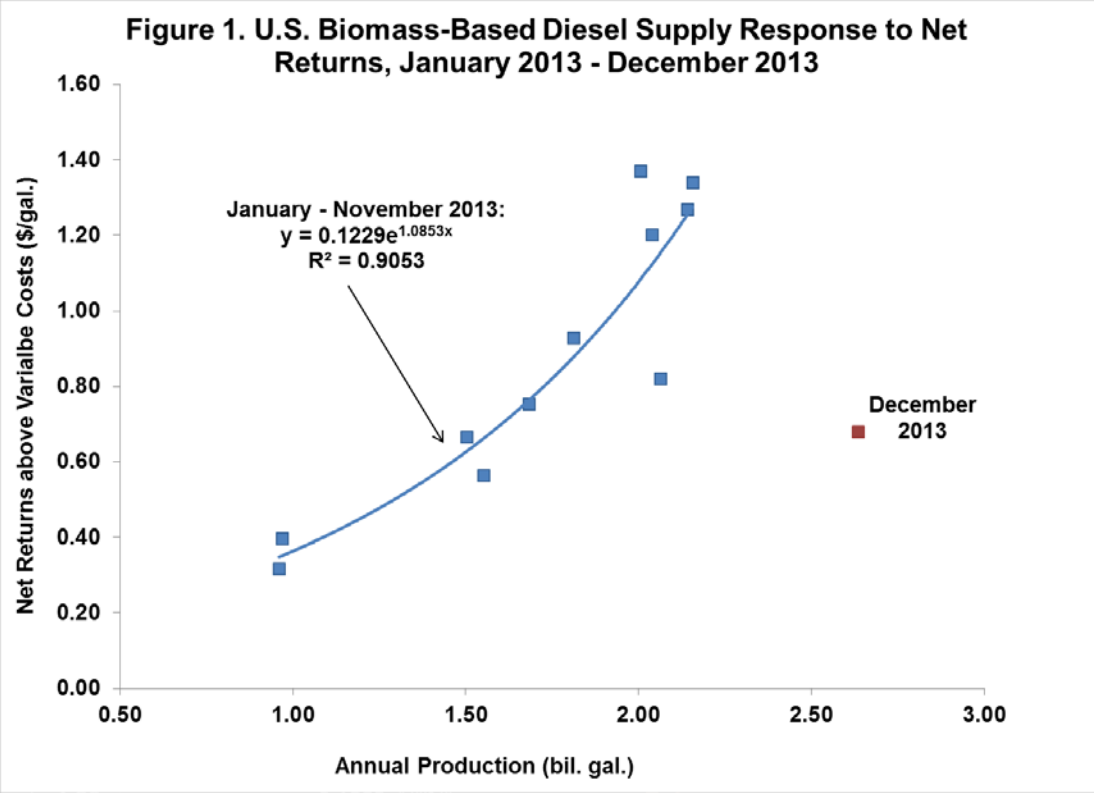
loss than blending ethanol with gasoline to make E85 then obligated parties will choose to fill the renewable gap using biodiesel.

In the debate surrounding the EPA's controversial proposed rulemaking for 2014, much of the focus has been on the potential role of E85 in meeting higher renewable mandate levels. The issue boils down to the level of D6 ethanol RINs that would incentivize the needed rise in E85 deployment and consumption. A positive D6 RINs price is necessary because E85 has to be priced low enough to compensate consumers for the lower gas mileage of E85 compared to E10 and the time value of more frequent refueling with E85. In addition, blenders need to be compensated for any additional investment in the infrastructure needed to expand E85 use. A recent study by Informa and another by Professors Bruce Babcock and Sebastian Pouliot of Iowa State University estimated the cost of increased deployment of E85 in terms of D6 RINs prices. These studies suggest that a D6 RINs price of $0.75 per gallon is sufficient with E10 pump prices near $3.50 per gallon and the assumption that E85 pump prices would need to be 20 percent below the parity price with E10 to induce consumers to use higher quantities of E85. Different assumptions about E10 prices, ethanol prices, discounts, and infrastructure costs will, of course, lead to different estimates of the required D6 price. We use the $0.75 estimate as representative across a variety of market conditions and assumptions.



The analysis of RINs prices and E85 consumption, while interesting and certainly relevant, is incomplete because the alternative of meeting a portion of a larger renewable mandate with biomass-based diesel is not considered (we use the term "biomass-based diesel" for the remainder of the article because both biodiesel and renewable diesel generate D4 RINs). The essential question is whether the blending economics of biomass-based diesel will result in a lower D4 RINs price compared to the assumed D6 RINs price of $0.75. Our analysis of this question starts with the estimation of a biomass-based diesel supply curve for 2014. That is a two-step process most recently discussed in the article found here. The first step is to estimate the response of biomass-based biodiesel supply to returns above variable costs. We use monthly production observations (annualized) and net returns from January through November 2013 (Figure 1). The December 2013 observation is shown, but not included in estimating the supply response. It is believed that production in December was distorted by the impending end to the biomass-based diesel blender tax credits and perhaps by expectations that large quantities of biomass-based biodiesel would be needed to meet the renewable fuel gap in 2014. The outlier designation appears to be verified by the fact that the combination of annualized production (about one billion gallons) and net returns was very near the

estimated supply response curve in January 2014 (not shown). The second step is to estimate a biomass-based diesel supply curve for 2014 by assuming a fixed cost of production and the supply response to net returns estimated in Figure 1. With a fixed cost of production, net returns vary according to the price of biodiesel, resulting in the estimated supply curve depicted in Figure 2. The largest cost of production of biomass-based diesel is the cost of the feedstock. Note that we assume the price of biodiesel and renewable diesel are the same for the analysis. That cost is estimated using a price of $0.39 per pound for soybean oil, the primary biomass-based diesel feedstock. That price reflected the cash price to biodiesel plants implied by soybean oil futures prices on February 25, 2014.

With the 2014 supply curve estimated, we only need to specify the biomass-based diesel demand curve to compute D4 RINs prices. Under the assumption that biodiesel sells at the same price as ultra low sulfur diesel (ULSD) and there is no tax credit for biomass-based diesel, the demand curve in Figure 2 is horizontal at the price of ULSD, currently about $3.00 per gallon. If the $1 per gallon tax credit is reinstated for 2014, the biodiesel demand curve is horizontal at $4.00 per gallon. The intersections of the estimated supply and demand curves in Figure 2 yield the following results:

1) with no biodiesel blender tax credit and no biofuels mandate, no biodiesel would be produced in 2014 (curves do not intersect),

2) with no blender tax credit and production at the preliminary mandate of 1.28 billion gallons of biodiesel for 2014, the price of RINs per wet gallon of biodiesel (D4) would be $0.82 per gallon, or $0.55 per gallon of ethanol equivalents ($0.82/1.5), in order to motivate sufficient biodiesel production,
3) with a blender tax credit, 1.56 billion gallons of biomass-based diesel would be produced and the implied D4 RINs price is zero.

Under the last outcome, biomass-based diesel production would exceed the preliminary mandate of 1.28 billion gallons by 280 million gallons, or 420 million gallons of ethanol equivalents. In other words, the biomass-based diesel blender credits under the projected market conditions would “unbind” the proposed mandate of 1.28 billion gallons. Those 420 million gallons could be applied to any renewable fuel gap resulting from a change in the 2014 EPA rulemaking, assuming that the undifferentiated advanced biofuels mandate of 280 million gallons was met with other advanced biofuels. The implication is that with a renewable fuel gap of 420 million gallons or less in 2014 and the reinstatement of the biomass-based diesel blenders credits, little or no expansion of E85 would be required to meet the renewable fuels mandate. The analysis also highlights the key role that the biomass-based diesel blenders credits could play in the compliance decisions of obligated parties under the RFS.

Another way to examine the potential role of biomass-based diesel in meeting any renewable fuel gap in 2014 is a breakeven analysis. Specifically, how much can the quantity of biomass-based diesel rise before the D4 biomass-based diesel RINs price exceeds the breakeven D6 ethanol RINs price of $0.75 per gallon that others have implied would be needed to incentivize E85 consumption? That outcome is illustrated in Figure 3 under the assumption of no biomass-based diesel blenders tax credits. The estimated biodiesel supply curve is the same as in Figure 2. The demand curve, however, is drawn at $4.13 which is equal to the $3.00 price of ULSD plus the $1.13 per gallon “wet” biodiesel RINs (D4) price implied by a $0.75 per gallon D6 ethanol RINs price ($ 0.75 X 1.5 = $1.13). The outcome is for estimated biomass-based diesel production of 1.72 billion gallons. That exceeds the preliminary mandate of 1.28 billion gallons by 440 million gallons, or 660 million gallons of ethanol equivalents. Those 660 million gallons could be applied to any renewable fuels gap under the same assumption as before about the undifferentiated advanced biofuels mandate. With a renewable fuels gap of 660 million gallons or less and a breakeven D6 ethanol RINs price of $0.75 per gallon, higher blends of ethanol would not be required in 2014 to meet the renewable fuels mandate. Of course, a renewable gap higher than 660 million gallons would be met with a combination of biomass-based diesel and E85.

The implications for the breakeven analysis of extending the $1 per gallon blenders tax credits in 2014 are illustrated in Figure 4. The supply curve is the same as in Figures 2 and 3. With the blenders tax credits in place, the D4 RINs price is less than the breakeven D6 RINs price of $0.75 all the way out to 2.21 billion gallons of biomass-based biodiesel production. That quantity would be sufficient to meet the 1.28 billion gallon biodiesel mandate and the maximum 1.4 billion gallon renewable fuels gap implied by the statutory renewable fuels mandate of 14.4 billion gallons and an E10 blend wall of 13 billion gallons. The biodiesel

price required to produce 2.21 billion gallons is estimated at $4.68 per gallon, $0.68 above the price of ULSD of $3.00 plus the blenders tax credit of $1.00. The $0.68 per gallon wet RINs price is equivalent to a $0.45 D6 ethanol RINs price. That is well below the estimated $0.75 needed to incentivize E85 consumption so that the entire renewable gap could be easily met with additional biomass-based diesel.

Figure 2. Estimated U.S. Biomass-Based Diesel Supply Curve for 2014 and D4 RINs Pricing Under Alternative Policies

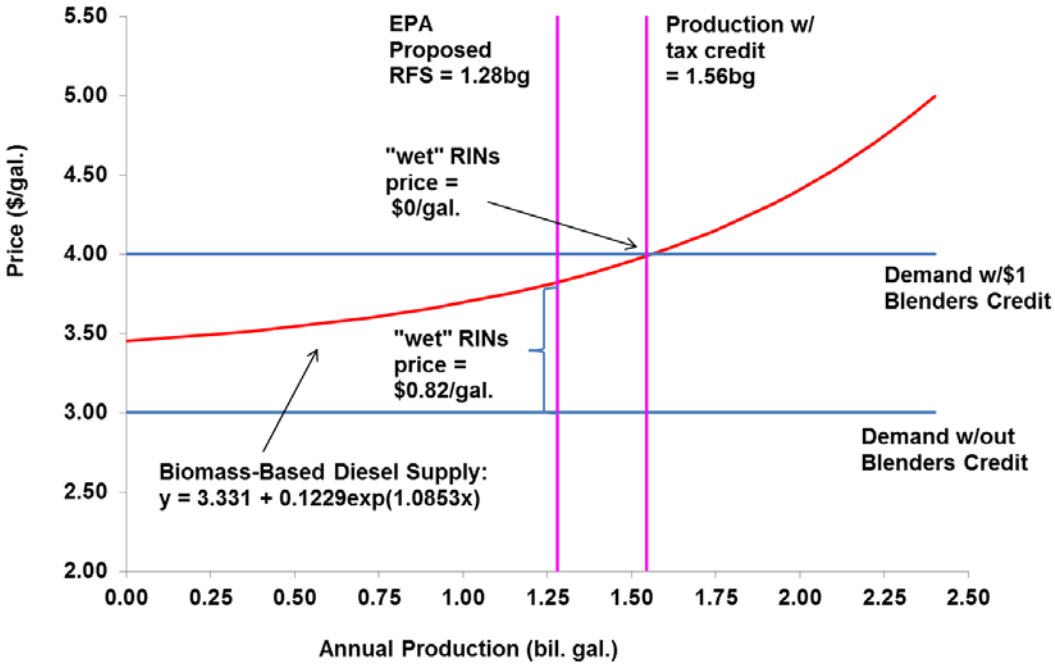
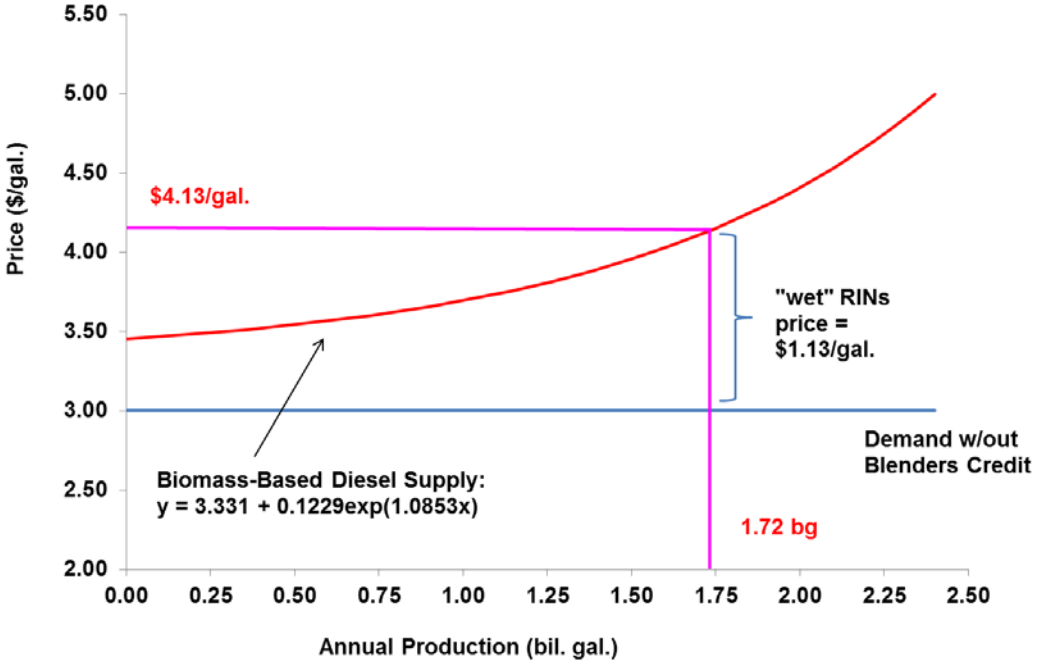
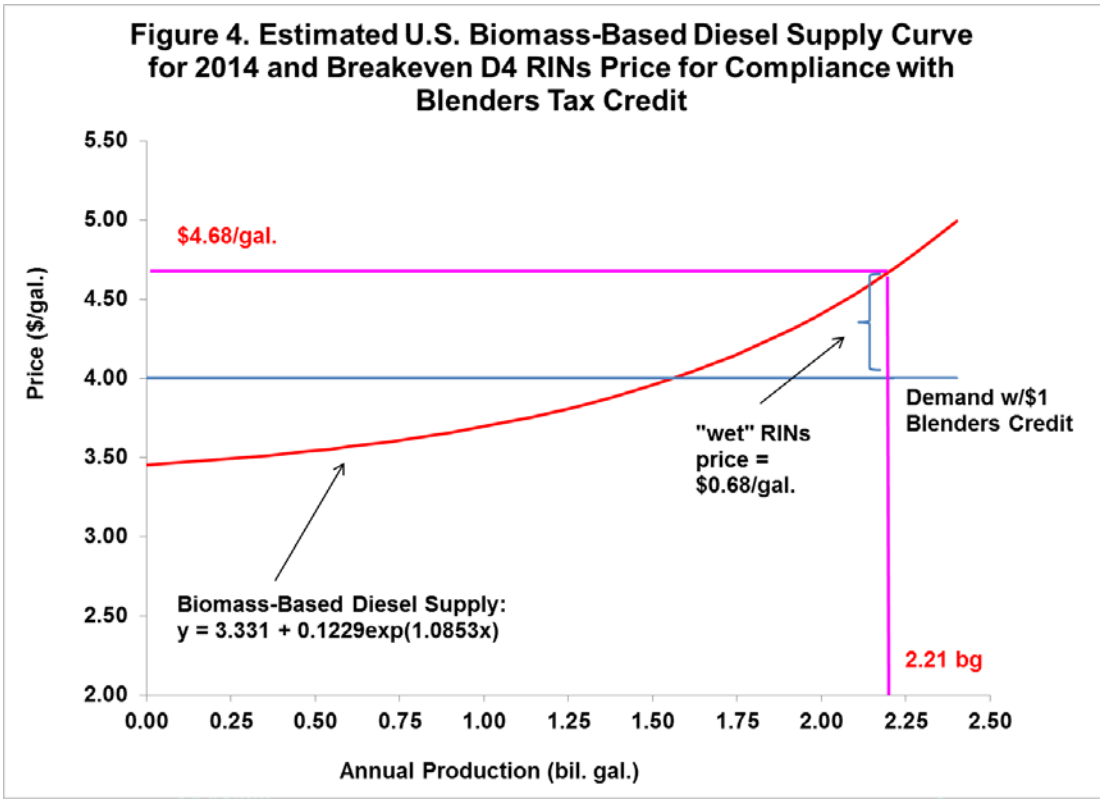


Figure 3. Estimated U.S. Biomass-Based Diesel Supply Curve for 2014 and Breakeven D4 RINs Price for Compliance without Blenders Tax Credit





Implications

There is considerable uncertainty about the magnitude of the RFS biofuels mandates and the fate of the biomass-based diesel blenders tax credits for 2014. However, there are some indications that at least the renewable fuels (ethanol) portion of the mandate may be increased from the preliminary quantity of 13.01 billion gallons in the EPA's proposed rulemaking. If that is the case, then the question becomes one of how the larger renewable mandate is met. Part of any increase could be met with more E10 if motor fuel consumption grows. Larger increases, however, would have to be met with some combination of higher ethanol blends, likely E85, and advanced biofuels, most likely biomass-based diesel. It appears that many believe that the most likely pathway to meet a higher renewable mandate is with E85. As a result, the most vocal advocates for an increase in the renewable mandate are in the ethanol industry. While the outcome of the analysis presented here is subject to changes in the underlying market assumptions and the fate of the blenders tax credits, it certainly may be the case that the big winner from a reversal of the write down of the renewable fuels mandate for 2014 could actually be the biodiesel industry.

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