Iowa Renewable Fuels Association
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April 29, 2013

The Honorable Fred Upton
Chairman
House Energy and Commerce Committee
2125 Rayburn House Office Building
Washington, DC 20515

The Honorable Henry Waxman
Ranking Member
House Energy and Commerce Committee
2125 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Upton and Ranking Member Waxman:

As the largest trade association representing Iowa's ethanol and biodiesel producers, the Iowa Renewable Fuels Association (IRFA) appreciates the opportunity to respond to your request for stakeholder comment on questions regarding the agricultural sector impacts of the renewable fuels standard (RFS).

IRFA welcomes a full, fair, and factual review of the Renewable Fuel Standard by the House Energy and Commerce Committee. The stakeholder questions cover a number of topics, but fail to touch on some important areas. IRFA would like to draw your attention to these areas in addition to responding to your stakeholder questions.

Livestock producers and the RFS

The Committee white paper suggests that "cattle, pork, and poultry producers" are opposed to the RFS. It is certainly the goal of most national livestock trade associations to convince DC policymakers of this, but it is simply not true. It would be more accurate to note that some livestock producers have raised questions about the RFS. In Iowa, there are many cattle, pork and poultry producers who support the RFS and believe it benefits their livestock operations.

You have to look no further than the recently adopted position on renewable fuels by the Iowa Cattlemen's Association. In December of 2012 (after the full impact of the 2012 drought was known) at their state convention, Iowa's cattle farmers stated:

> "WHEREAS, the production of renewable fuels and their co-products in the state of Iowa is beneficial to the Iowa cattle industry.

> "THEREFORE, BE IT RESOLVED, the Iowa Cattlemen's Association support renewable fuels production; and legislation that promotes growth in renewable energy and supports initiatives that maximize access to co-products for Iowa's cattle industry."

http://www.iacattlemen.org/CMDocs/IowaCA/POL_Policy%20Book_Web.pdf

If you dig through enough USDA databases, you'll discover an interesting fact. From 1981 through 2005, the average price a farmer received for a bushel of corn was lower than the average cost of production in 22 out of 25 years. *(Attachment A)* The taxpayer-funded multi-billion dollar Farm Program kept farmers in business during this time. The price of corn hovered around $2 per bushel even though it cost a corn farmer around $2.60 per bushel to grow it.

During the 25 years of that era, the Texas cattlemen would buy $2 corn and have a decided advantage over the farmer-feeder model in Iowa. In other words, the subsidized corn prices helped the large, massive cattlemen who didn't grow, but just bought their corn. Since renewable fuels have helped boost the price of corn back above the cost of production, the Iowa farmer-feeder model has had the economic advantage over the large "destination" corporate feedlot. So if you're a cattleman in Texas, or a hog producer in North Carolina, or you raise millions of chickens in Arkansas you aren't happy about this change. You had a pretty good 25-year run based on subsidized corn.

So ethanol is not "bad" for livestock as some groups want you to believe, but it has shifted the relative economics within the livestock industry. But those, like here in Iowa, willing to adapt and to take advantage of distillers grains are expanding. We have returned to a time where the price of corn is set by the market and not a government policy. IRFA does not believe it is in our nation's interest to return to a period of subsistence farming.

Farm Bill and the RFS

The Committee did not ask about the impact the RFS has had on the Farm Bill. As discussed above, IRFA believes it is beyond doubt that expanded renewable fuels demand has reduced taxpayer costs associated with Farm Bill programs. As we write, Congress is considering a new Farm Bill that many observers believe could be much different from those in the past. This would not be possible without a more financially stable agriculture sector, and renewable fuels played a large role in creating that financial stability.

IRFA encourages the committee to seek further input on this important topic from USDA and other qualified stakeholders.

Farmer Environmental Stewardship and the RFS

Some have suggested that higher commodity prices have enticed farmers to disregard effective land stewardship practices and "plant fence row to fence row." It is not surprising, however, that the facts paint a very different picture because what leads to poor land stewardship is not rural prosperity, but rural desperation.

When the low price of commodities pushes a farmer to the brink, they have no money to invest in new equipment for reduced tillage or new terraces or a cost-share wetlands project with NRCS. And with a farm that might have been in their family for 100 to 150 years on the fiscal brink, a farmer might plant right up to that creek and or that boggy corner of the field in the desperate hope that just a few more bushels might be enough to keep the banker at bay.

In Iowa, we all know families that lost farms in the 1980s. Losing a farm is more than losing a job or land – it's losing a legacy. So we also remember the ads for the farmer suicide hotlines. To argue that farmers don't care about the land or don't want to hand it down to the next generation in good shape is just plain wrong.

Instead, the farmer track record of efficiency and environmental improvement is impressive. Just consider the environmental improvements farmers have achieved since 1980. *(Attachment B)*

- Land use per bushel is down 30 percent.
- Soil loss is down 67 percent.
- Energy use per bushel is down 43 percent.
- GHG emissions per bushel are down 36 percent.

Those improvements are coming even faster today because of renewable fuels.

In 2000, before the first modern dry mill ethanol plant was built in Iowa, there were just <u>under</u> 1.6 million acres enrolled in CRP. Iowa produced 440 million gallons of ethanol that year. But in 2012, Iowa had <u>over</u> 1.6 million acres in CRP while we produced 3.7 billion gallons of ethanol.

Therefore, IRFA does agree that higher commodity prices impact how farmers treat the land, but we strongly disagree that the impact is negative. The facts show that instead of losing CRP acres, farmers have taken their higher income and reinvested it back into their operation. Simply put they don't feel economic pressure to farm right up to the stream or in that boggy corner of the field. Farmers now have the income to improve their farm for the next generation.

According to an IRFA survey of farmers invested in renewable fuels plants *(Attachment C)*, since 2005 farmers have reinvested their higher income by:

- purchasing precision farming equipment – 63 percent;
- instituting conservation practices like strip tilling or no tilling – 61 percent; and,
- installing environmental protections like buffer strips or wetlands – 71 percent.

In fact, I was recently told by the USDA that farmers are now the number one source of new wetlands.

One farmer testimonial stated: "Precision technology is making a major difference. In our own operation I have seen 4-6 percent less seed usage with the automatic planter row shutoffs. This saves seed, but we have to remember this is treated seed with pesticides and fungicides that are not being over applied. We also have seen similar benefits from fertilizer applications where we utilize practices such as strip till. We apply our fertilizer in a deep placed band then follow with the planter directly over the fertilizer band – eliminating fertilizer loss from sheet erosion. This is not possible without using precision technology. There is pesticide and insecticide application improvements using this technology in our spray application equipment and fuel savings from eliminating overlap with tillage. We use RTK [real-time kinematics] guidance that provides us with sub inch year-by-year repeatable paths to follow. Farmers are active environmentalists because we live and raise our families here, unlike the environmental activists who catch the headlines. This precision technology is quickly being adopted because we have a strong profitable farm economy. Investments in this technology will no doubt slow down when we have a slow economy. The RFS helps maintain the rural economy, which drives investments by producers in this type of equipment."

It takes money to do these things. It is clear that renewable fuels and higher commodity prices have led to an era of the best land stewardship practices ever. And with farmland values rising, the incentive is for farmers to protect this valuable asset even better in the future – for the future.

Committee Questions for Stakeholder Comment

1. What has been the impact of the RFS on corn prices in recent years? What has been the impact on soybean prices? Have other agricultural commodity prices also been affected?

The experts at the USDA have commented extensively on these questions. IRFA has nothing to add.

2. How much has the RFS increased agricultural output? How many jobs has it created? Have any jobs been lost? What is the net impact on the agriculture sector?

Again, the experts at the USDA have commented extensively on these questions at a national level. For our tenth anniversary, IRFA recently examined the impact of renewable fuels on Iowa and found the last decade really has been one of progress and prosperity for rural Iowa. The IRFA study highlighted the profound impact ethanol and biodiesel production have on Iowa jobs, Iowa income, and Iowa wealth creation *(Attachment D)*. Clearly, Iowa's economy would be in a much different place if ethanol and biodiesel production were still at 2002 levels.

Key study findings included:

- Over the last decade in Iowa, ethanol production has increased 741%, while biodiesel production has increased an astounding 1,600%;
- The portion of Iowa's agricultural economic output attributable to the renewable fuels industry increased from 4.6% in 2002 to more than 37% in 2011;
- The price of farm land in Iowa has tripled over the past decade with the average price for all grades of cropland increasing from $2,083 per acre in 2002 to $6,708 in 2011.
- In 2002 the renewable fuels industry was a negligible component of Iowa's manufacturing sector. By 2011, ethanol and biodiesel production accounted for nearly 7% of manufacturing sector output;

- The total number of jobs in the entire Iowa economy supported by the renewable fuels industry has grown from about 3,500 full-time equivalent jobs in 2002 to more than 79,000 in 2011, an increase of more than 2,000%. By 2011, the renewable fuels industry directly or indirectly supported 5.4% of Iowa employment;

- The renewable fuels industry has added $12.9 billion of income to the pockets of Iowans over the past decade; and,

- The renewable fuels industry has generated $1.8 billion of tax revenue for Iowa over the past decade.

In addition, along with a group of interested parties, IRFA commissioned an economic impact study specifically to look at the impact of the Iowa biodiesel industry *(Attachment E)*. The study found that since increased crush demand for soybeans also increases production of soybean meal, an increase in biodiesel use and soybean oil demand will reduce soybean meal prices to the benefit of Iowa's livestock producers. Taking into account both production costs and revenues, biodiesel production boosts the net income for an Iowa farmer finishing cattle by more than $16 per head and for an Iowa hog farmer by more than $4 per head.

3. Was EPA correct to deny the 2012 waiver request? Are there any lessons that can be drawn from the waiver denial?

Yes, EPA was correct. As noted in IRFA's comments on the waiver requests at the time *(Attachment F),* the record was clear that the waiver proponents failed to demonstrate that the RFS was causing economic harm and that waiving the RFS would redress the drought-driven economic concerns they raised. Maybe even more important, if the Agency assumed – for sake of argument – that granting a waiver would have the impact the proponents claimed, then the result would have been economic harm felt across the U.S. as gasoline prices increased and tens of thousands of corn and family livestock farmers lost income. Subsequent experience since the waiver denial has only reinforced its correctness.

As for lessons, we have learned that the current system is operating successfully and that it can withstand unsubstantiated waiver requests.

4. Does the Clean Air Act provide EPA sufficient flexibility to adequately address any effects that the RFS may have on corn price spikes?

Yes.

5. What has been the impact, if any, of the RFS on food prices?

Again, the experts at USDA have commented on this extensively. The fact is that what might seem like a big shift in corn prices just doesn't translate into the price people pay for food. And as the Committee white paper notes, energy prices drive food prices much more than commodity prices.

The Committee white paper notes that only a portion of the corn kernel (the starch portion specifically) is converted into ethanol. The protein, oil, and fiber are converted into a range of feed products, most notably dried distillers grains (DDGs). In fact, the US ethanol industry has become one of the largest and most important animal feed producers in the world.

The Committee should note:

- that more tons of distillers grains are produced each year by US ethanol plants than tons of feed are fed to every cow in every US feed lot;
- that when it comes to the production of nutritious animal feed, US ethanol plants produce more tons than all the US soybean crush facilities combined;
- that since the RFS was enacted in 2005, food inflation has averaged 2.95 percent, while food inflation averaged 3.47 percent during the prior 25 years;
- that since the RFS was expanded in 2007, energy price inflation has been three times the rate of food price inflation; and,
- that US ethanol producers use just 2.9 percent of the global grain supply.

6. What role could cellulosic biofuels play in mitigating the potential effects of the RFS on corn prices?

As the RFS corn discrimination clause unnecessarily precludes corn ethanol from ever being considered an advanced biofuel – even when it meets the statutory scientific requirements – there is likely to be little interplay between the two fuels within the RFS structure. By displacing more expensive foreign oil, both will help reduce gasoline prices, enhance US energy security and improve the air we breathe.

7. What impact are cellulosic biofuels expected to have on rural economies as the production of such fuels ramps up?

Iowa is at the cutting edge in the commercialization of next generation, cellulosic biofuels. As this technology expands, the geographic footprint of ethanol production could reach every state. But rural and agricultural areas are also poised to benefit. Today's incredible seed traits allow more seeds per acre to be planted. This boosts crop yields from existing acres, but it also creates new agronomic challenges. Today, there is often too much crop residue remaining in fields after harvest. While some residue is necessary to protect soil health and to prevent erosion, the "extra" residue can create pest problems, prevent proper soil warming in the spring necessary for proper germination, and interfere with environmentally-friendly fertilization efforts. By creating a market for sustainable residue removal, cellulosic biofuels create another source of income for farmers while helping combat emerging agronomic challenges. Learn more about the DuPont Nevada Site Cellulosic Ethanol Facility here: http://biofuels.dupont.com/cellulosic-ethanol/nevada-site-ce-facility/

8. Will the cellulosic biofuels provisions succeed in diversifying the RFS?

Yes. They already have (see answer above).

9. What is the scale of the impact of the RFS on international agricultural production and global land use changes?

The amazing productivity of the American farmer has allowed the ethanol industry to grow without impacting land use change in the United States, let alone half way around the world. Almost every week, better data and better models are showing that the "threat" of international indirect land use change just isn't real.

The Committee white paper presumes that greater corn demand in the US will create "greater incentives to clear new land for agricultural production" (emphasis added). This presumption ignores the fact that roughly two billion acres of worldwide farm land were left fallow as a result of US agriculture policies in the 1980s and 1990s. Repeated Farm Bills stimulated overproduction of corn, which was sent onto world markets at below-production cost prices. As a result, many farmers around the globe could not compete. Their land lay fallow. And low-income, rural populations lost their self-sufficiency in food production.

Today, world farmers are responding to the higher grain prices and production and rural incomes are up. In fact, in 2012 – despite the massive US drought – the world produced the second largest corn crop of all time.

Last year Ethiopia – the poster child of world starvation – actually produced enough grain to establish a formalized grain trade. Roughly 70 percent of the world's poor live in rural areas and derive their living from agriculture. With grain prices reflecting market value, not artificially low due to Farm Bill programs, we're giving the world's poor a true chance to better their economic lot.

According to the Food and Agriculture Organization of the United Nations (FAO): "…under-investment in agriculture is a problem that seriously handicaps food production in the developing world, and that this, coupled with rural poverty, is a key driver of world hunger. Done properly and when appropriate, bioenergy development offers a chance to drive investment and jobs into areas that are literally starving for them…bioenergy production holds great potential to revitalize rural economies, reduce poverty, and improve household food security."
http://www.fao.org/news/story/en/item/74708/icode/

The facts are clear. Improving the world's agricultural sector directly benefits a great majority of the world's poor and hungry who rely on it for their sustenance. Biofuels do not hurt the world's poor and, in fact, may be one of the best tools for creating a better future for the world's poor and hungry.

Thank you again for the opportunity to respond to your request for stakeholder comment on the agricultural sector impacts of the RFS. We appreciate your consideration of the answers presented above and the accompanying material, and we look forward to a thoughtful discussion of the RFS as the Committee continues its review throughout the year. If you have any questions regarding these comments, please contact me at 515-252-6249 or mshaw@iowarfa.org.

Sincerely,

Monte Shaw
Executive Director

Iowa Renewable Fuels Association

Attachment A

National Corn Statistics:
Average Cost of Production vs. Average Price Per Bushel

Year[1]	Cost per Acre[2]	Yield[3]	Production Cost per Bushel (calculated)	Average Price per Bushel[3]	Below Cost Differential (calculated)	
2011	$537.34	147.2	$3.65	$6.20	$2.55	
2010	$542.90	152.8	$3.55	$5.18	$1.63	
2009	$550.70	164.7	$3.34	$3.55	$0.21	
2008	$529.38	153.9	$3.44	$4.06	$0.62	RFS
2007	$443.97	150.7	$2.95	$4.20	$1.25	
2006	$409.74	149.1	$2.75	$3.04	$0.29	
2005	$386.88	147.9	$2.62	$2.00	($0.62)	
2004	$377.50	160.3	$2.35	$2.06	($0.29)	
2003	$354.41	142.2	$2.49	$2.42	($0.07)	
2002	$334.31	129.3	$2.59	$2.32	($0.27)	
2001	$348.53	138.2	$2.52	$1.97	($0.55)	
2000	$378.32	136.9	$2.76	$1.85	($0.91)	
1999	$364.73	133.8	$2.73	$1.82	($0.91)	
1998	$362.86	134.4	$2.70	$1.94	($0.76)	
1997	$363.73	126.7	$2.87	$2.43	($0.44)	
1996	$353.94	127.1	$2.78	$2.71	($0.07)	
1995	$333.42	113.5	$2.94	$3.24	$0.30	
1994	$321.47	138.6	$2.32	$2.26	($0.06)	
1993	$287.10	100.7	$2.85	$2.50	($0.35)	
1992	$302.33	131.5	$2.30	$2.07	($0.23)	
1991	$292.55	108.6	$2.69	$2.37	($0.32)	
1990	$292.52	118.5	$2.47	$2.28	($0.19)	
1989	$284.89	116.3	$2.45	$2.36	($0.09)	
1988	$262.57	84.6	$3.10	$2.54	($0.56)	
1987	$244.57	119.8	$2.04	$1.94	($0.10)	
1986	$243.12	119.4	$2.04	$1.50	($0.54)	
1985	$277.01	118	$2.35	$2.23	($0.12)	
1984	$289.02	106.7	$2.71	$2.63	($0.08)	
1983	$258.45	81.1	$3.19	$3.21	$0.02	
1982	$270.86	113.2	$2.39	$2.55	$0.16	
1981	$278.60	108.9	$2.56	$2.50	($0.06)	

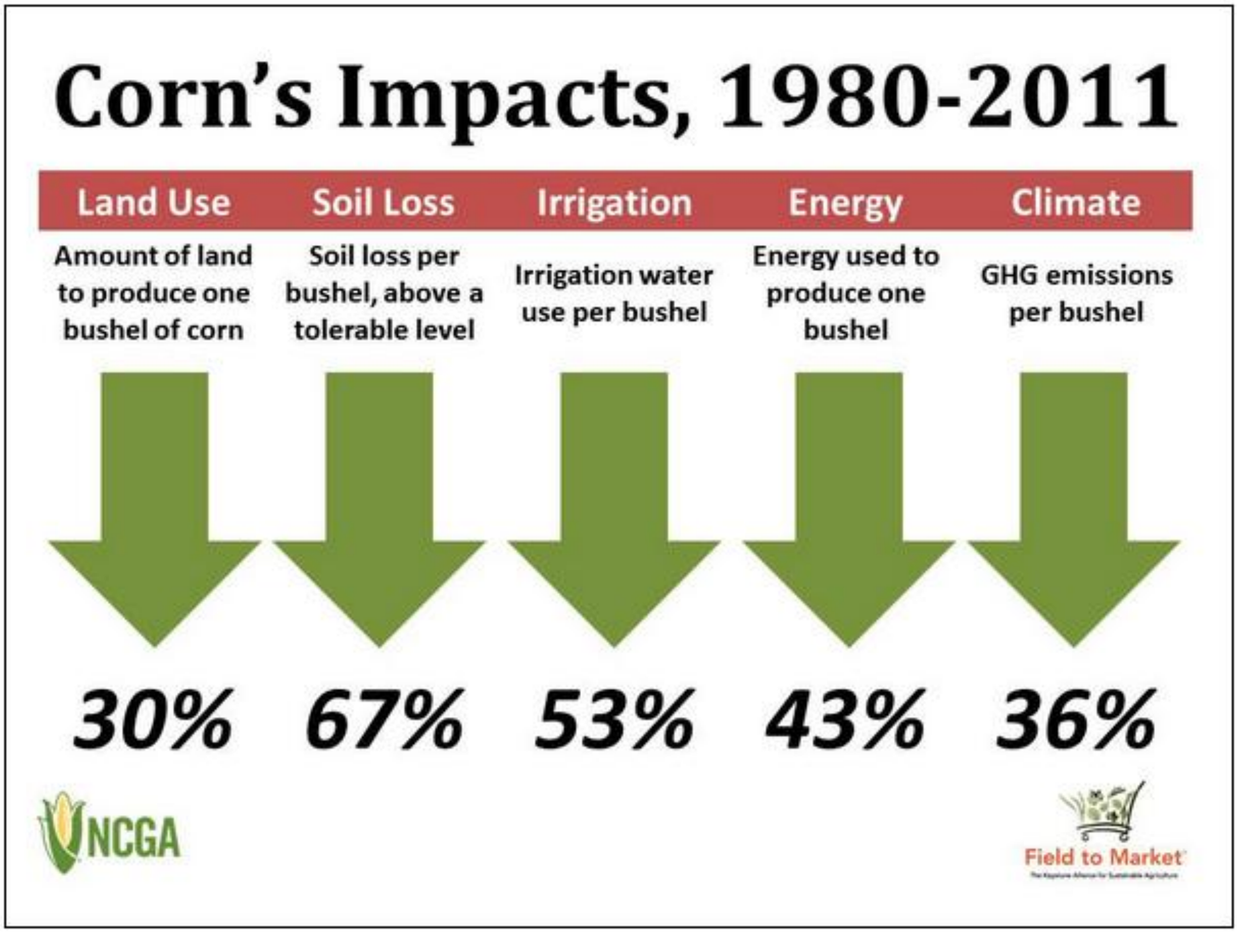
Footnotes

1 Corn Marketing Year
2 USDA http://www.ers.usda.gov/Data/CostsAndReturns/testpick.htm
3 USDA National Agricultural Statistics Service: http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats_1.0/index.asp

Iowa Renewable Fuels Association

Attachment B

Attachment B



Iowa Renewable Fuels Association

Attachment C

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IRFA Poll: Increase in Corn Prices Means Better Environmental Practices by Iowa's Farmers

The Iowa Renewable Fuels Association (IRFA) recently surveyed farmers invested in Iowa ethanol and biodiesel plants to learn more about the impacts of increased corn prices since the inception of the federal Renewable Fuels Standard (RFS) in 2005. The results show that a boost in corn prices has allowed Iowa's farmers to invest in better environmental practices.

The survey asked:

Has the increase in corn prices since 2005 allowed you to reinvest in your farming operation by:

Investing in precision farming equipment?

- Yes: 62.7%
- No: 37.3%

Instituting conservation practices (ridge/ strip tilling, no/modified tilling, etc.)?

- Yes: 60.6%
- No: 39.4%

Improving your land with increased environmental protections (terraces, buffer strips, wetlands, etc.)?

- Yes: 70.5%
- No: 29.5%

High corn prices have impacted how farmers treat the land. But despite misleading attacks, the truth is farmers have taken their higher income and reinvested it back into their operation. Simply put they don't feel economic pressure to farm right up to the stream or in that boggy corner of the field. They have the income to improve their farm for the next generation.

Iowa Renewable Fuels Association

Attachment D

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CONTRIBUTION OF THE RENEWABLE FUELS INDUSTRY TO THE ECONOMY OF IOWA: 2002-2011

Prepared for the Iowa Renewable Fuels Association

John M. Urbanchuk
Technical Director - Environmental Economics

June 15, 2012

The renewable fuels industry has grown spectacularly over the past decade and Iowa has been a major participant and beneficiary. Iowa is the nation's largest producer of both ethanol and biodiesel. Between 2002 and 2011 U.S. ethanol production increased 552% while output in Iowa grew from 440 million gallons in 2002 to 3.7 billion gallons in 2011, an increase of 741%. The biodiesel industry is both younger and smaller than the ethanol industry, but Iowa accounts for more than 15% of national biodiesel output producing 169 million gallons in 2011 compared to approximately 10 million gallons in 2002, an increase of nearly 1600%.

Ethanol and biodiesel producers are part of a manufacturing sector that adds substantial value to agricultural commodities produced in Iowa and makes a significant contribution to the Iowa economy. Virtually all of the ethanol and biodiesel produced in Iowa is produced from corn and soybean oil and other fats produced and refined in Iowa. Since feedstocks account for the largest share of production costs and most other inputs -- from labor to electricity and natural gas -- are procured locally, the Iowa economy benefits more directly from renewable fuels production than most other states.

As discussed in greater detail below, key findings of the analysis include the following points:

- The economic activity associated with agriculture output created by the renewable fuels industry increased from 4.6% of the value added to Iowa's economy by agriculture in 2002 to more than 37% in 2011.
- The price of farm land in Iowa has tripled over the past decade with the average price for all grades of cropland increasing from $2,083 per acre in 2002 to $6,708 in 2011. When viewed in the context of the number of acres planted to principal crops, the aggregate value of cropland in Iowa has increased from $51.2 billion in 2002 to $165.9 billion in 2011, an increase of 224%.
- In 2002 the renewable fuels industry was a negligible component of Iowa's manufacturing sector. By 2011, ethanol and biodiesel production accounted for nearly 7% of manufacturing sector output.
- The total number of jobs in the entire Iowa economy supported by the renewable fuels industry (including agriculture) has grown from about 3,500 full-time equivalent jobs in 2002 to more than 79,000 in 2011, an increase of more than 2000%. By 2011, the renewable fuels industry directly or indirectly supported 5.4% of Iowa employment.
- The renewable fuels industry has added $12.9 billion of income to the pockets of Iowans over the past decade.
- The renewable fuels industry has generated $1.8 billion of tax revenue for Iowa over the past decade.

Table 1 summarizes the growth in Iowa ethanol and biodiesel production, use of corn for ethanol and fats and oils for biodiesel production, and total expenditures for renewable fuels production from 2002 to 2011.

Table 1
Renewable Fuel Production, Feedstock use, and Expenditures
2002-2011

	Ethanol Production (Mil Gal)	Biodiesel Production (Mil Gal)	Corn Used (Mil bu)	Fats & Oils Used (Mil lb)	Ethanol Expenditures (Mil $)	Biodiesel Expenditures (Mil $)
2002	440	10	160	75.5	$502.8	$16.8
2003	598	10	217	75.5	$719.8	$21.7
2004	859	15	312	113.3	$1,079.9	$39.4
2005	1100	20	400	151.0	$1,451.7	$42.3
2006	1500	60	545	453.0	$2,201.3	$134.8
2007	1900	70	691	528.5	$3,616.1	$241.0
2008	2750	80	1,000	604.0	$6,785.1	$357.5
2009	3200	85	1,164	641.8	$5,945.5	$265.9
2010	3500	48	1,273	362.4	$7,063.2	$173.4
2011	3700	169	1,345	1,276.0	$10,952.5	$805.9

Source: EIA; USDA; IRFA

Methodology

The spending associated with renewable fuels production circulates throughout the entire Iowa economy several fold. Consequently this spending stimulates aggregate demand, supports the creation of new jobs, generates additional household income, and provides tax revenue for the State and local governments. We estimated the impact of the renewable fuels industry on the Iowa economy over the past decade by applying expenditures by the relevant supplying industry to the appropriate final demand multipliers for value added output, earnings, and employment.

The multipliers used in this study are from the IMPLAN (Impact Analysis for Planning) economic impact model for Iowa and were based on 2010 data. IMPLAN models provide three economic measures that describe the economy: value added, income, and employment.

- Value added is the total value of the goods and services produced by businesses in the county and are generally referred to as GDP. It is equivalent to the sum of labor income, taxes paid by the industry, and other property income or profit.
- Labor income is the sum of employee compensation (including all payroll and benefits) and proprietor income (income for self-employed work). In the case of this analysis,

demand for corn, soybeans, and other feedstocks to produce ethanol and biodiesel supports farm income through higher crop receipts than would be the case without biofuel production. The impact of this higher farm income is evaluated on a gross basis in this analysis. That is, the model does not factor in the distributional effects on consumers from higher grain and oilseed prices (i.e. reduced spending on non-food goods and services).

- Employment represents the annual average number of employees, whether full or part-time, of the businesses producing output. Income and employment represent the net economic benefits that accrue to Iowa as a result of increased economic output.

Three types of effects are measured with a multiplier: direct, indirect, and induced effects. The direct effect is the known or predicted change in the economy. The indirect effect is the business-to-business transactions required to produce the direct effect (i.e. increased output from businesses providing intermediate inputs). Finally, the induced effect is derived from spending on goods and services by people working to satisfy the direct and indirect effects (i.e. increased household spending resulting from higher personal income).

Contribution of the Renewable Fuels Industry

The contribution of the renewable fuels industry to Iowa over the past decade is detailed in Table 2. This reflects the total impact on GDP and earnings from ethanol and biodiesel manufacturing and the agriculture sector, and the direct, indirect and induced impact on employment.

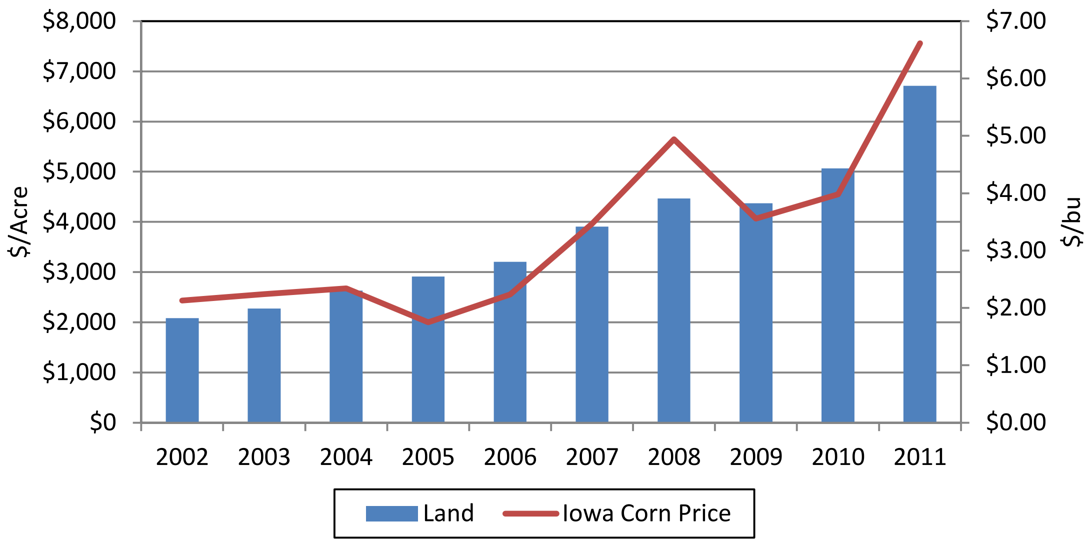
Table 2
Contribution of the Renewable Fuels Industry to Iowa

	GDP (Mil $2012)	Earnings (Mil 2012$)	Estimated Tax Revenue (Mil 2012$)	Direct (Jobs)	Indirect (Jobs)	Induced (Jobs)	Total (Jobs)
2002	$245.5	$157.7	$21.4	1,447	1,127	942	3,516
2003	$350.3	$225.1	$30.7	2,047	1,629	1,345	5,020
2004	$528.9	$339.7	$47.3	3,096	2,448	2,029	7,573
2005	$705.9	$453.7	$65.0	4,137	3,270	2,709	10,116
2006	$1,104.6	$708.1	$103.1	6,498	5,034	4,229	15,762
2007	$1,824.0	$1,168.7	$170.8	10,469	8,559	6,980	26,008
2008	$3,376.7	$2,166.0	$313.4	19,248	16,051	12,936	48,235
2009	$2,935.9	$1,884.5	$263.9	16,980	13,749	11,255	41,984
2010	$3,418.6	$2,198.1	$307.8	19,853	16,044	13,127	49,025
2011	$5,561.6	$3,561.5	$502.7	31,085	26,871	21,272	79,229

The most significant contribution to Iowa from the renewable fuels industry comes from agriculture. This is not surprising considering the importance of feedstocks (corn, soybean oil, and other fats and oils) as inputs for biofuels production. For example the amount of corn required to produce Iowa's ethanol industry increased from an estimated 160 million bushels, or 8.1% of Iowa's corn crop) in 2002 to 1,345 million bushels in 2012, or 57% of Iowa corn production. Since most, if not all, of this corn is grown and marketed by Iowa farmers the ethanol industry contributes a significant share of cash receipts (income) for farmers. Similarly most of the soybean oil and other biodiesel feedstocks are produced in Iowa from soybeans grown by Iowa farmers and fats supplied by Iowa livestock producers.

One indication of the impact of increased demand and revenue from corn and soybeans is reflected in the price of farm land. Figure 1 contrasts the average price of farmland (all grades) with the price of corn over the past decade.

Figure 1
Iowa Farm Land and Corn Prices



Source: Iowa State University.

Corn prices have become imbedded in farmland prices. According to the Iowa Land Value Survey conducted and published by Iowa State University the price of farm land in Iowa has tripled over the past decade with the average price for all grades of cropland increasing from $2,083 per acre in 2002 to $6,708 in 2011[1]. This has provided a significant boost to the net worth of Iowa farmers. When viewed in the context of the number of acres planted to principal crops, the aggregate value of cropland in Iowa has increased from $51.2 billion in 2002 to $165.9 billion in 2011, an increase of 224%.[2] While not all of this gain is directly linked to the renewable fuels industry, higher demand for corn and soybeans for oil to produce ethanol and biodiesel has played a significant role in supporting the increase in agricultural land values.

[1] http://www.extension.iastate.edu/agdm/wholefarm/html/c2-72.html

[2] Source: USDA/NASS Crop Production Annual Summary. Crops included are corn, sorghum, oats, barley, rye, winter wheat, Durum wheat, other spring wheat, rice, soybeans, peanuts, sunflower, cotton, dry edible beans, potatoes, canola, proso millet, sugar beets, and all hay.

Over the past decade the renewable fuels industry has:

- Increased the size of the Iowa economy. The contribution of renewable fuels to Iowa GDP has increased from 0.2% in 2002 to nearly 4% in 2011. The GDP associated with agriculture output created by the renewable fuels industry increased from 4.6% to more than 37% of Iowa GDP originating in agriculture between 2002 and 2011. In 2002 the renewable fuels industry was a negligible component of Iowa's manufacturing sector. By 2011, ethanol and biodiesel production accounted for nearly 7% of manufacturing sector output.

- Jobs are created from the economic activity supported by ethanol and biodiesel production. While ethanol and biodiesel production is not a labor-intensive industry, the economic activity resulting from the full activities of the biofuels industry supports a much larger number of jobs in the economy. Since renewable fuels production uses feedstocks produced by Iowa farmers, the ethanol and biodiesel industry has the largest impact on agriculture, supporting as many as 28,500 direct farm and farm-related jobs. Most of the agriculture jobs supported by the renewable fuels industry are farm workers and laborers associated with grain and oilseed production. However, a wide range of jobs in support activities related to crop production ranging from farm managers and bookkeepers to farm equipment operators are supported by biofuel production. When the indirect and induced effects are considered, the total number of jobs in the entire Iowa economy supported by the renewable fuels industry (including agriculture) has grown from about 3,500 full-time equivalent jobs in 2002 to more than 79,000 in 2011. By 2011, the renewable fuels industry directly or indirectly supported 5.4% of Iowa employment. Increased economic activity and new jobs result in higher levels of income for Iowans.

- The renewable fuels industry has added an aggregate $12.9 billion in income to the pockets of Iowa households over the past decade.

- The renewable fuels industry also has contributed to Iowa in terms of tax receipts from personal and corporate income. Using tax revenue as a share of GDP as a basis for computation, the increase in economic activity supported by the renewable fuels industry has generated $1.8 billion of tax revenue for Iowa over the past decade.

Caveats

This analysis focuses on the impact to the Iowa economy from production of ethanol and biodiesel over the past decade. Absent from the analysis is the impact of construction from new capacity. As indicated above, more than 3 billion gallons of new ethanol and 200 million gallons of biodiesel capacity were constructed in Iowa over the past decade. The expenditures associated with this construction activity totaled more than $6.5 billion over the decade. The size of the impact of this activity on Iowa was dependent on the share of equipment and materials procured from Iowa manufacturers and the length of construction activity. The economic activity from construction is transient, that is, it ends when construction is completed and is replaced by the permanent activity generated by ongoing operations. Reflecting this, the estimates discussed in this report are conservative.

Conclusion

The renewable fuels industry has emerged as a major contributor to the Iowa economy over the past decade in virtually all measures. Perhaps the most significant contribution of ethanol and biodiesel production is the increased demand for corn, soybean oil, and other agricultural products produced in Iowa. The growth of biofuel production has generated cash income for Iowa farmers and improved net worth by supporting increases in the value of their major asset – farmland.

Importantly the number of jobs in all sectors of the economy supported by the renewable fuels industry has become a significant source of employment for Iowans.

As the renewable fuels industry expands and diversifies regarding new feedstocks and technology the contribution of renewable fuels to Iowa will continue to expand. New feedstocks will create new market opportunities for Iowa farmers and new technologies will require new capital expenditures..

Iowa Renewable Fuels Association

Attachment E

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Impact of Biodiesel on the Iowa Agriculture Economy

Prepared for
The Iowa Renewable Fuels Association, the Iowa Soybean Association, the Iowa Corn Growers Association and the Iowa Biodiesel Board

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The renewable fuels industry has grown spectacularly over the past decade and Iowa has been both a major participant and beneficiary. Iowa is the nation's largest producer of ethanol and biodiesel. The biodiesel industry is both younger and smaller than the ethanol industry, but Iowa accounts for about 17 percent of national biodiesel output and produced an estimated 184 million gallons in 2012, 11 percent more than 2011 and 18 times as much as in 2002.

Objective

Biodiesel producers are part of a manufacturing sector that adds substantial value to agricultural commodities produced in Iowa and makes a significant contribution to Iowa agriculture. The objective of this analysis is to identify and quantify the impact of the Iowa biodiesel industry on the Iowa agricultural economy by estimating what the impact on Iowa corn, soybean, and livestock producers would be in the absence of the Iowa biodiesel industry.

Impact of Biodiesel on Commodity Prices

Iowa is the nation's leading biodiesel producer with the second largest biodiesel capacity (after Texas). According to the Iowa Renewable Fuels Association (IRFA), Iowa's 12 biodiesel plants have rated capacity of 314.5 million gallons and produced

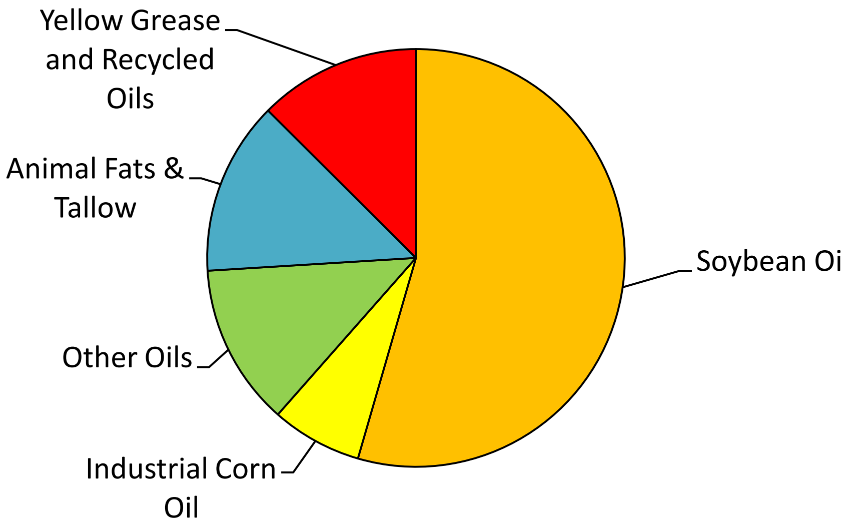
184 million gallons of biodiesel in 2012[1] accounting for about 17 percent of total U.S. biodiesel output.

Virtually all of the biodiesel produced in Iowa is produced from soybean oil, industrial grade corn oil, canola oil, and other fats produced and refined in Iowa. The increased demand for industrial grade corn oil as a biodiesel feedstock has created a new value stream for Iowa's ethanol industry that is benefitting both biodiesel and ethanol producers. Since feedstocks account for the largest share of production costs and most other inputs -- from labor to electricity and natural gas -- are procured locally, Iowa farmers and the agriculture economy benefits more directly from renewable fuels production than most other states.

Biodiesel is produced from a wide range of potential feedstocks including soybean oil, canola oil, industrial grade corn oil, animal fats and tallow, and recycled cooking oils and grease. Energy Information Administration (EIA) statistics indicate that nearly 6 billion pounds of fats and oils were used to produce 781 million gallons of biodiesel during the first nine months of 2012.[2] As shown in Figure 1 soybean oil is the primary biodiesel feedstock in the U.S. accounting for nearly 55 percent of biodiesel output. Industrial grade corn oil accounted for 7 percent of biodiesel production while the remaining feedstocks were more or less equally split among animal fats and tallow, yellow grease and recycled oils, and other vegetable oils.

[1] http://www.iowarfa.org/biodiesel_refineries.php
[2] U.S. Energy Information Administration, Form EIA-22M "Monthly Biodiesel Production Survey"

Figure 1
U.S. Biodiesel Feedstocks: 2012 (5.9 Bil lbs)



Reflecting the large concentration of soybean processing facilities in Iowa, the state's biodiesel industry uses a larger share of soybean oil as a feedstock than other states. As reported by IRFA and shown in shown in Figure 2, the Iowa biodiesel industry used nearly one billion pounds of soybean oil in 2012 to produce biodiesel, nearly 72 percent of total feedstock use. In addition Iowa biodiesel producers used approximately 250 million pounds of animal fats, 111 million pounds of canola oil, 23 million pounds of industrial grade corn oil, and 9 million pounds of used cooking oil as biodiesel feedstock in 2012. A vast majority of the raw material for biodiesel production in Iowa is procured locally.

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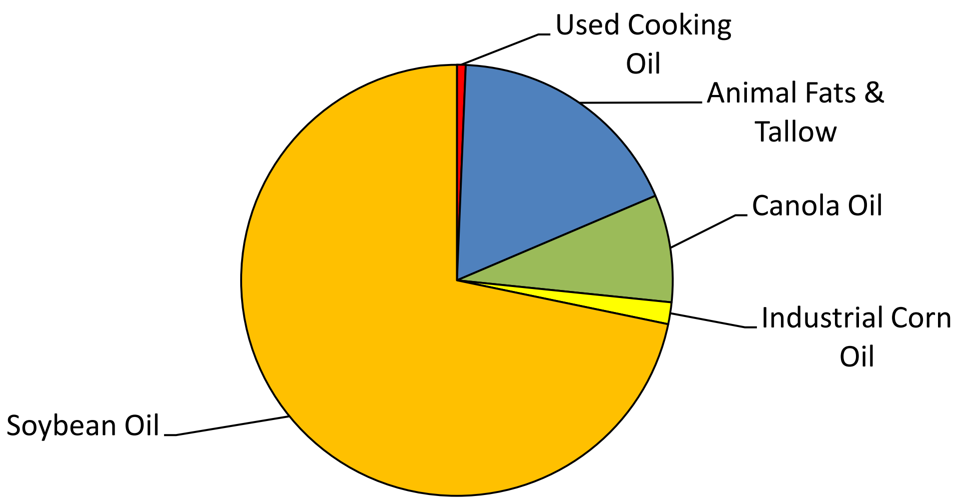
Figure 2
Iowa Biodiesel Feedstocks: 2012 (1.4 Bil lbs)



Soybean oil is one of the two principal co-products of soybean processing and Iowa is the nation's largest soybean producer. Increased use of soybean oil raises soybean oil prices and moderates soybean meal prices. Since soybeans compete with corn for land, higher soybean prices also have a positive impact on corn prices. Iowa is also the nation's largest corn producer. Consequently, higher biodiesel production raises both soybean and corn prices and boosts revenue for Iowa crop farmers. Since increased crush demand for soybeans also increases production of soybean meal, an increase in biodiesel use and soybean oil demand will reduce soybean meal prices to the benefit of Iowa's livestock producers.

A recent analysis of the impact of biodiesel demand on soybean meal prices indicated that over the five year period 2005 to 2009 a 10 percent increase in the demand for soybean oil resulted in a five cents per pound increase in the price of soybean oil, $0.24 per bushel increase in soybean prices and $12.90 per ton decrease in soybean meal prices (Bard and Schroeder 2012). Applying these changes to the average prices of these three commodities over the five-year period suggests a demand elasticity of 0.143 for soybean oil, 0.29 for soybeans and -0.047 for soybean meal.[3] In other words, all other things held

[3] These studies do not include the impact on Distillers dried grains or other fats and oils. In order to calculate the impact of changes in soybean oil demand (and soybean oil prices) on DDG, tallow and lard prices we estimated price elasticities for these products from OLS regressions on annual data of wholesale prices reported by USDA.

constant, a 10 percent increase in soybean oil demand would increase soybean oil prices by 14.3 percent; soybean prices 2.9 percent, and reduce soybean meal prices by 4.7 percent.

The impacts of changes in soybean and soybean oil prices on corn and the cross price effects on beef were estimated and reported in an analysis of the impact of biofuels on crop and food prices published by economists at the Federal Reserve Board. Using data from the USDA and FAPRI they estimate that a one percent increase in soybean prices will increase corn prices about 0.65 percent; one percent increase in corn prices will push up beef prices on 0.1 percent while a one percent increase in soybean prices will push up beef prices by 0.06 percent. (Baier et. al. 2009, p. 11).

We estimate that demand for soybean oil for biodiesel production in 2012 increased an estimated 29 percent over year-ago levels. As shown in Table 1, applying these demand elasticities to 2011 marketing year prices suggests that in the absence of the Iowa biodiesel industry in 2012, Iowa soybean prices would have been 8.3 percent lower; corn prices 5.4 percent lower; and beef cattle and hog prices one percent lower.[4] However, soybean meal and Distillers dried grains prices would have been 13.6 percent and five percent higher, respectively.

Table 1
Impact of a 29% Increase in Soybean Oil Demand from Biodiesel

	Without Biodiesel Price	Change Due to Biodiesel	Actual 2011/12 Price
Soybeans ($/bu)	$11.56	8.3%	$12.60
Soybean Meal ($/ton)	$429.20	-13.6%	$377.67
DDG 65% ($/ton)	$235.30	-5.0%	$224.13
DDG 10% ($/ton)	$78.54	-5.0%	$74.81
Corn ($/bu)	$5.87	5.4%	$6.20

It is important to note that these impacts are estimated to result solely from a 29 percent increase in soybean oil used for biodiesel in 2012. Impacts from other biodiesel factors such as increased demand for animal fats are discussed in subsequent sections.

This analysis indicates that the elasticity of DDG prices with respect to soybean meal and corn prices is 0.4665 and the elasticities of edible tallow and lard prices to soybean oil prices are 0.881 and 0.893, respectively.

[4] While the FRB study does not specifically reference an impact on hogs, we have assumed the same change for hog prices as was indicated for cattle.

Biodiesel Impact on Industrial grade corn oil

Ethanol producers have begun to extract industrial grade corn oil from Distillers dried grains with solubles (DDGS) for use as a biodiesel feedstock. Typically this oil is of lower quality than that produced by corn wet mills for the food market but is an excellent biodiesel feedstock. The use of industrial grade corn oil provides several benefits to ethanol and biodiesel producers and livestock feeders. First industrial grade corn oil provides an additional revenue stream for ethanol producers which can help offset high corn prices. Since industrial grade corn oil is a co-product and is typically priced at a discount to crude soybean oil, it provides biodiesel producers with competitive alternative feedstock, thereby enhancing biodiesel returns. Finally, separating industrial grade corn oil from DDGS changes the nutritional value of Distillers grains by increasing the protein content and reducing the amount of fat.

According to IRFA 33 of Iowa's 35 dry mill ethanol plants extract industrial grade corn oil. These plants represent more than 3 billion gallons of ethanol production utilizing nearly 1.1 billion bushels of corn. Using an average industrial grade corn oil yield of 0.6 pounds per bushel, this equates to approximately 656 million pounds of industrial grade corn oil.

Information provided by major industrial grade corn oil marketers suggests that approximately 70 percent of Iowa industrial (non-food) corn oil was sold as a biodiesel feedstock in 2012. Industrial grade corn oil extracted by dry mill ethanol plants typically has a high free-fatty-acid composition and a high content of waxes and other chemicals that make it unsuitable for human consumption. Consequently this industrial grade corn oil trades at a discount to food-grade oil that makes it competitive with animal fats and yellow grease. Discussions with biodiesel producers indicate that industrial or non-food grade corn oil is priced in correlation with crude (or unrefined) soybean oil. To reflect this relationship we have assumed that industrial grade corn oil is priced at 80 percent of crude soybean oil as a biodiesel feedstock. At an average price of $0.51 per pound for crude soybean oil[5], this equates to $0.41 per pound and amounts to $55 million of additional revenue for Iowa's ethanol industry.

A 100 MGY dry mill ethanol plant that extracts 0.6 pounds of industrial grade corn oil for every bushel of corn would produce 24 million pounds of industrial grade corn oil and add $0.087 cents of revenue to each gallon of ethanol marketed. Based on industry reports that 70 percent of Iowa industrial grade corn oil is sold as a biodiesel feedstock, the biodiesel share accounts for as much as 6.6 cents per gallon of

[5] Cash market prices, Wall Street Journal.

net revenue for a dry mill ethanol plant increasing profitability by 55 percent.[6] The impact of industrial grade corn oil used for biodiesel on net revenue for a typical 100 million gallon Iowa dry mill ethanol plant producing at 110 percent of capacity that extracts industrial grade corn oil is illustrated in Table 2.

Table 2
Impact of Industrial Grade Corn Oil
100 MGY Iowa Dry Mill Ethanol Plant: 2012

	Corn Oil Extraction "No Biodiesel"	**Corn Oil Extraction "With Biodiesel"**
OPERATING COSTS	**$/gal**	**$/gal**
Corn	$2.475	$2.475
Enzymes, Yeast, Chemicals, Denaturant	$0.159	$0.159
Natural Gas ($/MCF)	$0.131	$0.131
Labor	$0.059	$0.059
Other Operating Costs	$0.130	$0.130
Net Operating Costs	**$2.947**	**$2.947**

REVENUE	**$/gal**	**$/gal**
Ethanol (FOB, IA $/gal)	$2.231	$2.231
DDG (10% Iowa $239/ton)	$0.749	$0.749
Industrial grade corn oil ($0.41/lb)	$0.0210	$0.087
Total Revenue	$3.002	$3.067
EBIDTA	**$0.0590**	**$0.119**
Biodiesel Impact		**$0.066**

Impact of biodiesel demand for beef tallow and white grease on the value of beef cattle and hogs.

In addition to soybean and industrial grade corn oil, Iowa biodiesel producers also have available a range of other feedstocks including beef tallow and white grease. These feedstocks are byproducts of the

[6] We have assumed that in the absence of the biodiesel industry, a dry mill plant would lose the full 70 percent of the biodiesel feedstock market. The actual decline is likely to be somewhat smaller since reduced biodiesel demand would reduce industrial corn oil prices which would stimulate other non-food use. However, given the role of industrial corn oil as a biodiesel feedstock the new equilibrium demand and price is expected to be lower than in the presence of the biodiesel industry.

livestock slaughter and rendering industry. Increased use of these products as biodiesel feedstocks increases demand for livestock. EIA reports that 793 million pounds of beef tallow, white grease and poultry fat were used as a biodiesel feedstock in the first 9 months of 2012. This suggests an annual rate of nearly 1.1 billion pounds for the full year. USDA reports production, prices, and per head values for the primary byproducts beef tallow, lard, and choice white grease.[7] These data can be applied to cattle and calf and hog slaughter numbers for Iowa to estimate production.

A recent study on the impact of biodiesel demand on animal fats and tallow prepared for the National Biodiesel Board by Centrec Consulting indicates that biodiesel demand accounts for 60 to 72 percent of the increase in the value per head of these by products for beef cattle over the past five years and 60 to 74 percent of the increase in the value per head for hogs (Centrec 2012).

We estimate the contribution of biodiesel to byproduct values using yields published by USDA, 2012 average prices for edible and inedible tallow for cattle and lard and choice white grease for hogs, and changes in byproduct prices caused by biodiesel demand. Applying the price elasticities for tallow and lard with respect to soybean oil discussed in footnote 3, in the absence of an Iowa biodiesel industry, tallow, lard, and white grease prices would be about 36 percent lower than actual. As shown in Tables 3 and 4 byproduct values for cattle would be $12.21 per head lower than current values and hog byproduct values would be $1.11 per head lower without Iowa biodiesel production.

Table 3
Impact of Byproduct Demand on Iowa Cattle

	Edible Tallow	Inedible Tallow	Total Tallow
Actual (2012)			
Yield (lb/cw)	1.20	4.50	
Actual Price ($/lb)	$0.44	$0.48	
Value ($/cwt)	$0.53	$2.17	$2.70
Value ($/hd)	$6.56	$27.11	$33.68
Without Biodiesel			
Price ($/lb)	$0.28	$0.31	
Value ($/cwt)	$0.34	$1.38	$1.72
Value ($/hd)	$4.18	$17.29	$21.47
Biodiesel Impact ($/hd)			**$12.21**

[7] USDA/AMS Weekly Byproduct Drop Value Cattle, LS 441, and Hogs, LS 446.

Table 4
Impact of Byproduct Demand on Iowa Hogs

	Lard	Ch. White Grease	Total
Actual (2012)			
Yield (lb/cw)	1.72	0.50	
Actual Price ($/lb)	$0.52	$0.42	
Value ($/cwt)	$0.89	$0.21	$1.10
Value ($/hd)	$2.44	$0.57	$3.01
Without Biodiesel			
Price ($/lb)	$0.33	$0.26	
Value ($/cwt)	$0.56	$0.13	$0.69
Value ($/hd)	$1.54	$0.36	$1.91
Biodiesel Impact ($/hd)			**$1.11**

Impact of the Iowa biodiesel industry on Iowa farms.

The impact of biodiesel production and demand on commodity prices has a substantial impact on the profitability of Iowa crop and livestock farms. We evaluated the impact of biodiesel on three specific farm operations.

1. A row crop farmer with 800 acres split 50/50 between corn and soybeans.

   A farm that primarily grows corn and soybeans benefits substantially from the Iowa biodiesel industry realizing increased net revenue through higher commodity prices. Holding acres planted constant, commodity production and the associated costs will not change, but farm cash receipts in the absence of the biodiesel industry will fall due to lower crop prices, resulting in lower net farm revenues.

Table 5
Impact of Biodiesel on an 800 Acre Iowa Corn and Soybean Farm

	Actual 2011/12 Corn	Actual 2011/13 Soybeans	Actual 2011/14 Aggregate
Yield per acre (bu)	172.0	50.5	
Ave Farm Price ($/bu)	$6.20	$12.60	
Gross Revenue ($/ac)	$1,066.40	$636.30	$1,702.70
Var. Oper Costs ($/ac)	$299.12	$208.85	$507.97
Net Revenue ($/ac)	$767.28	$427.45	$1,194.73
Net Revenue 400 ac	$306,912	$170,980	$477,892

	Without Biodiesel Corn	Without Biodiesel Soybeans	Without Biodiesel Aggregate
Yield per acre (bu)	172.0	50.5	
Ave Farm Price ($/bu)	$5.87	$11.56	
Gross Revenue ($/ac)	$1,008.87	$583.64	$1,592.51
Var. Oper Costs ($/ac)	$299.12	$208.85	$507.97
Net Revenue ($/ac)	$709.75	$374.79	$1,084.54
Net Revenue 400 ac	$283,899	$149,915	$433,814
Change in Net Revenue	**-$23,013**	**-$21,065**	**-$44,078**

Variable production costs for a corn and soybean farm were taken from the estimated costs of crop production for Iowa published by the Iowa Agricultural Extension Service. If no changes are made to planting and production, the only impact on crop farmers from no biodiesel production will be provided by lower corn and soybean prices. Applying the price increases resulting from a 29 percent increase in 2012 soybean oil use for biodiesel discussed above to 2011/12 marketing year farm-level prices indicates that the total net typical Iowa farm with 400 acres each of corn and soybeans would realize a 9.2 percent decline ($44,078) in net revenue if there were no Iowa biodiesel industry.

2. Impact on a farmer feeder with 1,200 acres split 50/50 between corn and soybeans who feeds 3,500 cattle per year.

An Iowa farmer who grows corn and soybeans and feeds 3,500 head of cattle annually benefits substantially from the biodiesel industry. As shown in Table 6, net returns from 600 acres each of corn and soybeans benefit from higher crop prices. Without an Iowa biodiesel industry, net revenues from crops would decline by 9.2 percent, or $66,177.

The current environment is challenging for the cattle industry both nationally and in Iowa. Estimated returns for finishing steer calves to choice slaughter weights published by the Iowa Cooperative Extension Service indicate that Iowa cattle feeders lost money in 2012. However, the absence of an Iowa biodiesel industry would have resulted in a larger loss than actually occurred.

An Iowa farmer who feeds cattle benefits from the biodiesel industry primarily through higher revenues. Without a biodiesel industry a farmer that feeds 3,500 head would realize modestly lower production costs despite higher protein (DDG) prices. In large part this is due to a smaller credit for on farm feed use. Estimated budgets for Iowa cattle feeding published by the Iowa Agricultural Extension Service indicate that each head of cattle consumes 47.7 bushels of corn and nearly one ton of protein. ISU livestock economists report that Iowa cattle feeders feed relatively little soybean meal using instead Distillers grains, corn gluten and syrup as a protein source. In place of expensive hay, Iowa cattle feeders use crop residues such as corn stalks and soybean straw which is readily available. Distillers grain prices are affected both by corn (the feedstock) and soybean meal (the competition) prices. In the absence of an Iowa biodiesel industry, lower corn prices are partially offset by higher Distillers dried grains prices.

Revenue from marketings for cattle is higher than would be the case without a viable biodiesel industry. The change in revenue shown in Table 6 results from the price impacts on cattle from increased demand for soybean oil as discussed earlier and byproduct demand shown in Table 3. Because of the impact of demand for fats and oils to produce biodiesel, the biodiesel industry supports higher byproduct (inedible and edible tallow) values that are reflected in the selling price for finished steers. As a result without a biodiesel industry, an Iowa farmer who feeds 3,500 head would realize a loss of $76,231, three and a half times more than with a biodiesel industry. The bottom line is that biodiesel has a net positive impact on finishing cattle in Iowa.

In addition, aggregate net profit for a farmer who grows corn and soybeans and feeds 3,500 head of cattle would fall $121,251 in the absence of biodiesel production. In other words the biodiesel industry boosts net farm profit by 17 percent. The details of the impact of biodiesel on a combined corn, soybean and cattle feeding operation are detailed in Table 6.

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Table 6
Impact of Biodiesel Industry on an Iowa Farm Growing
600 Acres of Corn, 600 Acres of Soybeans and Feeding 3,500 Cattle

	Actual 2011/12 Corn	Actual 2011/12 Soybeans	Actual 2011/12 Crops	Without Biodiesel Corn	Without Biodiesel Soybeans	Without Biodiesel Crops
Yield per acre (bu)	172.0	50.5		172.0	50.5	
Ave Farm Price ($/bu)	$6.20	$12.60		$5.87	$11.56	
Gross Revenue ($/ac)	$1,066	$636	$1,703	$1,009	$584	$1,593
Var. Oper Costs ($/ac)	$299	$209	$508	$299	$209	$508
Net Revenue ($/ac)	$767	$427	$1,195	$710	$375	$1,085
Total Crop Net Revenue	**$460,368**	**$256,470**	**$716,838**	**$425,849**	**$224,872**	**$650,721**
Without Biodiesel						**($66,117)**

	Assumptions		Value	Assumptions		Value
Cattle Fed (head)	3,500			3,500		
Steer Price ($/cwt)	$122.39			$121.12		
Market weight (lbs)	1,250			1,250		
PRODUCTION COST						
Corn	$6.20		$1,035,090	$5.87		$979,247
DDG (30% dry, 70% wet)	$119.61		$397,690	$125.57		$417,506
Crop Residues	$35.00		$44,345	$35.00		$44,345
Minerals & Nutrients			$56,000			$56,000
Purchase Price			$4,166,334			$4,124,671
Other Operating Costs			$301,105			$301,105
Credit for on farm feed			($460,368)			($425,849)
Total Costs			$5,540,196			$5,497,025
REVENUE						
Marketings			$5,354,599			$5,256,294
Credit for manure			$164,500			$164,500
Total Revenue			$5,519,099			$5,420,794
Net Profit from Cattle			**($21,097)**			**($76,231)**
Without Biodiesel						**($55,134)**
Total Net Crops & Cattle			**$695,741**			**$574,490**
Without Biodiesel						**($121,251)**

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3. Impact on a farmer feeder with 1,200 acres split 50/50 between corn and soybeans that finishes 16,000 hogs per year.

An Iowa farmer who grows corn and soybeans and finishes hogs also benefits from the biodiesel industry. The impact of biodiesel on crop profitability for the hog farmer that grows 600 acres each of corn and soybeans is the same as for a cattle feeder. In the absence of a biodiesel industry profits from producing and marketing corn and soybeans would fall $66,117 or 9.2 percent.

Without a biodiesel industry, higher costs for soybean meal and Distillers grains virtually offset lower corn prices. When also factoring in a smaller credit for on farm feed use, in the absence of the biodiesel industry total production costs for hogs are higher. Increased demand for fats and oils as shown in Table 4 supports a higher market hog price through increased lard and choice white grease byproduct values than would be the case in the absence of a biodiesel industry. As a result without a biodiesel industry, an Iowa farmer who weans and finishes 16,000 hogs would realize a loss of nearly $118,000, more than twice than with a biodiesel industry. The bottom line is that biodiesel has a net positive impact on weaning and finishing hogs in Iowa.

When combined with net revenues from corn and soybeans, an Iowa farmer who grows both corn and soybeans and finishes 16,000 hogs annually earned $130,851 (or 19.7 percent) more in net profit than would be the case in the absence of a biodiesel industry. The details of the impact of biodiesel on a combined corn, soybean and hog finishing operation are detailed in Table 7.

Table 7
Impact of Biodiesel Industry on an Iowa Farm Growing
600 Acres of Corn, 600 Acres of Soybeans and Finishing 16,000 Hogs

	Actual 2011/12 Corn	Actual 2011/12 Soybeans	Actual 2011/12 Crops	Without Biodiesel Corn	Without Biodiesel Soybeans	Without Biodiesel Crops
Yield per acre (bu)	172.0	50.5		$172.00	$50.50	
Ave Farm Price ($/bu)	$6.20	$12.60		$5.87	$11.56	
Gross Revenue ($/ac)	$1,066	$636	$1,703	$1,009	$584	$1,593
Var. Oper Costs ($/ac)	$299	$209	$508	$299	$209	$508
Net Revenue ($/ac)	**$767**	**$427**	**$1,195**	**$710**	**$375**	**$1,085**
Total Crop Revenue	**$460,368**	**$256,470**	**$716,838**	**$425,849**	**$224,872**	**$650,721**
Without Biodiesel						**($66,117)**

	Assumptions		Value	Assumptions		Value
Sows	841			841		
Pigs/litter	8.50			8.50		
Litters/yr	2.24			2.24		
Pigs Finished	16,013			16,013		
Hog Price ($/cwt)	$63.85			$63.19		
Sow price ($/hd)	$140.00			$138.60		
Market weight (lbs)	270			270		
Cost to wean 12# Pig	**$44.70**		**$757,949**	**$44.54**		**$755,095**
Cost to finish to 270#						
Corn	$6.20		$1,226,380	$5.87		$1,160,217
Soybean Meal	$377.67		$360,359	$429.20		$409,526
DDGS	$224.13		$60,800	$235.30		$63,830
Other Direct			$407,912			$407,912
Indirect Costs			$526,383			$526,383
Credit for on farm feed			-$460,368			-$425,849
Total Costs			$2,879,416			$2,897,109
REVENUE						
Marketings			$2,760,499			$2,714,118
Cull Sows			$65,934			$65,275
Total Revenue			$2,826,433			$2,779,393
Net Profit from Hogs			**($52,983)**			**($117,716)**
Without Biodiesel						**($64,734)**
Net Profit Hogs & Crops			**$663,855**			**$533,005**
Without Biodiesel						**($130,851)**

Conclusion

The biodiesel industry has a significant positive impact on the Iowa agriculture economy. Increased demand for soybean oil and other vegetable oils and fats supports higher prices for corn, soybeans, soybean and industrial grade corn oil, cattle and hogs. In addition increased demand for feedstocks to produce biodiesel also increases the value of cattle and hog byproducts such as tallow, lard and choice white grease. These higher values are reflected in the market price for hogs and finished steers. Without the demand for fats and oils from the biodiesel industry, revenue from marketings would decline. As a consequence of these impacts Iowa farmers who grow corn and soybeans benefit from higher net revenues as do Iowa cattle and hog producers. Finally, Iowa ethanol producers benefit from increased revenue provided by increased demand and higher prices for industrial grade corn oil.

Without a viable biodiesel industry, the entire Iowa agriculture sector would suffer reduced profitability and lost revenue.

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Iowa Renewable Fuels Association

Attachment F

Iowa Renewable Fuels Association

October 11, 2012

Environmental Protection Agency
Air and Radiation Docket
Docket ID No. EPA-HQ-OAR-2012-0632
Mailcode 6102T
1200 Pennsylvania Ave., NW
Washington, DC 20460

RE: Request for Comment on Letters Seeking a Waiver of the Renewable Fuel Standard

With 41 ethanol biorefineries capable of producing over 3.7 billion gallons annually and 13 biodiesel refineries capable of producing 320 million gallons annually, Iowa is the nation's premier biofuels producer. Iowa is also the largest producer of both corn and soybeans in the U.S. Therefore, as the largest representative of Iowa's ethanol and biodiesel producers, the Iowa Renewable Fuels Association (IRFA) is uniquely suited to comment on recent requests for a waiver of volume obligations under the Renewable Fuels Standard (RFS).

Threshold for initiating a waiver request

While the facts laid out below will clearly demonstrate that the waiver requests should be summarily denied, IRFA would like to first comment on the very existence of this public docket. IRFA has appreciated the opportunity to provide formal comments on many issues throughout the creation and implementation of the RFS. We have always found the Environmental Protection Agency (Agency) staff open to our ideas and points of view.

However, in the case of the current waiver requests, IRFA believes the Agency has been a bit too open, so to speak. The public law creating the RFS and its waiver provisions intentionally set a high bar for any waiver to be granted. The burden of proof for a waiver was rightly placed upon those wishing to set aside the RFS, the most successful energy policy of the last 50 years. As such, the Agency should only open formal consideration of a waiver request if a certain threshold of evidence has been presented to the Agency.

In its ruling on the current waiver requests, the Agency should make clear that in the future, a simple one-page letter requesting a waiver based on dubious grounds and with absolutely no substantiating evidence is not the basis for the Agency to initiate full consideration. Rather, any future waiver request should be accompanied by a minimum level of fact and science to support the underlying claims for a waiver.

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The current waiver requests before the Agency simply do not meet any type of scientific or fact-based threshold in order to launch a full-scale review process. To be clear, IRFA is not saying that a future waiver request must prove beyond a doubt that it is justified before a review process can be started – that is rightly the job of the review process and public docket. However, initiating a full review process without any threshold causes real and serious implications.

Agency staff are busy implementing numerous acts of Congress, studying new RFS fuel pathways for advanced biofuels and feedstocks, and fighting off silly E15 lawsuits by wealthy multi-national corporations afraid of competition from farmer-owned co-ops. Agency staff time and, by extension, taxpayer money should not be wasted on frivolous RFS waiver requests.

More importantly, the existence of a formal RFS waiver review process sends very real, very chilling signals to the marketplace. Uncertainty over the future of the RFS is heightened. As a result:

- Investors may pause advanced biofuels projects.
- Farmers in South America may reconsider the number of corn acres they will plant this fall.
- U.S. farmers will be uncertain what seed and inputs to lock in for next spring.
- End users of corn are left to guess about potential, if any, market impacts.
- Terminals may reconsider investing in expanded ethanol and biodiesel blending and storage infrastructure.
- Retailers considering offering E15 may hold back as the RFS is key to their access for necessary summertime gasoline blendstocks.
- Retailers may also balk at moving forward with planned installation of blender pumps or biodiesel dispensers.

In short, additional uncertainty in America's energy and agricultural markets is not needed – especially when it can and should be avoided.

As near as IRFA can tell there are only three groups who benefit from a nonexistent threshold for initiating an RFS waiver review: the analysts hired by each side to write reports for the docket, the trade and DC-based press filling their pages with coverage and advocacy ads, and retired college professors (likely) paid by the RFS opponents to sign anti-RFS op-eds throughout the country.

Background for the current waiver requests

While we hope that parties will be required to make a meaningful submission in order to launch a full review process in the future, the fact remains that the Agency is seeking comment on the Perdue/Beebe waiver requests today. Therefore, we think it is important to consider the background of the groups pushing for an RFS waiver.

The governors' letters and other public comments make clear that those pushing for the waiver are largely the "usual suspects" – oil companies, large livestock corporations, and large food processors. I refer to them as the "usual suspects" because these groups opposed the RFS during its initial consideration by Congress in 2005, they opposed the RFS when it was expanded in 2007, they opposed the RFS during the oil-driven commodity bubble in 2008, they oppose the RFS during the current drought of 2012 and they have opposed the RFS at ALL TIMES in between.

The "usual suspects" pushing for a waiver today want the Agency to view this request through the lens of the 2012 drought, while ignoring that they have always opposed the RFS. To these groups, the current waiver request is simply the most recent front in their multi-year war against the RFS. They lobbied in attempt to prevent Congress from passing the RFS. They petitioned the Agency to make the RFS rules unworkable. They sued the Agency to throw out the rules once adopted. They supported the 2008 RFS waiver request that was rejected. They urged governors to ask for the current waiver request without even a modicum of supporting evidence. And they are already in the press outlining their efforts to gut the RFS in Congress in 2013.

IRFA believes this is vitally important to understand. It goes to the issue of creditability. By midnight on October 11th the public docket will no doubt be filled with many comments – some routine, some thoughtful, and many accompanied by various reports and studies supporting their side. In this "trial" of the RFS, the burden of proof is rightly on those seeking the waiver. In essence the Agency must play the role of judge and jury, seeking to find the truth. In a trial, when witnesses take opposing sides it is up to the judge/jury to determine if one witness is more credible than another.

In the case of the current RFS waiver request, the Agency must find that the waiver proponents have politicized the current drought in an attempt to achieve their political ends dating back to 2005. This fact brings into question their credibility. These groups have already endorsed one waiver request found severely lacking by the Agency. The record will reflect that this politically motivated waiver request is even more lacking.

The impact of the 2012 drought

To be fair, some proponents of the current waiver request were no doubt motivated by sincere concerns regarding the historic drought of 2012. But many of the dire predictions of the early summer have been tempered by the reality showing up in combine hoppers across the Midwest. The drought of 2012 has been severe, painful and – at the same time – not worthy of justifying an RFS waiver request.

Other comments in the public docket will highlight in great detail the US and world crop production and use situation and IRFA will not repeat that here. It is simply important to note that according to the U.N. Food and Agricultural Organization, world grain production will hit an all-time high in 2012 and world corn production – despite the US drought – will be 4% greater in 2012 than it was in 2011 (http://www.governorsbiofuelscoalition.org/?p=3951). That is a tremendous testament to farmers all over the world and to the investments in new seed technology by companies here in the U.S.

At the end of day, the USDA still projects a carry-out of 2012 corn into the next marketing year. Although tight by historic standards, the supplies of corn will be large enough for end users to adjust to without undermining the long-term benefits stemming from the RFS and greater renewable fuels use.

The RFS and the market are working

Again, many other organizations will discuss in detail the market responses to the RFS and the drought of 2012.

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These facts remain central to the Agency's deliberations:

- Corn prices have already fallen from their highs as the market responded to the drought.
- U.S. ethanol production is down, ethanol exports are down, ethanol stocks are down, and ethanol (and corn) imports are up – the market is working.
- There are 2.5 billion (or more) excess RINs available to obligated parties to offset the need to blend wet gallons of renewable fuels.
- Obligated parties have the option to push forward part of their 2012 or 2013 obligation if they so choose. (The fact they won't says everything you need to know about the efficacy of this waiver request.)
- Ethanol has been, and largely still is, driven by simple blending economics. While the RFS becomes increasingly important in cracking the petroleum monopoly in 2014 and beyond, today – even with current corn prices – corn-based ethanol is still the world's cheapest source for fuel octane.
- Many studies have shown a waiver would not result in reduced feed costs, but would result in higher gasoline prices (FAPRI, CARD, LSU, Cardno-Entrix, etc.)

Be careful what you wish for

Maybe the most puzzling and confusing aspect of the entire waiver request debate is the disconnect between what large livestock and food corporations say they want from a waiver and what the consensus of scientific study has concluded.

The ethanol industry has driven the production of a larger corn crop. Simply put, there is more corn to go around. American farmers responded to the demand for more corn for ethanol processing by planting millions more acres. With no ethanol industry, farmers would have likely planted around 75 million acres of corn this year (just like they did in 2001), instead of 95 million acres. So, factoring in drought reduced yields, without ethanol production the 2012 corn crop would likely be more than two billion bushels smaller and there would be NO distillers grains to use as a cost-effective substitute for high-priced corn and soybean meal.

Instead of reducing feed or input costs, the granting of a waiver could actually exacerbate the challenge corn users face. A waiver would tell both U.S. and world farmers to plant less acres to corn, driving up prices. A waiver would lead to higher feed costs as the availability of (relatively) low-cost distillers grains would be reduced, only to be replaced with higher cost corn and soybean meal.

In fact, perhaps the most important number in the recent USDA WASDE report (http://usda01.library.cornell.edu/usda/current/wasde/wasde-09-12-2012.pdf) was not the corn production or ending stocks numbers, but rather the projection for record low soybean meal ending stocks. By removing the starch, an ethanol plant effectively turns corn into a feed product (distillers grains) more similar to soybean meal than corn. Reducing the supply of distillers grains will only serve to tighten the already low supply of soybean meal. For a complete analysis of this phenomenon, IRFA commends the recent study commissioned by the Renewable Fuels Association entitled "Impact of Waiving the Renewable Fuel Standard on Total Net Feed Costs" (www.ethanolRFA.org).

Granting a waiver would both diminish the already stressed supply and escalate the already high price of soybean meal for livestock producers in a second way. A recent economic study from Centrec Consulting Group showed that "increased demand for soybean oil (for biodiesel) has subsequently increased the production of soybean meal, thus lowering soybean meal prices by

$16 to $48 per ton from where they would have otherwise been from MY05 through MY09" (http://www.scribd.com/doc/54435165/Biodiesel-Meal-Centrec-Soybean-Co-Products-Economics). Much biodiesel demand is currently underpinned by the RFS. Lowering the RFS volume obligations for biodiesel would not only harm biodiesel producers, but would also remove a demand driver for soybean crushing, resulting in higher prices for the soybean meal used in livestock rations.

Reducing biodiesel production could remove another potential cost-effective feedstock for livestock producers. A multi-year feed trial conducted by West Texas A&M University found several attractive traits for feeding glycerin, biodiesel's co-product, to cattle. At inclusion rates of 2.5% to 7.5%, corn could be displaced and feed efficiency was increased. (http://farmprogress.com/story-corn-feed-alternative-cattle-may-biodiesel-industry-0-58290).

In short, a waiver will reduce the 2013 corn supply, putting upward pressure on corn prices. A waiver will also reduce the supply of distillers grains, putting upward pressure on soybean meal prices. A waiver will also reduce soybean oil demand for biodiesel, causing further reductions in soybean meal supply and even higher soybean meal prices. That is a one-two-three punch that most livestock producers do not need. (See attachment A for more ways ethanol production helps livestock during the 2012 drought.) Why then should they ask for a waiver? As stated earlier, it is not to mitigate the impact of the 2012 drought, but rather to pursue their multi-year anti-RFS campaign.

Economic harm, really?

The petroleum industry's opposition to the RFS is easily understood by most. They have enjoyed a near monopoly on motor fuel supply for a century. Petroleum fuels benefit today from an 85% federal mandate, billions in federal tax subsidies, federal loan guarantees for petroleum pipelines and a monopoly over fuel distribution that was built using the first three items. No other fuel source comes anywhere close to the level of government support and protection given petroleum fuels. It is no wonder the petroleum industry opposes a law that is designed to crack that monopoly and to bring fuel choice to consumers. (See attachments B and C.)

Less understood is the impact of the RFS and renewable fuels on the livestock industry. The first common mistake is to think of livestock producers as "an industry." The segments within the livestock industry can be as varied as ExxonMobil is from a corner ma-and-pa gasoline station. Ethanol production has increased during the RFS era, resulting in higher corn prices and increased farm income. This also resulted in dramatically reduced farm program costs. And as a result, the relative economics within the livestock industry have changed.

For the 25 years prior to the enactment of the RFS, the economic advantage went to large corporate livestock operations far removed from actually growing corn and soybeans. These big businesses might be thought of as cattle in Texas, chickens in Arkansas, pigs in North Carolina or turkeys in Virginia. These large corporations control their respective national trade associations: National Cattlemen's Beef Association, National Pork Producers Council, National Chicken Council, and National Turkey Federation. So while it might appear to some that there is a united voice for livestock on the RFS, it would be a mistake to think that these groups speak for all livestock producers.

Since the onset of the 2012 drought, IRFA has received many calls from family livestock producers in the Midwest concerned that the ethanol industry will shut down and end their access to distillers grains. For in the Midwest, renewable fuels production and family livestock farming are mutually beneficial. So while reducing renewable fuels production might benefit large corporate livestock operations, it would have a detrimental impact on Midwest family livestock farmers. This is a highly critical fact to process while considering the claims of alleged economic harm and redress.

In fact, for many family livestock producers around the country, the ethanol industry provides a desperately needed highly-concentrated protein animal feed (distillers grains), which provides a cost-effective alternative to high corn and soybean meal prices. Distillers grains lower the cost of gain and improve animal performance by reducing the need for additional supplements and providing 115% of the energy value of corn. If an RFS waiver was granted and actually reduced ethanol production further than what would otherwise occur, it would have a devastating effect on Midwest livestock feeders. For example, in July an Iowa-based feed nutritionist using Iowa State University research calculated that the inclusion of distillers grains in beef cattle rations decreases feed costs an average of 6 percent, which equates to an average of $38 per head.

In Iowa the combination of corn production, ethanol/distillers grains production, and livestock feeding has created a synergistic economic relationship that has benefited all sectors of the rural economy and helped power Iowa's economy during the recent downturn. In reality, the combined total is worth more than the individual parts. To unnecessarily disrupt this mutually supportive economic system could cause further harm to Iowa jobs and Iowa's economy already pressured by the historic drought. (See attachment D for renewable fuels' impact on Iowa.)

Ethanol – changing livestock economics

To better understand the differing impacts of ethanol and the RFS on the various segments of the livestock industry, the IRFA dug through USDA databases to pull together some interesting facts. From 1981 through 2005, the average price a farmer received for a bushel of corn was lower than the average cost of production in 22 out of 25 years. (See attachment E) How was that sustainable? Well, before ethanol production ramped up, the taxpayers funded a multi-billion dollar Farm Program to keep farmers in business.

In other words, if you grew corn – at the cost of $2.60 per bushel for example – and fed the corn to your own livestock, then you were at a huge disadvantage to the large feedlots in Texas that were paying only two dollars for that same bushel of corn. Family livestock farmers in the Midwest couldn't compete. Not surprisingly, we saw an important segment of value-added agriculture leave Iowa and the Midwest and head to Texas, North Carolina, Arkansas, and so on.

But after 2005 – not coincidentally the year the federal RFS was signed into law – the average farm gate price for a bushel of corn has been above the average cost of producing that same bushel. That means the economic advantage has returned to the family livestock producer who grows some corn and has ready access to distillers grains. As a result, cattle and hog numbers are going up in Iowa and the Midwest.

So ethanol is not "bad" for livestock as some groups want you to believe. True, it has shifted the relative economics within the livestock industry. But those willing to adapt and to take advantage of distillers grains are expanding.

IRFA understands that the large corporate livestock producers don't like the change. We understand they would prefer to pay $1.80 for a bushel of corn. But with all due respect, Iowa farmers never liked selling corn for less than it cost to produce it. Taxpayers didn't like supporting a large Farm Bill just to boost corporate livestock profits while keeping the family farmer treading water. And that hardworking family farmer didn't like farming according to a federal program instead of a fair market price.

So while ethanol has changed corn and livestock economics, our country is the better for it. After 25 years of North Carolina, Arkansas, and Texas livestock profits being subsidized by federal farm programs, they shouldn't expect to find sympathy for their desire to roll back the clock to the days of $2 corn. That is a recipe for economic harm, not relief.

RFS waiver = real economic harm

When assessing the potential economic impact of granting a waiver, the Agency must consider all those impacted. Large livestock corporations claim they will be helped – although the scientific consensus is just the opposite. Regardless, who will be hurt?

The very lynchpin of the corporate livestock argument is that ethanol production will be reduced and corn prices will go down. If so,

- Dozens of states will be hurt by reduced economic activity during a recession;
- Hundreds of renewable fuels employees will lose their good paying jobs;
- Thousands of local renewable fuels investors will see their retirement nest egg wither – or even disappear into bankruptcy;
- Tens of thousands of corn farmers will have their income reduced; and,
- Millions of Americans will face higher gasoline prices at the pump (See attachment F for more details).

You don't have to be a CPA to add up the columns and realize that granting an RFS waiver would cause – not relieve – economic harm.

Conclusion

The record is clear that the waiver proponents have failed to demonstrate that the RFS is causing economic harm and that waiving the RFS would redress the drought-driven economic concerns they have raised. Maybe even more important, if the Agency assumed – for sake of argument – that granting a waiver would have the impact the proponents claim, then the result would be economic harm felt across the U.S. as gasoline prices increased and tens of thousands of corn and family livestock farmers lost income. In either scenario the facts dictate that the Agency deny the waiver.

We stand ready to work with you and to provide any further information or background on the issues discussed above or on any other topic where we may be of assistance. Please do not hesitate to contact me at mshaw@IowaRFA.org or 515-252-6249.

Sincerely,

Monte Shaw

Monte Shaw
Executive Director

Iowa Renewable Fuels Association

Attachment A

The 2012 Drought, the RFS, and Ethanol Production

The historic 2012 drought is having a profound impact on crop production. The resulting supply and price impacts will be felt by corn consumers around the world; no user of corn is untouched. Yet, the ag sector has seen droughts before, and it will survive again. In fact, thanks to ethanol production, there is a larger and more flexible corn supply than was available during previous droughts of this magnitude.

This is a time when all of agriculture should pull together. Unfortunately, national livestock trade associations have chosen to politicize the on-going drought as part of their multi-year effort to return corn prices to $2 per bushel.* At times like this, it is important to look past the rhetoric to the facts.

The Facts about the 2012 Drought, the RFS, and Ethanol Production

1. The ethanol industry has driven the production of a larger corn crop. Simply put, there is more corn to go around. American farmers responded to the demand for more corn for ethanol processing by planting millions more acres. With no ethanol industry, farmers would have likely planted around 75 million acres of corn this year (just like they did in 2001), instead of 95 million acres. So, factoring in drought reduced yields, without ethanol production the 2012 corn crop would likely be more than two billion bushels smaller and there would be NO distillers grains to use as a cost-effective substitute for high-priced corn and soybean meal.

2. The ethanol industry will bear the brunt of any rationing stemming from the drought. Without ethanol, the smaller corn harvest (yield and acres) would have to be rationed solely by livestock producers (domestic or export customers). Ethanol producers have already cut back production by over 10% (several plants have shut down, putting people out of work), and that's likely just the beginning.

3. Due to ethanol demand, seed companies spent much more than they would have otherwise on research and development over the last decade. As a result, farmers have access to seed varieties with greater yields that can withstand the drought much better than in prior years, like 1988.

4. Maintaining the RFS sends a market signal to world farmers (including those in South America who will be planting soon) and U.S. farmers not to reduce corn acres. Conversely, lowering the threshold for waiving the RFS would send a market signal that renewable fuels are not a reliable market and corn acres planted would be reduced – ultimately hurting the livestock groups asking for such a waiver.

5. One-third of every bushel of corn processed into ethanol returns to the livestock feed supply in the form of distillers grains – including all of the protein, fat, fiber and other nutrients. Only the starch portion of the kernel is used to produce ethanol. Last year the amount of distillers grains produced was more than the total amount of grain consumed by all the beef cattle in American feedlots.

6. As the nutritious feed portions of the corn kernel are concentrated, distillers grains are a more efficient source of energy and protein than the ingredients they are replacing in livestock diets. Distillers grains provide approximately 130-150% of the energy of an equivalent amount of corn when fed to beef cattle. This allows for the use of cheap roughage (corn stalks, soybean straw) to be used in livestock diets.

7. Without distillers grains, the cost of cattle and hog rations in the Midwest would go up as distillers grains and roughage are replaced with expensive corn and soybean meal. Bill Couser, of the Couser Cattle Company near Nevada, Iowa, stated: "It's amazing to see what ethanol has done for the cattle industry in the state. It used to take 75 bushels of corn to finish a 1300 pound steer. Today, with distillers grains, we use only 16 to 30 bushels of corn and that number keeps dropping."

8. The drought has negatively impacted much pasture land. Without ample grass, cows may be unable to nurse their calves for the traditional 200-day period. According to Purdue University research, by incorporating distillers grains at 30 or 60 percent of the ration and weaning calves after 100 days, cattle feeders can save money on feed costs with no negative impacts on average daily gain, feed intake and marbling score.

9. Distillers grains improve weight gains despite external factors, such as hot, dry weather. Andy Jenson of Jenson Farms in Nebraska stated that since cattle like the taste of distillers, they eat on a steady basis and gain weight more uniformly, despite changes in weather.

10. Distillers grains provide an economic source of energy, amino acids and phosphorus for hog diets. According to University of Minnesota research, distillers grains improves the digestive health of grower-finisher pigs and may increase the size of litters when sows are fed high levels of distillers grains (30-50% inclusion rate). Roger Zylstra, of Zylstra Hillside Pork near Kellogg, Iowa, adds 30% distillers grains to his hog rations and notes that animal performance is the same while costs are reduced.

** For 22 out of the 25 years prior to enactment of the RFS, large livestock producers were able to purchase corn for a price below the cost of production. This was "sustainable" only because of multi-billion dollar crop support programs in the Farm Bill. This situation gave a competitive advantage to livestock producers (like those in Texas, North Carolina, and Arkansas that control the national livestock groups) who purchase all their corn. Since 2006, the market economics have reversed, thereby benefiting the farmer-feeder over the large livestock producers. When you also factor in the cost advantages of ethanol's feed co-product (distillers grains) it is clear that ethanol production is not "bad" for livestock producers, although ethanol production has played a role in returning corn prices to levels sustainable by market forces, not price support programs.*

Iowa Renewable Fuels Association

Attachment B

Iowa Renewable Fuels Association

The Big Oil Anti-Free Market Agenda

The petroleum industry and its front groups are fond of complaining that renewable fuels, like ethanol and biodiesel, receive special treatment from the federal government in the forms of tax incentives, mandates, and infrastructure programs.

Ironically, this line of attack by Big Oil is simply an effort to divert attention away from the truth: no industry in American history has – and continues – to benefit from federal government subsidies and protections more than petroleum.

	Big Oil	Renewable Fuels
Billions in Tax Subsidies	**Yes**	**No**
Pipeline Loan Guarantees	**Yes**	**No**
Fuel Distribution Monopoly	**Yes**	**No**
Federal Use Mandate	**85%**	**10%**

That is not a level playing field.

Big Oil is Protected by a Federal Petroleum Mandate

The biggest hurdle to consumer fueling choice is the Federal Petroleum Mandate, which requires that the vast majority of fuel you buy be from petroleum.

Most people are unaware that Federal law requires that any fuel you put into your vehicle be first approved by the EPA. Of course gasoline was grandfathered into this system. If you use an unapproved fuel in your car or truck, you are subject to a $37,500 per day fine.

Unless you are one of the four percent of Americans who drive flexible fuel vehicles, the EPA-approved fuels are E0, E10 and E15. From a petroleum perspective that means the approved fuels range from 100% petroleum down to 85% petroleum. American motorists are under an 85% federal petroleum mandate.

If you choose a higher ethanol blend, like E30, because it costs less, performs better and is locally produced, you can be fined each day roughly the amount an average Iowan takes home after taxes during an entire year.

That is not the free market.

Big Oil is the Only Subsidized Fuel

Big Oil has routinely attacked targeted, limited tax credits for alternatives to petroleum fuels, saying the government should not "pick winners and losers." But the facts are different. The only liquid transportation fuels in use today receiving tax subsidies are gasoline and diesel made from oil.

While the tax credits for ethanol and biodiesel have been allowed to expire, today the oil industry enjoys billions in permanent tax subsidies UNIQUE to the petroleum industy. Just a partial list of the billions of dollars of subsidies (some dating back to 1913) available only to the oil industry includes:

- Percentage depletion allowance
- Marginal oil well incentives
- Enhanced oil recovery credits
- Intangible Drilling Costs expensing
- Deduction for tertiary injectants
- Exception from passive loss limitations for oil and gas
- Oil and gas excess percentage over cost depletion

These Big Oil tax subsidies are current and cost the taxpayers billions.

DTN has reported: "Looking at state and federal tax and other incentives available exclusively to the oil industry, DTN's tally comes to $17.9 billion annually."

Western Capital Energy Development notes: "The immediate deduction of the intangible drilling costs is very significant, and by taking this up front deduction, the risk capital is effectively subsidized by the government by reducing the participant's federal, and possibly state income tax." (emphasis added)

Investopedia.com adds: "No other investment category in America can compete with the smorgasbord of tax breaks that are available to the oil and gas industry."

Buried deep on its website the **American Petroleum Institute's** even brags: "Taxpayers have had the option to expense [intangible drilling costs] since the inception of the Tax Code."

After 100 years of subsidies it is fair to ask: When will Big Oil be able to stand on its own two feet without a taxpayer crutch?

Big Oil Uses Monopoly to Thwart Competition

Given 100 years of government support, Big Oil has created a near fuel distribution monopoly. Today a small number of companies control the refineries, they control what goes into the pipelines, and thereby they often control what can be sold at the "independent" corner gasoline station.

The impact of Big Oil's monopoly is very real and very powerful.

Consider this, even though E15 has cleared the mountain of federal regulations (anti-free market barriers to entry) to become a legal fuel, Big Oil will still be able to freeze E15 out of entire markets for much of the year.

In Iowa we have consumers that want to buy E15 and we have retailers that want to sell E15. Some of those retailers are "branded" by Big Oil and their contracts won't allow it. <u>But Big Oil can even prevent E15 from being sold by the independent retail stations in the summer.</u>

From September 16th through the end of May, we can blend 15 percent ethanol with the type of gasoline typically found in Iowa that is blended with standard 10 percent ethanol. So E15 could be sold during that time. But due to discriminatory federal fuel regulations, from June 1st through September 15th we will not be allowed to make E15 using the same gasoline as we do to blend E10.

Further, Big Oil has made it clear that it has no intention of putting a gasoline in the pipelines to Iowa that is necessary for blending with 15 percent ethanol under the federal regs. That is a clear example of how Big Oil's fuel distribution monopoly can prevent free market competition and thwart the will of those retailers and consumers who want to use E15.

<u>Big Oil Fights Against Free Market Competition/Consumer Fuel Choice</u>

The petroleum industry spends tens of millions of dollars each year in a multi-faceted effort to maintain its "most favored fuel" status within federal energy policy. <u>Big Oil repeatedly takes legislative, regulatory, and judicial actions to protect its near monopoly on the US liquid fuel supply.</u> Big Oil does not want a level playing field or free market competition.

Consider just some of Big Oil's recent actions:

1. Big Oil sued the EPA to prevent the sale of E15.

2. Big Oil sued the EPA to rollback the 2011 federal biodiesel RFS requirement.

3. Big Oil hypocritically lobbied to preserve its federal tax breaks as "necessary" while urging Congress to end incentives for renewable fuels.

4. Big Oil lobbied Congress to use an appropriations gimmick to ban E15 from entering the marketplace.

5. Big Oil uses its near monopoly power over petroleum distribution to prevent the proper E15 summertime blendstock from being widely available.

6. Big Oil bars its branded retailers from selling higher ethanol blends like E15 or E85 under the canopy or listing the fuels on their pricing signs.

7. Big Oil urged the EPA to adopt an absurdly anti-E15 mandatory pump label while resisting pump labels informing consumers of the concentration of known human carcinogens in petroleum fuels.

8. Big Oil opposes country-of-origin labeling for gasoline, thereby denying consumers the ability to choose domestic options.

Iowa Renewable Fuels Association

Attachment C

Iowa Renewable Fuels Association

Big Oil Uses Petroleum Distribution Monopoly to Thwart Competition

Given a century of government subsidies and loan guarantees, Big Oil has created what amounts to a fuel distribution monopoly. Today a small number of companies control the refineries, they control what goes into the pipelines, and thereby they often control – and limit – what can be sold at the "independent" corner gasoline station.

The impact of Big Oil's petroleum distribution monopoly is very real and very powerful.

What is the petroleum distribution monopoly?

Pipelines provide the most cost-effective mode of transporting liquid fuels. Today, many of the pipeline/terminal system are owned and operated by independent companies. But the real control over fuel supplies remains with the refiners. The refiners decide what products are put into a pipeline and at what fuel terminals those products are taken out.

Therefore, even if the refiners put gasoline suitable for blending with 15% ethanol into a pipeline system, they can dictate it only be taken out at Kansas City and Chicago, for example. By not providing the E15 blendstock to Iowa terminals, Big Oil can effectively control the fuel choices offered at a corner gas station in Iowa. That is a clear example of how Big Oil's fuel distribution monopoly can prevent free market competition and thwart the will of those retailers and consumers who want to use E15.

Why can't the same gasoline used for E10 be used for E15?

Federal regulations dictate that conventional fuels during the summer (June 1 through September 15) adhere to a 9 psi limit on the Reid vapor pressure (RVP) scale (a measure of volatility of the fuel). The fuel volatility cap helps to reduce evaporative emissions.

When ethanol accounts for a minority of a fuel blend, the blended product will have a higher vapor pressure than the gasoline blendstock alone. However, in recognition of ethanol's ability to reduce tailpipe emissions, the EPA long ago granted E10 a 1 psi waiver from the 9 psi RVP summer limit. Therefore, E10 blends can have an RVP of up to 10 psi.

Even though the positive emissions impact of E15 is even greater than E10, the EPA has not granted E15 a similar one pound waiver. As a result, refiners can send a traditional 9 psi gasoline to Iowa in the summer for blending to E10 (it meet the 10 psi cap for E10). But blending 15% ethanol with that gasoline would result in a blend over the 9 psi cap for fuels other than E10.

During the winter fuel season (Sept. 16 through May 30) there is no RVP cap for conventional fuels. Therefore, the same 9 psi fuel can be used to blend both E10 and E15. So without another resolution, E15 sales will be very limited or non-existent until September 16.

What can be done to break the petroleum distribution monopoly?

Little can be done to prevent a tiny number of refiners from controlling what products go into any given pipeline system. However, steps can be taken to lessen the power of refiners to leverage their petroleum distribution monopoly to limit consumer fueling options.

Congress or the EPA could equalize the summertime RVP limits for E10 and E15. Either both ethanol blends could be granted the one pound waiver or both fuels could be held to the standard 9 pound limit. IRFA supports either alternative. If both E10 and E15 had the same RVP limit then the same gasoline could be blended with both – preventing Big Oil from using the regulatory quirk to limit consumer fuel choices.

In the meantime, an oil refiner could choose to make an E15 blendstock available in Iowa. The oil industry continually insists that the small number of refiners that service any given market does not prevent competition, but you couldn't tell that from looking at retailer efforts to offer E15 in Iowa. Only one refiner needs to decide to offer the gasoline suitable for blending E15 in Iowa. After all, a suitable blendstock is already delivered to Kansas City's low-RVP market using the same pipeline that goes through Iowa.

Why not simply go around the pipeline monopoly?

Iowa has no refineries. To transport products like E15 by truck instead of pipelines is costly and can result in the ethanol price savings being eaten up by the added transportation costs. For example, IRFA was recently quoted 17.5 cents per gallon to truck the low RVP gasoline from Kansas City to Iowa. This would eat up the 5-10 cents per gallons savings from the additional ethanol and result in E15 being higher priced than E10.

In short, there are no cost-effective ways to circumvent the pipeline system and the refiners control over it.

So how can E15 move forward?

There are Iowa consumers that want to buy E15 and there are Iowa retailers that want to sell E15. While IRFA is exploring solutions for this summer, we are working hard to make a big E15 push starting September 16. If sales of E15 are strong this fall and winter, we hope at least one refiner will break the monopoly and offer gasoline suitable for blending E15 in Iowa next summer. IRFA will also be pushing the EPA and/or Congress to equalize the summer RVP caps for E10 and E15 by June 1, 2013.

IRFA encourages consumers interested in lower cost, home grown E15 to contract your federal representatives and local fuel retailers expressing your support for E15. Iowa needs fueling independence and consumers demand real choices at the pump – not Big Oil dictates.

Iowa Renewable Fuels Association

Attachment D

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CONTRIBUTION OF THE RENEWABLE FUELS INDUSTRY TO THE ECONOMY OF IOWA: 2002-2011

Prepared for the Iowa Renewable Fuels Association

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June 15, 2012

The renewable fuels industry has grown spectacularly over the past decade and Iowa has been a major participant and beneficiary. Iowa is the nation's largest producer of both ethanol and biodiesel. Between 2002 and 2011 U.S. ethanol production increased 552% while output in Iowa grew from 440 million gallons in 2002 to 3.7 billion gallons in 2011, an increase of 741%. The biodiesel industry is both younger and smaller than the ethanol industry, but Iowa accounts for more than 15% of national biodiesel output producing 169 million gallons in 2011 compared to approximately 10 million gallons in 2002, an increase of nearly 1600%.

Ethanol and biodiesel producers are part of a manufacturing sector that adds substantial value to agricultural commodities produced in Iowa and makes a significant contribution to the Iowa economy. Virtually all of the ethanol and biodiesel produced in Iowa is produced from corn and soybean oil and other fats produced and refined in Iowa. Since feedstocks account for the largest share of production costs and most other inputs -- from labor to electricity and natural gas -- are procured locally, the Iowa economy benefits more directly from renewable fuels production than most other states.

As discussed in greater detail below, key findings of the analysis include the following points:

- The economic activity associated with agriculture output created by the renewable fuels industry increased from 4.6% of the value added to Iowa's economy by agriculture in 2002 to more than 37% in 2011.
- The price of farm land in Iowa has tripled over the past decade with the average price for all grades of cropland increasing from $2,083 per acre in 2002 to $6,708 in 2011. When viewed in the context of the number of acres planted to principal crops, the aggregate value of cropland in Iowa has increased from $51.2 billion in 2002 to $165.9 billion in 2011, an increase of 224%.
- In 2002 the renewable fuels industry was a negligible component of Iowa's manufacturing sector. By 2011, ethanol and biodiesel production accounted for nearly 7% of manufacturing sector output.
- The total number of jobs in the entire Iowa economy supported by the renewable fuels industry (including agriculture) has grown from about 3,500 full-time equivalent jobs in 2002 to more than 79,000 in 2011, an increase of more than 2000%. By 2011, the renewable fuels industry directly or indirectly supported 5.4% of Iowa employment.
- The renewable fuels industry has added $12.9 billion of income to the pockets of Iowans over the past decade.
- The renewable fuels industry has generated $1.8 billion of tax revenue for Iowa over the past decade.

Table 1 summarizes the growth in Iowa ethanol and biodiesel production, use of corn for ethanol and fats and oils for biodiesel production, and total expenditures for renewable fuels production from 2002 to 2011.

Table 1
Renewable Fuel Production, Feedstock use, and Expenditures
2002-2011

	Ethanol Production (Mil Gal)	Biodiesel Production (Mil Gal)	Corn Used (Mil bu)	Fats & Oils Used (Mil lb)	Ethanol Expenditures (Mil $)	Biodiesel Expenditures (Mil $)
2002	440	10	160	75.5	$502.8	$16.8
2003	598	10	217	75.5	$719.8	$21.7
2004	859	15	312	113.3	$1,079.9	$39.4
2005	1100	20	400	151.0	$1,451.7	$42.3
2006	1500	60	545	453.0	$2,201.3	$134.8
2007	1900	70	691	528.5	$3,616.1	$241.0
2008	2750	80	1,000	604.0	$6,785.1	$357.5
2009	3200	85	1,164	641.8	$5,945.5	$265.9
2010	3500	48	1,273	362.4	$7,063.2	$173.4
2011	3700	169	1,345	1,276.0	$10,952.5	$805.9

Source: EIA; USDA; IRFA

Methodology

The spending associated with renewable fuels production circulates throughout the entire Iowa economy several fold. Consequently this spending stimulates aggregate demand, supports the creation of new jobs, generates additional household income, and provides tax revenue for the State and local governments. We estimated the impact of the renewable fuels industry on the Iowa economy over the past decade by applying expenditures by the relevant supplying industry to the appropriate final demand multipliers for value added output, earnings, and employment.

The multipliers used in this study are from the IMPLAN (Impact Analysis for Planning) economic impact model for Iowa and were based on 2010 data. IMPLAN models provide three economic measures that describe the economy: value added, income, and employment.

- Value added is the total value of the goods and services produced by businesses in the county and are generally referred to as GDP. It is equivalent to the sum of labor income, taxes paid by the industry, and other property income or profit.
- Labor income is the sum of employee compensation (including all payroll and benefits) and proprietor income (income for self-employed work). In the case of this analysis,

demand for corn, soybeans, and other feedstocks to produce ethanol and biodiesel supports farm income through higher crop receipts than would be the case without biofuel production. The impact of this higher farm income is evaluated on a gross basis in this analysis. That is, the model does not factor in the distributional effects on consumers from higher grain and oilseed prices (i.e. reduced spending on non-food goods and services).

- Employment represents the annual average number of employees, whether full or part-time, of the businesses producing output. Income and employment represent the net economic benefits that accrue to Iowa as a result of increased economic output.

Three types of effects are measured with a multiplier: direct, indirect, and induced effects. The direct effect is the known or predicted change in the economy. The indirect effect is the business-to-business transactions required to produce the direct effect (i.e. increased output from businesses providing intermediate inputs). Finally, the induced effect is derived from spending on goods and services by people working to satisfy the direct and indirect effects (i.e. increased household spending resulting from higher personal income).

Contribution of the Renewable Fuels Industry

The contribution of the renewable fuels industry to Iowa over the past decade is detailed in Table 2. This reflects the total impact on GDP and earnings from ethanol and biodiesel manufacturing and the agriculture sector, and the direct, indirect and induced impact on employment.

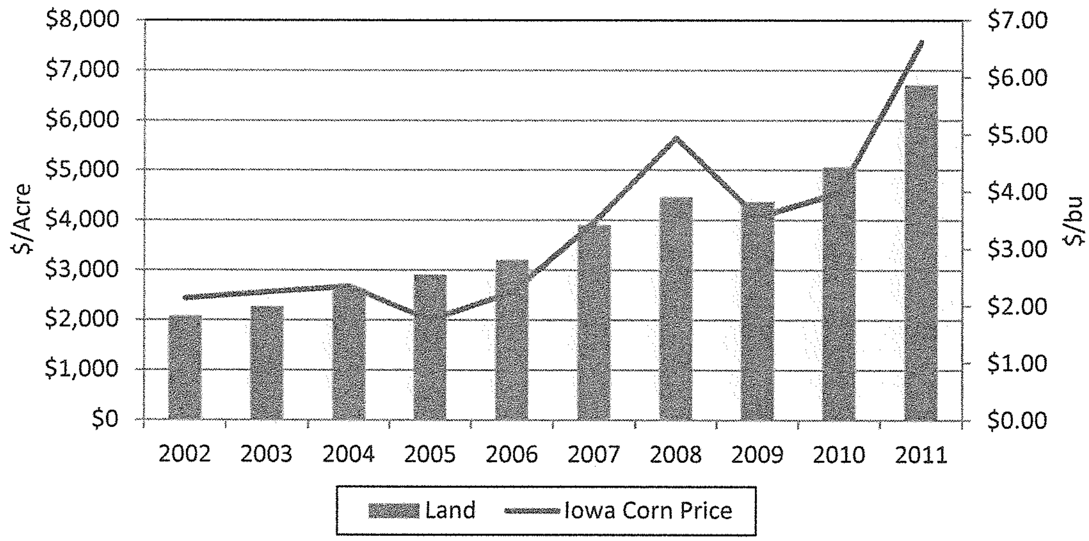
Table 2
Contribution of the Renewable Fuels Industry to Iowa

	GDP (Mil $2012)	Earnings (Mil 2012$)	Estimated Tax Revenue (Mil 2012$)	Direct (Jobs)	Indirect (Jobs)	Induced (Jobs)	Total (Jobs)
2002	$245.5	$157.7	$21.4	1,447	1,127	942	3,516
2003	$350.3	$225.1	$30.7	2,047	1,629	1,345	5,020
2004	$528.9	$339.7	$47.3	3,096	2,448	2,029	7,573
2005	$705.9	$453.7	$65.0	4,137	3,270	2,709	10,116
2006	$1,104.6	$708.1	$103.1	6,498	5,034	4,229	15,762
2007	$1,824.0	$1,168.7	$170.8	10,469	8,559	6,980	26,008
2008	$3,376.7	$2,166.0	$313.4	19,248	16,051	12,936	48,235
2009	$2,935.9	$1,884.5	$263.9	16,980	13,749	11,255	41,984
2010	$3,418.6	$2,198.1	$307.8	19,853	16,044	13,127	49,025
2011	$5,561.6	$3,561.5	$502.7	31,085	26,871	21,272	79,229

The most significant contribution to Iowa from the renewable fuels industry comes from agriculture. This is not surprising considering the importance of feedstocks (corn, soybean oil, and other fats and oils) as inputs for biofuels production. For example the amount of corn required to produce Iowa's ethanol industry increased from an estimated 160 million bushels, or 8.1% of Iowa's corn crop) in 2002 to 1,345 million bushels in 2012, or 57% of Iowa corn production. Since most, if not all, of this corn is grown and marketed by Iowa farmers the ethanol industry contributes a significant share of cash receipts (income) for farmers. Similarly most of the soybean oil and other biodiesel feedstocks are produced in Iowa from soybeans grown by Iowa farmers and fats supplied by Iowa livestock producers.

One indication of the impact of increased demand and revenue from corn and soybeans is reflected in the price of farm land. Figure 1 contrasts the average price of farmland (all grades) with the price of corn over the past decade.

Figure 1
Iowa Farm Land and Corn Prices



Source: Iowa State University.

Corn prices have become imbedded in farmland prices. According to the Iowa Land Value Survey conducted and published by Iowa State University the price of farm land in Iowa has tripled over the past decade with the average price for all grades of cropland increasing from $2,083 per acre in 2002 to $6,708 in 2011[1]. This has provided a significant boost to the net worth of Iowa farmers. When viewed in the context of the number of acres planted to principal crops, the aggregate value of cropland in Iowa has increased from $51.2 billion in 2002 to $165.9 billion in 2011, an increase of 224%.[2] While not all of this gain is directly linked to the renewable fuels industry, higher demand for corn and soybeans for oil to produce ethanol and biodiesel has played a significant role in supporting the increase in agricultural land values.

[1] http://www.extension.iastate.edu/agdm/wholefarm/html/c2-72.html

[2] Source: USDA/NASS Crop Production Annual Summary. Crops included are corn, sorghum, oats, barley, rye, winter wheat, Durum wheat, other spring wheat, rice, soybeans, peanuts, sunflower, cotton, dry edible beans, potatoes, canola, proso millet, sugar beets, and all hay.

Over the past decade the renewable fuels industry has:

- Increased the size of the Iowa economy. The contribution of renewable fuels to Iowa GDP has increased from 0.2% in 2002 to nearly 4% in 2011. The GDP associated with agriculture output created by the renewable fuels industry increased from 4.6% to more than 37% of Iowa GDP originating in agriculture between 2002 and 2011. In 2002 the renewable fuels industry was a negligible component of Iowa's manufacturing sector. By 2011, ethanol and biodiesel production accounted for nearly 7% of manufacturing sector output.

- Jobs are created from the economic activity supported by ethanol and biodiesel production. While ethanol and biodiesel production is not a labor-intensive industry, the economic activity resulting from the full activities of the biofuels industry supports a much larger number of jobs in the economy. Since renewable fuels production uses feedstocks produced by Iowa farmers, the ethanol and biodiesel industry has the largest impact on agriculture, supporting as many as 28,500 direct farm and farm-related jobs. Most of the agriculture jobs supported by the renewable fuels industry are farm workers and laborers associated with grain and oilseed production. However, a wide range of jobs in support activities related to crop production ranging from farm managers and bookkeepers to farm equipment operators are supported by biofuel production. When the indirect and induced effects are considered, the total number of jobs in the entire Iowa economy supported by the renewable fuels industry (including agriculture) has grown from about 3,500 full-time equivalent jobs in 2002 to more than 79,000 in 2011. By 2011, the renewable fuels industry directly or indirectly supported 5.4% of Iowa employment. Increased economic activity and new jobs result in higher levels of income for Iowans.

- The renewable fuels industry has added an aggregate $12.9 billion in income to the pockets of Iowa households over the past decade.

- The renewable fuels industry also has contributed to Iowa in terms of tax receipts from personal and corporate income. Using tax revenue as a share of GDP as a basis for computation, the increase in economic activity supported by the renewable fuels industry has generated $1.8 billion of tax revenue for Iowa over the past decade.

Caveats

This analysis focuses on the impact to the Iowa economy from production of ethanol and biodiesel over the past decade. Absent from the analysis is the impact of construction from new capacity. As indicated above, more than 3 billion gallons of new ethanol and 200 million gallons of biodiesel capacity were constructed in Iowa over the past decade. The expenditures associated with this construction activity totaled more than $6.5 billion over the decade. The size of the impact of this activity on Iowa was dependent on the share of equipment and materials procured from Iowa manufacturers and the length of construction activity. The economic activity from construction is transient, that is, it ends when construction is completed and is replaced by the permanent activity generated by ongoing operations. Reflecting this, the estimates discussed in this report are conservative.

Conclusion

The renewable fuels industry has emerged as a major contributor to the Iowa economy over the past decade in virtually all measures. Perhaps the most significant contribution of ethanol and biodiesel production is the increased demand for corn, soybean oil, and other agricultural products produced in Iowa. The growth of biofuel production has generated cash income for Iowa farmers and improved net worth by supporting increases in the value of their major asset – farmland.

Importantly the number of jobs in all sectors of the economy supported by the renewable fuels industry has become a significant source of employment for Iowans.

As the renewable fuels industry expands and diversifies regarding new feedstocks and technology the contribution of renewable fuels to Iowa will continue to expand. New feedstocks will create new market opportunities for Iowa farmers and new technologies will require new capital expenditures..

Iowa Renewable Fuels Association

Attachment E

National Corn Statistics:
Average Cost of Production vs. Average Price Per Bushel

Year[1]	Cost per Acre[2]	Yield[3]	Production Cost per Bushel (calculated)	Average Price per Bushel[3]	Below Cost Differential (calculated)	
2011	$537.34	147.2	$3.65	$6.20	$2.55	
2010	$542.90	152.8	$3.55	$5.18	$1.63	
2009	$550.70	164.7	$3.34	$3.55	$0.21	
2008	$529.38	153.9	$3.44	$4.06	$0.62	RFS
2007	$443.97	150.7	$2.95	$4.20	$1.25	
2006	$409.74	149.1	$2.75	$3.04	$0.29	
2005	$386.88	147.9	$2.62	$2.00	($0.62)	
2004	$377.50	160.3	$2.35	$2.06	($0.29)	
2003	$354.41	142.2	$2.49	$2.42	($0.07)	
2002	$334.31	129.3	$2.59	$2.32	($0.27)	
2001	$348.53	138.2	$2.52	$1.97	($0.55)	
2000	$378.32	136.9	$2.76	$1.85	($0.91)	
1999	$364.73	133.8	$2.73	$1.82	($0.91)	
1998	$362.86	134.4	$2.70	$1.94	($0.76)	
1997	$363.73	126.7	$2.87	$2.43	($0.44)	
1996	$353.94	127.1	$2.78	$2.71	($0.07)	
1995	$333.42	113.5	$2.94	$3.24	$0.30	
1994	$321.47	138.6	$2.32	$2.26	($0.06)	
1993	$287.10	100.7	$2.85	$2.50	($0.35)	
1992	$302.33	131.5	$2.30	$2.07	($0.23)	
1991	$292.55	108.6	$2.69	$2.37	($0.32)	
1990	$292.52	118.5	$2.47	$2.28	($0.19)	
1989	$284.89	116.3	$2.45	$2.36	($0.09)	
1988	$262.57	84.6	$3.10	$2.54	($0.56)	
1987	$244.57	119.8	$2.04	$1.94	($0.10)	
1986	$243.12	119.4	$2.04	$1.50	($0.54)	
1985	$277.01	118	$2.35	$2.23	($0.12)	
1984	$289.02	106.7	$2.71	$2.63	($0.08)	
1983	$258.45	81.1	$3.19	$3.21	$0.02	
1982	$270.86	113.2	$2.39	$2.55	$0.16	
1981	$278.60	108.9	$2.56	$2.50	($0.06)	

Footnotes

1 Corn Marketing Year

2 USDA http://www.ers.usda.gov/Data/CostsAndReturns/testpick.htm

3 USDA National Agricultural Statistics Service: http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats_1.0/index.asp

Iowa Renewable Fuels Association

Attachment F

The Impact of Ethanol Production on U.S. and Regional Gasoline Markets: An Update to 2012

Xiaodong Du and Dermot J. Hayes

Working Paper 12-WP 528
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Abstract

We update the findings of the impact of ethanol production on U.S. and regional gasoline markets as reported previously in Du and Hayes (2009 and 2011), by extending the data to December 2011. The results indicate that over the period of January 2000 to December 2011, the growth in ethanol production reduced wholesale gasoline prices by $0.29 per gallon on average across all regions. The Midwest region experienced the biggest negative impact of $0.45/gallon, while the regions of East Coast, West Coast, and Gulf Coast experienced negative impacts of similar magnitudes around $0.20/gallon. Based on the data of 2011 only, the marginal impacts on gasoline prices are found to be substantially higher given the increasing ethanol production and higher crude oil prices. The average effect across all regions increases to $1.09/gallon and the regional impact ranges from $0.73/gallon in the Gulf Coast to $1.69/gallon in the Midwest.

Introduction

The impact of US ethanol production on national and regional gasoline prices has been evaluated in Du and Hayes (2009 and 2011). Du and Hayes (2009) was based on data that was available prior to 2008. The results were updated in Du and Hayes (2011) using the data of January 2000-December 2010. Since then, US transportation fuel markets, including ethanol and gasoline markets, have experienced significant changes. Average crude oil price increased from about \$80/barrel in 2010 to about \$95/barrel in 2011. Correspondingly, average U.S. wholesale gasoline prices have risen 30% from 2010-2011. A wider than normal price differential between ethanol and gasoline prices provides further economic incentives for ethanol production and consumption, which reached approximately 13.9 billion gallons by the end of 2011 (see Figure 1). The purpose of this report is to update the earlier analysis using an additional year of historical data.

We calculate the average impact of ethanol production both nationally and regionally over the period of January 2000-December 2011 and specifically for 2011. Estimation results indicate that on average, over the whole sample period and all five PADDs (Petroleum Administration for Defense Districts), the growth in ethanol production reduced wholesale gasoline prices by \$0.29/gallon. The Midwest region (PADD II) experienced the biggest negative impact of \$0.45/gallon, while the other regions such as East Coast (PADD I), West Coast (PADD V), and Gulf Coast (PADD III) had similar negative impacts around \$0.20/gallon. Based on the data of 2011 only, the marginal impacts on gasoline prices are found to be substantially higher given the dramatic increase in ethanol production and higher crude oil prices. The national average effect increases to \$1.09/gallon and the regional impact ranges from \$0.73/gallon in the Gulf Coast to \$1.69/gallon in the Midwest.

The impact of ethanol production on wholesale gasoline prices

Here we briefly describe the updates and changes to Du and Hayes (2009 and 2011). In the current study, we extend the sample period to January 2000-December 2011.

Dependent variables

As in the previous studies, two dependent variables, the crack ratio and the crack spread, are employed.

(a) The crack ratio (π_{CR}) is defined as the relative gasoline price to the price of crude oil,

(1) $$\pi_{CR} = P_G * 42 / P_O$$

where P_G is the average wholesale gasoline price ($/gallon), and P_O is the U.S. crude oil composite acquisition cost to refiners ($/barrel).

(b) The crack spread (π_{CS}) represents the refinery's profit margin and is defined as the price differential between the crude oil and refinery products,

(2) $$\pi_{CS} = \frac{2}{3} P_G * 42 + \frac{1}{3} P_H * 42 - P_O$$

where P_H is the wholesale price of No. 2 distillate fuel ($/gallon). The crack spread is deflated by the Producer Price Index (PPI) of crude energy material. Monthly data of all related prices are collected from Energy Information Administration (EIA) website.

Explanatory variables

As described in Du and Hayes (2009), explanatory variables include monthly U.S. ethanol production, monthly seasonal dummies (January to November), monthly crude oil ending stocks (excluding the Strategic Petroleum Reserve (SPR)), total motor gasoline ending stocks, complexity-adjusted refinery capacity, the HHI index representing regional refinery market concentration, dummy variables for September and October 2005 representing the unexpected supply disruptions induced by Hurricanes Katrina and Rita, and regional gasoline imports. Du and Hayes (2009) provides justifications for the included variables.

Estimation

A fixed-effects panel data model is specified as

(3) $$\pi_{it} = \alpha_i + X_{it}^{'} \beta + \varepsilon_{it} \qquad i = 1,...,N; t = 1,...T.$$

where $i = 1,...,N$ denotes the cross-section dimension, the PADD regions, and $t = 1,...T$ denotes the time-series dimension. π_{it} is the crack ratio (crack spread) on the i th region for time period t. X_{it} is the K-dimensional vector of explanatory variables listed above.

The parameter estimates for the crack ratio and crack spread are reported in Table 1. All explanatory variables have the expected signs and largely consistent with previous studies. Evaluating at the sample mean, the wholesale gasoline price is lowered by $0.29/gallon due to ethanol production. This is equivalent to a 17% reduction over what gasoline prices would have been without ethanol production.

We use the crack ratio to quantify the gasoline price impact. Specifically, the change of wholesale gasoline price, -0.29/gallon, is calculated as:

$$\begin{aligned}\text{Price change} &= \text{estimated coefficient} \times \text{Average ethanol production} \times \text{Average crude oil price (\$/gallon)}\\ &= -0.0000175 \times 12324.61 \times \frac{57.10\ (\$/\text{barrel})}{42}\\ &= -0.2932\ (\$/\text{gallon})\end{aligned}$$

where the sample average ethanol production and crude oil price are employed.

Regional analysis

The crack ratio is employed as the dependent variable for the regional analysis. Ordinary Least Squares (OLS) estimation results are reported in Table 2. The results indicate that ethanol production has a significant and negative effect on wholesale gasoline prices in all regions. The Midwest has the largest impact of $0.45/gallon. The other regions such as East Coast, West Coast, and Gulf Coast experience negative impacts of similar magnitude on gasoline prices, which is around $0.20/gallon. The Rocky Mountain region has a $0.30/gallon reduction in wholesale gasoline prices. The impacts are estimated based on the data for the whole sample period. The change of gasoline price in a regional market, for example, $0.45/gallon in the Midwest region (PADD II), is calculated as

$$\text{Price change} = \text{estimated coefficient} \times \text{Average ethanol production} \times \text{Average crude oil price (\$/gallon)}$$

$$= -0.000027 \times 12324.61 \times \frac{57.10 \text{ (\$/barrel)}}{42}$$

$$= -0.4524 \text{ (\$/gallon)}$$

Basing only on the data of 2011, we calculate the marginal impact of increasing ethanol production on wholesale gasoline prices. We find that the average effect across regions increases to $1.09/gallon and the regional impact ranges from $0.73/gallon in the East Coast to $1.69/gallon in the Midwest. The average and marginal effects of ethanol production on the US and regional markets are summarized in Table 3.

Why do the regional impacts vary so much?

In our original analysis we had hypothesized that the impact of national production ethanol should have had a greater impact on PADDs where ethanol penetration is greatest and we used the larger estimated impact in the Midwest as evidence in support of the ethanol impact hypothesis. The PADDs are also very different in terms of their economic conditions, oil and petroleum characteristics, oil related pipeline infrastructure, and local product supply and demand conditions. Therefore one would expect different gasoline price impacts for each region, especially because we estimate different parameters for each region.

Because of its high population density, the East Coast (PADD I) has the highest demand for refined products in the country, but it has very limited refinery capacity. Its regional demand is largely satisfied by the Gulf Coast and by foreign imports. The Midwest PADD II is distinct in its coexistence of a highly industrialized section and a rural agricultural section. Much of the crude oil used in the Midwest is piped in from the Gulf Coast and Canada. The Gulf Coast region (PADD III), including Texas, Louisiana, New Mexico, Arkansas, Alabama, and Mississippi, produces over 50% of the nation's crude oil and 47% of its final refined products. This region also serves as a national hub for crude oil and is the center of the pipeline system. It also exports gasoline. The Rocky Mountain region, or PADD IV, has the smallest and fastest-growing oil market in the U.S. With only 3% of national petroleum product consumption, it has the lowest ethanol penetration. The West Coast region, PADD V, is independent of other regions since it is geographically separated by the Rocky Mountains. In addition, the refinery market of this region is highly concentrated. Given this regional differentiation in our explanatory variables, it is not surprising that we end up with different estimates of the impact of ethanol.

Why are the 2011 results so large?

The results for 2011 are very large. These results may be questionable because we multiply a mean coefficient that is estimated over the entire sample period against data that is specific to the end of the sample period. We can be much more confident in the statistical accuracy of the estimated average impact but this estimate is not relevant to the current debate because ethanol production has surged since the mid point of the historic data. With higher crude oil price and expanding ethanol production, the marginal impact of ethanol growth on gasoline prices becomes increasingly pronounced.

The surge in ethanol production in recent years has essentially added 10% to the volume of fuel available for gasoline powered cars and in so doing it has allowed the US to switch from being a major importer of finished gasoline to a major exporter of both gasoline and ethanol. Countries that switch trade patterns in this way will see dramatic price impacts because internal prices switch from world prices *plus* transportation costs to world prices *minus* transportation costs. In the early period, the US gasoline price had to be equal to the EU gasoline price plus the costs of transporting the gasoline from the EU to the US. Now that ethanol has allowed the US to reverse this trade pattern, US prices are lower than EU gasoline prices by an amount equal to transportation costs. In this context a $1.09 per gallon marginal impact for 2011 seems reasonable.

How does the lower energy density of ethanol affect the results?

The gasoline price that we use is the "Wholesale/Resale Price by Refiners" taken from EIA website. These prices are averaged over grade (regular, midgrade and premium) and formulation (conventional, oxygenated, and reformulated). This is the wholesale gasoline that retailers buy. Since these are finished motor gasolines, not the gasoline blendstock, the price will already include ethanol where it is blended. Ethanol has lower energy content per gallon than gasoline and this raises the question of how our results might differ on a cost-per-mile basis reflecting the slightly lower energy content of ethanol-blended gasoline compared to unblended gasoline. .

According to EPA, "the theoretically expected decrease in fuel energy as a result of oxygenate use is in the 2% to 3% range when compared to gasoline. This corresponds to 0.5 to 0.8 miles per gallon for a car that averages 27 miles per gallon."[1] This means a driver using ethanol-blended gasoline would have to fill up his car slightly more often in order to travel the same distance as he would if he were using unblended gasoline. Using a gasoline price of $3.50 per gallon, a 2.5% reduction in energy value would equate to $0.087 per gallon. In theory, this means a gallon of gasoline blended with 10% ethanol would need to be priced at $3.41 per gallon to provide the same cost per mile as a gallon of unblended gasoline priced at $3.50 per gallon. However, ethanol is blended with gasoline primarily for its additive properties, such as boosting octane and oxygen content, not strictly as a source of energy for combustion. Regardless, the impact of ethanol's lower energy content on gas prices is much smaller than the price impacts we have measured and does not change the overall conclusions of our analysis. .

References

Du, X., and D.J. Hayes. 2009. The impact of ethanol production on US and regional gasoline markets. *Energy Policy* 37: 3227-3234.

Du, X., and D.J. Hayes. 2011. The impact of ethanol production on US and regional gasoline markets: an update to May 2009. CARD Working Paper 11-WP 523. Center for Agricultural and Rural Development, Iowa State University.

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[1] See (http://www.epa.gov/otaq/regs/fuels/ostp-3.pdf)

Table 1. Estimation results for the fixed effects model on the crack ratio and crack spread

Variable	Crack Ratio		Crack Spread	
	Estimate	Std. Err.	Estimate	Std. Err.
Oil stock	3.05e-06***	5.66e-07	6.89e-05***	1.10e-05
Gasoline stock	1.78e-06	1.58e-06	-2.11e-05	3.08e-05
Equivalent Refinery capacity	2.71e-06	2.30e-6	1.36e-04***	4.48e-5
Ethanol production	-1.75e-5***	6.97e-07	-.00016***	1.36e-05
Supply disruption	.09**	.04	.15	.71
Gasoline import/export	-8.26e-6**	2.28e-06	-1.70e-4***	4.45e-05
HHI	2.60e-5	3.31e-5	0.001	0.0006
January	0.01	.02	0.15	.39
February	0.02	.02	0.74*	.39
March	.09***	.02	1.85***	.39
April	.14***	.02	2.92***	.39
May	.17***	.02	3.51***	.39
June	.12***	.02	2.77***	.39
July	.08***	.02	2.18***	.39
August	.08***	.02	2.66***	.39
September	.08***	.02	3.11***	.39
October	.05**	.02	2.34*	.40
November	.01	.02	0.71	.39

Note: Single (*), double (*), and triple (***) asterisks denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 2. Regression results for the crack ratio with individual PADD regional data

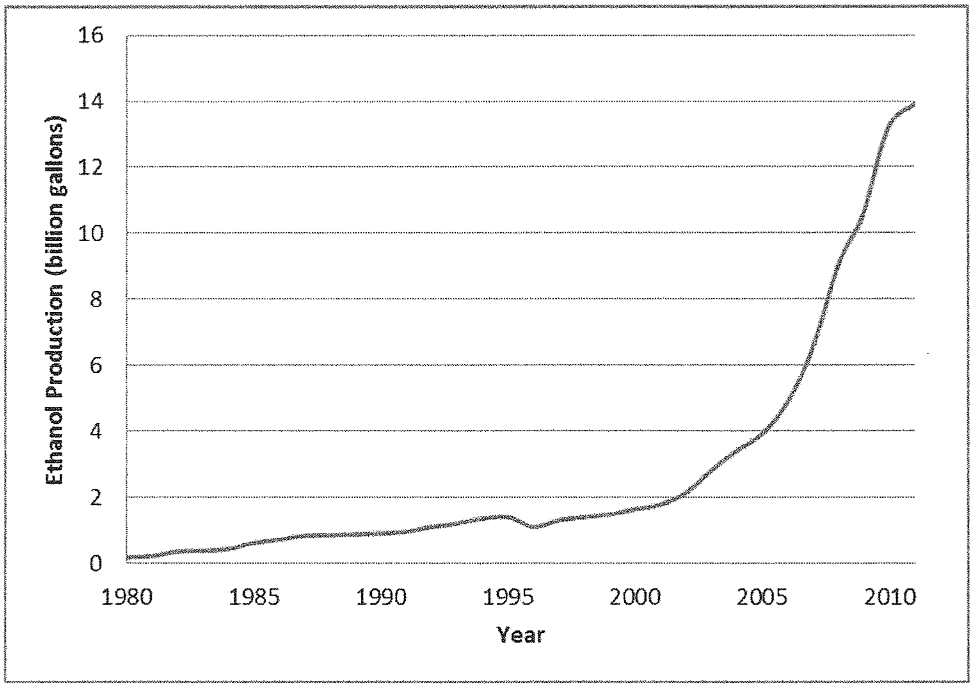
Variable	PADD I	PADD II	PADD III	PADD IV	PADD V
Oil stock	3.99e-6	6.78e-6***	2.04e-6***	2.51e-5	4.01e-6
Gasoline stock	-5.78e-6**	-5.57e-6	2.15e-6	-2.50e-5	2.34e-7
Refinery capacity	-1.92e-5**	1.11e-5	-1.17e-6	2.41e-5	-6.15e-5***
Ethanol production	-.0000121***	-0.000027***	-.0000116**	-.0000178**	-.0000138**
Supply disruption	.18***	0.04	.19**	.13	.05
Gasoline import/export	-3.45e-6	.0005**	-1.59e-5	.004**	.00003
HHI	-.0001***	-.0003	-.00005	.0003*	.00004
January	.04	.06	.02	.01	.02
February	.01	.04	.02	.04	.06
March	.05	.07	.06	.09*	.16***
April	.11***	0.10**	.10***	.12**	.19***
May	.15***	.17***	.12***	.19***	.18***
June	.10**	.13***	.07**	.16***	.13**
July	.06	.07*	.04	.12***	.09
August	.02	.09**	.04	.13***	.09
September	-.009	.09**	0.03	.15***	.11*
October	-.03	.04	0.002	.08*	.08
November	-.02	.001	-.002	.04	.04
Constant	2.25***	1.25***	1.06***	.91	3.15***
R^2	.69	.71	.61	.69	.63

Note: Single (*), double (*), and triple (***) asterisks denote significance at the 0.10, 0.05, and 0.01 levels, respectively.

Table 3. The negative impact of ethanol production on wholesale gasoline prices (in $/gallon)

	Average across regions	PADD I (East Coast)	PADD II (Midwest)	PADD III (Gulf Coast)	PADD IV (Rocky Mountain)	PADD V (West Coast)
Average effect (based on monthly data of 01/2000-12/2011)	0.29	0.20	0.45	0.19	0.30	0.23
Marginal effect (based only on data of 2011)	1.09	0.76	1.69	0.73	1.11	0.86

Figure 1. U.S. historical ethanol production (in billion gallons), 1980-2011.



4-29-13
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Answers to Questions in Agricultural Sector Impacts White Paper

1. There are about 325 million acres of prime major grain cropland in the U. S.---most of which is in the Midwestern states. Current corn ethanol production of about 13 billion gallons annually requires about 45 million acres of prime farmland to grow the corn to produce that level of ethanol. Assuming that about two-thirds of the corn used is lost for food consumption (that is not available for animal feed) the net corn acres going to ethanol are about 30 million acres or nearly 10% of all US prime crop land. Soybeans, wheat and even rice acreage planted has declined because of the demand for corn for ethanol. Corn acres planted this year are expected to exceed 96 million acres or well above the 80 million os so acres planted in corn prior to 2004.

   Corn, soybean, wheat have significantly higher market prices than was the case for 2004 and prior after adjusting for inflation. These higher prices are caused directly by corn ethanol and the RFS. There is no idle prime cropland in the U.S. <u>If you take 30 million acres out of the 325 million acres available for major grain production and devote it to corn ethanol for fuel you have in fact raised the prices of these crops well beyond what they would have been without the RFS. The corn lobbyists have argued that the increase in yield per acre planted would assure that abundant supply of corn would be available and prices would not rise. But yields have increased very little so this theory is so much BS. Only a paid lobbyist or individuals who have not passed third grade arithmetic would argue that the RFS is not responsible for the sharp and major price increases in these major crops.</u>

   <u>Further, the RFS has resulted in sharply lower exports of US corn and other major crops. The RFS lowers U. S. oil imports by a tiny bit (if any) while at the same time lowering U.S. corn exports. What is even more absurd is the U. S. taxpayer has subsidized U. S. corn exports since the 1950s at a cost of tens of billions of dollars so that the domestic corn growers would have a place to sell their corn. The RFS is rapidly eliminating U. S. corn exports and the corn lobbyists seem to have memory failure when it comes to remembering that US taxpayers subsidized corn exports for the past 60+ years and continue to do so at substantial cost.</u>

2. Overall, in the U.S. the RFS has not increased aggregate physical output of the major grain crops. The RFS has caused a huge increase in the real prices of major grains. That is the reality!

3. EPA has been an advocate for corn ethanol since the author's days in the White House OMB circa 1970-1997. EPA has pushed for corn ethanol even though it has major and adverse

environmental impacts. EPA officials appear to care less about the environment and the enormous adverse environmental impacts caused by corn ethanol. These adverse impacts include air, water, degradation and increases in GHG emissions. Anyone that trusts EPA on ethanol whether its corn or cellulosic is clueless. No, EPA has not and cannot do objective economic or environmental analysis and was dead wrong to deny the waiver based on the facts. EPA is taking its marching orders from the White House and the White House is out soliciting campaign funds from Midwestern state RFS interests for the 2014 elections. Why would anyone think that EPA would do an objective analysis on the waiver request?

4. It does not matter what authority is given to EPA via the Clean Air Act the politically imposed answer will be the same and, that is, take care of the RFS interests and screw the consumers and taxpayers. EPA and the CAA should not be in the business of directing the nationwide fuel content of gasoline. This is a return to the failed energy policies of the 1970s when the petroleum allocation act was law. The RFS is its twin brother.

5. The RFS has caused food prices to be sharply higher for the reasons cited in the answer to question 1. Go to several poor countries and talk with the poorest of the poor and ask them how they are coping with higher major grain prices worldwide.

6. None, cellulosic ethanol is a theory invented by the environmental lobbyists to try and offset the major environmental damage done by corn ethanol. After nearly six years and massive federal subsidies for cellulosic ethanol there is still not significant continuous commercial production. The 2022 RFS mandate of 16 billion gallons of annual production in that year is less likely than the U.S. launching a human colony on Mars by 2022. Only in Washington would such fiction be spoken let alone believed and enacted into the RFS. A congressional member that voted for the RFS in 2007 is in the same science fiction category as one that would proposed selling snowballs to Eskimos in the middle of winter.

   There is now a mountain of evidence that shows cellulosic ethanol on the scale mandated by the RFS will never be economic nor even technically feasible. Worse yet, the environmental lobbyists, desperate to show progress on cellulosic, are actually pushing sugar cane or energy cane crops that require farmland currently used for food production.

   Once again, common sense suggests that after six years of offering $3+ per gallon plus of federal subsidies the stuff is not economic and never will be. Only the Department of Navy with billions of Defense dollars to waste has been stupid enough to pay a reported $27 a gallon for cellulosic ethanol when you can buy all the petroleum based fuels needed for less than $3 a gallon.

7. None. Cellulosic is neither technically or economically feasible. Worse yet, the U.S. now has a glut of domestically produced crude oil and NGLs and the same goes for Canada. Why would anybody with a high school diploma or better waste any more time and money on cellulosic ethanol? It must be all those big time investors with very few bucks at risk who are bound and

determined to create a few more failures like Fisker, Solendra, etc---as long as the US taxpayers take nearly all the investment risk and suffer the vast majority of losses.

8. No, only those who believe in the tooth fairy or those who are on the federal dole would believe this.

9. World population continues to grow and each day there are increasing numbers of higher income folks in countries like China, India, etc who now want meat in their daily diet. These changes are resulting in increased world demand for major grains beyond what could be supplied at 2004 and prior prices. The result is corn ethanol has forced major grain prices substantially higher.

In sum, the RFS has transferred a tremendous amount of wealth to Midwest state corn and soybean farmers and farmland owners. Farmland values in these states have quadrupled or better since 2004. Crop prices in real terms are three times what they were in 2004 and prior. Massive federal subsidies continue in the form of deeply subsidized crop insurance to corn and soybean farmers, a $1.01 per gallon tax subsidy for cellulosic production, etc, etc. The RFS has gifted trillions of dollars of wealth to less than 300,000 corn/soybean farmers in the Midwest states. Of these, less than 70,000 are large scale operations and this privileged group has taken most of the trillions in benefits from the RFS. Conversely, US food consumers/taxpayers have to pay these trillions of dollars. They get no benefit because petroleum is readily available at a lower cost than corn ethanol.

April 29, 2013

United States House of Representatives
Committee on Energy and Commerce
Chairman Fred Upton
2125 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Upton and the Committee on Energy and Commerce,

RE: Comments on White Paper – Renewable Fuel Standard Assessment, Agricultural Sector Impacts

As a stakeholder in the assessment of the Renewable Fuel Standard (RFS), I would like to issue a formal comment in favor of reform. I am Chairman of the Louisiana Poultry Federation, and I have seen firsthand, the impact of the RFS on food prices. I am in favor of opening up the conventional biofuels portion of the RFS, to allow alternative technologies to compete with corn, which will balance the price of feed and allow everyone the chance to produce and prosper.

Over the last six years, since the RFS was enacted, prices for feed have tripled and my colleagues and I have struggled to stay in business. With over 40% of corn going to ethanol, it's no wonder we were crushed by this past summer's drought. I appreciate the need for alternative fuels, but corn should not be the only option we rely on.

A broader range of dependable and affordable feedstocks provides viable solutions. Natural gas is abundant, inexpensive, and domestically sourced. Existing technology can manufacture ethanol from natural gas. Yet, natural gas is not currently allowed under the conventional biofuels portion of the RFS. This unfairly benefits corn ethanol, at the expense of sound alternatives.

In order to meet current and future RFS mandates and protect food supplies, additional feedstocks and technologies must be considered. By enlarging the feedstock base allowed by the RFS, the US would see a lower cost, more abundant supply of domestically produced food and fuels. Please reform the RFS and help our states, communities and local businesses benefit from a balanced energy policy.

Sincerely,

April 29, 2013

The Honorable Fred Upton
Chairman
House Energy & Commerce Committee
2125 Rayburn House Office Building
Washington, DC 20515

The Honorable Henry Waxman
Ranking Member
House Energy & Commerce Committee
2125 Rayburn House Office Building
Washington, DC 20515

Dear Chairman Upton and Ranking Member Waxman:

The livestock and poultry groups appreciate your leadership with the release of a white paper reviewing the agricultural impacts due to the renewable fuel standard (RFS). Please find below comments submitted on behalf of:

American Meat Institute
American Sheep Industry Association
California Dairies, Inc.
Milk Producers Council
National Cattleman's Beef Association
National Pork Producers Council
National Turkey Federation
North American Meat Association

In addition, please find attached a study entitled "The RFS, Fuel and Food Prices, and the Need for Reform" completed by Dr. Tom Elam of FarmEcon on behalf of the listed organizations. We look forward to working with you and your staff as this issue progresses within the committee.

Animal Agriculture Impacts due to the RFS

Effects of the RFS versus market forces in bringing about the rapid 2007-2012 increase in U.S. ethanol production, and the corn that it has taken off the market, is central to this discussion. If the RFS has played little or no role, then there is no need to reform the current program. If the RFS is a significant driver, is distorting markets, and the market has played a secondary role, then a debate is in order.

Iowa State's FAPRI econometric model has generated results that suggest that lowering the RFS would have little impact on corn prices of ethanol production. The implication reached was that it is market forces that are the primary driver.

However, there are two facts in evidence that strongly suggest that the role of the RFS has been the primary force in the rapid development U.S. corn-based ethanol.

First is the simple fact that nowhere in the world have we seen any significant biofuel production created without strong government support in the form of mandates and/or subsidies. Everywhere you look, markets have not been the primary drivers. China, Canada and the EU, once strong proponents of biofuels, have backed away from increasing biofuel production by mandates and subsidies. The U.S. RFS program is by far the most ambitious biofuel mandate in the world, and we have seen the most rapid increase in ethanol production on record.

If biofuels were a marketplace phenomenon, driven by business people who see market-based opportunities, we would see biofuel investments without mandates and subsidies. We do not see those free market investments happening on any significant scale. The RFS is the primary driving force behind U.S. ethanol production, and the RFS debate is of vital importance.

The second fact in evidence is the biofuel sector's strong negative reaction to this debate. If the sector had any faith in its ability to maintain and grow its market based on the merits of its products it would not object strenuously to RFS reform. The leadership of the ethanol industry is fully aware that if the support of RFS mandates is reduced or eliminated, their business will suffer. This fact further validates the RFS as the key driver behind ethanol industry growth.

1. What has been the impact of the RFS on corn prices in recent years? What has been the impact on soybean prices? Have other agricultural commodity prices also been affected?

The RFS has been the major driver in increasing corn use for ethanol production, and causing corn stocks to decline to crisis levels. In a market-driven world, ethanol would be priced competitively with gasoline. That has never been true in the entire history of the industry. Once relegated to niche additive markets for octane enhancement and oxygenation, ethanol was originally worth a premium to gasoline. At current production levels, ethanol is being used for its energy content, about 67% of gasoline. At current (April 18, 2013) gasoline price levels ethanol has a market value of about $1.80 per gallon for its energy content. The national average wholesale price was about $2.70 today. At $1.80 per gallon, an ethanol plant can afford to pay only $3.80 per bushel for corn. At $2.70 per gallon for ethanol, the affordable corn price for an ethanol producer is $6.55 per bushel. Thus simple, one day, example of how far from true market value the RFS has taken corn prices is typical of what has been driving daily corn prices since 2008.

A secondary effect has been increased corn price volatility. Compared to 2000-2006, corn price volatility has doubled since the RFS became law. The RFS has driven corn use growth faster than production. The result is stocks chronically depleted to minimum levels, causing market prices for corn and other agricultural commodities to swing wildly on the whims of the weather.

Corn is by far the most important food ingredient in U.S. agriculture. Other farm commodity prices are correlated with corn. That list includes wheat, soybean meal, sorghum, barley, oats, and hay. In addition, by-product feed prices such as distillers' grains, wheat milling by-products, edible fats, meat and bone meal and oilseed milling are all influenced by corn prices.

2. How much has the RFS increased agricultural output? How many jobs has it created? Have any jobs been lost? What is the net impact on the agriculture sector?

We need to discount 2012 because of the weather disaster that reduced crop production. However, using 2012 data, since the RFS arrived in 2008, total corn, wheat and soybean production have not grown. In fact, corn production declined 10.8%, soybean production increased 1.6%, and wheat production is down 9.2%. If we go back one year, to 2011, and compare to 2008, corn production was up 2.2%, soybeans up 4.2% and wheat was down 20%. While 2012 weather has played a role, since the current RFS was created total major crop production has not materially increased.

The jobs question is difficult to answer, but if we look objectively at jobs created by various corn using industries the answer is that increased ethanol has undoubtedly destroyed more jobs than it created.

Using a recent 2013 Renewable Fuels Association study, there were 11,971 direct jobs in the nation's ethanol companies in 2012. According to a 2009 American Meat Institute study there are 524,500 direct jobs in meat and poultry processing. Both estimates are for direct employment only, and do not include indirect and induced effects.

If we include indirect and induced jobs, the Renewable Fuels Association study claims a total of 383,260 total jobs that are affected by ethanol production. This implies that every ethanol plant job supports, in a meaningful way, another 32.5 jobs in the economy. That "jobs multiplier" of 32.5 is about 10 times what is generally accepted by economists.

The similar 2009 American Meat Institute study claimed a jobs multiplier of 2.4, and total direct, indirect and induced jobs of 1,269,500. The bottom line is that just the meat and poultry portion of food production supports a much larger labor force than the entire fuel ethanol industry.

Scaling jobs to the amount of corn used also shows large differences. A million tons of corn used to produce meat and poultry supports over 3,600 direct jobs. That same volume of corn used by the ethanol sector supports only 145 jobs. Including indirect and induced employment (as claimed by the respective industry associations), a million tons of corn supports 5,117 ethanol-related jobs and 8,119 meat and poultry-related jobs. The ethanol industry claim is based on a jobs multiplier that is significantly higher than generally accepted.

To the extent that the RFS has diverted corn from food to fuel production, jobs have been lost. It is not just current jobs that were lost, but job creation opportunities that were not realized because food production was constrained.

From 2007 to 2012, over 27.9 million tons of combined corn and distillers' grains were removed from total food production, of which meat and poultry processing is only a portion. Ethanol producers' corn use, net of distillers' grain returned to food production, increased about 40.6 million tons over this same period. Given the vastly different direct job multipliers, far more direct jobs, existing and potential, were destroyed in meat and poultry processing than were created by ethanol producers.

3. Was EPA correct to deny the 2012 waiver request? Are there any lessons that can be drawn from the waiver denial?

The waiver petition should have been granted. Record-high corn prices, distress in the food sector, corn exports that declined by 50%, the closing of numerous ethanol plants, and skyrocketing D6 ethanol RIN values are all symptoms of severe economic distortions caused by the RFS. Market forces should have been allowed to allocate the limited corn supply.

The lesson learned is that the EPA should not have the sole power to judge waiver requests.

4. Does the Clean Air Act provide EPA sufficient flexibility to adequately address any effects that the RFS may have on corn price spikes?

No, it does not. The current mechanism is cumbersome, inflexible and does not fairly weigh the effects on all affected parties. The Clean Air Act should be amended, or the entire conventional fuel RFS should be removed.

5. What has been the impact, if any, of the RFS on food prices?

Food prices are covered extensively in the paper submitted with these comments. Since the RFS was implemented in 2008, food price inflation has gone from slightly slower than general inflation to 60% higher than general inflation. Food affordability that had been increasing steadily since 1950 suddenly reversed that trend, and food started to become less affordable. Higher food costs are damaging the economy's ability to create jobs, and holding down consumers' ability to increase discretionary spending. As stated at the beginning, much of the reversal in food affordability is the result of the RFS, and the market distortions it has caused.

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A source of information on global farming and food systems
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The RFS, Fuel and Food Prices, and the Need for Reform

April 18, 2013

Dr. Thomas E. Elam
President, FarmEcon LLC

The information contained herein has been taken in part from trade and statistical services and other sources believed to be reliable. FarmEcon LLC makes no warranty, express or implied, that this third party information is accurate or complete. Funding for this study was provided by a coalition of food producing interest groups.

Table of Contents

Executive Summary

Current U.S. biofuels policy contains escalating corn-based ethanol blending requirements (the Renewable Fuel Standard - or RFS) that do not automatically adjust to energy and corn market realities. That same policy contains cellulosic ethanol requirements that do not reflect the fact that the biofuels industry, despite decades of effort and large subsidies, has failed to develop a commercially viable process for converting cellulosic biomass to ethanol.

Corn-based ethanol blending requirements have pushed corn prices, and thus ethanol production costs, so high that the market for ethanol blends higher than 10 percent is essentially non-existent. That same policy has also destabilized corn and ethanol prices by offering an almost risk-free demand volume guarantee to the corn-based ethanol industry. Domestic and export corn users other than ethanol producers have been forced to bear a disproportionate share of market and price risk.

Consumers have seen food prices increase faster than general inflation since the current RFS was enacted in 2007. Food affordability has stopped the long term trend of improving, and is deteriorating.

Job creation in the food sector has been substantially reduced by the diversion of corn to ethanol production. Almost 1 million potential food sector jobs that could have been created from 2007 to 2011 were not. Diversion of corn to ethanol production is one contributing factor to the prolonged recession in the U.S. labor market.

Increases in ethanol production since 2007 have made little, or no, contribution to U.S. energy supplies, or dependence on foreign crude oil. Rather, those increases have pushed gasoline supplies into the export market. Domestic gasoline production and crude oil use have not been reduced. If the RFS is made more flexible, and ethanol production shrinks due to market forces, we can easily replace ethanol with gasoline currently being exported.

This paper will argue that it is time to reform the current RFS. Corn users other than the ethanol industry need assurance of market access in the event of a natural disaster, and a sharp reduction in corn production. Ethanol producers should fully share the burden of market adjustments, along with domestic food producers and corn export customers. Ethanol prices should reflect the fuel's energy value relative to gasoline, not a corn price that is both inflated and destabilized by the inflexible RFS.

Finally, the RFS schedule should be revised to reflect the ethanol industry's inability to produce commercially viable cellulosic fuels. Policy should reflect reality when that reality does not reflect substantial and undeniable barriers to achieving policy goals.

Key Points

- Current ethanol policy has increased and destabilized corn and related commodity prices to the detriment of both food and fuel producers. Corn price volatility has more than doubled since 2007.
- Following the late 2007 increase in the RFS, food price inflation relative to all other goods and services accelerated sharply to twice its 2005-2007 rate.
- Post-2007 higher rates of food price inflation and declines in food affordability are associated with sharp increases in corn, soybean and wheat prices.
- On an energy basis, ethanol has never been priced competitively with gasoline.
- Ethanol production costs and prices have ruled out U.S. ethanol use at levels higher than E10. As a result, we exported 1.2 billion gallons of ethanol in 2011 and 740 million in 2012.

- Due to its higher energy cost and negative effect on fuel mileage, ethanol adds to the overall cost of motor fuels. In 2011 the higher cost of ethanol energy compared to gasoline added approximately $14.5 billion, or about 10 cents per gallon, to the cost of U.S. gasoline consumption. Ethanol tax credits (since discontinued) added another 4 cents per gallon. The 2012 cost was reduced to $7.6 billion by the expiration of the conventional biofuel tax credit (VEETEC).
- Using measures of gasoline prices and oil refiner margins, from 2000 through 2012 there was no statistically significant effect of increased ethanol production on gasoline prices or oil refiner margins.
    - Both statistical models showed very weak, statistically insignificant, associations between increased ethanol production and gasoline prices and oil refiner margins.
    - Factors that do account for gasoline prices and refining margins include: crude oil prices, crude oil inventories, gasoline inventories, net gasoline exports (exports minus imports), seasonality, and supply disruptions caused by hurricane Katrina, refinery outages, and methyl tertiary butyl ether (MTBE) gasoline additive withdrawal.
    - A similar model from Iowa State University found a negative effect of increased ethanol production on refiner margins and gasoline prices. That model used flawed methodology. Projected 2011 effects are unrealistic.
- In the U.S., the January 2007, through December 2012, increase in ethanol production had no effect on: 1) gasoline production; 2) crude oil imports; 3) crude oil consumption; or 3) refinery utilization.
- From January 2007, through December 2012, increased ethanol production displaced gasoline in the U.S. fuel supply, but did not cause reduced gasoline production. The displaced gasoline was exported. Gasoline consumption declined by more than the ethanol displacement, further boosting gasoline exports. In effect, the 2007 to 2012 increase in ethanol production has been exported.
- Declining U.S. oil imports are being caused by increased U.S. crude oil production, and higher refinery yields, not increased ethanol production.
- Abandonment of the conventional biofuel RFS would not affect overall U.S. fuel supplies, but would tend to reduce the volatility and level of corn and other important agricultural commodity prices to the benefit of both food and fuel producers.
- Given the realities of cellulosic biofuels, the RFS program should be amended to reflect the lack of technological progress in this area, and potential risks to the environment.

Ethanol Prices and Production Costs

Supporters of current ethanol policy have claimed that ethanol is saving American motorists money. That claim is partially based on the fact that ethanol typically sells for less per gallon than gasoline. The problem with that claim is that engines do not run on gallons, they run on energy. On an energy basis gasoline and ethanol are very different fuels.

Earlier in the modern history of ethanol use in motor fuels its main purpose was for a combination of octane enhancement and as a fuel oxygenator. In more recent times, with the dramatic increase in ethanol production, those limited markets have become saturated. To go beyond use as a fuel additive, and compete with gasoline as a fuel, ethanol must be priced competitively based on its energy content. This section will show that ethanol continues to be priced at a premium that prevents its widespread use beyond the universally authorized E10 (90% gasoline, 10% ethanol) blend level. The fact that substantial amounts of ethanol were exported in 2011 when the E10 market became saturated supports that fact.

Ethanol's value as a fuel is established by its energy content relative to competing fuels. Despite its higher octane rating, gallon of ethanol has only 67 percent of the net energy of a gallon of gasoline[1]. As a result, in current gasoline engine technology, fuel mileage per gallon declines as ethanol content increases. Fuel mileage per BTU is approximately equal between gasoline and ethanol. This fact was born out in a tightly controlled test performed by Oak Ridge National Laboratory and the National Renewable Energy Laboratory[2]. To quote from that study (page 3-1):

"The following trends from E0 to E20 were found to be statistically significant. Fuel economy decreased (7.7% on average), consistent with the energy density reduction associated with ethanol blending (in limited tests, this trend was observed to continue to E30)."

Ethanol must sell at a significant discount to gasoline to achieve equal fuel cost per mile. If ethanol blends higher than 10 percent are not competitively priced, the result will be failure of those fuels to achieve significant sales. That has been the fate of E85. According to recent Department of Energy statistics, ethanol blends of more than 55 percent account for only 1,000 barrels per week out of total gasoline production of about 8.8 million barrels per week. Ethanol blends under 55 percent, almost entirely E10, account for about 94 percent of U.S. gasoline production[3]. There is little, or no, room for E10 to grow further, and E85 cannot grow due to its high cost. E15 will likely suffer a similar fate.

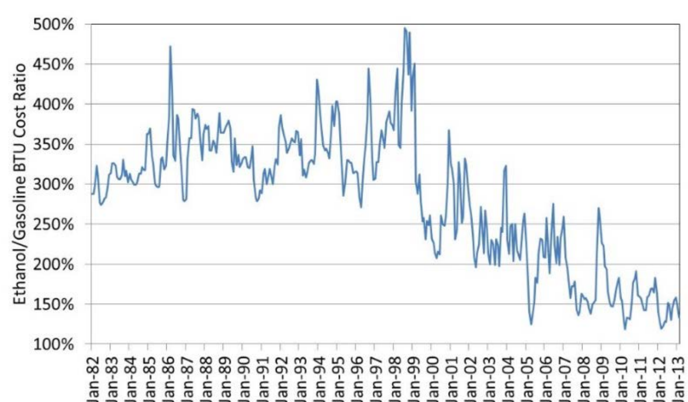
The Nebraska Energy Office publishes monthly averages of 87 octane unleaded gasoline and ethanol prices at Omaha fuel terminal rack locations[4]. These averages represent ethanol prices near the center of U.S. ethanol production. They are among the lowest ethanol and gasoline prices in the country. This comparison is thought to be representative of relative prices across much of the United States. From January 1982, until February 2013, ethanol has never been priced at energy parity with 87 octane unleaded gasoline. The relative ethanol price has declined since 2000 as the octane and oxygenator markets have become saturated. However, since the current RFS was adopted in late 2007, ethanol energy has averaged a 60 percent average premium to gasoline at Omaha blending locations.

Key Point:

Ethanol is an expensive fuel. Compared to 87 octane unleaded gasoline at Omaha, Nebraska fuel terminals the cost of ethanol per gallon of gasoline energy has been higher than gasoline every month since 1982. Higher relative values prior to 2007 reflect an ethanol octane enhancement and oxygenator value premium. Recent declines in the ratio reflect a spike in wholesale gasoline prices.

Ethanol Price as Percent of 87 Octane Gasoline Energy

Omaha, Nebraska, January 1982 to February 2013



[1] Ethanol contains 76,100 BTUs per gallon compared to 114,100 for 87 octane gasoline.

[2] National Renewable Energy Laboratory. "Effects of Intermediate Ethanol Blends on Legacy Vehicles and Small Non-Road Engines, Report 1 – Updated." NREL/TP-540-43543. February 2009.

[3] Department of Energy. Weekly Refiner & Blender Net Production, 4 Week Average. Found at http://www.eia.gov/dnav/pet/pet_pnp_wprodrb_dcu_nus_w.htm. Accessed 4/17/2013.

[4] Nebraska Energy Office. Ethanol and Unleaded Gasoline Average Rack Prices. Found at http://www.neo.ne.gov/statshtml/66.html, Accessed 4/17/2013.

In 2011, the United States exported 1.2 billion gallons of ethanol, and 740 million gallons in 2012. A major reason was that ethanol's energy is more expensive than gasoline, and thus E85 cannot be priced competitively in the U.S. market.

Another way to look at the ethanol price premium compared to gasoline is ethanol's price difference per gallon of gasoline energy. As the next chart shows, the energy-equivalent per gallon price difference has declined only slightly since the 1980s. Since the current RFS was enacted in late 2007, the average price difference was $1.20 per gallon premium for ethanol energy versus gasoline energy. From January, 1982 until December 2007, the average was a $1.36 per gallon premium for ethanol energy. Again, ethanol energy has not been priced competitively with gasoline since 1982.

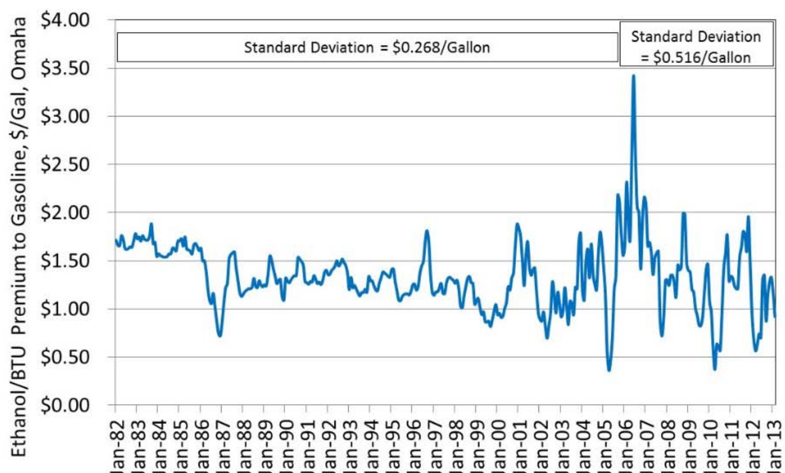
Not only has the ethanol energy price premium remained at high levels, the volatility of the premium has doubled. The standard deviation of the ethanol energy premium was $0.268 per gallon from 1982 to mid-2005, when the first RFS was enacted. Since then the standard deviation was $0.516 per gallon. A recent journal article by Bruce A. Babcock and Lihong Lu McPhaila shows that the RFS is a major cause of this increased volatility for both ethanol and corn prices[5].

Key Point:

Ethanol is an expensive fuel. Since 1982, relative to 87 octane gasoline, ethanol energy has been priced at about a $1.30 higher per gallon of gasoline energy. That premium has declined slightly since 2007, but remains nearly as high on average as it was prior to the current RFS. Since the original 2005 RFS, the volatility of the price premium has doubled.

Ethanol Price Premium/Gallon Gasoline Energy Equivalent

Omaha, Nebraska, January, 1982 to February, 2013



The impact of this increased volatility on fuel markets is difficult to understate. Gasoline blenders and their retail customers who might want to sell E85 have been discouraged by the state of flux in gasoline versus ethanol pricing. This pricing instability has likely been a detriment to installation of E85 fueling stations and flex-fuel auto purchases. As will be shown later, much of this increased volatility can be traced back to the impact of the inflexible RFS on corn use, corn inventories, and corn prices.

The most significant ethanol production cost is corn. Since the first RFS schedule in 2005, the corn cost in a gallon of ethanol has increased from about 50 percent to more than 80 percent of total ethanol production costs. Corn costs for ethanol producers have also been much more volatile. The increased volatility of corn costs is directly attributable to large increases in mandated corn use for ethanol production, resulting lower corn stocks, and increased corn price volatility.

[5] Bruce A. Babcock and Lihong Lu McPhaila. Impact of US biofuel policy on US corn and gasoline price variability. Energy. Volume 37, Issue 1. January 2012.

Increases in corn prices since 2005 are primarily the result of both higher mandates for corn-based ethanol production and higher energy prices. Each played a significant role, and they reinforced each other in their corn price effects. Absent the RFS mandates and higher oil prices, corn prices would be much lower today. How much each of the driving forces affected corn prices and ethanol production is debatable, but there is no doubt that both were important.

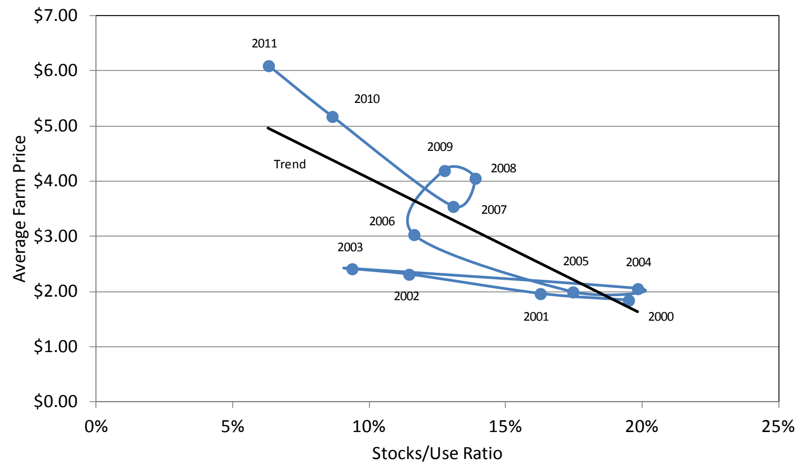
The next chart shows the 2000-2011 crop year average farm level corn prices versus the ratio of ending stocks-to-use. Clearly, as the stocks-to-use ratio declines there is a tendency for corn prices to rise.

Key Point:

The increased demand for corn that has been partially the result of the inflexible RFS has caused corn stocks to decline to near-record low levels relative to total corn use. Tighter stocks have caused higher corn prices for all users, including ethanol producers.

Season-Average Corn Price vs. Stocks-to-Use Ratio

(Year is Year of Harvest, Black Line is Trend))

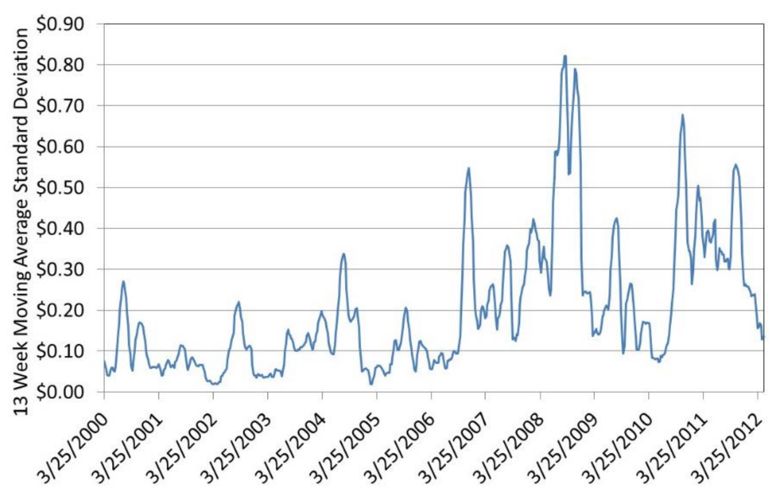


Less obvious than the increase in corn prices has been in the increase in their volatility. The next graph shows the 13 week standard deviation of weekly Central Illinois elevator corn bids. The volatility obviously increases markedly after the 2007 RFS. This higher volatility has increased business risks for all corn users. The result has been the bankruptcy of a number of ethanol companies and food producers.

Key Point:

Tighter stocks shown in the chart above have also caused much higher corn price volatility for all users, including ethanol producers. This higher volatility has substantially increased business risks, resulting in a number of bankruptcies of ethanol and food producers.

13 Week Standard Deviation of Central IL Elevator Corn Bids

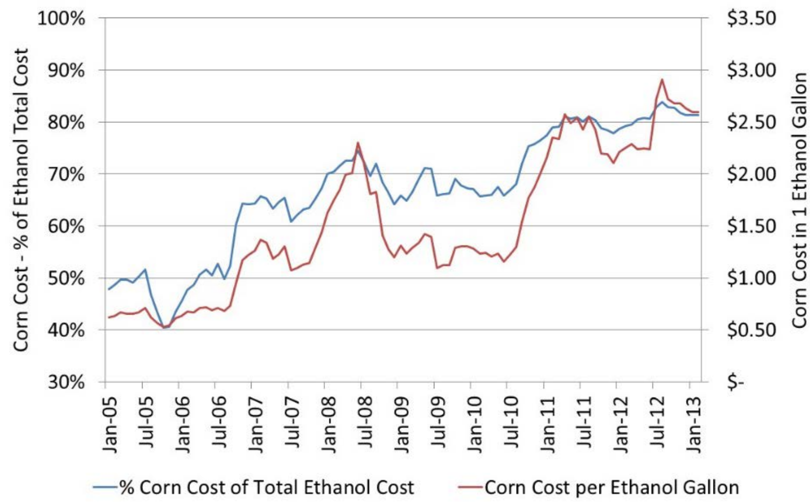


The impact of higher corn prices on ethanol production costs is shown in the following chart. Prior to the RFS, corn accounted for about a $0.60 cost per gallon of ethanol. The corn cost per gallon is now in the $2.50 to $2.75 range. Looking at the cost of just the corn used in ethanol for per gasoline-equivalent fuel energy produced, that cost is currently in the $3.75 to $4.10 range. This cost alone is well above recent wholesale prices for 87 octane unleaded gasoline.

Key Point:

Higher corn prices have increased the cost of ethanol production. Corn now represents over 80 percent of the cost of ethanol versus 40-50 percent prior to the RFS. Higher ethanol prices are acting as a choke point on use of ethanol at blends higher than 10 percent.

Corn Cost Impact on Ethanol Production Cost[6]



Corn Prices and Food Production Costs

Corn is one of the key commodities used in U.S. food production. It enters the food chain via a wide range of products, but meat, poultry and dairy are the major users. Ranked by wholesale value of primary commodities, corn dwarfs the second and third ranking commodities, soybean products and wheat. Distiller's Grains (DGs), an animal feed by-product of ethanol production, are included with corn to arrive at the total value of corn used for U.S. food production.

Top Three U.S. Food Production Commodities, by Value, 2012/2013 Crop Year[7]

Commodity	Units	Domestic Food Production Use	Price	Value/Cost, $ Million
Corn				
Corn as Grain	Bushels	5,787	$6.90	$39,930
DGs from Corn	Tons	33.7	$270	$9,099
Total Corn				$49,029
Soybeans				
Soybean Meal	Tons	29,900	$425	$12,708
Soybean Oil	Million Pounds	13,200	$0.49	$6,468
Total Soybeans				$19,176
Wheat	Bushels	1,386	$7.80	$10,811

6 Source: Iowa State Ethanol Plant Profitability Model. Found at http://www.extension.iastate.edu/agdm/energy/xls/d1-10ethanolprofitability.xls. Accessed 4/17/2013

7 USDA. World Agricultural Supply and Demand Estimates. April, 2013. DGs statistics are estimated based on ethanol production, exports and year-to-date prices.

Not only is corn important on its own, corn prices also influence wheat, soybeans and other important commodities. As corn prices have risen, so have prices of the other two major commodities. Increases in prices of these three major food production items have driven costs of U.S. food production significantly higher since the first RFS was introduced in 2005.

Cost of Corn, Soybean Products and Wheat Used In U.S. Food Production[8]

Crop Years 2005-2012

Commodity	2005	2006	2007	2008	2009	2010	2011	2012	% Increase 2005-2012
Corn									
Corn as Grain	$12,310	$21,177	$30,454	$26,382	$23,057	$32,126	$37,152	$39,930	224%
DDGS from Corn	$946	$1,782	$3,333	$3,118	$3,478	$6,884	$8,266	$9,099	861%
Total Corn	$13,256	$22,959	$33,787	$29,500	$26,536	$39,011	$45,418	$49,029	270%
Soybeans									
Soybean Meal	$5,782	$7,059	$11,138	$10,181	$9,537	$10,470	$12,708	$12,708	120%
Soybean Oil	$3,845	$4,947	$7,985	$4,656	$5,081	$7,479	$6,468	$6,468	68%
Total Soybeans	$9,626	$12,006	$19,123	$14,837	$14,618	$17,948	$19,176	$19,176	99%
Wheat	$3,677	$4,507	$6,234	$8,034	$5,206	$6,430	$10,811	$10,811	194%
Total Cost	**$26,559**	**$39,472**	**$59,143**	**$52,371**	**$46,360**	**$63,389**	**$75,404**	**$79,016**	**198%**
Cumulative Increase		**$12,912**	**$45,496**	**$71,308**	**$91,109**	**$127,939**	**$176,783**	**$229,240**	

By 2012, the annual farm level cost of the three commodities had risen from $26.6 billion in 2005 to $79.0 billion, more than tripled. The cumulative cost increase over the 2005-2012 was $229.2 billion.

It should come as no surprise that the cost of food has increased much faster than overall inflation since 2005. The following table shows consumer level price inflation for selected food categories, and all items other than food, between calendar years 2005 and 2012. The time periods are before and after the 2007 RFS came into force. Overall price inflation of items other than food, even including energy, declined dramatically after December, 2007. The decrease was largely due to the 2008-2009 recession. In 2005 to 2007, food prices increased 9.6 percent, slower than the all items other than food increase of 10.5 percent. From 2008 to 2012 food prices increased 13.3 percent, all other items increased only 8.3 percent. Total inflation for all items other than food slowed by 21.2 percent from the period before the RFS compared to the period after. Food inflation increased 37.8 percent faster. Food categories that depend heavily on grains any edible oils saw even more rapid inflation increases after the RFS.

U.S. Price Inflation, Food, All Items Other than Food and Selected Food Categories[9]

Before and After the 2007 RFS

CPI Category and Ratio	From: / To:	January-2005 / December-2007	January-2008 / December-2012	Change in Inflation
All CPI Items Other Than Food (Includes Energy)		10.5%	8.3%	-21.2%
All Food		9.6%	13.3%	37.8%
Cereals and Bakery Products		9.4%	16.6%	76.6%
Meats, Poultry, Fish, and Eggs		8.3%	16.3%	96.7%
Fats and Oils		5.0%	29.6%	493.1%

[8] USDA. World Agricultural Supply and Demand Estimates. Various issues, 2005-2013. Value is domestic use times price.

[9] Bureau of Labor Statistics. Consumer Price Index Database. Found at http://www.bls.gov/cpi/data.htm. Accessed 4-17-2013.

The rapid increase in the last three categories should come as no surprise. They all make heavy use of the three basic commodities shown in a table above. Ethanol from corn and biodiesel from soybean oil are both targeted by the 2007 RFS fuel blending mandates. Wheat and soybean prices have risen with corn due to the potential for corn to take wheat and soybean acreage, and the potential for wheat to substitute for corn in animal feeding.

Some studies have shown little or no contemporaneous, month-to-month, relationship between corn prices and consumer food prices. However, the effects are not month-to-month or limited to corn, but cumulative and spread across other basic commodities. Post-2007 food prices, especially categories that make heavy use of corn, wheat and soybean products, accelerated much rates much faster than overall inflation. The 2008-2009 recession had little negative effect on longer term food prices because those were being pushed up by the artificial demand of RFS mandates that increased faster than the ability to produce corn, wheat and soybeans.

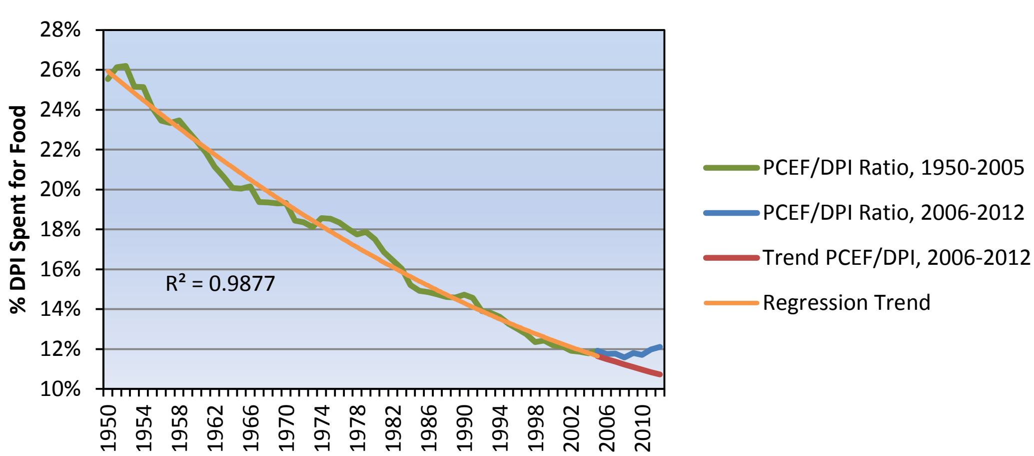
In addition, ethanol production costs and ethanol prices were also increased by the 2007 RFS. The result was that ethanol has been priced out of all blends except E10. Thus, the United Sates is producing surplus ethanol that cannot be sold here, and was having to export significant surplus ethanol until the 2012 crop disaster forced reductions in ethanol production!

Food Affordability Has Been Profoundly Affected

A major U.S. long term economic trend has been increasingly affordable food. Affordability has been commonly measured as the percent of disposable income spend for food. The trend is not a straight line; affordability improvement has been slowing over time, but was still trending down until 2006. Since 2006 this trend has reversed, and that reversal is the largest since 1950. Increasing food affordability has freed up income for spending on all other consumer goods and services, helping the economy grow and add jobs.

Since 2007, food prices are increasing compared to all other prices, and consumers' food costs are now increasing relative to the long term trend. The last time the gap grew in a manner similar to the current experience was during the 1970s when farm commodity prices boomed as a result of growing grain and soybean exports. The current gap is much larger than that one.

Personal Consumption Expenditures for Food (PCEF): Percent of Disposable Personal Income (DPI)

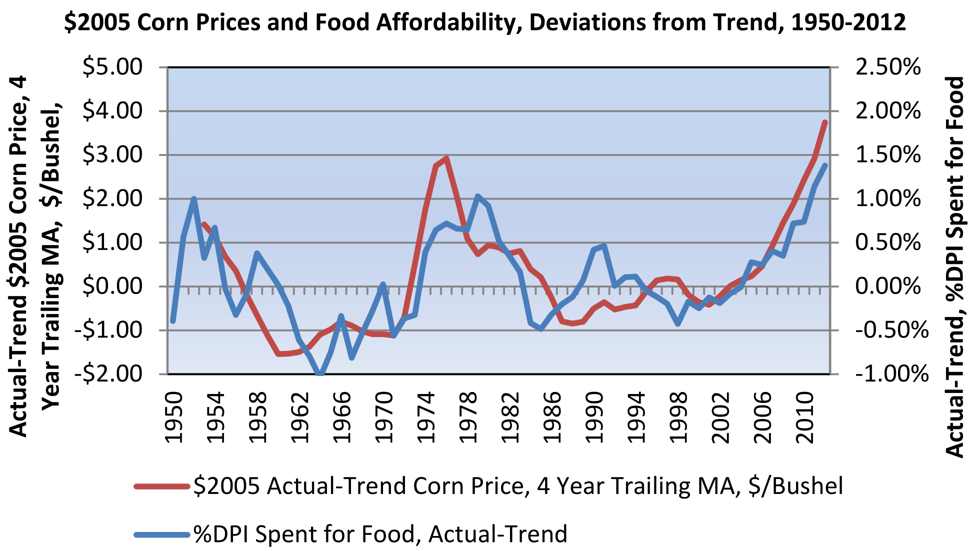


The graph above shows this departure from the long term affordability trend. Food spending is shown as a percent of disposable (after tax) personal income.

With a R^2 of 0.988, the 1950-2005 affordability trend line (orange) is a near perfect fit to the actual data (green). The blue line is 2006-2012 actual data, the red line is the 1950-2005 trend projected from 2006 to 2012. A declining trend shows improving food affordability. The blue line trends up, and indicates declining affordability. The gap between the 2012 actual and trend food affordability is about $160 billion in food spending.

The increasing food affordability gap is related to the sharp increase in post-2007 commodity prices. With a very long and involved chain of production and supply of all the items that use major crops, increases in their prices do not immediately show up at the supermarket or restaurant. In fact, short term volatility in major crop prices rarely show up at the consumer level. But, with the sustained price increases since 2005, we are now seeing major impacts on food production costs, retail food prices, and restaurant menu prices.

Looking at the record of corn prices and food affordability (measured as percent of disposable income spent for food, see next chart) there is a clear relationship between changes in corn prices and food affordability. As already mentioned, corn prices affect markets and prices for other farm products, so when corn prices rise as they have since 2005, other farm product prices will go up too, adding pressure to increase retail prices of a broad range of food prices.



The graph above shows the relationship between constant dollar (using the 2005 base year Personal Consumption Expenditures (PCE) price deflator) corn price deviations from trend versus food affordability deviation from trend. Due to the high year-to-year volatility of corn prices, a 4 year moving average of the corn price trend deviations is used. The data are, again, 1950 to 2012. An increase in food spending as a percent of DPI is a reduction in food affordability.

Costs to the Average Food Consumer, Family of Four and the U.S. Economy: The post-2005 increase in food costs relative to trend has had added significant expense to family food bills and the nation's food expense. The table below details these food cost increases versus the long term affordability trend.

In current 2012 dollars, the average person saw a 2012 food bill that was $514 higher than trend. For a family of four, the increased cost above the trend was $2,055.

For the country's food spending, the actual above-trend 2012 food bill was $162 billion. In perspective, the increase in food spending is about the same as annual consumer spending on either vehicle repairs, college education, or telecommunications. Given the outlook for sustained high major crop prices through mid-2013, we are likely to see another very large 2013 food bill increase.

Food Cost Increases Versus 1950-2005 Trend

Year	Per Capita Actual-Trend Cost, $2005	Per Capita Actual-Trend Cost, $Actual	Family of 4 Food Cost, $Actual	Family of 4 Actual-Trend Cost, $Actual	Total Economy Actual-Trend Cost, Billion $2005	Total Economy Actual-Trend Cost, Billion $Actual
2006	$79	$82	$15,589	$326	$24	$24
2007	$132	$139	$16,255	$557	$40	$42
2008	$116	$126	$16,754	$504	$35	$38
2009	$230	$250	$16,484	$1,002	$71	$77
2010	$238	$264	$16,807	$1,057	$74	$82
2011	$371	$423	$17,736	$1,690	$116	$132
2012	$440	$514	$18,017	$2,055	$139	$162

Of the $162 billion above-trend total food cost increase for the 2012 U.S. food bill, about $70 billion, or 44%, is due to 2005-2012 price increases for grains, soybean products, DDGS and hay. These are the major commodities used to produce our meats, eggs, dairy products, bread, bakery products, cereal, and are also included in a wide range of other supermarket and restaurant food items. In addition, costs for a wide variety of other related minor agricultural commodities have also increased.

The RFS was a major factor behind the increased corn demand that led to higher food prices and increased family spending. Nowhere in the world has there been any major biofuel production sector created without similar mandates or heavy subsidies. Absent the RFS and its blending mandates, the industry would not have the market power to create these disruptions to the nation's economic fabric and food production sector.

Has Increased Ethanol Production Created or Destroyed Jobs?

Direct versus Indirect and Induced Jobs: Economic activity in any sector will create activity in other sectors. Indirect jobs are created when, for example, a construction project in the meat processing sector creates jobs for the construction sector. For meat and poultry, indirect jobs are also created in the very large food wholesaling, retailing and foodservice sectors. Induced jobs are created when direct employees in a sector spend their income for goods and services in other sectors. For example, when an ethanol plant employee visits a doctor, jobs are supported in the medical care sector.

Drawing the line on what to count and not to count in indirect and induced jobs is always arbitrary. Direct jobs are the only ones we can count with a high degree of precision.

Impact on Direct Post-Farm Processing Jobs: If we examine corn use numbers in the context of post-farm processing sector direct jobs that are part of food versus fuel value-added chains, there is a dramatic difference. Each million tons of corn plus DDG used to produce meat and poultry supports 3,602.3 direct jobs in processing alone (524,500 ÷ 145.6). The same number for ethanol processing is

159.8 direct jobs (11,971 ÷ 74.9), only 4.4% as many per ton of corn used as meat and poultry processing. Clearly, diverting corn from meat and poultry production to ethanol reduces the net employment opportunities.

Direct Jobs per Million Tons of Corn/DDG Use and Indirect/Induced Jobs Multipliers
Ethanol versus Meat and Poultry Processing

Item	Value
Direct Jobs in Ethanol Processing Sector	11,971
Direct Jobs in Meat and Poultry Processing Sector	524,500
Million Tons of Corn Used in Ethanol Production Net of DDG Production	74.9
Million Tons of Corn and DDG Used in Meat and Poultry Production	145.6
Direct Jobs per Million Tons of Corn and DDG Used in Ethanol Processing Sector	159.8
Direct Jobs per Million Tons of Corn and DDG Used in Meat and Poultry Processing Sector	3,602.3
Claimed Indirect and Induced Jobs in Ethanol Processing	383,260
Assumed Ethanol Processing Jobs Multiplier	**32.5**
Claimed Indirect and Induced Jobs in Meat and Poultry Processing	1,269,500
Assumed Meat and Poultry Processing Jobs Multiplier	**2.4**

Direct employment in meat and poultry processing is over 32 times the number directly employed by ethanol processors. Put another way, for every direct job at risk in the ethanol industry, there are more than 32 direct jobs at risk in meat and poultry value-added sectors. Or, put another way, corn used in meat and poultry production creates more than 32 times the number of direct jobs than the same amount of corn used in ethanol production. Unintended consequences of the RFS are putting large numbers of current and potential food sector jobs at risk in exchange for minimal job gains in ethanol production and value.

A recent Renewable Fuels Association employment study claimed an added 32.5 indirect and induced jobs per direct employment job in the ethanol industry. The meat and poultry study claimed a more modest 2.4 jobs. Given the vastly lower post-processing value added to ethanol versus meat and poultry, the higher jobs impact multiplier for ethanol is extremely dubious.

Impact on Indirect and Induced Post-Farm Jobs: As shown in the table above, both meat and poultry and ethanol production affect many jobs outside their direct value chains. Indirect jobs are those that support the activities of the value adding process, but are defined as belonging to other economic sectors. These jobs include equipment and services suppliers, construction, hired transportation, travel, government employees, and a myriad of other occupations that support the direct employment sector. Induced jobs are those supported by the income earned by direct and indirect jobs holders. Induced jobs span the entire economy.

The methodology used to estimate the number of indirect and induced jobs is, by its nature, somewhat arbitrary. In theory, all economic activity has some degree of impact on all other economic activity. Some of those impacts are major, and easily observable. Construction work on a meat processing or ethanol plant obviously causes meaningful impact on the local construction sector, and its suppliers. A million gallons of ethanol produced in the U.S. has a theoretical, but not meaningful or measurable, impact on European grain production and associated jobs. Drawing the line between meaningful and negligible impacts will always involve judgment on where to stop counting. However, these impacts are very real.

Both meat and poultry groups and the ethanol industry have published recent indirect and induced job impact estimates. A 2011 study sponsored by the Renewable Fuels Association claimed 401,600 direct, indirect and induced jobs are associated with ethanol production[10]. The Renewable Fuels Association estimate implies that a million tons of corn used in ethanol production affects 5,359 jobs (401,400 ÷ 74.9).

According the 2009 American Meat Institute (AMI) study, 1,794,000 direct, indirect and induced jobs are involved in meat and poultry production and processing[11]. Meat and poultry production and processing system touches 10,749 jobs per million tons (1,794,000 ÷ 166.9), or 2.0 times the number of ethanol jobs. Even accepting very dubious ethanol industry indirect and induced jobs claims, corn used to produce meat and poultry creates significantly more employment.

A 2012 study for the U.S. poultry (broilers, turkeys and eggs) industry, using the same model employed by Renewable Fuels, estimated 327,400 direct jobs and a total of 1,337,030 direct and indirect jobs.[12] The total number of jobs affected is similar to the AMI study. Many of those jobs are in the processing, retailing and foodservice sectors that overlap both poultry and other meats.

Evidence of Economic Damage and job Losses from Employment Statistics: One symptom of reduced meat and poultry consumption shows up in recent declines in indirect food sector jobs. From 2002 to 2007 direct employment, on a full time equivalent (FTE) basis, in food production, processing, retailing and foodservice increased by 751,000. From 2007 to 2011 (2012 data are not available as of this time), employment in the same area declined by 195,000 FTE jobs. The net swing in job creation was 941,000 jobs. This change in job creation is partially attributable to the declines in meat and poultry consumption in 2007-2011 versus 2002-2007.

Full Time Equivalent Direct Employment in Food-Related Sectors (000s)[13]

Industry	2002	2007	2011
Agriculture, Farming	747	643	643
Food processing	1,689	1,622	1,575
Food stores	2,558	2,527	2,454
Food Service	6,718	7,671	7,596
Total Food Related FTE Employees	11,712	12,463	12,268
Net Change		**751**	**(195)**

Has Increased Ethanol Production Reduced Gasoline Prices?

A recent Iowa State working paper[14] claimed to show that increased ethanol production lowered the average 2011 gasoline price by $1.09 per gallon. To get that result the authors used an indirect,

[10] Data Source: Renewable Fuels Association, Contribution of the Ethanol Industry to the Economy of the United States, 2011.

[11] Data Source: American Meat Institute, The Meat and Poultry Industry Economic Contribution Study: 2009

[12] Data Source: The Poultry and Egg Industry Economic Contribution Study: 2012

[13] Data Source: Bureau of Economic Analysis: National Income and Product Accounts Tables

convoluted, calculation based on a highly dubious statistical model, since refuted by both this study and a more complete analysis from MIT and UC Davis[15].

With a more direct approach using actual (not the arbitrarily deflated data used in the Iowa State study) energy prices, several statistical models were estimated. All show that increased ethanol production from January 2000 through February 2012 had no statistically significant effect on gasoline prices or oil refiner margins. Furthermore, simple trends of gasoline energy equivalent ethanol production and U.S. gasoline exports show that increased ethanol production since 2007 has added nothing to the U.S. fuel supply. Rather, the increase in ethanol production has shifted U.S. gasoline from domestic use to exports.

Statistical Models

To estimate an impact of ethanol production on gasoline prices or oil refiner margins, an approach similar to the Iowa State paper was taken. Two models were used. Both of the models are based on monthly data for January 2000 through December 2012. All energy data are from the U.S. Department of Energy, Energy Information Administration.

Model 1: Gasoline Prices, Crude Oil Prices, Ethanol Production and Other Related Factors:

The New York harbor conventional gasoline, regular grade, monthly average price (cents per gallon) was explained using the following factors:

1. U.S. Crude Oil Composite Acquisition Cost by Refiners (Dollars per Barrel)
2. U.S. Fuel Ethanol Production (Thousand Barrels)
3. U.S. Percent Utilization of Refinery Operable Capacity (Percent)
4. U.S. Ending Stocks Excluding Strategic Reserves (Thousand Barrels)
5. U.S. Motor Gasoline Ending Stocks (Thousand Barrels)
6. Net Gasoline Exports (Exports-Imports, Thousand Barrels)
7. Monthly Seasonal Effects
8. Katrina Effect, September to October 2005
9. MTBE Effect, April to August 2006
10. 2007 Refinery Outages Effect, March to July 2007

Except for ethanol production and net gasoline exports, all of the factors were statistically significant. The model shows that ethanol production had a small positive, but statistically meaningless, effect on gasoline prices. The estimated equation explained 98.7 percent of the variation in gasoline prices. Crude oil prices were by far the leading driver of gasoline prices.

The model shows that increasing ethanol production was very weakly associated with higher, not lower, gasoline prices. While interesting, the model really shows that increasing ethanol production did not depress, or increase, gasoline prices. Crude oil prices are the major driver.

Detailed results for both models are in the appendix to this study.

[14] Xiaodong Du and Dermot J. Hayes. The Impact of Ethanol Production on U.S. and Regional Gasoline Markets: An Update to 2012, Working Paper 12-WP 528. Center for Agricultural and Rural Development. Iowa State University. May 2012.
[15] Christopher R. Knittel and Aaron Smith. Ethanol Production and Gasoline Prices: A Spurious Correlation. Giannini Foundation for Agricultural Economics. University of California Davis. July 12, 2012

Model 2: 3:2:1 Crack Spread, Crude Oil Prices, Ethanol Production and Other Related Factors:

This model closely resembles the Iowa State paper 3:2:1 crack spread model. There are two major differences. The Iowa State paper deflated the crack spread by the Producer Price Index (PPI) of crude energy material. This version uses the actual, non-deflated, crack spread. The Iowa State model also did not include crude oil prices as a driver of the margin, or the MTBE and refinery outage events.

The "Crack Spread" is a common measure of refiner margins above the cost of crude oil. It is the weighted value of two major refiner products, gasoline and distillate fuel oil, minus crude oil cost. It is the value of 2 barrels (84 gallons) of gasoline, 1 barrel (42 gallons) of distillate fuel oil, versus the total value of the price of three barrels of crude oil. For February 2012 the crack spread was:

Gasoline Value: $3.044/gallon x 42 gallons per barrel x 2 barrels = $255.70
+ Fuel Oil Value: $3.196/gallon x 42 gallons per barrel x 1 barrel = $134.23
- Crude Oil Value: $107.19/barrel x 3 barrels = $321.57
= $68.36 per 3 barrels of crude oil; or $22.79 per barrel of crude oil, the value used in the model.

The variables used to explain the crack spread are the same as used in Model 1. The results are also almost the same. Ethanol production had a small negative, but statistically meaningless, effect on the crack spread. Net gasoline exports were also statistically insignificant. All statistically significant variables had the expected direction of influence on the crack spread.

The model explained 73.6 percent of the variation in the crack spread.

Conclusions

Measures of gasoline prices and oil refiner margins were used to model the effect of increasing ethanol production on those prices and margins. The monthly data used spanned January 2000 through December 2012. In the models increasing ethanol production was statistically insignificant in explaining wholesale gasoline prices or refiner margins.

The overall conclusion is that increasing ethanol production over the 2000-2012 period had no significant effect on wholesale gasoline pricing or refiner margins.

In both models net gasoline exports were also statistically insignificant. Increased ethanol production has caused gasoline exports to increase, but those increased exports have not depressed gasoline prices or refining margins.

Why Do These Results Differ from Iowa State's Paper?

There are several items that contribute to the differences between the Iowa State results and these.

For the 3:2:1 Crack Spread version there are three major differences. The Iowa State version deflated the spread by a Producer Price Index (PPI) for crude energy materials. This study did not deflate the crack spread, but used actual data. This study also included crude oil price effects, an important variable.

The deflation of the crack spread may have produced a spurious result in the Iowa State version. Their model showed a statistically significant negative effect of increasing ethanol production on the spread. However, deflating that spread by the cost of energy materials causes it to not increase as fast as the actual raw data. Thus, with the crack spread increases held down in a time of increasing ethanol production and energy costs, there is a measured negative effect, even if one does not exist in the actual, non-deflated, data.

A second major difference is that both models in this paper included crude oil prices as a variable to explain the crack spread. The reason is that oil refineries use some oil in their processing. As crude oil prices increase, the crack margin should also increase to cover those higher costs. The model results confirm this effect. The effect of crude oil cost is positive, highly significant, and contributes to the different model results.

Finally, all of this paper's price and margin models include the effects of major March-July 2007 refinery outages that caused petroleum product prices and margins to increase over those months. The effect is statistically significant. Also included is an April-August 2006 gasoline price and margin increase associated with the withdrawal of the MTBE additive in several areas of the country. The effect is statistically significant. Neither of these market disruptions was considered in the Iowa State paper.

Using a more complete model, and actual prices and refiner margins, the effects of increased ethanol production on gasoline prices and oil refiner margins shown in the Iowa State model disappear.

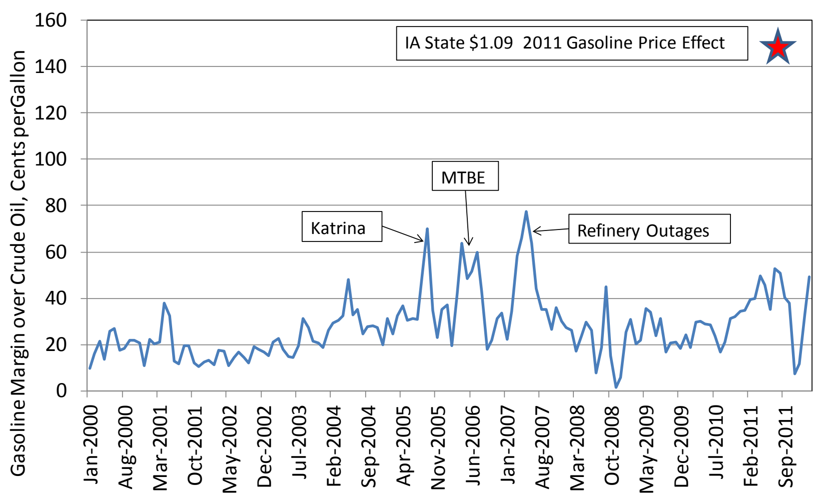
Other Iowa State Paper Issues

There are several other issues with the Iowa State paper's results. The Iowa State 3:2:1 crack spread model uses a deflated spread to estimate the impact of increasing ethanol production. They then use that result to project an actual price difference for gasoline. Mixing deflated model results and actual non-deflated price data is statistically problematic.

Key Point:

The Iowa State finding that 2011 gasoline prices would have been $1.09 higher without ethanol production increases is out of line with historical prices and the fact that we are producing large gasoline exports. The actual 2011 gasoline premium to crude oil was 37.1 cents/gallon. An added $1.09 makes that margin $1.46.

Gasoline Price Margin over Crude Oil Price, 2000-February, 2011



More significantly, the Iowa State authors do not seem to realize that their extrapolated $1.09 per gallon increase in 2011 gasoline price relative to the crude oil price would cause major changes in supply-side market behavior (preceding graph). The 2000-2011 average gasoline crack price spread was 27.8 cents per gallon. The 2011 margin averaged 37.1 cents. A $1.09 increase in that margin would lead to refineries quickly increasing gasoline production and reducing gasoline exports. The increase in gasoline supply available to the U.S. market would largely, likely entirely, wipe out the higher gasoline price.

Put simply, a $1.09 gasoline price increase in 2011 would have never happened. There is enough U.S. and global spare capacity to produce more gasoline, or the United States could export less, and bring gasoline prices down relative to crude oil.

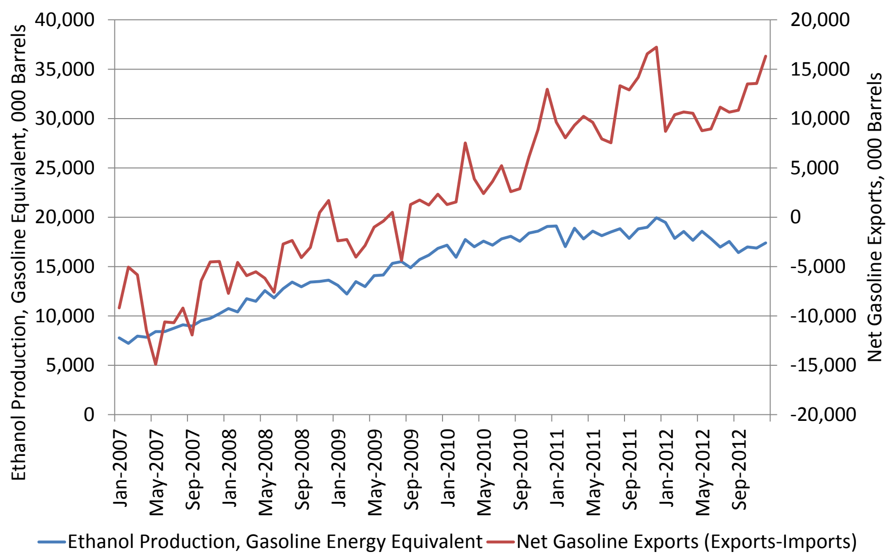
Has Increased Ethanol Production Increased U.S. Energy Supplies?

Another fact that supports the lack of impact of increased ethanol production on gasoline prices is that more ethanol production has not added to the U.S. energy supply. Rather, ethanol has displaced some U.S. gasoline consumption, but not production. The gasoline that was displaced from 2007 to 2012 was exported (next chart).

Monthly Ethanol Production (Gasoline Energy Equivalent) and Gasoline Exports

Key Point:

The increase in ethanol production since 2007 has displaced U.S. gasoline consumption, not added to the domestic energy supply. All of the energy produced by the added ethanol, and more, has left the country in the form of higher gasoline exports and reduced gasoline imports. As of the end of 2012, net gasoline exports are almost equal to the gasoline equivalent of all ethanol production.



In the chart above ethanol production was corrected for the fact that ethanol has only 67 percent of the energy in gasoline. Net gasoline exports are calculated as exports minus imports. Until about 2009 the U.S. was a net gasoline importer, thus the negative exports until then.

How can the ethanol industry claim that they are adding to the U.S. liquid fuel supply, or affecting prices, when ethanol production has had no significant effect on gasoline production?

The ethanol industry has also claimed that “Ethanol is now 10 percent of the U.S. motor fuel supply.” This is a very misleading statement.

In 2012, about 94 percent of U.S. gasoline was sold as E10, containing 10 percent ethanol by volume, but only 6.7 percent by energy content. Measured by volume, and for gasoline alone, the claim is very close to the fact. That is far from the whole story. A gallon of ethanol is not a gallon of gasoline, and gasoline is a far cry from the entire U.S. liquid fuels supply.

Gasoline is not the only liquid fuel used in the United States. According to the U.S. Department of Energy, 2012 U.S. total liquid fuel consumption was about 5.199 billion barrels. Gasoline-equivalent ethanol consumption was about 203 million barrels (table below). U.S. ethanol energy consumption was only 3.9 percent of U.S. liquid fuel consumption, not 10 percent. On a global scale, U.S. ethanol energy production contributed well under 1 percent of global liquid fuels consumption.

U.S. Ethanol Production Versus U.S. and Global Liquid Fuels Consumption

Item	2012, 000 Barrels
U.S. Ethanol Consumption, Gasoline Equivalent	202,549
Total U.S. Liquid Fuels Consumption	5,199,910
Ethanol Percent of U.S. Liquid Fuels	3.9%
U.S. Ethanol Production, Gasoline Equivalent	212,166
Global Liquid Fuels Consumption	32,499,600
U.S. Ethanol Percent of Global Liquid Fuels	0.65%

Does Ethanol Save Motorists Money?

The ethanol industry claims that increased use of ethanol fuel is saving motorists' money. We have already shown that higher ethanol production has had no effect on gasoline prices. That claim is also based in part on the fact that ethanol now typically sells for less per gallon than gasoline. Once again, a gallon of ethanol displaces only 0.67 gallons of gasoline. On an equal energy basis, a gallon of ethanol has never sold for less than a gallon of gasoline.

2011 Wholesale Level Cost of U.S. Ethanol Consumption[16]

Item	2012
Gasoline Average Price per Gallon	$2.95
Ethanol Average Price per Gallon, Gasoline Equivalent	$3.54
Ethanol Price Premium per Gallon	$0.59
Billion Gallons of Ethanol Consumed	12.95
Ethanol Cost to Motorists, $Billion	$7.61
Actual Ethanol Average Price per Gallon	$2.37

The table above shows that the 2012 ethanol price premium added about $7.6 billion to motorists' fuel bills. That cost was about half of 2011. Elimination of the conventional ethanol tax credit on January 1, 2012 saved $5.7 billion in federal outlays, and reduced the wholesale ethanol price by about $0.40 cents per gallon. The lower ethanol price reduced the cost of ethanol in the E10 blend that was 94% of sales.

Has Increased Ethanol Production Reduced U.S. Crude Oil Imports?

One claim made by the ethanol Industry is that ethanol substantially reduces U.S. oil imports. On the surface, that may seem obvious. The logic is that ethanol replaces gasoline, and if less gasoline is

[16] Sources: Ethanol and gasoline prices are from the Nebraska Energy Office. Ethanol consumption is from the Department of Energy, Energy Information Administration.

consumed we need to import less oil. The real world is not that simple. Increased ethanol production since 2007 has not replaced U.S. crude oil imports. Rather, since 2007, increased ethanol production has increased gasoline exports.

The Renewable Fuels Association claims that 2011 ethanol production reduced U.S. oil imports by 485 million barrels[17]. However, on an energy basis the U.S. consumed only 188 million barrels of ethanol in 2011. How can 188 million barrels replace 485 million barrels?

The claim is apparently based on the theory that for every barrel of ethanol production there is no need to import all of the crude oil used to produce that barrel of gasoline. Since a barrel of crude oil yields about half a barrel of gasoline, the theory is that a barrel of ethanol actually replaces more than one barrel of crude oil imports. The first problem with this theory is that if the U.S. did reduce crude oil imports, there would less production of all crude oil-based fuels, and other products other than gasoline. The U.S. would then need to import those other products. So, about half of the 485 million barrel claim makes no contribution to reducing dependency on imported petroleum. It does not matter if it is imported crude oil or refined products, both represent dependency on “foreign oil.”

A second problem is that a barrel of ethanol actually replaces only 0.67 barrels of gasoline. U.S. fuel ethanol use in 2012 was about 281 million barrels. That is the energy of 188 million barrels of gasoline, and the most gasoline that fuel ethanol could have replaced.

If there is any replacement of crude oil and refined product imports, the actual maximum reduction in foreign dependency is about 40 percent of the claimed amount. Even that claim may not be true if U.S. gasoline production did not decline in line with the increase in gasoline energy equivalent ethanol production. Data from the Department of Energy will show if U.S. gasoline production declined, or not. If gasoline production declined, it is also expected that there would be declines in the other major refinery production stream, distillate fuel oil used to make diesel, heating oil and jet fuel.

The next table summarizes 2007 to 2012 U.S. production and use for gasoline, ethanol, distillate fuel oil and crude oil use. U.S. finished gasoline production, net of the ethanol it includes, has increased, not declined, since 2007. Since gasoline consumption declined, gasoline net exports have increased more than production. That means that the U.S. demand for the oil needed for gasoline production has not declined at all. Use of crude oil did decline slightly, but that was due to increased refinery fuel yields, not refined product supply reductions.

U.S. Gasoline and Ethanol, Production, Trade and Consumption, 2007-2012[18]

[17] http://ethanolrfa.org/pages/ethanol-facts-energy-security, Accessed April 17, 2013
[18] These estimates use definitions that are different from the U.S. Department of Energy

Year	Finished Gasoline Production - Ethanol Used (Thousand Barrels)	Gasoline Net Exports (Thousand Barrels)	Gasoline Production - Net Exports (Thousand Barrels)	Ethanol Used for Blending (Thousand Barrels, Gasoline Equivalent)	Gasoline Production - Net Exports + Ethanol Used (Thousand Barrels, Gasoline Equivalent)	U.S. Refinery and Blender Net Production of Distillate Fuel Oil (Thousand Barrels)	U.S. Refinery and Blender Net Input of Crude Oil (Thousand Barrels)
2007 Actual	2,914,011	(104,248)	3,018,259	91,524	3,109,783	1,508,530	5,532,097
2008 Actual	2,938,589	(47,541)	2,986,130	127,356	3,113,486	1,571,539	5,361,287
2009 Actual	2,965,771	(10,210)	2,975,981	161,440	3,137,421	1,477,534	5,232,656
2010 Actual	3,020,517	58,954	2,961,563	191,542	3,153,105	1,541,503	5,374,094
2011 Actual	3,008,762	136,539	2,872,223	199,168	3,071,391	1,637,771	5,404,347
2012 Actual	2,947,293	134,069	2,813,224	202,549	3,015,773	1,639,606	5,492,025
2007-12 Change	**33,282**	**238,317**	**(205,035)**	**111,025**	**(94,010)**	**131,076**	**(40,072)**

From 2007 to 2012, actual U.S. gasoline production and gasoline net exports both increased. Gasoline supplied to the U.S. market declined, ethanol use increased, and on balance total gasoline and ethanol (on an energy basis) declined. On balance, all the gasoline displaced by ethanol, plus a significant amount of ethanol, was exported. Net gasoline exports increased by more than twice the increase in ethanol blending use. Net gasoline exports of 134,069,000 barrels in 2012 were more than the 2007-2012 111,025,000 barrel increase in ethanol blending (gasoline energy equivalent). Crude use declined, but not due to refined fuel product production reductions.

One way to look at what happened as a result of increased ethanol production is that the RFS has forced almost all of the 2007-2012 ethanol production increase to be used in the U.S. In a very real sense, all of the energy contained in the 2007-2012 ethanol production increase was actually exported in the form of gasoline because there was no market for it here! We could have exported all of that 111,025,000 barrels of 2007-2012 increased ethanol production (gasoline energy equivalent) and still been a net gasoline exporter in 2012!

In other words, the 2007-2012 increase in ethanol production increased the global energy supply, but that energy was exported from the U.S. in the form of gasoline. Increased ethanol production since 2007 has not increased U.S. motor fuel consumption, or reduced crude oil use, or crude oil imports. That fact helps make sense out of the statistical model results that show no impact of increasing ethanol production in gasoline prices.

A major factor in reduced crude oil imports and use was increased total refiner fuel yield. As shown in the next table, the total gasoline and fuel oil yield increased from 71.6 percent in 2007 to 74.3 percent in 2012. Refiners reduced gasoline yields slightly due to its declining consumption. Versus 2007 yields, the yield increase saved 149 million barrels of 2012 crude oil use.

But, why did oil refiners continue to produce more gasoline when ethanol production was increasing? Gasoline is not the only important fuel produced from crude oil. Diesel, aviation and heating fuels made from distillate fuel oil are also very important to refiners. Total demand for those products was increasing from 2007 to 2012. Ethanol cannot replace any of those other refinery products.

Refinery Yields, Two Major Products

Year	Gasoline Yield	Distillate Fuel Oil Yield	Total Gasoline and Distillate Fuel Oil Yield
2007	45.5%	26.1%	71.6%
2008	44.2%	27.8%	72.0%
2009	46.1%	26.9%	73.0%
2010	45.7%	27.5%	73.2%
2011	44.9%	28.9%	73.8%
2012	45.2%	29.1%	74.3%

To meet the demand for fuels other than gasoline, and keep refineries running at efficient rates, oil companies had to maintain crude oil use even as ethanol supplies grew and gasoline sales fell. With U.S. gasoline consumption on the decline, and ethanol adding to the gasoline supply, refiners simply started to produce slightly less per barrel of oil, and export more, gasoline to balance their total fuels supply and demand.

RFS Impact on Corn and Meat Market Conditions

In the post-RFS era grain and soybean prices have reached record-high prices, and volatility levels are the highest seen in modern history. Such an outcome is to be expected given the fixed nature and size of the RFS blending mandates versus forces of nature that largely determine biofuel feedstock production.

Consequences of high, volatile, grain and soybean prices have been detrimental to both the food and ethanol fuel sectors, and the overall economy. As was pointed out earlier, since 2007 food price inflation has accelerated to double the pre-2007 rate relative to non-food prices. Higher food prices, and their impact on food spending, have acted as a drag on post-2007 economic growth, and recovery from the 2008-2009 recession. Job creation has also been slowed.

The effects of the fixed RFS can be seen in the next table that details the 2005 to 2012 corn supply and use situation. The 2007 RFS promise of guaranteed ethanol use helped drive corn used for ethanol from 1.6 billion bushels in the 2005/2006 crop year to 5.0 in 2011/2012 before the 2012 crop disaster forced use down to 4.55 billion in 2012/2013. That increase in ethanol use forced higher prices and significant rationing of corn among feed users and export customers.

Feed use of corn declined from 6.2 billion bushels in 2005/2006, to only an estimated 4.4 billion in 2012/2013. Part, but not all, of the decline in corn feeding was offset by the increase in distillers' grains that are a by-product of ethanol production.

There are no official USDA estimates of distillers' grains production or stocks, but export data are available. To estimate distillers' grain feed use a standard yield of 18 pounds of 10 percent moisture distillers' dried grains with solubles (DDGS) per bushel of corn used for fuel ethanol production was assumed. That production volume was then factored up to from 10 percent to 14 percent moisture, the standard for corn. That supply was assumed to substitute for corn on a 1:1 basis. That is, 56 pounds of 14 percent moisture DDGS was assumed to replace one bushel of corn. Exports were subtracted from production to obtain domestic supply. DDGS has no use other than feeding, and inventory data are not available, so the entire domestic supply was assumed to be fed in the year of production.

Even with the add-back of DDGS, total feed use of corn plus DDGS declined from about 6.6 billion bushels in 2005/2006, to an estimated 5.7 billion bushels in 2012/2013.

Corn exports declined from about 2.1 billion bushels in 2005/2006 to an estimated 0.8 billion bushels in 2012/2013.

Both of these declines in use are the result of farm level corn prices increasing from $2.00 for the 2005/2006 crop year to almost $7.00 in 2012/2013. Higher corn prices (and associated increases in wheat and soybean product prices) have dramatically raised the costs of producing meat and poultry. Our former export customers have turn largely to South America for their corn needs.

April 10, 2013 USDA Corn Production, Supply and Demand Estimates[19]

Item	2005/ 2006	2006/ 2007	2007/ 2008	2008/ 2009	2009/ 2010	2010/ 2011	2011/ 2012	2012/2013 USDA Fcst.
Area Planted (Mill. Ac.)	81.8	78.3	93.5	86.0	86.4	88.2	91.9	97.2
Area Harvested (Mill. Ac.)	75.1	70.6	86.5	78.6	79.5	81.4	84.0	87.4
Yield (Bu/Ac.)	148.0	149.1	150.7	153.9	164.7	152.8	147.2	123.4
Beg. Corn Stocks (Mill. Bu.)	2,114	1,967	1,304	1,624	1,673	1,707	1,128	990
Corn Production (Mill. Bu.)	11,114	10,535	13,038	12,092	13,092	12,447	12,360	10,780
Corn Imports (Mill. Bu.)	9	12	20	14	8	28	29	125
Total Corn Supply (Mill. Bu.)	13,237	12,514	14,362	13,729	14,773	14,182	13,517	11,895
Corn Feed Use (Mill. Bu.)	6,155	5,598	5,938	5,182	5,125	4,793	4,545	4,400
Food/Seed/Ind. Use (Mill. Bu.)	2,981	3,488	4,363	5,025	5,961	6,426	6,439	5,937
Fuel Ethanol Use (Mill. Bu.)	1,603	2,117	3,026	3,709	4,591	5,021	5,011	4,550
Est. DDGS Prod. @18 lbs (Mill. Bu. Equiv.)	563	744	1,064	1,304	1,614	1,765	1,762	1,599
DDGS Exports (Mill. Bu. Equiv.)	50	73	161	204	340	340	309	267
Est. DDGS Feed Use (Mill. Bu. Equiv.)	513	671	903	1,100	1,274	1,425	1,452	1,333
Corn + DDGS Feed Use (Mill. Bu. Equiv.)	6,668	6,269	6,841	6,282	6,399	6,218	5,997	5,733
Other Food/Seed/Ind. Use (Mill. Bu.)	1,378	1,371	1,337	1,316	1,370	1,405	1,428	1,387
Corn Exports (Mill. Bu.)	2,134	2,125	2,436	1,849	1,980	1,835	1,543	800
Corn Net Exports (Mill. Bu.)	2,125	2,113	2,416	1,835	1,972	1,807	1,514	675
Total Corn Use (Mill. Bu.)	11,270	11,210	12,737	12,056	13,066	13,054	12,527	11,137
Ending Corn Stocks (Mill. Bu.)	1,967	1,304	1,624	1,673	1,707	1,128	990	758
U.S. Average Farm Price, Corn, $/Bu.	$2.00	$3.04	$4.20	$4.06	$3.55	$5.18	$6.22	$6.90
% Corn Production Used for Fuel Ethanol	14%	20%	23%	31%	35%	40%	41%	42%

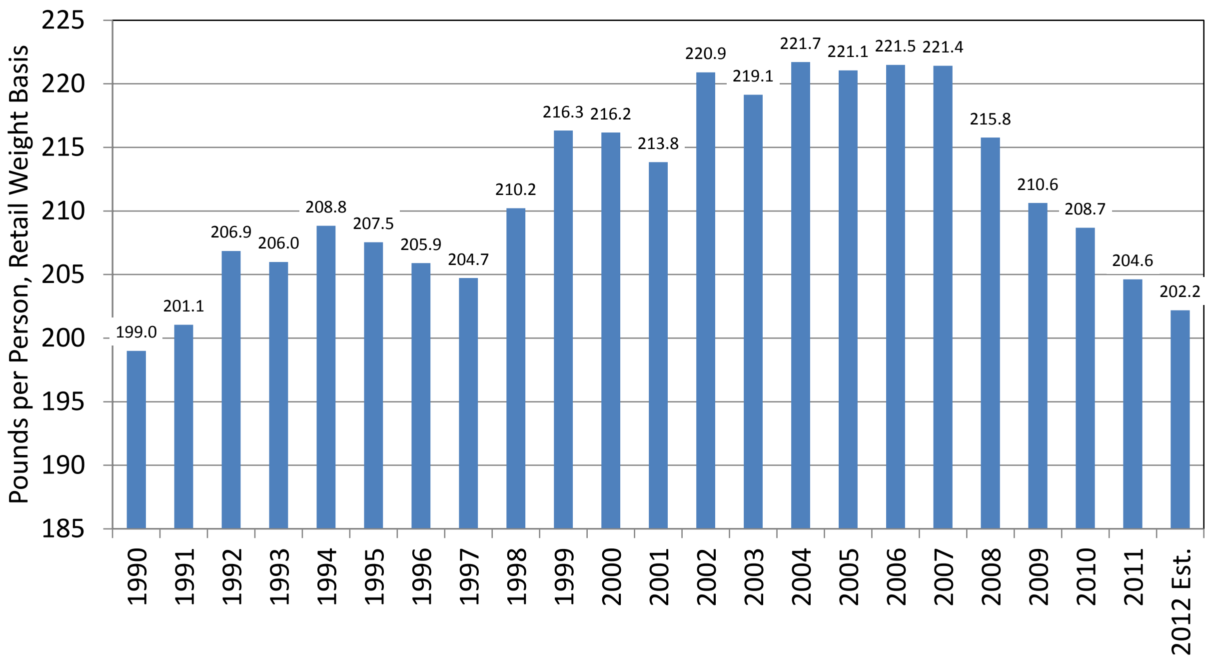
In the domestic market, the sharp increases in corn prices after 2007 have led to higher prices for foods that make heavy use of corn. Meat and poultry production has been heavily affected. Higher prices for these commodities have forced price rationing among consumers, and per capita consumption has declined to levels not seen since 1991 (next chart).

The post-2007 decline in U.S. meat and poultry consumption is unprecedented. But, so is the current RFS that reduces this industry's access to its basic feedstock, corn. By encouraging the diversion of corn to ethanol production, even in times when corn production and stocks were dangerously low, the RFS has forced all other users to reduce production to accommodate higher costs. It is no accident that the decline in meat and poultry consumption started in 2008, the first year of the current RFS.

USDA Estimates of Per Capita Total Meat and Poultry Consumption, 1990-2012[20]

[19] USDA, World Agricultural Supply and Demand Estimates, April 10, 2013. Years are September 1 crop years. DDGS statistics estimated by FarmEcon.

[20] USDA, World Agricultural Supply and Demand Estimates, May 10, 2012 and prior editions.



Summary: An inflexible RFS has caused high and volatile corn prices. Extremely small carryover stocks in 2010/2011 to 2012/2013 caused corn prices to increase to new record levels. Those higher prices severely rationed both feed use, resulting meat consumption, and exports.

The inflexible RFS impact on corn prices and price volatility was studied by Iowa State University. Not only would corn prices have been lower, price volatility would also have declined. The Babcock and McPhail article cited earlier concluded:

"We examine the marginal effect of ethanol policies such as the RFS mandates and the blending wall on price variability of corn and gasoline. Theoretical and empirical results both suggest that current ethanol policies decrease the price elasticity of demand for both commodities, and therefore increase price variability. An important implication has to do with the policy actions with respect to biofuels and particularly ethanol from corn. Policy actions that result in maintaining or changing the current mandates and/or the blend wall should account for their effect on the price elasticity of demand and price volatility for corn and gasoline markets."

Using a statistical model of gasoline and corn prices the authors ran scenarios with historically low and high crude oil prices, and elimination of the RFS. Corn and gasoline price volatility would be reduced more with low crude oil prices because the incentives to continue ethanol production would be lower in a low energy price environment.

The authors also included elimination of the 10 percent ethanol blend limit (BW, or blend wall, in the table below) in their analysis. That elimination also lowered price volatility, but not by as much as eliminating the RFS in the case of low crude oil prices. "Low" and "High" crude oil prices refer not to a specific price, but the lower and upper ends of the historical range. Gasoline price volatility is also decreased. The results presented in the table below are not surprising. Artificially created, inflexible, demand should increase price volatility.

Price Variability of Corn and Gasoline Under Different Crude Oil Price Scenarios

Scenario	Corn CV	Gasoline CV
High crude oil prices		
RFS, BW, and tax credits	0.2654	0.2365
Elimination of BW	0.2008	0.2180
Elimination of RFS	0.2441	0.2295
Low crude oil prices		
RFS, BW, and tax credits	0.3043	0.2703
Elimination of BW	0.2952	0.2661
Elimination of RFS	0.2497	0.2518

The "CV" is the coefficient of variation. It is the standard deviation of the corn or gasoline price divided by the average of the respective price. As such, it is a measure of the volatility of the prices relative to their averages.

RFS Adjustments for Cellulosic Ethanol

An ambitious RFS schedule and generous tax credits for cellulosic ethanol have completely failed to produce any meaningful amount of fuel. The first commercial scale plants (Poet/DSM and DuPont) are under construction. They are scheduled to come online in 2014. However, they will cost about $500 million to build, and have only 55 million gallons-per-year initial capacity, but only if they operates as designed.

The 2014 cellulosic ethanol RFS calls for 1.75 billion gallons of cellulosic ethanol. The 2014 cellulosic RFS, and all years beyond 2013, is grossly unrealistic.

The 2007 cellulosic RFS was recently examined in great detail by the National Research Council[21]. A broad-based, multi-disciplinary, group of experts concluded that meeting the current cellulosic RFS schedule is highly unlikely. Extraordinary technical barriers to successful commercialization of cellulosic ethanol were described in detail. In addition, the report found significant issues with increased greenhouse gas emission goals, cost-efficient feedstock production, increased competition for food crop land, increased federal subsidy costs, increased water use, and potential air quality degradation.

In light of these recent findings, the EPA should reexamine the 2007 RFS schedule for cellulosic ethanol. Any cellulosic ethanol RFS should reflect the realities of technical barriers, fuel costs, food production, and environmental impact.

In addition to the technical issues with increased cellulosic ethanol production, there is also a major price and competitiveness problem. Corn-based ethanol has already saturated the E10 market. Unless cellulosic ethanol is fully price competitive with gasoline, it will be very difficult to move beyond the current E10 volume ceiling. Simply put, while there is a blending mandate, motorists will not voluntarily buy higher blend levels unless the cost per mile is at least as good as E10. Mandating purchase of a product for which there is no purchase incentive will prove to be very difficult.

[21] National Research Council. Renewable Fuel Standard: Potential Economic and Environmental Effects of U.S. Biofuel Policy. Washington DC. 2011.

The Bottom Line

Despite overwhelming evidence that the inflexible RFS is causing significant economic harm, and few benefits, the EPA refused to grant a RFS waiver in the wake of the 2012 corn crop disaster. The current waiver system that relies on the judgment of a single political appointee is broken. The conventional biofuel RFS needs to be substantially reformed.

Appendix: Gasoline Price Models

Model 1, Monthly Gasoline Prices, Crude Oil Prices, Ethanol Production and Other Related Factors:

January, 2000 to December, 2012 monthly average New York harbor conventional gasoline regular spot price FOB (Cents per Gallon) is a function of:

Variable	Coefficient	T
Constant	-92.33935775	-2.326185877
U.S. Crude Oil Composite Acquisition Cost by Refiners (Dollars per Barrel)	2.661642753	45.55229375
U.S. Oxygenate Plant Production of Fuel Ethanol (Million Barrels)	0.075380391	0.20072791
U.S. Percent Utilization of Refinery Operable Capacity (Percent)	1.727789506	4.802931302
U.S. Ending Stocks excluding SPR of Crude Oil and Petroleum Products (Million Barrels)	0.11918305	4.725172965
U.S. Motor Gasoline Ending Stocks (Million Barrels)	-0.824142742	-5.767141876
Net gasoline exports (Million Barrels)	0.04983226	0.210245441
Jan	16.03112208	3.860174213
Feb	17.75201631	4.158569722
Mar	10.5352715	2.686626276
Apr	5.162261127	1.301101864
May	0.958144504	0.229422696
Jun	-5.694714684	-1.330484275
Jul	-9.651037834	-2.192225171
Aug	-10.3360385	-2.133427155
Sep	-1.862283641	-0.430238169
Oct	-8.462763507	-1.926738424
Nov	-6.681878724	-1.671766198
Katrina Effect Sept-Oct 2005	33.33642842	4.296622099
MTBE Effect Apr-Aug 2006	21.5025586	4.493252383
2007 Refinery Outages Mar-Jul 2007	27.25898261	5.653795163

n = 156, Degrees of Freedom = 134, R^2 = 0.987

A “T Statistic” of ±1.98 is required to be statistically significant from zero at the 95 percent level.

Discussion: Except for ethanol production all of the variables are statistically significant and have the expected direction of influence. Ethanol production and net gasoline exports were not statistically significant. The monthly price level seasonal estimates use December as the base month.

Model 2, Monthly 3:2:1 Crack Spread, Crude Oil Prices, Ethanol Production and Other Related Factors:

January 2000 to December 2012 monthly average New York gasoline and heating oil prices and the crude oil composite acquisition cost by refiners were used to compute the 3:2:1 crack spread ($/barrel). The crack spread is modeled as a function of:

Constant	-33.17838042	-2.435228108
U.S. Crude Oil Composite Acquisition Cost by Refiners (Dollars per Barrel)	0.18145835	9.048244859
U.S. Oxygenate Plant Production of Fuel Ethanol (Thousand Barrels)	-4.08342E-05	-0.316811101
U.S. Percent Utilization of Refinery Operable Capacity (Percent)	0.631397725	5.11382022
U.S. Ending Stocks excluding SPR of Crude Oil and Petroleum Products (Thousand Barrels)	3.89383E-05	4.497876255
U.S. Motor Gasoline Ending Stocks (Thousand Barrels)	-0.000282767	-5.765201869
Net gasoline exports (Thousand Barrels)	-1.10472E-05	-0.135798319
Jan	5.30267672	3.720189262
Feb	5.554682218	3.791249947
Mar	2.44603812	1.817404701
Apr	-0.012523	-0.009196162
May	-1.876730705	-1.309285103
Jun	-3.964723245	-2.69884258
Jul	-5.418660026	-3.586162342
Aug	-5.526645823	-3.323626663
Sep	-2.318905977	-1.560893056
Oct	-3.5890465	-2.380765055
Nov	-2.517690736	-1.835296485
Katrina Effect Sept-Oct 2005	12.00910082	4.509677446
MTBE Effect Apr-Aug 2006	6.170663751	3.756898444
2007 Refinery Outages Mar-Jul 2007	8.212864375	4.963088033

n = 156, Degrees of Freedom = 134, R^2 = 0.736

A “T Statistic” of ±1.98 is required to be statistically significant from zero at the 95 percent level.

Discussion: All of the variables have the expected direction of influence. Ethanol production was not statistically significant. Net gasoline exports had a negative, and insignificant, effect on the 3:2:1 crack spread.