RENEWABLE FUELS ASSOCIATION

30 Years of Leadership

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Subcommittee on Energy and Power
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Hearing on
The American Energy Initiative

Testimony of

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Good morning, Chairman Whitfield, Ranking Member Rush, and Members of the Subcommittee. My name is Bob Dinneen and I am president and CEO of the Renewable Fuels Association (RFA), the national trade association representing the U.S. ethanol industry.

RFA is the leading trade association for America's ethanol industry. Its mission is to advance the development, production, and use of fuel ethanol and co-products by strengthening America's ethanol industry and raising awareness about the benefits of renewable fuels. Founded in 1981, RFA's 300-plus members are working to help America become cleaner, safer, more energy secure and more economically vibrant.

This is a timely and important hearing. Gasoline prices are inching closer to record high levels and consumers are seeing higher oil prices drive up the cost of everything from food to clothing. I am pleased to be here today to discuss how our nation's ethanol industry is already helping to decrease our reliance on foreign oil and keep volatile gasoline prices in check, and how the industry is poised to make even more significant contributions in the future.

The 109th Congress put our nation on a path toward greater energy diversity, enhanced national security, and increased economic activity when it passed the Energy Policy Act of 2005. That visionary and innovative policy, originally introduced by Rep. Joe Barton (R-Tex.), established the first-ever Renewable Fuels Standard (RFS) requiring the use of increasing volumes of domestically produced renewable fuels. Recognizing the benefits of renewable fuels, the 110th Congress expanded the RFS to 36 billion gallons per year by 2022, an amount that would virtually eliminate the need for foreign oil imported from OPEC nations, several of which are hostile to the United States and our way of life. EISA has stimulated unprecedented investment in the U.S. biofuels industry and, as a consequence, the U.S. now leads the world in the production and use of clean, renewable, domestic liquid transportation fuels.

However, the U.S. Environmental Protection Agency (EPA) took great liberty when writing the rules for the expanded RFS, and the agency's tortured reading of several important provisions in EISA threatens to put Congress' goals in jeopardy. In many instances, we believe Congress' intent, as clearly established in EISA, has been misconstrued by EPA in the rulemaking and implementation process. Renewable fuel

producers and the obligated parties alike have been frustrated by many elements of EPA's implementation of the RFS program.

For EISA's ultimate goal of 36 billion gallons of renewable fuel use to be realized, EPA must endeavor to faithfully honor Congress' intent and refrain from legislating through rulemaking and regulation. In addition, EPA must strictly adhere to the objectives and goals outlined by Congress in future legislative efforts to open renewable fuel markets, stimulate investments in new biofuel technologies and assist in the development of infrastructure for these new fuels. Further, Congress should resist the calls of some critics to re-open and modify the RFS.

Background

Today, ethanol is blended into roughly 90 percent of the gasoline sold in the U.S., the majority as E10 (10 percent ethanol and 90 percent gasoline) – a blend component adding octane, displacing toxics and helping refiners meet Clean Air Act specifications. Ethanol is a thoroughly tested, safe, and effective motor fuel. Americans spend nearly $1 billion a day importing oil, often from hostile regions of the world. If the recent chaos in the Middle East and the subsequent escalation of oil prices teaches us anything, it should be that America must more aggressively pursue the path of energy self-reliance. Increasing the use of domestic renewable fuels like ethanol is the first, and arguably, the easiest step we can take.

At a time when American drivers are facing gas prices at record or near-record levels, ethanol is helping to hold pump prices lower than they would be otherwise. On Monday, economists from Iowa State University and the University of Wisconsin released a paper showing that the increased use of ethanol reduced wholesale gasoline prices by an average of $0.89 per gallon in 2010. The new analysis, an update to a 2009 Energy Policy paper authored by professors Dermot Hayes and Xiaodong Du, also found that the growth in ethanol production reduced gasoline prices by an average of $0.25, or 16 percent, over the entire decade of 2000-2010. U.S. Department of Energy data shows U.S. gasoline use averaged 138 billion gallons per year from 2000 to 2010, meaning annual savings due to ethanol during the decade averaged $34.5 billion.

According to the new analysis, the impact of ethanol on gasoline prices in 2010 was even more pronounced, as oil prices rose and ethanol production expanded to 10 percent of the gasoline pool. In 2010 alone, ethanol reduced the average American household's gasoline bill by more than $800.[1]

The study also examined what would happen to U.S. gasoline prices if ethanol production came to an immediate halt -- something that is unlikely to ever occur, but also something that has been advocated by some misguided opponents of biofuels. The authors found that, "Under a very wide range of parameters, the estimated gasoline price increase would be of historic proportions, ranging from 41 percent to 92 percent." At today's prices, that means gasoline prices would increase from roughly $4 per gallon to $5.60-$7.70.

That finding should serve as a wake-up call to those who are seeking to reduce or eliminate the role of ethanol in the U.S. energy market at a time when oil markets are increasingly volatile. As the economic recovery is fragile and oil markets are unstable, policymakers should be embracing -- not shunning -- ethanol's ability to add to domestic fuel supplies and hold prices in check. If we woke up tomorrow morning and the 10 percent of our gasoline supply that comes from ethanol was gone, it is easy to see

[1] Data from the Federal Highway Administration, Environmental Protection Agency, and Department of Energy show the average household consumed 900 gallons of gasoline at an average price of $2.74 per gallon in 2010. That means the average family's annual gasoline bill was $2,470, but it would have been closer to $3,270 without ethanol.

how gasoline prices could nearly double. That type of increase would be absolutely crippling to the American economy. The new study is attached to this testimony as Appendix A.

Additionally, ethanol production is contributing to our nation's financial well-being as well as that of American households. In 2010, ethanol production contributed $53.6 billion to the national Gross Domestic Product and added $36 billion to household incomes.

According to an economic analysis from Cardno ENTRIX, 70,600 Americans are employed directly in the production of ethanol and in industries providing goods and services to ethanol producers. The economic activity generated by ethanol production supported a total of more than 400,000 Americans in 2010.

It can be argued that ethanol production is virtually paying for itself. The increased economic activity and income generated by America's ethanol industry added some $12 billion to Federal, state and local governments through increased tax revenue.

Moreover, domestic ethanol production improves our nation's balance of trade while also reducing our reliance on foreign oil. The production of 13 billion gallons of ethanol means that the U.S. needed to import 445 million fewer barrels of oil in 2010 to refine gasoline. That is more oil than America imports from Saudi Arabia annually. Displacing these imported oil barrels saved the U.S. $34 billion in 2010.

Unfortunately, opponents of biofuels have propagated the false notion that increased use of grain for ethanol is somehow causing a food crisis and driving retail food prices higher. They wrongly argue that grain is being diverted away from livestock feed markets for the purpose of producing biofuel -- this myth has been dubbed as "Food vs. Fuel." The truth is food inflation rates have been historically normal over the period of rapid ethanol growth. In fact, the 2010 food inflation rate of 0.8 percent was lowest since 1962. Further, a number of recent economic analyses have confirmed that a number of factors, including oil prices and speculation in commodities markets, have a much more significant effect on food prices than ethanol production or corn prices. A more detailed discussion of the "Food vs. Fuel" issue is found in Appendix B.

RFS Implementation Challenges

As discussed above, the benefits of expanding renewable fuel production and use in accordance with the RFS are clear. But, as alluded to earlier, the long-term goals of the RFS -- and the economic and environmental benefits related to those goals -- are in jeopardy of not being met because of several issues related to EPA's implementation of the program.

There are many challenges associated with the RFS that have stemmed from, or been aggravated by, EPA's misinterpretation of EISA. One recent example is EPA's approach to carrying out a triennial study of the impacts of the RFS. The requirement for this study was clearly articulated by Congress in Section 204 of EISA, which compelled EPA to study and report on the "impacts to date and likely future impacts" of the RFS program. Unfortunately, EPA's recently released draft of this required study disregarded and clearly exceeded the intended scope as established by Congress. While EISA explicitly requires EPA to assess "…the likely future impacts" of the RFS, the EPA draft report seems to identify every conceivable potentially negative impact associated with biofuels expansion, rather than focusing only on those future impacts of the RFS that appear most likely or most damaging. Further, EISA Section 204 requires EPA to assess only the likely future environmental impacts of the RFS, not the potential future impacts of total "increased biofuel production and use." EPA also crosses the line by discussing potential international indirect effects of biofuels expansion -- something that clearly was not included in the scope intended by

Congress. RFA believes the draft report's general approach and content must be substantively revised before finalization and submission to Congress.

Another problem created by the EPA's interpretation of EISA is the continual waiving and reducing of the RFS cellulosic biofuel targets. EPA's rulemaking made it extremely easy to waive the cellulosic biofuel requirements, meaning the RFS fails to serve as a true mandate for these fuels and fails to provide the investor surety and risk mitigation that Congress intended.

Other RFS challenges resulting from EPA's handling of the rulemaking and implementation of the regulation include the agency's exclusion of certain biofuel feedstocks that do not meet the narrow definition of "renewable biomass"; confusion over the process to approve new biofuel pathways; failure to keep up with advances in lifecycle GHG analysis; problems with the reporting system; and, other issues. A detailed account of some of these challenges is offered in Appendix C.

These challenges highlight the need for EPA to revisit Congress' intent when it passed EISA in 2007. Rather than throwing up red-tape roadblocks to biofuels expansion, Congress meant for EISA to serve as the blueprint for a rapid evolution of the U.S. fuel supply toward greater volumes of renewables and less imported oil.

The E10 "Blend Wall"

First and foremost, full implementation of EISA will require the use of ethanol beyond the traditional 10 percent blends, as 36 billion gallons of renewable fuels represents about 25 percent of the gasoline pool. Unfortunately, current regulations essentially limit the amount of ethanol can be blended with gasoline to 10 percent for conventional automobiles. EPA has approved E15 blends to for use in cars, pickups and SUVs built in 2001 and later, or about two-thirds of the vehicles on the road today.

While this is a good start, EPA's bifurcation of the vehicle fleet raises a number of practical concerns and challenges for gasoline blenders, marketers and retailers. The RFA continues to urge EPA to quickly extend the waiver for E15 use to all conventional light-duty vehicles. A report by the highly regarded automotive engineering firm, Ricardo Inc., concluded there were no unique emissions, material compatibility or drivability issues with older vehicles compared to 2001 automobiles. Our nation can and should move in the direction of ethanol blends in excess of 10 percent in conventional, gas-only vehicles. As with any new fuel, additional testing and some regulatory issues relating to the fuel's properties must be addressed before widespread E15 use can occur. The RFA is working with EPA and others to address those issues and accelerate the commercial use of E15.

It will be critical to the future growth opportunities for cellulosic and advanced ethanol to promote ethanol's important role as an alternative fuel as well. Currently, the E85 market represents just a fraction of the overall U.S. ethanol market, but it is growing. We estimate that there are about 8.5 million flexible fuel vehicles (FFV) on America's roadways today. That is up significantly from recent years and a testament to the leadership and commitment of General Motors and Ford; but it still represents just 3 percent of the total automotive fleet. Likewise, we estimate E85 and mid-level blends are offered at approximately 2,700 retail gas stations across the U.S. That is a huge improvement over the handful of E85 stations just a decade ago, but it still represents just 1.5 percent of the nation's gas stations. Obviously we have a long way to go if consumers are to be given the flexibility to maximize their use of domestic renewable fuels like ethanol. Efforts to expand FFV technology must be a part of our energy future. Putting more Americans behind the wheel of an FFV is a critical component of our strategy to transform current ethanol policy and the current ethanol industry. Together with more blender pumps, investment in infrastructure is one leg of the approach that recognizes the need to put the market back in ethanol policy.

Overcoming this "blend wall" issue is paramount to the success of the RFS. Cellulosic and advanced ethanol will largely represent the renewable fuel supply beyond the E10 blend market. To leave the market artificially constrained further limits market opportunities for next generation biofuels very close to commercialization, missing an opportunity to meaningfully increase America's use of renewable fuels and reduce our dependence on imported oil.

Conclusion

The ethanol industry greatly appreciates the continued commitment of the 112th Congress and this Subcommittee to the further development of a robust and dynamic domestic renewable fuels industry. Chairman Whitfield and Ranking Member Rush, you have made clear your commitment to the hardworking men and woman across America who are today's newest energy producers. The RFA looks forward to working with you to further develop and implement sound policies that provide the proper incentives to grow the U.S. ethanol industry.

Thank you.

APPENDIX A

The Impact of Ethanol Production on US and Regional Gasoline Markets: An Update to May 2009

Xiaodong Du and Dermot J. Hayes

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Abstract

This report updates the findings in Du and Hayes 2009 by extending the data to December 2010 and concludes that over the sample period from January 2000 to December 2010, the growth in ethanol production reduced wholesale gasoline prices by $0.25 per gallon on average. The Midwest region experienced the biggest impact, with a $0.39/gallon reduction, while the East Coast had the smallest impact at $0.16/gallon. Based on the data of 2010 only, the marginal impacts on gasoline prices are found to be substantially higher given the much higher ethanol production and crude oil prices. The average effect increases to $0.89/gallon and the regional impact ranges from $0.58/gallon in the East Coast to $1.37/gallon in the Midwest. In addition, we report on a related analysis that asks what would happen to US gasoline prices if ethanol production came to an immediate halt. Under a very wide range of parameters, the estimated gasoline price increase would be of historic proportions, ranging from 41% to 92%.

Keywords: crack ratio, crack spread, import elasticity.

Introduction

In a 2009 analysis published in *Energy Policy* (Du and Hayes 2009), we evaluated the impact of US ethanol production on national and regional gasoline prices. This article was based on data that was available prior to 2008. Since then, US ethanol production has increased significantly, and two years of additional historical data has become available. The purpose of this report is to update the earlier analysis. We calculate the average impact of ethanol production both nationally and regionally over the period January 2000–December 2010 and specifically for 2010. Estimation results indicate that, on average, over the whole sample period and all five PADD (Petroleum Administration for Defense District) regions, the growth in ethanol production reduced wholesale gasoline prices by $0.25/gallon. The Midwest region (PADD II) experienced the biggest impact with a $0.39/gallon reduction, while the East Coast (PADD I) had the smallest impact at $0.16/gallon. Based on the data of 2010 only, the marginal impacts on gasoline prices are found to be substantially higher given the much higher ethanol production and crude oil prices. The national average effect increases to $0.89/gallon and the regional impact ranges from $0.58/gallon on the East Coast to $1.37/gallon in the Midwest.

In addition, we now report on a related analysis that asks what would happen to US gasoline prices if ethanol production came to an immediate halt. This analysis is topical because a 2011 drought might force a shutdown of corn-based ethanol production and also because world energy stocks are tight. Moreover, the ethanol industry now provides approximately 10% of the gasoline used in automobiles, an amount that exceeds the spare capacity of US oil refineries. This "missing" fuel would have to be imported in the short run, and the required volume would be large relative to available import supplies. The only way to solve this short-term supply problem would be to use high gasoline prices to ration demand. The size of the required gasoline price increase cannot be calculated with any certainty because key parameters are not known with certainty. However, we can say that under a very wide range of parameters, the gasoline price increase would be of historic proportions, ranging from 41% to 92%.

The impact of ethanol production on wholesale gasoline prices

In this section, we briefly describe the updates and changes to Du and Hayes 2009. In the current study, the sample period is extended to January 2000 through December 2010.

Dependent variables

As in Du and Hayes 2009, two dependent variables are employed:

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

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

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

(b) The crack spread (π_{CS}) is defined as

(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 then deflated by the Producer Price Index of crude energy material. Monthly data of all related prices are collected from the Energy Information Administration (EIA) website.

Explanatory variables

As in the previous study, besides the monthly US ethanol production, other explanatory variables include monthly dummies (January to November), monthly crude oil ending stocks (excluding the Strategic Petroleum Reserve), total motor gasoline ending stocks, complexity-adjusted refinery capacity, HHI index for 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. Please see Du and Hayes 2009 for the justifications for included variables.

One change worth noting is that since EIA discontinued the Amsterdam-Rotterdam-Antwerp gasoline price series after September 2008, in the current study, the regional gasoline imports are not instrumented as described in Du and Hayes 2009, and the estimation method is changed accordingly.

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 discussed above.

The parameter estimates for the crack ratio and crack spread are presented in Table 1. All explanatory variables have the expected signs and are largely consistent with our previous study.

Evaluating at the sample mean, the wholesale gasoline price is lowered by $0.25/gallon because of ethanol production, which is about 16% of the sample average. We use the crack ratio to quantify the gasoline price impact. Specifically, the change in the wholesale gasoline price, -0.25/gallon, is calculated as

$$\begin{aligned}\text{Price change} &= \text{estimated coefficient} \times \text{Average ethanol production} \times \text{Average crude oil price (\$/gallon)} \\ &= -0.000031 \times 10916.95 \times \frac{53.67\ (\$/\text{barrel})}{42} \\ &= -0.2525\ (\$/\text{gallon})\end{aligned}$$

where the average ethanol production and crude oil price are averaged over the whole sample period.

Regional analysis

We use wholesale gasoline prices for this portion of the analysis. The crack ratio is employed as the dependent variable. The ordinary least squares 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 at $0.39/gallon. The East Coast experiences the smallest negative ethanol impacts, with gasoline prices lowered by $0.16/gallon. The Gulf Coast has a $0.20/gallon reduction in retail gasoline prices. The downward gasoline price changes in the West Coast and the Rocky Mountains are about $0.17/gallon and $0.38/gallon, respectively. The change in gasoline price in a regional market, for example, $0.39/gallon in the Midwest region (PADD II), is calculated as

$$\text{Price change} = \text{estimated coefficient} \times \text{Average ethanol production} \times \text{Average crude oil price (\$/gallon)}$$
$$= -0.0000276 \times 10916.95 \times \frac{53.67\ (\$/\text{barrel})}{42}$$
$$= -0.3850\ (\$/\text{gallon})$$

Based only on the 2010 data, we calculate the marginal impact of increasing ethanol production on wholesale gasoline prices. We find that the average national effect increases to $0.89/gallon and the regional impact ranges from $0.58/gallon in the East Coast to $1.37/gallon in the Midwest. The average and marginal effects of ethanol production on the US and regional markets are summarized in Table 3.

The impact of eliminating ethanol production on wholesale gasoline prices

Here we attempt to predict what would happen to domestic wholesale gasoline prices if ethanol production was totally eliminated. We treat ethanol as a perfect substitute for gasoline and then quantify the impact of reduced ethanol supply on domestic gasoline prices in a partial equilibrium model. The domestic gasoline demand, domestic supply including ethanol, and imports are modeled in a simultaneous equation system as

$$(4) \qquad \begin{cases} D_1 = D(p_1) \\ S_1^d = S_1^d(p_1) \\ S_1^i = S_1^i(p_1) \end{cases}$$

where D, the domestic gasoline demand, is defined as a function of domestic gasoline price p. S_d and S_i denote domestic gasoline supply including ethanol and gasoline imports, respectively. The demand and supply equations are assumed to be linear with slopes given by short-run price elasticities. Specifically, given demand elasticity $\varepsilon_d \left(\equiv \frac{D_1 - D_0}{p_1 - p_0} \times \frac{p_0}{D_0} \right)$, the demand price relation is derived as $D_1 = \varepsilon_d D_0 (p_1 - p_0) / p_0 + D_0$. We use the market data of 2010 as starting points (D_0 and p_0) in the system. The domestic supply and import equations can be similarly defined as functions of gasoline prices.

The short-run demand elasticity is obtained from the literature as -0.06 with a range of -0.034 to -0.077 (Hughes, Knittel, and Sperling 2008). The short-run elasticity of domestic supply is

estimated to be 0.06 with a range of 0.03–0.07.[1] Following Lee and Sumner (2010), the import elasticity is approximated as[2]

(5) $$\varepsilon_i = (Q_{tu} / Q_i)\varepsilon_d - [(Q_{tu} / Q_i) - 1]\varepsilon_s$$

where Q_{tu} / Q_i is the inverse of the import share in the domestic gasoline market, which is approximately 5% in our case. ε_s and ε_i denote domestic supply and import elasticities, respectively.

In the scenario in which ethanol is totally eliminated from domestic supply, the system specified in (4) is used to simulate the gasoline price responses after taking into account (i) the gasoline stocks at the level of 2010, and (ii) the full utilization of the spare capacity of US oil refineries in 2010. Three sets of simulation results are generated under different levels of elasticities (high, medium, and low). The results summarized in Table 4 indicate that if the ethanol supply were eliminated from the domestic gasoline market, wholesale gasoline prices may change by 41%–92% in the short run depending on the sensitivity of producers and consumers to prices.

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[1] The results are available upon request.
[2] The equation is found on page 333 of Lee and Sumner 2010.

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

Variable	Crack Ratio		Crack Spread	
	Estimate	Std. Err.	Estimate	Std. Err.
Oil stock	3.42e-06***	6.46e-07	7.2e-5***	1.2e-5
Gasoline stock	-3.62e-07	1.7e-06	-6.0e-5*	3.1e-5
Equivalent Refinery capacity	1.18e-06	2.47e-6	0.00013***	4.6e-5
Ethanol production	-.000018***	8.12e-07	-.00019***	1.5e-5
Supply disruption	.09**	.04	.18	.69
Gasoline import	-6.6e-6**	2.80e-06	-9.2e-5*	5.1e-5
HHI	5.1e-6	3.7e-5	.0023***	.001
January	0.004	.02	-.12	.39
February	0.01	.02	.44	.39
March	.08***	.02	1.45***	.39
April	.13***	.02	2.64***	.40
May	.16***	.02	3.20***	.39
June	.11***	.02	2.46***	.39
July	.06***	.02	1.76***	.39
August	.06***	.02	2.17***	.40
September	.07***	.02	2.70***	.40
October	.03	.02	2.01***	.35
November	.007	.02	.59	.39

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

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

Variable	PADD I	PADD II	PADD III	PADD IV	PADD V
Oil stock	5.1e-6	7.7e-6***	2.3e-6***	.000022	3.8e-6
Gasoline stock	-6.8e-6***	-5.8e-6	-9.7e-8**	-.000022	-2.4e-6
Refinery capacity	-1.8e-5**	.00001	1.7e-6	.0002	-.000065***
Ethanol production	-.0000116***	-0.000028***	-.000015**	-.000027***	-.0000124**
Supply disruption	.19***	0.06	.17**	.11	.08
Gasoline import	-3.8e-6	.0005**	-1.3e-5	.003	.0001***
HHI	-.00011**	-.0003*	-.0002	.0004**	.00006
January	.04	.06	.01	-.02	-.01
February	.002	.05	.003	-.00002	.02
March	.04	.06	.04	.05	.09
April	.11***	0.09**	.09**	.10*	.16**
May	.15***	.17***	.11***	.17***	.12*
June	.09**	.13***	.06	.13**	.10
July	.042	.07	.02	.09*	.05
August	.0006	.09**	.01	.10**	.01
September	-.01	.09**	.01	.12**	.07
October	-.05	.03	-.01	.06	.04
November	-.03	-.002	-.03	.03	.02
Constant	2.3***	1.31***	1.11***	.29	3.31***
R^2	.65	.69	.60	.64	.61

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	PADD II	PADD III	PADD IV	PADD V
Average effect (based on whole sample period)	0.25	0.16	0.39	0.20	0.38	0.17
Marginal effect (based only on 2010 data)	0.90	0.58	1.37	0.72	1.35	0.62

Table 4. Simulation results of the impact of eliminating ethanol production

	Equilibrium gasoline price ($/gallon)	Domestic gasoline demand (million gallons)	Domestic gasoline supply (million gallons)	Gasoline import (million gallons)
2010 baseline	2.16	138496	131571	6925
Low elasticities				
$\varepsilon_d = -0.034$; $\varepsilon_s = 0.03$; $\varepsilon_i = 0.11$.	4.15	134168	126544	7625
Medium elasticities				
$\varepsilon_d = -0.06$; $\varepsilon_s = 0.06$; $\varepsilon_i = 0.06$.	3.29	134168	127027	7141
High elasticities				
$\varepsilon_d = -0.077$; $\varepsilon_s = 0.07$; $\varepsilon_i = 0.21$.	3.04	134168	126653	7515

Appendix B[1]
Discussion of Food vs. Fuel Issue

Background

Food versus fuel is a term used to suggest that the increased production of biofuels has caused food prices to increase. The theory is that using grain for fuel increases the demand for grain, which in turn drives up grain prices and increases the cost of producing or gaining access to food. The food versus fuel headline is important to all biofuel sectors because its chief proponents are using the theory to underpin an effort to rollback or curtail the RFS, which requires the use of a wide variety of conventional and advanced biofuels.

Discussion

From 1974 to 2005, real food prices (adjusted for inflation) dropped by roughly 75 percent. From 2005 to 2008, food and grain prices increased steadily. During this period, both the price of oil and the use of ethanol rose significantly. These correlations led to a robust public debate, starting in 2008, about whether ethanol or oil was the primary cause of food and grain price increases.

Recent events greatly inform the food versus fuel debate. After increasing sharply, oil prices dropped dramatically in late 2008 and 2009. During the same period, the Consumer Price Index (CPI) for groceries showed the steepest year-over-year decline since 1950, with the Bureau of Labor Statistics citing the 27.3 percent decline in the energy index as the primary cause. And as food prices declined steeply in 2009, biofuel production continued to increase to record levels. In sum, since the inception of "food versus fuel" in 2008, the correlation between oil price and food price has continued, while the brief correlation between ethanol use and food price has broken.

There are other facts strongly suggesting that the food versus fuel theory is overblown:

- Corn is well-supplied. U.S. agriculture has doubled its production of corn over the last thirty years while expanding corn acreage by only 3 percent.

- U.S. agricultural exports have not decreased as grains have allegedly been "diverted" to biofuel production. In most cases, they have increased.

- A recent campaign called FoodPriceTruth.org revealed that profit margins among the major food producers in the United States (e.g. Kraft, Cargill, etc.) increased significantly, in some cases more than 100 percent, during a time when their major trade association, the Grocery Manufacturers Association, blamed biofuels for price spikes.

The purpose of the food versus fuel campaign appears to be to roll back the clock on corn ethanol policies to facilitate a reduction in grain prices. There are several problems with this approach: (1) biofuel critics want to open and amend the RFS, which would cause great harm to the advanced biofuel industry; (2) the correlation between ethanol use and food prices does not exist to any significant degree, which suggests that reducing ethanol use would not provide significant food or price relief; and, (3) using less renewable fuels will increase fuel prices, according to Merrill Lynch and others, which is the primary cause of food price increases.

Appendix C
Discussion of RFS Implementation Issues

EPA's misinterpretation of several important provisions of EISA has resulted in a number of significant RFS implementation challenges that threaten to undermine the original goals of the policy. The following implementation problems have resulted from EPA's liberal interpretation of the statute and overly intrusive rulemaking process.

- **Renewable biomass**: EPA's interpretation of the "renewable biomass" definition is overly narrow and may unintentionally preclude certain economically and environmentally sustainable feedstocks from generating credits under the RFS. For example, certain waste streams that would otherwise be landfilled are not likely to qualify as "renewable biomass," even though they can be used economically to produce biofuels.

- **Process for approving new feedstocks/pathways**: We applaud EPA for finalizing provisions that allow petitions to be submitted for the approval of new feedstocks and biofuel pathways. However, the process for petitioning the agency is somewhat unclear, as is the timeline and criteria for petition approval. We note that no feedstock/pathway petitions have been approved by EPA at this point. EPA must better define the requirements for petitioners and establish a transparent process and timeline for approvals.

- **Cellulosic biofuels waiver provision**: Continual waiving and reducing of cellulosic requirement threatens to undermine progress toward commercialization. The RFS cellulosic biofuel requirements fail to function as true mandate and fail to provide investor surety and risk mitigation.

- **Lifecycle Greenhouse Gas (GHG) accounting**: It is unclear how EPA will keep up with advances in lifecycle analysis and improvements in crop and biofuels production technology. EPA's lifecycle analysis is already outdated, as recent analyses of corn ethanol direct GHG effects have shown significant improvement over EPA's assumptions. Further, recent indirect land use change analysis by Purdue University produced results for corn ethanol that are 50 percent lower than EPA's analysis. EPA must be flexible and receptive to integrating new lifecycle GHG analysis into the RFS regulation.

- **Renewable Identification Number (RIN) transaction reporting and EMTS issues**: Renewable fuel producers and obligated parties alike have encountered a number of issues regarding RIN transactions and reporting. One example is EPA's insistence that the RIN transaction date must be the actual date that title of the renewable fuel is transferred, rather than the established RFS1 practice of allowing the use of the invoice date for the RIN transaction date.

- **RIN rollover cap**: EPA took great liberty in constructing the provisions for allowing surplus RINs to carry forward. The 20 percent rollover allowance is excessive and permits obligated partied to bank amounts of RINs that are substantial enough to distort and manipulate the renewable fuels market.

- **Technology requirements for new/expanded (i.e. non-grandfathered) corn ethanol**: The RFS2 final rule specifies that new or expanded corn ethanol capacity will only be deemed compliant with the 20 percent GHG requirement if that capacity uses prescribed "advanced technologies" chosen by EPA. The truth is there are a multitude of new technologies, process improvements, and production practices that could feasibly move new or expanded capacity past

the 20 percent GHG threshold. EPA should be flexible in its approach to determining whether new or expanded corn ethanol capacity meets the 20 percent GHG reduction threshold. Producers should be allowed to demonstrate that their new or expanded capacity meets the threshold without going through the tedious and uncertain petition process for new pathways.