

United States Senate Committee on Environment and Public Works

Oversight Hearing on Domestic Renewable Fuels

Testimony of:

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Good morning, Chairwoman Boxer, Ranking Member Vitter, and Members of the Committee. My name is Brooke Coleman and I am the Executive Director of the Advanced Ethanol Council (AEC).

The Advanced Ethanol Council represents worldwide leaders in the effort to develop and commercialize the next generation of ethanol fuels and products, ranging from cellulosic ethanol made from switchgrass, wood chips and agricultural waste to advanced ethanol made from sustainable energy crops, municipal solid waste and algae. Our members include those endeavoring to operate production facilities, those interested in augmenting conventional biofuel plants with “bolt on” or efficiency technologies, and those developing and deploying the technologies necessary to make advanced biofuel production a commercial reality.

This is an important and timely hearing, and we are honored to be here today to discuss renewable fuels and the emerging advanced biofuels industry.

It is probably safe to say that any assessment of the domestic renewable fuels industry begins and ends with the federal Renewable Fuel Standard (RFS). It is probably also safe to say that the RFS is a disruptive policy that has caught the attention of incumbent industries, the media, and a wide range of public advocacy groups. The underlying question seems to be: is the RFS garnering this much attention because it’s not working, or because it’s working exactly as designed?

1. The RFS is working as designed

The RFS is an aggressive but flexible program that requires obligated parties to blend increasing volumes of various types of renewable fuel over time. When RFS2 was passed in 2007, Congress divided the 36 billion gallon per year (by 2022) blending standard into two primary categories: conventional biofuels (15 billion gallons per year) and advanced biofuel (21 billion gallons per year). The conventional biofuel requirement increases to 15 bgy by 2015, then “flat lines” at this level through 2022. The advanced biofuel requirement started with 600 million gallons in 2009 and increases to 21 billion gallons annually in 2022.

The beauty of the RFS is its flexibility in the context of constantly changing global financial and energy markets. Contrary to claims made by representatives of the oil industry, the program is

not requiring obligated parties to do something they cannot do. The ethanol industry has produced more than enough fuel to meet the conventional standard, and administrative flexibility in the advanced pool has allowed these blending targets to be achieved through the use of biodiesel, cane ethanol and other types of advanced biofuel. While it is true that the cellulosic biofuels industry has not produced enough fuel to meet the cellulosic targets set forth by Congress in the Energy Independence and Security Act of 2007, the standards within the advanced biofuel pool are nested and administratively flexible. U.S. EPA has waived more than 98 percent of the cellulosic obligation to date while facilitating broader RFS compliance with other advanced biofuels.¹ The advanced biofuels industry also expects to provide sufficient volumes of biofuel in 2013 to meet the originally legislated RFS targets. Simply put, this is a tremendous accomplishment during very difficult economic times.

But as the RFS drives increasing quantities of renewable fuel into the marketplace, and forces incumbent industries to truly diversify their fuel portfolios, it is important to focus on how the program works at a more granular level. The key is to focus on the program's compliance protocol; or more specifically, how Renewable Identification Numbers (RINs) work to change market behavior. Individual obligated parties (usually refiners or importers) must blend a certain volume of renewable fuel per year based on their respective share of the total non-renewable gasoline and diesel market. Obligated parties have the option of complying with the RFS by blending actual liquid renewable fuel gallons or by buying RINs on the open market. One RIN is generated per gallon of renewable fuel at the point of production. RINs then enter the market (free of charge) attached to the gallon of renewable fuel at the point of sale, but can then be separated from the liquid gallon for sale on the open market.² Compliance is achieved by retiring the right number of RINs with U.S. EPA every year. Obligated parties have the flexibility to defer some of their compliance obligation from year to year, and retire RINs secured from prior years to demonstrate compliance with U.S. EPA. In essence, obligated gasoline and diesel fuel refiners and importers get a RIN for free when they purchase a gallon of renewable fuel, which they can then retire that year to demonstrate compliance, hold for future compliance, or sell for a profit on the open market.

One of the focal points of the oil industry's attempt to rationalize amendment or repeal of the RFS at the legislative level is the miscasting of recently increasing RIN prices relative to the so-called blend wall and gas prices. Some major oil companies are arguing that they cannot blend more renewable fuel because of the "blend wall;" that higher RIN prices reflect the need to buy RINs instead of gallons to meet the RFS; and, that higher RIN prices will ultimately result in higher gas prices during the economic recovery. This is a creative argument, but it is not true.

¹ The requirement for cellulosic biofuels constitutes 16 of the 21 billion gallon advanced requirement, but Congress gave U.S. EPA the administrative flexibility to adjust downward the target for cellulosic biofuels based on expected supply. In essence, this means that RFS2 is a 20 billion gallon per year standard with 16 billion gallons per year waivable "adder" for cellulosic biofuels that can be adjusted over time by U.S. EPA based on the forecasted emergence of the industry.

² See <http://www.eia.gov/todayinenergy/detail.cfm?id=11511>.

The RFS is actually well-engineered to address the so-called blend wall (and other types of oil industry intransigence) on its own and without consumer cost. That is, when an oil company refuses to blend more liquid biofuel, they can buy a RIN on the open market instead. If a significant number of oil companies refuse to blend liquid gallons and seek RINs on the open market, RIN trading and values will increase as a result of their affirmative non-compliance. Higher RIN prices then provide an extra incentive for other obligated parties to blend liquid renewable fuel gallons, because they acquire a valuable and saleable RIN free of charge with each gallon of renewable fuel purchased. In essence, higher RIN values reward good behavior and facilitate the objectives of the RFS.

Higher RIN prices are not costing consumers money for two primary reasons: (1) higher RIN values are largely incenting the increased use of a renewable fuel that is up to \$1 cheaper than gasoline, which cut consumer spending by \$700 billion to \$2.6 trillion in 2013, according to an oil economist; and, (2) many oil companies are now on record on earnings calls attesting to the fact that they are the ones *profiting* from higher RIN values, because they get the RIN for free when they buy a gallon of renewable fuel and can sell it to other obligated parties.³ In other words, obligated parties buy and sell RINs amongst themselves after receiving them for free. For this reason, oil industry claims about higher RIN prices increasing gas prices defy basic logic. And there is always the option to avoid buying RINs all together by simply blending more renewable fuel.

Oil industry claims that they cannot physically blend more renewable fuel also do not survive closer scrutiny. Obligated parties can blend more E15 (15% ethanol by content), E85 (85% ethanol by content), biodiesel (most engines are warranted to handle higher biodiesel blends), and/ or more renewable diesel. With regard to E85, there were enough “flex-fuel” vehicles on the road in 2012 to consume 3 billion additional gallons of ethanol if, according to independent analysis, price per mile costs aligned with E10.⁴ The chart below shows steeply increasing E85 sales in Minnesota during the spring, summer and fall of 2013 when RIN prices started to show value and E85 started to be priced below E10. This trend was occurring in many other states at the same time.

As discussed, E85 is not the only option for compliance going forward in the immediate term. E15 is now legal for 2001 and newer vehicles, which represents about two-thirds of the passenger vehicles on the road today. E15 is a premium, high octane fuel that, if priced correctly, would be cheaper than standard 87-octane blends. In discussing the interests of the oil industry relative to the RFS and the blend wall, oil industry economist Phil Verleger put it simply, “[t]he oil industry doesn’t like to sell less oil ... [t]hey want to get the [RFS] program changed so that they can sell more gasoline and not have to use as much ethanol.”⁵ The battle for market access is critical to the emergence of the advanced biofuels because second generation biofuel developers need to be able to demonstrate

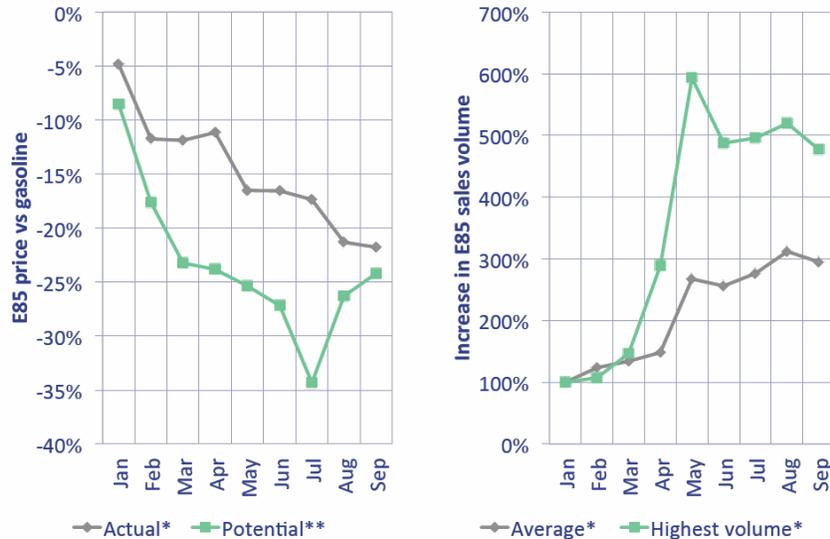
³ For consumer savings, see: http://www.pkverlegerllc.com/assets/documents/130923_Commentary1.pdf. For summary of oil companies RIN profits, see: <http://www.fuelsamerica.org/blog/entry/something-funny-about-those-oil-company-profits>.

⁴ See <http://www.card.iastate.edu/publications/dbs/pdffiles/13pb15.pdf>

⁵ See: audio, <http://www.zimmcomm.biz/rfa/rins-verleger.mp3>

a reasonable expectation of market (i.e. demand) in order to secure project finance. As such, the solution to the blend wall is consistent and unwavering administration of the program, which in turn is both a long- and short-term solution to high gas prices. Softening the RFS in any way to address the blend wall will actually perpetuate the blend wall as a construct to dampen innovation and competition, which will cost consumers at the pump and undercut innovation in the sector.

Recent E85 sales data from MN (2013)



Source: State of Minnesota; Presented by Butamax Advanced Biofuels. Senate Briefing, November 2013

2. Advanced and cellulosic biofuels are breaking through at commercial scale notwithstanding very challenging financial markets

While the delta between the legislated targets and actual production for cellulosic biofuel is not a policy problem given the administrative flexibility built into the regulation, it has created optics issues for our industry and political opportunity for the oil industry. However, by any standard, the cellulosic biofuel industry is making tremendous progress.

As shown in the Progress Report recently released by the Advanced Ethanol Council (see U.S. Map below), the industry is breaking through at commercial scale less than six years after the enactment of RFS2 and notwithstanding the global recession.⁶ And as noted by a recent assessment by U.S. EPA, the production cost of cellulosic biofuels continues to fall; the industry continues to make significant progress towards producing cellulosic biofuel at prices competitive with petroleum fuels; cellulosic biofuel producers faced not only the challenge of the scale-up of innovative, first-of-kind technology, “but also the challenge of securing funding in a difficult economy;” it is reasonable

⁶ See AEC Progress Report: Cellulosic Biofuels at http://ethanolrfa.3cdn.net/96a2f9e04eb357bbbd_1sm6vadqk.pdf.

to expect production and capital costs to continue to decline as more facilities come online and the so-called “commercial learning curve” is achieved; and, first commercial projects in the pipeline for cellulosic biofuels have made great progress in securing the necessary feedstock for their plants.⁷ These industrial benchmarks are also widely reported in a number of academic studies.⁸ For example, an industry survey conducted by Bloomberg New Energy Finance concluded that “[t]he operating costs of the [cellulosic biofuel] process have dropped significantly since 2008 due to leaps forward in the technology [emphasis added]... [f]or example, the enzyme cost for a litre of cellulosic ethanol has come down 72% between 2008 and 2012.”⁹ Very simply, the best way to for Congress to facilitate the ongoing development of the advanced biofuels industry is to leave the RFS alone. The program will continue to work if policy uncertainty is kept to a minimum.

Locations of Projects Profiled by AEC Progress Report¹⁰

Each project is profiled in detail in the report



Non-U.S./Canada Technological Development, by Location

Cellulosic Biofuel Production Facilities Outside of the U.S./Canada Developing Technologies for Deployment in the U.S.



KEY	★	PILOT/DEMONSTRATION FACILITY
	★	COMMERCIAL FACILITY (UNDER CONSTRUCTION/COMMISSIONING)
	★	COMMERCIAL FACILITY (ENGINEERING STAGE)

⁷ See Docket ID No. EPA-HQ-OAR-2012-0546: Regulation of Fuels and Fuel Additives: 2013 Renewable Fuel Standards

⁸ See: *Cellulosic Ethanol Heads for Cost-Competitiveness by 2016*, <http://about.bnef.com/press-releases/cellulosic-ethanol-heads-for-cost-competitiveness-by-2016/>; Brown, T., Brown, R. “A review of cellulosic biofuel commercial-scale projects in the United States.” *Biofuels, Bioprod. Bioref.* DOI:10.1002/bbb.1387 (2013).

⁹ See <http://about.bnef.com/press-releases/cellulosic-ethanol-heads-for-cost-competitiveness-by-2016/>

¹⁰ To view full AEC Progress report, see http://ethanolrfa.3cdn.net/96a2f9e04eb357bbbd_1sm6vadqk.pdf.

It is important to note that the projects being developed by the advanced and cellulosic biofuels industry are producing and will produce the lowest carbon liquid fuels in the world. Cellulosic ethanol, for example, is: (a) vastly more carbon reductive than its primary competitor on the margin of the petroleum industry (tar sands, heavy oil, tight oil); (b) vastly more carbon reductive than the baseline used to analyze the RFS – 2005 gasoline; and, (c) significantly more carbon reductive than technologies often regarded to be the most innovative (electric drive, hydrogen).

California Air Resources Board Carbon Intensity Comparison

Baseline: The carbon intensity of unconventional petroleum is ~ 105+ g/MJ

Note: Many waste to-ethanol fuels are carbon *reductive* (i.e. less than 0 g/MJ)

Fuel / Feedstock	Carbon Intensity (gCO _{2e} /MJ)
Ethanol, conventional	95.66
Ethanol, CA corn	80.70; decreasing to 70.70 in 2016
Ethanol, Low CI Corn	73.21
Ethanol, Sugarcane	73.40; decreasing to 67.38 by 2020
→ Ethanol, Cellulosic	21.30 ^a
Renewable Gasoline	25.00 ^b
Compressed natural gas	68.00
Biogas, landfill	11.56
Electricity, marginal ^c	30.80; decreasing to 26.32 by 2020
Hydrogen ^d	39.42

^a The average of CARB pathways for ethanol from farmed trees and forest ways
^b Estimated carbon intensity based on stakeholder consultation.
^c Includes the energy economy ratio (EER) of 3.4 for electric vehicles
^d Includes the EER of 2.5 for fuel cell vehicles

Source: ICF International

- The U.S. government has always used federal policy to promote energy security and jobs and avoid the pitfalls of being dependent on other countries for energy supply; the RFS is a cost-effective and appropriate way to support the renewable fuels industry, especially in the context of substantial existing support for the fossil fuel industry**

The RFS does not exist in a vacuum. It was certainly designed and implemented to benefit the renewable fuels industry, but it exists over the top of a myriad of other government programs promoting the development of non-renewable fuels to facilitate economic development, energy security and/or job creation. While many of these policies lie outside of the jurisdiction of this committee, ongoing support for bioenergy from programs within the jurisdiction of this committee should not be analyzed with a mythical baseline in which supports for biofuels are in any way unique.

The fossil fuels industry, in particular, enjoys the benefit of a number of unique federal tax allowances – unavailable to renewable fuels – that de-risk the ongoing development of oil and gas resources relative to other sources of liquid fuel. For example, a recent study estimates that fossil fuels received 70 percent of U.S. federal energy subsidies between 2002 and 2008, to the tune of more than \$70 billion during this time period.¹¹ This number does not include the loopholes in oil and gas laws that, according to the Government Accountability Office (GAO), allowed petroleum companies to forego paying \$53 billion in royalty payments, over just four years, for extracting natural resources from lands owned by the American taxpayer. The federal government also helps incumbent industries develop new technologies. According to a recent Congressional Research Service report, [f]or the period from 1948 through 2012, 11.6% of Department of Energy R&D spending went to renewables, 9.7 % to efficiency, 25% to fossil energy, and 49.3% to nuclear.¹²

The RFS, by contrast, is a flexible blending requirement that costs the U.S. Treasury virtually nothing (either via direct payments or foregone revenue) but nonetheless has resulted in the development of an entirely new industry that creates jobs, reduces gas prices, lessens foreign oil dependence, mitigates climate change emissions from the liquid fuel sector, and provides an alternative to costly “high carbon” fuel sources like heavy oil, tight oil and tar sands.

Some oil industry trade associations have suggested that we no longer need the RFS because of recent successes in the Bakken and other tight oil reserves. As discussed below, this argument relies on a fantastical view of what lies beneath the ground in these tight oil formations and their potential to reorder influence in world oil markets. But from the perspective of government support, it is important to note that federal policy also unleashed these energy plays. In June 2012, the Senate Finance Committee received testimony from the largest leaseholder in the nation’s largest oil play (the Bakken) about the importance of tax incentives for new energy production. Among other points, the CEO of Continental Resources stated:

There is good reason that when the tax code was reformed in 1986, a bipartisan majority recognized the importance of leaving the tax provisions of the American independent oil and gas industry intact. This decision played a significant role in the technology-driven oil and gas renaissance we are currently experiencing.

... The development of horizontal drilling took trial and error. Without the current capital [federal tax] provisions in place, we would not have been able to fail over and over again [emphasis added], which is what it took to advance the technology needed to produce the Bakken and numerous other resource plays across America [emphasis added]. And this technology that allows us to drill two miles down, turn right, go another two miles and hit a target the size of a lapel pin is the technology that has unlocked the resources that make energy independence a reality.

¹¹ See http://www.elistore.org/Data/products/d19_07.pdf.

¹² See <http://www.fas.org/spp/crs/misc/RS22858.pdf>

This paradigm shift in American oil and gas exploration brings with it high-paying jobs, increased tax revenues, and economic growth, while lessening our dependence on foreign oil. But it depends on substantial amounts of capital. The tax provisions that let us keep our own money [emphasis added] to reinvest in drilling are crucial to keep this energy revival going.¹³

It is critical to point out that cellulosic biofuel producers and “tight oil” producers have something in common; they are both endeavoring to supply the country and world markets with what the Energy Information Administration (EIA) terms “unconventional fuel.” While facing similar technology risk, the cellulosic biofuels industry does not receive the same tax treatment as companies like Continental Resources (from the perspective of value or duration).

4. The idea that America no longer faces a serious oil dependence problem is myth, and weakening the RFS would make Americans and the U.S. economy more vulnerable to the clear risks of its ongoing over dependence on only one type of fuel

Oil dependence is well-recognized as a serious threat to the economic well-being of the United States. In discussing the impact of high oil prices on the U.S. economic recovery, Central bank chairman Ben Bernanke recently stated that, “sustained rises in the prices of oil or other commodities would represent a threat both to economic growth and to overall price stability, particularly if they were to cause inflation expectations to become less well anchored.”¹⁴ Americans transferred nearly \$1 trillion to OPEC member states during what was termed the oil price spike of 2008, in just 6-8 months. 2013 EIA forecasts suggest that trends above \$100 per barrel are not a spike, but are instead a new equilibrium.¹⁵

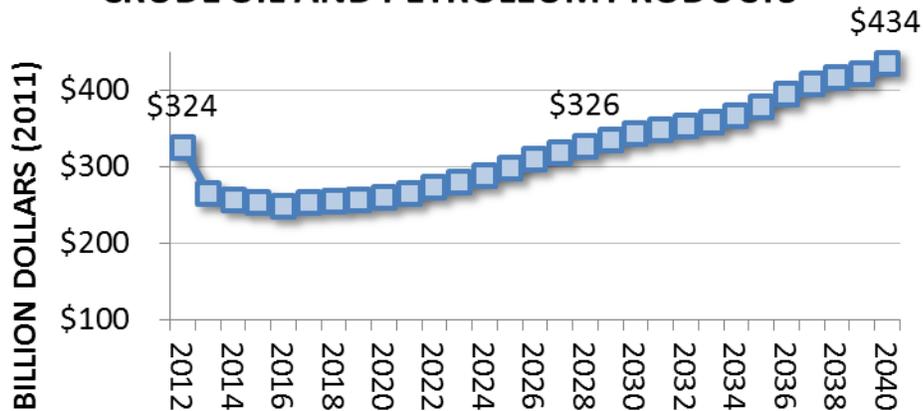
The oil industry argues that recent discoveries of tight oil and technological breakthroughs for accessing these reserves change the equation when it comes to oil dependence. But the recent increase in domestic oil production does not mitigate the risks of oil dependence. First, while domestic oil production is up, the *consumer cost* (i.e. financial drain) of oil dependence is actually expected to increase. The increasing cost of oil dependence stems from multiple factors, including but not limited to: (1) the fact that the U.S. supplies only 8 percent of the world’s oil and the “boom” in 2012 only increased U.S. output by 12 percent; (2) the fact that light sweet crude reserves appear to be in steep decline in the face of quickly increasing demand from countries like China and India; and, (3) the new types of unconventional oil coming online are expensive to extract.

¹³ See <http://www.finance.senate.gov/imo/media/doc/Hamm%20Testimony1.pdf>, p. 2.

¹⁴ See <http://abcnews.go.com/blogs/politics/2011/03/bernanke-warns-rising-oil-prices-could-pose-threat-to-economy/>

¹⁵ See http://www.eia.gov/forecasts/steo/pdf/steo_full.pdf

NET EXPENDITURES FOR IMPORTS OF CRUDE OIL AND PETROLEUM PRODUCTS



Source: RFA, based on data from the U.S. Energy Information Administration

Second, current global reserves of petroleum-based unconventional fuel (heavy oil, tight oil, etc.) are not proven reserves. In other words, while these reserves have been discovered via advanced imaging, it is not clear that they can be recovered. An April 2013 article in *Science* states, “data on reserves of many unconventional sources are now regarded as optimistic, compounded by thermodynamic inefficiencies in the processes, often relying on high energy inputs, [that] will ultimately limit the net gain to provide fuel quantities well below predicted figures.”¹⁶ Historically, overstating the potential impact of new oil reserves is nothing new. The oil industry and its analysts have a long history of way overestimating the vastness of its claimed reserves (see attachment).

The uncertainty and risk surrounding the viability of unconventional oil reserves is compounded by the fact that there is virtually no transparency when it comes to “source data” for the myriad of claims about future oil markets made on an everyday basis by analysts in the sector. For example, Russia (one of the world’s largest conventional oil producers) declared all oil data a state secret in 2004. Neither Saudi Arabia nor Venezuela share data publicly when they make claims about future capacity. OPEC members have the incentive to inflate reserves because quotas are based on reported reserves; the higher the reported reserve, the higher the quota relative to other members. There is also the challenge of attracting investment, from both government and outside sources. As discussed in the aforementioned article in *Science*, “there are political and financial pressures to misreport figures ... [and] there are fears that Saudi oil reserves (and others) may have been over-estimated by at least 40% ... [a]t best Saudi reserves are seen as near maturity,” given that

¹⁶ Chapman, I., *The end of Peak Oil? Why this topic is still relevant despite recent denials*, Energy Policy (2013). <http://dx.doi.org/10.1016/j.enpol.2013.05.010>.

7 million barrels of sea water are being injected in the main field on a daily basis to increase flow.¹⁷ John Hofmeister, former President of Shell Oil, recently told CNBC that, “I think OPEC is about maxed out ... when people talk about spare capacity in OPEC, I don't see it. I just don't see it coming through and I'm not sure it's there. And it's not just that they're greedy, but they're really producing what they can produce.”¹⁸

OPEC and the oil industry also have the incentive of exaggerating the size and accessibility of “new reserves” to weaken political and market interest in developing alternatives. OPEC first admitted its focus on alternative fuels in 2006, when it openly admitted that its price setting is designed partially to deter their use.¹⁹ Likewise, the Bakken reserve is often used to support the thesis that the United States no longer needs the Renewable Fuel Standard (RFS). But the 4.3 billion barrels of technically recoverable tight oil from the Bakken (as estimated by the U.S. Geological Survey) is less than one year’s worth of crude oil consumption by U.S. refineries.

5. The RFS hedges oil supply risk for the American consumer and the U.S. economy while simultaneously promoting innovation as a free market would otherwise do on its own

Given the lack of transparency with regard to global oil supply data, and the clear risks of ongoing dependence on petroleum, it is critical for Congress to stay aggressive with regard to developing alternatives to oil. As part of this imperative, it is important to recognize that federal policy is necessary because the market is not going to promote innovation on its own.

In a price-driven competitive marketplace, the increasing cost and scarcity of crude oil would play to the benefit of alternatives such as advanced biofuels. However, global liquid fuel markets are not free markets. They are collusively price-controlled by OPEC at the global level, and are extremely consolidated and vertically integrated domestically. The absence of free market forces in the liquid fuel marketplace are a problem for the advanced biofuels industry (and other innovators) because a non-competitive marketplace does not properly facilitate and reward innovation. Non-competitive and non-price driven markets are almost impossible to predict with regard to future demand opportunity, because the market does not behave based on free market fundamentals and the creation of a better product does not necessarily translate into market demand. This lack of predictability increases investment risk – or makes risk impossible to assess – which in turns drives investment and potential strategic partners to other sectors.

Much of this testimony has been dedicated to the importance of the RFS with regard to providing biofuel innovators with a reasonable expectation of demand in a broken marketplace. But the value of the RFS can also be viewed through the lens of gas prices and oil supply risk.

¹⁷ See Chapman, I., *The end of Peak Oil? Why this topic is still relevant despite recent denials*, Energy Policy (2013). <http://dx.doi.org/10.1016/j.enpol.2013.05.010> at pp. 3, 4.

¹⁸ See <http://video.cnn.com/gallery/?video=3000073805>.

¹⁹ See <http://www.foxnews.com/story/0,2933,222840,00.html>

The primary reason Americans are paying significantly more for a gallon of motor fuel or heating oil is the reduced availability of cheap crude oil supply relative to increased demand, and the market response (both direct and via speculation) to this dynamic. The RFS has driven the development of a new alternative fuel industry during a period of very high economic vulnerability and fuel prices in the United States. Speaking to this dynamic, energy economist Philip K. Verleger (who served as an advisor on energy issues to both the Ford and Carter administrations) recently said, “the U.S. renewable fuels program has cut annual consumer expenditures in 2013 between \$700 billion and \$2.6 trillion ... [t]his translates to consumers paying between \$0.50 and \$1.50 per gallon less for gasoline.”²⁰ Mr. Verleger notes that the RFS put the equivalent of Ecuador’s world oil output on the market during a period of extreme tightness:

Had Congress not raised the renewable fuels requirement, commercial crude oil inventories at the end of August [2013] would have dropped to 5.2 million barrels, a level two hundred million barrels lower than at any time since 1990 ... [t]he lower stocks would almost certainly have pushed prices higher. Crude oil today might easily sell at prices as high as or higher than in 2008. Preliminary econometric tests suggest the price at the end of August would have been \$150 per barrel.”

Renewable fuels reduce gas prices in two ways: (1) the predominant fuel used to date to meet the RFS is ethanol, which has been \$.60 to \$1.00 cheaper per gallon than wholesale gasoline for the bulk of the time that the RFS has been in place; and, (2) by adding supply to very tight oil markets, which reduces the impact of both perceived and real disruptions to supply and curtails speculative engagement by the markets. One would have to stand basic economics on its head to argue that reducing the use of renewable fuels will not increase gas prices.

6. The climate change and environmental impacts of the RFS should not be analyzed in a vacuum; weakening the program would lead to a number of unintended consequences with regard to air quality, water quality and climate change

Calls to waive or reduce the RFS targets are often made without apparent consideration for the fact that these gallons would need to be replaced with another (likely petroleum) liquid fuel. Petrobras chief Jose Sergio Gabrielli has declared that “the era of cheap oil is over.” This means that oil companies are shifting very quickly to increasing reliance on more expensive and riskier “unconventional” fuels – including tight oil (e.g. the Bakken), deep water (e.g. Gulf of Mexico, Deep Water Horizon) and Canadian tar sands (e.g. Keystone) – to meet the global demand for fuel energy.²¹ In essence, what the RFS does is send a signal to an oil-dominated marketplace to include renewable fuels in the quest to commercialize the next gallon of transportation fuel. In almost all cases, the real world alternative to renewable fuel on the margin of the global liquid fuel marketplace is going to be unconventional oil in the near to intermediate term. These fuels are not

²⁰ See http://www.pkverlegerllc.com/assets/documents/130923_Commentary.pdf.

²¹ See http://www.eia.gov/forecasts/aeo/MT_liquidfuels.cfm#crude_oil

just more carbon intensive than the “2005 average petroleum” legislated by Congress in 2007 as the analytical baseline for RFS eligibility, they are far worse than all types of renewable fuels in a number of environmental areas.

For example, numerous studies show that drilling through rock formations has the potential to release (in the absence of containment) a number of hazardous radioactive compounds, such as uranium and thorium, into local waterways and ecosystems.²² There is also the issue of groundwater contamination from oil and gas wells. The oil industry claims that these incidences are rare, and that generally speaking, oil and gas wells are constructed and abandoned following regulations that protect freshwater aquifers. In fact, the fracking industry is largely unregulated, and the incidences of groundwater pollution are much higher than that. For example, a recent study of documented groundwater contamination incidents in Ohio uncovered ~ 1 incident for every 180 O&G wells drilled during the 25-year study period, and that 22 % (41 out of 185) of these documented O&G-related incidents were related to leakage from orphaned wells.²³ With regard to surface water, many critics of the biofuel industry point to the impact of biofuel production and agriculture on water use and water quality. There is no question that biofuel production and agriculture require water usage. However, as noted by a recent report by several analysts from the Oak Ridge National Laboratory, the oil and gas industry generates more solid and liquid waste than municipal, agricultural, mining and other industrial sources *combined*.²⁴ And any literature review will demonstrate that while biofuel producers are using less and less water (more than 20 percent reduction in the last ten years), the processes required for the extraction of unconventional oil require more and more water. These oil and gas extraction processes, and their environmental impacts, are relevant to the RFS discussion because: (a) these are the types of petroleum-based fuels that will be used more intensively in the absence of renewable fuels, or instead of waived RFS gallons; and, (2) these fuels make up the real baseline when it comes to assessing the real environmental impacts of ethanol and other biofuels. As such, it is critical to assess the environmental impacts of ethanol and other biofuels relative to the most viable set of fuel alternatives in the immediate to intermediate term.

With regard to greenhouse gas (GHG) emissions, the methodology used for assessing the GHG impact of different categories of renewable fuel actually undercounts the real world GHG benefits of producing and using renewable fuels. The Energy Independence and Security Act of 2007 requires U.S. EPA to compare existing and prospective types of renewable fuel against the average carbon intensity of U.S. gasoline in 2005. This legislated baseline clarifies the assessment methodology for U.S. EPA, but undervalues the real world benefits of blending renewable fuels because the new types of petroleum coming into the global liquid fuel marketplace on the “margin”

²² See Esther S. Parish, Keith L. Kline, Virginia, H. Dale, Rebecca A. Efroymson, Allen C. McBride, Timothy L. Johnson, Michael R. Hilliard, et al., *Comparing Scales of Environmental Effects from Gasoline and Ethanol Production*, (2012).

²³ See

http://fracfocus.org/sites/default/files/publications/state_oil_gas_agency_groundwater_investigations_optimized.pdf

²⁴ See Esther S. Parish, Keith L. Kline, Virginia, H. Dale, Rebecca A. Efroymson, Allen C. McBride, Timothy L. Johnson, Michael R. Hilliard, et al., *Comparing Scales of Environmental Effects from Gasoline and Ethanol Production* (2012), p. 26.

are significantly more carbon intensive than average gasoline in 2005. Put another way, while U.S. EPA has concluded that the biofuels being used under the RFS today meet or exceed the GHG standards legislated as part of EISA07 (i.e. as compared to 2005 gasoline), these renewable fuels are an alternative to other (petroleum-derived) liquid fuels on the margin that are significantly more carbon intensive than the 2005 petroleum baseline. For example, with the Keystone Pipeline question in mind, a recent report released by the Congressional Research Service (CRS) found that Canadian oil sands are 14-20 percent more carbon intensive than the 2005 EPA baseline.²⁵ The report also quantified the carbon intensity of a number of other types of “marginal” petroleum, and found that many of the most common imports (e.g. Venezuela, Mexico, and Nigeria) are significantly more carbon intensive than the 2005 petroleum baseline.

7. Changing the rules in the middle of the game would send a negative signal to investors interested in committing to clean energy development projects in the United States

One of the many extraordinary aspects of the RFS is the duration of the commitment (15+ years). Long-term policy commitments reduce investment risk and attract private capital from around the world to achieve the policy objective at hand. With the notable exception of the permanent federal tax incentives offered to fossil fuels and nuclear, we are unaware of any other federal energy policy that makes this type of long term commitment to achieve energy security. In very simple terms, it is a cornerstone to dozens of U.S. advanced biofuel projects, such as those detailed in the AEC progress report, and potentially hundreds of projects in the future. As discussed, these projects are under development notwithstanding the lack of free market forces (that would otherwise reward innovation) because the RFS partially ameliorates the non-competitive nature of the global fuels market by providing clear and predictable demand targets over time.

It would be a huge step backwards for the advanced biofuel industry – and U.S. energy policy credibility in general – if Congress decides to change its mind on a landmark energy policy just five years in to a fifteen year commitment. Changing the RFS at this point will send a clear message to the energy investment marketplace (for this and other energy policies) that Congress is willing to change the rules in the middle of the game, strand billions of dollars of investments and drive future innovation spending to other countries or sectors based on spurious claims by incumbent industries.

The oil industry understands sensitivity of the investment marketplace to the reality or appearance of policy uncertainty, which is why the oil trade associations are putting so much effort into creating the perpetual prospect that Congress will not honor its original 15 year commitment to the RFS. It is important to note that this perpetually uncertain political landscape is a serious global competitiveness issue, because it stands in stark contrast to the extensive, multiyear commitments made by our competitors (e.g. China, Brazil) to the development of renewable energy. With specific regard to China, which spends nearly \$12 billion per month on clean energy development, former

²⁵ See <http://www.fas.org/sgp/crs/misc/R42537.pdf>

U.S. Commerce Secretary Gary Locke noted, “they’re doing this because they really want to be the world’s supplier of clean energy and they recognize this will support millions of jobs.”²⁶

Quite simply, the RFS is the global gold standard when it comes to advanced biofuel policy. It is the U.S. advantage when it comes to attracting a quickly innovating, global advanced biofuels industry to the U.S. soil, and it has already fundamentally changed the U.S. liquid fuel marketplace for the better. But if there is no certainty going forward around the policy commitments that Congress has made, the private sector is not going to take the capital risk in these projects despite the obvious value proposition of producing advanced biofuels at cost competitiveness with oil.

As such, we strongly encourage the Committee to consider the fact that legislative intervention at this point in the deployment of the RFS is unwarranted, would send highly unproductive signals to the clean energy marketplace, and would be the equivalent of exporting the advanced biofuels industry opportunity to other countries that are maintaining their long-term commitment to renewable fuels.

Recommendations:

The Advanced Ethanol Council encourages Congress to pursue the following initiatives to facilitate the rapid deployment of advanced biofuels:

1. Clearly message that the RFS is a landmark policy and should be left alone at the legislative level
2. Work with U.S. EPA at the administrative level to address any concerns Congress might have, including the recent proposal to overly reduce the 2014 RVO
3. Work with the committees of jurisdiction to take the biases out of the federal tax code that favor oil and gas development over renewable fuel development
4. Continue to support a robust energy title in the farm bill in recognition of the fact that American agriculture is well-suited to produce food, feed and energy
5. Facilitate a more price-driven, competitive marketplace by pursuing legislative (outside of the RFS) and administrative ways to open market access for biofuels via: (a) the more aggressive deployment of FFVs; (b) eliminating unnecessary delay with regard to RFS pathway approval and regulatory adjustments for legal fuel blends (e.g. RVP, E15); (c) the more aggressive deployment of higher biofuel blend refueling infrastructure; and, (d) closer scrutiny of potentially illegal oil industry behavior with regard to discouraging legal biofuel blending through franchise relationships.

Thank you for the privilege of speaking before you today. I look forward to your questions.

²⁶ See <http://yaleglobal.yale.edu/content/chinas-green-ambition-us-sees-red>

Attachment A

Easy Answers to a Number of Complex Allegations Made Against the RFS

1. “The RFS has increased corn feed prices and hurt the livestock industry.”

Corn prices today are almost identical to corn prices on the day that President Bush signed RFS2 in December 2007. Generally, corn and other agricultural commodity prices have gone up and down with oil price as the economy adjusts to a new equilibrium in world oil markets.

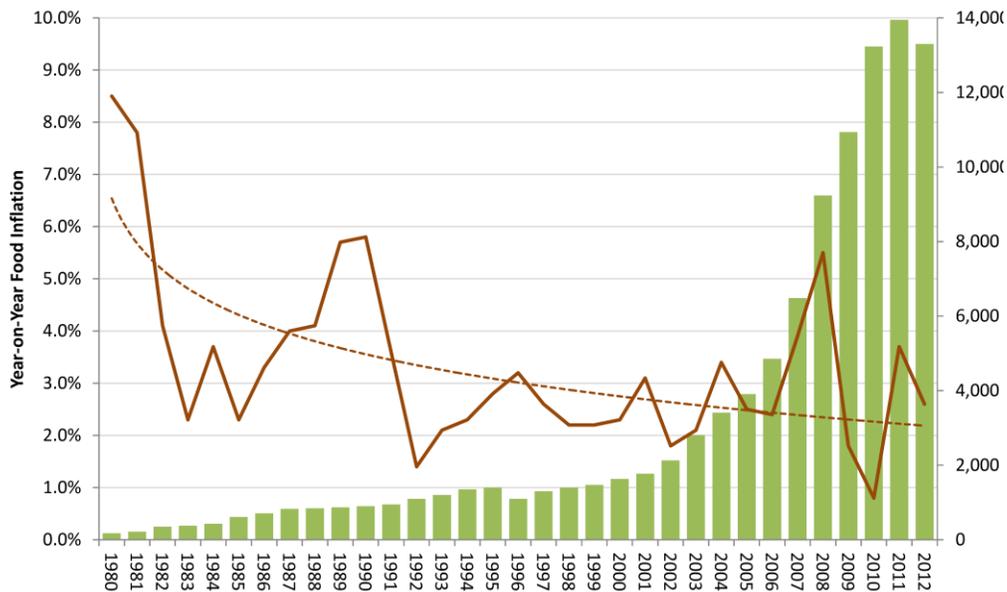
2. Higher RIN prices in 2013 are a cost of compliance for oil companies that will ultimately increase gas prices

Many oil companies are now on record on earnings calls attesting to the fact that they are the ones *profiting* from higher RIN values, because they get the RIN for free when they buy a gallon of renewable fuel and can sell it to other obligated parties.²⁷

3. “The RFS has increased food prices in the grocery aisle.”

Food prices are not increasing, and they are decreasing *against* the increase in ethanol use.

U.S. Food Price Inflation and Ethanol Production



²⁷ See: <http://www.fuelsamerica.org/blog/entry/something-funny-about-those-oil-company-profits>

4. "E15 is a threat to boaters and small engines."

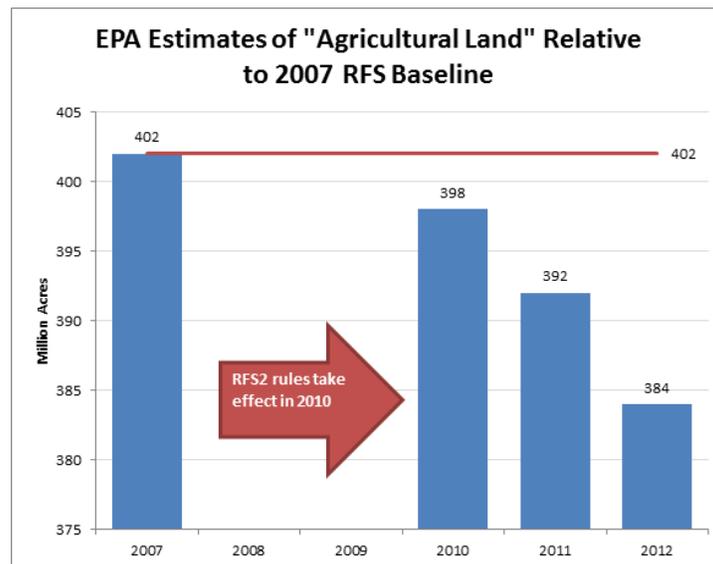
E15 is an option at the pump, as opposed to the new baseline fuel. Boaters and small engine users can simply fill up with other fuel to avoid higher ethanol blends if they want to.

5. "The RFS increases the price of gasoline."

Energy economist Philip K. Verleger (who served as an advisor on energy issues to both the Ford and Carter administrations) recently said, "the U.S. renewable fuels program has cut annual consumer expenditures in 2013 between \$700 billion and \$2.6 trillion ... [t]his translates to consumers paying between \$0.50 and \$1.50 per gallon less for gasoline."²⁸

6. "The increased use of biofuels has resulted in the plowing of virgin and pristine land."

The national agricultural footprint is not expanding, it's contracting.



There is always some regional variation with regard to agricultural land use, but recent allegations about prairie conversion are misleading:

- Critics of the RFS point to reduced acreage in the Conservation Reserve Program (CRP), but acreage in the program went down commensurate with the funding cut in the 2008 farm bill.
- Allegations about "15 million more corn acres planted" are true, but should be considered relative to the more than 20 million acres of wheat taken out of production during the same period. Crops are generally rotating, not expanding.
- Wheat acres dropped more than corn acres increased in the specific states that the Associated Press claimed were using pristine lands for corn ethanol production.

²⁸ See http://www.pkverlegerllc.com/assets/documents/130923_Commentary.pdf.

7. “The RFS has not decreased climate change emissions.”

This claim is inconsistent with the position of U.S. EPA and relies on a distortion of their analysis. U.S. EPA debited biofuels for *future* theoretical land use change and therefore decided to take into account future efficiencies relative to a 2005 gasoline baseline that is far dirtier today. Critics of the RFS want use future land use change penalties but eliminate future efficiencies with regard to production.

8. “The boom in domestic oil production renders the RFS outdated policy.”

Americans and the U.S. economy are still at great risk to dwindling world supplies of oil. The increase in U.S. oil output (up 12% in 2012) pales in comparison to what is going on with OPEC. John Hofmeister, former President of Shell Oil, recently told CNBC that, “I think OPEC is about maxed out ... when people talk about spare capacity in OPEC, I don't see it. I just don't see it coming through and I'm not sure it's there.”

In addition, oil analysts have a long history of vastly over estimating new reserves:

- a. In 2002, the U.S. Geological Survey estimated that the National Petroleum Reserve-Alaska contained 10.6 billion barrels (mean estimate) of oil. In late 2010, USGS revised their estimate to 896 million barrels – a downward adjustment of roughly 90 percent.²⁹
- b. When BP discovered the Thunder Horse field in the Gulf of Mexico in 1999, they estimated that the reserve contained more than a billion barrels of oil. The discovery fundamentally changed projections about U.S. oil capacity and was credited with changing the global price of oil. BP and partners built the largest oil platform in the Gulf. However, oil extraction was delayed by more than 3 years due to technical difficulties, and according to a consultant for oil exploration, “Thunder Horse hasn't reached anywhere near its expected potential.”³⁰
- c. Proponents of the “domestic oil boom” also point to a recent International Energy Agency (IEA) report concluding that U.S. dependence on foreign oil will come down significantly due to the recovery of very large “tight oil” reserves (e.g. the Bakken). This agency predicted in 2000 that deep water reserves would supply massive quantities of oil to U.S. and global markets between 2000-2010, and oil prices would therefore be relatively low (\$28.25 per barrel) in 2010. In fact, those reserves did not come online as quickly or as substantially as predicted (see above), and the price per barrel of oil in 2010 was \$79.61.³¹

²⁹ See http://www.newsminer.com/news/alaska_news/oil-estimates-slashed-for-national-petroleum-reserve-alaska/article_999d982e-5823-59c2-82f7-8b6bb65d8fd6.html.

³⁰ See <http://www.theoil Drum.com/node/6415>.

³¹ For more information, see article in *Christian Science Monitor* at <http://www.csmonitor.com/Environment/Energy-Voices/2013/0520/When-oil-forecasts-get-it-wrong>.