WRITTEN STATEMENT OF

AMERICAN FUEL & PETROCHEMICAL MANUFACTURERS

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COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

United States Senate

on

"Oversight Hearing on Domestic Renewable Fuels"

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AFPM, the American Fuel & Petrochemical Manufacturers, appreciates the opportunity to share its views on the Renewable Fuel Standard (RFS). AFPM is a trade association representing high-tech American manufacturers of virtually the entire U.S. supply of gasoline, diesel, jet fuel, other fuels and home heating oil, as well as the petrochemicals used as building blocks for thousands of products vital to everyday life. AFPM members operate 122 U.S. refineries comprising approximately 98 percent of U.S. refining capacity. As refiners and importers of gasoline and diesel, AFPM's members are the obligated parties under the RFS.

This hearing comes at a critical time for the refining industry and American consumers. The energy landscape in the United States is markedly different than it was during the debate over creating the RFS, as the U.S. is experiencing a crude oil and natural gas production revolution that is redefining energy security as we know it. It is also now clear that the RFS is not only failing to achieve many of its original purposes, but in many cases undermines its own goals. This testimony will provide some context around the changed circumstances around key justifications for the original law, the issues obligated parties face if the law is implemented as written, a brief discussion on the importance of EPA's action to reduce the 2014 volumes, and why Congressional action is still vitally important.

I. Background

The RFS was established with the goals of enhancing both energy security and environmental protection, while providing development opportunities to rural America. Many also believed advanced biofuels would be developed that could work in existing infrastructure and be produced from non-food feed stocks. In practice, however, the RFS has operated contrary to these goals and most of its foundational assumptions turned out to be false. Refiners are now forced to comply with an unworkable law that places consumers at risk of high food and fuel costs, engine damage, and environmental harm.

This hearing takes place against a backdrop of greatly increased domestic oil and gas production that promises to enhance energy security for the U.S., without mandates or subsidies. Meanwhile, second generation renewable fuels have not materialized as the reality becomes clear that policymakers cannot mandate innovation or favorable economics. Perhaps most critically this year, fuel demand, which was projected to steadily increase when RFS2 was established in 2007, has declined and is expected to decline further. The annually increasing amounts of biofuel required to be blended into a declining fuel supply mean the federal biofuel mandate threatens to create fuel supply shortfalls and risk damaging consumer engines. The combination of these factors demonstrates that the RFS is unnecessary, unworkable, and should be repealed.

A. Changes since RFS2 was adopted

Energy security landscape. In 2007 the energy discussion in the United States was one of scarcity, not abundance. Since that time, the U.S. began to unlock its true energy potential – without the use of mandates or subsidies. The Energy Information Administration reported in November 2013 that for the first time in nearly 20 years the U.S. produced more oil than it imported. In July, the Energy Information Administration (EIA) testified before the Senate Energy and Natural Resources Committee that between 2007 and 2012, domestic oil production increased by 1.5 million barrels per day, or 30 percent, with most of the growth occurring over the past three years.[1] Onshore oil production in the lower 48 states rose 64 percent between February 2010 and February 2013 alone.[2] The United States' newfound energy abundance is not a short-term phenomenon. Indeed, comparing its 2007 and 2012 estimates for 2022, EIA projects a 23-percent increase in oil production and a 62-percent increase in natural gas production. During that time, U.S. petroleum imports declined from 61 percent of consumption to 41 percent in 2012. EIA testified before the House Energy and Commerce Committee on June 26 that ethanol was only a minor factor in the drop in petroleum imports.

[1] Testimony of EIA Administrator Adam Sieminski before the Senate Committee on Energy and Natural Resources (July 16, 2013).
[2] *Id.*

Ironically, and as detailed below, by placing refining infrastructure at risk, the RFS will also undermine this important American economic and security advantage.

Failure of cellulosic and other advanced biofuels leads to increased imports. At the same time that the U.S. has been increasing oil and gas production, development of many advanced biofuels promised at the time the RFS was enacted has not occurred. Given this reality, the RFS essentially mandates fuels that do not exist. The law requires specific advanced biofuels to be blended into the fuel supply, including biomass-based diesel, cellulosic biofuels, and other advanced biofuels. When the RFS was written into law, policy makers envisioned one billion gallons of cellulosic biofuel would be consumed in 2013, increasing to 16 billion gallons by 2022. In reality, zero gallons of cellulosic biofuel were produced in 2010 and 2011, and only 21,093 gallons were produced in 2012 (20,069 of which were exported and unavailable for compliance). EPA's EMTS data indicate less than 360 thousand gallons of cellulosic fuel have been produced January through October 2013. In addition, EIA projects that drop-in biofuels[3] will only grow to approximately 341 million gallons by 2022—enough to satisfy .07 percent of gasoline demand.[4]

Ironically, for a law with "energy independence" in its title, EPA indicated in the NPRM that in 2013, most of the other unidentified advanced biofuels (i.e., excluding biomass-based diesel and cellulosic) mandated would be met by imported sugarcane ethanol (primarily from Brazil). The prevalence of imports and failure of the RFS to develop domestic second and third generation biofuels ensures that RFS will continue to rely on imported ethanol to satisfy its advanced biofuel volumes. This situation belies the argument that the law is enhancing energy independence and, as explained later, ensures the required use of biofuels generating more emissions and other environmental issues than arise from using gasoline.

Fuel Demand. While the energy supply picture has been changing, so has fuel demand. Largely due to the stagnant economy, and improved automobile efficiency, projections for gasoline[5] use have shifted significantly between 2007 and 2012. The 2007 EIA Annual Energy Outlook projected a 12 percent higher demand for gasoline in 2013 than is actually occurring. The 2013 Annual Energy Outlook (AEO) now projects 2022 gasoline demand will be 28 percent lower than the 2007 AEO projection for 2022. Importantly, and as described below, the combination of decreased gasoline demand and rising biofuels mandates has exacerbated the onset of the E10 blendwall—the point after which blenders are unable to safely add additional ethanol to the fuel mix. We are now at the point where existing delivery infrastructure and the consumer vehicle fleet are not capable of safely handling increased concentrations of ethanol.

B. Flawed implementation concept

The RFS is implemented in a way that makes fuel manufacturers responsible for consumer's renewable fuel demand. The mandate establishes how much biofuel volume must be consumed, but quixotically places the obligation for such consumption on upstream fuel manufacturers, who do not have the ability to control the nation's downstream ethanol blending or retail operations. Refiners and importers must demonstrate that for every gallon of gasoline and diesel fuel they sell into the U.S. market, a certain amount of renewable fuel was consumed. This requirement holds despite the fact that refiners have no control over either consumer purchasing habits or (in the majority of cases) retail decisions on what fuels to sell to the public or whether to replace dispensers and other refueling infrastructure to accommodate corrosive ethanol blends. Additionally, the structure of the mandate allows compliance credits, called Renewable Identification Numbers (RINs), to be held by non-obligated parties, boosting compliance costs for obligated parties because these intermediate, nonobligated parties see an opportunity to profit from participation.

[3] Drop-in biofuels can move in pipelines, trucks, and barges without equipment modification; are usable in existing fueling stations without modification, and are usable by existing vehicle fleet without modification.
[4] EIA, *Drop-In Biofuels in the AEO*, EIA Biofuels Workshop, March 20, 2013.
[5] Gasoline includes blends of up to 10 percent ethanol.

Penetration of new fuels requires that consumers see a benefit to buying the fuel and that retailers see adequate market incentives to install equipment or make other changes necessary to offer the fuel. A common misconception is that refiners or importers own/control retail operations. Refiners own less than five percent of the retail stations in the U.S. In June 2011, GAO reported that the major integrated companies own only one percent of the stations and only half of stations are "branded" franchises. The remaining retailers are unbranded independent businesses, and 56 percent of all stations are single-station operators. In the case of franchised gasoline stations, station owners are responsible for the equipment and infrastructure—the branding is often just a fuel supply agreement whereby the franchisee has certainty in its supply rather than relying on the spot market.

These stations may sell higher ethanol blends (such as E85 or E15) as long as they continue to sell the branded product (a key feature of a franchise), but they generally have chosen not to carry these higher ethanol blends because of a lack of consumer demand and the potential liabilities associated with mid-level ethanol blends. In general, franchisees get the benefit of a steady fuel supply at a contracted price, marketing assistance, and the ability to use a refiner's trusted brand to help sell fuel. Typically, in return, franchisees must sell at least two grades of the refiner's product. Put another way, franchisees are getting the benefit of a contractual bargain between two private parties – the definition of a free market. Those franchisees may invest in additional tanks and dispensers to carry additional fuel types, or may terminate their franchise agreements and sell unbranded fuel.

Retailers must therefore see the financial benefit in offering a new fuel, including an increase in demand for the new fuel that requires consumer acceptance. Penetration is not quick in many areas, even in cases where much of the infrastructure was in place. One alternative fuel currently available in certain markets is E85, which contains up to 85 percent ethanol and 15 percent gasoline. E85 requires specialized storage and dispensing equipment and can only be used in flex fuel vehicles (FFVs), which consist of less than five percent of the total consumer vehicle fleet. The infrastructure and vehicles are not in place for the widespread adoption of E85, and acceptance of this fuel has moved much more slowly than E10, with sales in key states that promote E85 actually declining last year before rebounding to the historic mean in 2013. These realities place a functional cap on the amount of ethanol that can be blended into the fuel supply at E10 and creates significant barriers to implementing the RFS, which will be discussed later in more detail.

In addition to the market acceptance and penetration issues, a perverse compliance mechanism exacerbates the adverse implications of the RFS. Obligated parties (refiners and importers) must obtain a requisite number of RINs to turn into EPA to demonstrate compliance each year. A RIN is generated when a gallon of renewable fuel is produced. It stays with this gallon until it can be separated when an obligated party purchases the gallon of biofuel or when that gallon is blended into the fuel supply. Refiners do not often own the terminals where the biofuel is blended, or do not own enough terminal capacity to satisfy their full obligation in any given year, and must therefore rely upon unrelated third parties to blend ethanol and make the separated RINs available to the marketplace. Many refiners and importers simply sell gasoline blendstocks into the wholesale market, where a third party terminal or marketing company purchases them and blends in ethanol to produce finished fuel. Unless an obligated party owns the terminals or other marketing assets that can cover its full obligation, or has a contractual agreement with the owner of those assets, the obligated party must buy RINs from marketers or off the open market. As a result, a company purchasing its RINs on the open market at $1.00 each incurs an implied $0.10 per gallon increase in cost to produce a gallon of gasoline. To further illustrate why RINs are not "free," as some claim, one need look no further than the first quarter financial statements of many terminal companies. Although they are not obligated parties, these companies and others like them actually blend the fuel and sell RINs to the obligated parties for compliance. These companies reported significant new revenue from RIN trading during the run-up in prices through the first half of 2013. To be clear, AFPM does not believe these companies are unduly benefiting or doing anything wrong – this is just illustrative of how the RFS works and more evidence of its true cost.

After understanding changing market dynamics since the inception of the RFS and the intricacies of its implementation, it is important to focus on the serious short-term problem of the blendwall and

highlight the long-term issues of the RFS. However, AFPM would like to reiterate that it is neither anti-biofuels nor anti-ethanol. Two of AFPM's members are among the top five ethanol producers, and at least one makes more ethanol than 97 percent of the Renewable Fuels Association's membership. Biofuels can and do play an important role in the fuel mix, provided they are safely integrated into the fuel supply and consumers demand them. In testimony before the House Energy and Commerce Committee on June 26, 2013, both EIA and the U.S. Department of Agriculture (USDA) indicated that as long as ethanol is economical to use, refiners and blenders would likely continue to use it – even in the absence of a mandate. However, AFPM opposes mandates and subsidies, including the RFS, because they limit consumer choices and stifle innovation. Moreover, and as this testimony demonstrates, the law is unworkable at its core, threatening to significantly raise consumer costs. For these reasons, Congress should repeal the RFS.

II. Serious Short-Term Issue: the Blendwall

The U.S. currently faces the onset of the E10 "blendwall," which will fundamentally compromise the fuel industry's ability to simultaneously meet the requirements of the RFS and to meet U.S. transportation fuel demand. The E10 blendwall refers to the point where nearly all the gasoline supplied domestically contains 10 percent ethanol, which is the effective, practical limit on the amount of ethanol that can safely be blended into the fuel supply without risking engine or infrastructure damage.

A. RFS volumes create blendwall challenges in 2013 and 2014

As referenced above, gasoline demand is falling in the United States. EIA's current projection of gasoline demand for 2013 is 133.8 billion gallons, and is expected to fall an additional 600 million gallons to133.2 billion gallons in 2014.[6] At these levels of demand, the 10 percent (E10) saturation point is approximately 13.3 billion gallons. This year, the RFS requires obligated parties to obtain and submit 13.8 billion conventional biofuel renewable identification numbers (RINs) to demonstrate that the requisite gallons of renewable fuel were blended into the fuel supply. The conventional biofuel mandate is primarily filled by corn-based ethanol. In addition to conventional biofuels, the RFS requires volumes of cellulosic biofuel, other advanced biofuel (included sugar-cane-based ethanol), and biomass-based biodiesel. These RFS volumes are "nested" mandates as depicted in figure 1. When you add the requirements for each of these biofuel types together, EPA finalized a renewable fuel obligation totaling 16.55 billion gallons in 2013 (approximately 14.6 billion gallons, or 88 percent, of which is projected to be ethanol from both conventional and advanced fuel mandated categories). Therefore, the proposed EPA RFS obligation for 2013 is already requiring much more ethanol than E10 and the mandate now exceeds the amount of ethanol our fuel delivery system can safely handle. As a result, obligated parties will only use approximately 13 billion gallons of conventional ethanol in 2013, and fill the remaining obligation with banked RINs from previous years. In 2014, as obligated parties exhaust the supply of banked credits (RINs) from over-complying in previous years[7], and as gasoline demand declines further while facing a statutory implicit conventional ethanol mandate of alone 14.4 billion gallons, the math becomes even more problematic.

[6] EIA Short Term Energy Outlook (November 13, 2013).

[7] Obligated parties have can comply by meeting up to 20% of its current obligation with RINs generated in the previous year. In previous years, blenders used more ethanol than mandated, creating a "RIN bank" that will likely be drawn down by 2014 as obligated parties use these banked RINs for 2013 compliance.

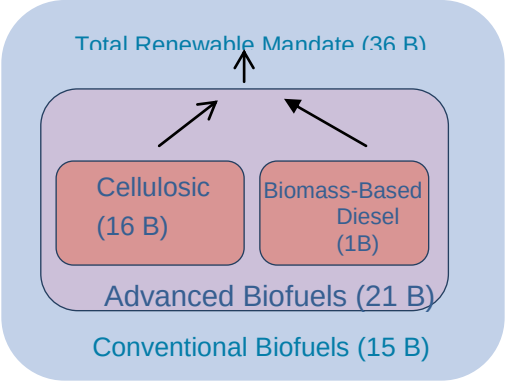

Figure 1 RFS Nested Mandates

B. Market already showing blendwall effects through RIN prices

Although not every company or every region reaches the blendwall at the same time, due to differences in companies' business models, the market indicated that the combination of higher mandates and declining gasoline consumption forced the onset of the blendwall in 2013 and that the full effects will start to be felt in 2014. This is most apparent in the RIN market, which reflects the expectation of how much ethanol can be blended into gasoline. This RIN supply/demand tightening is not due to ethanol production shortages, but to the inability to push more ethanol into the fuel supply and generate more RINs. As the mandates increase, the demand for RINs increases, but the RIN supply is tighter because the mandate is higher, meaning fewer companies have excess RINs to sell. Prior to the onset of the blendwall, conventional biofuel RINs (D6 category) typically traded at $0.02-0.04 until late 2012. Since that time, however, D6 RIN prices increased to as much of $1.48 the week of July 15 as the market anticipates a RIN shortage (see figure 2). At $1.48 per RIN, an obligated party selling to the wholesale or spot market, without controlling the blending facility or retail, faces an added $0.148 per gallon to produce gasoline. After a series of House whitepapers and hearings, and EPA's proposal to waive the 2014 volumes due to the blendwall, RIN prices retreated to the $0.18-$0.25 range. While significantly less onerous that $1.40 RINs, current RIN prices are more than 500% higher than historical trends and remain volatile. RIN price volatility will continue due to uncertainty in EPA's rulemaking process—only Congressional action can reduce this volatility in the long term.

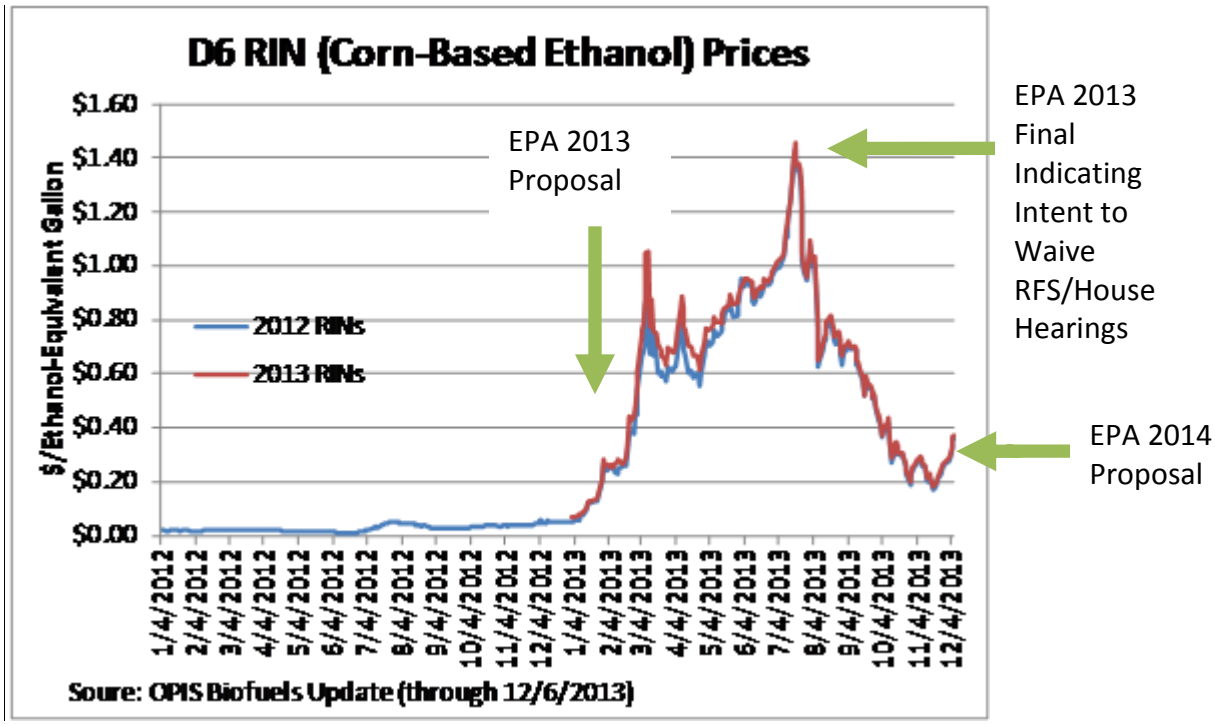

Figure 2 Corn Ethanol RIN Prices (Source: OPIS)(used with permission)

Finally, the RFS requires companies to buy RINs for biofuel that may need to be blended into products they do not even make. For instance, if the year's renewable fuel obligation is 10 percent, a company that produces 100,000 gallons of gasoline and diesel would incur an obligation to produce 10,000 RINs divided among the nested RFS categories – regardless of their ratio of fuels produced. Thus, a company that produces very little diesel still incurs an obligation to purchase biomass-based diesel RINs.

This leads to the question of what options are available to obligated parties. Obligated parties have limited options to remain in compliance with the requirements of the RFS as the blendwall hits. First, obligated parties will maximize the amount of E10 sold and for a short period of time, some may be able to rely on the limited number of banked RINs generated from over compliance in previous years. EIA reported in June that the small amount of RINs that are allowed to be carried over from last year, which exist from companies that may have over-complied with the mandate last year, are expected to fall significantly in 2014.[8] While some claim E15 and E85 provide answers to this problem, as described below, incompatible infrastructure, vehicles and consumer demand place insurmountable restraints on the ability of these fuels to meet challenges of the blendwall – and particularly the short-term challenges obligated parties face.

C. E85 will not solve the blendwall

E85[9] will not (and cannot) generate sufficient RINs to alleviate the effects of the blendwall—particularly in the short term. Due to limited infrastructure, the limited number of flex-fuel vehicles (FFVs) in commerce, and lack of interest in the fuel from FFV owners with access to the fuel, E85 will not solve the blendwall problem. In particular, the Department of Energy estimates that approximately 2,347 retail stations (less than 1.5 percent of stations nationwide) carry E85.[10] There are only approximately 11.5 million FFVs in use today (equal to about 5.1 percent of the overall light duty vehicle fleet There are only approximately 11.5 million FFVs in use today (equal to about 5.1 percent of the overall light duty vehicle fleet). In its 2010 Regulatory Impact Analysis, EPA estimated a very low refueling rate (only 4% in 2008) for FFVs with reasonable access to E85.[11] AFPM is not aware of more recent numbers, but sales data continues to show stagnant E85 sales, notwithstanding an increase in the number of FFVs on the road.

According to EIA, based on observations of Brazil's experience, consumers buy fuels based on energy adjusted price. A gallon of gasoline has more energy than a gallon of ethanol. In fact, the average E85 blend has 76-percent of the energy content of gasoline, meaning E85 consumers lose 24-percent of the fuel mileage.[12] E85 has not been price competitive with regular gasoline at any point since the inception of the RFS, a major reason for stagnant consumer interest. For example, the AAA Fuel Gauge Report, which displays energy-adjusted prices for E85 and other fuels, regularly shows that E85 is more expense than regular gasoline.[13] Even with the price incentives use more E85 in 2013, data for two heartland states using E85 (Minnesota and Iowa) indicate that sales recovered from the depressed levels seen in 2012, but only to prior historical levels.[14] Although E85 sales have recovered from 2012 lows, even with the high RIN prices in 2013 the state did not experience record sales.

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[8] http://www.eia.gov/todayinenergy/detail.cfm?id=11551.
[9] E85 contains 51-83 percent ethanol.
[10] EIA Biofuels Issues and Trends at 29 (Oct. 2012), citing http://www.afdc.energy.gov/fuels/ethanol_locations.html.
[11] 75 FR 14762
[12] EIA, *Biofuels Issues and Trends*, at 29 (Oct. 2012).
[13] AAA Fuel Gauge Report available at http://fuelgaugereport.aaa.com/?redirectto=http://fuelgaugereport.opisnet.com/index.asp
[14] http://mn.gov/commerce/energy/images/E-85-Fuel-Use-Data.pdf.

As mentioned in the previous section, the overwhelming majority of gas stations are owned and operated by small businesses, not by obligated parties. Installing a pump can cost up to $200,000 per station – depending on how extensive an overhaul is required. In order for a small business to make such an investment, it needs certainty that the product will sell – certainty that does not exist in the case of E85. In June, a National Association of Convenience Stores (NACS) survey found that 75 percent of retailers do not believe there is sufficient demand for E85 to justify the expense associated with installing an E85 pump.

Figure 3 E85 Sales in MN (Sources: MN Dept of Commerce)

The future is not much brighter for E85. The 2011 CAFE standards began to phase out credits for FFV production, creating a disincentive for automakers to continue producing FFVs. Even assuming significant increases in the installation rate of flex-fuel pumps (which will still not help obligated parties alleviate the blendwall in 2013 and 2014), E85 is also unlikely to achieve widespread consumer acceptance in the long term. In its 2010 regulatory impact analysis, EPA estimated that to meet the volumes envision by the RFS, 70 percent of the nation would need access to E85 at one in every four pumps they pass, and FFV owners would need to fill up with E85 74 percent of the time in 2022 – a far cry from the market realities nationwide and the Minnesota experience.[15]

In the short term, EIA projects that E85 sales will reach only 100 million gallons in 2013 – barely moving the needle in the 133 billion gallon gasoline market. To meet the 2014 statutory volumes for conventional ethanol alone, consumer demand for E85 would need to increase more than 1900 percent. To meet overall 2014 volumes, consumer demand would need increase 3400 percent. Moreover, EIA lowered its long term projections for E85 sales between 2012 and 2013, and now projects that E85 demand will remain flat at approximately 0.5 percent of transportation fuel demand through 2040. For these reasons, E85 is not a viable solution to the ethanol blendwall.

D. E15 will not solve or delay the blendwall

In 2011, EPA approved a 50-percent increase in the amount of ethanol (from 10 percent to 15 percent, or E15) that may be used in model year 2001 and newer automobiles. However, E15 creates significant market and legal concerns among fuel manufacturers, distributors, and retailers, as well as small engine manufacturers and automakers. E15 provides a limited and problematic path to RFS compliance, but ultimately does not solve the blendwall even as it creates an entirely new set of problems for consumers.

Engine Compatibility. Critically, despite EPA's assertions that E15 is safe to use in model year 2001 and newer cars, no automaker will warranty E15 for those cars built before 2012. Although some automakers have recently begun certifying new cars for E15, there are still a significant number of legacy vehicles on the road that were not built or certified to use E15. The disconnect between EPA's assertion about E15's safety and the automakers concerns stems from the depth and breadth of

[15] EPA RFS 2 Regulatory Impact Analysis at 291.

testing that EPA and DOE undertook. In particular, in evaluating E15 for use in 2001 and newer vehicles, EPA only tested the emissions control devices (e.g. catalytic converters) of the automobiles, but overlooked other critical engine components, such as fuel pumps. Subsequent testing undertaken by the Coordinating Research Council (CRC) demonstrates the inadequacy of EPA's approval process. In two studies conducted on engine durability and fuel pumps, CRC found that a substantial number of the 29 million 2001-2007 light duty vehicles (LDVs) on the road today are susceptible to system failure and other mechanical damage from E15 – notwithstanding EPA's approval. It is important to note that EPA and DOE were both participants in the CRC testing. There are no other non-road or off-road engines (motorcycles, lawnmowers, boats, etc) approved to use E15. Historically, nonroad, heavy duty gasoline vehicles, and motorcycles consumed about 8 percent of gasoline in the U.S.[16] However, the haphazard way EPA has allowed for the introduction of E15 into the marketplace could lead to significant consumer misfueling of these non- or off-road engines. The fact that E15 is not backward compatible with existing gasoline engines creates a significant potential liability throughout the fuel supply chain and represents one of the most significant hurdles to the provision of E15 in the marketplace.

Infrastructure compatibility. The lack of engine compatibility is exacerbated by the lack of infrastructure compatibility. A 2010 study by the National Renewable Energy Laboratory (NREL) found that using E15 in fuel dispensers already approved for E10 resulted in reduced levels of safety and performance. Similarly, in a 2011 review of challenges with mid-level ethanol blends, the Government Accountability Office (GAO) identified several challenges with E15 retail[17]:

> First, federal and state regulations governing health and environmental concerns must be met before these blends are allowed into commerce, and fuel-testing requirements to meet these regulations may take 1 year or more to complete. Second, according to knowledgeable federal officials and UL representatives, federal safety standards do not allow ethanol blends over E10 to be dispensed at most retail fueling locations, and federally sponsored research has indicated potential problems with the compatibility of intermediate ethanol blends with existing dispensing equipment. Third, according to EPA and several industry representatives, the compatibility of many UST systems with these fuels is uncertain, and retailers will need to replace any components that are not compatible if they choose to store intermediate blends. Fourth, industry associations representing various groups, such as fuel retailers and refiners, are concerned that, in selling intermediate ethanol blends, fuel retailers may face significant costs and risks, such as upgrading or replacing equipment.

All equipment used to store and dispense flammable and combustible liquids must be certified by a nationally recognized laboratory, such as Underwriters Laboratories (UL). Significantly, UL will not retroactively certify existing infrastructure to handle E15 and has not approved significant numbers of pump configurations. Moreover, underground storage tanks (USTs) must likewise be certified for higher ethanol blends. EPA reports that because USTs have a lifespan approaching 30 years, many USTs in commerce are not able to handle E15. As a result, and much like E85, large investments must be made by small businesses in order to sell E15.

Misfueling and Consumer Awareness. A new fuel, like E15, introduced into commerce without sufficient misfueling mitigation measures will likely lead to misfueling and damage consumers' engines. Unfortunately for consumers, EPA's only misfueling mitigation requirement is a small 4x4 label calling "attention" to E15's appropriate uses, but does not include requirements for a physical

[16] EPA RFS2 Regulatory Impact Analysis at 288.
[17] Government Accountability Office, *Biofuels: Challenges to the Transportation, Sale, and Use of Intermediate Ethanol Blends*, June 2011, available at http://www.gao.gov/assets/320/319297.pdf.

barrier to misfueling like those that were present during the switchover from leaded to unleaded gasoline. Exacerbating the problem is a general lack of consumer awareness about E15. In December 2012, AAA conducted a survey and found that 95 percent of consumers had not even heard of E15. Based on the results of the survey and the fact that less than 5 percent of cars on the road are designed and built to handle E15, AAA recommended against E15's sale and use. In June 2013, NACS found that when consumers learned about E15, only 56 percent said they'd be willing to buy it if it were the same price as gasoline.

The combination of engine and retail compatibility issues, inadequate misfueling protection and a lack of consumer awareness creates a major disincentive for fuel manufacturers and retailers to sell E15. Nearly half of the retailers surveyed by NACS identified potential liability as a concern in selling E15.

Other issues. E15 does not qualify for the one-pound Reid Vapor Pressure (RVP) waiver legislated for E10. EPA regulates RVP, a measure of gasoline's volatility, to control hydrocarbon emissions, a ground-level ozone precursor. According to EIA, E15 would not be an environmentally compliant fuel in summer months using most current gasoline blendstocks. This is a simple, but major, disincentive for fuel manufacturers and blenders to produce E15. In some cases terminals would not be able to stock another distinct blendstock. DOE has also noted that 90 state laws and regulations limit the sale of E15 and it is not known when they will be revised. Other states, such as California, do not currently allow the sale of E15.

Finally, it is worth noting that if none of the market, technical or legal barriers existed, nationwide use of E15 would only permit approximately 19 billion gallons of ethanol in the fuel supply—15 billion gallons short of EPA's estimate of the ethanol needed to fulfill the full RFS, which is nearly equal to the entire cellulosic biofuel mandate. In terms of how it operates in engines and infrastructure, ethanol is ethanol regardless of feedstock. For those interested in second generation ethanol, however, these numbers should cast serious doubts about the RFS' ability to achieve those goals.

E. Biomass-based diesel will not solve the problem

Another pathway for generating additional RINs for RFS compliance is to use more biodiesel, which generates 1.5 RINs for each gallon used and which is not currently butting up against the biodiesel blendwall (commonly understood to be a maximum of five percent biodiesel that can be blended for use in existing diesel engines). Biodiesel comprises a little less than three percent of the diesel consumption, but the real challenge facing biodiesel is its feedstock supply. EIA projects that only 1.32 and 1.21 billion gallons of biodiesel will be produced in 2013 and 2014, respectively. A major impediment for biodiesel is cost, as biodiesel derived from soybean oil typically costs more than $1.00 more to produce than petroleum diesel. Finally, and as explored more fully in section III(D), in 2011 and 2012 the biodiesel industry faced serious instances of RIN fraud (a situation not yet resolved). EPA's treatment of obligated parties that purchased fraudulent RINs froze the biodiesel market and hurt the growth of the biodiesel industry.

A related, unanticipated, effect of the RFS is its treatment of diesel. Due to a combination of the RFS structure, a modest biomass-diesel supply, and the practical cap on biodiesel that can be blended into diesel fuel, for each gallon of diesel a refiner produces, it incurs a "diesel deficit" that requires additional ethanol RINs for compliance. Put another way, a refiner's obligation is determined by the total volume of gasoline and diesel produced or imported for domestic consumption. For each gallon of diesel fuel added to the fuel supply, an obligated party must produce RINs for each of the nested mandates. Because biodiesel can only make up a limited portion of the fuel supply (currently less than three percent), and petroleum diesel is only able to use biodiesel as an additive, there is a significant shortfall in RINs that must be filled by additional ethanol RINs. In 2013, each gallon of diesel produces a 6.63 percent RIN deficit. While in prior years, surplus conventional ethanol RINs were available to make up this difference, the blendwall and associated impact on RIN costs make the diesel deficit more costly and increasingly unworkable. In recent weeks, biodiesel and ethanol RINs have been trading at roughly the same price.

F. Other Options for Obligated Parties and Resultant Impacts

After understanding how E15, E85 or greater biodiesel use are not viable pathways for addressing the blendwall, it becomes apparent that refiners are left with few options for compliance. If obligated parties are unable to purchase RINs in the open market at an affordable price, the remaining RFS compliance options are reducing gasoline and diesel supplied to the U.S. through a combination of reduced refinery runs, reduced imports, and increased exports. For instance, a 10 percent RVO on a 100,000 gallon refinery means the company needs to turn in 10,000 RINs if the fuel is sold in the U.S. If that company cuts back production and exports so that its total domestic supply is only 70,000, the company reduced its obligation by 3,000 RINs to 7,000. Due to the respective blendwalls of ethanol and biodiesel, a refiner has incentive to cut back on diesel production first. This is most simply explained as follows: 100 gallons of diesel blended as B3 (i.e., 97% diesel and 3% biomass-based diesel) will generate 4.5 RINs (since a gallon of biomass based diesel is given 1.5 RINs). However, 100 gallons of E10 (90% petroleum blendstock and 10% ethanol) will produce 10 RINs. Adding to the diesel hurdle, production of biodiesel in 2013 is unlikely to meet five percent of the U.S. diesel fuel market, exacerbating the diesel deficit under the RFS. Therefore a company facing a RIN shortfall will reduce its obligation by cutting back first on diesel sold in the U.S. The RIN essentially now acts as a permit to sell gasoline and diesel to the U.S. market.

The macroeconomic implications of this situation are significant. Diesel is the primary fuel used to transport a wide variety of goods through truck and rail, as well as a major input into agricultural production. In 2011, for example, U.S. farms consumed approximately 2.9 billion gallons of diesel. NERA Consulting recently modeled the implications of the blendwall and found that by 2015 (assuming the statutory requirements are maintained) the blendwall will cause a $770 billion decline in GDP, a reduction of $2700 in household consumption, a 30 percent increase in the cost of producing gasoline, and a 300 percent increase in the cost of producing diesel.

While NERA's numbers are staggering, real world examples from this year already demonstrate the arrival and impact of the blendwall.

1. In March, the Oil Price Information Service (OPIS) reported that a Florida gasoline importer was turning a planned shipment to an offshore buyer in order to avoid incurring a RIN obligation.

2. Monroe Energy, which saved a Philadelphia area refinery in 2012, will spend substantially more on RINs this year than it purchased the refinery for last year.

3. PBF Energy, a large supplier to the east coast market, will increase its ethanol blending in 2013, but will still need to purchase approximately half of its RINs. PBF estimates its spent $108 million through the first three quarters of 2013.

4. Valero Energy testified before the Senate Energy and Natural Resources Committee that it expects to spend $500 million in increased costs due to RIN volatility in 2013. Valero is also the third largest ethanol producer in the United States, with 10 ethanol plants and over 1.2 billion gallons of annual production.

The blendwall is the most immediate and significant concern with the RFS, although it is not the only issue.

III. Long-term RFS issues beyond the blendwall

Two of the major objectives of the RFS were to move towards energy independence with increased domestic fuel supply and improve the environment through reduced greenhouse gas emissions. The RFS is doing little towards meeting these goals. We are meeting the energy independence through

the surprising increase in U.S. and Canadian production of crude oil and natural gas, not anticipated in 2007, the development of technologies for economic production of more environmentally friendly second generation fuels has not occurred, and the promised environmental benefits of conventional biofuels have been called into question. We must rethink the nation's energy policies in light of these new realities.

A. Environmental Impacts.

In light of biofuels' purported environmental benefits as a central rationale for the RFS, it is important to recognize the actual impacts biofuels are having on the environment. It is now clear that, using EPA data and peer-reviewed data from the National Academy of Sciences (NAS), the RFS is not only failing to achieve its promised environmental benefits, but that it is undermining progress compared to a gasoline-only baseline. In particular, EPA's own data shows that the overwhelming majority of ethanol produced this year will actually raise greenhouse gas (GHG) emissions compared to gasoline. For the typical natural gas fired dry mill plants[18], GHG emissions are increasing by 33 percent over gasoline.

Moreover, a comprehensive 2011 study by the NAS found that lifecycle emissions of major air pollutants (CO, NOx, PM2.5, SOx, and NH3) are higher for corn and cellulosic ethanol than for gasoline. NAS states, in part, "overall production and use of ethanol was projected to result in increases in pollutant concentration for ozone and particulate matter [compared to] gasoline on a national average, but the local effects could be variable. Those projected air-quality effects from ethanol fuel would be more damaging to human health than gasoline use." Similarly, EPA reports that biodiesel production and use is increasing levels of NOx, PM (10 and 2.5), SO2, and NH3 compared to petroleum diesel.

According to EPA's 2010 Regulatory Impact Analysis, RFS2 will raise ozone levels 0.46 ppb over the RFS1 baseline, placing dozens of counties in danger of falling into non-attainment. In addition to the air quality and GHG impacts, ethanol requires an enormous amount of water to produce. NAS estimates that a gallon of gasoline requires between 1.4-6.6 gallons of water to produce. By comparison, corn ethanol requires 15-2400 gallons and switchgrass cellulosic ethanol requires 2.9-1307 gallons. It is clear that the RFS is not only failing to achieve its environmental goals, but is actively undermining them.

B. Inadequate process for dealing with the failed cellulosic biofuel mandate

> "Do a good job cellulosic producers. If you fail, we'll fine your consumers."
> - U.S. Court of Appeals for the DC Circuit, opining on EPA's management of the cellulosic mandate. *API v. EPA*, 706 F.3d 474, 480 (D.C. Cir. 2013).

Cellulosic biofuels—produced from feedstocks such as corn stover, switchgrass and woodchips—are a subcategory of the advanced biofuels mandate. The RFS calls for 16 billion gallons of cellulosic biofuels in addition to the five billion gallon of non-cellulosic advanced biofuels in 2022. Putting aside the fact that there is no room left in the fuel mix for more ethanol, Congress was overly optimistic about the cellulosic industry's ability to meet these mandates.

Each year, EIA is required to send a letter to EPA detailing its estimates on cellulosic production for the following calendar year. EPA is required to take those estimates and to base its final proposal based on EIA's estimate. In 2010 and 2011, the RFS called for a combined 350 million gallons of cellulosic biofuel. Recognizing that the industry would not produce that much, EIA projected a combined total of 10.28 million gallons. EPA, in an attempt to provide a greater market for the still non-existent fuel, set the final mandates at 12.5 million gallons. Precisely zero gallons were produced. In 2012, the cycle repeated itself, as EIA projected 6.9 million gallons and EPA increased the mandate to 10.45 million ethanol-equivalent gallons. In 2012, the U.S. produced a total of 21,093 gallons- of

[18] EPA estimates about 80 percent of corn ethanol plants are natural gas fired, and 88 percent are drymill facilities.

which 20,069 were a demonstration batch shipped to the Rio+20 climate conference and thus unavailable for compliance. The company that produced those gallons recently declared bankruptcy.

Therefore, in order to stay in compliance with the RFS, obligated parties were forced to purchase "waiver credits" from EPA. A January 2013 court decision rescinded the requirement in 2012, but in 2010 and 2011, credits totaling about $5 million dollars were purchased. Unfortunately, EPA also denied petitions from the industry asking for a retroactive waiver recognizing that the fuel was not produced. In its proposed rule implementing the 2014 volumes, EPA proposed refunding the 2011 cellulosic biofuel waver credits to obligated parties, which AFPM supports.

Recognizing the absurdity of the situation, in January 2013 the U.S. Court of Appeals for the D.C. Circuit vacated the 2012 cellulosic mandate and admonished EPA to base the mandates using more realistic projections. Yet less than a week after the Court's decision, EPA doubled down and once again proposed raising the mandate, this time to 14 million gallons. Although EPA promulgated a final rule further reducing the cellulosic target to 6 million gallons, the cellulosic industry will not meet that target either. Through October, a total of only 360 thousand gallons of cellulosic biofuels were produced. For the cellulosic target, the annualized volume is only 432 thousand gallons- or 11 percent of the target EPA set in August.

EIA projects that cellulosic biofuel production will fall significantly below volumes envisioned by the RFS—reaching only 0.5 billion gallons by 2022. If the RFS remains in place, however, and if breakthroughs in technology and economics of cellulosic *ethanol* make it commercially feasible, requirements for these advanced biofuels will only exacerbate the ethanol blendwall problem.

C. Unintended consequence of increasing imports and emissions

As described previously, the mandate for other advanced fuels can only be met with by importing sugar-cane based ethanol, mainly from Brazil. At the same time, the U.S. is exporting corn ethanol to Brazil. This "fuel shuffling" between countries increases total GHG emissions due to unnecessary transportation that would not occur absent the RFS. In early July 2013, Thompson-Reuters released an analysis of U.S.-Brazil ethanol shipments and found that since 2011, one billion gallons of ethanol was exchanged between the two countries, producing more than 312,000 tonnes of CO2.[19] According to the EPA, 8 million tree seedlings would need to be grown over the next decade to offset these emissions.

D. Another implementation consequence: biodiesel fraud

In November 2011, February 2012, and April 2012, EPA issued Notices of Violation (NOVs) to obligated parties that unknowingly purchased and used invalid RINS sold by EPA registered biodiesel producers. The fraud was perpetuated by three companies, which (in total) sold 140 million RINs to unsuspecting obligated parties. For context, 140 million RINs equaled approximately 5-12 percent of the biodiesel market during 2010 and 2011. These companies were registered by EPA, which required registration paperwork such as third-party engineering reports. In addition to fining the victims of the fraud (obligated parties), EPA forced those parties to go into the market and purchase replacement RINs—which cost more than $1.00 each and without obligated parties knowing whether they were valid. AFPM estimates that the fines and replacement RINs cost the industry nearly $200 million in 2012.

Although EPA worked with obligated parties, biofuel interests, and others to design a "quality assurance program" aimed at preventing future fraud, EPA's proposal is overly complex and expensive—increasing the likelihood that smaller renewable fuel producers will not take advantage of the voluntary certification. EPA took comments on the proposed rule, which closed on April 18, 2013, but has yet to finalize the QAP program. In the meantime, obligated parties and biodiesel producers

[19] Ali Morrow and Alex Plough, *Ethanol Trade Undermines U.S. Biofuels Policy*, Thompson Reuters Foundation (July 3, 2013), available at: http://www.trust.org/item/20130703091935-47h65/

alike face legal and regulatory uncertainty.

IV. EPA's Proposed Rule Implementing 2014 Volumetric Targets

On November 29, EPA released its proposed rule implementing the 2014 renewable blending targets. For the first time, EPA proposed a decrease in the mandated volumes of corn ethanol and to use its discretionary authority to waive the total advanced and total renewable categories by the amount of the cellulosic waiver.

A. 2014 Proposed Volumes

Importantly, and despite dire claims to the contrary, compared with current consumption levels EPA did not propose massive cuts in any of the buckets. In particular, obligated parties used approximately 13 billion gallons of ethanol in 2010, 2011 and 2012, will use approximately 13 billion gallons in 2013 (using banked RINs to meet the rest of the mandate), and so EPA's proposal of 13 billion gallons for 2014 merely continues status quo consumption. Given this fact, the ethanol industry's claim that EPA's proposal will somehow shutter ethanol plants and place jobs at risk rings particularly hollow. At the same time and as explained below, however, gasoline consumption is projected to decline yet again in 2014, indicating that EPA should reduce the volumes slightly further to avert the blendwall.

For cellulosic, EPA is actually proposing to more than double the 2013 mandate, despite the fact that the cellulosic industry has yet to exceed even 1 million gallons of production or meet its modest targets in any given year. For biomass-based diesel, EPA is already more than a year late in promulgating volumes for 2014, but maintained the same mandate for biomass based diesel for 2014 and 2015. The remaining difference in the numbers is EPA's decision to use its authority to reduce the total and advanced mandates by the amount it waived the cellulosic targets. In using this authority, EPA is essentially preventing a requirement to import ever increasing amounts of Brazilian sugarcane ethanol in order to meet the advanced biofuels mandate and the resulting exacerbation of the E10 blendwall. Although biomass-based diesel is also able to fill the non-cellulosic advanced biofuels mandate, it is also eligible to fill the total renewable mandate, so there will continue to be a market for higher biodiesel volumes than the biomass based diesel requirement alone would indicate.

B. Impact of the 2014 Volumes on the Blendwall and Need for Congressional Action

AFPM is pleased that EPA recognized the blendwall, but believes the final rule must go further to avert its full impacts. In August 2013, AFPM and the American Petroleum Institute filed a petition on behalf of its members seeking a partial waiver of the 2014 RFS. In its petition, AFPM detailed the technical and marketplace challenges associated with increasing the volume of biofuel in the fuel supply, and requested a waiver that would set the ethanol content in gasoline at an average of 9.7 percent, for a total 2014 RFS of 12.9 billion gallons of ethanol and 1.9 billion ethanol-equivalent gallons of biomass-based diesel. In 2013, available data through August indicate ethanol use is averaging 9.7 percent at a time when every incentive has been pushing towards more ethanol use. In particular, a 9.7 percent cap would retain a small market for gasoline containing no ethanol required for some applications (such as boating, older cars, and some lawn equipment), promote liquidity in the RIN market, and account for historical differences between the Energy Information Administration's (EIA) projections of gasoline demand and actual demand. EIA's data imply that 2012 E0 use was about 3.4% of gasoline demand and recreational boating alone was about 1.2% of demand. Unfortunately, EPA's proposal would place the average ethanol content at approximately 9.8 percent- precariously placing the RIN market on a cliff's edge.

Moreover, it is critical that Congress recognize the EPA proposal is not final, and—if finalized—is only valid for 2014. EPA would need to reassert its waiver authority each year, throwing the entire fuel market into disarray due to the uncertainty of the regulatory climate and near certainty of legal challenges. Nor does a year-to-year, lawsuit-to-lawsuit fuels policy allow for rational planning and investment choices, land use decisions, or stability in commodity markets that has helped bring such a

diverse set of interests together seeking reformation or repeal of the RFS.

For these reasons, Congress must act to bring long term stability and certainty back to the fuels markets by repealing or significantly restructuring the RFS.

V. Conclusion

Congress often sunsets legislation so that it may periodically reexamine laws to ensure they are meeting their intended goals and having their intended consequences. Unfortunately, there is no such mechanism in the RFS, which makes this hearing—and ultimately legislation---all the more critical. In 2007, the energy landscape was markedly different than it is today and policymakers did not have the wealth of information now available demonstrating the unintended consequences of biofuel mandates. Just as the European Union recently decided to roll back its biofuel mandates in response to concerns about the environmental and agricultural impacts, the U.S. Congress should look at the facts and take action to stem the consequences of this law before they grow worse. In addition to the technological innovations in oil and gas production leading to an energy renaissance in the U.S., we now know that the RFS is raising food and fuel costs, increasing GHG emissions, reversing advancements in air and water quality, and increasing the likelihood of engine damage. While the law is flawed at its core, its implementation has demonstrated the extent of the mandate's unworkability.

AFPM believes a two-step process is needed to alleviate the problems. Although it should go further, EPA is undertaking the first step to reduce the 2014 mandates using its discretionary waiver authority. This authority is merely a band-aid, however, as EPA's authority extends only a year at a time. Ultimately, Congress needs to take action to begin rolling back this unworkable and anti-consumer mandate – and soon.

Thank you again for holding this critical hearing. AFPM appreciates the opportunity to share its views.