WRITTEN STATEMENT OF

AMERICAN FUEL & PETROCHEMICAL MANUFACTURERS

AS SUBMITTED TO THE

SUBCOMMITTEE ON ENERGY AND POWER

Committee on Energy and Commerce
United States House of Representatives

on

"Overview of the Renewable Fuel Standard: Stakeholder Perspectives"

July 23, 2013

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 an oil and gas 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.

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 create 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 in 2013, 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 supply 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. Just last week, 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] During that time, U.S. petroleum imports declined from 61 percent of consumption to 41 percent in 2012. 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. The International Energy Agency reported in November that the U.S. is on pace to surpass Saudi Arabia as the world's largest oil producer in 2020, and can become a net oil producer by 2025. EIA testified in this Committee on June 26 that ethanol was only a minor factor in the drop in petroleum imports. 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 and increased imports. At the same time that the U.S. has been increasing oil and gas production, development of many advanced biofuels hoped for in

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

the RFS 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). The rate of production in 2013 has been slower than in 2012, with only 4,900 gallons produced between January and May. EIA now projects that only 0.5 of the 16-billion-gallon-cellulosic mandate will be produced in 2022. 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 projects that approximately 80 percent of the other advanced biofuels mandated will 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 heavily on corn-based ethanol production to satisfy its volumes. This situation undermines 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 recession, a stagnant economy, and recent fuel economy/automobile GHG standards, 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 27 percent lower than the 2007 AEO projection for 2022. Importantly, and as described below, the combination of

[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

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 use of fuel containing higher concentrations of ethanol.

B. Flawed implementation concept

The RFS is implemented in a way that makes fuel manufacturers responsible for consumer 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 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.

Penetration of new fuels requires that consumers see a benefit to buying the fuel and that retailers see adequate 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.

Retailers must see the financial benefit in offering a new fuel, including an affordable cost and consumer acceptance. Penetration was not quick in many areas, even in cases where much of the infrastructure was in place. One alternative fuel currently available on the market is E85, which contains up to 85 percent ethanol and 15 percent gasoline. It 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. These realities place a functional cap on the amount of biofuel that can be blended into the fuel supply at E10. This 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 (mainly refiners and importers) must obtain an appropriate number of RINs to turn into EPA to demonstrate compliance. 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 terminal companies such as Kinder Morgan and Murphy Oil.

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. Both companies reported significant new revenue from RIN trading during the recent run-up in prices. 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 this 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 132.9 billion gallons, and is expected to fall an additional 200 million gallons to132.7 billion gallons in 2014.[6] At these levels of demand, the 10 percent (E10) saturation point is approximately 13.2 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 has proposed a renewable fuel obligation totaling 16.55 billion gallons in 2013 (14.63 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 the E10 system can safely handle. In 2014, as obligated parties run out of banked credits from over-complying in previous years[7], and as gasoline demand declines further while facing an implicit ethanol mandate of 14.4 billion gallons, the math becomes even more problematic.

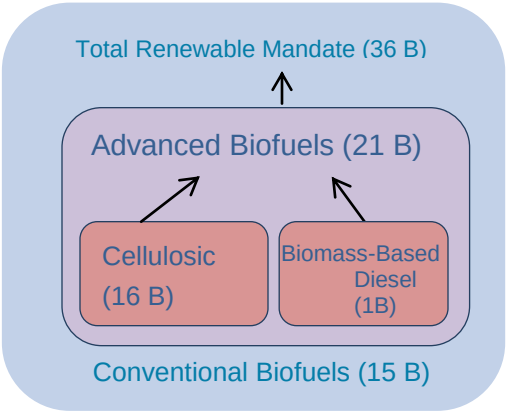


Figure 1 RFS Nested Mandates

[6] EIA Short Term Energy Outlook (July 9, 2013)
[7] Obligated parties have the ability to carry over 20 percent of RINs for one 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 RINs for compliance.

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 is currently anticipating that the combination of higher mandates and declining gasoline consumption will force the blendwall in 2013, with the full effects starting 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 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.

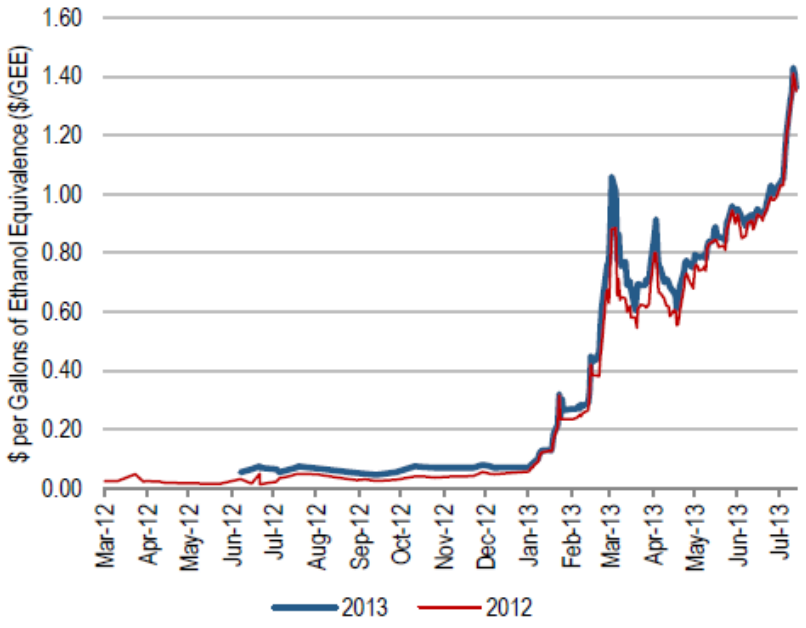


Figure 2 Corn Ethanol RIN Prices (Source: Credit Suisse/Bloomberg)

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, hypothetically, if the year's renewable fuel obligation is 10 percent, a company that produces 100,000 gallons of gasoline and diesel incurs 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 at more than $1.00 each.

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 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 to zero 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).

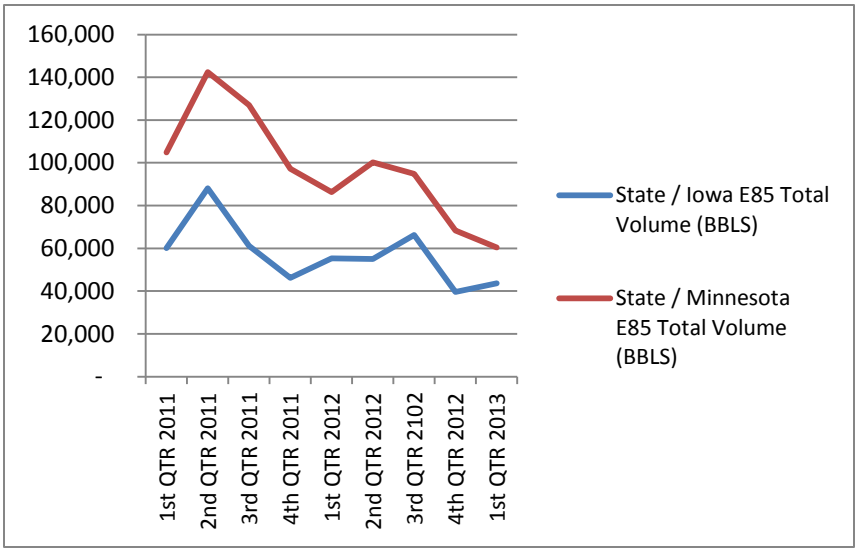
[8] http://www.eia.gov/todayinenergy/detail.cfm?id=11551
[9] E85 contains 51-83 percent ethanol
[10] EIA Biofuels Issues and Trends at 29 (Oct. 2012), citing http://www.afdc.energy.gov/fuels/ethanol_locations.html

However, even when consumers with a FFV have reasonable access to E85, EPA estimates they only refuel with E85 approximately 4 percent of the time.

According to EIA, based on observations of Brazil's experience, consumers buy fuels based on energy adjusted price. A gallon of gasoline has 50 percent more energy than a gallon of ethanol, meaning that the average E85 blend has 76-percent of the energy content of gasoline and consumers lose 24-percent of the fuel mileage.[11] 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.[12] In fact, E85's lackluster sales extend to the heart of the corn belt. Sales of E85 in Minnesota, which has the nation's most developed E85 infrastructure, decreased from a peak of 22 million gallons in 2008 to 15 million in 2012, even as the number of FFVs in the Minnesota marketplace increased (see figure 3).[13] 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 installing an E85 pump.

[11] EIA, *Biofuels Issues and Trends*, at 29 (Oct. 2012).
[12] AAA Fuel Gauge Report available at http://fuelgaugereport.aaa.com/?redirectto=http://fuelgaugereport.opisnet.com/index.asp
[13] http://mn.gov/commerce/energy/images/E-85-Fuel-Use-Data.pdf

Figure 3 E85 Sales in MN and IA (Sources: IA Dept of Review; 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 break through 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.[14]

In the short term, EIA projects that E85 sales will reach only 130 million gallons in 2013 – barely moving the needle in the 133 billion gallon gasoline market. 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.

D. E15 will not solve or delay the blendwall

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

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 assertion that E15 is safe to use in model year 2001 and newer cars, no automaker will warranty those cars. Only two automakers—General Motors and Ford—recently announced they'd start to warranty 2012 and 2013 models. The disconnect between EPA's assertion about E15's safety and the automakers concerns stems from the depth and breadth of 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.[15] 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.

[15] EPA RFS2 Regulatory Impact Analysis at 288.

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[16]:

> 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

[16] 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.

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 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 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, AAA conducted a survey and found that 95 percent of consumers had not even heard about 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, 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—about the same percent that identified cost as a concern.

Other issues. Finally, 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 evaporative emissions. 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 use and which is not currently facing the biodiesel blendwall (commonly understood to be a maximum of five percent biodiesel that can be blended into petroleum diesel). Biodiesel comprises approximately two percent of the diesel consumption, but the real challenge facing biodiesel is its feedstock supply. EIA projects that only 1.28 and 1.49 billion gallons of biodiesel will be produced in 2013 and 2014, respectively, far short of the required volumes for the RFS and wholly inadequate to fulfill the RFS obligations triggered from the sale of diesel fuel. A major impediment for biodiesel is cost, as biodiesel typically costs at least $1.00 or more, on average, to produce than petroleum diesel. Coupled with the $1.00 per gallon biodiesel tax credit, consumers are paying $2.00 or more (through higher cost fuel and their tax bills) per gallon of biodiesel consumed than a petroleum diesel alternative. 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, coupled with the RIN equivalence values, 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, further depressing diesel fuel's ability to contribute to the RFS obligations. 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 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 estimate it will spend at least $180 million on RINs in 2013.

4. Last week, the Chairman and CEO of Valero Energy testified before the Senate Energy

and Natural Resources Committee that it expects to spend $500 million - $750 million in increased costs due to RIN volatility in 2013. Valero is also the third largest ethanol producer in the United States.

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[17], 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 than 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. Appendix A includes a map of EPA's RIA, as well as a district by district breakdown of impacts on this Subcommittee. 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 four billion gallon of non-cellulosic advanced biofuels in 2022. Putting aside

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

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 gallons. In 2012, the U.S. produced a total of 21,093 gallons- of 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 more than $14.9 million dollars were purchased. Unfortunately, EPA also denied retroactive petitions from the industry asking for a waiver recognizing that the fuel was not produced.

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. Through the first five months of the year, a total of 4,901 gallons of cellulosic biofuels were produced (and only during the month of March).

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.[18] 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 and February 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.

[18] 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/

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 alike face legal and regulatory uncertainty.

IV. Conclusion

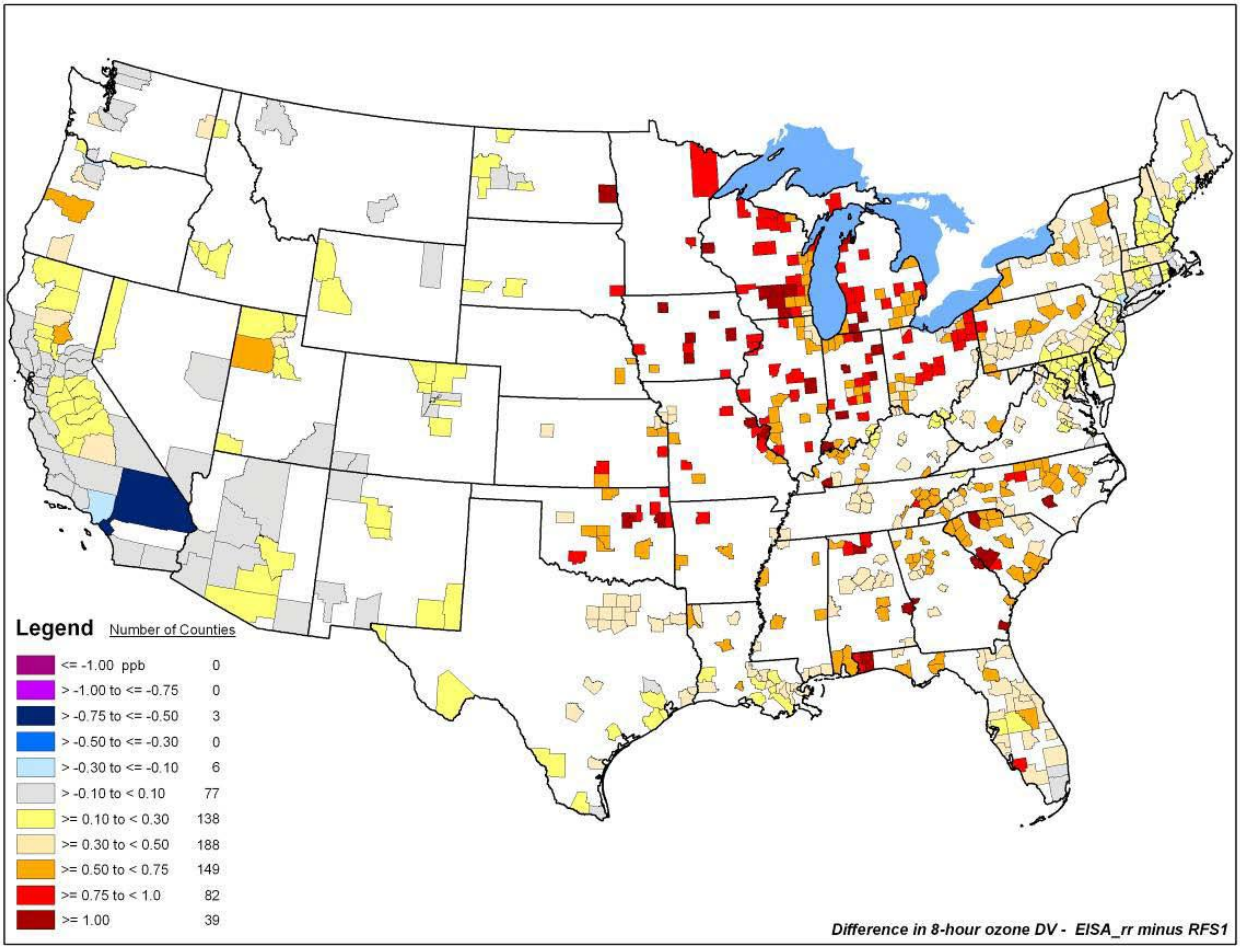
Laws, while often passed with the best of intentions, should be consistently reexamined to ensure they are having their intended impacts. The RFS is no different. In 2007, the energy landscape was markedly different than it is today and policymakers did not have the wealth of information now available 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. First, EPA should waive the 2013 and 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. This will provide some time to establish the long term certainty that the market requires. Congress needs to take action to repeal this unworkable and anti-consumer mandate – and soon.

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

Appendix A: Impacts of the Renewable Fuel Standard on Ozone Levels

Source: Environmental Protection Agency, Renewable Fuels Program (RFS2) Regulatory Impact Analysis (Feb. 2010) at 599.



Subcommittee on Energy and Power

Member	Counties (* = partial county)	Ozone Increases (in ppb) (projected change between RFS2 Control Scenario and RFS1 Reference Case)
Whitfield	McCracken	>=.3 to <.5
	Trigg	>= 1.0
	Livingston	>=.5 to <.75
	Christian	>=.3 to <.5
	Henderson	>=.5 to <.75
	McLean	>=.5 to <.75
	Simpson	>=.5 to <.75

Rush	Cook	>=.3 to <.5
	Will*	>=.5 to <.75
Scalise	Jefferson Parish	>=.3 to <.5
	Lafourche Parish*	>=.1 to <.3
Hall	Hunt	>=.3 to <.5
	Rockwall	>=.3 to <.5
	Collin	>=.3 to <.5
Shimkus	N/A	
Pitts	Chester*	>=.3 to <.5
	Lancaster	>=.3 to <.5
	Berks*	>=.3 to <.5
Terry	Douglas	>=.5 to <.75
Burgess	Denton*	>=.3 to <.5
	Tarrant*	>=.3 to <.5
	Dallas*	>=.3 to <.5
Latta	Lucas	>-.1 to <.1
	Wood	>=.75 to < 1.0
Cassidy	Pointe Coupee Parish	>=.3 to <.5
	West Baton Rouge Parish	>=.3 to <.5
	East Baton Rouge Parish	>=.3 to <.5
	Ascension Parish	>=.3 to <.5
	St. John the Baptist Parish	>=.3 to <.5
	St. Charles Parish	>=.3 to <.5
	Iberville Parish	>=.1 to <.3
	Lafourche Parish*	>=.1 to <.3
	Livingston Parish	>=.1 to <.3
Olson	Brazoria	>=.1 to <.3
	Harris	>=.1 to <.3
McKinley	Monongalia	>=.5 to <.75
	Wood	>=.3 to <.5
Gardner	Weld	>=.1 to <.3
	Adams	>-.1 to <.1

	Arapahoe	>=.1 to <.3
	Boulder	>=.1 to <.3
	Douglas	>-.1 to <.1
Pompeo	Sedgwick	>=.75 to < 1.0
	Sumner	>=.5 to <.75
Kinzinger	Will*	>=.5 to <.75
	Winnebago	>=.75 to < 1.0
Griffith	Wythe	>=.3 to <.5
	Roanoke*	>=.3 to <.5
Barton	Ellis	>=.3 to <.5
	Tarrant*	>=.3 to <.5
Upton	Allegan	>=.75 to < 1.0
	Berrien	>=.5 to <.75
	Cass	>=1.0
	Kalamazoo	>=1.0
McNerney	San Joaquin*	>=.1 to <.3
	Contra Costa*	>-.1 to <.1
	Sacramento*	>-.1 to <.1
Tonko	Albany County	>=.3 to <.5
	Rensselaer County	>=.3 to <.5
	Saratoga County	>=.3 to <.5
	Schenectady County	>=.3 to <.5
Engel	Westchester	>-.1 to <.1
Green	Harris*	>=.1 to <.3
Capps	San Luis Obispo	>-.1 to <.1
	Santa Barbara	>-.1 to <.1
	Ventura*	>-.1 to <.1
Doyle	Allegheny	>=.3 to <.5
	Westmoreland	>=.3 to <.5

Barrow	Richmond	>=1.0
Matsui	Sacramento*	>-.1 to <.1
	Yolo	>-.1 to <.1
Christensen	N/A	
Castor	Hillsborough County	>=.1 to <.3
	Pinellas County	>=.3 to <.5
Dingell	Washtenaw	>=.5 to <.75
	Wayne	>=.5 to <.75
Waxman	Los Angeles	>-.3 to <=-.1