Evaluating the Impact of Recent Political Events on the Renewable Fuel Standard
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I. Executive Summary
Congress created the Renewable Fuel Standard (RFS) program under the Energy Policy Act of 2005 (EPAct) and the Energy Independence and Security Act (EISA) of 2007, both of which amended the Clean Air Act (CAA). The RFS program is a national policy that requires a certain volume of renewable fuel to replace or reduce the quantity of petroleum-based transportation fuel, heating oil or jet fuel. The Environmental Protection Agency (EPA) implements the program. The 2007 enactment of EISA and its subsequent implementation by the EPA in 2010 and a body of rule-making from 2010-2017 is the overall regulatory framework that is known as the RFS (or RFS2) today.

President Donald J. Trump and the members of his Cabinet are, in general, advocates of fewer federal regulations, especially those that cost Americans’ their jobs. Members of his administration have also questioned the impact of human activity on climate change. However, there is no indication that the administration wants to eliminate the RFS. In a letter to attendees at the National Ethanol Conference in February 2017, President Trump wrote, “Rest assured that your president and this administration values the importance of renewable fuels to America’s economy and to our energy independence. As I emphasized throughout my campaign, renewable fuels are essential to America’s energy strategy.”

Among his Cabinet, the EPA Administrator, who leads the agency, is entrusted to implement the RFS and can have the biggest impact on the future of the RFS. Other Cabinet level positions such as the Secretaries of Energy and Agriculture typically have little or no impact on EPA programs such as the RFS. They do, however, contribute towards its successful implementation by making recommendations to limit adverse economic or environmental impacts. As an example, the EPA calculates a Renewable Volume Obligation (RVO) for each year based on estimates of gasoline usage created by the Department of Energy’s Energy Information Agency.

Mr. Scott Pruitt, current Administrator of the EPA recently stated on CNBC, “I think that measuring with precision human activity on the climate is something very challenging to do and there’s tremendous disagreement about the degree of impact, so no, I would not agree that it’s a primary contributor to the global warming that we see,” Mr. Pruitt’s remarks appear to call into question whether the EPA will play a role in the regulation of greenhouse gases emitted as a result of human activity. This has created some speculation among market participants on how his beliefs on climate change could impact the RFS. The RFS is an existing law and it would require an act of Congress to repeal it.

2 Secretary of Energy, Mr. Rick Perry, during his Senate confirmation hearing, said that global warming caused by humans is real, indicating that there is a diverse set of opinions on this subject within the administration.
A Congressional repeal of the RFS has a low probability for a variety of reasons. The main reason being that the RFS has created a strong market for corn and soybeans. About 40% of the US corn crop goes to ethanol production under the RFS program. There are about 200 operating ethanol refineries spread over 29 states in the US with an aggregate nameplate capacity of almost 16 billion gallons. According to the Renewable Fuels Association, the US ethanol industry is an economic driver in rural America and has created about 86,000 direct jobs. Similarly, the demand for biodiesel created by the RFS increases demand for soybean oil. About 20% of the soybean harvest was converted to oil consumed in biodiesel production in 2016. The rural economy that depends on growing, delivering and processing corn and soybeans is dependent on regulations such as the RFS for stability. A majority of rural voters voted for President Trump and the Republican majority in the House and Senate, and there is not much political mileage that the elected officials can gain from repealing a law that helps their rural constituents.

Furthermore, there is a lack of consensus among the opponents of the RFS on any alternative solution. RFS opponents range from representatives of the oil industry to environmental activists who see harm in diverting human food sources to produce biofuels. In between, there are groups representing a wide range of interests such as marine engine manufacturers, fleet operators, animal feedlots, restaurant chains, etc. The sheer diversity of their agenda has been a challenge to anyone trying to build a unified coalition against the RFS.

There is some fear that the EPA’s ability to set annual biofuel volume targets give the Administrator an opportunity to weaken it by setting low targets. Congressional volume targets for renewable fuels are provided in Figure 1. The EPA Administrator does not have the authority to arbitrarily overturn or change the statutory volume obligations. The statute does contain a general waiver authority that allows the EPA Administrator to waive the RFS volumes, in whole or in part, based on a determination that implementation of the program is causing severe economic or environmental harm, or based on inadequate domestic supply.

On May 29, 2015, the EPA used this general waiver authority and set an RVO lower than the benchmarks established by Congress for conventional biofuels. Ethanol advocacy groups such as the RFA and Growth Energy and the National Corn Grower’s Association have taken EPA to court to challenge the agency’s interpretation of its waiver authority. The basic premise of the lawsuit is that the EPA does not have the authority to arbitrarily reduce the standards, and that it has not shown there is any economic harm or lack of

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3 In December and January several news articles reported uncertainty among biofuel proponents. E.g., https://farmpolicynews.illinois.edu/2016/12/biofuels-trump-picks-str-unease/
domestic supply. Congress provides such a waiver option only when there is determination that the program is causing severe economic harm or if there is inadequate domestic supply. The case is scheduled for oral arguments on April 25th, 2017.

During EPA administrator Mr. Pruitt’s confirmation hearing, various Midwestern Senators questioned his views on undermining Congressional intent by using the general waiver authority. Mr. Pruitt’s responses indicated that he believes the role of the EPA is to enforce the law as written by Congress, and not undermine the RFS. “It’s not the job of the administrator of the EPA to do anything other than administer the program according to the intent of Congress, and I commit to you to do so,” he stated in response to one such question.

The EPA also has the authority to adjust cellulosic, advanced and total volumes set by Congress as part of the annual rule process. Although the Clean Air Act specifies increasing volumes of cellulosic biofuels to be used as transportation fuel for each year from 2010 through 2022, the statute also requires that EPA project the volume of cellulosic biofuel that will be produced each year, and if that projection is less than the statutory applicable volume, the statute requires EPA to use the lower projected value in determining the blending requirement for cellulosic biofuel for that calendar year.

For each year since 2010, when the first cellulosic biofuel requirement was established, EPA’s projection of cellulosic biofuel production has been lower than the statutory applicable volume, and EPA has used its waiver authority to reduce the standard for cellulosic biofuels. With the classification of renewable compressed natural gas from biogas as a cellulosic biofuel and the availability of increasing volumes of cellulosic ethanol, the EPA projection of domestic cellulosic biofuel production has been steadily increasing each year, and this trend is expected to continue.

President Trump has proposed a federal budget “blueprint” with $2.6 billion in cuts to the EPA’s budget, a 31% decrease. The cuts are expected to result in the elimination of 3,200 jobs at the Agency, including a 25% cut to the funding of the Office of Enforcement. The main targets of the cuts are the Clean Power Plan, international climate change programs, climate change research and related efforts. Although the final budget must be approved by Congress and

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4 http://ethanolrfa.org/resources/publications/pocket/
5 Approximate calculation is as follows: 1.5 bushels of soybeans result in oil for 1.0 gallon of biodiesel. There were approximately 4 billion bushels harvested and 2 billion gallons of biodiesel produced in 2016 of which about 60% used soybean oil as feedstock.
may involve less cuts to the EPA, there is a general consensus that there will be some cuts to the EPA's budget going forward. The biggest threat to the RFS seems to be in EPA's ability to implement it effectively. The exact effect of budget cuts on the EPA's ability to administer the RFS program is unknown. Potential impacts include delays in project approvals, delays in enforcement actions, delays in setting annual RVOs, or delays in new pathway development.

The full implication of Mr. Pruitt’s comments on greenhouse gases and climate change are unknown at this time. It may result in certain compounds being removed from a list of known pollutants and it may result in the EPA scaling back its efforts to improve air quality for Americans. There is general industry consensus that the target of his administration will be to scale back climate focused agency actions that were initiated under President Obama’s administration, mainly the Clean Power Plan. President Trump will try to keep his campaign promise to protect coal mining communities from regulations that may take away their livelihoods. President Trump’s preliminary budget also cuts all funding for diplomatic efforts to slow climate change and cut scientific missions to study the climate. However, once we sift through the data, we find nothing that suggests he is attempting to roll back the RFS. On the contrary, he continues to express support for it as seen in the recent letter to NEC attendees.

The overall result of the analysis can be summed up as follows:

1. There is very low probability of the RFS being repealed during the current administration
2. There is a small probability of RFS being amended during the current administration
3. There is greater probability of inefficient implementation of the RFS due to budget cuts at the EPA during the current administration

Report Structure

This report aggregates available data and interprets current opinions around anticipated changes to the RFS program under the 115th United States Congress and the administration under current Federal Administration.

Section II of this report provides an overview of the RFS and how it works.

Section III of this report provides an overview on several alternative renewable fuel programs. Section IV and V analyzes reported political events and pending legislation regarding the RFS program. As a part of this study, EcoEngineers hired a 3rd party consultant to conduct a formal survey of a sample of industry

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6 Americans for Clean Energy et al. v. U.S. Environmental Protection Agency, case number 16-1005, in the U.S. Court of Appeals for the D.C. Circuit
leaders. The details of the survey and the results are provided in Section VI. In Section VII, we analyze the price fluctuation in the credit used for RFS compliance and track it against political events. Section VIII provides a brief analysis of the economics of the Dane County gas upgrading project under a couple of theoretical, adverse political scenarios.

Given the estimated $1.2 billion to $4 billion that may be needed to put in place nutrient control systems for non-point sources in Iowa, the State should conduct a thorough review of the potential to produce biogas from a mixture of energy crops and manure.

Proactively managing land use and the organic waste shed in Iowa’s watersheds could create a new market for agricultural biomass such as cover crops and energy crops.

8 https://www.epa.gov/cleanpowerplan/clean-power-plan-existing-power-plants
II. Renewable Fuel Standard (RFS)
Overview

The RFS program is a national policy that requires a certain volume of renewable fuel to replace or reduce the quantity of petroleum-based transportation fuel, heating oil or jet fuel. The RFS has the following key features:

- Annual renewable fuel volume requirements until 2022
- 36 billion gallons of renewable fuel to be blended by 2022
- Explicit greenhouse gas (GHG) reduction requirements for renewable fuels
  Four renewable fuel categories:
  - Biomass-based diesel (biodiesel and renewable diesel)
  - Cellulosic biofuel (biogas, ethanol and diesel made from cellulosic feedstock)
  - Advanced biofuel (non-cellulosic renewable fuel with GHG reduction of 50%)
  - Renewable fuel (any renewable fuel with a GHG reduction of 20% and grandfathered fuel)
- Specific definitions of “renewable biomass” that can be used as feedstock for renewable fuel production
  EPA has the authority to implement alternative compliance procedures if/when statutorily required renewable fuel volumes are not available in a given year

Renewable Volume Obligations (RVOs)

Congress intended the RFS to incentivize the production and use of renewable fuels by requiring petroleum refineries and importers to blend a portion of renewable fuel into the transportation fuel mix that is commercially sold in the U.S. The minimum mandated levels of renewable fuels to be blended are known as Renewable Volume Obligations (RVOs). These are calculated as a percentage of the total refined product output of the major refining companies and importers of petroleum fuels (known as obligated parties or OPs).

10 Renewable biomass means each of the following (including any incidental, de minimis contaminants that are impractical to remove and are related to customary feedstock production and transport):
(1) Planted crops and crop residue harvested from existing agricultural land cleared or cultivated prior to December 19, 2007 and that was nonforested and either actively managed or fallow on December 19, 2007.
(2) Planted trees and tree residue from a tree plantation located on non-federal land (including land belonging to an Indian tribe or an Indian individual that is held in trust by the U.S. or subject to a restriction against alienation imposed by the U.S.) that was cleared at any time prior to December 19, 2007 and actively managed on December 19, 2007.
(3) Animal waste material and animal byproducts.
(4) Slash and pre-commercial thinnings from non-federal forestland (including forestland belonging to an Indian tribe or an Indian individual, that are held in trust by the United States or subject to a restriction against alienation imposed by the United States) that is not ecologically sensitive forestland.
(5) Biomass (organic matter that is available on a renewable or recurring basis) obtained...
The EPA calculates and establishes RVOs every year through rule making, based on the CAA volume requirements and projections of gasoline and diesel production for the coming year. The standards are converted into a percentage and obligated parties must demonstrate compliance annually. See Figure 1 for statutory RVO projections. As discussed earlier in the report, the EPA does not have authority to legislate. It is required to implement Congressional intent and the annual renewable volume obligations are set by statute. The only instances when the EPA can reduce RVOs from statutory levels are when there is lack of domestic supply or if there is a determination that the program is causing severe economic harm.

In 2015, the EPA reduced the RVO for corn based ethanol on the belief that a distribution infrastructure required to blend ethanol at a level greater than 10% of the gasoline consumption did not exist. As previously discussed, this is being challenged in court right now with oral arguments set for April 2017. The petitioners are industry groups representing ethanol and other biofuels, and they claim that the absence of a distribution network does not meet the two conditions when the EPA can use its waiver authority.

**Renewable Identification Numbers (RINs)**

RINs are the credits that obligated parties use to demonstrate compliance with the RFS. OPs are required to purchase renewable fuel or credits corresponding to gallons of renewable fuels in proportion to their RVOs to demonstrate compliance with the RFS. Obligated parties must obtain sufficient RINs for each fuel type in order to demonstrate compliance with the annual standard.

- A RIN is a virtual compliance product – a derivative of renewable fuel production.
- RINs are generated when a producer makes renewable fuel.
- Each RIN represents the energy equivalent of one gallon of ethanol or 77,000 BTUs.
- A RIN is separated from the physical fuel when the renewable fuel is used as transportation fuel or blended with fossil transportation fuel.
- Once separated from the physical fuel, RINs can be traded among various parties.

**Fuel Pathways & D Codes**

For a fuel to qualify as a renewable fuel under the RFS program, it must meet...
the following minimum requirements:

- It must be produced from renewable biomass.
- It must be used to replace or reduce the quantity of fossil fuel present in a transportation fuel
- It must have lifecycle greenhouse gas emissions that are at least 20 percent\(^1\) less than baseline lifecycle greenhouse gas emissions

EPA has approved fuel pathways under the RFS program under all four categories of renewable fuel. Advanced fuel pathways already approved include; ethanol made from sugarcane, jet fuel made from camelina, cellulosic ethanol made from corn stover, and compressed natural gas from municipal wastewater treatment facility digesters, manure digesters and landfills.

Figure 1 - Congressional volume target for renewable fuel

### Congressional Volume Target for Renewable Fuel

![Graph showing renewable fuel targets](image)

Each fuel pathway is assigned a “D code” – a code that identifies the renewable fuel type – based on the feedstock used, fuel type produced, energy inputs and GHG reduction thresholds, among other requirements. See Figure 2 below for lifecycle GHG reduction requirements for each D code.

The four categories of renewable fuel have the following assigned D codes. Each of these four “D code” fuel types have different values in the RINs market, based on legislation and annual target RVOs set by EPA for Obligated Parties.
- Cellulosic biofuel – D3 or D7
  - Cellulosic biofuel including biogas is D3 (Dane County’s BioCNG)
  - Cellulosic diesel is D7
- Biomass-based diesel is D4
- Advanced biofuel is D5
- Renewable fuel (non-advanced/conventional biofuel) is D6

Each D code RIN type has a minimum GHG reduction it must meet. A fuel with a higher GHG reduction threshold can be used to meet the compliance obligations of other fuel types with a lower GHG reduction threshold. For example, a D3 fuel from landfill gas (minimum 60% GHG reduction) can be used to meet the D4 or D5 (minimum 50% GHG reduction) RVO for an Obligated Party. Figure 3 below shows which RIN type and D-code can be used to demonstrate compliance with the four categories of fuel that together comprise an obligated parties’ renewable volume obligation (RVO).

**Figure 2 - The concept of “nested” compliance obligations**

![Fuel nesting scheme for Renewable Fuel Standard (RFS)](image)

**Biogas as a Cellulosic Fuel**

In the summer of 2014, the EPA classified renewable compressed natural gas (RCNG) made from biogas from landfills, agricultural digesters, municipal solid waste digesters and municipal wastewater treatment digesters as a cellulosic biofuel eligible to generate D3 under the RFS program. The Dane County landfill gas project would qualify as a cellulosic biofuel and be eligible to generate D3 RINs under current rules, and D3 RINs generally have a higher value relative to other RIN types. The higher value of D3 RINs is due to a somewhat arcane provision in the regulations known as the Cellulosic Waiver Credit.
Cellulosic Waiver Credits

When the RFS was promulgated, there was an emphasis on incentivizing fuel production from cellulosic materials (as opposed to starches and sugars) in order to disincentives competition for raw materials that can also be human or animal food. However, the availability of cellulosic biofuels was limited or non-existent in 2010 and seven years later, there is still only a limited supply of cellulosic fuels.

A compliance conflict was created by the unavailability of cellulosic fuels on a commercial scale and the existence of cellulosic standards. EPA addressed this using an additional flexibility is provided in the regulations that allows the EPA to reduce the required volume of cellulosic biofuels through waivers. Cellulosic waiver credits (CWC) are then offered by EPA at a price determined by a formula in the statute. Obligated parties have the option of purchasing CWCs in lieu of blending cellulosic biofuel or obtaining a cellulosic RIN. EPA has used this waiver provision and sold CWCs each year since 2010.

The price of a CWC is the greater of $0.25 or $3.00 minus the wholesale price of gasoline (most recent 12 months), where both the $0.25 and $3.00 are adjusted for inflation. Thus, the price of a CWC is inversely proportional to the average price of wholesale gasoline, the assumption being that if wholesale price of gasoline were to increase, then there will be greater incentive in the marketplace to commercialize alternative fuels without price supports. In the case of RCNG from landfill gas, an increase in the price of diesel would result in more truck fleets exploring natural gas engines. If the price of diesel was in the same range as a diesel gallon equivalent (DGE) of natural gas, then RIN prices would make natural gas fueling price competitive.

Table 1 illustrates the 2017 CWC price calculation for 2017. The wholesale price of gasoline for the previous 12 months from the calculation date was $1.423 and inflation factor from 2009 to 2016 was 1.142. In this example, the 2017 CWC could have been worth as low as $0.29 if wholesale gasoline prices for the previous 12 months were $3.13 or higher. Conversely, the CWC could have been as high as $3.00 if the wholesale gasoline prices for the previous 12 months were $0.42 or lower.

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13 https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?s=EMA_EPM0_PBR_NUS_DPG&f=M
14 For the 2017 calculation, EPA sets the inflation rate using the Unadjusted Index values from the Consumer Price Index for All Urban Consumers (CPI-U): U.S. City Average, for the All Items expenditure category as provided by the Bureau of Labor and Statistics, for the months of January 2009 (the first comparable value after 2008) and June 2016, as specified in 40 CFR 80.1456(d)(3).
Pricing a D3 RIN

Due to the nested nature of the compliance obligations and the availability of the CWC, the cellulosic fuel compliance requirement under the RFS is complicated. Obligated parties can either purchase a D3 RIN or purchase a CWC to fulfill their cellulosic biofuel compliance obligation. Due to the nested nature of the compliance obligations, RINs used to meet an obligated party’s cellulosic biofuel obligation are also counted towards their advanced biofuel and total renewable fuel obligations. CWCs, conversely, do not count towards an obligated party’s advanced biofuel or total renewable fuel obligations. If a company complies with their cellulosic biofuel obligation using CWCs, they must purchase sufficient RINs to fully satisfy their non-cellulosic biofuel obligations. The cost of obligation for 2017 is outlined in Table 2.

The floor price of a D3 RIN is always the D5 RIN price. If the market were to be flooded with D3 RINs, they would be fungible in value with D5s because D3 RINs can be used to fulfill D5 obligations. Similarly, the ceiling price is the sum of the D5 and the CWC. The sum is the total cost of compliance for an Obligated Party if they were to use an alternative compliance mechanism such as the CWC.

The size of the D3 market is small relative to other biofuel RVOs (see Table 3) and prices are typically confidential business information between the parties. However, informally available market information suggests that the actual

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15 Average D5 RIN price for 2017 is Year to date (3/27/2017). 90% of the ceiling price is assumed to be achieved when D3 RINs are traded.

16 For example, let’s say an OP has an advanced biofuel obligation of 5 RINs, and a cellulosic biofuel obligation of 2 RINs. The obligated party can comply by securing 2 D3 RINs and 3 D5 RINs. The D3 RINs can be counted towards meeting the cellulosic biofuel and advanced biofuel standards; D5 RINs can be
price of a D3 RIN has varied between the floor price and the ceiling as seen in intermittent real trades, with most trades commanding prices at the higher end of the range.

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<tr>
<th>Table 3 - Biofuel RVOs under the RFS</th>
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<tr>
<td>Cellulosic biofuel (million gallons)</td>
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<tr>
<td>Biomass-based diesel (billion gallons)</td>
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<tr>
<td>Advanced biofuel (billion gallons)</td>
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<tr>
<td>Corn Starch Ethanol Cap</td>
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<td>Renewable fuel (billion gallons)</td>
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Ultimately, the pricing of a D3 RIN is driven by the cellulosic RVO. Current trends in the biofuel sector show increasing availability of cellulosic biofuels primarily driven by corn kernel cellulosic ethanol technologies and RCNG from biogas. Major ethanol producers such as POET DSM, Pacific Ethanol, Little Sioux Corn Processors, and Flint Hills Resources are launching cellulosic biofuel strategies to take advantage of market opportunities. Many municipal wastewater treatment facilities such as City of Des Moines, Portland, Raleigh, St Louis, etc. are exploring or implementing biogas to RCNG projects.

- The floor price of a D3 RIN is always the D5 RIN price.
- Ultimately, the pricing of a D3 RIN is driven by the cellulosic RVO.
III. Other Renewable Fuel Programs
There are a number of renewable fuel incentive programs in place in states across the United States that are independent of the Renewable Fuel Standard. These programs range from blending incentive and state biofuel mandates to production or blending tax incentives and other credit markets similar to the RFS. Some of the most prominent programs are described below. These programs allow for renewable natural gas to be injected into the natural gas distribution grid anywhere in the 48 contiguous states to qualify as a renewable fuel supplier into their state. These regional programs offer a degree of diversification for project revenues.

Renewable fuel producers can claim credits from the federal Renewable Fuel Standard and the credits for state incentive programs, like the LCFS. A project may only claim credits in one state. If a project can be structured so as to qualify for regional and federal programs, then the risk to revenue from the instability of one incentive program is reduced. Dane County is uniquely positioned to take advantage of these regional programs because it has a national natural gas distribution line that bisects the landfill property.

**California LCFS**

In 2009 the California Air Resource Board (CARB) approved the Low Carbon Fuel Standard (LCFS) regulation to reduce the carbon intensity (CI) of transportation fuel used in California by at least 10% by 2020 relative to a 2010 baseline. The LCFS is a key measure to reduce greenhouse gas emissions and improve air quality in California. The LCFS sets annual maximum CI standards for all transportation fuels, which are lowered according to an annual schedule based on the replacement of diesel and gasoline. CI takes into account the GHG emissions associated with all of the steps of producing, transporting, and consuming a fuel—also known as a complete lifecycle analysis for that fuel. The LCFS is fuel-neutral, and lets the market determine which mix of fuels will be used to reach the program targets. Credits in the program have traded at averages values of $90-$93 per credit in January and February 2017, with a price range between $46 and $113 per credit. Example pricing scenarios are available in Appendix B.

AB 32 has been renewed and approved through 2030 and is going through a rule making process to determine the future GHG reduction for the LCFS program. A reduction of either 18% or 25% has been proposed and will be finalized in 2017. CARB has set a ceiling for credit prices at $200 per credit to prevent the program from being overly burdensome. The program is considered to be robust and demand is growing for renewable fuels that will meet the reduction goals of the program through 2030.
The LCFS requires CNG fuel to be used as transportation fuel in California in order to be eligible to generate credits. Due to the growth in the RNG sector for transportation use, the demand for natural gas fueling in California is approaching saturation point – i.e., all CNG consumed in California may soon be allocated to a biogas project. If the state were to become saturated, new biogas projects will have to find one or more fleets in California willing to convert from diesel to CNG and be their fueling partner in order to generate environmental credits. A saturation of the LCFS market will result in projects being shut out of the market or sharing a greater percentage of their revenues with fueling partners and gas marketers to gain a position in California.

**Oregon Clean Fuels Program**

The 2015 Oregon Legislature passed SB 324 allowing the Oregon Department of Environmental Quality (DEQ) to fully implement the Clean Fuels Program (CFP) in 2016. The rules for the program are adopted in Oregon Administrative Rules Chapter 340 Division 253 – as filed with the Secretary of State. The goal of the CFP is to reduce the average carbon intensity of Oregon’s transportation fuels by 10 percent over a 10-year period. DEQ has set a series of annual reduction targets to reach the overall goal between 2016 and 2025. Compliance with the annual targets is shown through quarterly reports submitted by Oregon producers and importers of gasoline, diesel, ethanol and biodiesel.

The administration of the OR CFP is very similar to that of California. At the end of the compliance period, a regulated party must have enough credits to balance out their deficits to be in compliance. A regulated party can generate their own credits by producing or importing renewable fuel.

The first compliance period is 2016 and 2017 and is in progress. Starting in 2018 regulated parties must comply yearly by the end of each calendar year. The program is being implemented. Credits were traded in November and December 2016, but the price for the credits is currently publicly withheld and is unknown.

**BC Renewable & Low Carbon Fuel Requirements Regulation**

The Renewable & Low Carbon Fuel Requirements Regulation is a GHG reduction program for British Columbia, Canada. Part 2 of the Regulation establishes renewable fuel content requirements for gasoline and diesel sold in British Columbia:

Fuel suppliers must ensure that they have a minimum renewable fuel content of five percent (5%) for gasoline and four percent (4%) for diesel, on a provincial
annual average basis. Fuel suppliers have the flexibility to vary their blend percentages and can choose where in the province they supply renewable fuel blends, as long as they meet the provincial annual average requirement for renewable fuel content.

Part 3 of the Act establishes low carbon fuel requirements for fuels sold in British Columbia. Fuel suppliers must progressively decrease the average carbon intensity of their fuels to achieve a 10% reduction in 2020 relative to 2010. Under the Regulation, fuel suppliers choose their own approach for compliance with Part 3 requirements. Fuel suppliers may choose to supply more low carbon fuels, acquire credits through a Part 3 Agreement, or trade credits with other suppliers.

The program is currently being implemented and credits are being traded. The average credit price was $171 Canadian (Approximately $126 US) as of December 31, 2016.

Note that RNG sold into Canadian markets will not qualify for RINs under the RFS, or any other US incentive programs.

**Pan-Canadian Carbon Pricing**

Canada is implementing a Pan-Canadian carbon pricing program to uniformly reduce GHG emissions across Canada. Renewable natural gas markets in Canada already benefit from a variety of GHG reduction programs in place, so the federal program is a clear signal for continued growth and opportunity. At the policy-making level, renewable fuel standards and carbon pricing at both the federal and provincial levels should increase demand and create incentive for RNG growth. On a related note, industry players including Canada’s natural gas utilities, RNG technology providers, feedstock suppliers, and other stakeholders have recently united to form the Canadian RNG Consortium to advocate for RNG policy.

On October 3, 2016, the Government of Canada announced a plan to implement a Pan-Canadian carbon pricing program. In past years, Canadian provinces led the way by instituting their own carbon pricing programs. British Columbia has had a revenue-neutral carbon tax since 2008 which reached its current rate of $30/tonne in 2012. In 2017, Alberta instituted hybrid carbon tax and cap and trade system. Quebec began a cap and trade program in 2013 which is linked with California’s carbon markets through the Western Climate Initiative (WCI) creating the largest carbon market in North America. The WCI is set to expand with the addition of Ontario’s cap and trade market in 2017 and eventually Manitoba as well. Under the planned Pan-Canadian carbon pricing, a minimum price of $10/tonne would be required across all provinces to increase by $10 a year until 2022. Provinces would be allowed the flexibility of utilizing a cap and trade, carbon tax, or hybrid system.
minimum price of $10/tonne would be required across all provinces to increase by $10 a year until 2022. Provinces would be allowed the flexibility of utilizing a cap and trade, carbon tax, or hybrid system.

The Canadian government is also planning to develop a Clean Fuel Standard under the Canadian Environmental Protection Act. The standard’s objective is to incentivize a broad range of lower carbon fuels and alternative energy sources, including renewable natural gas and would go beyond transportation fuels to include industry, home and building uses. A goal of 30 megatonnes of annual GHG emissions reductions and overall life-cycle carbon intensity reductions of 10-15% by 2030 are being considered. A Discussion Paper issued by Environment and Climate Change Canada on the new standard is open for comment until April 25, 2017 following which the ECCC will develop a draft regulatory framework for the standard. The figure below, provided by Advanced Biofuels Canada, gives a good breakdown of the renewable fuel standards currently in place at the provincial and federal levels.

Figure 3 - Provincial and Federal Renewable Fuel Mandates

![Provincial Mandates](image)

British Columbia adopted its own low carbon fuel standard in 2008 to decrease carbon intensity of fuels 15% by 2030. This low carbon fuel standard applies to all fuels used for transportation in British Columbia excepting that used by aircraft or for military operations. Suppliers comply with the standard by either reducing the carbon intensity of fuels they supply or by acquiring credits from another fuel supplier. British Columbia has also allowed natural gas utilities to
incentivize conversion to natural gas fleets in certain industries. In Ontario, the Climate Change Action Plan has earmarked $60-100 million dollars to support a renewable content requirement for natural gas in industrial, transportation, and buildings sectors.

In 2014, an RNG technology roadmap was developed by the Canadian Gas Association with the support of the Canadian government which recognized the potential for an RNG marketplace and the important role RNG can play in meeting Canada’s GHG reduction targets. Per estimates from a 2010 Alberta Innovates Technology Futures study, Canada’s RNG potential could offer 108 MT CO2/eq of GHG reductions. The natural gas utilities in Canada, recognizing this potential, committed to an aspirational target of displacing 5% RNG in their pipeline systems by 2025 and 10% by 2030 and provide nearly 500,000 km of already in place natural gas infrastructure.

Note that RNG sold into Canadian markets will not qualify for RINs under the RFS, or any other US incentive programs.

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IV. Reported Political Events
A review of political events over the past few months suggest an active campaign on the part of Midwestern Senators and Governors to protect the RFS. Below are quotes from Senators Joni Ernst and Chuck Grassley of Iowa and other sources in regards to this matter.

“In regards to RFS, it is imperative that the law is followed. I received assurances from Mr. Pruitt that he intends to do so, and I will hold him to that commitment. I was pleased to hear that President-elect Trump made it clear to Mr. Pruitt that he cares about the RFS. Mr. Pruitt told me in our meeting that the role of the EPA is to enforce the law as written by Congress, and not undermine the RFS.”
- Senator Joni Ernst (R-IA)

“We got a very positive response on Mr. Pruitt’s support not just for the RFS, but more importantly, for the rule of law. The rule of law is that what Congress passed, the EPA is supposed to follow and not undermine it, the way the current administration has done with the RFS,”
- Senator Chuck Grassley (R-IA)

“I also reinforced the need to implement a strong Renewable Fuel Standard as Congress intended, which is critical for farmers and energy producers across rural America.”
- Senator Heidi Heitkamp (D-SD)

“Rest assured that your President and this administration value the importance of renewable fuels to America’s economy and to our energy independence,” Trump wrote. “As I emphasized throughout my campaign, renewable fuels are essential to America’s energy strategy.”
- President Donald J. Trump

“It’s not the job of the administrator of the EPA to do anything other than administer the program according to the intent of Congress, and I commit to you to do so.”
- EPA Administrator Scott Pruitt in response to questions during his confirmation hearing about whether he would use his waiver authority to undermine statutory RVOs

Articles referenced for the above quotes may be found in Appendix C.

31 https://www.govtrack.us/congress/bills/statistics
V. Current Legislative Considerations
The following sections describe current legislative influences and processes related to the RFS, including pending legislation, the legislative review process completed by Congressional committees, and recent calls to alter the point of obligation.

Pending Legislation
As detailed below, there are currently three bills in Congress to alter or repeal the RFS. However, the prognosis of these bills becoming law are quite low. It is a statistical fact that most bills never become law. Over the past 20 years (105th Congress – 114th Congress), only 4% of bills introduced have become law. A staggering 83% of bills and resolutions that were introduced, referred to committee, or reported by committee had no further action taken on them.

As mentioned earlier, ethanol and biodiesel production are important drivers of the rural economy. U.S. net farm income is forecast to fall for the fourth consecutive year in 2017 according to the USDA. In this context, there is very little political will to further upset the rural economy by repealing a known and established law that creates stable markets for corn and soybeans. Although there are bills introduced in Congress, the likelihood of these bills finding their way out of committee, getting sufficient votes in both houses of Congress and becoming law is very slim. Table 3, below outlines bills that would impact the RFS.

<table>
<thead>
<tr>
<th>Bill Name</th>
<th>Description</th>
<th>Date</th>
<th>Sponsor</th>
<th>Bill Status</th>
<th>Current Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>H.R. 1314: Renewable Fuel Standard Elimination Act</td>
<td>To repeal the renewable fuel program of the Environmental Protection Agency.</td>
<td>3/2/17</td>
<td>Rep. Bob Goodlatte (R-VA)</td>
<td>Referred to Committee on Mar 2, 2017</td>
<td>2% chance of being enacted according to PredictGov</td>
</tr>
<tr>
<td>H.R. 1315: RFS Reform Act of 2017</td>
<td>To amend the Clean Air Act to eliminate certain requirements under the renewable fuel program, to prohibit the Administrator of the Environmental Protection Agency from approving the introduction into commerce of gasoline that contains greater than 10-volume-percent ethanol, and for other purposes.</td>
<td>3/2/17</td>
<td>Rep. Bob Goodlatte (R-VA)</td>
<td>Referred to Committee on Mar 2, 2017</td>
<td>2% chance of being enacted according to PredictGov</td>
</tr>
<tr>
<td>H.R. 776:</td>
<td>To require that until a comprehensive study is completed, the volume of cellulosic biofuel mandated under the renewable fuel program be limited to what is commercially available, and for other purposes.</td>
<td>1/31/17</td>
<td>Rep. James Sensenbrenner (R-WI)</td>
<td>Referred to Committee on Jan 31, 2017</td>
<td>3% chance of being enacted according to PredictGov</td>
</tr>
</tbody>
</table>

Committee Legislative Review Process
Legislation in Congress is referred to a committee after introduction according
to its subject matter. RFS reform or amendment could be referred to various committees, depending on the nature of the reform or the grounds for repeal and who is proposing it. Committees that may review such a bill include Committees on Agriculture, Nutrition, and Forestry; Commerce, Science, and Transportation; Energy and Natural Resources; Environment and Public Works; etc. Members of these committees represent a wide range of constituents and provide a diverse set of viewpoints.

For example, the membership of the EPA committee which oversees the EPA include Senators Barrasso (R-WY) and Inhofe (R-OK), who have agitated against the RFS in the past, to Senators Fischer (R-NE) and Ernst (R-IA) who have consistently fought for a strong RFS.

<table>
<thead>
<tr>
<th>Majority</th>
<th>Minority</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Barrasso (Chairman)</td>
<td>Thomas R. Carper (Ranking Member)</td>
</tr>
<tr>
<td>James M. Inhofe</td>
<td>Benjamin L. Cardin</td>
</tr>
<tr>
<td>Shelley Moore Capito</td>
<td>Bernard Sanders</td>
</tr>
<tr>
<td>John Boozman</td>
<td>Sheldon Whitehouse</td>
</tr>
<tr>
<td>Roger F. Wicker</td>
<td>Jeff Merkley</td>
</tr>
<tr>
<td>Deb Fischer</td>
<td>Kirsten Gillibrand</td>
</tr>
<tr>
<td>Jerry Moran</td>
<td>Cory A. Booker</td>
</tr>
<tr>
<td>Mike Rounds</td>
<td>Edward Markey</td>
</tr>
<tr>
<td>Joni Ernst</td>
<td>Tammy Duckworth</td>
</tr>
<tr>
<td>Dan Sullivan</td>
<td>Kamala Harris</td>
</tr>
<tr>
<td>Richard Shelby</td>
<td></td>
</tr>
</tbody>
</table>

**Table 5 - Senate Committee Environment and Public Works**

**Potential Point of Obligation Change**

A potential change that has been much discussed in 2017 is a potential change in the Point of Obligation for the RFS program. Some refiners and importers would like to move their legal obligations under the RFS on to downstream entities who blend and retail the fuel. This effort is primarily led by Mr. Carl Icahn who owns refining assets, and other merchant refiners who do not have the ability to physically blend and acquire RINs and Valero. EPA has received several petitions requesting that EPA initiate a rulemaking process to reconsider or change the regulations to move the point of obligation. On November 10, 2016, EPA proposed to deny all of the petitions requesting the agency redefine the point of obligation under the RFS. The comment period for this proposed change closed on February 22, 2017. Currently, there is no timeline for the final ruling. It is unclear what the new administration will ultimately decide on this issue. Mr. Icahn role as a
special advisor to the president is perceived by some as giving his position an advantage. However, there are many entities opposed to the change, including Growth Energy and the American Petroleum Institute (API), the national trade association representing the oil and natural gas industry, whose membership includes most of the currently obligated parties.

In the discussion document leading to the denial of the petitions, EPA wrote that “[EPA] do not anticipate a benefit from changing the point of obligation... [and EPA] do believe that such a change would significantly increase the complexity of the RFS program, which could negatively impact its effectiveness.” Changing the point of obligation could cause restructuring of the fuels marketplace as newly obligated parties alter their business practices to purchase fuel under contract. The universe of obligated parties could increase exponentially and could make program management correspondingly difficult, especially if budget cuts and staffing cuts are implemented.

In the discussion document, the EPA also admits it is unclear whether it has the authority to make this change to the regulations. “It is unclear whether EPA has statutory authority to place the point of obligation on position holders who are not in fact refiners, importers, or blenders.” Some trade associations such as the National Biodiesel Board have focused on this lack of authority to maintain the point of obligation where it is.

It is unlikely that a change in the point of obligation, even if it were to be effected, will have any impact on RIN markets in the short run. A change in the rules could be met with legal challenges and may prevent its implementation. The impact on RINs in the long run from an altered point of obligation is unknown at this point.

VI. Survey of Industry Opinion on the Future of the RFS
EcoEngineers hired the Longview Group to conduct a formal survey of key industry leaders around the issue of RFS reform or repeal. Respondents were asked to rate the probability of certain events happening during the terms of the 115th Congress and the 116th Congress. The sample surveyed included congressional staffers, ethanol, biodiesel and biogas industry leaders, association heads and political consultants. A scale of 0-5 was used, where 0 indicates an event being the least probable and 5 indicates it as being highly probable. Full survey results are provided in Appendix A. Summary results are provided below. The weighted average scores are the sum-product of the number of people who picked an answer and the answer they picked divided by the total number of respondents.

Most people surveyed admitted that there was a greater degree of unpredictability around the RFS program with the election of President Donald J. Trump. However, their responses to the probability of events happening that will negatively impact the RFS was fairly consistent. There was almost unanimous agreement that a repeal of the RFS is very unlikely.

There was some agreement that we may see some amendments to the RFS by 2020. However, some respondents added that they consider the annual RVO set by the EPA as an annual amendment and budgets cuts that impact implementation as also potential amendments. See Table 4, below for results of the survey.

<table>
<thead>
<tr>
<th>Event</th>
<th>Least Probable</th>
<th>Highly Probable</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFS Repeal by Dec 31, 2018</td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td>RFS Amended by Dec 31, 2018</td>
<td>1.73</td>
<td></td>
</tr>
<tr>
<td>RFS Repeal by Dec 31, 2020</td>
<td>0.82</td>
<td></td>
</tr>
<tr>
<td>RFS Amended by Dec 31, 2020</td>
<td>2.36</td>
<td></td>
</tr>
</tbody>
</table>

The survey further inquired into the probability of specific aspects of the RFS that could be amended, and the results are shown below in Table 5.

- There was almost unanimous agreement that a repeal of the RFS is very unlikely.
- Due to the nested nature of the obligations D3 RINs will always be at least as valuable as a D5 since they can be used to meet the D5 obligation.
Table 7 - Weighted probability of RFS amendments from survey of key industry leaders

<table>
<thead>
<tr>
<th>Amendment</th>
<th>Least Probable</th>
<th>Highly Probable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing the point of obligation</td>
<td></td>
<td>2.44</td>
</tr>
<tr>
<td>Setting a cap on the ethanol RVOs</td>
<td></td>
<td>2.00</td>
</tr>
<tr>
<td>Setting a cap on the biomass based diesel RVOs</td>
<td></td>
<td>1.78</td>
</tr>
<tr>
<td>Reducing or eliminating the cellulosic RVO</td>
<td></td>
<td>2.27</td>
</tr>
<tr>
<td>Elimination of cellulosic waiver credit</td>
<td></td>
<td>1.36</td>
</tr>
<tr>
<td>Reducing or eliminating the advanced biofuel RVO</td>
<td></td>
<td>1.64</td>
</tr>
</tbody>
</table>

Although changing the point of obligation and lowering the cellulosic RVO are perceived as having a relatively higher probability of occurrence with a cap on ethanol RVO close behind them, they still failed to reach the range of being probable. This is consistent with the theory that it is challenging to muster enough support to reach broad consensus and implement an amendment to the RFS. However, there is a greater probability of this occurring than a repeal. A change in the point of obligation was discussed in the previous section and it should not have an impact on the D3 obligation or RIN prices in the short run.

The cellulosic RVO has been lowered by the EPA each year since the inception of the RFS, and, in that context, it is not surprising that survey respondents believe the cellulosic RVO will be lowered in the coming years. The statutory standard for cellulosic biofuels as currently set in the rule is 5.5 billion gallons for 2017 and it peaks at 16 billion gallons in 2022. Most people in the industry agree that it is unattainable. EPA sets the annual cellulosic target based on its estimate of cellulosic biofuel production for the year. In a 2013 court ruling, the D.C. Circuit Court ruled that EPA cannot set its blending projections artificially high in order to promote growth in the cellulosic biofuel industry. The court requires EPA to use a “neutral methodology” to project actual biofuel production and base the annual standard on those projections.

The cellulosic RVO is set by the EPA from production estimates it develops by polling industry associations. In a worst-case scenario, EPA would lower the cellulosic RVO below actual production. If supply exceeded demand, it would devalue D3 RINs. However, due to the nested nature of the obligations D3 RINs
will always be at least as valuable as a D5 since they can be used to meet the D5 obligation.

The survey further inquired into the impact specific areas of government would have on the RFS and the results are below. The EPA administrator, Mr. Scott Pruitt, is perceived as having greater influence over the RFS than Congress or other members of the administration. However, Mr. Pruitt was still not perceived as a threat except to the extent that his ability to cut the EPA’s budget would negatively impact RFS implementation. Mr. Pruitt has not indicated he will do anything to scale back the RFS. As discussed earlier, his comments on climate change primarily focus on rolling back the prior administration’s efforts to decommission coal powered power generation and participate in international climate treaties. His comments regarding his views on using the waiver authority suggests he will follow the “rule of the law” and implement Congressional intent. “It’s not the job of the administrator of the EPA to do anything other than administer the program according to the intent of Congress, and I commit to you to do so,” he stated when questioned on this subject during his confirmation hearings. However, a “worst case” scenario of Mr. Pruitt’s actions would be the reduction of the cellulosic standard below production levels, which would devalue D3 RINs to D5 levels. Table 6, below outlines the results of the survey.

| Table 8 - Weighted probability of key sections of the government adversely impacting the RFS |
|-----------------------------------------------|-----------------------------------------------|
| Least Probable | Highly Probable |
| 0 | 1 | 2 | 3 | 4 | 5 |
| What is the likelihood that the next EPA Administrator will adversely impact the implementation of the RFS as it is? | 2.18 |
| What is the likelihood that the 115th Congress will adversely impact the implementation of the RFS as it is? | 1.27 |
| What is the likelihood that the White House and the Trump administration will adversely impact the implementation of the RFS as it is? | 1.64 |

Some specific comments collected during the survey that add some qualitative color to the survey results are as follows:
- If you mean amended means administrative amendment, there is a capacity for annual changes which is an automatic amendment.
- If Trump and Congress fails to provide funds for EPA to administer
this, things could change dramatically. Funding going away can be an amendment.

- Most vulnerable area is reduction in budget.
- Given the Republican majority in Congress, there is an opportunity to increase support for renewable fuels – Midwest and South who voted for Trump have influence to make situation sweeter for renewable fuels.
- Who knows what will happen?
VII. RIN Pricing Analysis
RIN prices between September 2016 and March 2nd 2017 are shown in Figure 4. Also included is the range for D3 RINs using the cap price of D5 + CWC credits and the floor of D5 RIN price. The RIN market is subject to political uncertainty and RIN prices can be significantly affected in the short term due to political events and rumors (Table 9). Conversely, RIN prices also include perceptions of future market movements and can be a useful indicator of how the market perceives the future of the RFS. RIN fundamentals still follow economic principles of supply and demand and this is explained below in brief.

**Figure 4 - RIN pricing March 2015 – March 23, 2017 with Events**

![Graph showing RIN pricing March 2015 – March 23, 2017 with Events]

Table 9 - Political events and rumors that have impacted RIN prices over the past 6 months

<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Donald Trump becomes President of the United States</td>
</tr>
<tr>
<td>2</td>
<td>EPA sets 2017 RVOs and the D6 RVO is higher than expected</td>
</tr>
<tr>
<td>3</td>
<td>President Trump orders a freeze and review of all regulations passed in the last 90 days of previous administration, which includes the 2017 RVOs</td>
</tr>
<tr>
<td>4</td>
<td>Rumors of possible change in point of obligation</td>
</tr>
<tr>
<td>5</td>
<td>60 Day Trump Administration regulatory freeze ends with 2017 RVO unchanged</td>
</tr>
</tbody>
</table>

RIN prices are driven by normal supply-demand fundamentals. The demand is set by the annual RVO, which is set by the EPA. And supply is from renewable fuel production. In the case of D3 the production is from biogas to CNG projects and cellulosic ethanol production. RIN prices are quoted by the D code of the RIN. Political events that impact the RVO affect future demand for the RIN and RIN prices.
As mentioned earlier, due to the nested nature of compliance obligations, D3 and D5 RINs can be used to meet the compliance obligations for all fuel types. RINs for advanced biofuels such as biogas and/or biodiesel can be used to meet the total renewable fuel standards typically met by corn starch ethanol. Therefore, D3 RINs should have a higher value than D5 and D5 should have a higher value than a D6 RIN, which represents a gallon of corn ethanol. However, through all of 2015-16, D6 RINs saw price parity with the advanced biofuel RINs.

The reason for the higher value of D6 RINs was due to the ethanol standard being set at a level higher than what is possible to achieve by physically blending 10% ethanol into the nation’s gasoline supply. The marginal cost of the D6 RINs, when it is not available, is the cost of the D5 RINs. The price of the D5 is dependent on the economics of producing and blending biodiesel into the nation’s diesel supply. This has hovered below the $1.00 mark for most of the previous 24 months and has led the price for the D5 and D6 RINs.

The graph in Figure 4 follows predictable patterns. The small dip in RIN prices in November 2016 followed the election of President Trump and a swirl of rumors on the potential for regulatory reform. However, on November 23rd 2016, the EPA finalized the 2017 RVOs and they were more aggressive than expected and set the 2017 D6 RVO at 15 billion gallons – clearly outside the physical blending capacity available in the country. This led to a precipitous rally of RIN prices with D5s touching $1.20 briefly. Subsequently, RIN markets settled back and closed the year at levels where they had been trending all of 2016 as the transition team prepared to take office and Mr. Carl Icahn was appointed as a special advisor to the White House. Mr. Icahn is an owner of refining interests and a known opponent of the RFS.

Since the beginning of 2017, we have been seeing a de-coupling of D6 and D5 prices. This can mostly be attributed to a visible strategy on the part of some oil industry representatives such as Mr. Icahn to target the ethanol obligation which is the biggest cost burden on his business interests. The appointment of Mr. Pruitt and President Trump’s freeze and review of all pending EPA regulations as he took office has led to some speculation that the 2017 ethanol RVOs could be rolled back to more manageable levels. This has resulted in D6 RINs losing 40% of their value relative to D5 RINs in a span of 60 days. This cycle has also witnessed sudden shocks such as a leaked report (subsequently declared false) that the President was going to issue an executive order changing the point of RFS obligation which saw RIN prices drop rapidly the first few days of March.
From the above brief analysis, the complexity and volatility of RIN markets are primarily driven by perceptions of supply and demand, which are driven by perceptions about the stability of the RFS. Current pricing does not suggest a radical departure from perceptions over the past 24 months for D5 RINs. In the first 3 months of 2017, D6 RINs have decoupled from D5 RINs, which suggests that the ethanol mandate may be perceived as less secure relative to the other RVOs. However, with the power of the corn lobby behind it, the ethanol RVO is well-defended. Therefore, we are seeing buyers hedge their bets and pay up to 40% of a D5 RIN value for a D6 RIN.

An analysis of RIN prices over the past 3 months suggests that the RFS will continue to place a demand on D5 RINs with D6 RINs potentially hovering right above the physical blend wall. D3 RINs are largely shielded from market fluctuations due to the smaller size of the pool and their value depending on the cellulosic waiver credits. If the D3 RVOs were to be set below production estimates, then the floor price of a D3 RIN would be the D5 RIN. If the entire advanced biofuel RVO were to be set below production estimates, then the D5 RIN price will fall to a D6 level.

---

6 All impacts are expressed in 2015 dollars.
7 Earnings include wages, salaries, and self-employment income.
VIII. Economic Analysis
As part of the risk analysis, we modeled a baseline scenario and a high and a low scenario to provide some guidance on future earnings. The various commodities that are being produced include environmental attributes and the various assumed value of these are provided in Appendix B. The results are provided below:

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>LOW</th>
<th>MEDIUM</th>
<th>HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas</td>
<td>$593,928</td>
<td>$1,205,080</td>
<td>$1,781,784</td>
</tr>
<tr>
<td>RINS</td>
<td>$1,737,239</td>
<td>$8,224,670</td>
<td>$14,332,225</td>
</tr>
<tr>
<td>LCFS</td>
<td>$2,190,000</td>
<td>$4,197,500</td>
<td>$8,212,500</td>
</tr>
<tr>
<td>Subtotal</td>
<td>$6,349,723</td>
<td>$13,957,222</td>
<td>$24,326,509</td>
</tr>
<tr>
<td>Credit share with gas marketer</td>
<td>$(2,222,403)</td>
<td>$(3,489,305)</td>
<td>$(2,432,651)</td>
</tr>
<tr>
<td>Gross Revenue</td>
<td>$4,127,320</td>
<td>$10,467,916</td>
<td>$21,893,858</td>
</tr>
</tbody>
</table>

In the interest of simplicity, we assumed that the bundling of RFS and LCFS credits represents all possible credit programs. Also, the credit share with a marketer will be the cost of acquiring a fueling partner. At a low end this was assumed to be 40% of the total revenue and 10% under the highly profitable scenario. In the above analysis, the D3 RIN value is a major driver of the project. At the low end, if D3 RINs fail to secure a premium value, we assumed they would minimally retain the D5 value. At the high end, they aggregate the D5 value and the price of a CWC.
IX. Conclusion
Pipeline injection is the most viable option for landfill gas under current policy. Pipeline injection provides the project with the flexibility to diversify their revenue sources and generate environmental attributes that can be sold into multiple carbon marketplaces. The injection allows for the participation in multiple regional marketplaces in addition to the federal incentive programs.

The financial incentives for stacking environmental credits and the ability to sell into multiple marketplaces has strong economic potential and could greatly benefit Dane County.
# Appendix A: Survey Results

February/March 2017 Renewable Fuels Telephone Interview Study

## PARTICIPANTS IN THE STUDY
The following persons responded to the study survey. All participants preferred all the responses remain anonymous.

<table>
<thead>
<tr>
<th>IOWA BASED</th>
<th>CONGRESSIONAL BASED</th>
<th>NATIONAL BASED</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 REDACTED Corn</td>
<td>4 REDACTED House of Representatives</td>
<td>6 REDACTED Biogas Association</td>
<td>11 Eric Dvorak Biogas Producer</td>
</tr>
<tr>
<td>2 REDACTED Biodiesel</td>
<td>5 REDACTED Senate</td>
<td>7 REDACTED Biogas Marketer</td>
<td></td>
</tr>
<tr>
<td>3 REDACTED Political Consultant</td>
<td></td>
<td>8 REDACTED Biogas Association</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 REDACTED Biodiesel Association</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 REDACTED Biogas Association</td>
<td></td>
</tr>
</tbody>
</table>

The Longview Group, LLC  
3 Longview Knoll  Iowa City, IA 52240  |  P.O. Box 2068  Zephyrhills, FL 33536  
319-321-6226
### Appendix B: Economic Assumptions

<table>
<thead>
<tr>
<th></th>
<th>LOW</th>
<th>MEDIUM</th>
<th>HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gas Production</strong></td>
<td>SCFM</td>
<td>1300</td>
<td>1400</td>
</tr>
<tr>
<td><strong>Methane Content</strong></td>
<td>BTUs/CF</td>
<td>565</td>
<td>565</td>
</tr>
<tr>
<td><strong>Gas Production</strong></td>
<td>MMBtus/day</td>
<td>1,058</td>
<td>1,139</td>
</tr>
<tr>
<td><strong>Natural gas value</strong></td>
<td>/MMBtu</td>
<td>$2.00</td>
<td>$3.00</td>
</tr>
<tr>
<td><strong>Potential Gas revenues</strong> /day</td>
<td>$2,115</td>
<td>$3,417</td>
<td>$4,882</td>
</tr>
<tr>
<td><strong>RINs/MMBtu</strong></td>
<td></td>
<td>11.7</td>
<td>11.7</td>
</tr>
<tr>
<td><strong>RIN value</strong></td>
<td>/RIN</td>
<td>$0.75</td>
<td>$1.75</td>
</tr>
<tr>
<td><strong>Potential RIN revenues</strong> /day</td>
<td>$9,281</td>
<td>$23,322</td>
<td>$39,266</td>
</tr>
<tr>
<td><strong>LCFS CI</strong></td>
<td>gCO2e/MJ</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td><strong>Daily credit generation</strong></td>
<td>MT</td>
<td>100</td>
<td>115</td>
</tr>
<tr>
<td><strong>LCFS credit value</strong></td>
<td>/MT</td>
<td>$60.00</td>
<td>$100.00</td>
</tr>
<tr>
<td><strong>Potential LCFS revenues</strong> /day</td>
<td>$6,000</td>
<td>$11,500</td>
<td>$19,500</td>
</tr>
<tr>
<td><strong>Downstream credit share</strong></td>
<td></td>
<td>35%</td>
<td>25%</td>
</tr>
</tbody>
</table>
Appendix C

Select political headlines are provided here as qualitative data on the future of the RFS and as background to industry opinions.

**Biofuels: Trump Picks Stir Unease**

DECEMBER 22, 2016, BY O. KEITH GOOD

https://farpolicynews.illinois.edu/2016/12/biofuels-trump-picks-stir-unease/

**Branstad says Trump assures EPA chief will be pro-ethanol**

JANUARY 3, 2017, BY O. KAY HENDERSON

http://www.radioiowa.com/2017/01/03/branstad-says-trump-assures-epa-chief-will-be-pro-ethanol/

**AFPM petitions EPA to waive portion of 2016 cellulosic RVO**

JANUARY 04, 2017, BY ERIN VOEGELE


**Nebraska, Iowa senators have 'positive meeting' with EPA nominee Scott Pruitt**

JAN 6, 2017, BY JOSEPH MORTON


**RFS Change Unlikely Under Trump**

JANUARY 12, 2017, BY PAUL NIZNIK


**Trump Reaffirms Ethanol Support Amid Its Fight With Icahn**

FEBRUARY 21, 2017, BY MARIO PARKER


**Merchant refiners spent $2.4 billion in RINs in 2016**

MARCH 7, 2017, MEGHAN SAPP

Trump Adviser Carl Icahn Lobbies for Rule Change That Benefits Icahn

MARCH 16, 2017, BY ZACHARY MIDER AND JENNIFER A DLOUHY

EcoEngineers guides energy companies through the maze of clean energy regulations and improves their bottom line by ensuring access to fuel and carbon markets.

Our core strengths are audit, compliance management and consulting services. We combine these strengths to support projects that promote energy recovery and reuse.