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Preface

Please DO NOT DISTRIBUTE the content of this NREL analysis report outside NREL, ORNL, INL, or DOE.

Please EXERCISE CAUTION when using contents from this report. The Renewable Identification Number (RIN) regulatory environment is rapidly evolving and this report's content may become out of date. Also, some external reviewers consider the topic of the RIN market, and therefore, this report to be highly "sensitive." This report is primarily based on a review of publicly available data and literature, but includes some original analysis. External reviewers expressed concerns that these data sources do not capture a 'well-balanced' perspective of the RIN market due to the limitation of published research.

Report Update - Major RIN Market Developments starting in 2014 and through July 2015

The analysis scope of this report includes literature through the first few months of 2014. In 2014 several major RIN market-related developments occurred. These developments are impacting or will potentially affect the RIN regulatory environment. This section updates this report by noting major developments.

In 2014 EPA approved several new fuels pathways for generating cellulosic biofuel RINs. These pathways include those producing biogas for mixing with natural gas (at <75%) for liquefied natural gas (LNG) and compressed natural gas (CNG). Biogas-related fuel systems have generated over 15 million cellulosic biofuel RINs since this policy change in July.¹ Prior to the policy change biogas was classified as an advanced biofuel.

Recent developments related to biogas have important future implications for cellulosic biofuel RIN market prices. EPA is required to permanently reduce the cellulosic biofuel mandate in 2016 based on conditions in legislation as described in Section 1.2.4.4 of this report. Wavier credits currently driving cellulosic biofuel RIN market prices would no longer be available if EPA reduces the mandate below the RFS EPA sets for 2016.

In November 2014, the EPA announced it would delay setting a 2014 RFS (as required by legislation) until 2015.² In August 2014 EPA extended the compliance deadlines for the 2013 RFS until the publication of the final rule establishing the 2014 RFS.³

In April 2015 the EPA reached a proposed consent decree in litigation brought against the EPA by the American Petroleum Institute (API) and American Fuel and Petrochemical Manufacturers (AFPM) for EPA's non-compliance with its nondiscretionary obligation under the Clean Air Act to issue Renewable Fuel Standards. The decree established a timeline for issuing Renewable Fuel Standards for 2014 and 2015. The decree stated the EPA would propose volumetric requirements for 2015 by June 1, 2015 and would finalize volumetric requirements for 2014 and 2015 as well

¹ <http://www.epa.gov/otaq/fuels/rfsdata/2014emts.htm>

² <http://www.epa.gov/otaq/fuels/renewablefuels/regulations.htm>

³ <http://www.epa.gov/otaq/fuels/renewablefuels/regulations.htm>

as resolve a pending waiver petition put forth by API and AFPM for 2014 by November 30, 2015.⁴⁵ In addition, the EPA stated that outside of the scope of the decree, they committed to proposing and finalizing the 2016 RFS and the biomass-based diesel volume requirements for 2017 within the same June 1 and November 30, 2015 timeframes.⁶

In May 2015 the EPA released the proposed volumetric requirements for 2014, 2015, 2016 for cellulosic biofuel, biomass-based diesel, advanced biofuel, and total renewable fuel, along with the 2017 requirements for biomass-based diesel.⁷ Similar to the original 2014 proposed rule (see section 1.3.4), the EPA is proposing to use its general waiver authority because of an “inadequate domestic supply” (see section 1.2.4.1) along with its cellulosic biofuel waiver authority (see section 1.2.4.2) to lower annual volumes below the statutory levels set by Congress in the Energy Independence and Security Act of 2007 (EISA 2007) (Pub. L. 110-140).⁸ The EPA’s use of these two waiver authorities is meant to address two constraints:

1. Limitations in the volume of ethanol than can be consumed given the constraints on the supply of higher ethanol blends to the vehicles that can use them (i.e., the blend wall).
2. Limitations in the ability to produce sufficient volumes of qualifying renewable fuel, particularly non-ethanol fuels.⁹

Of note, for 2014 the EPA is proposing to set the volumetric requirements at the levels that were actually used as transportation fuel, heating oil or jet fuel in the contiguous U.S. and Hawaii.¹⁰

1.1 Overview

*Please **EXERCISE EXTREME CAUTION** when using the contents of this report (highlighted in light grey). The report is primarily based on publicly available documentation of the law, rules, court cases, and published legal analysis. However, some external reviewers expressed disagreement with the interpretations cited or presented in this section.*

In 2005, the U.S. Congress passed the Energy Policy Act of 2005 (EPAct 2005), which amended the Clean Air Act (CAA) (42 USCS § 7401 et seq.) establishing the Renewable Fuel Standard (RFS1) and the first U.S. renewable fuel volumetric mandate. Building upon the RFS1, in 2007, the U.S. Congress passed the Energy Independence and Security Act of 2007 (EISA) (Pub. L. 110-140), establishing the Renewable Fuel Standard 2 (RFS2).

⁴ <http://www.epa.gov/otaq/fuels/renewablefuels/regulations.htm>

⁵ <http://www.epa.gov/otaq/fuels/renewablefuels/documents/consent-decree-proposed-2015-04-10.pdf>

⁶ <http://www.epa.gov/otaq/fuels/renewablefuels/regulations.htm>

⁷ <http://www.epa.gov/otaq/fuels/renewablefuels/regulations.htm>

⁸ <http://www.epa.gov/otaq/fuels/renewablefuels/documents/420f15028.pdf>

⁹ <http://www.epa.gov/otaq/fuels/renewablefuels/documents/420f15028.pdf>

¹⁰ <http://www.epa.gov/otaq/fuels/renewablefuels/documents/420f15028.pdf>

EISA again amended the CAA¹¹ to require the U.S. Environmental Protection Agency (EPA) to promulgate rules mandating further volumetric targets for several new biofuel categories. This RFS2 program increased the volume of renewable fuels required under the RFS1 program, included diesel fuel substitutes in addition to gasoline, and established new categories of renewable fuel, each with separate annual volumetric mandates (“Renewable Fuel Standard” 2013). EISA also amended the CAA to require the creation of a trading market for credits generated through biofuel production.

In 2011, the EPA implemented rules in furtherance of the RFS2 program, a credit trading system, along with biofuel volumetric mandates. The RFS2 program establishes specific volumetric requirements for four overlapping or “nested” categories of biofuels: renewable, advanced, biomass-based, and cellulosic. Compliance with these requirements is tracked through renewable identification numbers (RIN), which are numbers that are used to identify specific fuel volumes. The RIN market is complex compared to other credit trading systems with a separate category of credits for each of the four biofuel categories. Other trading systems often have a single category of tradable permit.

Recent developments and the future prospects for biofuels under the RFS reflect the combined influence of three domains: technological progress related to biofuel production and distribution; market developments in fuel prices, supply and demand for the fuels; and the evolving influence of set of fairly complex regulations and applicable laws.

This paper seeks to better-summarize and characterize the factors in the third, regulatory-legal domain. The future of the RFS2 program (and the RIN credit market) will be determined largely by the extent of the EPA’s authority and exercise of their authority under the RFS2 program, and related Congressional action that could change that authority. Legal challenges have both constrained and more clearly established the EPA’s authority: *see American Petroleum Institute (API) v. EPA* (discussed in section 1.3 below), where the D.C. Circuit vacated the EPA’s 2012 cellulosic biofuel projection, forcing the EPA to use an “outcome-neutral” methodology.

The RFS2 program (and RIN credit market) may also be impacted by legislation amending the program. For example, under proposed legislation, the RFS2 program could be amended to require the EPA to reduce renewable fuel and advanced biofuel mandated volumes when it reduces those volumes for cellulosic biofuel; prohibits the EPA from raising allowable ethanol content of gasoline above 10%; or otherwise modify it to reduce, repeal, or phase out the RFS2 program altogether.

This article addresses the major aspects of the RFS2 program, including:

- The statutory framework of the RFS2 program and associated EPA regulations in furtherance of the RFS2 program;
- The EPA’s authority under the RFS2 program and the limitations of its authority under principles of administrative law;
- The EPA’s proposed 2014 Standards for the RFS2 program; and

¹¹ For clarity, this article refers to the authority of the RFS2 program as EISA instead of the CAA.

- Proposed legislation to amend the RFS2 program.

This paper also includes a discussion of several of the above aspects of the RFS2 program within the context of biofuel related technological and market forces.

The legal and regulatory issues are also responding to the rate of new fuel technology development and the market forces of changing fuel supply, distribution infrastructure, and demand. A better understanding of the legal-regulatory context for the RFS helps to inform any market analysis, and it indicates how that legal-regulatory system might change under market pressures.

1.2 The RFS2 Program and EPA Regulations

Section 1.2 provides information on the statutory framework of the RFS2 program as enacted through EISA and the EPA's regulations found in 40 CFR § 80.1400 et seq. necessary for subsequent discussion of the legal and regulatory context of the RIN market. The statutory framework and EPA regulations cover a large breadth of topics including EPA's authority and process for establishing the fuel volume requirements, setup of the RIN market, and exceptions to the RFS program.

1.2.1 Legal and Regulatory Definitions

Appendix A defines key terms found within EISA and the EPA's regulations, including biofuel categories, regulated entities under the RFS2 program, and other aspects of the RIN market system.

1.2.2 Volumes of Renewable Fuels

EISA requires the EPA to promulgate regulations to ensure that gasoline sold or introduced into commerce in the United States contains the applicable required volume of biofuels on an annual basis (42 USCS § 7545 (o)(2)(A)(i)). In addition, EISA requires the EPA to revise regulations to ensure that this transportation fuel contains at least the applicable specified volumetric mandates of total renewable fuel (D6)¹², advanced biofuel (D5), cellulosic biofuel (D3), and biomass-based diesel (D4) as shown in Figure 1.1 (42 USCS § 7545 (o)(2)(A)(i)). EPA regulations contain compliance provisions applicable to refineries, blenders, distributors, exporters, and importers.

The categories of biofuels are “nested” (see Figure 1.1) with biomass-based diesel (D4) and cellulosic biofuel (D3) counting towards the required volume of advanced biofuel (D5), and the required volume of advanced biofuel (D5) counting towards the required volume of total renewable fuel (D6 (42 USCS § 7545 (o)(2)(B)) (42 USCS § 7545 (o)(2)(A)(i)). Cellulosic diesel (D7), while not an official fuel category under the RFS2, can count towards either cellulosic biofuel or biomass-based diesel, but the same gallon of fuel cannot count towards both requirements. Figure 1.2 provides the applicable volumes for each fuel category as specified in EISA.

¹² D codes signify the code number in the RIN indicating its biofuel category.

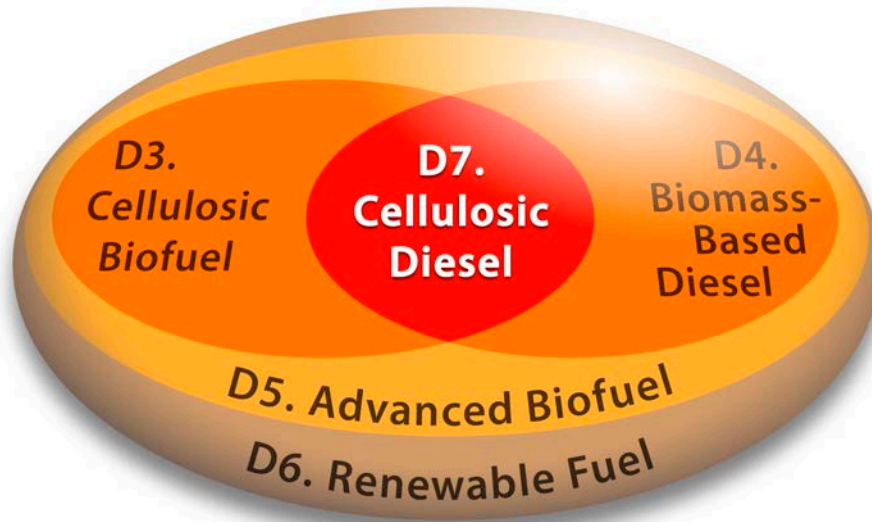


Figure 1.1. Nesting of biofuel categories under the RFS

See Appendix A for definitions for each biofuel category. Cellulosic biofuel (D3)¹³ and biomass-based diesel (D4) are both nested within advanced biofuel (D5), which is nested within renewable fuel (D6). (Diagram not to scale.)

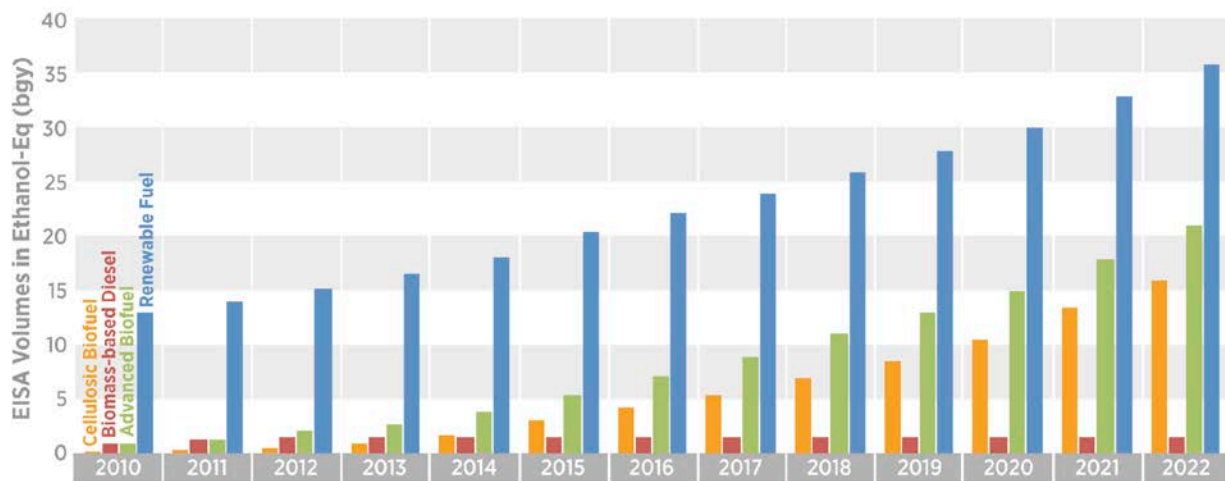


Figure 1.2. Annual EISA renewable fuel volumetric mandates for four biofuel categories from 2010-2022

Source: EPA 2010a, p. 14674

While EISA specifies absolute quantities for the volumetric mandate in all years 2010-2022, in practice the standard is implemented each year as a percentage standard for each biofuel category.

¹³ D1 and D2 RINs were used under RFS1 and are no longer applicable.

For 2005-2021, EISA requires the U.S. Energy Information Administration (EIA) to provide the EPA each year with an estimate of the volumes of transportation fuel, biomass-based diesel (D4), and cellulosic biofuel (D3) that the EIA projects will be sold or introduced into commerce for the following year (42 USCS § 7545 (o)(3)(A)).

Based on the EIA estimate, the EPA must determine annually and publish the RFS percentage for that calendar year applicable to refiners, blenders, and importers (42 USCS § 7545 (o)(3)(B)). In addition, the EPA must promulgate regulations providing annual volumetric mandates:

- For years beyond those in which EISA specifies an annual RFS for the biofuel type (discussed in the next paragraph)
- When the EPA waives an annual volumetric mandate listed in EISA (discussed further in Section 1.4)
- When a waiver by the EPA requires a modification of the volumetric mandate for future years (discussed further in Section 1.4.4) (42 USCS § 7545 (o)(2)(B)(ii)) (42 USCS § 7545 (o)(7)).

The EPA determines the annual RFS in coordination with the Secretaries of Agriculture and Energy, for years beyond those for which EISA specifies an annual volumetric mandate for the biofuel type (42 USCS § 7545 (o)(2)(B)(ii)). In determining annual RFSs for years beyond those listed in EISA, the EPA reviews the implementation of the RFS2 program for years for which EISA specifies an annual volumetric mandate. To do so, EPA analyzes a list of factors, including:

- The impact of the production and use of biofuels on the environment
- The impact of biofuels on the energy security of the United States
- The expected annual rate of future commercial production of biofuels
- The impact of biofuels on the infrastructure of the United States
- The impact of the use of biofuels on the cost to consumers of transportation fuel and the transportation of goods
- The impact of the use of biofuels on factors such as job creation, price and supply of agricultural commodities, rural economic development, and food prices (42 USCS § 7545 (o)(2)(B)(ii)).

EISA places a number of restrictions on the EPA's determination of RFSs for years not specified in the Act:

1. The volume of advanced biofuel (D5) must be at least the same percentage of the volume of renewable fuel (D6) as specified in 2022 (42 USCS § 7545 (o)(2)(B)(iii))
2. The EPA's determination of the volume of cellulosic biofuel (D3) must assume the EPA will not issue a waiver (42 USCS § 7545 (o)(2)(B)(iv))

3. The volume of biomass-based diesel (D4) must be no less than the volumetric mandate for 2012 (42 USCS § 7545 (o)(2)(B)(v)).

Figure 1.3 provides RFSs (bars) and original EISA mandated volumes (lines), if EPA waived part of the mandate in setting the RFS, for each fuel type as promulgated in the EPA's annual regulation.

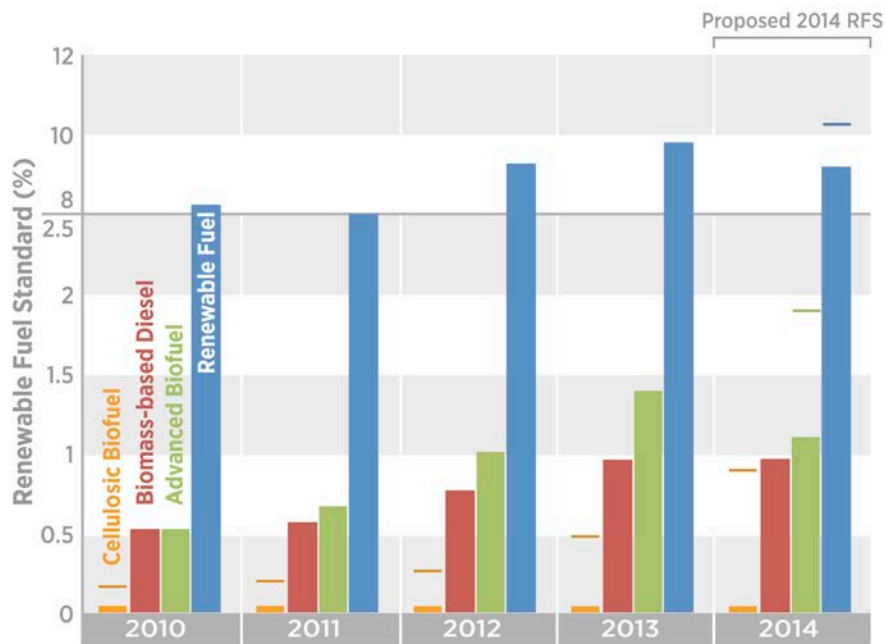


Figure 1.3. Annual EPA-promulgated volumetric mandates for four biofuel categories

Bars represent RFSs and lines represent the original volumetric mandate if EPA waived part of the mandate in setting the RFS.¹⁴ The RFS percentage is used by obligated parties to calculate renewable volume obligations (RVO) relative to their total petroleum fuel (i.e., gasoline and diesel) production or imports (EPA 2013b; EPA 2013c; EPA 2013d; EPA 2011a; EPA 2010b; EPA 2010c).

1.2.3 The RIN Credit Program

EISA requires the EPA to promulgate regulations creating a credit program to ensure that the RFS2 volumetric mandates discussed in Section 1.2.2 are met. The credit program provides for the generation of credits by any person that refines, blends, or imports gasoline containing a greater quantity of biofuel than required to meet volumetric mandates, for the generation of credits for biodiesel, and for the generation of credits by small refineries if they waive the small refinery exemption (42 USCS § 7545 (o)(5)(A)). In addition, EISA allows the EPA to promulgate regulations for the generation of credits by any person that refines, blends, or imports additional biofuels as specified by the EPA (42 USCS § 7545 (o)(5)(E)).

¹⁴ The green/blue lines are equal to the top of the bar for all years except 2014 and red for all years.

EISA further requires (or, in the case of additional biofuel, permits) EPA's regulations to allow a generator of credits to either use the credits for compliance or transfer the credits to another person for compliance with the volumetric mandates (42 USCS § 7545 (o)(5)(B)) (42 USCS § 7545 (o)(5)(E)).

EISA limits the duration of the credits to 12 months from the date of generation. EPA regulations specify that this duration allows the RIN to be used for compliance in the current year and the following calendar year (42 USCS § 7545 (o)(5)(C)) (40 CFR § 80.1428(c)).

Finally, EISA requires that the regulations include a provision which allows an obligated party that is unable to generate or purchase a sufficient number of credits to carry a deficit to the following calendar year, so long as the obligated party meets the biofuel requirements the following year and generates or purchases sufficient credits to offset the deficit from the previous year (42 USCS § 7545 (o)(5)(D)).

1.2.3.1 RIN Market

In furtherance of EISA credit requirements, the EPA has promulgated regulations for creating RINs. RINs are generated to represent a quantity of biofuel that has been produced or imported, and are denominated in ethanol equivalents (40 CFR § 80.1425) (40 CFR § 80.1426). Figure 1.4 illustrates the routes for RIN creation, separation, and other actions. A RIN is equivalent to one gallon of ethanol-equivalent fuel on the basis of the energy content of the fuel. These equivalence values (EV) are summarized in Table 1.1 as the number of RINs generated by each fuel as determined by the EPA.

RINs are only generated by biofuel producers and importers when the fuel is designated and intended for use as transportation fuel, heating oil, or jet fuel and meets the other requirements specified in 40 CFR §80.1426 (40 CFR § 80.1426(c)). RINs can be separated from volumes of renewable fuel, and any person registered with the EPA through the *EPA Moderated Transaction System* (EMTS) pursuant to 40 CFR §80.1450 can own the separated RIN and transfer it an unlimited number of times during the year in which it was created (40 CFR § 80.1428(b)). However, only obligated parties can bank RINs for compliance during the year following the RIN's creation.

An obligated party then can demonstrate compliance by "retiring" a sufficient amount of RINs to meet its Renewable Volume Obligations (RVOs) using the formulas specified for each fuel type in 40 CFR § 80.1427 (40 CFR § 80.1427). In addition, at the end of each year, obligated parties and biofuel exporters must submit an annual compliance report to the EPA that specifies, among other things, the RVO for the party, any deficit carried over by the party from the previous year or carried into the subsequent year, and information related to the RINs and cellulosic biofuel (D3) waiver credits (discussed in 1.2.4) used for compliance (40 CFR § 80.1451(a)).

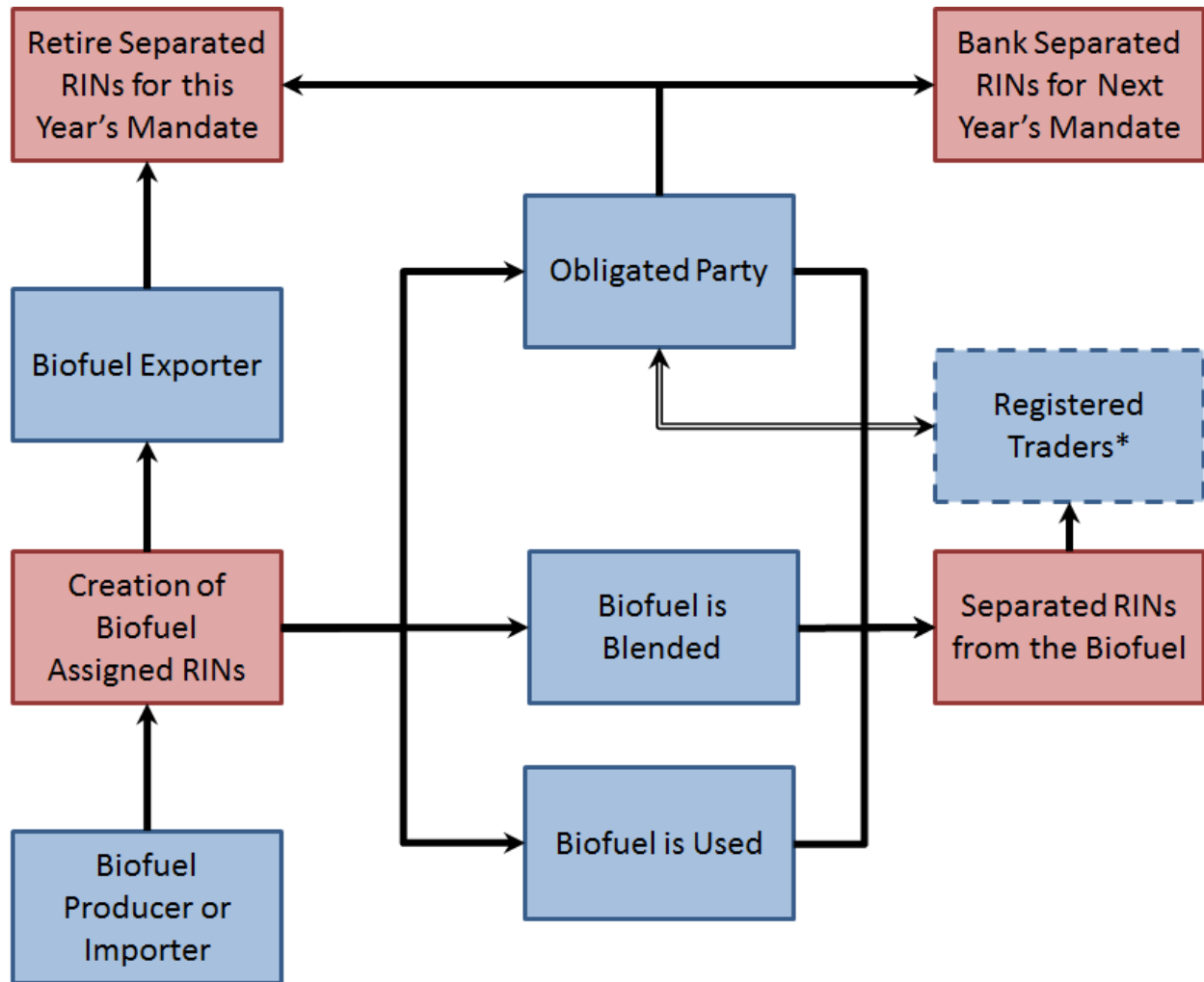


Figure 1.4. Process flow-diagram for creation, separation, transfer, retirement, and banking of RINs

*The dotted line box for traders indicates the system boundaries are larger than shown. That is, a trader is anyone registered with the EPA for handling RINs which can include market participants already shown in other blue boxes.

Table 1.1. RIN Equivalence Values (EV) for Biofuels as Assigned by the EPA

Fuel Category	Amount	EV (RIN/gal ethanol eq. fuel)
Ethanol	1 gal	1
Biodiesel	1 gal	1.5
Butanol	1 gal	1.3
Renewable Diesel	1 gal	1.7
Biogas	77,000 Btu (LHV)	1
Electricity	22.6 kWh	1

Source: 40 CFR § 80.1415(b)

Equivalence Value (EV) = $(R/0.972) * (EC/77,000)$

Where:

R = Renewable content of fuel.

EC = Energy content of the fuel, in Btu per gallon (lower heating value).

1.2.3.2 RIN Validity

The EPA has promulgated regulations that address when a RIN is deemed invalid as well as the effect of an invalid RIN. RINs are invalid for compliance if they are duplications, based on an incorrect volume of biofuel, expired, do not represent a biofuel, were transferred to multiple parties, or fall under other situations specifically addressed in 40 CFR §80.1431(a) (40 CFR § 80.1431(a)). A party possessing an invalid RIN must retire the RIN, and the RIN cannot be used to meet RVOs, regardless of whether the party had a good faith belief the RIN was valid (40 CFR § 80.1431(b)).

If an obligated party has transferred invalid RINs, any valid RINs remaining in the obligated party's possession must be first applied to correct the invalid transfer before the obligated party can meet its own renewable fuel obligation (40 CFR § 80.1431(b)). The EPA does provide one exception in the case of RINs that were improperly generated as a result of a broken meter, inadvertent temperature correction error, or inadvertent administrative error under 40 CFR §80.1431(c), so long as all of the stipulations in that section are met.

As a result of RIN fraud and the “buyer beware” nature of the EPA’s penalty enforcement, EPA finalized a Voluntary Quality Assurance Plan (QAP) for the RFS2 program in July of 2014. (EPA 2014a, p. 42080). The QAP allows for independent third parties to audit the production of biofuel and the generation of RINs (EPA 2014a, p. 42080). Thereafter, parties can assert an affirmative defense to civil liability for transferring and using an invalid RIN (40 CFR §

80.1473). The affirmative defense requires the party to neither have known nor have reason to know the RIN was invalidly generated before the RIN was verified (40 CFR § 80.1473).

1.2.4 Waiver, Exemptions, and Modification of Mandates

EISA provides waiver authority to the EPA, applicable generally as well as specifically to cellulosic biofuel (D3) and biomass-based diesel (D4). In addition, EISA requires a modification to the statutorily defined volumetric mandates when certain waiver thresholds are met.

1.2.4.1 General Waiver

EISA provides the EPA (in consultation with the Secretaries of Agriculture and Energy) the ability to waive renewable fuel (D6) volumetric mandates for a calendar year, in whole or in part (42 USCS § 7545 (o)(7)(A)). A general waiver can take place either after a petition from a state or obligated party or on the EPA's own initiative (42 USCS § 7545 (o)(7)(A)). EISA specifies two sets of criteria under which the EPA may issue a waiver: (1) The implementation of the RFS for the calendar year would severely harm the economy or environment of a state, region, or the United States, or (2) there is inadequate domestic supply (discussed further in Section 1.3.4) (42 USCS § 7545 (o)(7)(A)). A waiver automatically terminates after one year, but the EPA may renew the waiver after consultation with the Secretaries of Agriculture and Energy (42 USCS § 7545 (o)(7)(A)). EPA has exercised its general waiver authority as a part of the proposed RFS for 2014.

1.2.4.2 Cellulosic Biofuel Waiver

For cellulosic biofuel (D3), in any calendar year in which the projected volume of production (projected by EPA based on an estimate from the EIA) is lower than the volumetric mandate for that year, the EPA must reduce the applicable volume for the calendar year to the projected volume (42 USCS § 7545 (o)(7)(D)). When the EPA reduces the applicable volume of cellulosic biofuel (D3) for the calendar year, the EPA also has the option to reduce the applicable volume of total renewable fuel (D6) and advanced biofuel (D5) by the same or a lesser volume (42 USCS § 7545 (o)(7)(D)). EPA has reduced the cellulosic biofuel (D3) volumetric mandate every year since 2010 when cellulosic volumes appeared.

In addition, whenever the EPA reduces the cellulosic biofuel (D3) volume, the EPA must offer cellulosic biofuel waiver credits (42 USCS § 7545 (o)(7)(D)(ii)) which are priced at the higher of \$0.25 per gallon or the amount by which \$3.00 per gallon exceeds the average wholesale price of a gallon of gasoline in the United States (42 USCS § 7545 (o)(7)(D)(ii)).

1.2.4.3 Biomass-Based Diesel Waiver

The EPA (after consulting with the Secretaries of Agriculture and Energy) must issue a waiver if the EPA determines that there is biofuel feedstock disruption or other market conditions that could increase the prices of biomass-based diesel (D4). The waiver may last for up to 60 days and reduce the annual volumetric requirement by no more than 15 percent of the annual volumetric requirement (42 USCS § 7545 (o)(7)(D)(ii)). To date, the biomass-based diesel mandate has never been waived.

The EPA can extend this waiver for an additional 60 days after consulting with the Secretaries of Agriculture and Energy, (42 USCS § 7545 (o)(7)(D)(iii)). EPA also has the option to reduce the

applicable volume of total renewable fuel (D6) and advanced biofuel (D5) by the same or a lesser volume when the EPA issues the initial biomass-based diesel (D4) waiver (42 USCS § 7545 (o)(7)(D)(ii)).

1.2.4.4 Modification of Volumetric Mandates

EISA requires modifications to future year volumetric mandates when the EPA waives either (1) at least 20 percent of the volumetric requirement for any biofuel category for two consecutive years or (2) at least 50 percent of the volumetric requirement for a single year (42 USCS § 7545 (o)(7)(F)). In these cases, and if the final year of the waiver is at least 2015, the EPA must promulgate a regulation within one year that modifies the future volumetric mandates for the year 2016 and beyond (42 USCS § 7545 (o)(7)(F)(ii)). In determining the volumetric mandates, the EPA must use the same criteria discussed above in Section 1.2.2 for establishing volumetric mandates for the years beyond those listed in EISA (42 USCS § 7545 (o)(7)(F)(ii)).

Currently, the cellulosic biofuel category will meet the requirements for permanent mandate reductions at the end of 2015. Required modifications to volumetric mandates will mean that cellulosic biofuel volumes will likely be permanently reduced at the end of 2015. The exact amount of this reduction will be determined by EPA and could have large effects on cellulosic biofuel RIN market prices that are currently largely regulated by the price of cellulosic waiver credits.

1.2.4.5 Small Refinery Exemption

EISA created special exemptions for small refineries (defined in Appendix A). In general, the volumetric mandates listed in EISA did not apply to small refineries until 2011 (42 USCS § 7545 (o)(9)(A)). In addition, EISA required the Secretary of Energy to determine whether compliance with the volumetric mandates would impose a disproportionate economic hardship on small refiners (which allows the EPA to extend the exemption) (42 USCS § 7545 (o)(9)(B)(i)). In a 2011 report, the U.S. Department of Energy (DOE) concluded that 13 of the 18 small refineries analyzed for the study suffered disproportionate economic hardship and recommended those refineries receive an extension of their exemptions (DOE 2011). The EPA extended the small refinery exemption for those 13 refineries for a period of two years (ending in 2013) based on the DOE's study report and recommendation (EPA 2011d). Small refineries may also petition at any time for an extension of the exemption due to disproportionate economic hardship (42 USCS § 7545 (o)(9)(A)(ii)) (40 CFR §80.1441(e)(2)).

EISA also provided small refineries with the ability to waive the exemption and participate in the RFS program from the outset or at any time during which the exemption still applies (42 USCS § 7545 (o)(9)(C) and (D)) (40 CFR §80.1441(f)).

1.2.5 Ability to Waive into RFS Program

EISA allows Alaska and United States territories to petition for inclusion in the RFS program (42 USCS § 7545 (o)(2)(A)(ii)). The EPA has promulgated regulations under 40 CFR §80.1443 in furtherance of this opt-in provision. To be approved, the petition must be signed by the governor or authorized representative of the territory and received by the EPA by November 1 for inclusion in the following calendar year (40 CFR §80.1443). Once the EPA approves the state or territory, all gasoline and diesel fuel refiners and importers in the state or territory become

obligated parties and all renewable fuel producers are required to generate RINs and generally comply with EPA's regulations in 40 CFR §80.1400 et seq. (40 CFR §80.1443 (e)). To date, Alaska or the U.S. territories have not opted into the RFS2 program. Hawaii opted in during the RFS1 program.

1.3 EPA Regulatory Authority Under EISA

This section discusses the EPA's authority under EISA to create regulations for the RFS program. This section begins with a short overview of administrative law and then discusses relevant case law and the 2014 EPA proposed rule. Thus far, only a couple of court cases apply to the EPA's authority under EISA 2007.

1.3.1 Administrative Law Overview

As a general principle of administrative law, a federal agency's power is limited to only those expressly conferred by the enabling statute and/or the Constitution. Under the Administrative Procedure Act, a court reviewing the agency's action, finding, or conclusion decides all relevant questions of law, interprets constitutional and statutory provisions, and determines the meaning or applicability of the terms of an agency action (5 USCS § 706). The Administrative Procedure Act requires a reviewing court to set aside any agency action, finding, or conclusions that it finds to be unlawful:

1. Arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law
2. Contrary to constitutional right, power, privilege, or immunity
3. In excess of statutory jurisdiction, authority, or limitations, or short of statutory right
4. Without observance of procedure required by law
5. Unsupported by substantial evidence in a case where the agency reviewed the action in a hearing and produced a written record
6. Unwarranted by the facts to the extent that the facts are subject to an independent review by the reviewing court (5 USCS § 706(2)).

The standard is narrow and a reviewing court cannot substitute its judgment for that of the agency in determining whether an action is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law" (U.S. Supreme Court 1983). Rather, the court must consider whether the agency's decision was based on a consideration of the relevant factors and whether the agency has made a clear error in judgment (U.S. Supreme Court 1983). An agency rule may be arbitrary and capricious if "the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise" (U.S. Supreme Court 1983, p. 43).

Courts use the two-part test in the United States Supreme Court's decision in *Chevron v. Natural Resources Defense Council* in determining the extent of deference an agency receives during judicial review of its statutory interpretation. First, the court must look to whether Congress has directly spoken on the issue in the statute (U.S. Supreme Court 1984). If the intent of Congress is

clear in the statute, the agency must follow the congressional intent (U.S. Supreme Court 1984). Second, if the statute is ambiguous or silent on the issue in the statute, the court looks to whether the agency's interpretation is a "permissible construction of the statute" (U.S. Supreme Court 1984). An agency interpretation is a permissible construction of the statute unless "arbitrary, capricious, or manifestly contrary to the statute" (U.S. Supreme Court 1984).

In addition, the Supreme Court has noted that the degree of deference provided to an agency administering its own statute should be based on its consistency with earlier and later pronouncements, formality in the process used to make the decision, and relative expertise in the area (U.S. Supreme Court 2000).

SEE ► 1.3.2 American Petroleum Institute v. EPA
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American Petroleum Institute (API) v. EPA addressed the EPA's authority under the RFS program. API objected to the EPA's 2012 projection for cellulosic biofuel (D3) and its refusal to reduce the applicable advanced biofuels (D5) volume for 2012 based on the projected shortfall in cellulosic biofuel (D.C. Cir. 2013).

The Court of Appeals for the D.C. Circuit in *API v. EPA* vacated the EPA's 2012 projection of cellulosic biofuel (D3) production because it was based on an "aspirational," technology-forcing methodology that was found not to be consistent with the EIA's estimate (D.C. Cir. 2013). In this instance, the court held that EISA's requirement that the EPA projection be based on the EIA's estimate implied an "outcome-neutral" methodology. EISA did not give the EPA authority to set cellulosic biofuel levels at a level which promotes growth (D.C. Cir. 2013). The court added that because the statute allows the EPA to "determine" the obligation "based on" the EIA's estimate, the EPA is entitled to Chevron deference and "Congress didn't contemplate slavish adherence by the EPA to the EIA estimate" (D.C. Cir. 2013, p. 478). The court said EPA is to read the phrase "based on" EIA's estimate "as requiring great respect but allowing deviation consistent with that respect" (D.C. Cir. 2013, p. 478).

The court upheld the EPA's decision not to reduce advanced biofuel (D5) volumes for 2012. EPA's decision was based on historical data and future production projections on sugarcane ethanol imports and biodiesel production. The court stated that this was a reasoned explanation (i.e., not arbitrary and capricious) despite not providing numerical projections for how advanced biofuels (D5) would make up for the loss in cellulosic biofuel (D3) (D.C. Cir. 2013). Here, the court reasoned that the EPA only needed to provide a "satisfactory explanation for its actions, including a rational connection between the facts found and the choice made" (D.C. Cir. 2013, p. 481).

EIA's annual short-run projections of cellulosic ethanol supply have relied on a plant-by-plant assessment of capacities that are scheduled to be or come on line at different stages of development (e.g. EIA/Newell 2010, Beville 2011, Schall/EIA 2013). Table 1.2 shows that in the past this approach has generally led to lower cellulosic biofuel projections than EPA's cellulosic biofuel projections. For the early years both EPA and EIA have over-estimated actual production, even with this method. This highlights the problems with projections in this early-transition period when cellulosic ethanol RIN production began in 2013.

Table 1.2. Projected and Achieved Cellulosic Biofuel Production, 2010-2014 (millions of gallons)

	2010	2011	2012	2013	2014 (to date)
EIA Projected	5	3.9	6.9	9.6 (rev to 4)	17
EPA Projected	5	6.6	8.7	6	17
Actual D3 RINs Gen	0	0	0.02	0.422	24.16

Sources: Regulation of Fuels and Fuel Additives: 2012 Renewable Fuel Standards, 77 Fed. Reg, API vs. EPA 2013, EPA EMTS database.

Past EIA forecasts did not include any cellulosic biofuel production from pilot plants. Future estimates, like prior ones, are likely to be based on EIA's and EPA's current assessment of available capacity and expected operations for each commercial scale plant during the coming year, considering the potential for delays in realized operations and uncertain capacity utilization rates. As EIA (Schaal 2013) stated, "Our updated forecast reflects EIA's best judgment ... but is inherently uncertain. Cellulosic biofuel production estimates are subject to significantly larger percentage uncertainty" than other transportation fuels.

In forming its prediction, EPA has the discretion to perform "supplemental analysis" in pursuit of the same of the same regulatory objective," as the court found permissible in *Sierra Club*, 356 F.3d at 306 n.7. That is, "based upon" EIA does not mean "solely based upon."¹⁵ Given the large uncertainty highlighted by EIA, this may still leave EPA substantial latitude to make a prediction which is "most likely" based on its own expert opinion (Enion 2013), although EPA cannot intentionally bias its estimate upward to promote industry growth, or so that the risk of overestimation deliberately outweighs the risk of underestimation.

A key point of the court decision [API v. EPA 2013 p. 4] is that supply forecasting is not a fixed methodology that, once established and unchallenged, can be repeated in a rote fashion year after year. Rather, forecasting should be evaluated and reconsidered in the context of its accuracy in prior years:

"The reasonableness of adopting a predictive methodology is not the same as the reasonableness of *maintaining* one in the face of experience; considering whether to maintain a methodology necessarily invites reflection on the success of earlier applications."

Thus future predictive-based rules can be challenged on the basis of the predictive method's prior success.

In 2014 actual cellulosic production, as measured by D3 RINs, increased substantially, primarily due to production of cellulosic RINs from renewable gas.¹⁶ Accounting for this added production source may be an important part of future supply predictions, and rulemakings.

¹⁵ *Sierra Club v. EPA* 2004 (Sierra Club, 356 F.3d) notes: "in the context of various statutes, courts have held that the phrase "'based on' is synonymous with 'arising from' and ordinarily refers to a 'starting point' or a 'foundation'"); *United States ex rel. Kreindler & Kreindler v. United Tech. Corp.*, 985 F.2d 1148, 1158 (2d Cir.1993) (holding that "based upon" in the False Claims Act does not mean based "solely" upon)."

¹⁶ The total D3 cellulosic biofuel RINs generated during the first 11 months of the year was 24.1 million. "This includes 594,316 D3 RINs generated for cellulosic ethanol, 44,168 D3 RINs generated for renewable gasoline, 10.72 million D3 RINs for renewable compressed natural gas, and 12.78 million D3 RINs for renewable liquefied

1.3.3 *Monroe Energy, LLC v. EPA*

In May 2014, the U.S. Court of Appeals for the D.C. Circuit issued a ruling concerning a challenge to the EPA's 2013 Final Rule, wherein the EPA chose not to reduce the applicable volume of advanced biofuel (D5) and renewable fuel (D6) after reducing the cellulosic biofuel (D3) volumetric requirement from 1 billion gallons to less than 14 million gallons (D.C. Cir. 2014). The petitioner, Monroe Energy, LLC argued that the EPA acted arbitrarily in not lowering the applicable volumes of advanced biofuel (D5) and total renewable fuel (D6) because it created a situation with more biofuel than the economy can absorb because of the blend wall (discussed further in 1.3.4 below) (D.C. Cir. 2014, p. 914).

In addition, a second petitioner, PBF Holding Company, intervened in the case (issuing a similar challenge) and argued that the EPA must only consider the projected volumes of advanced biofuel (D5) and renewable fuel (D6) that could be consumed in 2013 when determining whether to lower the volumetric mandates; no other factors, such as carryover of unused 2012 RINs should be considered (D.C. Cir. 2014, p. 916).

In response to the first challenge, the court held that the EPA is not required to consider any specific factors when deciding whether to lower the applicable volume of advanced biofuel (D5) and total renewable fuel (D6) (D.C. Cir. 2014, p. 917). Further, the court stated the EPA did not act arbitrarily because it exercised its authority in a reasonable manner considering the availability of biofuels that would qualify as advanced biofuel (D5) and renewable fuels (D6), the ability of those fuels to be consumed, and the role of 2012 carryover RINs (D.C. Cir. 2014, p. 917).¹⁷ As for the second argument, the court re-affirmed that the EPA has broad discretion in determining when to lower the advanced biofuel (D5) and renewable fuel (D6) volumetric mandates, and is not required to consider or limited to considering any specific factors (D.C. Cir. 2014, p. 916).

1.3.4 *The EPA's 2014 Proposed Rule*

For the first time, the EPA is proposing to use its general waiver authority to adjust EISA's volumetric mandates for advanced biofuel (D5) and total renewable fuel (D6) in its proposed 2014 Standards for the Renewable Fuel program (EPA 2013a).¹⁸ See also Figure 1.3. The EPA's use of the general waiver authority is predominantly based on the limitations in the volumes of ethanol that can be consumed in gasoline-ethanol lower blends given the reduction in gasoline use in the United States and the limited number of vehicles that can use higher ethanol blends. Jointly, these limits are commonly referred to as the blend wall (EPA 2013a).

The EPA is justifying the use of its general waiver authority under the "inadequate domestic supply" provision of 42 USCS § 7545(o)(7)(A)(ii) (EPA 2013a). The EPA argues that the term "inadequate domestic supply" is ambiguous and should apply to the full range of constraints, including the ability to distribute, blend, dispense, and consume the renewable fuel, in addition to

natural gas. All D3 RINs generated during the first 11 months of 2014 were generated by domestic producers." Voegelé, *Ethanol Producer*, December 19, 2014

¹⁷ The EPA's analysis included consideration of the blend wall in making the determination not to lower the volumetric mandates.

¹⁸ Recently, the EPA opted to delay their decision on issuing the 2014 final rule (EPA 2014c).

the ability to produce or import the renewable fuel (EPA 2013a). This interpretation, the EPA says, is justified through relying on the common meaning of the word “supply” as well as through a comparison with other provisions within the CAA, and the inadequate supply provision must be “judged in terms of availability for use by the ultimate consumer, including consideration of the capacity to distribute the product to the ultimate consumer” (EPA 2013a, p. 71756).

1.3.4.1 Validity of EPA’s General Waiver Interpretation

There are differing legal opinions on the validity of the EPA’s interpretation of the provision “inadequate domestic supply.” On one end, some argue that any challenge to the EPA’s interpretation of the provision would be upheld under the two-part test in *Chevron* (mentioned in Section 1.3.1). The term “inadequate domestic supply” is ambiguous, and as such the EPA should receive deferential treatment under part one of the *Chevron* test (Lafferty and McCullough 2014).

On the other end, some argue that if Congress wanted the EPA to determine the distribution capacity (i.e., the blend wall), it would have expressly stated so in the statutory amendment as it did in the previously enacted oxygenate requirements waiver provision also found in the CAA. Under CAA 211(m)(3)(C) the EPA can delay the effective date of oxygenated gasoline requirements for certain carbon monoxide nonattainment areas if the EPA finds “an inadequate domestic supply of *or distribution capacity for*, oxygenated gasoline...or fuel additives (oxygenate) necessary to meet such requirements” (emphasis added) (42 USCS § 7545(m)(3)(C)) (Coppess 2014).

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This argument relies on the decision in *Whitman v. American Trucking Assn., Inc.*, in which the Supreme Court refused to allow the EPA to consider implementation costs in setting National Ambient Air Quality Standards where not expressly permitted in the CAA (Coppess 2014; U.S. Supreme Court 2001). In *Whitman*, the Supreme Court reasoned that the Air Quality Act of 1967 had explicitly mentioned implementation costs and sections of the 1970 amendments (of which the statutory provision at question is a part¹⁹) permitted or required consideration of implementation costs (Supreme Court 2001, p. 466-67). As such, the Supreme Court held that absent explicit language to consider implementation costs and because of the importance of the provision to the CAA as a whole, the EPA could not consider implementation costs (Supreme Court 2001, p. 472).

Coppess (2014) applies this argument to the present discussion, stating that if Congress wanted the EPA to consider distribution capacity in the term “inadequate domestic supply,” it would have expressly stated so as it did in the oxygenate requirements waiver, and a court should not find an implicit authorization for the EPA to consider a factor expressly included in another provision of the CAA (Coppess 2014).

A similar argument can be made when reviewing the fuel and fuel additives waiver provision found in CAA section 211(c)(4)(C)(ii), whereby the EPA can waive a control or prohibition respecting the use of a required or regulated fuel or fuel additive if the EPA finds that “extreme and unusual fuel or fuel additive supply circumstances exist...which prevents the *distribution of*

¹⁹ The section at question was later amended on August 7, 1977 under 91 Stat. 691.

an adequate supply of the fuel or fuel additives to consumers” [emphasis added] 42 USCS § 7545(c)(4)(C)(ii)). Here, Congress expressly used the terms distribution and consumer, making it clear that the adequacy of the supply was determined by its availability to the consumer.

1.3.4.2 EPA Justification for General Waiver Authority

The EPA addressed the express mention of distribution in other sections of the CAA in its 2014 proposed rule and came to the conclusion that although the RFS waiver provision does not include language expressly stating that distribution should be considered, the term “inadequate domestic supply” is “broad and ambiguous” and gives the EPA the discretion to consider distribution (EPA 2013a, p. 71756). Further, the EPA states that while the term “inadequate domestic supply” in the oxygenate waiver provision in CAA 211(m)(3)(C) could be read more narrowly because of the addition of “distribution capacity for”, absent such a provision in the RFS waiver, the term should be read as ambiguous and allow for the inclusion of factors such as distribution capacity (EPA 2013a, p. 71756).

1.3.4.3 Limits of Chevron Deference

Even if the term “inadequate domestic supply” is ambiguous and entitled to Chevron deference, that does not provide the EPA carte blanche to interpret the statute. Rather as discussed above, the EPA’s interpretation must be a “permissible construction of the statute,” which the Supreme Court has stated means the interpretation is not arbitrary, capricious, or manifestly contrary to the statute (U.S. Supreme Court 1984). While courts will not substitute their judgment for that of an agency, a court could hold impermissible a decision that runs counter to the evidence before the EPA, or is so implausible that it could not be ascribed to a difference in view or the product of EPA expertise.

In the instance of the RFS waiver provision, the EPA is aware that a bill prior to the final adoption of EISA included the phrase “inadequate domestic supply or distribution capacity to meet the requirement,” but was removed for reasons unknown to the EPA (EPA 2013a, p. 71757). The EPA speculates the phrase “distribution capacity to meet the requirement” could have been removed because Congress believed the “inadequate domestic supply” was broad enough that a reference to distribution capacity was superfluous (EPA 2013a, p. 71757).

The EPA’s speculation does not appear to be supported by language used in the rest of the CAA that EISA amends. Congress uses this language in the oxygenated fuels waiver provision in CAA 211(m)(3)(C) and provides a definition of distribution capacity in CAA 211(m)(3)(C)(iv) (42 USCS § 7545(m)(3)(C)(iv)). Inclusion of language and definitions in the CAA indicates that Congress was likely aware of both terms when drafting the RFS waiver provision, these terms had different meanings in other provisions of the CAA, and Congress chose not to use the term distribution capacity in the RFS waiver provision.

As an alternative rationale, the EPA states that removing the phrase “or distribution capacity to meet the requirement,” could have been because Congress felt that including the phrase would be too limiting (EPA 2013a, p. 71757). However, the use of the disjunctive “or” in the phrase allowing the term “inadequate domestic supply” would have allowed it to remain an independent clause for EPA interpretation (only being limited to not include distribution capacity) and would not limit the EPA’s interpretation of the term.

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On the other hand, the term “inadequate domestic supply” when read by itself is ambiguous as to what factors the EPA must rely on in making the RFS waiver determination. While in a different context, the recent ruling in *Monroe Energy, LLC vs. EPA* demonstrates the deference courts are willing to provide the EPA in regulating the RFS program, particularly where sections of the statute do not include any specific factors to consider. For example, absent expressly stated factors for determining whether there is an “inadequate domestic supply” a court is likely to provide deference to the EPA in determining whether the term refers to neat fuel *supplied* to obligated parties or blended fuel *supplied* to the ultimate consumer (i.e. less demand for gasoline will result in a lower supply of gasoline that requires blending with biofuels).

In addition, a court could provide deference to the EPA based on the intention of the RFS program. When read in the isolation of EISA’s amendment to the CAA, the EPA interpretation may receive deference as a permissible construction of the statute that is consistent with congressional intent. Rather than looking at how similar terms are used in other sections of the CAA, which were enacted at an earlier time and do not pertain to the RFS program, a court might look to the congressional purpose of the program. As the EPA points out, Congress’s purpose for establishing the RFS program was to have renewable fuel replace fossil based transportation fuels in use by the consumer. Without the consumer using the renewable fuel, the energy security and greenhouse gas reduction benefits cannot be realized and the program would merely create a penalty for obligated parties to purchase neat ethanol, without the demand to blend and deliver to the consumer (EPA 2013a, p. 71757).

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In November 2014, the EPA opted to delay their decision on issuing the 2014 final rule (EPA 2014c). The move was met with disapproval from both supporters of the RFS and opponents (Law 360). The delay also prompted American Fuel & Petrochemical Manufacturers (AFPM) to file a notice of intent to sue EPA for not releasing the final rule (Law 360).

Whether the EPA will issue a 2014 final rule that includes its first use of the general waiver provision for “inadequate domestic supply” is still to be determined. However, even if the EPA elects not to use its general waiver authority in 2014, if the demand for petroleum fuel continues to decrease over the next few years the extent of EPA’s authority under the general waiver provision could continue to be ripe for debate. Alternatively, over the longer term the development of new motor fuel formulations or infrastructure-compatible biofuels could diminish the pressure for waivers due to the ethanol blend-wall. The judicial system will likely determine the extent of EPA’s authority to issue a waiver under the term “inadequate domestic supply.”

1.4 Proposed Legislation Amending the RFS Program

This section briefly highlights some of the Congressional bills that have been proposed to amend or repeal the RFS program. To date, none of these bills have been voted on and some of these bills have not been acted upon for over a year.

The RFS program has mostly been a bi-partisan effort. The RFS1 program was passed in 2005 under the Bush Administration with a Republican Congress. The RFS2 was passed under Bush Administration with a Democratic Congress. However, recent court cases or EPA’s delaying of

the 2014 final rule could lead to congressional hearings in 2015. Based on proposed bills in the last few years, such hearings could lead to modification or potentially the repeal of the RFS.²⁰

1.4.1 Bills to Amend the RFS as a Result of *API v. EPA*

A couple bills have been designed to reverse the holdings of *API v. EPA*. For example, 113 S. 251 (113th Congress) adds a provision on the process by which the EIA estimates cellulosic biofuel (D3) projections. The provision would require the EPA to use the exact estimate from the EIA in setting cellulosic biofuel (D3) levels. In addition, this bill would require the EPA to reduce the volume of renewable fuel (D6) and advanced biofuel (D5) by the same volume as it reduced cellulosic biofuel, eliminating EPA discretion to make this decision. A second bill, 2013 H.R. 796 (113th Congress) proposes that, in addition to the above mentioned changes, the projection for cellulosic biofuel for a calendar year cannot be more than five percent or one million gallons (whichever is greater) larger than the total volume of cellulosic biofuel (D3) that was commercially available in the most recent year for which such data is known.

The passage of 113 S. 251 would reduce the overall biofuel volume obligations whenever EIA projections for cellulosic biofuel required the EPA to reduce cellulosic biofuel mandates as prescribed under EISA (Figure 1.2 above). In the past, the EPA has opted not to lower overall biofuel volume requirements even when reducing cellulosic biofuel volumes. EPA has in effect transferred the cellulosic biofuel volume obligations to advanced biofuel volume obligations. This option allowed EPA to keep on track with their overall volume obligations under the RFS even without meeting the original cellulosic biofuel mandate laid out in EISA 2007.

1.4.2 Bill to Amend the RFS to Limit the Volumetric Mandates of Renewable Fuel

A second line of bills aim to limit the volumetric mandates for renewable fuel (D6). For example, 2013 H.R. 1462 (113th Congress) proposed to prohibit the EPA from approving the introduction of gasoline that contains greater than 10-volume-percent (E10) into commerce. In addition, 2013 H.R. 1462 includes comprehensive changes to the RFS to reduce previously set volumetric mandates, change waiver requirements, and change cellulosic biofuel (D3) projections.

Passage of 2013 H.R. 1462 would prevent the EPA, including by granting a waiver under section 211(f)(4) of the CAA from authorizing or otherwise allowing the introduction into commerce of gasoline containing greater than 10 volume-percent ethanol.. Passage would remove one strategy for addressing the “blend wall.” Higher blends would allow for more ethanol to be blended into the current gasoline stocks and give an additional market for new cellulosic ethanol. Without the E15 or higher approved blends, the future volume obligations will have to be decreased or RIN prices will increase in order to meet the additional RVO’s above the 10% blend wall. RIN price increases would be due to the need to use alternative “infrastructure-compatible” biofuels not subject to a blend wall.

²⁰ Note: Section 1.4 uses the language of the proposed bills themselves and may not be perfectly clear or aligned with existing statutes and regulations described in previous sections.

A second bill, 2013 H.R. 1469 (113th Congress) also proposes an E10 limit, but in addition requires that volumetric mandates for renewable fuel be left at existing levels and that all subsequent years listed in EISA be replaced with 7.5 billion gallons, which is about half of current levels. Moreover, the bill strikes provisions to allow RIN credits for additional renewable fuel produced and strikes language allowing for waivers and modification to the volumetric mandates for all types of renewable fuel.

Passage of H.R. 1469 would eliminate the current effect of the RFS since the biofuel industry produces 14 billion gallons. The RFS would set a floor for renewable fuels production that is below the current level, and would only have an effect become a constraint in the event that economic incentives declined (Babcock and Pouliot 2013a).

1.4.3 Bills to Repeal or Phase Out the RFS Program

A third line of bills seeks to terminate or phase out the RFS program altogether. The U.S. House of Representatives has proposed many bills similar to 113 H.R. 3895 (113th Congress) that would terminate the RFS program immediately. However, more recently, 113 S. 2170 (113th Congress) and its companion bill 113 HR 4286 (113th Congress) propose to phase out the RFS program entirely by the end of 2018. 113 S. 2170 and its companion bill propose to reduce the RFS by 20 percent per year through 2018, after which the RFS program would terminate on December 31, 2018.

Passage of a bill eliminating the RFS would most likely limit the ethanol market to the current 10% blend. Ethanol production is already sufficient at current gasoline consumption to meet market demand (Westcott and McPhail 2013). There is currently little incentive to use more than the current 10% blend (Babcock 2013). E85 has not been competitively priced (or priced to account for its lower volumetric energy content), and E15 growth would require overcoming infrastructure and legislative hurdles (Babcock and Pouliot 2013b).

All else being equal, terminating or phasing out the RFS program could likely limit developing biofuel technologies. Without the market guaranteed by RFS2 investment would be difficult to justify for developing biofuel industries in the short-term, such as for liquid biofuel from cellulose. Eliminating the RFS would reduce the incentives to invest and develop alternative fuel systems. For example, EPA's EMTS data indicates that the RFS has potentially played a role in increasing the use of non-commercial biofuels such as biogas and non-ester based diesel. Developing biofuel industries would most likely only began producing additional biofuel volumes if and when other drivers such as higher petroleum prices or policy changes lead to increased incentive to use and invest in research, development, and use.

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1.5 Conclusion

The future of the RFS2 program (and the RIN market) will be determined largely by the extent of the EPA's authority under the RFS2 program, and by fuel market developments that could hamper or facilitate the introduction of biofuels, creating or relieving pressure for regulatory change. While court cases such as API and Monroe Energy, LLC have begun to shape EPA's authority and the RFS2 program, looming issues, namely legal challenges to the EPA's general waiver authority under the term "inadequate domestic supply" could have an even larger impact on the program.

Future legislation may also amend the RFS2 program. Congress could respond to judicial decisions that have defined the current scope of the EPA's authority, repeal the program, or make the program irrelevant under current market conditions by lowering volumetric requirements to below existing production levels.

Future EPA interpretation, legal challenges, and legislation will impact the RFS2 program and the U.S. biofuel industry.

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Appendix A. Legal and Regulatory Definitions

A.1 Definitions

Advanced biofuel (D5) is defined as “renewable fuel, other than ethanol derived from corn starch, that has life-cycle greenhouse gas emissions...that are at least 50 percent less than baseline lifecycle greenhouse gas emissions” (42 USCS § 7545 (o)(1)(B)(i)). This includes the following types of fuel:

- “Ethanol derived from cellulose, hemicellulose, or lignin
- Ethanol derived from sugar or starch (other than corn starch)
- Ethanol derived from waste material including crop residue, other vegetative waste material, animal waste, and food and yard waste
- Biomass-based diesel (D4)
- Biogas (including landfill gas and sewage waste treatment gas) produced through the conversion of organic matter from renewable biomass²¹
- Butanol or other alcohols produced through the conversion of organic matter from renewable biomass
- Other fuel derived from cellulosic biomass” (42 USCS § 7545 (o)(1)(B)(ii)).

Baseline lifecycle greenhouse gas emissions is defined as “the average lifecycle greenhouse gas emissions...for gasoline or diesel (whichever is being replaced by renewable fuel) sold or distributed as transportation fuel in 2005” (42 USCS § 7545 (o)(1)(C)).²²

Biomass-based diesel is defined as “renewable fuel that is biodiesel as defined in section 312(f) of the Energy Policy Act of 1992 (42 USCS 13220(f))²³ and that has lifecycle greenhouse gas emissions...that are at least 50 percent less than the baseline lifecycle greenhouse gas emissions” (42 USCS § 7545 (o)(1)(D)). EPA regulations have extended the biomass-based diesel (D4) definition by requiring that fuel:

- “Is a transportation fuel, transportation fuel additive, heating oil, or jet fuel

²¹ In 2014, the EPA added two fuel pathways that effectively replace the former biogas category (1) compressed natural gas produced from biogas from landfills, municipal waste-water treatment facility digesters, agricultural digesters, and separated MSW digesters and (2) liquefied natural gas produced from biogas from landfills, municipal waste-water treatment facility digesters, agricultural digesters, and separated MSW digesters (EPA 2014c, p. 42128).

²² Gasoline contained a baseline level of 98 g CO₂eq/MJ, while diesel contained a baseline level of 97 g CO₂eq/MJ (EPA 2010).

²³ The Energy Policy Act of 1992 defines biodiesel as “a diesel fuel substitute from non-petroleum renewable resources that meets the registration requirements for fuels and fuel additives established by the EPA under Section 211 of the Clean Air Act.” The term includes biodiesel derived from animal waste, municipal solid waste and sludges, and oils derived from wastewater and the treatment of wastewater. 42 USCS 13220(f).

- Meets the definition of either biodiesel²⁴ or non-ester renewable diesel²⁵
- Is registered as a motor vehicle fuel or fuel additive under 49 CFR part 79 if the fuel or fuel additive is intended for use in a motor vehicle” (40 CFR § 80.1401).

Cellulosic biofuel (D3) is defined as “renewable fuel derived from any cellulose, hemicellulose, or lignin that is derived from renewable biomass and that has lifecycle greenhouse gas emissions...that are at least 60 percent less than the baseline lifecycle greenhouse gas emissions” (42 USCS § 7545 (o)(1)(E)).

Cellulosic diesel (D7) is defined as “any renewable fuel which meets both the definition of cellulosic biofuel and biomass-based diesel” (40 CFR § 80.1401).

Conventional biofuel is defined as “renewable fuel that is ethanol derived from corn starch” (42 USCS § 7545 (o)(1)(F)). Conventional biofuel requires 20% greenhouse gas emission reduction compared with a baseline plant.

The *EPA Moderated Transaction System* (EMTS) is a database through which certain EPA-regulated parties must submit information related to RINs to the EPA. Regulated parties that must create an account through the EMTS include:

- Domestic or foreign producers or importers of renewable fuel each time they assign RINs to a batch of renewable fuel pursuant to 40 CFR §80.1426(e)
- Any party that sells, separates, or retires RINs (each time sold, separated, or retired)
- Any party that purchases RINs (each time purchased) (40 CFR § 80.1452).

An *Obligated party* is defined as “any refiner that produces gasoline or diesel fuel within the 48 contiguous states or Hawaii, or any importer who imports gasoline or diesel fuel into the 48 contiguous states or Hawaii during a compliance period. A party that simply blends renewable fuel into gasoline or diesel fuel, as defined in §80.1407(c) or (e), is not an obligated party” (40 CFR § 80.1406(a)(1)).²⁶

Renewable biomass is defined as “each of the following:

²⁴ Under 40 CFR § 80.1401, biodiesel is defined as a mono-alkyl ester that meets American Society for Testing and Materials D 6751-09, Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels.

²⁵ Under 40 CFR § 80.1401, non-ester renewable diesel is defined as a fuel that can be used in an engine designed to operate on conventional fuel, or be heating oil or jet fuel and is not a mono-alkyl ester.

²⁶ Note that, under 40 CFR § 80.1406(a)(2), if the Administrator approves a petition of Alaska or a United States territory to opt-in to the renewable fuel program under the provisions in 40 CFR §80.1443, then the obligated party also includes any refiner that produces gasoline or diesel fuel within that state or territory, or any importer that imports gasoline or diesel fuel into that state or territory which has opted in.

- Planted crops and crop residue harvested from agricultural land cleared or cultivated at any time prior to the enactment of this sentence that is either actively managed or fallow, and non-forested
- Planted trees and tree residue from actively managed tree plantations on non-federal land cleared at any time prior to enactment of this sentence, including land belonging to an Indian tribe or an Indian individual, that is held in trust by the United States or subject to a restriction against alienation imposed by the United States
- Animal waste material and animal byproducts
- Slash and pre-commercial thinnings that are from non-federal forestlands, including forestlands 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, but not forests or forestlands that are ecological communities with a global or State ranking of critically imperiled, imperiled, or rare pursuant to a State Natural Heritage Program, old growth forest, or late successional forest
- Biomass obtained from the immediate vicinity of buildings and other areas regularly occupied by people, or of public infrastructure, at risk from wildfire
- Algae
- Separated yard waste or food waste, including recycled cooking and trap grease” (42 USCS § 7545 (o)(1)(I)).

Renewable fuel is defined as “fuel that is produced from renewable biomass and that is used to replace or reduce the quantity of fossil fuel present in a transportation fuel.” EPA regulations have extended the renewable fuel definition to require that the fuel “has lifecycle greenhouse gas emissions that are at least 20 percent less than baseline lifecycle greenhouse gas emissions,” unless exempted pursuant to 40 CFR § 80.1403 (40 CFR § 80.1401).

Renewable fuel exporter is any party that owns any amount of renewable fuel that is exported from the contiguous 48 states, Hawaii, and any territory that opts. Renewable fuel exporters must acquire sufficient RINs to comply with RVO requirements, which are based on the amount of biofuel exported (40 CFR § 80.1430).

Renewable Identification Number (RIN) is defined as “a unique number generated to represent a volume of renewable fuel” (40 CFR § 80.1401).

Renewable volume obligation (RVO) is a percentage of renewable fuel for which an obligated party is responsible for based on petroleum production and the renewable fuel standard for the calendar year (as determined by the EPA pursuant to 40 CFR § 80.1405) (40 CFR § 80.1407). Each category of renewable fuel has its own calculation under 40

CFR § 80.1407. An obligated party complies with the RVO through retiring a sufficient amount of RINs by the compliance deadline.²⁷

Small producer/importer threshold refers to renewable fuel producers or importers that produce less than 10,000 gallons a year of renewable fuel. Small producers and importers are not subject to requirements related to the generation of RINs, registration, reporting, EMTS, recordkeeping, attest engagement, and production outlook report (40 CFR § 80.1455).

A *small refinery* is defined as a “refinery for which the average aggregate daily crude oil throughput for the calendar year...does not exceed 75,000 barrels” (42 USCS § 7545 (o)(1)(K)).

Transportation fuel is defined as “fuel for use in motor vehicles, motor vehicle engines, non-road vehicles, or non-road engines (except for oceangoing vessels)” (42 USCS § 7545 (o)(1)(L)).

²⁷ An obligated party carrying over an allowable renewable fuel deficit would equate to less RINs being retired than the RVO required for the present year, with the deficit being retired the following year.