ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 80

[EPA–HQ–OAR–2016–0004; FRL–9955–84–OAR]

RIN 2060–AS72

Renewable Fuel Standard Program: Standards for 2017 and Biomass-Based Diesel Volume for 2018

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: Under section 211 of the Clean Air Act, the Environmental Protection Agency (EPA) is required to set renewable fuel percentage standards every year. This action establishes the annual percentage standards for cellulosic biofuel, biomass-based diesel, advanced biofuel, and total renewable fuel that apply to all motor vehicle gasoline and diesel produced or imported in the year 2017. Relying on statutory authority that is available when projected cellulosic biofuel production volumes are less than the applicable volume specified in the statute, the EPA is setting volume requirements for cellulosic biofuel, advanced biofuel, and total renewable fuel that are below the statutory applicable volumes, but which are nevertheless significantly higher than past requirements. The final rule also establishes the four percentage standards applicable to obligated parties, namely producers and importers of gasoline and diesel, based on the corresponding volume requirements. The final standards are expected to continue driving the market to overcome constraints in renewable fuel distribution infrastructure, which in turn is expected to lead to substantial growth over time in the production and use of renewable fuels. In this action, we are also establishing the applicable volume of biomass-based diesel for 2018.

DATES: This final rule is effective on February 10, 2017.

ADDRESSES: The EPA has established a docket for this action under Docket ID No. EPA–HQ–OAR–2016–0004. All documents in the docket are listed on the *http://www.regulations.gov* Web site. Although listed in the index, some information is not publicly available, *e.g.,* CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available electronically through *http://www.regulations.gov.*

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SUPPLEMENTARY INFORMATION: Entities potentially affected by this final rule are those involved with the production, distribution, and sale of transportation fuels, including gasoline and diesel fuel or renewable fuels such as ethanol, biodiesel, renewable diesel, and biogas. Potentially regulated categories include:

Category	NAICS [1] codes	SIC [2] codes	Examples of potentially regulated entities
Industry	324110	2911	Petroleum Refineries.
Industry	325193	2869	Ethyl alcohol manufacturing.
Industry	325199	2869	Other basic organic chemical manufacturing.
Industry	424690	5169	Chemical and allied products merchant wholesalers.
Industry	424710	5171	Petroleum bulk stations and terminals.
Industry	424720	5172	Petroleum and petroleum products merchant wholesalers.
Industry	221210	4925	Manufactured gas production and distribution.
Industry	454319	5989	Other fuel dealers.

[1] North American Industry Classification System (NAICS).
[2] Standard Industrial Classification (SIC) system code.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this final action. This table lists the types of entities that EPA is now aware could potentially be regulated by this final action. Other types of entities not listed in the table could also be regulated. To determine whether your entity would be regulated by this final action, you should carefully examine the applicability criteria in 40 CFR part 80. If you have any questions regarding the applicability of this final action to a particular entity, consult the person listed in the **FOR FURTHER INFORMATION CONTACT** section.

Outline of This Preamble

I. Executive Summary

The Renewable Fuel Standard (RFS) program began in 2006 pursuant to the requirements in Clean Air Act (CAA) section 211(o) that were added through the Energy Policy Act of 2005 (EPAct). The statutory requirements for the RFS program were subsequently modified through the Energy Independence and Security Act of 2007 (EISA), resulting in the publication of major revisions to the regulatory requirements on March 26, 2010.[1] EISA's stated goals include moving the United States toward "greater energy independence and security, to increase the production of clean renewable fuels." Today, nearly all of the approximately 142 billion gallons of gasoline used for transportation purposes contains 10 percent ethanol (E10), and a substantial portion of diesel fuel contains biodiesel.

Renewable fuels represent an opportunity for the U.S. to move away from fossil fuels towards a set of lower lifecycle GHG transportation fuels, and the RFS program provides incentives for these lower lifecycle GHG fuels to grow and compete in the market. While renewable fuels include non-advanced (conventional) corn starch ethanol, which is the predominant renewable fuel in use to date, Congress envisioned the majority of growth from 2014 forward to come from advanced biofuels, as the conventional volumes remain constant in the statutory volume tables starting in 2015 while the advanced volumes continue to grow.[2]

The statute includes annual volume targets, and requires EPA to translate those volume targets (or alternative volume requirements established by EPA in accordance with statutory waiver authorities) into compliance obligations that refiners and importers must meet every year. In this action, we are establishing the annual percentage standards for cellulosic biofuel, biomass-based diesel, advanced biofuel, and total renewable fuel that would apply to all gasoline and diesel produced or imported in 2017. We are also establishing the applicable volume of biomass-based diesel for 2018.

The standards we are setting are designed to achieve the Congressional intent of increasing renewable fuel use over time in order to reduce lifecycle GHG emissions of transportation fuels and increase energy security, while at the same time accounting for the real-world challenges that have slowed progress toward these goals. Those challenges have made the volume targets established by Congress for 2017 beyond reach for all fuel categories other than biomass-based diesel (BBD), for which the statute specifies only a minimum requirement of 1.0 billion gallons. In setting these standards for 2017, we have used the cellulosic waiver authority provision provided by Congress to establish volume requirements that will be lower than the statutory targets for fuels other than biomass-based diesel, but nevertheless represent significant growth from past years.

The 2017 volume requirements for advanced biofuel and total renewable fuel are higher than the levels we proposed in the NPRM, reflecting our assessment of updated information and a review of comments received. We are also finalizing the proposed volume requirement for BBD for 2018. This BBD volume requirement will continue to provide support for the BBD industry, and we expect that larger volumes of this fuel type are likely to be used to comply with the advanced biofuel requirement. The final volume requirements are shown in Table I–1 below. These final volumes, when considered together with the volumes established over the past several years of the RFS program, indicate that the RFS program is working to deliver steady, ambitious growth in the total amount of renewable fuel produced and used in the United States, consistent with Congressional intent.

TABLE I–1—PROPOSED AND FINAL VOLUME REQUIREMENTS [a]

	2017		2018	
	Proposed	Final	Proposed	Final
Cellulosic biofuel (million gallons)	312	311	n/a	n/a
Biomass-based diesel (billion gallons)	[b] 2.0	[b] 2.0	2.1	2.1
Advanced biofuel (billion gallons)	4.0	4.28	n/a	n/a
Renewable fuel (billion gallons)	18.8	19.28	n/a	n/a

[a] All values are ethanol-equivalent on an energy content basis, except for BBD which is biodiesel-equivalent.
[b] The 2017 BBD volume requirement was established in the 2014–2016 final rule (80 FR 77420, December 14, 2015).

[1] 75 FR 14670, March 26, 2010.

[2] In this document we follow the common practice of using the term "conventional" renewable fuel to mean any renewable fuel that is not an advanced biofuel.

Despite significant increases in renewable fuel use in the United States, real-world constraints, such as the slower than expected development of the cellulosic biofuel industry and constraints in the marketplace related to supply of certain biofuels to consumers, have made the timeline laid out by Congress for the growth in renewable fuel use (other than for BBD) impossible to achieve. These challenges continue, and are largely the same for 2017 as they were for 2016. However, a careful review of the comments we received in response to the May 31, 2016 Notice of Proposed Rulemaking (NPRM) and other information that has become available since May has led us to conclude that volume reductions for 2017 need not be as great as we had proposed. In light of the lower reductions necessary, in this final rule we rely exclusively on the cellulosic waiver authority to provide reductions in both advanced biofuel and total renewable fuel volumes. That is, we have determined that it is not necessary to provide an additional increment of volume reduction for total renewable fuels through use of the general waiver authority based on a finding of inadequate domestic supply, as we had done in the final rule establishing annual standards for 2014–2016 (''Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass-Based Diesel Volume for 2017,'' (hereinafter referred to as the ''2014–2016 final rule''),[3] and as we also proposed to do in establishing standards for 2017.[4]

We believe that the RFS program can and will drive renewable fuel use, and we have considered the ability of the market to respond to the standards we set when we assessed the amount of renewable fuel that can be reasonably attained in 2017. Therefore, while this final rule applies the tools Congress provided to make adjustments to the statutory volume targets in recognition of the constraints that exist today, we believe the standards we are setting in this action will drive growth in renewable fuels, particularly advanced biofuels, which achieve substantial lifecycle GHG emissions. In our view, while Congress recognized that supply challenges may exist as evidenced by the waiver provisions, it did not intend growth in the renewable fuels market to be stopped by those challenges, including those associated with the ''E10 blendwall.'' [5] The fact that Congress chose to mandate increasing and substantial amounts of renewable fuel clearly signals that it intended the RFS program to create incentives to increase renewable fuel supplies and overcome constraints in the market. The standards we are setting in this action will provide those incentives.

The standards we are setting in this final rule are part of a collection of actions, in both the government and private sectors, to increase the use of renewable fuels. In addition to ongoing efforts to evaluate new pathways for RIN generation for advanced biofuels, we have recently proposed regulatory provisions that we believe will enhance the ability of the market to increase not only the production of advanced and cellulosic biofuels, but also the use of higher-level ethanol blends such as E15 and E85.[6] DOE and USDA are continuing to provide funds for the development of new technologies and expansion of infrastructure for higher ethanol blends, and the ethanol industry has also made efforts to expand the use of higher ethanol blends through its Prime the Pump program. These actions are expected to continue to help clear hurdles to support the ongoing growth in the use of renewable fuels in future years.

A. Purpose of This Action

The national volume targets of renewable fuel that are intended to be achieved under the RFS program each year (absent an adjustment or waiver by EPA) are specified in CAA section 211(o)(2). The statutory volumes for 2017 are shown in Table I.A–1. The cellulosic biofuel and BBD categories are nested within the advanced biofuel category, which is itself nested within the total renewable fuel category. This means, for example, that each gallon of cellulosic biofuel or BBD that is used to satisfy the individual volume requirements for those fuel types can also be used to satisfy the requirements for advanced biofuel and total renewable fuel.

TABLE I.A–1—APPLICABLE 2017 VOLUMES SPECIFIED IN THE CLEAN AIR ACT

[Billion gallons] [a]

Cellulosic biofuel	5.5
Biomass-based diesel	≥1.0
Advanced biofuel	9.0
Renewable fuel	24.0

[a] All values are ethanol-equivalent on an energy content basis, except values for BBD which are given in actual gallons.

Under the RFS program, EPA is required to determine and publish annual percentage standards for each compliance year. The percentage standards are calculated to ensure use in transportation fuel of the national ''applicable volumes'' of the four types of biofuel (cellulosic biofuel, BBD, advanced biofuel, and total renewable fuel) that are set forth in the statute or established by EPA in accordance with the Act's requirements. The percentage standards are used by obligated parties (generally, producers and importers of gasoline and diesel fuel) to calculate their individual compliance obligations. Each of the four percentage standards is applied to the volume of non-renewable gasoline and diesel that each obligated party produces or imports during the specified calendar year to determine their individual volume obligations with respect to the four renewable fuel types. The individual volume obligations determine the number of RINs of each renewable fuel type that each obligated party must acquire and retire to demonstrate compliance.

EPA is establishing the annual applicable volume requirements for cellulosic biofuel, advanced biofuel, and total renewable fuel for 2017, and for BBD for 2018.[7] Table I.A–2 lists the statutory provisions and associated criteria relevant to determining the national applicable volumes used to set the percentage standards in this final rule.

[3] 80 FR 77420, December 14, 2015.

[4] 81 FR 34778, May 31, 2016.

[5] The ''E10 blendwall'' represents the volume of ethanol that can be consumed domestically if all gasoline contains 10% ethanol and there are no higher-level ethanol blends consumed such as E15 or E85.

[6] See the recently proposed Renewables Enhancement and Growth Support (REGS) Rule (81 FR 80828, November 16, 2016). More information about this proposed rule can be found at *https://www.epa.gov/renewable-fuel-standard-program/proposed-renewables-enhancement-and-growth-support-regs-rule.*

[7] The 2017 BBD volume requirement was established in the 2014–2016 final rule.

TABLE I.A–2—STATUTORY PROVISIONS FOR DETERMINATION OF APPLICABLE VOLUMES

Applicable volumes	Clean air act reference	Criteria provided in statute for determination of applicable volume
Cellulosic biofuel	211(o)(7)(D)(i)	Required volume must be lesser of volume specified in CAA 211(o)(2)(B)(i)(III) or EPA's projected volume.
	211(o)(7)(A)	EPA in consultation with other federal agencies may waive the statutory volume in whole or in part if implementation would severely harm the economy or environment of a State, region, or the United States, or if there is an inadequate domestic supply.
Biomass-based diesel [8]	211(o)(2)(B)(ii) and (v)	Required volume for years after 2012 must be at least 1.0 billion gallons, and must be based on a review of implementation of the program, coordination with other federal agencies, and an analysis of specified factors.
	211(o)(7)(A)	EPA in consultation with other federal agencies may waive the statutory volume in whole or in part if implementation would severely harm the economy or environment of a State, region, or the United States, or if there is an inadequate domestic supply.
Advanced biofuel	211(o)(7)(D)(i)	If applicable volume of cellulosic biofuel is reduced below the statutory volume to the projected volume, EPA may reduce the advanced biofuel and total renewable fuel volumes in CAA 211(o)(2)(B)(i)(I) and (II) by the same or lesser volume. No criteria specified.
	211(o)(7)(A)	EPA in consultation with other federal agencies may waive the statutory volume in whole or in part if implementation would severely harm the economy or environment of a State, region, or the United States, or if there is an inadequate domestic supply.
Total renewable fuel	211(o)(7)(D)(i)	If applicable volume of cellulosic biofuel is reduced below the statutory volume to the projected volume, EPA may reduce the advanced biofuel and total renewable fuel volumes in CAA 211(o)(2)(B)(i)(I) and (II) by the same or lesser volume. No criteria specified.
	211(o)(7)(A)	EPA in consultation with other federal agencies may waive the statutory volume in whole or in part if implementation would severely harm the economy or environment of a State, region, or the United States, or if there is an inadequate domestic supply.

As shown in Table I.A–2, the statutory authorities allowing EPA to modify or set the applicable volumes differ for the four categories of renewable fuel. Under the statute, EPA must annually determine the projected volume of cellulosic biofuel production for the following year. If the projected volume of cellulosic biofuel production is less than the applicable volume specified in section 211(o)(2)(B)(i)(III) of the statute, EPA must lower the applicable volume used to set the annual cellulosic biofuel percentage standard to the projected production volume. In Section III of this final rule, we present our analysis of cellulosic biofuel production and the final applicable volume for 2017. This analysis is based on information provided by the Department of Energy's Energy Information Administration (EIA), an evaluation of producers' production plans and progress to date following discussions with cellulosic biofuel producers, and is informed by comments we received in response to the NPRM.

With regard to BBD, Congress chose to set aside a portion of the advanced biofuel standard for BBD, and CAA section 211(o)(2)(B) specifies the applicable volumes of BBD to be used in the RFS program only through year 2012. For subsequent years the statute sets a minimum volume of 1 billion gallons, and directs EPA, in coordination with the U.S. Departments of Agriculture (USDA) and Energy (DOE), to determine the required volume after review of implementation of the renewable fuels program and consideration of a number of factors. The BBD volume requirement must be established 14 months before the year in which it will apply. In the 2014–2016 final rule we established the BBD volume for 2017. In Section VI of this preamble we discuss our assessment of statutory and other relevant factors and our final volume requirement for BBD for 2018, which has been developed in coordination with USDA and DOE. We are increasing the required volume of BBD so as to provide continued support to that important contributor to the pool of advanced biofuel while at the same time setting the volume requirement in a manner anticipated to provide continued incentive for the development of other types of advanced biofuel.

Regarding advanced biofuel and total renewable fuel, Congress provided several mechanisms through which those volumes could be reduced if necessary. If we reduce the applicable volume of cellulosic biofuel below the volume specified in CAA section 211(o)(2)(B)(i)(III), we also have the authority to reduce the applicable volumes of advanced biofuel and total renewable fuel by the same or a lesser amount. We refer to this as the ''cellulosic waiver authority.'' We may also reduce the applicable volumes of any of the four renewable fuel types using the ''general waiver authority'' provided in CAA section 211(o)(7)(A) if EPA, in consultation with USDA and DOE, finds that implementation of the statutory volumes would severely harm the economy or environment of a State, region, or the United States, or if there is inadequate domestic supply. Sections II, IV, and V of this final rule describe our use of the cellulosic waiver authority alone to reduce volumes of advanced biofuel and total renewable fuel, and our assessment that the resulting volumes are reasonably attainable. As described in the NPRM, and consistent with the views that we expressed in the 2014–2016 final rule, we continue to believe that reductions in the statutory targets for 2017 are necessary. However, in light of our review of updated information and consideration of comments, we are making those reductions under the cellulosic waiver authority alone and are not finalizing an additional

[8] Section 211(o)(7)(E) also authorizes EPA in consultation with other federal agencies to issue a temporary waiver of applicable volumes of BBD where there is a significant feedstock disruption or other market circumstance that would make the price of BBD fuel increase significantly.

increment of reduction for total renewable fuel based on a finding of inadequate domestic supply under the general waiver authority as we had proposed. Despite the reductions we are finalizing today, we continue to be mindful that the primary objective of the statute is to increase renewable fuel use over time. While progress has taken longer than Congress anticipated, we note that today's rule provides for 15 billion gallons of conventional renewable fuel, the implied level envisioned under the statute for 2017, while also providing for a substantial increase in the required volume of advanced biofuel over past volume requirements.

B. Summary of Major Provisions in This Action

This section briefly summarizes the major provisions of this final rule. We are establishing applicable volume requirements and associated percentage standards for cellulosic biofuel, advanced biofuel, and total renewable fuel for 2017, as well as the percentage standard for BBD for 2017, and the applicable volume requirement for BBD for 2018.

1. Approach to Setting Volume Requirements

The approach we have taken in this final rule is essentially the same as that presented in the NPRM and in the 2014–2016 final rule with regard to establishing the cellulosic biofuel volume requirement, and the use of the cellulosic waiver authority to reduce advanced biofuel and total renewable fuel. However, it differs in that we have not found it necessary to also use the general waiver authority to provide an additional increment of reduction with respect to total renewable fuel. While in the NPRM we proposed to determine the maximum reasonably achievable supply of total renewable fuel, consistent with the general waiver authority's ''inadequate domestic supply'' criterion, in this final rule we have instead identified the total renewable fuel volume that results from use of the cellulosic waiver authority, and have determined that this volume of total renewable fuel is reasonably attainable. In this assessment, we took into account the same constraints in the supply of renewable fuel we noted in the NPRM, but have come to a different result with respect to necessary volume reductions in light of updated information and consideration of comments.

Section II provides a general description of our approach to setting volume requirements in today's rule, including a review of the statutory waiver authorities and our consideration of carryover RINs. Section III provides our assessment of the 2017 cellulosic biofuel volume based on a projection of production that reflects a neutral aim at accuracy. Sections IV and V describe our assessment of reasonably attainable volumes of advanced biofuel and total renewable fuel, respectively. Finally, Section VI provides our determination regarding the 2018 BBD volume requirement, and reflects an analysis of a set of factors stipulated in CAA section 211(o)(2)(B)(ii).

2. Cellulosic Biofuel

In the past several years the cellulosic biofuel industry has continued to make progress towards increased commercial scale production. Cellulosic biofuel production reached record levels in 2015, driven largely by compressed natural gas (CNG) and liquefied natural gas (LNG) derived from biogas, and is expected to exceed these volumes in 2016. Cellulosic ethanol, while produced in much smaller quantities than CNG/LNG derived from biogas, was produced consistently on a commercial scale for the first time in 2015. Cellulosic ethanol production levels increased from existing facilities in 2016, and significant work continues to be done to enable the production of cellulosic ethanol at new facilities in 2017 and beyond. Available data suggest that the production levels for both cellulosic CNG/LNG and cellulosic ethanol in 2016 will exceed by a significant margin the levels produced in 2015. In this rule we are establishing a cellulosic biofuel volume requirement of 311 million ethanol-equivalent gallons for 2017 based on the information we have received regarding individual facilities' capacities, production start dates and biofuel production plans, information received in public comments, input from other government agencies, and EPA's own engineering judgment.

As part of estimating the volume of cellulosic biofuel that will be made available in the U.S. in 2017, we considered all potential production sources by company and facility. This included facilities still in the commissioning or start-up phases, as well as facilities already producing some volume of cellulosic biofuel.[9] From this universe of potential cellulosic biofuel sources, we identified the subset that is expected to produce commercial volumes of qualifying cellulosic biofuel for use as transportation fuel, heating oil, or jet fuel by the end of 2017. To arrive at projected volumes, we collected relevant information on each facility. We then developed projected production ranges based on factors such as the status of the technology being used, progress towards construction and production goals, facility registration status, production volumes achieved, and other significant factors that could potentially impact fuel production or the ability of the produced fuel to qualify for cellulosic biofuel Renewable Identification Numbers (RINs). We also used this information to group these companies based on production history and to select a value within the aggregated projected production ranges that we believe best represents the most likely production volume from each group of companies in 2017. Further discussion of these factors and the way they were used to determine our final cellulosic biofuel projection for 2017 can be found in Section III.

3. Advanced Biofuel

The conditions that compelled us to reduce the 2016 volume requirement for advanced biofuel below the statutory target remain relevant in 2017. As for 2016, we investigated the ability of volumes of non-cellulosic advanced biofuels to backfill unavailable volumes of cellulosic biofuel in 2017, through domestic production or import. We took into account the substantial GHG emissions reduction required of advanced biofuels, the various constraints on supply of advanced biofuels, the ability of the standards we set to bring about market changes in the time available, and the potential impacts associated with diverting some feedstocks from current use to the production of biofuel. Based on these considerations and review of the comments received in response to the NPRM and other information that has become available, we have determined that a portion of the shortfall in cellulosic biofuel may appropriately be backfilled with advanced biofuel. We are exercising our cellulosic waiver authority to reduce the statutory applicable volume of advanced biofuel to a final volume requirement of 4.28 billion gallons for 2017. This is somewhat higher than the proposed level of 4.0 billion gallons. The applicable volume for advanced biofuel that we are establishing for 2017 will result in significant volume growth over the volume requirement for 2016, and will require the use of more non-

[9] Facilities primarily focused on research and development (R&D) were not the focus of our assessment, as production from these facilities represents very small volumes of cellulosic biofuel, and these facilities typically have not generated RINs for the fuel they have produced.

cellulosic advanced biofuel (3.97 billion gallons) than would have been required under the statutory targets (3.50 billion gallons).

4. Total Renewable Fuel

Following our determination of the appropriate volume reduction for advanced biofuel for 2017 using the cellulosic waiver authority, we applied the same volume reduction to the statutory target for total renewable fuel, resulting in a volume requirement of 19.28 billion gallons. We then evaluated this total renewable fuel volume to determine if it is reasonably attainable given assessments of attainable volumes of individual fuel types, including biodiesel, renewable diesel, ethanol (in the form of E10 or higher ethanol blends such as E15 or E85, taking into account demand for E0), and other renewable fuels. Based on comments received in response to the NPRM and other information that has become available, we have determined that a total renewable fuel volume of 19.28 billion gallons is reasonably attainable in 2017. There is, therefore, no need to use the general waiver authority to further reduce the total renewable fuel volume requirement due to a finding of inadequate domestic supply.[10]

5. Biomass-Based Diesel

In EISA, Congress specified increasing applicable volumes of BBD through 2012. Beyond 2012 Congress stipulated that EPA, in coordination with other agencies, was to establish the BBD volume taking into consideration implementation of the program to date and various specified factors, providing that the required volume for BBD could not be less than 1.0 billion gallons. For 2013, EPA established an applicable volume of 1.28 billion gallons. For 2014 and 2015 we established the BBD volume requirement to reflect the actual volume for each of these years of 1.63 and 1.73 billion gallons.[11] For 2016 and 2017, we set the BBD volume requirements at 1.9 and 2.0 billion gallons respectively.

Given current and recent market conditions, the advanced biofuel volume requirement is driving the use of biodiesel and renewable diesel volumes over and above volumes required through the separate BBD standard, and we expect this to continue. Nevertheless, we continue to believe for 2018 that it is appropriate to set increasing BBD applicable volumes to provide a floor to support continued investment to enable increased production and use of BBD. In doing so we also believe in the importance of maintaining opportunities within the advanced biofuel requirement for growth in other types of advanced biofuel, such as renewable diesel co-processed with petroleum, renewable gasoline blend stocks, and renewable heating oil, as well as others that are under development.

Thus, based on a review of the implementation of the program to date and all the factors required under the statute, and in coordination with USDA and DOE, we are finalizing an increase in the applicable volume of BBD by 100 million gallons, to 2.1 billion gallons for 2018. We believe that this increase will support the overall goals of the program while also maintaining the incentive for development and growth in production of other advanced biofuels. Establishing the volumes at this level will encourage BBD producers to manufacture higher volumes of fuel that will contribute to the advanced biofuel and total renewable fuel requirements, while also leaving considerable opportunity within the advanced biofuel mandate for investment in and growth in production of other types of advanced biofuel with comparable or potentially superior environmental or other attributes.

6. Annual Percentage Standards

The renewable fuel standards are expressed as a volume percentage and are used by each producer and importer of fossil-based gasoline or diesel to determine their renewable fuel volume obligations. The percentage standards are set so that if each obligated party meets the standards, and if EIA projections of gasoline and diesel use for the coming year prove to be accurate, then the amount of renewable fuel, cellulosic biofuel, BBD, and advanced biofuel actually used will meet the volume requirements used to derive the percentage standards, required on a nationwide basis.

Four separate percentage standards are required under the RFS program, corresponding to the four separate renewable fuel categories shown in Table I.A–1. The specific formulas we use in calculating the renewable fuel percentage standards are contained in the regulations at 40 CFR 80.1405. The percentage standards represent the ratio of renewable fuel volume to projected non-renewable gasoline and diesel volume. The volume of transportation gasoline and diesel used to calculate the final percentage standards was provided by the Energy Information Administration (EIA). The final percentage standards for 2017 are shown in Table I.B.6–1. Detailed calculations can be found in Section VII, including the projected gasoline and diesel volumes used.

TABLE I.B.6–1—FINAL 2017 PERCENTAGE STANDARDS

Cellulosic biofuel	0.173%
Biomass-based diesel	1.67%
Advanced biofuel	2.38%
Renewable fuel	10.70%

7. Assessment of Aggregate Compliance

By November 30 of each year we are required to assess the status of the aggregate compliance approach to land-use restrictions under the definition of renewable biomass for both the U.S. and Canada. In today's action we are providing the final announcements for these administrative actions.

As part of the RFS regulations, EPA established an aggregate compliance approach for renewable fuel producers who use planted crops and crop residue from U.S. agricultural land. This compliance approach relieved such producers (and importers of such fuel) of the individual recordkeeping and reporting requirements otherwise required of producers and importers to verify that such feedstocks used in the production of renewable fuel meet the definition of renewable biomass. EPA determined that 402 million acres of U.S. agricultural land was available in 2007 (the year of EISA enactment) for production of crops and crop residue that would meet the definition of renewable biomass, and determined that as long as this total number of acres is not exceeded, it is unlikely that new land has been devoted to crop production based on historical trends and economic considerations. We indicated that we would conduct an annual evaluation of total U.S. acreage that is cropland, pastureland, or conservation reserve program land, and that if the value exceeds 402 million acres, producers using domestically grown crops or crop residue to produce renewable fuel would be subject to individual recordkeeping and reporting to verify that their feedstocks meet the definition of renewable biomass. As described in Section VIII.A, based on data provided by the USDA and using the methodology in place since 2014,

[10] The general waiver authority can also be used under a determination that the RFS volumes would cause ''severe economic or environmental harm.'' As described in Section II.A.2 and in more detail in the response to comments document accompanying this rule, EPA does not believe that the record supports a finding of severe economic or environmental harm with respect to the volume requirements we are finalizing today.

[11] The 2015 BBD standard was based on actual data for the first 9 months of 2015 and on projections for the latter part of the year for which data on actual use was not available at the time.

we have estimated that U.S. agricultural land totaled approximately 380 million acres in 2016 and thus did not exceed the 2007 baseline acreage. This assessment means that the aggregate compliance provision can continue to be used in the U.S. for calendar year 2017.

On September 29, 2011, EPA approved the use of a similar aggregate compliance approach for planted crops and crop residue grown in Canada. The Government of Canada utilized several types of land use data to demonstrate that the land included in their 124 million acre baseline is cropland, pastureland or land equivalent to U.S. Conservation Reserve Program land that was cleared or cultivated prior to December 19, 2007, and was actively managed or fallow and non-forested on that date (and is therefore RFS2 qualifying land). As described in Section VIII.B, based on data provided by Canada, we have estimated that Canadian agricultural land totaled approximately 118.4 million acres in 2016 and thus did not exceed the 2007 baseline acreage. This assessment means that the aggregate compliance provision can continue to be used in Canada for calendar year 2017.

II. Authority and Need For Waiver of Statutory Applicable Volumes

The statute provides the EPA with the authority to reduce volume requirements below the applicable volume targets specified in the statute under specific circumstances. This section discusses those authorities and our use of the cellulosic waiver authority alone to set 2017 volume requirements for cellulosic biofuel, advanced biofuel, and total renewable fuel that are below the statutory volume targets.

A. Statutory Authorities for Reducing Volume Targets

In CAA section 211(o)(2), Congress specified increasing annual volume targets for total renewable fuel, advanced biofuel, and cellulosic biofuel for each year through 2022, and for biomass-based diesel through 2012, and authorized EPA to set volume requirements for subsequent years in coordination with USDA and DOE, and after consideration of specified factors. However, Congress also recognized that under certain circumstances it would be appropriate for EPA to set volume requirements at a lower level than reflected in the statutory volume targets, and thus provided waiver provisions in CAA section 211(o)(7).

1. Cellulosic Waiver Authority

Section 211(o)(7)(D)(i) of the CAA provides that if EPA determines that the projected volume of cellulosic biofuel production for a given year is less than the applicable volume specified in the statute, that EPA must reduce the applicable volume of cellulosic biofuel required to the projected production volume for that calendar year. In making this projection, EPA must take a ''neutral aim at accuracy.'' *API* v. *EPA,* 706 F.3d 474 (D.C. Cir. 2013). Pursuant to this provision, EPA has set the cellulosic biofuel requirement lower than the statutory volumes for each year since 2010. As described in Section III.D, the projected volume of cellulosic biofuel production for 2017 is less than the 5.5 billion gallon volume target in the statute. Therefore, for 2017, we are setting the cellulosic biofuel volume requirement at a level lower than the statutory applicable volume, in accordance with this provision.

Section 211(o)(7)(D)(i) also provides that ''[f]or any calendar year in which the Administrator makes . . . a reduction [in cellulosic biofuel volumes], the Administrator may also reduce the applicable volume of renewable fuel and advanced biofuels . . . by the same or a lesser volume.'' Using this authority, the reductions in total renewable fuel and advanced biofuel can be less than or equal to, but no more than, the amount of reduction in the cellulosic biofuel volume. EPA used this authority to reduce applicable volumes of advanced biofuel in 2014–16, and to reduce the total renewable fuel volumes in those years by an equal amount. We refer to authority in Section 211(o)(7)(D)(i) to waive volumes of advanced and total renewable fuel as the ''cellulosic waiver authority.''

The cellulosic waiver authority was discussed by the United States Court of Appeals for the District of Columbia Circuit, in the context of its consideration of a judicial challenge to the rule establishing the 2013 annual RFS standards. As the court explained,

> The Clean Air Act provides that if EPA reduces the cellulosic biofuel requirement, as it did here, then it 'may also reduce' the advanced biofuel and total renewable fuel quotas 'by the same or a lesser volume.' 42 U.S.C. 7545(o)(7)(D)(i). There is no requirement to reduce these latter quotas, nor does the statute prescribe any factors that EPA must consider in making its decision. *See id.* In the absence of any express or implied statutory directive to consider particular factors, EPA reasonably concluded that it enjoys broad discretion regarding whether and in what circumstances to reduce the advanced biofuel and total renewable fuel volumes under the cellulosic waiver provision. *Monroe* v. *EPA,* 750 F.3d 909, 915 (D.C. Cir. 2014).

Some stakeholders have commented that EPA may only exercise the cellulosic waiver authority to reduce total and advanced volumes in circumstances described in CAA section 211(o)(7)(A) (that is, where there is inadequate domestic supply or severe harm to the environment or economy), or that it must in using the cellulosic waiver authority consider the factors specified in section 211(o)(2)(B)(ii) that are required considerations when EPA sets applicable volumes for years in which the statute does not do so. Contrary to these comments, the Court found in the *Monroe* case that the statute does not prescribe any factors that EPA must consider in making is decision; EPA has broad discretion under 211(o)(7)(D)(i) to determine when and under what circumstances to reduce the advanced and total renewable fuel volumes when it reduces the statutory applicable volume of cellulosic biofuel.

When using the cellulosic waiver authority, we believe that there would be substantial justification to exercise our discretion to lower volumes of total and advanced biofuels in circumstances where there are questions regarding the sufficiency of production or import of potentially qualifying renewable fuels, and where there is evidence of constraints that would limit the ability of those biofuels to be used for purposes specified in the Act (*i.e.,* in transportation fuel, heating oil, or jet fuel). In addition, we believe that it is appropriate in exercising the cellulosic waiver authority for EPA to consider the Congressional objectives reflected in the volumes tables in the statute, and the environmental objectives that generally favor the use of advanced biofuels over non-advanced biofuels. For example, in light of the larger GHG emissions reductions required for advanced biofuels as compared to conventional biofuel, and the Congressional objective to dramatically increase their use in the time period between 2015 and 2022, we believe that it is generally appropriate for reasonably attainable volumes of advanced biofuel that are sourced in a manner expected to provide significant GHG reduction benefits to backfill for shortages in cellulosic biofuel. On the other hand, we do not believe it would be appropriate for the gap in the availability of cellulosic biofuel in 2017 to be filled or partially filled with non-advanced biofuel, taking into consideration both the substantially lower greenhouse gas emissions reductions required for non-advanced biofuel[12] and the Congressional intent reflected in the statutory tables that use of these biofuels in this time period would be limited.[13] These considerations are consistent with EPA's past interpretation of the cellulosic waiver authority as envisioning equivalent reductions in the applicable volumes of advanced biofuels and total renewable fuels.[14] *See* 74 FR 24914; 78 FR 49810.

We believe, as we did in setting the volumes in the past, that the circumstances justifying use of our cellulosic waiver authority and thus a reduction in statutory volumes are currently present, and we are again using our cellulosic waiver authority under 211(o)(7)(D)(i) to reduce volume requirements for advanced biofuel and total renewable fuel. Congress envisioned that there would be 5.5 billion gallons of cellulosic biofuel in 2017, while our production projection, described in detail in Section III, is for 311 million gallons. Under 211(o)(7)(D)(i), EPA must lower the required cellulosic volume to the projected production volumes. See also *API* v. *EPA,* 706 F.3d 474 (D.C. Cir. 2012). Doing so also provides EPA with authority to lower advanced and total renewable fuel volumes by the same or a lesser amount.

We have determined, as described in Section IV, that the applicable volume for advanced biofuels specified in the statute for 2017 cannot be achieved and, consistent with the principles described above, we are exercising our cellulosic waiver authority to lower the applicable volume of advanced biofuel to a level that is both reasonably attainable and appropriate, and to provide an equivalent reduction in the applicable volume of total renewable fuel. In addition, we have determined that there is adequate supply to satisfy the total renewable fuel volume derived through applying an equal volume reduction as for advanced biofuel. Therefore, no further reductions of the total renewable fuel volume requirement are necessary to address concerns of inadequate supply. The resulting volume requirements provide the benefits associated with the use of reasonably attainable and appropriate volumes of advanced biofuels to partially backfill for missing volumes of cellulosic biofuel in 2017, while also providing for an implied volume requirement for conventional biofuel equal to that envisioned by Congress for 2017.

2. General Waiver Authority

Section 211(o)(7)(A) of the CAA provides that EPA, in consultation with the Secretary of Agriculture and the Secretary of Energy, may waive the applicable volume specified in the Act in whole or in part based on petition by one or more States, by any person subject to the requirements of the Act, or by the EPA Administrator on her own motion. Such a waiver must be based on a determination by the Administrator, after public notice and opportunity for comment that (1) implementation of the requirement would severely harm the economy or the environment of a State, a region or the United States, or (2) there is an inadequate domestic supply. Because the general waiver provision provides EPA the discretion to waive the statutory applicable volume ''in whole or in part,'' we interpret this section as granting EPA authority to fully or partially waive any of the four applicable volume requirements in appropriate circumstances. For the years 2014–2016, EPA determined that there was an inadequate domestic supply of total renewable fuel, and used the general waiver authority to reduce the total renewable fuel volumes further than the reductions obtained using the cellulosic waiver authority. In the notice of proposed rulemaking for this rule, EPA proposed to use the general wavier authority in a similar way, and for the same reason, in establishing the 2017 total renewable fuel volume requirement.

Based on further evaluation of the availability of renewable fuel in the market, in the interim between the NPRM and this final rule, and review of public comment, EPA has determined that it is not necessary to use the general waiver authority. That is, we have determined that use of the cellulosic waiver authority alone will be sufficient to yield a volume requirement that is consistent with available supply.[15]

3. General Comments Related to Waiver Authorities

Many commenters suggested that EPA should only use the cellulosic waiver authority to reduce volumes of total renewable fuel in 2017. While we do not believe this would have been possible under the circumstances described in the proposal, in light of EPA's re-evaluation of available supplies, as discussed in Sections IV and V, we are today following the approach suggested by these commenters in using the cellulosic waiver authority exclusively to reduce volumes of both advanced biofuel and total renewable fuel.

Some commenters said that EPA should not reduce the volume requirements for advanced biofuel and total renewable fuel at all and should instead set standards for 2017 based on the statutory targets. In most cases, these commenters based their positions on the availability of carryover RINs and an expectation that ''letting the market work'' would be sufficient to overcome all constraints related the production and distribution of fuels that can be used to satisfy these standards. As described in Section II.B below, we continue to believe that, in light of the expected volume of carryover RINs, it would be inappropriate for 2017 to intentionally draw down the bank of carryover RINs for the purposes of increasing the volume requirements above levels that can be satisfied with physical volume. As for ''letting the market work,'' we believe that this view is dismissive of the market constraints discussed in the NPRM, Table II.E. 1–1 of the 2014–2016 final rule and in Sections IV.B and V.B of this final rule. The market is not unlimited in its ability to respond to the standards EPA sets. While setting the standards at the statutory targets would undoubtedly produce a significant increase in RIN prices, doing so in light of the combined actions of all constraints shown in Table II.E.1–1 of the 2014–2016 final rule and discussed in Sections IV.B. and V.B. of this rule would nevertheless create a

[12] Non-advanced biofuel must meet the 20% reduction in lifecycle GHG emissions described in CAA section 211(o)(2)(A)(i), unless they qualify for an exemption under 40 CFR 80.1403.

[13] Since the advanced biofuel volume requirement is nested within the total renewable fuel volume requirement, the statutory implied volume for conventional renewable fuel in the statutory tables can be discerned by subtracting the applicable volume of advanced biofuel from that of total renewable fuel. Performing this calculation with respect to the tables in CAA section 211(o)(2)(B) indicates a Congressional expectation that in the time period 2015–2022, advanced biofuel volumes would grow from 5.5 to 21 billion gallons, while the implied volume for conventional renewable fuel would remain constant at 15 billion gallons.

[14] Our consistent view has been that the provision is best interpreted and implemented to provide for equal reductions in advanced biofuel and total renewable fuel. We believe that this approach is consistent with the statutory language and best effectuates the objectives of the statute, in that it allows for EPA to determine an appropriate volume of advanced biofuel providing meaningful GHG emissions reductions to backfill missing cellulosic volumes, while also resulting in an implied volume for conventional renewable fuel of no greater than 15 billion gallons as envisioned in the statutory time period for 2015–2022.

[15] Some commenters noted that in addition to the authority to reduce applicable volumes under the general waiver authority on the basis of an ''inadequate domestic supply'' that EPA possesses the ability to use the general waiver authority where it finds that the RFS volumes would cause ''severe economic or environmental harm in a State, region, or the United States.'' As described in more detail in the response to comments document accompanying this rule, EPA does not believe that the record supports a finding of severe economic or environmental harm with respect to the volume requirements we are finalizing today.

shortfall in supply in 2017 that would likely lead to a complete draw-down in the bank of carryover RINs, noncompliance, and/or additional petitions for a waiver of the standards. As described in Sections IV and V, we are authorized to use the cellulosic waiver authority in 2017 to reduce volumes of advanced and total renewable fuel, and believe it is appropriate to do so for the reasons noted in those sections.

B. Treatment of Carryover RINs

Consistent with our approach in the 2014–2016 final rule, we have also considered the availability and role of carryover RINs in our decision to exercise our cellulosic waiver authority in setting the advanced and total volume requirements for 2017.[16] Although the statute requires a credit program and specifies that the credits shall be valid for a 12-month time period, neither the statute nor EPA regulations specify how or whether EPA should consider the availability of carryover RINs in exercising its cellulosic waiver authority.[17] As noted in the context of the rule establishing the 2014–16 RFS standards, we believe that a bank of carryover RINs is extremely important in providing obligated parties compliance flexibility in the face of substantial uncertainties in the transportation fuel marketplace, and in providing a liquid and well-functioning RIN market upon which success of the entire program depends.[18] Carryover RINs provide flexibility in the face of a variety of circumstances that could limit the availability of RINs, including weather-related damage to renewable fuel feedstocks and other circumstances potentially affecting the production and distribution of renewable fuel.[19] On the other hand, carryover RINs can be used for compliance purposes, and in the context of the 2013 RFS rulemaking we noted that an abundance of carryover RINs available in that year, together with possible increases in renewable fuel production and import, justified maintaining the advanced and total renewable fuel volume requirements for that year at the levels specified in the statute.[20]

In the 2017 NPRM, EPA estimated that the likely volume of the carryover RIN bank for 2017 would be approximately 1.72 billion carryover RINs (including all D codes). We proposed that in light of this relatively limited volume and the important functions provided by the RIN bank, that we would not set the volume requirements for 2017 in a manner that would intentionally lead to a drawdown in the bank of carryover RINs. In their comments on the 2017 NPRM, parties generally expressed two opposing points of view. Commenters representing obligated parties supported EPA's proposed decision to not assume a drawdown in the bank of carryover RINs in determining the appropriate level of volume requirements. These commenters reiterated the importance of maintaining the carryover RIN bank in order to provide obligated parties with necessary compliance flexibilities, better market trading liquidity, and a cushion against future program uncertainty. Commenters representing renewable fuel producers, however, contended that carryover RINs represent actual supply and should be accounted for when establishing the annual volume standards and, in particular, in any determination under the general waiver authority that there is an ''inadequate domestic supply.'' They expressed concern that obligated parties could use carryover RINs as an alternative to RINs generated for renewable fuel produced in 2017, leading to less demand for their product and inadequate return on investment.[21]

1. Updated Projection of Carryover RIN Volume

In the NPRM, EPA estimated that the carryover RIN bank available in 2017 would be approximately 1.72 billion carryover RINs. Since that time, obligated parties have submitted their compliance demonstrations for the 2014 compliance year and, based on that information, we now estimate that there will at most be 1.54 billion carryover RINs available for possible use in complying with the standards for 2017, a decrease of nearly 200 million RINs from the previous estimate.[22] This is approximately 8 percent of the final 2017 total renewable fuel volume standard and less than half of the 20 percent limit permitted by the regulations to be carried over for use in complying with the 2017 standards. However, there remains considerable uncertainty surrounding this number since compliance demonstrations still need to be made for the 2015 and 2016 RFS standards, and it is unclear at this time whether some portion of the 1.54 billion carryover RINs we estimate will be available for the 2017 compliance demonstrations will be used for compliance prior to 2017. In addition, we note that there have been enforcement actions in past years that have resulted in the retirement of RINs that were fraudulently generated and were therefore invalid, and parties that relied on those invalid RINs for compliance were required to acquire valid substitutes to true up their past compliance demonstrations. Future enforcement actions could have similar results, and require that obligated parties settle past enforcement-related obligations in addition to the annual standards, thereby potentially creating demand for RINs greater than can be accommodated through actual renewable fuel blending in 2017. Collectively, the result of satisfying RFS obligations in 2015 and 2016 and settling enforcement-related accounts could be an effective reduction in the size of the collective bank of carryover RINs to a level below 1.54 billion RINs. Thus, we believe there is considerable uncertainty that a RIN bank as large as 1.54 billion RINs will be available in 2017.

2. EPA's Decision

EPA has decided to maintain the proposed approach, and not set the volume requirements in the final rule with the intention or expectation of drawing down the current bank of carryover RINs. In finalizing this approach, we carefully considered the many comments received, including on the role of carryover RINs under our waiver authorities and the policy implications of our decision. While we have not assumed an intentional

[16] The discussion of the role of carryover RINs as they relate to the cellulosic volume standard for 2017 can be found in Section III.D.

[17] CAA section 211(o)(5) requires that EPA establish a credit program as part of its RFS regulations, and that the credits be valid to show compliance for 12 months as of the date of generation. EPA implemented this requirement though the use of RINs, which can be used to demonstrate compliance for the year in which they are generated or the subsequent compliance year. Obligated parties can obtain more RINs than they need in a given compliance year, allowing them to ''carry over'' these excess RINs for use in the subsequent compliance year, although use of these carryover RINs is limited to 20% of the obligated party's RVO. For the bank of carryover RINs to be preserved from one year to the next, individual carryover RINs are used for compliance before they expire and are essentially replaced with a newer vintage RIN that is then held for use in the next year. For example, if the volume of the RIN bank is unchanged from 2016 to 2017, then all of the vintage 2016 carryover RINs must be used for compliance in 2017, or they will expire. However, the same volume of 2017 RINs can then be ''banked'' for use in the next year.

[18] See 80 FR 77482–77487 (December 14, 2015).

[19] See id., and 72 FR 23900 (May 1, 2007).

[20] See 79 FR 49794 (August 15, 2013).

[21] A full description of comments received, and our detailed responses to them, is available in the Response to Comments document in the docket.

[22] The calculations performed to estimate the number of carryover RINs available in 2017 can be found in the memorandum, ''2017 Carryover RIN Bank Calculations,'' available in the docket.

drawdown in the overall bank of carryover RINs owned by obligated parties collectively in establishing the volume requirements for 2017, we understand that some obligated parties may choose to sell or use all or part of their individual banks of carryover RINs. To the extent that they do so, other obligated parties would be in a position to bank carryover RINs by using available renewable fuel or purchasing RINs representing such fuel, with the expected net result being no effective change in the size of the overall bank of carryover RINs that is owned collectively by obligated parties.

In response to those parties who argued that carryover RINs must be considered part of the ''supply'' when EPA uses the general waiver authority on the basis of a finding of ''inadequate domestic supply,'' we note that we are not using the general waiver authority in this final action, so these arguments are irrelevant. We believe that a balanced consideration of the possible role of carryover RINs in achieving the statutory volume objectives for advanced and total renewable fuels, versus maintaining an adequate bank of carryover RINs for important programmatic functions, is appropriate when EPA exercises its discretion under the cellulosic waiver authority, and that the statute does not specify the extent to which EPA should require a drawdown in the bank of carryover RINs when it exercises this authority.

An adequate RIN bank serves to make the RIN market liquid and to avoid the possible need for adjustments to the standards. Just as the economy as a whole functions best when individuals and businesses prudently plan for unforeseen events by maintaining inventories and reserve money accounts, we believe that the RFS program functions best when sufficient carryover RINs are held in reserve for potential use by the RIN holders themselves, or for possible sale to others that may not have established their own carryover RIN reserves. Were there to be no RINs in reserve, then even minor disruptions causing shortfalls in renewable fuel production or distribution, or higher than expected transportation fuel demand (requiring greater volumes of renewable fuel to comply with the percentage standards that apply to all volumes of transportation fuel, including the unexpected volumes) could lead to the need for a new waiver of the standards, undermining the market certainty so critical to the long term success of the RFS program. Furthermore, many obligated parties lack the ability to separate one or more types of RINs through blending. With a functioning liquid RIN market this is not a problem because we expect that these obligated parties will be able to comply by securing these RINs on the open market. However, a significant drawdown of the carryover RIN bank leading to a scarcity of RINs may stop the market from functioning in an efficient manner, even where the market overall could satisfy the standards. For all of these reasons, the collective carryover RIN bank provides a needed programmatic buffer that both facilitates individual compliance and provides for smooth overall functioning of the program.[23] With volume requirements increasing annually, and the size of the carryover RIN bank shrinking through use of carryover RINs in both 2013 and 2014, we believe it is prudent not to intentionally draw down the RIN bank for 2017 that we have determined will not likely be larger than 1.54 billion carryover RINs, and which could in fact be smaller.

For the reasons noted above, and consistent with the approach we took in the 2014–2016 final rule, we have determined that under current circumstances, an intentional drawdown of the carryover RIN bank should not be assumed in establishing the 2017 volume requirements. The current bank of carryover RINs will provide an important and necessary programmatic buffer that will both facilitate individual compliance and provide for smooth overall functioning of the program. Therefore, we are not setting renewable fuel volume requirements at levels that would envision the drawdown in the bank of carryover RINs. However, we note that we may or may not take a similar approach in future years; we will assess the situation on a case-by-case basis going forward, and take into account the size of the carryover RIN bank in the future and any lessons learned from implementing past rules.

III. Cellulosic Biofuel Volume for 2017

In the past several years the cellulosic biofuel industry has continued to make progress towards increased commercial-scale production. Cellulosic biofuel production reached record levels in 2015, driven largely by compressed natural gas (CNG) and liquefied natural gas (LNG) derived from biogas.[24] Cellulosic ethanol, while produced in much smaller quantities than CNG/LNG derived from biogas, was also produced consistently in 2015. Plans for multiple commercial scale facilities capable of producing drop-in hydrocarbon fuels from cellulosic biomass were also announced. This section describes our assessment of the volume of cellulosic biofuel that we project will be produced or imported into the United States in 2017, and some of the uncertainties associated with those volumes.

In order to project the volume of cellulosic biofuel production in 2017 we considered the Energy Information Administration's projections of cellulosic biofuel production[25] along with data reported to EPA through the EPA Moderated Transaction System (EMTS) and information we collected regarding individual facilities that have produced or have the potential to produce qualifying volumes for consumption as transportation fuel, heating oil, or jet fuel in the U.S. in 2017. In this final rule we have updated the projected facility start-up dates, facility capacities, production volumes, and other relevant information with the most recent information available. However, we are using the methodology discussed in the proposed rule to project the available supply of cellulosic biofuel for 2017. As described in a memorandum to the docket, the use of essentially the same methodology to generate the applicable standards for 2016 resulted in volumes that the market is currently on track to meet, taking into account anticipated seasonal variation in cellulosic biofuel supply based on data from previous years.[26]

New cellulosic biofuel production facilities projected to be brought online in the United States over the next few years would significantly increase the production capacity of the cellulosic industry. Operational experience gained at the first few commercial scale cellulosic biofuel production facilities could also lead to increasing production of cellulosic biofuel from existing production facilities. The following section discusses the companies the EPA reviewed in the process of projecting qualifying cellulosic biofuel

[23] Here we use the term ''buffer'' as shorthand reference to all of the benefits that are provided by a sufficient bank of carryover RINs.

[24] The majority of the cellulosic RINs generated for CNG/LNG are sourced from biogas from landfills, however the biogas may come from a variety of sources including municipal wastewater treatment facility digesters, agricultural digesters, separated MSW digesters, and the cellulosic components of biomass processed in other waste digesters.

[25] ''EIA projections of transportation fuel for 2017,'' docket EPA–HQ–OAR–2016–0004. We note that EIA projections do not include renewable fuel oil, imports of cellulosic biofuel from foreign facilities, or CNG/LNG used as transportation fuel in their estimate of cellulosic biofuel production.

[26] ''Assessment of the Accuracy of Cellulosic Biofuel Production Projections in 2015 and 2016'', memorandum from Dallas Burkholder to EPA Air Docket EPA–HQ–OAR–2016–0004.

production in the United States in 2017. Information on these companies forms the basis for our projection of 311 million ethanol-equivalent gallons of cellulosic biofuel produced for use as transportation fuel, heating oil, or jet fuel in the United States in 2017.

A. Statutory Requirements

The volumes of renewable fuel to be used under the RFS program each year (absent an adjustment or waiver by EPA) are specified in CAA section 211(o)(2). The volume of cellulosic biofuel specified in the statute for 2017 is 5.5 billion gallons. The statute provides that if EPA determines, based on EIA's estimate, that the projected volume of cellulosic biofuel production in a given year is less than the statutory volume, then EPA is to reduce the applicable volume of cellulosic biofuel to the projected volume available during that calendar year.[27]

In addition, if EPA reduces the required volume of cellulosic biofuel below the level specified in the statute, the Act also indicates that we may reduce the applicable volumes of advanced biofuels and total renewable fuel by the same or a lesser volume, and we are required to make cellulosic waiver credits available. Our consideration of the 2017 volume requirements for advanced biofuel and total renewable fuel is presented in Sections IV and V of this rule.

B. Cellulosic Biofuel Industry Assessment

In order to project cellulosic biofuel production for 2017, we have tracked the progress of several dozen potential cellulosic biofuel production facilities. As we have done in previous years, we have focused on facilities with the potential to produce commercial-scale volumes of cellulosic biofuel rather than small R&D or pilot-scale facilities. Larger commercial-scale facilities are much more likely to generate RINs for the fuel they produce and the volumes they produce will have a far greater impact on the cellulosic biofuel standards for 2017. The volume of cellulosic biofuel produced from R&D and pilot-scale facilities is quite small in relation to that expected from the commercial-scale facilities. R&D and demonstration-scale facilities have also generally not generated RINs for the fuel they have produced in the past. Their focus is on developing and demonstrating the technology, not producing commercial volumes. RIN generation from R&D and pilot-scale facilities in previous years has not contributed significantly to the overall number of cellulosic RINs generated.[28]

From this list of commercial-scale facilities we used information from EMTS, publically available information (including press releases and news reports), and information provided by representatives of potential cellulosic biofuel producers, to make a determination of which facilities are most likely to produce cellulosic biofuel and generate cellulosic biofuel RINs in 2017. Each of these companies was investigated further in order to determine the current status of its facilities and its likely cellulosic biofuel production and RIN generation volumes for 2017. Both in our discussions with representatives of individual companies [29] and as part of our internal evaluation process we gathered and analyzed information including, but not limited to, the funding status of these facilities, current status of the production technologies, anticipated construction and production ramp-up periods, facility registration status, and annual fuel production and RIN generation targets.

Our approach for projecting the available volume of cellulosic biofuel in 2017 is discussed in more detail in Section III.D below. The approach is the same as the approach adopted in establishing the required volume of cellulosic biofuel in 2016.[30] The remainder of this Section discusses the companies and facilities EPA expects to be in a position to produce commercial-scale volumes of cellulosic biofuel by the end of 2017. This information, together with the reported cellulosic biofuel RIN generation in previous years in EMTS and EIA's projection of liquid cellulosic biofuel production in 2017 forms the basis for our volume requirement for cellulosic biofuel for 2017.

1. Potential Domestic Producers

There are a number of companies and facilities [31] located in the United States that have either already begun producing cellulosic biofuel for use as transportation fuel, heating oil, or jet fuel at a commercial scale, or are anticipated to be in a position to do so at some time during 2017. The financial incentive provided by cellulosic biofuel RINs,[32] combined with the facts that to date nearly all cellulosic biofuel produced in the United States has been used domestically [33] and all the domestic facilities we have contacted in deriving our projections intend to produce fuel on a commercial scale for domestic consumption using approved pathways, gives us a high degree of confidence that cellulosic biofuel RINs will be generated for any fuel produced by commercial scale facilities. In order to generate RINs, each of these facilities must be registered under the RFS program and comply with all the regulatory requirements. This includes using an approved RIN-generating pathway and verifying that their feedstocks meet the definition of renewable biomass. Most of the companies and facilities have already successfully completed facility registration, and many have successfully generated RINs. A brief description of each of the companies (or group of companies for cellulosic CNG/LNG producers) that EPA believes may produce commercial-scale volumes of RIN generating cellulosic biofuel by the end of 2017 can be found in a memorandum to the docket for this final rule.[34] These descriptions are based on a review of publicly available information and in many cases on information provided to EPA in conversations with company representatives. General information on each of these companies or group of companies considered in our projection of the potentially available volume of

[27] The United States Court of Appeals for the District of Columbia Circuit evaluated this requirement in *API* v. *EPA* 706 F.3d 474. 479–480 (D.C. Cir. 2013), in the context of a challenge to the 2012 cellulosic biofuel standard. The Court stated that in projecting potentially available volumes of cellulosic biofuel EPA must apply an ''outcome-neutral methodology'' aimed at providing a prediction of ''what will actually happen.''

[28] While a few small R&D and pilot scale facilities have registered as cellulosic RIN generators, total production from each of these facilities from 2010 through September 2016 has been less than 50,000 RINs.

[29] In determining appropriate volumes for CNG/LNG producers we generally did not contact individual producers but rather relied primarily on discussions with industry associations, and information on likely production facilities that are already registered under the RFS program. In some cases where further information was needed we did speak with individual companies.

[30] See 80 FR 77420, 77499 (December 14, 2015).

[31] The volume projection from CNG/LNG producers does not represent production from a single company or facility, but rather a group of facilities utilizing the same production technology.

[32] According to data from Argus, the price for 2016 cellulosic biofuel RINs averaged $1.84 in 2016 (through September 2016). Alternatively, obligated parties can obtain a RIN value equivalent to a cellulosic biofuel RIN by purchasing an advanced (or biomass-based diesel) RIN and a cellulosic waiver credit. The price for a 2016 cellulosic waiver credit is $1.33.

[33] The only known exception was a small volume of fuel produced at a demonstration scale facility exported to be used for promotional purposes.

[34] ''Cellulosic Biofuel Producer Company Descriptions (October 2016)'', memorandum from Dallas Burkholder to EPA Air Docket EPA–HQ–OAR–2016–0004.

cellulosic biofuel in 2017 is summarized in Table III.B.3–1 below.

2. Potential Foreign Sources of Cellulosic Biofuel

In addition to the potential sources of cellulosic biofuel located in the United States, there are several foreign cellulosic biofuel companies that may produce cellulosic biofuel in 2017. These include facilities owned and operated by Beta Renewables, Enerkem, Ensyn, GranBio, and Raizen. All of these facilities use fuel production pathways that have been approved by EPA for cellulosic RIN generation provided eligible sources of renewable feedstock are used and other regulatory requirements are satisfied. These companies would therefore be eligible to register these facilities under the RFS program and generate RINs for any qualifying fuel imported into the United States. While these facilities may be able to generate RINs for any volumes of cellulosic biofuel they import into the United States, demand for the cellulosic biofuels they produce is expected to be high in their own local markets.

EPA is charged with projecting the volume of cellulosic biofuel that will be produced or imported into the United States. For the purposes of this final rule we have considered all of the registered foreign facilities under the RFS program to be potential sources of cellulosic biofuel in 2017. We believe that due to the strong demand for cellulosic biofuel in local markets, the significant technical challenges associated with the operation of cellulosic biofuel facilities, and the time necessary for potential foreign cellulosic biofuel producers to register under the RFS program and arrange for the importation of cellulosic biofuel to the United States, cellulosic biofuel imports from facilities not currently registered to generate cellulosic biofuel RINs are highly unlikely in 2017. We have therefore, for purposes of our 2017 cellulosic biofuel projection evaluated in detail only the potential for foreign cellulosic biofuel production from facilities that are currently registered. Two foreign facilities that have registered as cellulosic biofuel producers have already generated cellulosic biofuel RINs for fuel exported to the United States; projected volumes from each of these facilities are included in our projection of available volumes for 2017. Two additional foreign facilities have registered as a cellulosic biofuel producer, but have not yet generated any cellulosic RINs. EPA contacted representatives from these facilities to inquire about their intentions to export cellulosic biofuel to the United States in 2017. In one case, company representatives indicated they intended to export cellulosic biofuel to the United States, and EPA believes that there is sufficient reason to believe imports of cellulosic biofuel from this company are likely. EPA has included potential volumes from this facility in our 2017 volume production projection (see Table III.B.3–1 below).

3. Summary of Volume Projections for Individual Companies

The information we have gathered on cellulosic biofuel producers forms the basis for our projected volumes of cellulosic biofuel production for each facility in 2017. As discussed above, we have focused on commercial-scale cellulosic biofuel production facilities. Each of these facilities is discussed further in a memorandum to the docket.[35]

TABLE III.B.3–1—PROJECTED PRODUCERS OF CELLULOSIC BIOFUEL BY 2017

Company name	Location	Feedstock	Fuel	Facility capacity (MGY) [36]	Construction start date	First production [37]
CNG/LNG Producers [38].	Various (US and Canada).	Biogas	CNG/LNG	Various	N/A	August 2014.
DuPont	Nevada, IA	Corn Stover	Ethanol	30	November 2012	End 2016.
Edeniq	Various	Corn Kernel Fiber	Ethanol	Various	Various	Fall 2016.
Ensyn	Renfrew, ON, Canada.	Wood Waste	Heating Oil	3	N/A	2014.
GranBio	São Miguel dos Campos, Brazil.	Sugarcane bagasse.	Ethanol	21	Mid 2012	September 2014.
Poet	Emmetsburg, IA	Corn Stover	Ethanol	24	March 2012	4Q 2015.
QCCP	Galva, IA	Corn Kernel Fiber	Ethanol	4	Late 2013	October 2014.

C. Projection From the Energy Information Administration

Section 211(o)(3)(A) of the Clean Air Act requires EIA to ''. . . provide to the Administrator of the Environmental Protection Agency an estimate, with respect to the following calendar year, of the volumes of transportation fuel, biomass-based diesel, and cellulosic biofuel projected to be sold or introduced into commerce in the United States.'' EIA provided these estimates to EPA on October 19, 2016.[39] With regard to cellulosic biofuel, the EIA estimated that the available volume in 2017 would be 10 million gallons.

In their letter, EIA did not identify the facilities on which their estimate of cellulosic biofuel production was based. EIA did, however, indicate in their letter that they did not include estimates for cellulosic biofuel produced from biogas from landfills, municipal wastewater treatment facilities, separated MSW digesters, or agricultural digesters or those producing renewable heating oil, which represent approximately 96% of our projected cellulosic biofuel volume for 2017. They also did not include projections for facilities located outside of the United States that we project will export cellulosic biofuel into the United

[35] ''Cellulosic Biofuel Producer Company Descriptions (October 2016)'', memorandum from Dallas Burkholder to EPA Air Docket EPA–HQ–OAR–2016–0004.

[36] The Facility Capacity is generally equal to the nameplate capacity provided to EPA by company representatives or found in publicly available information. If the facility has completed registration and the total permitted capacity is lower than the nameplate capacity then this lower volume is used as the facility capacity. For companies generating RINs for CNG/LNG derived from biogas the Facility Capacity is equal to the lower of the annualized rate of production of CNG/LNG from the facility or the sum of the volume of contracts in place for the sale of CNG/LNG for use as transportation fuel (reported as the actual peak capacity for these producers).

[37] Where a quarter is listed for the first production date EPA has assumed production begins in the middle month of the quarter (*i.e.,* August for the 3rd quarter) for the purposes of projecting volumes.

[38] For more information on these facilities see ''October 2016 Assessment of Cellulosic Biofuel Production from Biogas (2017)'', memorandum from Dallas Burkholder to EPA Air Docket EPA–HQ–OAR–2016–0004.

[39] ''EIA projections of transportation fuel for 2017,'' docket EPA–HQ–OAR–2016–0004.

States in 2017. When limiting the scope of our projection to the companies assessed by EIA, we note that while our volume projections are not identical, they are very similar. EPA projects approximately 11 million gallons of liquid cellulosic biofuel will be produced domestically in 2017 (when excluding heating oil, as EIA did in their estimate of cellulosic biofuel production). EIA did not provide detail on the basis of their projections, so we cannot say precisely why EPA and EIA's projections differ. We further note that if we used EIA's projections for domestic liquid cellulosic biofuel production without modification in place of our own assessment of these facilities the impact on the cellulosic biofuel standard overall for 2017 would be less than 1%.

D. Cellulosic Biofuel Volume for 2017

For our 2017 cellulosic biofuel projection, we have used the same methodology used in the final rule establishing the cellulosic biofuel volume standard for 2016.[40] We believe this methodology produces a production projection that is consistent with EPA's charge to project volumes with a ''neutral aim at accuracy,'' and that cellulosic RIN generation data in 2015 and 2016 demonstrate that the use of this methodology has produced reasonable projections in these years.[41] We also received comments on our projection methodology, some of which are discussed below, with the remainder discussed in the response to comment document. Some commenters objected to the use of the same methodology used to establish the cellulosic biofuel volume for 2015 and 2016, arguing that this methodology has consistently over-estimated cellulosic RIN generation.[42] In this final rule we considered modifying several of the individual components of our production projection methodology (such as the start-up date, ramp-up period, expected production volume with the projected ranges, etc.), but ultimately decided to use the same methodology as proposed, as we believe this methodology resulted in reasonably accurate projection of cellulosic biofuel RIN generation in the final three months of 2015, and will likely result in a reasonably accurate projection for 2016 based on the available data that is currently available.[43] While this methodology overestimated portions of the cellulosic biofuel pool (such as the production of liquid cellulosic biofuels from new facilities), it also underestimated production for other portions of the cellulosic biofuel pool (production of CNG/LNG derived from biogas). Modifying individual components of the past methodology may seem justified based on a narrow consideration of each factor, but we do not believe that there is currently sufficient information to support these changes. Adjusting each individual component of the methodology each year based on the most recent information would result in an increasingly complex and unpredictable methodology, and would not necessarily project overall cellulosic biofuel production more accurately. This is especially true in an industry at the early stages of commercialization. We do not believe it would be reasonable to establish a methodology where the success or failure of a small group of companies, and in some cases a single company, would have a dramatic impact on the methodology used to project volumes from other companies the following year, especially where the methodology overall has been demonstrably successful. Therefore, for this year we have decided to use the same methodology that worked successfully in 2015 and 2016. We will continue to evaluate this methodology on an annual basis, and will adjust the methodology if it ceases to provide reasonably accurate projections in future years.

To project cellulosic biofuel production in 2017 we separated the list of potential producers of cellulosic biofuel into four groups according to whether they are producing liquid cellulosic biofuel or CNG/LNG from biogas, and whether or not the facilities have achieved consistent commercial-scale production and cellulosic biofuel RIN generation (See Table III.D–1 through Table III.D–3). We next defined a range of likely production volumes for each group of potential cellulosic biofuel producers. The low end of the range for each group of producers reflects actual RIN generation data over the last 12 months for which data are available (October 2015—September 2016). The low end of the range for companies that have not yet begun commercial-scale production (or in the case of CNG/LNG producers have not yet generated RINs for fuel sold as transportation fuel in the United States) is zero.

To calculate the high end of the projected production range for each group of companies we considered each company individually. To determine the high end of the range of expected production volumes for companies producing liquid cellulosic biofuel we considered a variety of factors, including the expected start-up date and ramp-up period, facility capacity, and fuel off-take agreements. As a starting point, EPA calculated a production volume for these facilities using the expected start-up date, facility capacity, and a benchmark of a six-month straight-line ramp-up period representing an optimistic ramp-up scenario.[44] Generally we used this calculated production volume as the high end of the potential production range for each company. The only exceptions were cases where companies provided us with production projections (or projections of the volume of fuel they expected to export to the United States in the case of foreign producers) that were lower than the volumes we calculated as the high end of the range for that particular company. In these cases, the projected production volume (or import volume) provided by the company was used as the high end of the potential production range rather than the volume calculated by EPA. For CNG/LNG producers, the high end of the range was generally equal RIN production projections for 2017 provided to EPA by the renewable natural gas industry.[45] The high end of the ranges for all of the individual companies within each group were added together to calculate the high end of the projected production range for that group.

[40] See 80 FR 77499 for additional detail.

[41] ''Assessment of the Accuracy of Cellulosic Biofuel Production Projections in 2015 and 2016'', memorandum from Dallas Burkholder to EPA Air Docket EPA–HQ–OAR–2016–0004.

[42] As support for these claims, commenters reviewed EPA's projections of cellulosic biofuel production going back to 2010. We note that we used a substantially different methodology to project volumes for 2015 and 2016 than we used in previous years, and we therefore do not believe that overestimates of cellulosic biofuel production in years prior to 2015 are relevant in assessing the reasonableness of the current methodology.

[43] ''Assessment of the Accuracy of Cellulosic Biofuel Production Projections in 2015 and 2016'', memorandum from Dallas Burkholder to EPA Air Docket EPA–HQ–OAR–2016–0004.

[44] We did not assume a six-month straight-line ramp-up period in determining the high end of the projected production range for CNG/LNG producers. This is because these facilities generally have a history of CNG/LNG production prior to producing RINs, and therefore do not face many of the start-up and scale-up challenges that impact new facilities. For further information on the methodology used to project cellulosic RIN generation from CNG/LNG producers see ''October 2016 Assessment of Cellulosic Biofuel Production from Biogas (2017)'', memorandum from Dallas Burkholder to EPA Air Docket EPA–HQ–OAR–2016–0004.

[45] For additional detail on the methods used to project cellulosic biofuel production for CNG/LNG producers see ''October 2016 Assessment of Cellulosic Biofuel Production from Biogas (2017)'', memorandum from Dallas Burkholder to EPA Air Docket EPA–HQ–OAR–2016–0004.

TABLE III.D–1—2017 PRODUCTION RANGES FOR LIQUID CELLULOSIC BIOFUEL PRODUCERS WITHOUT CONSISTENT COMMERCIAL SCALE PRODUCTION

[Million gallons]

	Low end of the range [a]	High end of the range [a]
DuPont	0	7
Edeniq	0	6
GranBio	0	2
Poet	0	18
Aggregate Range	0	33

[a] Rounded to the nearest million gallons.

TABLE III.D–2—2017 PRODUCTION RANGES FOR LIQUID CELLULOSIC BIOFUEL PRODUCERS WITH CONSISTENT COMMERCIAL SCALE PRODUCTION

(Million gallons)

	Low end of the range	high end of the range [a]
Ensyn	[b] X	3
Quad County Corn Processors	[b] X	4
Aggregate Range	3.5	7

[a] Rounded to the nearest million gallons.
[b] The low end of the range for each individual company is based on actual production volumes and is therefore withheld to protect information claimed to be confidential business information.

TABLE III.D–3—2017 PRODUCTION RANGES FOR CNG/LNG PRODUCED FROM BIOGAS

[Million gallons]

	Low end of the range [a]	High end of the range [a]
CNG/LNG Producers (New Facilities)	0	178
CNG/LNG Producers (Currently generating RINs)	174	221

[a] Rounded to the nearest million gallons.

EPA received comments from biofuels producers stating that production projections we receive from companies should be used as the basis for the mean value of any projected production range. They argue that EPA should defer to the technical expertise of the cellulosic biofuel manufacturers who provide these projections, and that it is inappropriate to use these projections as the high end of a projected range, with the low end of the projected range based on previous production data. EPA understands that the volume projections provided by companies included in our projection are intended to represent the companies' expectations for production, rather than the high end of a potential production range. We also acknowledge the technical expertise of these companies and the significant amount of investment that has gone into the development of these biofuel production processes as they have progressed from R&D through demonstration and pilot scale in preparation for the first commercial scale facilities. While acknowledging these facts, we do not believe it would be appropriate to ignore the history of the cellulosic biofuel industry. Each year since 2010, EPA has gathered information, including volume production projections, from companies with the potential to produce cellulosic biofuel. Each of these companies supported these projections with successful pilot and demonstration scale facilities as well as other supporting documentation. In the majority of these cases, due to a variety of circumstances, the companies were unable to meet their own volume projections, and in some cases were unable to produce any RIN-generating cellulosic biofuel.

We believe our methodology reasonably projects the range of potential production volumes for each company. A brief overview of each of the companies we believe will produce cellulosic biofuel and make it commercially available in 2017 can be found in a memorandum to the docket.[46] In the case of cellulosic biofuel produced from CNG/LNG we have discussed these facilities as a group rather than individually. EPA believes it is appropriate to discuss these facilities as a group since they are utilizing proven production technologies and the uncertainties and challenges they face relate primarily to linking their production to ultimate use as transportation fuel that is eligible to generate RINs under the RFS program.[47]

After defining likely production ranges for each group of companies we projected a likely production volume from each group of companies for 2017. We used the same percentile values to project a production volume within the established ranges for 2017 as we did in the final rule establishing the cellulosic biofuel standards for 2014–2016; the 50th and 25th percentiles respectively for liquid cellulosic biofuel producers with and without a history of consistent cellulosic biofuel production and RIN generation, and the 75th and 50th percentiles respectively for producers of CNG/LNG from biogas with and without

[46] "Cellulosic Biofuel Producer Company Descriptions (October 2016)", memorandum from Dallas Burkholder to EPA Air Docket EPA–HQ–OAR–2016–0004.

[47] For individual company information see "October 2016 Cellulosic Biofuel Individual Company Projections for 2017 (CBI)", memorandum from Dallas Burkholder to EPA Air Docket EPA–HQ–OAR–2016–0004.

a history of consistent commercial-scale production and RIN generation. As discussed in the final rule establishing the 2014–2016 cellulosic biofuel standards, we believe these percentages appropriately reflect the uncertainties associated with each of these groups of companies.[48] We further believe that the progress to date in 2015 and 2016 supports the use of these percentile values.[49] We also note that these percentile values are used to project a likely production volume within the projected range for each group of companies. In most cases, especially for companies that have not yet consistently produced cellulosic RINs, the high end of these projected ranges are not necessarily the nameplate capacities of the facilities, as the projected start-up dates and ramp-up periods have been taken into consideration in developing the likely production ranges for each company. This means that our percentile values are not directly comparable to the ''utilization rates'' calculated or projected by some commenters, which calculate a percentage using the facility capacity rather than the high end of the ranges in the tables below. After calculating a likely production volume for each group of companies in 2017, the volumes from each group are added together to determine the total projected production volume of cellulosic biofuel in 2017.

TABLE III.D–4—PROJECTED VOLUME OF CELLULOSIC BIOFUEL IN 2017

[Million gallons]

	Low end of the range [a]	High end of the range [a]	Percentile	Projected volume [a]
Liquid Cellulosic Biofuel Producers; Producers without Consistent Commercial Scale Production	0	33	25th	8
Liquid Cellulosic Biofuel Producer; Producers with Consistent Commercial Scale Production	4	7	50th	5
CNG/LNG Producers; New Facilities	0	178	50th	89
CNG/LNG Producers; Consistent Production	174	221	75th	209
Total	N/A	N/A	N/A	311

[a] Volumes rounded to the nearest million gallons.

EPA received comments requesting that we assess each potential cellulosic biofuel production facility individually, in a way that reflects the circumstances of each facility, rather than grouping facilities together. We continue to believe that grouping the potential cellulosic biofuel producers using the criteria of whether or not they have achieved consistent commercial-scale production is appropriate for the purposes of projecting a likely production volume. While each of these groupings contains a diverse set of companies with their own production technologies and challenges, we believe there is sufficient commonality in the challenges related to the funding, construction, commissioning, and start-up of commercial-scale cellulosic biofuel facilities to justify aggregating these company projections into a single group for the purposes of projecting the most likely production volume of cellulosic biofuel. The challenges new production facilities face are also significantly different than those of facilities ramping up production volumes to the facility capacity and maintaining consistent production. Finally, we believe that the level of uncertainty associated with production volumes from any individual facility is sufficiently high that assessing facilities individually, rather grouping them together as done in this final rule, would not necessarily result in more accurate volume projections.

Several commenters claimed that EPA had underestimated the potential production of cellulosic RINs from cellulosic CNG/LNG in 2017. Some commenters noted the large quantity of biogas that is currently produced at landfills, or the development of new digesters designed to produce CNG/LNG from biogas to support their claims. Others stated that because biogas collection from landfills or production in digesters was an established technology EPA should not discount projections from these producers, but rather should assume these volumes can be produced. While we acknowledge that these factors reduce the uncertainty related to cellulosic biofuel production for CNG/LNG derived from biogas, they do not eliminate the uncertainties associated with these fuels. RINs can only be generated for CNG/LNG derived from biogas if the RIN generator can verify (in accordance with the regulations) that an equivalent volume of CNG/LNG was used as transportation fuel. The limited demand for CNG/LNG as transportation fuel is a significant source of uncertainty related to the generation of cellulosic RINs for CNG/LNG for biogas. We believe that the percentile values used in the proposed rule to project cellulosic RIN generation for CNG/LNG from biogas (75th percentile for facilities that have previously generated RINs and 50th percentile for new facilities) is appropriate, and that this is supported by the RIN generation data for cellulosic RINs from CNG/LNG in 2015 and 2016.[50] We also note that in comments on the proposed rule a group of organizations representing CNG/LNG producers supported this methodology as doing a ''reasonable job at projecting production with a neutral aim at accuracy.''[51]

EPA also received comments claiming that the proposed cellulosic biofuel volumes were unreasonably high. These commenters generally claimed that in light of the inability of cellulosic biofuel companies to achieve their projected production volumes, start-up dates, and ramp-up schedules in previous years EPA should instead rely solely on historical production data to project volumes for future years. They suggested that EPA should project future production volumes based on available cellulosic RIN generation data

[48] For a further discussion of the percentile values used to projected likely production from each group of companies see 80 FR 77499.

[49] ''Assessment of the Accuracy of Cellulosic Biofuel Production Projections in 2015 and 2016'', memorandum from Dallas Burkholder to EPA Air Docket EPA–HQ–OAR–2016–0004.

[50] ''Assessment of the Accuracy of Cellulosic Biofuel Production Projections in 2015 and 2016'', memorandum from Dallas Burkholder to EPA Air Docket EPA–HQ–OAR–2016–0004.

[51] See comments from David Cox, General Counsel, Coalition for Renewable Natural Gas et al. EPA–HQ–OAR–2016–0004–1732.

from previous months. EPA believes this would be inconsistent with our charge to project available cellulosic biofuel volume by taking a neutral aim at accuracy. Adopting such an approach would effectively mean ignoring the potential for facilities that have not generated RINs in the past to contribute volumes in the future. It would also ignore the potential for facilities that have begun producing RINs to increase their fuel production rates. This would be inconsistent with our expectations for an industry that has shown substantial growth over the last several years, and is anticipated to continue to grow in 2017. Most importantly, the significant year-over-year increases in the supply of cellulosic biofuel in recent years demonstrates that this suggested method is inappropriately conservative.[52] We recognize that in the past we have both overestimated and underestimated cellulosic RIN generation but we do not believe that our current methodology is fundamentally biased to either an overestimate or an underestimate of total cellulosic RIN production.

Some commenters suggested that after projecting the cellulosic biofuel production volume for 2017, EPA should add to this number the number of available carryover RIN generated in previous years available for use in 2017. These commenters argued that these RINs should be viewed as part of the available supply of cellulosic biofuel, and that a failure to include these RINs in our projection of available volume could have negative impacts on the price of cellulosic RINs and ultimately the cellulosic biofuel industry. EPA does not believe it would be appropriate to add an estimate of carryover RINs available for use in 2017 to our projection of cellulosic biofuel production in 2017 for the purposes of establishing the 2017 cellulosic biofuel standard. Because the compliance deadlines for 2015 and 2016 occur after the finalization of this rule it is impossible to know precisely the number of carryover RINs that will be available for use in 2017. While the compliance data for 2014 indicate that there are likely to be approximately 12 million cellulosic biofuel carryover RINs from that year,[53] and cellulosic RIN generation in 2015 exceeded the standard by 17 million RINs,[54] it is possible that cellulosic RIN generation in 2016 may fall short of the standard, and that many of these RINs may be used to off-set that shortfall. While it is uncertain to what extend RINs representing past production could lawfully be included in the projection of future cellulosic biofuel production required under 211(o)(7)(D), EPA has not seen any evidence that the existence of RINs generated in previous years that may be used towards satisfying cellulosic biofuel obligations in future years has had a negative impact on cellulosic RIN prices.[55] This suggests that any cellulosic biofuel RINs in excess of the standard are being used by obligated parties in much the same way as other types of carryover RINs; aiding market liquidity and reducing the price volatility and potential impacts of short-term supply disruptions. While we do not believe it would be appropriate to add an estimate of available cellulosic carryover RINs for use in 2017 to the projected production volume, EPA remains committed to the success of the cellulosic biofuels industry and will continue to carefully monitor the market for both cellulosic biofuels and cellulosic biofuel RINs, and will re-evaluate this issue in future years.

We believe our range of projected production volumes for each company (or group of companies for cellulosic CNG/LNG producers) represents the range of potential production volumes for each company, and that projecting overall production in 2017 in the manner described above results in a neutral estimate (neither biased to produce a projection that is unreasonably high or low) of likely cellulosic biofuel production in 2017 (311 million gallons). A brief overview of individual companies we believe will produce cellulosic biofuel and make it commercially available in 2017 can be found in a memorandum to the docket.[56] In the case of cellulosic biofuel produced from CNG/LNG we have discussed the production potential from these facilities as a group rather than individually.[57]

IV. Advanced Biofuel Volume for 2017

The national volume targets for advanced biofuel to be used under the RFS program each year through 2022 are specified in CAA section 211(o)(2)(B)(i)(II). Congress set annual renewable fuel volume targets that envisioned growth at a pace that far exceeded historical growth and prioritized that growth as occurring principally in advanced biofuels (contrary to historical growth patterns where most growth was in conventional renewable fuel, namely corn-ethanol). Congressional intent is evident in the fact that the portion of the total renewable fuel volume target that is not required to be advanced biofuel is 15 billion gallons in the statutory volume tables for all years after 2014, while the advanced volumes continue to grow through 2022 to a total of 21 billion gallons, for a total of 36 billion gallons in 2022.

We have evaluated the capabilities of the market and have concluded that the 9.0 billion gallons specified in the statute for advanced biofuel cannot be reached in 2017. This is primarily due to the expected continued shortfall in cellulosic biofuel; production of this fuel type has consistently fallen short of the statutory targets by 95% or more, and again in 2017 will fall far short of the statutory target of 5.5 billion gallons. In addition, although in earlier years of the RFS program we determined that the available supply of non-cellulosic advanced biofuel and other considerations justified our retaining the statutory advanced biofuel target

[52] Total RIN generation in July–September of 2014 (likely the last 3 months for which EPA would have data available to use in a rule establishing annual volume for 2015) was 11 million ethanol-equivalent gallons, indicating an annual standard of 44 million ethanol-equivalent gallons for 2015 if this was the only information considered in establishing the standard. Actual cellulosic RIN supply in 2015 (RINs generated less those retired for reasons other than compliance) was 141 million ethanol-equivalent gallons. Similarly, total RIN generation in July–September of 2015 was 39.2 million ethanol-equivalent gallons, indicating an annual standard of 157 million ethanol-equivalent gallons for 2016 if this was the only information considered in establishing the standard. Actual cellulosic RIN supply for 2016 (RINs generated less those retired for reasons other than compliance) has already surpassed 127 million RINs and in the first 9 months of the year and is expected to meet the 2016 standard of 230 million ethanol-equivalent gallons.

[53] Annual compliance data can be found on EPA's Web site at *https://www.epa.gov/fuels-registration-reporting-and-compliance-help/annual-compliance-data-obligated-parties-and.*

[54] According to EPA's EMTS Web site (*https://www.epa.gov/fuels-registration-reporting-and-compliance-help/2015-renewable-fuel-standard-data*) net cellulosic RIN generation was approximately 140 million RINs in 2015, while the cellulosic biofuel volume requirement for 2015 was 123 million gallons.

[55] According to data from Argus, the average 2016 cellulosic biofuel RIN price has been $1.84 through September 2016. We believe this price is reasonable, as is it is somewhat below the ''theoretical maximum'' cellulosic RIN price of $2.19 (the cellulosic waiver price plus the average price of all non-cellulosic advanced RINs) and significantly above the ''theoretical minimum'' cellulosic RIN price of $0.86 (the average price of all non-cellulosic advanced RINs; we consider this the ''theoretical minimum'' price for a cellulosic biofuel RINs as excess cellulosic biofuel RINs can be used to satisfy an obligated party's advanced biofuel obligation).

[56] ''Cellulosic Biofuel Producer Company Descriptions (October 2016)'', memorandum from Dallas Burkholder to EPA Air Docket EPA–HQ–OAR–2016–0004.

[57] For individual company information see ''October 2016 Cellulosic Biofuel Individual Company Projections for 2017 (CBI)'', memorandum from Dallas Burkholder to EPA Air Docket EPA–HQ–OAR–2016–0004.

notwithstanding the shortfall in cellulosic biofuel production, several factors preclude such a determination for 2017, including:

- The more ambitious statutory target for 2017
- The fact that a greater proportion of that target was intended to be satisfied by cellulosic biofuels [58]
- The continued slow pace of growth in cellulosic biofuel production
- Limited volumes of advanced biofuels that we believe are appropriate to backfill for missing volumes of cellulosic biofuel

As a result, we are exercising the authority granted by the statute to reduce the applicable volume of advanced biofuel using the cellulosic waiver authority. The final volume requirement for advanced biofuel recognizes the ability of the market to respond to the standards we set while staying within the limits of reasonable feasibility, providing for a partial backfilling of missing cellulosic biofuel volumes with volumes of advanced biofuel we have determined are appropriate to require for this purpose. The net impact of this volume requirement is that the required volume of advanced biofuel for 2017 will be significantly greater than volumes required or used in the past, but below the statutory target.

To help inform today's action, we investigated whether the market is on track to meet the 2016 advanced biofuel volume requirement of 3.61 billion gallons. As described in a memorandum to the docket, supply through the end of September coupled with a review of seasonal variations in supply for previous years indicate that the 2016 standards are indeed attainable.[59] For comparison, we have also reviewed RINs available for compliance in previous years, along with the effective volume requirements in those years.[60]

A. Volumetric Limitation on Use of the Cellulosic Waiver Authority

As described in Section II.A, when making reductions in advanced biofuel and total renewable fuel under the cellulosic waiver authority, the statute limits those reductions to no more than the reduction in cellulosic biofuel. As described in Section III.D, we are finalizing a 2017 volume requirement for cellulosic biofuel of 311 million gallons, representing a reduction of 5,189 million gallons from the statutory target of 5,500 million gallons. As a result, 5,171 million gallons is the maximum volume reduction for advanced biofuel and total renewable fuel that is permissible using the cellulosic waiver authority.[61] If we were to use the cellulosic waiver authority to this maximum extent, the resulting 2017 volumes would be 3.83 and 18.83 billion gallons for advanced biofuel and total renewable fuel, respectively.

TABLE IV.A–1—LOWEST PERMISSIBLE VOLUME REQUIREMENTS USING ONLY THE CELLULOSIC WAIVER AUTHORITY

[Million gallons]

	Advanced biofuel	Total renewable fuel
Statutory target	9,000	24,000
Maximum reduction permitted under the cellulosic waiver authority	5,189	5,189
Lowest 2017 volume requirement permitted using only the cellulosic waiver authority	3,811	18,811

We are authorized under the cellulosic waiver authority to reduce the advanced and total renewable fuel volumes ''by the same or a lesser'' amount as the reduction in the cellulosic biofuel volume. Thus, we are not required to use the authority to its maximum extent. And, as discussed in Section II.A, EPA has broad discretion in using the cellulosic waiver authority, since Congress did not specify the circumstances under which it may or should be used nor the factors to consider in determining appropriate volume reductions. We believe that advanced biofuel should be permitted to compensate for a portion of the shortfall in cellulosic biofuel, thereby promoting the larger RFS goals of reducing GHG emissions and enhancing energy security. To that end, we have investigated the volume of advanced biofuel that is reasonably attainable and appropriate to require in 2017, and have determined that such volumes are higher than the lowest permissible volumes shown in the table above.

B. Determination of Reasonably Attainable and Appropriate Volumes

In the NPRM we proposed to use only the cellulosic waiver authority to reduce volumes of advanced biofuel, and to use both the cellulosic and general waiver authorities to reduce volumes of total renewable fuel. As noted above, and described in more detail in this section and in Section V, we have determined that use of the general waiver authority is not necessary for any renewable fuel category in 2017. However, in response to the NPRM, some commenters misstated our obligations under the cellulosic waiver authority and our intent with respect to its use in setting the volume requirement for advanced biofuel. For instance, some stakeholders expressed concern that EPA had not proposed to set the advanced biofuel volume requirement at the maximum achievable level, but rather at a level that was ''reasonable.'' Many of these stakeholders suggested that it would be most consistent with the statutory goals if we were to set the volume requirement for advanced biofuel equal to the maximum achievable volume.

In the NPRM, as well as in the 2014–2016 final rule, we made a clear distinction between our approach in setting volumes under the cellulosic waiver authority versus our approach in setting volumes under the general waiver authority. The prerequisite for the general waiver authority as EPA has exercised it to date is a finding that there is an ''inadequate domestic supply'' of renewable fuel. In using this authority in the 2014–2016 final rule we noted that our objective was to waive volumes to the point where the inadequacy of supply is removed.

[58] For example, while the statutory tables indicate that 61.1% of the 2017 advanced biofuel target would be satisfied by cellulosic biofuel, the corresponding value for 2013 was only 36.4%.

[59] ''Comparison of 2016 availability of RINs and 2016 standards,'' memorandum from David Korotney to docket EPA–HQ–OAR–2016–0004.

[60] ''Comparison of availability of RINs and standards for previous years,'' memorandum from David Korotney to docket EPA–HQ–OAR–2016–0004.

[61] If we determined it necessary to provide further reductions to address inadequate domestic supply or severe economic or environmental harm, such further reductions would be possible using the general waiver authority.

Therefore, we set volume requirements at the level we determined to be the maximum achievable. When using the cellulosic waiver authority, in contrast, we are only required to ensure that any reduction is no larger than that provided for cellulosic biofuel. The statute does not specify other prerequisites for its use, nor any criteria or factors that EPA should consider in determining whether, and to what extent, to use the authority. Thus, under the cellulosic waiver authority, Congress provided EPA with broad discretion to lower advanced biofuel and total renewable fuel applicable volumes in instances where it lowers the cellulosic biofuel requirement, as in today's rule. In exercising this broad discretion in the context of the 2014–2016 final rule, our intent was to require the use of ''reasonably attainable'' volumes to partially backfill for missing cellulosic biofuel volumes. We explained that we were not required, and did not intend, to necessarily require the use of the ''maximum'' volumes of advanced biofuel, and that our assessment of ''reasonably attainable'' volumes was similar to, but not intended to be as exacting, as our assessment of ''maximum achievable'' supplies when using the general waiver authority based on a finding of inadequate domestic supply.

In using the cellulosic waiver authority to set the 2017 advanced biofuel volume requirement, we have been mindful of the fact that the statute concentrates all of the very substantial growth in the statutory targets for renewable fuel on advanced biofuel for years after 2014, and that advanced biofuels are required to provide significantly greater lifecycle GHG reductions (at least 50%) in comparison to non-advanced renewable fuel (20%, or no reduction if grandfathered under § 80.1403). In addition, we generally believe that greater use of renewable fuel enhances energy security. These considerations, taken alone, would support the commenters' suggestion that when using the cellulosic waiver authority we should require maximum achievable levels of advanced biofuel to backfill to the greatest extent possible for missing volumes of cellulosic biofuel. However, we note, first, that our assessments contain some uncertainty. To the extent we may over-estimate supply in setting the advanced biofuel volume requirement, we can create a situation where compliance costs dramatically escalate and/or obligated parties are either unable to comply or compliance requires a substantial drawdown in the collective bank of carryover RINs. While our assessment of ''maximum achievable'' volumes for the 2014–2016 final rule reflected our view of what is achievable, if proven to be correct such negative implications will not materialize. Nevertheless, we believe that it is appropriate given the broad discretion afforded under the cellulosic waiver authority to allow an additional cushion to ensure that the standards can be met, and we describe this less exacting approach as one designed to identify ''reasonably attainable'' volumes based on supply considerations. In the 2014–2016 final rule we set the advanced biofuel volume requirement so as to require all reasonably attainable volumes of advanced biofuel, and we proposed a similar approach for 2017.

However, some commenters suggested that EPA should take into consideration the fact that higher advanced biofuel volume requirements could create an incentive for switching advanced biofuel feedstocks from existing uses to biofuel production, and that in light of such market reactions we should set the advanced biofuel volume requirement at less than the reasonably attainable level. We agree with these commenters that we have the broad discretion when using the cellulosic waiver authority to take into consideration such implications. We believe that in the short-term, every increment in the advanced biofuel standard should not necessarily be expected to result in a corresponding incremental increase in the volume of advanced biofuel feedstocks produced on a global scale, since increasing demand for such feedstocks for advanced biofuel production could potentially be filled through diversion of feedstocks from other non-biofuel markets. There is significant uncertainty related to the GHG emission benefits associated with fuels produced in this way. Moreover, rapidly increasing the required volumes of advanced biofuels without giving the market adequate time to adjust by increasing supplies could also result in diversion of advanced biofuels from foreign countries to the U.S. without increasing total global supply, contribute to shortages and/or reallocation of raw materials in other sectors, disrupt markets, and/or increase prices.[62] We believe that we are authorized to take these factors into account in exercising our discretion under the cellulosic waiver authority. Although we are not able to quantify these factors at this time, we believe that they would be a likely consequence of setting the 2017 volume requirement for advanced biofuel at the highest possible level, and that they justify our taking a more measured approach in determining the volume of advanced biofuel that should backfill for missing cellulosic biofuel volumes in 2017.[63] These considerations are described in more detail in the following section describing our assessment of advanced biodiesel and renewable diesel volumes. Our final approach results in a volume requirement that provides for significant growth in the production and use of advanced biofuels above all historic levels, is within the range of what is reasonably attainable from a supply perspective and is also appropriate, taking other considerations into account.

Having determined the reasonably attainable and appropriate volume reduction for advanced biofuel, we used the cellulosic waiver authority to provide an equivalent reduction in total renewable fuel. That step is described in more detail in Section V.A, together with our assessment that no further increment of reduction is required for total renewable fuel in 2017 on the basis of supply considerations.

1. Imported Sugarcane Ethanol

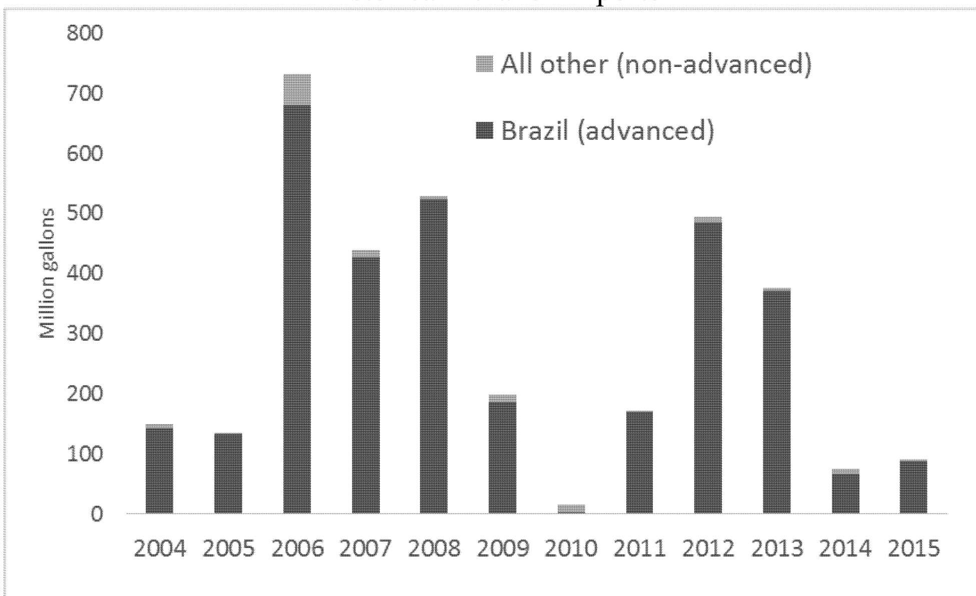
In the NPRM, we noted that the predominant source of advanced biofuel other than cellulosic biofuel and BBD was imported sugarcane ethanol, and we proposed that the volume of imported sugarcane ethanol for purposes of determining the reasonably attainable volume of advanced biofuel for 2017 would be 200 million gallons. This is the same volume that we used in setting the 2016 standards, and we said that the information currently available to us did not suggest that the circumstances would be significantly different for 2017 than they are for 2016. We also pointed to the high variability in ethanol import volumes in the past (including of Brazilian sugarcane ethanol, the predominant form of imported ethanol), the fact that imports of Brazilian sugarcane ethanol in 2014 and 2015 reached only 64 and 89 million gallons, respectively, increasing gasoline consumption in Brazil, and variability in Brazilian production of sugar.

[62] For example, see comments from Action Aid USA & The Hunger Project (EPA–HQ–OAR–2016–0004–1817), American Cleaning Institute (EPA–HQ–OAR–2016–0004–1735) and Union of Concerned Scientists (EPA–HQ–OAR–2016–0004–1672).

[63] We have also considered comments raising additional factors that stakeholders deemed relevant in setting the advanced biofuel standard, as described in the response to comments document. We believe the volume requirement established today reflects an appropriate balancing of these often competing considerations.

In response to the NPRM, stakeholders representing some refiners and conventional ethanol interests said that our estimate of 200 million gallons was too high given recent import levels. We agree that 200 million gallons is considerably higher than actual imports of Brazilian sugarcane ethanol in 2014 and 2015, of 64 and 89 million gallons, respectively, but it is far lower than the historic maximum of 680 million gallons of Brazilian sugarcane ethanol imports in 2006 or the more recent high volume of 486 million gallons imported in 2012.

Figure IV.B.1-1
Historical Ethanol Imports[a]



Source: "U.S. Imports of Fuel Ethanol from EIA," docket EPA-HQ-OAR-2016-0004.

[a] Imports from Brazil include those that are transmitted through the CBI and CAFTA, and are produced from sugarcane. Imports from other countries are typically not produced from sugarcane and do not qualify as advanced biofuel.

In proposing to use 200 million gallons in assessing reasonably attainable supply of advanced biofuel in 2017, we attempted to balance indications of lower potential imports from more recent data with indications that higher volumes were possible based on older data, as depicted in the figure above.

Stakeholders who represent advanced biofuel interests generally believed that our assumption of 200 million gallons of imported sugarcane ethanol for 2017 was too low. Some commenters cited projections from other sources that were considerably higher than 200 million gallons, and even pointed to the historical maximum of 681 million gallons for sugarcane ethanol imported in 2006 as evidence that volumes larger than 200 million gallons are possible. We generally believe that this information is of limited probative value in determining the volume of sugarcane ethanol that should be assumed in the context of determining reasonably attainable volumes of advanced biofuel for 2017. Sources providing projections for 2017 and beyond have not accurately predicted current and past import levels, highlighting the uncertainty in such projections.[64] As for the historical maximum of 681 million gallons in 2006, there is no basis for believing that the economic and market circumstances which led to that import volume would be repeated in 2017, more than a decade later, when more recent years have shown far more modest import levels.

The Brazilian Sugarcane Industry Association (UNICA) said that it was not appropriate for EPA to use actual import data from 2010–2015 as the basis for estimating the potential import volume in 2017. While these years reflects the period when the RFS2 program has been in place, UNICA argued that the low import volumes in 2014 and 2015 resulted from the fact that EPA had not established applicable RFS percentage standards until the end of 2015. However, UNICA also noted that weather, harvests, and world prices also affect ethanol exports from Brazil. As discussed in the 2014–2016 final rule, total ethanol exports from Brazil in 2014 and 2015 were at their lowest levels since 2004, suggesting the possibility that unusual factors were at work in these two years to minimize exports from Brazil. For instance, Brazil increased the ethanol concentration requirement in its gasoline in early 2015 and indications from available data suggest that total gasoline consumption will continue rising in 2016.[65] [66] Given the high variability of ethanol imports in the past and the difficulty in precisely identifying the reasons for that variability, there is no way to know whether the lack of applicable standards in 2014 and 2015 was the primary

[64] For instance, the FAPRI–MU report ''U.S. Baseline Briefing Book,'' (March 2016) indicates that ethanol imports in 2015 reached 167 mill gal, nearly double the actual imports of 89 mill gal according to data from EMTS. Also, the FAPRI–ISU report ''2012 World Agricultural Outlook'' projected that the U.S. would be a net ethanol exporter in 2013–2015, when in fact it was a net importer.

[65] See discussion at 80 FR 77477.

[66] ''Gasoline Demand in Brazil: An empirical analysis,'' Thaís Machado de Matos Vilela, Pontifical Catholic University of Rio de Janeiro, Figure 2.

reason for low import levels, or a less significant contributing factor.

Since release of the NPRM, some data on imports in 2016 have become available. Imports of sugarcane ethanol in 2016 through September have reached 34 million gallons, with essentially all of this volume occurring since June.[67] Historically, ethanol imports have been higher in the summer and early fall than at other times of the year, so it is possible that the monthly average that has occurred in June–September could continue through the end of the year. If so, then total sugarcane ethanol imports for 2016 could reach 76 million gallons, similar to the levels imported in 2014 and 2015. Nevertheless, the low observed 2016 volume indicates that an increase in the advanced biofuel standard does not necessarily result in an increase in imports of sugarcane ethanol, and also implies that even California's Low Carbon Fuel Standard (LCFS) has not spurred demand for the large volumes of advanced ethanol imports that UNICA predicted.[68]

As they did in response to the 2014–2016 proposed standards, UNICA again commented on the proposed 2017 standards that potential ethanol exports from Brazil to the U.S. are driven primarily by a combination of Brazilian ethanol production capacity and opportunities created by the RFS program itself. The RIN value of advanced biofuels is undoubtedly a factor in the volume of ethanol that Brazil exports to the U.S., and the RIN value is a function of the level of the advanced biofuel standard. However, recent data on imports of sugarcane ethanol into the U.S. suggest that it would be inappropriate to increase the volume used in the determination of the applicable volume requirement for advanced biofuel above 200 million gallons.

UNICA went on to say that sugarcane mills have significant flexibility in the amount of sugar versus ethanol that they produce, and that the amount of ethanol required to be blended into gasoline is likewise flexible based on opportunities for ethanol exports. We continue to believe that UNICA has underestimated the uncertainty associated with other market factors, including the E10 blendwall in the U.S., ongoing growth in gasoline demand in Brazil, and competing world demand for sugar, and has overstated the flexibility and speed with which Brazil can change the relative production of sugar versus ethanol and the required ethanol content of gasoline.

Based on these facts, we continue to believe that recent low import levels and high variability in longer-term historical imports are significant and must be taken into account in the context of determining reasonably attainable volumes of advanced biofuel for 2017. However, we do not agree with commenters who argued for deviating from the 200 million gallons of sugarcane ethanol that we proposed using in the determination of the 2017 advanced biofuel volume requirement. We believe that this level reflects a reasonable intermediate point between the lower levels imported recently and the considerably higher levels that have been achieved in earlier years. Regardless of this assumed level used only in deriving the advanced biofuel volume requirement, we note that actual imports of sugarcane ethanol could be higher or lower than 200 million gallons as shown in the scenarios for how the market could respond in Section V.C below.

Aside from the specific assessment of sugarcane ethanol imports, one stakeholder said that the inclusion of any imported renewable fuels in the determination of applicable standards was inconsistent with Congressional intent to increase domestic energy security. However, the statute does not discriminate between domestically-produced and imported biofuels, and an increased diversity of fuels, including those imported from a variety of countries, helps contribute to the stability of the energy supply.

2. Biodiesel and Renewable Diesel

With regard to biodiesel and renewable diesel, there are many different factors that could potentially constrain the *total* volume of these fuels that can be used as transportation fuel or heating oil in the United States. These constraints could include such factors as the availability of qualifying biodiesel and renewable diesel feedstocks, limitations on the market's ability to distribute biodiesel, and limitations related to diesel engine manufacturers recommendations for biodiesel use in the engines they produce. Each of these factors, and the degree to which they may constrain the total supply of biodiesel and renewable diesel in 2017, is discussed in detail in Section V.B.2. Of these potential constraints, however, the primary constraint considered in our determination of the reasonably attainable and appropriate volume of *advanced* biodiesel and renewable diesel considered in the context of deriving the advanced biofuel standard for 2017 is the availability of advanced biodiesel and renewable diesel feedstock.[69] This is because most registered biodiesel and renewable diesel production facilities are capable of producing either advanced or non-advanced biofuels depending on a number of economic and regulatory factors, and the combined production capacity of the registered biodiesel and renewable diesel facilities exceeds the volume of these fuels we project can be supplied in 2017.[70] Since the reasonably attainable and appropriate volume of *advanced* biodiesel and renewable diesel for 2017 projected in the context of deriving the advanced biofuel standard (determined primarily by an assessment of advanced biodiesel and renewable feedstocks) is less than the maximum reasonably achievable volume of all biodiesel and renewable diesel in 2017, other potential constraints (such as limitations on the market's ability to distribute and use biodiesel and renewable diesel) are not expected to limit the supply of *advanced* biodiesel and renewable diesel. This section will therefore focus on the availability of qualifying feedstocks, while other potential constraints related to the distribution and use of biodiesel and renewable diesel are discussed in Section V.B.2.

Before considering availability of qualifying feedstocks that could be used to produce advanced biodiesel and renewable diesel, it is helpful to review the supply of biodiesel and renewable

[67] Data from the International Trade Commission, from which EIA derives their reported values of imports of ethanol. See ''2016 imports of ethanol from Brazil through September,'' docket EPA–HQ–OAR–2016–0004.

[68] For instance, UNICA said that ''. . . sugarcane ethanol should continue to be a major renewable fuel source in California.''

[69] Throughout this section we refer to advanced biodiesel and renewable diesel as well as advanced biodiesel and renewable diesel feedstocks. In this context, advanced biodiesel and renewable diesel refers to any biodiesel or renewable diesel for which RINs can be generated that satisfy an obligated party's advanced biofuel obligation (*i.e.,* D4 or D5 RINs). An advanced biodiesel or renewable feedstock refers to any of the biodiesel, renewable diesel, jet fuel, and heating oil feedstocks listed in Table 1 to § 80.1426 that can be used to produce fuel that qualifies for D4 or D5 RINs. These feedstocks include soy bean oil; oil from annual cover crops; oil from algae grown photosynthetically; biogenic waste oils/fats/greases; non-food grade corn oil; camelina sativa oil; and canola/rapeseed oil (See pathways F, G, and H of Table 1 to § 80.1426).

[70] See Section V.B.2.ii for a discussion of the current production capacity for biodiesel and renewable diesel. While some biodiesel facilities are limited to certain types of feedstocks (typically virgin vegetable oils) we note that some virgin vegetable oils qualify as advanced biofuels, while others can only be used to produce non-advanced renewable fuel (fuel that qualifies to produce D6 RINs) when used at facilities that qualify for an exemption from the 20% lifecycle greenhouse gas reduction requirements under 40 CFR 80.1403.

diesel to the United States in recent years. While historic supply data and trends alone are insufficient to project the volumes of biodiesel and renewable diesel that are reasonably attainable and appropriate in future years, historic data can serve as a useful frame of reference in considering future volumes. Past experience suggests that a high percentage of the supply of biodiesel and renewable diesel to the United States qualifies as advanced biofuel.[71] In previous years biodiesel and renewable diesel produced in the United States has been almost exclusively advanced biofuel.[72] Imports of advanced biodiesel have increased in recent years and will likely continue in 2017, as discussed in Section V.B.2.iii. Setting the 2017 advanced biofuel volume requirement so as to require that a high percentage of the projected total supply of biodiesel and renewable diesel would be advanced biofuel would not only be consistent with our experience in previous years, but would also be consistent with the goal of seeking to increase volumes of fuels with higher potential GHG reductions.

TABLE IV.B.2–1—ADVANCED (D4 AND D5) BIODIESEL AND RENEWABLE DIESEL FROM 2011 TO 2016

[million gallons] [a]

	2011	2012	2013	2014	2015	2016 [b]
Domestic Biodiesel (Annual Change)	967 (N/A)	1,014 (+47)	1,376 (+362)	1,303 (−73)	1,253 (−50)	N/A
Domestic Renewable Diesel (Annual Change)	58 (N/A)	11 (−47)	92 (+81)	155 (+63)	175 (+20)	N/A
Imported Biodiesel(Annual Change)	44 (N/A)	40 (−4)	156 (+116)	130 (−26)	261 (+131)	N/A
Imported Renewable Diesel [b] (Annual Change)	0 (N/A)	28 (+28)	145 (+117)	129 (−16)	121 (−8)	N/A
Exported Biodiesel [c] (Annual Change)	48 (N/A)	102 (+54)	125 (+23)	134 (+9)	133 (−1)	N/A
Total (Annual Change)	1021 (N/A)	991 (−30)	1,644 (+653)	1,583 (−61)	1,677 (+94)	2,100 (+423)

[a] All data for 2011–2015 from EMTS. EPA reviewed all advanced biodiesel and renewable diesel RINs retired for reasons other than demonstrating compliance with the RFS standards and subtracted these RINs from the RIN generation totals for each category in the table above to calculate the supply in each year.

[b] Volumes for 2016 are those determined reasonably attainable in the final rule deriving the 2016 standards. This projection was for all advanced biodiesel and renewable diesel and did not differentiate between domestically produced and imported fuels or between biodiesel and renewable diesel.

[c] In calculating the supply of advanced biodiesel and renewable diesel we have assumed all exported biodiesel must retire 1.5 RINs per gallon consistent with 80.1130. No parties reported exports of advanced renewable diesel from 2011–2015.

TABLE IV.B.2—2 SUPPLY OF CONVENTIONAL (D6) BIODIESEL AND RENEWABLE DIESEL FROM 2011 TO 2016

[million gallons] [a]

	2011	2012	2013	2014	2015	2016 [b]
Domestic Biodiesel (Annual Change)	0 (N/A)	0 (+0)	6 (+6)	1 (−5)	0 (+0)	N/A
Domestic Renewable Diesel (Annual Change)	0 (N/A)	0 (+0)	0 (+0)	0 (+0)	0 (+0)	N/A
Imported Biodiesel (Annual Change)	0 (N/A)	0 (+0)	31 (+31)	52 (+21)	74 (+22)	N/A
Imported Renewable Diesel [b] (Annual Change)	0 (N/A)	0 (+0)	53 (+53)	0 (−53)	106 (+106)	N/A
Exported Biodiesel [c] (Annual Change)	0 (N/A)	0 (+0)	0 (+0)	0 (+0)	0 (+0)	N/A
Total (Annual Change)	0 (N/A)	0 (+0)	90 (+90)	53 (−37)	180 (+127)	400 (+220)

[a] All data for 2011–2015 from EMTS. EPA reviewed all conventional biodiesel and renewable diesel RINs retired for reasons other than demonstrating compliance with the RFS standards and subtracted these RINs from the RIN generation totals for each category in the table above to calculate the supply in each year.

[b] Volumes for 2016 are those used in deriving the total renewable fuel standard in the final rule deriving the 2016 standards. This projection was for all conventional biodiesel and renewable diesel and did not differentiate between domestically produced and imported fuels or between biodiesel and renewable diesel.

[c] In calculating the supply of conventional biodiesel and renewable diesel we have assumed all exported biodiesel must retire 1.5 RINs per gallon consistent with 80.1130. No parties reported exports of renewable diesel from 2011–2015.

Since 2011 the year-over-year increases in the volume of advanced biodiesel and renewable diesel in the United States have varied greatly, from a low of negative 61 million gallons from 2011 to 2012 to a high of 653 million gallons from 2012 to 2013. These changes in supply were likely influenced by a number of factors such as the cost of biodiesel feedstocks and petroleum diesel, the status of the biodiesel blenders tax credit, growth in marketing of biodiesel at high volume truck stops and centrally fueled fleet locations, demand for biodiesel and renewable diesel in other countries, and the volumes of renewable fuels (particularly advanced biofuels) required by the RFS. This historical information does not indicate that the maximum previously observed increase of 653 million gallons of advanced biodiesel and renewable diesel is reasonably attainable and appropriate from 2016 to 2017, nor does it indicate that the low growth rates observed in other years represent the limit of

[71] From 2011 through 2015 over 95% of all biodiesel and renewable diesel supplied to the United States (including domestically-produced and imported biodiesel and renewable diesel) qualified as advanced biodiesel and renewable diesel (6,836 million gallons of the 7,159 million gallons) according to EMTS data.

[72] From 2011 through 2015 over 99.8% of all the domestically produced biodiesel and renewable diesel supplied to the United States qualified as advanced biodiesel and renewable diesel (6,538 million gallons of the 6,545 million gallons) according to EMTS data.

potential growth in 2017. Rather, these data illustrate both the magnitude of the increases in advanced biodiesel and renewable diesel in previous years and the significant variability in these increases.

We also acknowledge that the volume of conventional (D6) biodiesel and renewable diesel use in the United States has increased in recent years, and that these fuels are likely to continue to contribute to the supply of renewable fuel in the United States in 2017.[73] If there are constraints on the total volume of all forms of biodiesel and renewable diesel related to the ability of the market to distribute and/or consume biodiesel and renewable diesel, as we believe will likely be the case in 2017, setting the RFS standards in such a way that the projected volume of *advanced* biodiesel and renewable diesel was equal to the projected volume of *total* biodiesel and renewable diesel (including both advanced and conventional fuels) would require all of the reasonably attainable volume of biodiesel and renewable diesel to qualify as an advanced biofuel (See Section V.B.2 for more detail on these constraints). This would assume that the standards we set could effectively close the market for *conventional* biodiesel and renewable diesel, as constraints related to the distribution and use of additional volumes of biodiesel and renewable diesel would be expected to make the use of conventional fuels in addition to the advanced volumes unlikely.[74] If effective, establishing the RFS volumes in this way could significantly disrupt the supply chains established to supply the United States with conventional biodiesel and renewable diesel. However, it is also possible that the conventional forms of these fuels would continue to be imported in 2017 despite our action in setting the advanced biofuel standard, consistent with past practice and established contracts and supply chains, and that the result, due to constraints related to distribution and/or consumption of all forms of biodiesel and renewable diesel, would be an inability to satisfy the advanced biofuel volume requirement through the production and use of advanced biofuels (as opposed to use of carryover RINs).

Although there is uncertainty regarding EPA's ability to effectively constrain the entry into commerce in the U.S. of conventional biodiesel and renewable diesel through setting a higher advanced biofuel standard, we believe our decision for 2017 is reasonably made on the basis of an analysis of feedstock availability. The primary difference between conventional and advanced forms of biodiesel and renewable diesel is the type of feedstock used for production. EPA received several comments on our proposed rule related to the availability of qualifying advanced biodiesel and renewable diesel feedstocks. Some of these comments argued that the expected increase of qualifying advanced feedstocks was less than the proposed increase of 200 million gallons of advanced biodiesel and renewable diesel from 2016 to 2017 (from 2.1 billion gallons to 2.3 billion gallons). These parties generally argued that because the available supply of qualifying advanced feedstocks would not increase in line with the proposed volume requirements, the proposed standards would likely result in feedstock substitution, with an increased use of qualifying advanced feedstocks for biodiesel and renewable diesel production, while the parties previously using these feedstocks for food, feed, or industrial purposes would turn to alternative feedstocks. These commenters generally speculated that as biodiesel and renewable diesel producers sought out more qualifying advanced feedstocks, other parties would likely turn to greater use of palm oil as a substitute. Alternatively, other parties argued that there were sufficient qualifying advanced feedstocks to achieve significantly higher volumes of advanced biodiesel and renewable diesel than the volumes in EPA's proposed rule. They requested that in light of the availability of these feedstocks EPA should finalize increases from both the proposed advanced biofuel standard for 2017 and the proposed biomass-based diesel standard for 2018. Commenters arguing for either lower or higher advanced biofuel standards in 2017 on the basis of the availability of qualifying advanced feedstocks both included feedstock assessments to support their claims. These assessments are discussed briefly below. More detail on EPA's evaluation of each of these assessments can be found in Section 2.4.5 of the RTC document.

Commenters claiming that qualifying feedstocks would not increase sufficiently to meet the proposed increase in advanced biodiesel and renewable diesel from 2016 to 2017 generally relied on a study by Nelson and Searle.[75] This study builds upon a 2015 study by Brorsen[76] of available feedstocks capable of being utilized to produce biodiesel. The Nelson and Searle study focused on the production and recovery of feedstocks in the United States that can be used to produce advanced biodiesel, after accounting for demand from other sectors (*e.g.,* food, feed, industrial, etc.). It concluded that feedstocks for advanced biofuels (*e.g.,* soy oil, canola oil, yellow grease etc.) were expected to increase so that biodiesel fuel could increase by 23 million gallons in 2017, and increase at an annual average rate of 31.5 million gallons through 2022.[77] The study's strength is its transparent methodology in accounting for the different types of feedstocks that can be utilized to produce advanced biofuels.

The Nelson and Searle study is a fairly conservative view of the increased availability of advanced biodiesel/renewable diesel feedstocks from planted crops in the United States in the next few years. For the following reasons we believe it likely under-estimates the total availability of advanced feedstocks for biodiesel and renewable diesel production in 2017. USDA's most recent World Agricultural Supply and Demand Estimates (WASDE) has larger increases in vegetable oils in the U.S. than the Nelson and Searle study (see discussion below).[78] The Nelson and Searle study did not consider the availability of feedstocks for advanced biodiesel and renewable diesel production in countries other than the United States. It also assumed no significant increases in distillers corn oil or the recovery of additional waste oils such as yellow grease or brown grease.[79]

[73] As shown in Table IV.B.2–2, there was no qualifying conventional biodiesel and renewable diesel used in the United States in 2011 and 2012, and the volume of these fuels rose to 90 million gallons, 53 million gallons, and 180 million gallons from 2013–2015.

[74] We also note that the potential constraints related to the distribution and use of biodiesel may lead to an increasing demand for renewable diesel, which faces fewer potential constraints related to distribution and use than biodiesel. Much of the renewable diesel produced globally would qualify as conventional, rather than advanced biofuel, and we therefore expect that conventional renewable diesel will continue to be an important source of renewable fuel used in the United States in 2017.

[75] Nelson, B. and Searle, S., ''*Projected availability of fats, oils, and greases in the U.S.*'', 2016, ICCT Working Paper. EPA–HQ–OAR–2016–0004–1800.

[76] Brorsen, W., ''*Projections of U.S. Production of Biodiesel Feedstock*'', 2015, EPA–HQ–OAR–2015–0111.

[77] Producing one gallon of biodiesel or renewable diesel requires approximately one gallon of feedstock.

[78] USDA, *World Agricultural Supply and Demand Estimates,* September 2016, p. 10.

[79] The study also did not account for the potential decline in soybean oil use in food, as a result of a June 2015 FDA determination requiring the elimination by 2018 of all partially hydrogenated oil in food use (See the determination on the RFS

Continued

Commenters arguing that there is sufficient available feedstock for much higher volumes of advanced biodiesel and renewable diesel generally cited studies conducted by LMC International.[80] [81] The 2016 LMC International study is an update to a previous study that LMC International undertook for the previous RFS Annual Rule (2014–2016). Both of the LMC International studies sought to quantify the global availability of feedstocks for advanced biodiesel and renewable diesel production, after accounting for demand for these feedstocks in other markets. The most recent LMC International study concluded that the global availability of feedstocks for use in advanced biodiesel and renewable diesel production is expected to grow from 8.6 billion gallons in 2017 to 9.2 billion gallons in 2018 and 9.8 billion gallons in 2020. While they do not provide an estimate of feedstock availability broken down by qualifying oils and fats in 2016, they do state that the global supply of advanced feedstock is expected to ''rise steadily'' over the forecast period. In part, this is due to an upward revision of the projected level of soy oil production worldwide since their 2015 study. This would suggest an annual increase in advanced feedstock availability of up to 600 million gallons per year. The most recent LMC International study does not attempt to determine how much of the increase in this feedstock, or the resulting biodiesel or renewable diesel, could be expected to be used in the United States versus other international markets, however they do note that approximately one third of the existing feedstock is produced in North America.

Both of the LMC International studies may overestimate feedstock availability. For example, when estimating availability, the studies consider the theoretical maximum amount of oil that could be extracted from an oil seed, or ''oil in seed'', versus the amount of oil actually expected to be extracted/produced. Some amount of the soybean supply is not crushed, and is fed directly to livestock, and in other instances the soybean is crushed, and oil is extracted, but it is added as a necessary element to feed and thus doesn't enter the oil market. These unaccounted for alternate practices contribute to oil supply estimates that are in some cases significantly higher than USDA estimates. For example, the most recent LMC International estimate of global soybean oil supply is more than 25 percent greater than that projected by USDA–WASDE in 2016/2017.[82]

NBB also submitted a study that contained updated results from the World Agricultural Economic and Environmental Services model (WAEES model).[83] Rather than project the availability of advanced biodiesel and renewable diesel feedstocks in 2017, this study instead looked at the likely impacts of meeting a ''market reality'' scenario with an advanced biofuel standard of 4.75 billion gallons in 2017 and 2018 and biomass-based diesel standards of 2.0 and 2.50 billion gallons in 2017 and 2018, respectively. In the ''market reality'' scenario, the WAEES model projected that approximately 2.3 billion gallons of biodiesel and 0.6 billion gallons of renewable diesel would be used to satisfy the RFS standards for 2017 assumed in this scenario.[84] The study concludes that these higher standards could be met with a rise in biodiesel costs from $3.02 in 2016 to $3.34 in 2017 and $3.58 in 2018.

These WAEES model results, however, are significantly impacted by a number of fairly optimistic assumptions. Each individual assumption may be justifiable, but when compiled together the results of the study imply an outlook for biodiesel/renewable diesel feedstocks that is more favorable than is likely. For example, WAEES assumes the U.S. biodiesel blenders tax credit is in place for 2017 and 2018; that foreign countries do not meet their renewable fuel mandates thus freeing up biodiesel supplies for the United States market;[85] that biodiesel consumption in 2015 was higher than the volumes reported in EMTS; and that much higher volumes of ethanol are used in higher level ethanol blends than EPA believes is possible.[86] Also, in contrast to the Nelson and Searle study, the WAEES model predicts that corn oil extraction rates from distillers' grains increase, resulting in an increase in the supply of corn oil available for biodiesel production in the United States. Using different assumptions, such as higher demand for biodiesel in the rest of the world, would result in higher cost impacts, and less availability of feedstocks to produce biodiesel for meeting the high potential standards evaluated by the WAEES model. The combined impact of the key assumptions including the renewal of the biodiesel blenders tax credit, higher ethanol than EPA believes is possible etc., are significant. This means that achieving these volumes is likely to be more difficult than the results from the WAEES model indicate.

In assessing the expected increase in the availability of feedstocks that can be used to produce advanced biodiesel and renewable diesel from 2016 to 2017, EPA has looked to a number of different sources. We believe the most reliable source for projecting the expected increase in vegetable oils in the United States is USDA's WASDE. The September 2016 WASDE report projects that the production of vegetable oils in the United States will increase by 0.33 million metric tons from 2016 to 2017.[87] This quantity of vegetable oils could be used to produce approximately 94

Web site at *http://www.fda.gov/Food/IngredientsPackagingLabeling/FoodAdditivesIngredients/ucm449162.htm*). To the extent that soy oil continues to be phased down for food purposes, this will free up some supply of soy oil for biodiesel. Any reduction in soybean oil used for food purposes, however, would be expected to lead to an increased use of other vegetable oils for food purposes. These alternative oils, then, would not be available as potential feedstocks for renewable fuel.

[80] LMC International, ''*Current and Future Supply of Biodiesel Feedstocks*'', 2016, EPA–HQ–OAR–2016–0004–2904 (Attachment 14).

[81] LMC International, ''*Current and Future Supply of Biodiesel Feedstocks*'', 2015, EPA–HQ–OAR–2016–0004–2904 (Attachment 14).

[82] USDA, *World Agricultural Supply and Demand Estimates,* August 2016. *http://usda.mannlib.cornell.edu/usda/waob/wasde//2010s/2016/wasde-08-12-2016.pdf*

[83] Kruse, J., ''Implications of Higher Biodiesel Volume Obligations for Global Agriculture and Biofuels'', 2016, World Agricultural Economic and Environmental Services (WAEES), EPA–HQ–OAR–2016–0004–2904 (Attachment 13).

[84] This study assumes that all of the biodiesel is advanced biodiesel, but notes that the volume of renewable diesel includes both advanced and conventional renewable diesel.

[85] Many foreign countries have their own biodiesel mandates. Most countries have increasing stringency in their levels of required biodiesel, although past performance does not equate to future results and some past mandates have not been satisfied. See an assessment entitled, ''Biomass-Based Diesel Mandates and Trade Trends around the World'' (available at *http://www.biofuelsdigest.com/bdigest/2016/08/31/biomass-based-diesel-mandates-and-trade-trends-around-the-world/*), for an overview of the status of biomass-based diesel mandates outside of the United States.

[86] The WAEES model projects 621 million gallons of ethanol will be used in mid to high level ethanol blends in 2016/2017 and 600 million gallons of ethanol will be used in mid to high level ethanol blends in 2017/2018. These volumes are significantly higher than those we project can be consumed in Section V.B.1 of this rule.

[87] The September WASDE was the most recent published WASDE report available to EPA at the time the advanced biodiesel and renewable diesel feedstock assessment was conducted. It is available online at: *http://www.usda.gov/oce/commodity/wasde/latest.pdf.* The WASDE projects the supply of agricultural commodities by agricultural marketing year, rather than calendar year. The agricultural marketing year runs from October 1 through September 30. We have therefore used the WASDE projections from 2015/2016 to represent available feedstocks in 2016, and the projections from 2016/2017 to represent available feedstocks in 2017.

million gallons of advanced biodiesel or renewable diesel.[88]

In addition to virgin vegetable oils, we also expect increasing volumes of distillers corn oil to be available for use in 2017. In assessing the likely increase in the availability of distillers corn oil from 2016 to 2017, the authors of the WAEES model considered the impacts of an increasing adoption rate of distillers corn oil extraction technologies, as well as increased corn oil extraction rates enabled by advances in this technology. They project that the availability of distillers corn oil will increase by approximately 83 million gallons from 2016 to 2017.[89] We believe that this is a reasonable projection of the increased production of distillers corn oil from 2016 to 2017. While the vast majority of the increase in advanced biodiesel and renewable diesel feedstocks produced in the United States from 2016 to 2017 is expected to come from virgin vegetable oils and distillers corn oil, increases in the supply of other sources of advanced biodiesel and renewable diesel feedstocks, such as biogenic waste oils, fats, and greases, may also occur. These increases, however, are expected to be modest. In total, we expect that increases in feedstocks produced in the United States are sufficient to produce approximately 200 million more gallons of advanced biodiesel and renewable diesel in 2017 relative to 2016. We note that this is consistent with the results from the LMC model, mentioned above, which projected a global increase of 600 million gallons of advanced biodiesel and renewable diesel feedstocks and notes that historically approximately one third of the total quantity of these feedstocks has been produced in North America.

In addition to the expected increase in advanced feedstocks produced in the United States, we have also considered the expected increase in the imports of advanced biodiesel and renewable diesel produced in other countries. We believe this is appropriate in light of the significant expected increase in advanced biodiesel and renewable diesel feedstocks in countries other than the United States (estimated at approximately 400 million gallons using the global results from the LMC model together with our estimate of the increase in the domestic production of these feedstocks discussed above), and the increasing volumes of imported advanced biodiesel and renewable diesel in recent years. While there has been significant variation in the volume of advanced biodiesel and renewable diesel imports in previous years, the general trend has been for increasing volumes of imports. From 2011 through 2015, the average annual rate of increase in the imported volume of advanced biodiesel and renewable diesel has been approximately 85 million gallons per year.[90] From 2012 through 2015 the average annual rate of increase for these fuels was approximately 105 million gallons per year.[91]

We therefore believe it is reasonable to expect the imports of advanced biodiesel and renewable diesel to increase by approximately 100 million gallons from 2016 to 2017. We believe that this volume of imported advanced biodiesel and renewable diesel will continue to provide the appropriate market demand signal for advanced biodiesel and renewable diesel, without resulting in the potential negative impacts of large scale feedstock switching discussed above. We note that we do not believe that the supply of imported advanced biodiesel and renewable diesel necessarily could or should increase by 100 million gallons per year for years beyond 2017. There are several factors, such as expected slowing growth rates in the production of advanced biodiesel and renewable diesel feedstocks and increasing demand for advanced biodiesel and renewable diesel in other countries, which indicate that this rate of growth in imported volumes of advanced biodiesel and renewable diesel will likely slow in futures years. Nevertheless, we believe an increase of 100 million gallons of imported advanced biodiesel and renewable diesel is reasonable to assume from 2016 to 2017.

After a careful consideration of the assessments of available feedstocks, along with comments we received on the proposed 2017 volume standards and a review of the historic supply of advanced biodiesel and renewable diesel to the United States in previous years, EPA has determined that 2.4 billion gallons of advanced biodiesel and renewable diesel is reasonably attainable and appropriate for use in our determination of the advanced biofuel standard for 2017. This volume, which is 300 million gallons higher than the volume of advanced biodiesel and renewable diesel projected in deriving the advanced biofuel standard in 2016, reflects EPA's assessment of the expected increase in advanced feedstocks available for the production of advanced biodiesel and renewable diesel for the U.S. market from 2016 to 2017. We believe that in not considering potential increases in the volume of distillers corn oil or waste feedstocks that can be recovered, and by focusing solely on feedstock availability in the United States, the Nelson and Seale study significantly under-estimated the likely increase in available feedstocks from 2016 to 2017. Conversely, while the LMC model may be a relatively reasonable assessment of the growth in global availability (with the exception of the optimistic assumptions noted above), it would be unreasonable to assume that all of this feedstock can or should be used for biodiesel and renewable diesel production for use in the United States.

While we are projecting that 2.4 billion gallons of advanced biodiesel and renewable diesel will be available to the United States in 2017 for the purposes of deriving the advanced biofuel standard, we do not believe that this is the maximum volume that could be supplied. It is possible that if EPA were to set a higher advanced biofuel standard that prices for biodiesel and renewable diesel (and the associated RINs) would rise to levels that would result in a greater supply of advanced biodiesel and renewable diesel to the United States. These increases, however, would likely not be the result of additional production of advanced biodiesel and renewable diesel production enabled by an increase in the production of advanced feedstocks. Advanced biodiesel and renewable diesel feedstocks include both waste oils, fats and greases and oils from planted crops. In recent years the demand for waste oils, fats, and greases for biodiesel production has been significant, especially as mandated volumes of renewable fuels in the United States and around the world have increased. While we believe an increase in supply of waste oils, fats, and greases is possible in 2017 based in part on the studies cited above, we

[88] To calculate this volume we have used a conversion of 7.7 pounds of feedstock per gallon of biodiesel. This is based on the expected conversion of soy oil (*http://extension.missouri.edu/p/G1990*), which is the largest source of feedstock used to produce advanced biodiesel and renewable diesel. We believe that it is also a reasonable conversion factor to use for all virgin vegetable oils.

[89] Kruse, J., ''Implications of Higher Biodiesel Volume Obligations for Global Agriculture and Biofuels'', 2016, World Agricultural Economic and Environmental Services (WAEES), EPA–HQ–OAR–2016–0004–2904 (Attachment 13).

[90] This number is calculated using the information in Table IV.B.2–1 above. The total imports of advanced biodiesel and renewable diesel was 44 million gallons in 2011, rising to 382 million gallons in 2015.

[91] This number is calculated using the information in Table IV.B.2–1 above. The total imports of advanced biodiesel and renewable diesel was 68 million gallons in 2012, rising to 382 million gallons in 2015.

believe this increase is limited as much of these oils, fats, and greases are already being recovered and used in biodiesel and renewable diesel production or for other purposes. Many of the planted crops that supply vegetable oil for advanced biodiesel and renewable diesel production are primarily grown as livestock feed with the oil as a co-product or by-product, rather than specifically as biodiesel and renewable diesel feedstocks.[92] This is true for soy beans and corn, which are the two largest sources of feedstock from planted crops used for biodiesel production in the United States.[93] This means that the planted acres of these crops are unlikely to respond to additional demand for vegetable oils for biodiesel and renewable diesel production in the near term, as the oils produced are not the primary source of revenue for these crops.

Given the limited ability of the markets to provide additional feedstocks in response to a higher advanced biofuel standard in 2017, we believe that the primary impact of setting a standard involving more than a 300 million gallon increase over the 2016 standard could be a decreased use of advanced biodiesel and renewable diesel in other countries (as this supply is shifted to the United States) as well as significant feedstock substitution as the food, feed, and industrial oil markets switch to non-advanced feedstocks to free up greater volumes of advanced feedstocks for advanced biodiesel and renewable diesel production.[94] Increasing the short-term supply of advanced biodiesel and renewable diesel to the United States in this manner (simply shifting the end use of advanced feedstocks and biodiesel and renewable diesel produced from these feedstocks and displacing conventional biodiesel and renewable diesel with advanced biodiesel and renewable diesel) may not advance the GHG goals of the RFS program. In a worst case scenario, higher standards could cause supply disruptions to a number of markets as biodiesel and renewable diesel producers seek additional supplies of advanced feedstocks and the parties that previously used these feedstocks, both within and outside of the fuels marketplace, seek out alternative feedstocks. This could result in significant cost increases, for both biodiesel and renewable diesel as well as other products produced from renewable oils, while failing to meaningfully reduce overall GHG emissions or increase U.S. energy security. Nevertheless, while the growth in the availability of advanced feedstocks may be slowing both in the U.S. and abroad, as indicated by some studies,[95] we believe that a volume of 2.4 billion gallons of advanced biodiesel and renewable diesel (300 million gallons more than our projection of the available volume of these fuels in 2016) is both reasonably attainable and appropriate in 2017.

The 300 million gallon annual increase we are using for 2017 is a little less than the increase in advanced biodiesel and renewable diesel we assumed in deriving the 2016 advanced biofuel standard would occur from 2015 to 2016 (approximately 370 million gallons). We believe that this is reasonable because the circumstances we are facing in this action are different from those we were facing in the 2014–2016 final rule. The 2016 standards followed two years where standards had not been set by the statutory deadlines. Relatively modest increases in the supply of advanced biodiesel and renewable diesel occurred in 2014 and 2015. This meant that there was greater opportunity in 2016 to take advantage of market changes that had not been fully utilized in the preceding two years.

EPA also received comments on the equivalence value EPA used to convert the volume of advanced biodiesel and renewable diesel into a projected number of RINs for the purpose of deriving the proposed advanced biofuel standard. Biodiesel has an equivalence value of 1.5, while renewable diesel generally has an equivalence value of 1.7.[96] In the proposed rule EPA assumed an equivalence value of 1.5, consistent with the past rules, using the simplifying assumption that the vast majority of volume was biodiesel. Commenters noted, however, that using an equivalence value of 1.5 did not properly account for the significant volumes of renewable diesel that is expected to be supplied to the United States in 2017. EPA agrees with these comments. In this final rule we have used an equivalence value of 1.55 to convert the projected volume of advanced biodiesel and renewable diesel to a volume of RINs for the purpose of deriving the advanced biofuel standard. We have similarly used this higher equivalence value (1.55) to convert the projected volume of total biodiesel and renewable diesel (both advanced and conventional) to a volume of RINs for the purpose of deriving the total renewable fuel standard for 2017. This higher equivalence value is generally consistent with the volume weighted average equivalence value for the volume of advanced biodiesel and renewable diesel supplied to the United States in recent years.[97] Note that this higher equivalence value does not impact the volume of biodiesel and renewable diesel, but does increase the number of RINs that is expected to be generated for this volume of biodiesel and renewable diesel, which impacts both the advanced and total renewable fuel standards.

We note that the reasonably attainable and appropriate volume of advanced biodiesel and renewable diesel projected for the purpose of deriving the advanced biofuel volume requirement cannot itself be viewed as a volume requirement. This volume is merely the basis on which we have determined the volume requirements for advanced biofuel and total renewable fuel. As discussed in more detail in Section V.C below, there are many ways that the market could respond to the percentage standards we establish, including use of advanced biodiesel and renewable diesel volumes higher or lower than those projected in this section.

[92] For example, corn oil is a co-product of corn grown primarily for feed or ethanol production, while soy and canola oil are primarily grown as livestock feed. For further discussion on this issue see the LMC International study, submitted as part of the NBB comments (EPA–HQ–OAR–2016–0004–2904, Attachment 14).

[93] According to EIA data 4,906 million pounds of soy bean oil and 1,044 million pounds of corn oil were used to produce biodiesel in the United States in 2015. Other significant sources of feedstock were yellow grease (1,232 million pounds), canola oil (745 million pounds), white grease (588 million pounds), tallow (429 million pounds), and poultry fat (190 million pounds). Numbers from EIA's February 2016 Monthly Biodiesel Production Report. Available at *http://www.eia.gov/biofuels/biodiesel/production/archive/2015/2015_12/biodiesel.pdf.*

[94] Given the constraints in the use of total biodiesel and renewable diesel in the U.S. described in Section V, increasing the use of advanced biodiesel and renewable diesel in the U.S. in 2017 could be expected to also lead to a decrease in the use of conventional biodiesel and renewable diesel. Any energy security benefits gained from additional volumes of advanced biodiesel and renewable diesel would be expected to be off-set by the corresponding lower consumption of conventional biodiesel and renewable diesel.

[95] See the results of the LMC International study, which projects that the availability of advanced feedstocks for biodiesel and renewable diesel production will increase by 600 million gallons from 2017 to 2018 (8.6 billion gallons to 9.2 billion gallons), but these increases will be only 300 million gallons per year from 2018–2020 (9.2 to 9.8 billion gallons over two years).

[96] This means that biodiesel producers generally generate 1.5 RINs for every gallon of biodiesel they produce, while renewable diesel producers generally generate 1.7 RINs for every gallon of renewable diesel they produce.

[97] "Converting volumes to RINs for biodiesel & renewable diesel," docket EPA–HQ–OAR–2016–0004.

3. Other Advanced Biofuel

In addition to cellulosic biofuel, imported sugarcane ethanol, and advanced biodiesel and renewable diesel, there are other advanced biofuels that can be counted in the determination of reasonably attainable and appropriate volumes of advanced biofuel for 2017. These other advanced biofuels include biogas, naphtha, heating oil, butanol, and jet fuel. However, the supply of these fuels has been relatively low in the last several years.

TABLE IV.B.3–1—HISTORICAL SUPPLY OF OTHER ADVANCED BIOFUELS

[Million ethanol-equivalent gallons]

	Biogas	Heating oil	Naphtha	Renewable diesel [a]	Total
2013	26	0	3	64	93
2014	20	0	18	15	53
2015	0	1	24	8	33

[a] Some renewable diesel generates D5 rather than D4 RINs as a result of being produced through coprocessing with petroleum or being produced from the non-cellulosic portions of separated food waste or annual cover crops.

The downward trend over time in biogas as advanced biofuel with a D code of 5 is due to the re-categorization in 2014 of landfill biogas from advanced (D code 5) to cellulosic (D code 3).[98] The average of the remaining sources over all three years is 44 million gallons. Based on historical supply and the expectation that growth in the advanced biofuel standard will continue to provide incentives for growth in the supply of these other advanced biofuels, we proposed using 50 million gallons in the context of determining the advanced biofuel volume requirement.

While some stakeholders suggested that volumes higher than 50 million gallons were possible in 2017, they relied primarily on opportunities for other biofuels to qualify as advanced under the existing regulations, including jet fuel, liquefied petroleum gas (LPG), and liquefied natural gas (as distinct from compressed natural gas). We agree that such opportunities exist, and believe that they could help the total volume of other advanced biofuels to reach 50 million gallons in 2017. However, since they have been produced in only de minimis amounts in the past, we do not have a basis for projecting substantial volumes from these sources in 2017. We have taken into consideration that the market supplied 67 million gallons of non-biogas advanced biofuel in 2013, demonstrating that it is capable of achieving supply of more than 50 million gallons. However, overall supply of other advanced biofuel decreased in 2014 and 2015, albeit during years when the RFS standards were not in place to drive increased production and use. Since it is not possible to discern the precise cause of the reduced volumes achieved in 2014 and 2015, we do not believe it would be reasonable to ignore these data points. We believe it is most reasonable to assume reasonably attainable volumes somewhat lower than the historic maximum, but higher than the low volumes seen in 2014 and 2015 that likely reflect in part the absence of a driving RFS standard. In light of these considerations, we believe it is reasonable to assume reasonably attainable and appropriate volumes of 50 million gallons of other advanced biofuel in 2017.

Some stakeholders suggested that we should ignore supply from other advanced biofuel sources altogether, citing the low volumes supplied in the past. We disagree. Some volumes are clearly attainable, and we do not believe it would be appropriate to ignore them. Therefore, for the purposes of determining the final advanced biofuel volume requirement, we have used 50 million gallons of other advanced biofuel.

4. Total Advanced Biofuel

The combination of all sources of advanced biofuel described in the previous sections leads us to believe that 4.28 billion gallons of advanced biofuel is reasonably attainable and appropriate to require in 2017, and that it is not necessary to reduce the advanced biofuel statutory target by the full amount permitted under the cellulosic waiver authority. This is the advanced biofuel volume requirement that we are establishing for 2017.

TABLE IV.B.4–1—VOLUMES USED TO DETERMINE THE FINAL ADVANCED BIOFUEL VOLUME REQUIREMENT FOR 2017

[Million ethanol-equivalent gallons except as noted]

	311
Advanced biodiesel and renewable diesel (ethanol-equivalent volume/physical volume)	3,720/2,400
Imported sugarcane ethanol	200
Other non-ethanol advanced	50
Total advanced biofuel	4,281

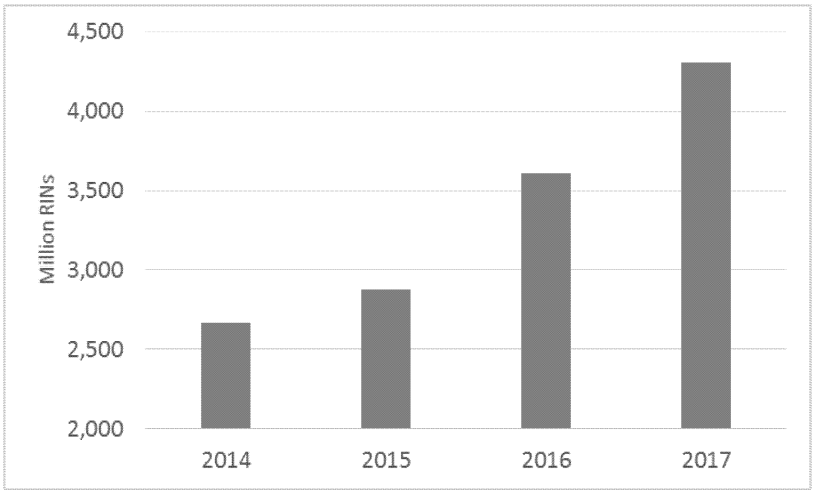
The final volume requirement for advanced biofuel for 2017 is an increase of about 300 million gallons from the proposed volume of 4.0 billion gallons, primarily reflecting our updated assessment of biodiesel and renewable diesel.

The volume of advanced biofuel that we are establishing for 2017 will require increases from current levels that are substantial yet reasonably attainable and appropriate, taking into account the constraints on supply discussed previously, our judgment regarding the ability of the standards we set to result in marketplace changes, feedstock availability, and the various

[98] 79 FR 42128, July 18, 2014.

uncertainties we have described. Figure IV.B.4–1 shows that the advanced biofuel volume requirement for 2017 will be significantly higher than the volume requirements for advanced biofuel in previous years.

Figure IV.B.4-1
Growth in Advanced Biofuel Volume Requirements



In response to the NPRM, stakeholders were strongly divided on whether the proposed 2017 advanced biofuel volume of 4.0 billion gallons was too high or too low. Parties representing advanced biofuel production, including biodiesel and sugarcane ethanol, expressed concern that 4.0 billion gallons would not provide enough incentive for the market to grow. However, the final volume of 4.28 billion gallons is about 700 million gallons higher than the 2016 volume requirement, providing significant opportunities for growth as discussed in more detail in Section V.C

Among commenters who suggested an alternative, higher volume for the 2017 advanced biofuel volume requirement, most based it primarily on a higher assumed level of BBD of between 2.5 and 2.9 billion gallons. As discussed in Section IV.B.2, after consideration of stakeholder comments, we do not believe that BBD volumes this high are reasonably attainable or appropriate in 2017. One stakeholder also believed that the methodology that we developed for determination of cellulosic biofuel underestimated potential 2017 volumes, and suggested that an additional 100 million gallons of cellulosic biofuel was possible. As discussed in Section III.D, we continue to believe that our methodology for cellulosic biofuel appropriately accounts for uncertainty in projections for that emerging industry, and that while an additional 100 million gallons of cellulosic biofuel could be considered possible, it is unlikely and thus should not be included in volumes used as the basis for the 2017 standards.

Parties representing the refining industry generally believed that the proposed volume of 4.0 billion gallons for advanced biofuel was too high. They suggested an alternative 2017 advanced biofuel volume requirement of 3.2 billion gallons, considerably below the 2016 volume requirement of 3.61 billion gallons. Although there are many problems with the assumptions these commenters used to justify their suggestion, we note first that, as described in Section I.B.1, available evidence indicates that the 2016 standard for advanced biofuel is on track to be met. Since available evidence indicates that the 2016 advanced biofuel standard is likely to be met, we see no reason to expect that at least the same volumes cannot be attained in 2017.

These stakeholders also assumed that imports of sugarcane ethanol and other advanced biofuel would be zero in 2017. Making such an assumption would be inconsistent with all past experience and there is no basis to assume that imports cannot contribute at least some volume in 2017.

The suggested advanced biofuel volume requirement of 3.2 billion gallons also assumes that cellulosic biofuel will only reach 200 million gallons instead of the 312 million gallons that we proposed. As described in Section III.D, we do not believe that using only historic cellulosic production volumes is appropriate when making projections for the future; the statute directs EPA to set the cellulosic volume at the ''projected volume . . . of production,'' rather than on the basis of past production alone.

Finally, these stakeholders' suggestion of 3.2 billion gallons of advanced biofuel assumes that the supply of BBD will not exceed the applicable BBD standard, which is 2.0 billion gallons for 2017. There is no basis for this assumption in setting the advanced biofuel volume requirement. The total supply of BBD has consistently exceeded the applicable BBD standard in the past, and is expected to do so again in 2016. Moreover, actual supply of BBD in 2016 is likely to exceed 2.0 billion gallons as shown in a memorandum to the docket.[99] As described in the NPRM and in the 2014–2016 final rule, the advanced biofuel standard creates a significant incentive for supply of BBD at levels higher than the BBD standard. Commenters supporting 3.2 billion gallons of advanced biofuel for 2017 gave no compelling reason why BBD cannot reach levels higher than 2.0 billion gallons.

As noted before, the volumes actually used to satisfy the advanced biofuel volume requirements may be different than those shown in Table IV.B.4–1 above. The volumes of individual types of renewable fuel that we have used in this analysis represent our best estimate of volumes that are reasonably

[99] ''Comparison of 2016 availability of RINs and 2016 standards,'' memorandum from David Korotney to docket EPA–HQ–OAR–2016–0004.

attainable by a market that is responsive to the RFS standards. However, given the uncertainty in these estimates, the volumes of individual types of advanced biofuel may be higher or lower than those shown above.

V. Total Renewable Fuel Volume for 2017

The national volume targets of total renewable fuel to be used under the RFS program each year through 2022 are specified in CAA section 211(o)(2)(B)(i)(I). For 2017 the statute stipulates that the volume of total renewable fuel should be 24 billion gallons. Since we have determined that the statutory volume target for cellulosic biofuel must be reduced to reflect the projected production volume of that fuel type in 2017, we are authorized under CAA section 211(o)(7)(D)(i) to reduce the advanced biofuel and total renewable fuel targets by the same or a lesser amount. We also have the authority to reduce any volume target under the general waiver authority under specific conditions as described in Section II.A.2. Although in the NPRM we had proposed to use a combination of the cellulosic waiver authority and the general waiver authority to reduce the statutory volume target for total renewable fuel for 2017, we have determined, based on comments received in response to the NPRM and a review of updated information, that 2017 supply is adequate to meet a total renewable fuel volume requirement of 19.28 billion gallons resulting from the use of the cellulosic waiver authority alone. The use of the general waiver authority for 2017 to further reduce the total renewable fuel standard is therefore not necessary. As a result, the implied volume for conventional (non-advanced) renewable fuel will be 15.0 billion gallons.

Today's standards are significantly higher than have been achieved in the past and will drive significant growth in renewable fuel use beyond what would occur in the absence of the requirements. The final volume requirements for both advanced biofuel and total renewable fuel recognize the ability of the market to respond to the standards we set, thereby accomplishing the goals of the statute to increase renewable fuel use.

We investigated whether the market is on track to meet the 2016 total renewable fuel volume requirement of 18.11 billion gallons, which EPA projected to be the maximum achievable volume for that year in the context of our use of the general waiver authority. As described in a memorandum to the docket, supply through the end of September coupled with a projection based on consideration of seasonal variations in supply for previous years indicate that compliance with the 2016 standards is indeed within reach.[100] We believe these results support the assessment conducted for purposes of establishing the 2016 total renewable fuel standard. For this final rule, we have taken a similar approach to assessing the adequacy of supply of total renewable fuel that differs in some particulars as described below.

A. Volumetric Limitation on Use of the Cellulosic Waiver Authority

In Section IV.B we explained our use of the cellulosic waiver authority to reduce the statutory volume target for advanced biofuel to a level that we have determined is reasonably attainable and appropriate given a consideration of factors related to the likely constraints on imports, distribution and use, and global GHG impacts of incremental growth in advanced biodiesel and renewable diesel. This did not require a reduction as large as the reduction in the statutory volume target for cellulosic biofuel, and so this reduction was within the authority provided by CAA section 211(o)(7)(D)(i).

As discussed in Section II.A.1, we believe that the cellulosic waiver provision is best interpreted to require equal reductions in advanced biofuel and total renewable fuel. We have consistently articulated this interpretation.[101] Having determined that we should establish the advanced biofuel volume at a level requiring a reduction of 4,719 million gallons from the statutory target, applying an equal reduction to the statutory target for total renewable fuel yields the results shown below.

TABLE V.A–1—APPLYING EQUAL VOLUME REDUCTIONS TO TOTAL RENEWABLE FUEL AS FOR ADVANCED BIOFUEL UNDER CELLULOSIC WAIVER AUTHORITY

[Million gallons]

	Advanced biofuel	Total renewable fuel
Statutory target	9,000	24,000
Reduction under the cellulosic waiver authority	4,719	4,719
Resulting volume	4,281	19,281

If we were to determine that there is an inadequate domestic supply to satisfy the total renewable fuel volume resulting from use of the cellulosic waiver authority alone, we could use the general waiver authority, described in Section II.A.2, to provide further reductions. Indeed, we proposed such an approach. However, we have re-evaluated the situation in light of new data and consideration of comments, and as described below we have determined that there will be adequate supply to meet a total renewable fuel volume requirement of 19.28 billion gallons in 2017.[102] As a result of this assessment, we have determined that further reductions in the total renewable fuel applicable volume using the general wavier authority are not necessary.

B. Assessing Adequacy of Supply

As noted above, the applicable volume of total renewable fuel was derived by applying the same volume reduction to the statutory volume target for total renewable fuel as was determined to be appropriate for advanced biofuel, using the cellulosic waiver authority. This section describes our assessment that there is adequate

[100] "Comparison of 2016 availability of RINs and 2016 standards," memorandum from David Korotney to docket EPA–HQ–OAR–2016–0004.

[101] For instance, see discussion in the final rule setting the 2013 standards: 78 FR 49809–49810, August 15, 2013.

[102] Stakeholder comments most directly impacting our assessment of the adequacy of supply of total renewable fuel were directed at distribution issues associated with biodiesel and renewable diesel. See Section V.B.2 for further discussion.

supply to meet an applicable volume requirement of 19.28 billion gallons. The objective of our assessment is different than our analysis in the NPRM, where we sought to identify the maximum reasonably achievable volume of total renewable fuel based on the sum of estimates of each type of renewable fuel, such as total ethanol, biodiesel and renewable diesel, biogas, and other non-ethanol renewable fuels. In this final rule, in contrast, we instead are evaluating those sources to determine if in the aggregate it appears that there is adequate supply to meet the total renewable fuel volume shown in Table V.A–1. Based on our conclusion that there is sufficient supply as discussed below, it is unnecessary to address any inadequate domestic supply through use of the general waiver authority.

Despite the different objective, we face much the same challenges that we noted in the NPRM: It is a very challenging task to estimate the adequacy of supply in light of the myriad complexities of the fuels market and how individual aspects of the industry might change in the future, and also because we cannot precisely predict how the market will respond to the volume-driving provisions of the RFS program. This is the type of assessment that is not given to precise measurement and necessarily involves considerable exercise of judgment.

Our investigation into whether there is adequate supply to meet the total renewable fuel volume shown in Table V.A–1 was driven primarily by a consideration of the total amount of ethanol that can be reasonably attained in light of various constraints, and the total volume of biodiesel and renewable diesel that can be reasonably attained. We also considered smaller contributions from non-ethanol cellulosic and other non-ethanol renewable fuels (*i.e.* naphtha, heating oil, butanol, and jet fuel). With regard to the more dominant contributors, the information that is available has allowed us to make a relatively more precise estimate of total supply of ethanol than of biodiesel/renewable diesel. This is due to the fact that the primary constraints in the supply of ethanol in 2017 are readily identifiable, although still challenging to quantify, while there are many different factors that could potentially constrain the supply of biodiesel and renewable diesel in 2017. As a result, we did not attempt to derive a specific estimate of reasonably attainable supply of total biodiesel and renewable diesel. Instead, after estimating what we consider to be reasonably attainable supply of ethanol in 2017, and taking into account the estimates of non-ethanol cellulosic biofuel supply discussed in Section III.D above and estimates of other non-ethanol renewable fuel supply discussed in Section IV.B.3, we considered whether the supply of total biodiesel and renewable diesel would be adequate to satisfy a requirement of 19.28 billion gallons.[103] The following sections provide our assessment of ethanol and biodiesel/renewable diesel volumes.

1. Ethanol

Ethanol is the most widely produced and consumed biofuel, both domestically and globally. Since the beginning of the RFS program, the total volume of renewable fuel produced and consumed in the United States has grown substantially each year, primarily due to the increased production and use of corn ethanol. However, the rate of growth in the supply of ethanol to the U.S. market has decreased in recent years as the gasoline market has become saturated with E10, and efforts to expand the use of higher ethanol blends such as E15 and E85 have not been sufficient to maintain past growth rates. Although we believe ethanol use is growing and can continue to grow, the low number of retail stations selling these higher-level ethanol blends, along with poor price advantages compared to E10, and a limited number of FFVs, among others, represent challenges to the rate of growth of ethanol as a transportation fuel in the United States.

In the 2014–2016 final rule we discussed in detail the factors that constrain growth in ethanol supply and the opportunities that exist for pushing the market to overcome those constraints.[104] That discussion generally remains relevant for 2017, though we believe that the supply of ethanol can be somewhat higher in 2017 than in 2016.

Ethanol supply is not currently limited by production and import capacity, which is in excess of 15 billion gallons.[105] Instead, the amount of ethanol supplied is constrained by the following:

- Overall gasoline demand and the volume of ethanol that can be blended into gasoline as E10 (typically referred to as the E10 blendwall).
- The number of retail stations that offer higher ethanol blends such as E15 and E85.
- The number of vehicles that can both legally and practically consume E15 and/or E85.
- Relative pricing of E15 and E85 versus E10 and the ability of RINs to affect this relative pricing.
- The supply of gasoline without ethanol (E0).

The applicable standards that we set under the RFS program provide incentives for the market to overcome many of these ethanol-related constraints.

While in the short term the RFS program is unlikely to have a direct effect on overall gasoline demand or the number of vehicles designed to use higher ethanol blends, it can provide incentives for changes in some other market factors, such as the number of retail stations that offer higher ethanol blends and the relative pricing of those higher ethanol blends in comparison to E10. The RFS program complements other efforts to increase the use of renewable fuels, such as the following:

- USDA's Biofuel Infrastructure Partnership (BIP) program which has provided $100 million in grants for the expansion of renewable fuel infrastructure in 2016 (supported by additional State matching funds)
- USDA's Biorefinery Assistance Program which has provided loan guarantees for the development and construction of commercial-scale biorefineries with a number of the new projects focused on producing fuels other than ethanol.
- The ethanol industry's Prime the Pump program, which has committed more than $45 million to date for retail refueling infrastructure[106]

In response to the NPRM, many stakeholders repeated their views from the 2014–2016 rulemaking regarding the existence and nature of the E10 blendwall. Ethanol proponents generally regard the blendwall as a fictional idea created by refiners, and said or implied that increases in ethanol supply beyond the blendwall are only limited by refiners' unwillingness to invest in the necessary infrastructure. Some also said that EPA's approach to setting standards, in which constraints on the supply of ethanol are used as justification for reducing the volume requirement below the statutory targets, was a self-fulfilling prophecy that guaranteed that the blendwall would

[103] As noted earlier, ''reasonably attainable'' volumes may be less than the ''maximum achievable'' volumes we would seek to identify when using the general waiver authority based on a finding of inadequate domestic supply. It follows that if there are sufficient reasonably attainable volumes of renewable fuel to satisfy a total renewable fuel requirement of 19.28 billion gallons, that there is no basis for a finding of inadequate domestic supply.

[104] 80 FR 77456–77465.

[105] ''RFA 2016 Annual Industry Outlook,'' docket EPA–HQ–OAR–2016–0004.

[106] ''Email dialogue with Robert White on Prime the Pump,'' docket EPA–HQ–OAR–2016–0004.

never be exceeded. Refiners and marketers typically viewed the constraints associated with the blendwall as representing a firm barrier that could not or should not be crossed, with costs for necessary infrastructure changes being prohibitively high and the associated opportunities for greater profits at retail being inconsequentially low. In their views, higher level ethanol blends such as E15 and E85 would be negligible in 2017 and standards that required higher ethanol blends to increase dramatically would compel refiners to reduce domestic supply of gasoline and diesel or risk non-compliance.

As stated in the 2014–2016 final rule and in the NPRM, our view of the E10 blendwall falls between these two viewpoints. We continue to believe that there are real constraints on the ability of the market to exceed an average nationwide ethanol content of 10%. However, these constraints do not have the same significance at all ethanol concentrations above 10%. Instead, for the state of infrastructure that can be available in 2017, the constraints represent a continuum of mild resistance to growth at the first increments above 10% ethanol and evolve to significant obstacles at higher levels of ethanol. In short, the E10 blendwall is not the barrier that some stakeholders believe it to be, but neither are increases in poolwide ethanol concentrations above 10% unlimited in the 2017 timeframe.

We continue to believe that the constraints associated with the E10 blendwall do not represent a firm barrier that cannot or should not be crossed. Rather, the E10 blendwall marks the transition from relatively straightforward and easily achievable increases in ethanol consumption as E10 to those increases in ethanol consumption as E15 and E85 that are more challenging to achieve. Comments received in response to the NPRM provided no compelling evidence that the nationwide average ethanol concentration in gasoline cannot exceed 10.0%.

However, we also recognize that the market is not unlimited in its ability to respond to the standards we set. This is true both for expanded use of ethanol and for non-ethanol renewable fuels. The fuels marketplace in the United States is large, diverse, and complex, made up of many different players with different, and often competing, interests. Substantial growth in the renewable fuel volumes beyond current levels will require action by many different parts of the fuel market, and a constraint in any one part of the market can act to limit the growth in renewable fuel supply. Whether notable constraints are in the technology development and commercialization stages, as has been the case with cellulosic biofuels, the development of distribution infrastructure as is the case with ethanol, or in the distribution and use of biodiesel, the end result is that these constraints limit the growth rate in the available supply of renewable fuel as transportation fuel, heating oil, or jet fuel. These constraints were discussed in detail in the 2014–2016 final rule, and we believe that the same constraints will operate to limit supply for 2017 as well.[107] Other factors outside the purview of the RFS program also impact the supply of renewable fuel, including the price of crude oil and global supply and demand of both renewable fuels and their feedstocks. These factors add uncertainty to the task of estimating the adequacy of supply of renewable fuel in the future.

While the constraints are real and must be taken into account in our evaluation of whether there is adequate supply to meet 19.28 billion gallons of total renewable fuel, none of those constraints represent insurmountable barriers to growth. Rather, they are challenges that are in the process of being addressed and will be overcome in a responsive marketplace given enough time and with appropriate investment. The speed with which the market can overcome these constraints is a function of whether and how effectively parties involved in the many diverse aspects of renewable fuel supply respond to the challenges associated with transitioning from fossil-based fuels to renewable fuels, the incentives provided by the RFS program, and other programs designed to incentivize renewable fuel use.

i. E0

We based the proposed total renewable fuel volume requirement in the NPRM on the same expectation from the 2014–2016 final rule regarding supply of E0: The RFS program would result in all but a tiny portion—estimated at 200 million gallons—of gasoline to contain at least 10% ethanol. We based this determination on the following two considerations:

1. The RFS program will continue incentivizing the market to transition from E0 to E10 and other higher level ethanol blends through the RIN mechanism.

2. Recreational marine engines represent a market segment that we believe would be particularly difficult to completely transition from E0 since they are used in a water environment where there is a greater potential for water contamination of the fuel. Some consumers are concerned that there could be a potential for consequent engine damage following phase separation of the water and fuel.[108]

Based on the analysis conducted for the 2014–2016 final rule, it is most likely that any recreational marine engines refueled at retail service stations (*i.e.,* not at marinas) would use only E10 since E0 is not typically offered at retail. Moreover, only a small minority of recreational marine engines refuel at marinas where E0 is more likely to be available, catering to that particular market. In a memorandum to the docket, we evaluated the information that had been supplied to us by stakeholders, highlighting the uncertainty in that information and concluding that about 200 million gallons of E0 was a reasonable estimate of the volume likely to be consumed by recreational marine engines.[109] In the NPRM, we expressed our belief that this analysis also reflected reasonable expectations for 2017.

In response to the proposal for the 2017 standards, some stakeholders said that we had significantly underestimated the volume of E0 used by recreational marine engines. However, no new information was provided that was not already considered in the 2014–2016 final rule and discussed in the aforementioned memorandum and, as before, no stakeholders provided any data on actual consumption of E0 by recreational marine engines. Moreover, the anecdotal information suggesting that most if not all recreational marine engines are fueled on E0 does not represent an appropriate basis for increasing our estimate since it was not based on any form of data and moreover appears highly unlikely given our expectation that only a small minority of recreational marine engines refuel at marinas where E0 is likely to be more prevalent.

Other stakeholders said that we had ignored significant demand for E0 in our determination of the total volume of

[107] See 80 FR 77450.

[108] We note that a recent report from the National Renewable Energy Laboratory calls into question the significance of water contamination for recreational marine engines. See ''Gas becomes stale before water uptake becomes a concern,'' Ethanol Producer Magazine, September 21, 2016. See also original report ''Water Uptake and Weathering of Ethanol-Gasoline Blends in Humid Environments,'' by Christensen & McCormick, National Renewable Energy Laboratory, September, 2016.

[109] ''Estimating E0 use in recreational marine engines,'' memorandum from David Korotney to docket EPA–HQ–OAR–2015–0111.

ethanol that can be supplied. They pointed beyond recreational marine engines to other small engines where there is demand for E0, and to Web sites like *Pure-gas.org*, which claim to list more than 11,000 stations which offer E0. Several stakeholders pointed to a report from EIA suggesting that 5.3 billion gallons of E0 was consumed in 2015.[110] Several refiners reiterated their comments responding to the 2014–2016 proposal which used EIA data to conclude that there is ongoing demand for E0 at a level of at least 3% of the total gasoline pool. This estimate of E0 demand was the primary basis for their request that the 2017 standards be set in such a way that the poolwide gasoline ethanol concentration is no higher than 9.7%.

Other than references to data and analyses collected by EIA, no stakeholder provided any data on actual E0 consumption. With regard to data from EIA, in the 2014–2016 final rule we addressed refiners' claim that 3% of the gasoline pool has been E0 for several years, concluding that those estimates were generated from incomplete EIA gasoline supply data which overestimated the potential demand for E0 at retail.[111] Comments from refiners in response to the 2017 proposal did not provide any new or different information that would change our conclusions with regard to that 3% estimate.

With regard to EIA's more recent estimate that 5.3 billion gallons of E0 was consumed in 2015, we do not believe that this value represents consumption of E0 at the retail. EIA's estimate was based on survey data from most U.S. terminals, which include information about domestic distribution from the terminal level and exports of ethanol-free gasoline, with the difference representing domestic disposition. EIA combines this information with estimates of available ethanol, assuming that the ethanol is used in a 10% blend with ethanol-free gasoline. As described in a memorandum to the docket, our analysis of EIA's estimate of 5.3 billion gallons of E0 concludes that it would require E85 volumes significantly higher than the volumes likely to have been supplied in 2015.[112] In our view, the 5.3 billion gallons of E0 estimated by EIA must include volumes that are blended with ethanol downstream of the terminal prior to dispensing from retail and centralized fleet refueling stations where additional ethanol blending can and does occur in excess of the blending used in EIA's estimate. The calculations are very sensitive to the exact volume of total ethanol available for blending, with EIA and EPA estimated volumes of total ethanol used differing by about 1 percent. We believe that EMTS data provides more accurate information on actual use of ethanol in motor fuel than EIA's survey data on ethanol production, blending, imports, and exports because it accounts for every gallon of ethanol produced but not exported, and is verified by the purchaser in the transaction within EMTS. Based on our analysis, we estimate that E0 consumption at the retail level in 2015 would have been closer to about 700 million gallons.

Some stakeholders pointed out that it would be difficult for the market to transition about 5 billion gallons of E0 to E10 within one year. However, since we believe that actual consumption of E0 in 2015 was much closer to 700 million gallons than 5.3 billion gallons, continuing to transition away from E0 since then to 200 million gallons of E0 by the end of 2017 is achievable. As a result, we continue to believe that 200 million gallons of E0 is a reasonable value to assume for purposes of assessing the adequacy of supply of total renewable fuel, based on our prior assessment that this volume dedicated to recreational marine engine use may not be significantly influenced by the standards we set in this time period, and our expectation that the RFS program will continue to incentivize all but this small portion of the gasoline pool to be blended with ethanol.

Stakeholders representing boat owners expressed concern that by including only 200 million gallons of E0 in the proposed derivation of maximum achievable total renewable fuel volumes, EPA anticipated effectively limiting the availability of E0 to 200 million gallons. This is not the case. The standards that EPA sets are not specific to ethanol nor to specific ethanol blends. Once the standards are set, the market has the flexibility to choose the mix of fuel types used to meet those standards. If, for instance, the demand for E0 in 2017 is higher than 200 million gallons, the market can compensate by providing higher volumes of E15 and/or E85, or additional non-ethanol renewable fuels.

ii. E15

In the NPRM, we proposed that a total ethanol volume of 14.4 billion gallons could be reached in 2017 based on the expectation that somewhat larger increases in ethanol supply were possible in 2017 than we had estimated for 2016. We did not provide specific estimates of E15 or E85 use in 2017, but instead said that we generally expected the RFS program to influence sales of E0, E15, and E85 in such a way as to produce this increase in ethanol volume. For this final rule, we have undertaken a more detailed estimate of the volumes of E15 and E85 that are possible in 2017, so as to more confidently assess whether there is adequate supply to reach a total renewable fuel volume requirement of 19.28 billion gallons.

Most comments in response to the NPRM repeated viewpoints they had expressed in response to the 2014–2016 proposal. Refiners and their associations, as well as parties representing fuel marketers and retail, expressed doubt that the number of stations offering E15 could increase significantly in 2017 and pointed to vehicle warranties that they believed would hinder many owners of 2001+ model year vehicles from refueling on E15. They also repeated their concerns about engine damage and liability for misfueling. Ethanol proponents generally pointed to the large number of in-use vehicles that are legally permitted to use E15 and information suggesting that many existing retail stations are already compatible with E15, or can be inexpensively upgraded. They also pointed to incentives for expanded infrastructure provided by programs such as USDA's Biofuels Infrastructure Partnership (BIP) program and the ethanol industry's Prime the Pump program. A more detailed discussion of our views of these comments can be found in the 2014–2016 final rule and in the Response to Comments document for this final rule.[113]

Consistent with our assessment for the 2014–16 final rule, we believe that neither the number of vehicles that are legally permitted to use E15, nor the number of owners of such vehicles who would choose to use it, are the predominant factors in determining the volume of E15 that is reasonably attainable in 2017. Instead, we believe that it is the number of retail stations offering E15 in 2017 that is more likely to determine how much E15 is actually consumed. The number of retail stations registered to offer E15 has grown to about 400 in the fall of 2016 based on information collected by the RFG Survey Association, more than doubling from the previous year. However, this is

[110] ''Almost all U.S. gasoline is blended with 10% ethanol,'' Energy Information Administration, *Today In Energy,* May 4, 2016.

[111] See discussion at 80 FR 77462.

[112] ''Ethanol Consumption in 2015 and Estimates of E0 Use,'' memorandum from David Korotney to Docket EPA–HQ–OAR–2016–0004.

[113] See discussion at 80 FR 77462–77464.

still a very small fraction of the approximately 150,000 retail stations currently operating. Based on comments received from retail station owners and their associations, this low number of retail stations offering E15 is most likely due to liability concerns and low expectations for a return on an investment in new or upgraded infrastructure.

We do not believe, based on past experience, that the core concerns retailers have with liability over equipment compatibility and misfueling would change if the RFS volume requirements were increased significantly. Similarly, while higher RFS volume requirements could make it incrementally more attractive for retailers to upgrade infrastructure to offer E15, the concerns they expressed in their comments about high capital costs and opportunities for return on their investment would remain. As a result, setting higher volume requirements would be unlikely to result in dramatic increases in the number of additional retail stations offering E15 in 2017 beyond those that may be upgraded through existing grant programs. As a result, we do not believe that E15 infrastructure expansion can occur on the much larger scale and faster timeframe that ethanol proponents believe it can. However, we do believe that retail infrastructure can and will change to offer more E15 in 2017. We have estimated the expansion that is possible in 2017 based on information on both the BIP and Prime the Pump programs, as well as an expectation that independent efforts to expand infrastructure will continue. As described in a memorandum to the docket, we believe that the number of stations will increase during the course of the year, and that an annual average of about 1,640 retail stations will be able to offer E15 in 2017.[114]

Since actual experience with E15 sales is so limited, and commenters provided little information on actual E15 sales volumes, we have made an estimate of possible E15 use in 2017 using the same methodology that was presented in the 2014–2016 final rule, supplemented by additional information about E15 that is expected to be supplied by terminals.[115] That estimate was based on the following equation, which was also used in the 2014–2016 final rule:

E15 volume = (Total gasoline throughput per station) × (Number of stations offering E15) × (Fraction of total gasoline sales which are E15)

We have updated the values used in this calculation based on comments provided by stakeholders and additional information that has become available since release of the NPRM. First, we have updated the number of retail stations that may offer E15 in 2017, as discussed above. Second, some stakeholders said that retail stations being targeted under the BIP program had greater total annual gasoline sales than average, such that it would be inappropriate to assume that the total gasoline throughput per retail service station in the above equation is equal to the nationwide average, currently about 0.95 million gallons per station per year. Available information on the BIP program does not include gasoline throughput, but larger retail stations would be more likely to produce the matching funds necessary as a condition of receiving BIP grant funds. One stakeholder that is actively and directly working with many of the retailers using funds from the BIP and Prime the Pump programs indicated that the average total gasoline throughput for affected retail stations is 2.8 billion gallons per year. Therefore, we have used this value in our determination of E15 supply for 2017. Further discussion can be found in a memorandum to the docket.[116]

Finally, in the 2014–2016 final rule we used a value of 50% for the fraction of total gasoline sales which are E15 at stations offering both E10 and E15 based on the expectation that E10 and E15 could be priced equally on a volumetric energy basis. While we continue to believe that 50% is possible, a number of refiners pointed out reasons that 50% may be too high in the near term, including the fact that there are likely to be fewer dispensers at a given retail station offering E15 than those offering only E10, and customer familiarity with E10. One party indicated that in Iowa in 2015, per-station E15 sales were 15% of per-station E10 sales, though the data on which this conclusion was based did not rely on retail stations selling both E10 and E15; the per-station estimate for E10 was based on all stations offering E10, regardless of whether they also offered E15. Not only are the Iowa data not necessarily representative of stations offering both E10 and E15, we have no information to indicate whether the experience in Iowa is representative of conditions that could exist under the increasing RFS standards in 2017. Nevertheless, we agree that the fraction of total gasoline sales which is E15 at stations offering both E15 and E10 is likely to be considerably less than 50% for the reasons described earlier (*e.g.,* number of dispensers offering E15 at a given station, consumer unfamiliarity with E15), at least in 2017. Since we only have one source of data upon which to base our estimate, we are using that 15% value in our assessment.

Although E15 has historically been produced at retail stations in blender pumps, since release of the NPRM we have become aware of new activities to produce E15 at terminals.[117] This E15 could be used in retail equipment that has been certified to be compatible with E15, and so would expand the use of E15 beyond that available through blender pumps, including those targeted by the BIP and Prime the Pump programs. Based on currently available information, four out of the approximately 1,400 terminals in the U.S. would produce E15 in 2017, and we expect that E15 production at those four terminals would be small in comparison to E10 production. As described in a memorandum to the docket, we estimate the E15 produced through terminals would be 41 million gallons in 2017.[118]

Based on the above discussion, we have estimated that total E15 supply in 2017 could reach 728 million gallons, resulting in about 38 million gallons of ethanol more than would be supplied if that portion of the gasoline pool were E10. We have included this in our discussion of total ethanol volumes in Section V.B.1.iv below.

iii. E85

As described previously, the NPRM did not provide specific estimates of E15 or E85 use in 2017, but instead indicated that we generally expected the RFS program to influence sales of E0, E15, and E85 in such a way as to produce a total ethanol supply of 14.4 billion gallons. Nevertheless, stakeholders provided comments on a variety of topics related to the estimation of achievable volumes of E85.[119] Many of these comments

[114] ''Projections of retail stations offering E15 and E85 in 2017,'' memorandum from David Korotney to docket EPA–HQ–OAR–2016–0004.

[115] ''Estimates of E15 and E85 volumes in 2017,'' memorandum from David Korotney to docket EPA–HQ–OAR–2016–0004.

[116] Ibid.

[117] ''HWRT & RFA Announce First-Ever Offering of Pre-blended E15,'' docket EPA–HQ–OAR–2016–0004.

[118] ''Estimates of E15 and E85 volumes in 2017,'' memorandum from David Korotney to docket EPA–HQ–OAR–2016–0004.

[119] We note that, in the 2014–2016 final rule, the estimation of E85 volumes was made in the context of determining the volume that constituted inadequate domestic supply under our general waiver authority. For this final rule, we are using

Continued

focused on an analysis of the relationship between E85 sales volumes and E85 price discount derived from publically available data from six states, which was provided with the 2014–2016 final rule.[120]

As for many other aspects of this rule, stakeholders were strongly divided on the volumes of E85 that are achievable in 2017. Refiners typically said that E85 volumes are likely to reach little more than around 100 million gallons in 2017 based on their own estimates of E85 in previous years using data collected by EIA from refiners, blenders, and ethanol production facilities. For instance, refiners suggested that E85 use in 2015 reached only 87 million gallons. However, as discussed in the 2014–2016 final rule, the EIA sources on which this estimate was based do not capture all E85 that is actually used; not all production at terminals, ethanol production facilities, or blenders with less than 50,000 barrels of product storage capacity are included, nor is E85 captured which is produced using reformulated gasoline or natural gasoline as the petroleum based component. Also, reported E85 production at ethanol production facilities is likely to represent net rather than total finished fuel production given the occasional negative values reported in the past.[121] These stakeholders provided no new information on historical E85 supply beyond what these EIA sources capture. As described in a memorandum to the docket, our own estimate of actual E85 use in 2015 based on E85 supply data from six states is approximately 186 million gallons.[122] Moreover, we also do not believe it would be appropriate to merely extrapolate 2017 E85 supply from trends in the past several years as some stakeholders suggested. Doing so would ignore the ability of the market to respond to the standards that we set.

In contrast, ethanol proponents said that E85 volumes could reach at least 500 million gallons in 2017, and some provided estimates considerably higher. Several pointed to E85 supply projections from EIA's Annual Energy Outlook 2016 (AEO2016), which projects 735 million gallons for 2017. However, we do not believe that the AEO is an appropriate basis for projecting E85 supply in 2017 for the purposes of setting the applicable volume requirements under the RFS program. For instance, the same modeling that projected 735 million gallons for 2017 also projected 326 and 508 million gallons, respectively, for 2014 and 2015. These volumes are far higher than what we believe the actual supply was in these years.[123] And AEO2016 projects that total ethanol use in 2017 would be 13.8 billion gallons, far lower than the 14.4 billion gallons that we proposed as the maximum achievable, and also considerably lower than EIA's own projections for 2017 in their Short-Term Energy Outlook (STEO). As the STEO projections are based on more current information and are focused on more near-term outcomes, and the STEO also forms the basis for the gasoline and diesel demand projections that EIA has indicated should be used for determining the applicable percentage standards, we do not believe that AEO is an appropriate basis for estimating the E85 supply in 2017 that is reasonably attainable, nor, as another commenter suggested, total gasoline energy demand for 2016. We have used the STEO for the projection of 2017 total gasoline demand, combined with our own projections of total ethanol supply based on our estimates of reasonably attainable volumes of E15 and E85, along with a small amount of E0.

For those stakeholders who provided detailed comments on how E85 supply might best be projected for 2017, those comments typically focused on three areas:

- The number of flex-fueled vehicles (FFVs) in the 2017 fleet that can use E85
- The retail infrastructure that can be made available in 2017 to supply E85 to FFVs
- The degree to which E85 sales can be influenced by the E85 price discount relative to E10

We continue to believe that the number of FFVs in the fleet is not the controlling constraint on the use of E85. According to AEO2016, the number of FFVs in the fleet in 2017 is expected to be about 21 million.[124] These vehicles could use up to 13 billion gallons of E85 if all of them had access to retail stations offering it and all FFV owners chose to refuel on E85 instead of E10. We acknowledge that a larger percentage of FFVs in the fleet could increase the volume of E85 consumed, but in the short term we believe that it is the relatively very small number of retail stations offering E85 that is operating as the primary constraint on the volumes of E85 sold, and to a lesser extent the relative price of E85 and E10.

Many stakeholders provided comments on how the number of retail stations offering E85 could grow through the end of 2017. Most pointed to a combination of USDA's Biofuels Infrastructure Partnership (BIP) program, the ethanol industry's Prime the Pump program, and ongoing efforts independent of these two programs. Parties representing gasoline marketing and retail, in contrast, generally repeated the concerns that they raised in the 2014–2016 final rule about costs for new infrastructure and low expected profit margins in support of their view that the number of retail stations offering E85 would grow slowly. Several stakeholders pointed to specific examples of retail stations that had stopped offering E85 due to poor sales.

Based on the information provided by stakeholders and other information that became available following release of the NPRM, we believe that the BIP and Prime the Pump programs will drive nearly all growth in E85 stations through the end of 2017, with far less growth occurring through independent efforts. As described in a memorandum to the docket, we believe that an annual average of about 4,300 retail stations can offer E85 in 2017.[125] This is a significant increase in comparison to the 3,200 that we projected would offer E85 in 2016 in the 2014–2016 final rule, but still a relatively small number of stations compared to the estimated 150,000 retail stations nationwide.

In order to estimate reasonably attainable sales volumes of E85 in 2017, it is also necessary to estimate the volume of E85 likely to be sold at each retail station that offers it. Recognizing this, stakeholders provided comments on the aforementioned analysis of the relationship between E85 sales volumes at retail and E85 price discount derived from publically available data from six states. Refiners generally dismissed the value of the data used in this analysis, saying that the uncertainty within the data and questions about its

the cellulosic waiver authority alone, and are estimating reasonably attainable volumes of E85.

[120] "Correlating E85 consumption volumes with E85 price," memorandum from David Korotney to docket EPA–HQ–OAR–2015–0111.

[121] Reported values for ethanol production facilities represent net finished fuel produced. Insofar as finished fuel brought into the facility (*i.e.,* gasoline) exceeds finished fuel produced by the facility (*i.e.,* E85), a net negative value will result. This would occur if gasoline brought into the facility is used as a denaturant only, or as both a denaturant and in the production of E85. As a result, the values reported by EIA do not capture actual E85 produced and made available by these facilities, which would be the relevant value to use in our assessment.

[122] "Final estimate of E85 consumption in 2015," memorandum from David Korotney to docket EPA–HQ–OAR–2016–0004.

[123] For instance, as described in the 2014–2016 final rule (80 FR 77460), we estimate that E85 use in 2014 was about 150 mill gal.

[124] Table 40, "Light-Duty Vehicle Stock by Technology Type."

[125] "Projections of retail stations offering E15 and E85 in 2017," memorandum from David Korotney to docket EPA–HQ–OAR–2016–0004.

representativeness for the nation as a whole made it an improper basis for future projections. They instead suggested that E85 use in 2017 should be based only on an extrapolation of E85 supply trends from the previous few years. We disagree. The data used for the analysis demonstrated statistically significant correlations between E85 sales volumes and E85 price discounts, and represented between 21% and 31% of all stations in the U.S. which offered E85.[126] Moreover, their suggested extrapolation from historical data would insufficiently account for the influence of both the RFS program itself and programs such as BIP and Prime the Pump, and would also be based on historical estimates of E85 supply using EIA data that, as described above, we believe are likely to be inaccurate.

Ethanol proponents recognized the value of the available data in developing correlations between E85 sales at retail and E85 price discounts. However, they provided critiques of the analyses we had conducted for the 2014–2016 final rule, and they also had alternative views on the application of the resulting correlations. Comments provided by these stakeholders generally fell into broad areas:

- The data should be represented by nonlinear rather than linear correlations
- Estimates of E85 use derived from the correlations should be based on substantial extrapolations beyond the limits of the data, *i.e.* using much higher E85 price discounts than have occurred in the past

Some stakeholders conducted their own analyses of the data wherein they employed additional statistical techniques to attempt to more precisely determine the nature of the relationship between E85 sales volumes and E85 price discounts. These included such things as adding seasonal and annual categorical variables into the correlations and an investigation into different nonlinear functional forms.

In light of the comments provided by these stakeholders, we determined that the analyses conducted for the 2014–2016 final rule should be updated. Not only is additional data now available for the six states included in the analyses, but more rigorous statistical methods can be employed to more precisely determine the relationship between E85 sales volumes and E85 price discount, including whether a nonlinear correlation is appropriate. As described in a memorandum to the docket, our revised analyses indicate that a weak nonlinear relationship can be discerned in the data, and that it does provide a small increase in the explanatory power of the curve fit.[127]

In addition to an estimate of the number of retail stations that may offer E85 in 2017, the use of a correlation between E85 sales volumes and E85 price discount to estimate reasonably attainable volumes of E85 for 2017 requires that we estimate an E85 price discount that would be reasonable for 2017. Again, stakeholders were strongly divided on what E85 price discount may be attainable in 2017. Refiners typically said that an E85 price discount beyond energy parity (about 22% below the price of E10) was not supportable based on historical data and pointed to EPA's analyses showing that a sizable portion of the RIN value is not passed on to retail customers, diluting the impact of RIN prices on E85 prices. Ethanol proponents instead said that historical E85 price discounts should not be used as a gauge of what future E85 price discounts could be under the influence of higher RFS program standards. They discounted the limitations associated with the pass-through of RIN values to retail customers, arguing that if EPA set the standards high enough, the resulting higher RIN prices would result in significantly discounted retail pricing for E85 at the retail level. Some commenters presented examples of individual stations or regions where it appeared the RIN value was being passed-through to a greater degree to support their statements, however EPA does not believe these examples are representative of retailer behavior across the country.[128]

There is no straightforward mechanism for precisely identifying an E85 price discount for use in assessing 2017 ethanol supply. While some stakeholders provided examples of E85 price discounts that could be reached under specific assumed RIN prices and assumed RIN value pass-through to retail customers, such examples were purely speculative and provided no method for determining the E85 price discount that is likely to be reasonably attainable in 2017 given the E85 retail prices we have observed to date and the history of the fuels market.

In order to identify an E85 price discount that could be reasonably be assumed for the nation as a whole in 2017, we continue to believe that an investigation of E85 price discounts reached in the past is both less speculative than the suggestions made by ethanol proponents in their comments and more consistent with commonly accepted approaches to data analysis. However, we also do not believe that the average levels achieved in the past are sufficiently representative of what could be expected to occur in the future under the influence of the RFS program. As described in a memorandum to the docket that we published with the NPRM, the monthly average E85 price discount has rarely exceeded energy parity (about 22%), and the highest 12-month average retail E85 price discount has been significantly lower.[129]

TABLE V.B.1.iii–1—E85 PRICE DISCOUNTS BETWEEN 2012 AND EARLY 2016

	Fuels Institute	E85prices.com	AAA
Highest E85 price discount in a single month	21.1% (May 2015)	23.7% (Oct 2014)	24.1% (Apr 2015).
Highest 12-month average E85 price discount	16.0% (Sep 2014–Aug 2015).	19.6% (Sep 2014–Aug 2015).	18.7% (Oct 2014–Sep 2015).

In that memorandum we indicated our belief that achieving energy parity for a full year would be unprecedented, but appears to be within the capabilities of the market given the historical values shown above. E85 price discounts higher than energy parity that were suggested by some stakeholders in their comments have not been achieved in

[126] Range depends on the month and year.

[127] "Updated correlation of E85 sales volumes with E85 price discount," memorandum from David Korotney to docket EPA–HQ–OAR–2016–0004.

[128] For a further discussion of these comments, see Section 2.3.8.2 of the Response to Comment document.

[129] "Estimating achievable volumes of E85," memorandum from David Korotney to docket EPA–HQ–OAR–2016–0004. Note that this memorandum was published with the NPRM on May 31, 2016, and with the exception of the discussion of historical E85 price reductions is largely supplanted by memoranda published with this final rule. See in particular "Estimates of E15 and E85 volumes in 2017," memorandum from David Korotney to docket EPA–HQ–OAR–2016–0004.

the past for any notable length of time, and thus, we believe, are not likely for all of 2017. They may, however, occur in future years as the number of retail stations offering E85 increases and competition between them drives E85 prices down. For the purposes of this final rule, we have used an E85 price discount of 22% in estimating the supply of E85 in 2017.

Some stakeholders pointed to a statement in the NPRM which said ''. . . an increase in the nationwide average E85 price reduction to 30% would be unprecedented,'' and then argued that EPA had not provided any justification for expecting this level to be sustainable for a full year.[130] We note that E85 price discounts have reached 30% in the past, albeit locally and for short time periods. However, we did not propose using an E85 price discount of 30% in the determination of the proposed 2017 volume requirement for total renewable fuel, but only provided it as one of several examples for how the market might respond.

Combining the updated correlation between E85 sales volumes and E85 price discounts with estimates for the number of retail stations that can offer E85 in 2017 and a reasonably attainable E85 price discount of 22%, we have determined that supply of about 275 million gallons of E85 is reasonably attainable in 2017, resulting in about 182 million gallons of ethanol more than would be supplied if that portion of the gasoline pool were E10. This level of E85 supply is an increase of almost 40% in just one year from the 200 million gallons that we believed could be reached in 2016, primarily reflecting the significant increase in the number of stations projected to offer E85 in 2017 as a result of USDA's BIP program and the ethanol industry's Prime the Pump program.

iv. Total Ethanol

The total supply of ethanol in 2017 is a function of the respective volumes of E10, E15, and E85, while accounting for some E0. Assuming that the total demand for gasoline energy is independent of the amounts of each of these types of fuel, estimating the supply of E0, E15, and E85 that are attainable can be used to derive the supply of E10.

Several stakeholders commented that we should use a more recent version of EIA's Short-Term Energy Outlook (STEO) than the April, 2016 version we used in the NPRM to estimate gasoline demand in 2017. We agree that we should use updated EIA data. For this final rule we have used the October, 2016 version, which projects a total gasoline energy demand of 17.29 Quadrillion Btu.[131] Based on estimates of E0, E15, and E85 supply for 2017 as discussed in previous sections, the E10 volume and resulting total ethanol supply can be calculated.

TABLE V.B.1.iv–1—GASOLINE VOLUMES USE TO DETERMINE REASONABLY ATTAINABLY ETHANOL SUPPLY IN 2017

	Fuel volume (mill gal)	Ethanol volume (mill gal)	Energy (Quad Btu)
E0	200	0	0.025
E10	142,480	14,248	17.151
E15	728	109	0.086
E85 [a]	275	204	0.026
Total	143,683	14,561	17.288

[a] Assumed to contain 74% ethanol.

Based on this assessment, we estimate an ethanol supply for 2017 of 14.56 billion gallons. While the market will ultimately determine the extent to which compliance with the annual standards is achieved through the use of greater volumes of ethanol versus other, non-ethanol renewable fuels, we nevertheless believe that this ethanol volume represents a reasonably attainable level that takes into account the ability of the market to respond to the standards we set and the constraints to fuel supply that we have noted.

One stakeholder said that EIA's projections of future gasoline demand as provided in the STEO have been too low in previous years, and that EPA should account for this underestimate when making projections of the volume of ethanol that can be achieved in 2017. We investigated this issue and determined that while EIA projections of future gasoline demand do contain uncertainty, they are not consistently above or below actual gasoline demand.[132]

In response to the NPRM, some stakeholders reiterated their concerns from the 2014–2016 final rule that EPA's methodology rewarded obligated parties for their recalcitrance in not investing in the infrastructure needed to substantially increase ethanol use above the E10 blendwall. In taking these positions, stakeholders cited both the statutory requirement that obligations be placed on ''refineries, blenders, and importers, as appropriate'' and EPA's regulations which (with limited exceptions) further narrow the applicability of the obligations to producers and importers of gasoline and diesel. As described in the 2014–2016 final rule, we agree that the statutory language, in combination with the regulatory structure, generally places the responsibility on producers and importers of gasoline and diesel to ensure that transportation fuel sold or introduced into commerce contains the required volumes of renewable fuel. Obligated parties have a variety of options available to them, both to increase volumes in the near term and the longer term. The standards that we are establishing today reflect both the responsibility placed on obligated parties as well as the short-term activities available to them, and we expect obligated parties to be taking actions now that will help to increase renewable fuel volumes in future years. However, as pointed out by some refiners in response to the NPRM, this general responsibility does not require

[130] See discussion at 81 FR 34790.

[131] Derived from Table 4a of the STEO, converting consumed gasoline and ethanol projected volumes into energy using conversion factors supplied by EIA. *http://www.eia.gov/forecasts/steo/archives/oct16.pdf.*

Excludes gasoline consumption in Alaska. For further details, see ''Calculation of final % standards for 2017'' in docket EPA–HQ–OAR–2016–0004.

[132] ''Accuracy of STEO gasoline demand projections,'' memorandum from David Korotney to docket EPA–HQ–OAR–2016.

obligated parties to take actions specific to E15 and/or E85 infrastructure, as the RFS program does not require any volumes of ethanol specifically. We continue to believe that as obligated parties procure and blend renewable fuels into transportation fuel, or purchase RINs from those who do so, the demand for RINs will drive demand for renewable fuel, thereby stimulating every participant in the fuels industry, including obligated parties themselves, to increase their activities to supply it.[133] Moreover, the reductions in statutory volumes reflected in this action are largely the result of the inability to date of renewable fuel producers to commercialize the volumes of cellulosic biofuel envisioned in the statute. This fact cannot reasonably be attributed to actions or inactions of obligated parties.

One stakeholder said that the EPA should target a poolwide gasoline ethanol content of less than 10% in part because blenders need a buffer to account for uncertainty associated with ethanol content testing and downstream mixing in the fungible distribution system. This stakeholder suggested that blenders have historically aimed to blend at less than 10% ethanol, and that as a result EPA should set standards consistent with this practice. We investigated this issue using survey data collected by the Alliance of Automobile Manufacturers for 2011–2015 and determined that the average ethanol content of all gasoline that contained more than de minimis levels of ethanol was 9.80%.[134] This estimate is based on the use of ASTM test method D–5599, which measures only the alcohol portion of the gasoline, not any denaturant that would have been included with the ethanol before it was blended into gasoline. Since the denaturant portion of ethanol is typically about 2%, ethanol that is blended into gasoline contains about 98% ethanol.[135] When blended into gasoline, therefore, the E98 would result in a gasoline-ethanol blend containing about 9.8% pure ethanol, or 10.0% denatured ethanol. Based on this investigation, we have determined that it is appropriate to continue assuming that the denatured ethanol content of E10 is 10%.

2. Biodiesel and Renewable Diesel

While the market constraints on ethanol supply are readily identifiable, it is more difficult to identify and assess the market components that may limit potential growth in the use of all qualifying forms of biodiesel and renewable diesel in 2017. Therefore, as discussed in the introduction to Section V.B, after estimating the supply of ethanol in 2017, and taking into account the estimates of non-ethanol cellulosic biofuel supply discussed in Section III.D above and estimates of other non-ethanol renewable fuel supply discussed in Section IV.B.3, we considered whether the supply of total biodiesel and renewable diesel would be adequate to satisfy a requirement of 19.28 billion gallons.

In Section V.A we described how use of the cellulosic waiver authority to provide a volume reduction for total renewable fuel that equals that provided for advanced biofuels yields a volume of 19.28 billion gallons. In addition to the ethanol volume discussed in Section V.B.1.iv above, cellulosic biogas can also contribute to this total volume of renewable fuel, as described more fully in Section III.D. While other renewable fuels such as naphtha, heating oil, butanol, and jet fuel can be expected to continue growing over the next year, collectively, we expect them to contribute considerably less than ethanol to the total volume of renewable fuel that can be supplied in 2017. These were discussed in Section IV.B.3. Based on these estimates of supply, about 2.9 billion gallons of biodiesel and renewable diesel would be needed in order to meet a total renewable fuel volume requirement of 19.28 billion gallons.

TABLE V.B.3–1—DETERMINATION OF VOLUME OF BIODIESEL AND RENEWABLE DIESEL NEEDED IN 2017 TO ACHIEVE 19.28 BILLION GALLONS OF TOTAL RENEWABLE FUEL

[Million ethanol-equivalent gallons except as noted]

Total renewable fuel volume	19,280
Ethanol	14,561
Non-ethanol cellulosic biofuel	299
Other non-ethanol renewable fuels [a]	50
Biodiesel and renewable diesel needed (ethanol-equivalent volume/physical volume)	4,370/2,819

[a] Includes naphtha, heating oil, butanol, and jet fuel. See further discussion in Section IV.B.3.

As discussed in the final rule establishing the RFS standards for 2014–2016, there are several factors that may, to varying degrees and at different times, limit the growth of biodiesel and renewable diesel, including local feedstock availability, production and import capacity, and the ability to distribute, sell, and use increasing volumes of biodiesel and renewable diesel. We continue to believe that the supply of biodiesel and renewable diesel as transportation fuel in the United States, while growing, is not without limit.

In the proposed rule we discussed the current status of each of a number of the factors that impact the supply of biodiesel and renewable diesel used as transportation fuel in the United States. We received a number of comments on our assessment of these factors. Some of these comments supported the proposed findings in the NPRM and agreed that EPA had sufficiently accounted for the factors that may constrain the growth of biodiesel and renewable diesel in 2017, while others argued that EPA had overstated these constraints and the degree to which they would limit the supply of biodiesel and renewable diesel in 2017. As stated in our proposed rule, we expect that the growth in the supply of biodiesel and renewable diesel will largely be driven by incremental developments across the marketplace to steadily increase volumes. However, after a careful review of the information submitted as comments on our proposed rule, we believe that the reasonably attainable supply of biodiesel and renewable diesel in 2017 is higher than we had proposed.

[133] The EPA Administrator signed the Proposed Denial of Petitions for Rulemaking to Change the RFS Point of Obligation on November 10, 2016. More information can be found at *https://www.epa.gov/renewable-fuel-standard-program/response-petitions-reconsideration-rfs2-rule-change-point-obligation*.

[134] Under the rounding method required under 40 CFR 80.9, ethanol concentrations of between 8.6% and 10.5% inclusive would qualify for the 1psi waiver.

[135] See definition of ''renewable fuel'' at 40 CFR 80.1401.

Based on our assessment of the various factors which affect the supply of biodiesel and renewable diesel, we have determined that 2.9 billion gallons of biodiesel and renewable diesel (including both advanced and conventional biofuel) can be reasonably attained in 2017, up from the 2.5 billion gallons that was projected for 2016. This volume is significantly higher than the previously established BBD standard of 2.0 billion gallons for 2017, as we believe additional volumes of both conventional and advanced biodiesel and renewable diesel can be supplied to the United States in 2017 (see Section VI for further discussion of the BBD standard). The following sections discuss our expectations for developments in key areas affecting the supply of biodiesel and renewable diesel in 2017.

i. Feedstock Availability

In previous years, the primary feedstocks used to produce biodiesel and renewable diesel in the United States have been vegetable oils (primarily soy, corn, and canola oils) and waste fats, oils, and greases. We anticipate that these feedstocks will continue to be the primary feedstocks used to produce biodiesel and renewable diesel in 2017. Global supplies of these oils are significant, however they are expected to increase relatively slowly over time, as vegetable oil production increases primarily with increases in crop yields and the remaining untapped supply of recoverable waste oils diminishes. Additional supplies of feedstocks could be produced by increasing the planted acres of oilseed crops (soy, canola, etc.), but with the exception of palm oil most vegetable oils are produced as a co-product of the production of animal feed and increased demand for vegetable oil is unlikely to result in a significant increase in oilseed crop planting absent growing demand for the animal feed. While some have suggested that industries that compete with the biodiesel and renewable diesel industry for renewable oil feedstocks will turn to alternative feedstock sources, resulting in greater feedstock availability for biodiesel and renewable diesel producers, such a shift in renewable oil feedstock use would not result in an increase in the total available supply of renewable oil feedstocks as those volumes will have to be backfilled. As a result, this would not alter the fundamental feedstock supply dynamics for biodiesel and renewable diesel production.

We anticipate that there will be a modest increase in the available supply of feedstocks that can be used to produce biodiesel and renewable diesel in 2017. Oil crop yield increases over the next few years are expected to be relatively modest, and significant increases in the planted acres of oil crops are expected to be limited by competition for arable land from other higher value crops and demand for the animal feed co-products produced by most oilseed crops.[136] The recovery of corn oil from distillers grains and the recovery of waste oils are already widespread practices, limiting the potential for growth from these sectors compared to what has been able to occur over recent years as these new markets were being tapped. In light of this, we do not believe that the availability of biodiesel and renewable diesel feedstocks is without limit. It is also possible that biodiesel production at some *individual* facilities, especially those built to take advantage of low-cost, locally available feedstocks, may be limited by their access to affordable feedstocks in 2017, rather than their facility capacity, even if the global supply of feedstocks is sufficient to enable additional production.

As discussed in further detail in Section IV.B.2, the availability of qualifying advanced biodiesel and renewable diesel feedstocks may also be limited (even if the total supply of feedstocks is sufficient), and large increases in advanced biodiesel and renewable diesel demand could lead to significant feedstock substitution rather than increased production of advanced feedstocks. Unreasonably high demand for biodiesel and renewable diesel could also cause undesirable market disruptions. Large increases in the available supply of biodiesel and renewable diesel in future years will likely depend on the development and use of new, high-yielding feedstocks, such as algal oils or alternative oilseed crops. Based on currently available information, we believe that the availability of feedstocks (including both feedstocks that can be used to produce advanced and conventional biodiesel and renewable diesel) is unlikely to significantly limit the supply of total biodiesel and renewable diesel used for transportation fuel in the United States in 2017, when considering the standards we are establishing in this rule. This is largely the case because we believe that other constraints, discussed below, will likely constrain the distribution and use of biodiesel and renewable diesel before the feedstock limits have been reached.

ii. Biodiesel and Renewable Diesel Production Capacity

The capacity for all registered domestic biodiesel production facilities is approximately 3.5 billion gallons.[137] The capacity for all registered domestic renewable diesel production facilities is approximately 0.7 billion gallons.[138] Active production capacity is lower, however, as a number of registered facilities were idle in 2015 and 2016. The capacity for all domestic biodiesel and renewable diesel production facilities that generated RINs in 2015 or 2016 is approximately 3.1 billion gallons.[139] While idled production facilities may be brought online, doing so would likely require sufficient time to re-staff the production facilities, make any necessary repairs or upgrades to the facility, and source the required feedstocks. Additionally, there are many factors that may limit biodiesel or renewable diesel production at any given facility to a volume lower than the facility capacity.[140] As with feedstock availability, we do not expect that production capacity at registered facilities will limit the supply of biodiesel/renewable diesel for use as transportation fuel in the United States in 2017. Foreign registered biodiesel and renewable diesel facilities represent a significant volume of additional potential production that could be made available to markets in the United States. While the total registered production capacity of foreign biodiesel and renewable diesel is significant, supply of biodiesel and renewable diesel from these facilities in 2017 may be impacted by the capacity to import these fuels, discussed in the following section.

iii. Biodiesel and Renewable Diesel Import Capacity

Another important market component in assessing biodiesel and renewable diesel supply is the potential for imported volumes and the diversion of domestically produced biodiesel and renewable diesel exports to domestic uses. In addition to the approximately 560 million gallons imported into the

[136] Because most oilseed crops are grown primarily to provide livestock feed, the planted acres of these crops are expected to increase in response to demand for livestock feed rather than demand for renewable vegetable oils.

[137] ''Biodiesel and Renewable Diesel Registered Capacity (October 2016)'', Memorandum from Dallas Burkholder to EPA Docket EPA–HQ–OAR–2016–0004.

[138] Ibid.

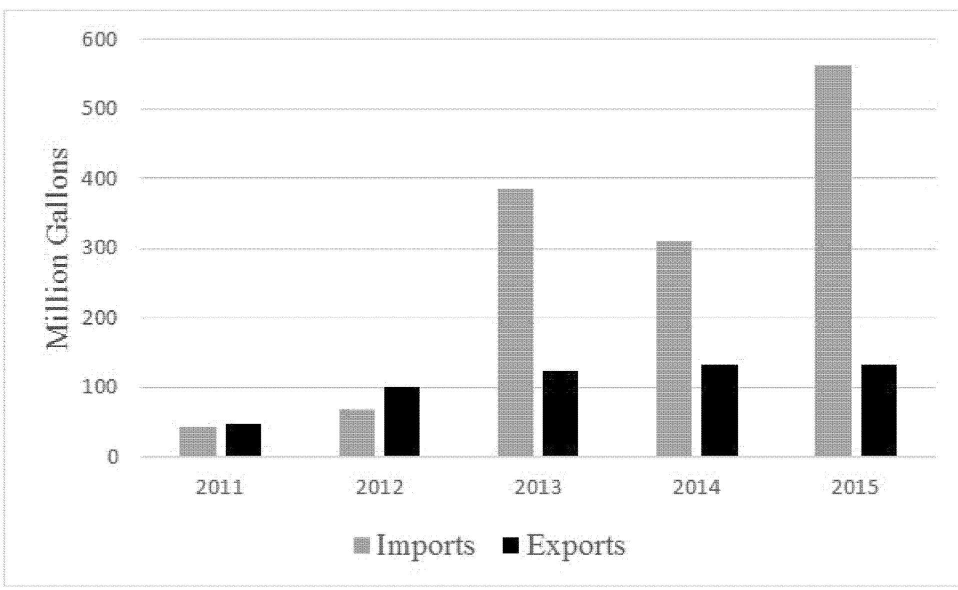
[139] Ibid.

[140] Due to the relatively low capital cost of biodiesel production facilities, many facilities were built with excess production capacity that has never been used.

U.S. in 2015, there were about 90 million gallons exported from the United States to overseas markets. One commenter used biodiesel import data from January 2012 through April 2016 to estimate that, based on the highest annual volume of biodiesel imports in the 55 cities that reported biodiesel imports during this time period, the United States current import capacity for biodiesel at these cities is approximately 659 million gallons.[141] Actual import capacity is likely to exceed this volume, as this estimate relied solely on historic import volumes, rather than an assessment of the capacity of the infrastructure that could be used to import biodiesel at these 55 cities. It is also likely that under the right circumstances there are additional locations through which biodiesel could be imported.

Given the right incentives, it may be possible to increase net biodiesel and renewable diesel imports, either by redirecting a portion of the biodiesel currently consumed in foreign countries to be exported to the U.S. and/or by reducing the volume of biodiesel exported from the United States. However, the amount of biodiesel and renewable diesel that can be imported into the United States is difficult to predict, as the incentives to import biodiesel and renewable diesel to the U.S. are a function not only of the RFS and other U.S. policies and economic drivers, but also those in the other countries around the world. These policies and economic drivers are not fixed, and change on a continuing basis. Over the years there has been significant variation in both the imports and exports of biodiesel and renewable diesel as a result of varying policies and relative economic conditions (See Figure V.B.2.iii–1 below). Increasing biodiesel and renewable diesel imports significantly beyond the 659 million gallons estimated above would require a clear signal to the parties involved that increasing imports will be economically advantageous and the potential re-negotiations of existing contracts. It may also require upgrades and expansions at U.S. import terminals. It is possible, but uncertain, whether higher RFS standards could provide such a signal. Also, to the degree that higher volumes of imported biodiesel or renewable diesel to the United States come at the expense of consumption in the rest of the world, the environmental benefits of this increased volume are expected to be modest.[142] In this final rule we have not projected biodiesel and renewable diesel imports separately from domestically produced biodiesel and renewable diesel, since these fuels are subject to the same potential limitations (*e.g.,* feedstock availability, distribution and use constraints, etc.).[143] We do believe, however that the standards in this final rule will result in an increase in biodiesel and renewable diesel imports consistent with the general trend observed in previous years, and our projection of the supply of these fuels in 2017 includes this expected increase.

Figure V.B.2.iii-11
Biodiesel and Renewable Diesel Imports and Exports (2012-2015)[a]



[a] Import data reported through the EMTS system. Export data sourced from EIA (http://www.eia.gov/dnav/pet/pet_move_expc_a_EPOORDB_EEX_mbbl_a.htm)

[141] See comments from Renewable Energy Group, Inc. (EPA–HQ–OAR–2016–0004–3477). REG used data from the Energy Information Agency in their assessment, and therefore did not capture renewable diesel imports. The total import capacity of biodiesel and renewable diesel therefore likely exceeds the volumes estimated here.

[142] See Section IV.B.2 for a further discussion of this issue.

[143] As discussed in Section IV.B.2, we expect an increase of approximately 100 million gallons of advanced biodiesel, advanced renewable diesel, and/or feedstocks that can be used to produce these fuels. We are also projecting an increase of 100 million gallons of conventional biodiesel and renewable diesel. Historically the majority of this fuel has been imported (see Table IV.B.2–2), and we expect this will again be the case in 2017.

iv. Biodiesel and Renewable Diesel Distribution Capacity

While biodiesel and renewable diesel are similar in that they are both diesel fuel replacements produced from the same types of feedstocks, there are significant differences in their fuel properties that result in differences in the way the two fuels are distributed and consumed. Renewable diesel is a pure hydrocarbon fuel that is nearly indistinguishable from petroleum-based diesel. As a result, it can generally use the existing distribution infrastructure for petroleum diesel and there are no significant constraints on its growth with respect to distribution capacity. Biodiesel, in contrast, is an oxygenated fuel rather than a pure hydrocarbon. It historically has not been distributed through most pipelines due to contamination concerns with jet fuel, and may require specialized storage facilities, additives, or blending with petroleum diesel to prevent the fuel from gelling in cold temperatures. In the past few years, however, a limited number of pipelines that do not carry jet fuel have begun shipping biodiesel blends.[144] Recent changes to the ASTM jet fuel specifications allowing up to 50 ppm biodiesel,[145] as well as experience gained in isolating jet fuel from biodiesel in pipelines may open new opportunities for distributing biodiesel blends by pipeline in future years. A number of studies have investigated the impacts of cold temperatures on storage, blending, distribution, and use of biodiesel, along with potential mitigation strategies.[146 147 148] Information provided by the National Biodiesel Board, as well as comments on our proposed rule, indicate that some retailers offer biodiesel blend levels that differ in the summer and winter to account for these cold temperature impacts.[149 150] While cold temperatures can cause problems with the distribution and use of biodiesel, the experiences of states such as Minnesota and Illinois, where biodiesel is used year-round despite cold winter weather, demonstrates that these challenges can be overcome with the proper handling of biodiesel.[151 152]

The infrastructure needed to store and distribute biodiesel has generally been built in response to the local demand for biodiesel. In some cases, the infrastructure must be expanded to bring biodiesel to new markets and additional infrastructure may also be needed to increase the supply of biodiesel in markets where it is already being sold. In other cases, sufficient infrastructure exists to increase the local supply of biodiesel and biodiesel blends using existing infrastructure.

Another factor potentially constraining the supply of biodiesel is the number of terminals and bulk plants that currently distribute biodiesel. A study conducted on behalf of the NBB used OPIS data to calculate that biodiesel is currently offered at fuel terminals in 369 of the 563 cities (approximately 66%) that have terminals providing gasoline, diesel and/or biodiesel.[153] In addition to these terminals, biodiesel is often distributed from bulk plants or directly from biodiesel production facilities. At present, the Web site Biodiesel.org lists over 600 distribution facilities reported as selling biodiesel either in pure form or blended form, the majority of which are bulk plants.[154 155] Biodiesel production facilities also serve as important distribution centers for biodiesel. According to a survey conducted by NBB, 30% of the biodiesel produced at facilities that responded to the survey is sold directly to retailers.[156] Direct sales to retail stations provide a significant opportunity for biodiesel producers to access local markets without first transporting biodiesel to a terminal or bulk plant for further distribution.

While there are a large number of biodiesel distribution points in the United States, including terminals, bulk plants, and biodiesel production facilities, the majority of these distribution points appear to be concentrated in the Midwest and most of the population centers of the country. These same areas consume the majority of the diesel fuel in the United States, and thus have the greatest potential markets for biodiesel. For the biodiesel market to continue to expand, it must either increase the volume of biodiesel sold in markets where it is already being sold, or expand into markets that currently do not have access to biodiesel. Either of these methods for expanding the biodiesel market will likely require additional infrastructure. Transportation of the biodiesel from production facilities to retail fuel stations, whether directly or through terminals and bulk plants, will also need to be expanded for volumes to continue to grow. This will likely require additional trucks and/or rail cars,[157] as biodiesel and biodiesel blends are currently generally not transported in common carrier pipelines. If recent changes to the ASTM specifications for jet fuel (discussed above) allow for greater volumes of biodiesel blends to be shipped by pipeline this would be a potentially significant change, as it would likely allow for biodiesel distribution at terminals that currently do not have access to biodiesel blends and could significantly reduce the cost of distributing biodiesel. Distributing biodiesel via truck or rail results in high fuel transportation costs (relative to petroleum derived diesel, which is generally delivered to terminals via pipelines), which may impact the viability of adding biodiesel distribution capacity at a number of existing terminals or bulk plants. It is likely that until and unless significant volumes of biodiesel blends are transported by pipeline, increasing the biodiesel market will require greater investment per volume of biodiesel supplied than in the past, as the new biodiesel distribution facilities will generally

[144] See NBB comments on the Proposed Rule (EPA–HQ–OAR–2016–0004–2904).

[145] While the ASTM specification generally limits biodiesel contamination in jet fuel to 50 ppm, up to 100 ppm biodiesel may be allowed on an ''emergency basis.'' Subcommittee J intends to consider a ballot to increase the limit of biodiesel in jet fuel to 100 ppm (See ASTM D1655).

[146] ''Biodiesel Cloud Point and Cold Weather Issues,'' NC State University & A&T State University Cooperative Extension, December 9, 2010.

[147] ''Biodiesel Cold Weather Blending Study,'' Cold Flow Blending Consortium.

[148] ''Petroleum Diesel Fuel and Biodiesel Technical Cold Weather Issues,'' Minnesota Department of Agriculture, Report to Legislature, February 15, 2009.

[149] *http://biodiesel.org/using-biodiesel/finding-biodiesel/retail-locations/biodiesel-retailer-listings.*

[150] See comment from CountryMark on the proposed rule (EPA–HQ–OAR–2016–0004–1826).

[151] Biodiesel is used year-round in Minnesota and Illinois in large part due to state mandates and tax credits respectively, in addition to the incentives provided by the RFS program.

[152] ''Report to the Legislature Annual Report on Biodiesel,'' Kevin Hennessy, Minnesota Department of Agriculture. January 15, 2016. Available online <*https://www.leg.state.mn.us/docs/2016/mandated/160162.pdf*>.

[153] See Attachment 6 of the comments submitted by the National Biodiesel Board (EPA–HQ–OAR–2016–0004–2904). The report lists 453 cities with terminals that offer gasoline and diesel, 369 that offer biodiesel or biodiesel blends, and 259 that offer both petroleum diesel and biodiesel.

[154] List of biodiesel distributers from Biodiesel.org Web site (*http://biodiesel.org/using-biodiesel/finding-biodiesel/locate-distributors-in-the-us/distributors-map*). Accessed 10/8/15. This list does not include terminals that distribute biodiesel or biodiesel blends.

[155] Bulk plants are much smaller than major gasoline and diesel distribution terminals, and generally receive diesel and biodiesel shipped by trucks from major terminals.

[156] See Attachment 6 of the comments submitted by the National Biodiesel Board (EPA–HQ–OAR–2016–0004–2904).

[157] Biodiesel can also be transported by barge, however we expect that a limited number of biodiesel production facilities have access to barge or ocean transportation. Survey data collected by NBB indicates that only 7% of biodiesel is currently transported by barge (see NBB comments on the proposed rule, attachment 6; EPA–HQ–OAR–2016–0004–2904).

have access to smaller markets than the existing facilities, or will face competition as they seek to expand into areas already supplied by existing distribution facilities.

The net result is that the expansion of the distribution infrastructure required to transport biodiesel to distribution points and retail stations and store it at these locations will be necessary, whether biodiesel consumption is increased through additional consumption in existing markets, expansion to new markets, or some combination of the two. While this is not an insurmountable challenge, it will require time and investment, and may limit the potential for the rapid expansion of the biodiesel supply. In previous years the expansion of biodiesel distribution and storage has largely been enabled by high volume diesel retailers, such as truck stops and travel centers. We believe this is likely to be the case in the near future as well, however the rate of increase of biodiesel and renewable diesel at these locations may slow as many are already supplying significant volumes of biodiesel and renewable diesel.

The distribution of biodiesel and biodiesel blends is an area in which the biodiesel industry has made steady progress over time, and we anticipate that this progress can and will continue into the future, particularly with the ongoing incentive for biodiesel growth provided by the RFS standards. This is especially true to the degree that excess biodiesel transportation infrastructure (trucks, rail cars, barges, etc.) and storage capacity currently exist. Low oil prices, however, may present a challenge to the expansion of biodiesel distribution infrastructure, since the profitability of such projects in current market conditions is largely dependent on government support such as the biodiesel blenders tax credit and RFS RIN value.[158] Since some investors view such government supports as inherently uncertain they may be hesitant to invest in new infrastructure to enable additional biodiesel distribution at a time when diesel prices are low. As with many of these potential supply constraints, increasing biodiesel storage and distribution capacity will require time and investment, potentially limiting the potential growth in 2017 and future years.

v. Biodiesel and Renewable Diesel Retail Infrastructure Capacity

For renewable diesel, we do not expect that refueling infrastructure (*e.g.,* refueling stations selling renewable diesel blends) will be a significant limiting factor in 2017 due to its similarity to petroleum-based diesel and the relatively small volumes expected to be supplied in the United States. The situation is different, however, for biodiesel. Biodiesel is typically distributed to retail stations in blended form with diesel fuel as blends varying from B2 up to B20, and in some narrow cases at levels exceeding B20. Biodiesel blends up to and including B20 can be sold using existing retail infrastructure, and generally do not require any upgrades or modifications at the retail level. Small retailers of diesel fuel, however, generally have only a single storage tank for diesel fuel, and can therefore generally only offer a single biodiesel blend. We expect that many of the retailers in this situation will be hesitant to offer biodiesel blends above B5, as doing so would mean only selling a fuel that is not recommended for use by some vehicle and engine manufacturers (see following section for a further discussion of potential engine warranty issues).

Large diesel fuel retailers, such as truck stops and travel centers may have sufficient tankage to offer multiple blends of diesel fuel and/or biodiesel, should they choose to do so. Some of these large retailers have biodiesel blending infrastructure at their retail facilities, allowing them greater control over the blends of biodiesel sold at their stations. This is significant, as EIA estimates that 80% of all diesel fuel sold in the United States is sold through large and mid-sized truck stops, with 25% of the diesel fuel being sold through stations owned by the four largest on-highway diesel sellers.[159] As some of the highest volume truck stops have begun selling increasing volumes of biodiesel blends in recent years, it has allowed biodiesel volumes to grow quickly. These large truck stops and travel sellers sell significant volumes of biodiesel, and in many cases offer biodiesel blends higher than B5.[160] Further they have expressed an intention to expand their sales of biodiesel in future years.[161] We expect that in future years these large truck stops and travel centers will continue to be a primary location for biodiesel sales, and will likely look to expand biodiesel sales in the future where it is profitable to do so. In addition, many centrally fueled fleets that often consume large volumes of diesel fuel have increased their use of biodiesel blends.[162]

As discussed in the next section, biodiesel blends up to 5% may be legally sold as diesel fuel without the need for special labeling, and are approved for use in virtually all diesel engines. Because biodiesel blends up to B5 can be used in virtually all diesel engines and require no specialized infrastructure at refueling stations, and many large diesel retailers have demonstrated a willingness to offer biodiesel blends higher than B5, expanding the number of refueling stations offering biodiesel blends is therefore expected to be constrained less by resistance from the retail facilities themselves, and more by the presence of nearby wholesale distribution networks that can provide the biodiesel blends to retail at attractive prices. As discussed in the previous section, we expect this expansion will continue at a steady pace in 2017.

vi. Biodiesel and Renewable Diesel Consumption Capacity

Virtually all diesel vehicles and engines now in the in-use fleet have been warranted for the use of B5 blends. Both the Federal Trade Commission (FTC) and ASTM International (ASTM) specifications for diesel fuel (16 CFR part 306 and ASTM D975 respectively) allow for biodiesel concentrations of up to five volume percent (B5) to be sold as diesel fuel, with no separate labeling required at the pump. Biodiesel blends of up to 5% are therefore often indistinguishable from diesel fuel that is not blended with biodiesel.

In recent years an increasing number of vehicle and engine manufacturers have approved the use of biodiesel blends up to B20.[163] According to information submitted to EPA by NBB, over 30% of all diesel vehicles registered in the United States are approved to use biodiesel blends up to B20 by the vehicle and engine manufacturers.[164] The percentage of vehicles and engines approved by the manufacturers to use biodiesel blends up to B20 rises to over 50% for class 8 trucks, which use the majority of the

[158] See comments from NATSO (EPA–HQ–OAR–2016–0004–1830).

[159] Estimates of diesel fuel sales through various retailers from EIA Web site: *http://www.eia.gov/petroleum/gasdiesel/diesel_proc-methods.cfm.*

[160] See information submitted by NBB in comments on the proposed rule (EPA–HQ–OAR–2016–0004–2904), pages 29–30.

[161] June 9, 2016 hearing statements from Musket Corporation, ''Transcript for room Chicago,'' docket EPA–HQ–OAR–2016–0004.

[162] ''Biodiesel Ranks First Among Fleets for Alt Fuel Use,'' *Biodiesel.org,* March 23, 2016. Available online <*http://biodiesel.org/news/news-display/2016/03/23/biodiesel-ranks-first-among-fleets-for-alt-fuel-use*>.

[163] See, for example, Paccar announcement approving all engines to use B20 blends.

[164] Information on the number of vehicles approved to use B20 from a presentation by NBB to EPA staff on July 28, 2016.

diesel fuel in the United States.[165] This information indicates that while the potential consumption of biodiesel in blends that exceed B5 in vehicles and engines that are approved for the use of this fuel is significant, such approval is not universal. For the nearly 70% of vehicles and engines that are not approved to use biodiesel blends greater than B5, using higher level blends could potentially void the warranties of the engines if the damage to the engine damage is attributable to the fuel that was used. While many of the vehicles that are not approved to use biodiesel blends greater than B5 are likely no longer covered by the manufacturer's warranty, the owners of these vehicles may still be hesitant to use a fuel that was not approved for use in their vehicle.

In light of the ability of effectively all diesel engines to use biodiesel blends at the B5 level, the increasing number of diesel engines approved to use biodiesel blends up to B20, and the compatibility of renewable diesel with in-use diesel engines, we believe the market will be capable of consuming 2.9 billion gallons of biodiesel and renewable diesel in 2017. However, to achieve this level of consumption we believe it will become increasingly necessary to sell higher-level biodiesel blends, greater quantities of renewable diesel, and/or additional volumes of biodiesel in qualifying nonroad applications. Even if every gallon of diesel sold in the United States in 2017 contained 5% biodiesel, the total volume of biodiesel consumed would only reach approximately 2.8 billion gallons.[166] When considering the potential availability of renewable diesel together with the use of biodiesel in non-road applications and higher level biodiesel blends, there are several scenarios that would enable the consumption of 2.9 billion gallons of biodiesel and renewable diesel. If we assume the availability of approximately 500 million gallons of renewable diesel in 2017 (approximately a 100 million gallon increase from 2015) and the use of 100 million gallons of biodiesel in qualifying nonroad (such as agricultural and mining equipment) and heating oil applications, approximately 84% of the highway diesel pool in 2017 would have to be sold as a B5 blend to supply 2.9 billion gallons of biodiesel and renewable diesel in 2017.[167] If we further assume that 20% of all diesel fuel in the United States is sold at higher biodiesel blend levels averaging B10 (to account for the sales of higher blends at travel centers and in states with biodiesel blend mandates), only 54% of the remaining diesel pool would have to be blended with 5% biodiesel to enable the consumption of 2.9 billion gallons of biodiesel and renewable diesel. We believe these scenarios, along with the possibility for even greater volumes of biodiesel to be used in qualifying non-road applications and higher level biodiesel blends, demonstrate that 2.9 billion gallons of biodiesel and renewable diesel is reasonably attainable in the United States in 2017. EPA will continue to monitor the compatibility of the in-use vehicle fleet to use of biodiesel in future years as we assess potential constraints on increased volumes.

vii. Biodiesel and Renewable Diesel Consumer Response

Consumer response to the availability of renewable diesel and low-level biodiesel blends (B5 or less) has been generally positive, and this does not appear to be a significant impediment to growth in biodiesel and renewable diesel use. Because of its similarity to petroleum diesel, consumers who purchase renewable diesel are unlikely to notice any difference between renewable diesel and petroleum-derived diesel fuel. Similarly, biodiesel blends up to B5 are unlikely to be noticed by consumers, especially since, as mentioned above, they may be sold without specific labeling. Consumer response to biodiesel blends is also likely aided by the fact that despite biodiesel having roughly 10 percent less energy content than diesel fuel, when blended at 5 percent the fuel economy impact of B5 relative to petroleum-derived diesel is a decrease of only 0.5%, an imperceptible difference. Consumer response has been further aided by the lower prices that many wholesalers and retailers have been willing to provide to the consumers for the use of biodiesel blends. The economic incentives provided by the biodiesel blenders tax credit and the RIN have made it possible for retailers to offer these blends at a lower price per gallon than diesel fuel that has not been blended with biodiesel despite the higher cost of production for biodiesel relative to petroleum based diesel, and the competition among diesel fuel retailers has generally led to these incentives being reflected in the retail price of biodiesel blends. The ability for retailers to offer biodiesel blends at competitive prices relative to diesel that does not contain biodiesel, even at times when oil prices are low, is a key factor in the growth in the supply of biodiesel and renewable diesel to date.

viii. Projected Supply of Biodiesel and Renewable Diesel in 2017

Due to the large number of market segments where actions and investments may be needed to support the continued growth of biodiesel blends, it is difficult to isolate the specific constraint or group of constraints that would be the limiting factor or factors to the supply of biodiesel and renewable diesel in the United States in 2017. Not only are many of the potential constraints inter-related, but they are likely to vary over time. The challenges in identifying a single factor limiting the growth in the supply of biodiesel and renewable diesel in 2017 does not mean, however, that there are no constraints to the growth in supply.

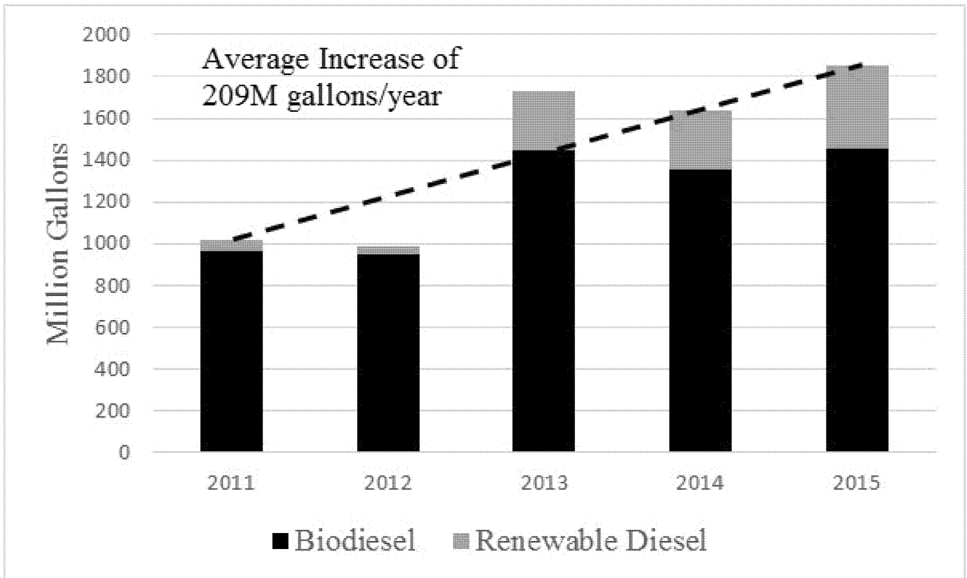
A starting point in developing a projection of the available supply of biodiesel and renewable diesel in 2017 is a review of the volumes of these fuels supplied for RFS compliance in previous years. In examining the data, both the absolute volumes of the supply of biodiesel and renewable diesel in previous years, as well as the rates of growth between years are relevant considerations. The volumes of biodiesel and renewable diesel (including both D4 and D6 biodiesel and renewable diesel) supplied each year from 2011 through 2015 are shown below.

[165] Ibid.

[166] This estimate assumes 55.5 billion gallons of diesel fuel are used in the United States in 2016 (from the EIA's August Short Term Energy Outlook). It also assumes no biodiesel is used in blends greater than B5.

[167] This estimate again assumes 55.5 billion gallons of diesel fuel are used in the United States in 2016 (from the EIA's August Short Term Energy Outlook) and no biodiesel is used in blends greater than B5.

Figure V.B.2.viii-1
Biodiesel and Renewable Supply by Year (2011-2015)[a]



[a] Values represent current estimates of the net supply of biodiesel and renewable diesel (including conventional, advanced, and BBD biodiesel and renewable diesel) from EMTS, accounting for the production, import, and export of biodiesel and renewable diesel.

To use the historical data (shown in the figure above) to project the available supply of biodiesel and renewable diesel in 2017, we started with the volume expected to be supplied in 2016 (2.5 billion gallons), and then assessed how much the supply could be expected to increase in 2017 in light of the constraints discussed above. Using historic data is appropriate to the extent that growth in the year or years leading up to 2016 reflects the rate at which biodiesel and renewable diesel constraints can reasonably be expected to be addressed and alleviated in the future. In assessing the potential growth of biodiesel and renewable diesel in 2017 we believe this to be the case. There are many potential ways the historical data could be used to project the supply of biodiesel and renewable diesel in future years. Two relatively straightforward methods would be to use either the largest observed annual supply increase (743 million gallons from 2012 to 2013) or the average supply increase (209 million gallons from 2011 to 2015) to project how much biodiesel and renewable diesel volumes could increase over 2016 levels in 2017. We recognize that there are limitations in the probative value of past growth rates to assess what can be done in the future, however we believe there is significant value in considering historical data, especially in cases where the future growth rate is expected to be largely determined by the same variety of complex and inter-dependent factors that have factored into historical growth.

In projecting the available supply of biodiesel and renewable diesel in 2016 for the final rule establishing the 2014–2016 standards, we estimated that the supply of biodiesel and renewable diesel could increase from the level supplied in 2015 in line with the largest observed annual supply increase from the historic record. While the availability of RIN generation data for 2016 is limited, we believe the data available to date confirm that this high year-over-year increase is possible.[168] We believe this is the case in part due to the relatively small growth in the supply of biodiesel and renewable diesel in 2014 and 2015, during which no annual RFS standards were in place to promote growth in the supply of biodiesel and renewable diesel and during which time the biodiesel blenders tax credit was only reinstated retroactively. During these years (2014–2015), while growth in the supply of biodiesel and renewable diesel was limited, significant progress continued to be made in a number of areas (upgrades at biodiesel production facilities, increasing number of vehicles approved to use blends greater than B5, increasing biodiesel distribution infrastructure, etc.) to expand the potential supply of biodiesel and renewable diesel used as transportation fuel in the United States. We believe that despite this progress, the absence of RFS standards for most of this time period (along with other economic factors such as the lapses in the biodiesel blenders tax credit and the fluctuating prices of petroleum diesel and biodiesel and renewable diesel feedstocks) resulted in limited increases to the supply of biodiesel and renewable diesel in these years. We therefore believe that the significant increase in the projected supply of biodiesel and renewable diesel from 2015 to 2016 was significantly enabled by the relatively slow growth in supply in 2014 and 2015.

Commenters also noted a similarly large increase in the supply of biodiesel and renewable diesel from 2010 to 2011 to support claims that large annual increases in the supply of biodiesel and renewable diesel to the United States could be achieved in successive years.[169] While this increase is yet another example of the rapid increase in the supply that can be achieved under certain market conditions, we once again note that in the years prior to 2010 the biodiesel and renewable diesel supply had been declining. It is not

[168] "Comparison of 2016 availability of RINs and 2016 standards," memorandum from David Korotney to docket EPA–HQ–OAR–2016–0004.

[169] See NBB comments on the proposed rule (EPA–HQ–OAR–2016–0004–2904), page 5.

clear from the historical data whether such large increases are sustainable year-over-year. Increases of this magnitude require a number of factors, including feedstock supply, production capacity, distribution capacity, retail offerings, and biodiesel consumption, to be addressed. In previous years a significant excess of feedstocks, in combination with newly established state and federal incentives and a group of large, interested retail partners have enabled significant rapid growth in the supply of biodiesel and renewable diesel. We believe that these market conditions are unlikely to be repeated in future years, but that there still exist opportunities for growth in the supply of biodiesel and renewable diesel. After reviewing the available information and the comments received on the proposed rule, we believe that increases in the supply of biodiesel and renewable diesel greater than those we have proposed are possible, but we do not believe that these increases are without limit, as some commenters have suggested.

We recognize that the growth rates achieved in the past (such as the average annual growth rate or the largest annual supply increase) do not necessarily indicate the growth rate that can be achieved in the future. In the past, biodiesel was available in fewer markets, allowing new investments to be targeted to have a maximum impact on volume. However, as the market becomes more saturated and biodiesel becomes available in an increasing number of markets, additional investments may tend to have less of an impact on volume, potentially limiting the increases in supply year over year. Additionally, much of the increase in the volume of biodiesel and renewable diesel supplied from 2012 to 2013 was renewable diesel, which is faced with far fewer distribution and consumption challenges than biodiesel for blends above B5. Such an increase in the available supply of renewable diesel in 2017 is unlikely as we are currently unaware of any renewable diesel facilities under construction, either in the United States or abroad, that are likely to supply significant volumes of fuel to the United States in 2017, and the capital costs and construction timelines associated with constructing new renewable diesel facilities are significant. It will likely require greater investment to achieve the same levels of growth in the supply of biodiesel and renewable diesel in 2017 as compared to the higher rates from previous years.

However, we must also consider the extent to which historic growth rates can be seen as representing what is possible with the RFS standards and other incentives in place. The year with the historic maximum rate of growth was 2013—a year in which both tax incentives and RFS incentives were in place to incentivize growth through the entire year. There were also fewer potential constraints to the growth of biodiesel and renewable diesel related to the distribution and use of biodiesel in 2013 than there are currently due to the significantly lower volume of these fuels supplied in 2012. We believe it is reasonable to assume the incentives provided by the standards in 2017 will be sufficient to enable supply increases despite these challenges discussed above, but do not believe it would be reasonable to assume that the RFS and other incentives could drive a rate of growth in 2017 that is equal to that seen in 2013. Comments received from the National Biodiesel Board, as well as from the National Association of Truck Stop Owners (which represents parties with significant experience and investment in the distribution and sales of biodiesel) suggest that parties have already begun making the necessary investments to distribute and sell volumes of biodiesel that exceed the volumes projected in our proposed rule in anticipation of ongoing support for biodiesel from both the blenders tax credit and the RFS program. At the public hearing for the proposed 2017 RFS standards, Michael Whitney of Musket Corporation testified that his company, which is the supply and trading arm of Love's Travel Stops, anticipated increasing biodiesel supply by 100 million gallons in 2017.[170] He further estimated that as they accounted for approximately 20–25% of all biodiesel blended in the United States, that total supply could be increased by 500 million gallons in 2016.[171] While we believe these numbers are somewhat speculative, we also believe they provide support for an expectation of considerable growth in 2017. We also note, however, that while the National Association of Truck Stop Owners (NATSO) generally supported ''ambitious'' standards with respect to biodiesel and renewable diesel, they also supported EPA's consideration of ''market realities'' to prevent the RFS standards from being set at unreasonably high levels.[172] Failure to do so, they stated, could result in RFS standards that are significantly beyond the market's ability to supply renewable fuels, ultimately resulting in higher prices for diesel fuel, negatively impacting both NATSO members and the entire U.S. economy.[173]

In the NPRM we projected that the available supply of biodiesel and renewable diesel in 2017 would be approximately 2.7 billion gallons. We discussed the many different factors that could potentially constrain the production and use of biodiesel and renewable diesel in 2017, and placed particular emphasis on the potential limitations associated with the ability to distribute increasing volumes of biodiesel from production facilities to retail locations. In response to our proposed rule, several parties, including NBB and REG, provided significant new information to EPA related to the ability of the market to distribute biodiesel from production facilities to retail locations.[174] This information included data on the significant volume of biodiesel that is sold and transported to retail stations and/or other end users directly from biodiesel production facilities, bypassing the traditional fuel distribution points such as fuel terminals or bulk plants. These data were supported by statements from diesel retailers, such as the testimony of Michael Whitney cited above. While we continue to believe that the potential to produce, distribute, and consume biodiesel and renewable diesel in the United States is not without limit, we believe the information we received in comments in our proposed rule provides a sufficient basis for concluding that a volume of 2.9 billion gallons of biodiesel and renewable diesel can be produced, distributed, and consumed in the United States in 2017. When taken together with our projection of 2.4 billion gallons of advanced biodiesel and renewable diesel, this assessment assumes 500 million gallons of conventional biodiesel and renewable diesel to be used towards satisfying the total renewable fuel standard.[175] However the market could choose to fill

[170] See testimony of Michael Whitney, Musket Corporation, June 9, 2016 (Chicago Room).

[171] Ibid.

[172] See comments from NATSO (EPA–HQ–OAR–2016–0004–1830).

[173] Ibid. If RFS standards are significantly beyond the market's ability to supply renewable fuels, the price of biofuels and separated RINs could rise to extreme levels as obligated parties seek to obtain the RINs necessary to satisfy their obligations. This would be expected to cause an increase in gasoline and diesel prices as obligated parties sought to recover their RFS compliance costs through the prices of the petroleum fuels they sell.

[174] See comments from NBB (EPA–HQ–OAR–2016–0004–2904) and REG (EPA–HQ–OAR–2016–0004–3477).

[175] Lesser volumes of conventional biodiesel and renewable diesel may be used to satisfy the standards if additional volumes of advanced biodiesel and renewable diesel are supplied to the market, or if the volume of ethanol supplied to the market exceeds EPA's projections in the previous section.

these volumes with advanced biodiesel or with other forms of renewable fuel.

The present constraints do not represent insurmountable barriers, but they will take time to overcome. The market has been making efforts to overcome these constraints in recent years, as demonstrated by discussion above and the fact that biodiesel and renewable diesel supply in the U.S. has been steadily increasing. We believe that opportunity for ongoing growth exists, but that the constraints listed above will continue to be a factor in the rate of growth in future years and that year-on-year growth may slow as the opportunities for large increases diminish. Taking all of the above into consideration, we believe that it would be reasonable to assume that growth in 2017 can exceed the 226 million gallon historic annual average increase from the 2011–2015 time period, but will be unlikely to reach the maximum 659 million gallon annual increase seen in 2013. Considering the multiplicity of factors potentially influencing supply, we do not believe that a projection can be made pursuant to any particular formula, but requires considerable exercise of judgment. We believe that it is reasonable to project a 400 million gallon increase in supply in 2017, which would result in a total supply of 2.9 billion gallons in 2017.

Throughout this section we have focused on determining if the market can reasonably attain the 2.9 billion gallons of biodiesel and renewable diesel needed, together with reasonably attainable volumes of ethanol and other renewable fuels, to satisfy the 19.28 billion gallon total renewable fuel volume derived through use of the cellulosic waiver authority alone. Based on the data available to EPA at this time, including data submitted in comments on the NPRM, we believe that the market is capable of producing, distributing, and using 2.9 billion gallons of biodiesel and renewable diesel in 2017. We note, however, that the 400 million gallon increase is significantly higher than the annual average increase in the supply of biodiesel and renewable diesel from 2011–2015, and when combined with the projected increase of approximately 600 million gallons from 2015 to 2016 would result in an increase in the supply of biodiesel and renewable diesel of over one billion gallons in just two years. While our analysis has not focused on determining the maximum reasonably achievable volume of biodiesel and renewable diesel in 2017, we believe that the ambitious growth in the supply of biodiesel projected from 2015 to 2017 indicate that the maximum reasonably achievable volume of these fuels in 2017 is likely near the 2.9 billion gallons assessed in this rule.

We recognize that the market may not necessarily respond to the final total renewable standard by supplying exactly 2.9 billion gallons of biodiesel and renewable diesel to the transportation fuels market in the United States in 2017, but that the market may instead supply a lower or higher volume of biodiesel and renewable diesel with corresponding changes in the supply of other types of renewable fuel. As a result, we believe there is less uncertainty with respect to the attainability of the total volume requirement of 19.28 billion gallons than there is concerning the projected 2.9 billion gallons of biodiesel and renewable diesel that we have used in determining the adequacy of supply of total renewable fuel for 2017.

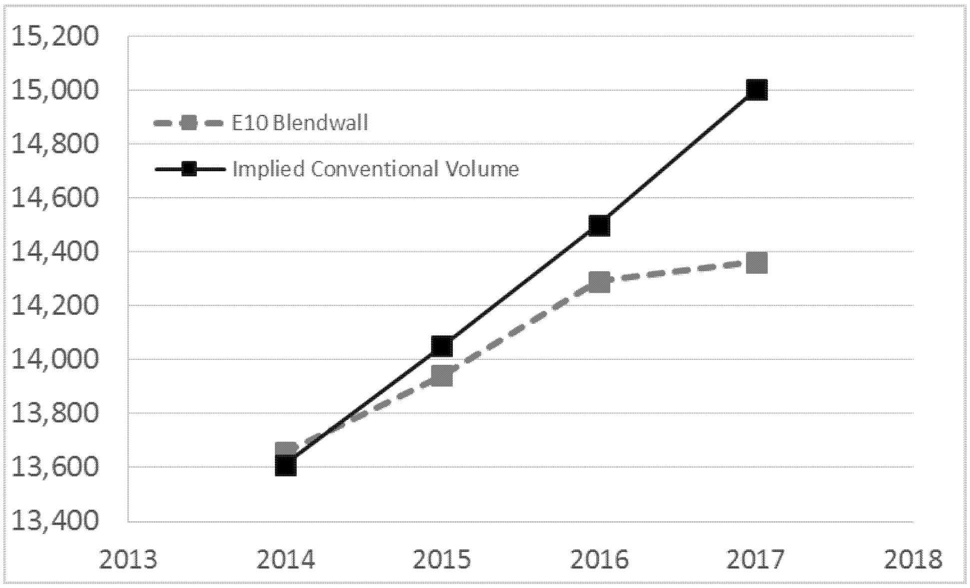
3. Total Renewable Fuel Supply

In Section V.A we described how use of the cellulosic waiver authority to provide a volume reduction for total renewable fuel that equals that provided for advanced biofuels yields a volume of 19.28 billion gallons. Based on our assessment of supply of ethanol and biodiesel/renewable diesel, along with smaller amounts of non-ethanol cellulosic biofuel and other non-ethanol renewable fuels, we have determined that there will be adequate supply to meet a volume requirement of 19.28 billion gallons for total renewable fuel. As a result, there is no need for further reductions on the basis of an ''inadequate domestic supply'' determination using the general waiver authority.[176] Therefore, we are establishing the total renewable fuel volume requirement at 19.28 billion gallons.

Our use of the cellulosic waiver authority alone to set the advanced biofuel and total renewable fuel volume requirements results in an implied volume for non-advanced (*i.e.* conventional) renewable fuel of 15.0 billion gallons. This is an increase over the proposed level of 14.8 billion gallons, and a significant increase in comparison to the 2016 implied volume of 14.5 billion gallons. We recognize that some stakeholders are primarily concerned about this implied conventional renewable fuel volume. For these stakeholders, it may be helpful to compare the implied volume for conventional renewable fuel to the E10 blendwall, despite the fact that a portion of the 15.0 billion gallon implied volume is likely to be met with conventional biodiesel and renewable diesel. As shown below, 15.0 billion gallons continues a year-by-year trend of exceeding the E10 blendwall (the volume of ethanol that could be consumed if all gasoline was E10 and there was no E0, E15, or E85) by ever increasing amounts.

[176] As discussed in the response to comments document, we also do not believe that the record indicates either severe economic or environmental harm that would justify further reductions using the general waiver authority.

Figure V.B.3-1
Comparison of E10 Blendwall to Implied Conventional Volume



As discussed in Section V.B.2.viii above, we believe that there will be adequate supply of biodiesel and renewable diesel such that the total renewable fuel volume requirement of 19.28 billion gallons can be satisfied, based in part on our determination that 2.9 billion gallons of biodiesel and renewable diesel is reasonably attainable in 2017. While our analysis has not focused on determining the maximum reasonably achievable volume of renewable fuel in 2017, we believe that the ambitious growth in the supply of each of the various types of renewable fuel (discussed in further detail in the preceding Sections) indicates that the maximum reasonably achievable volume of these fuels in 2017 is likely near the 19.28 billion gallons assessed in this rule.

We note that the contributions from individual sources shown in Table V.B.3–1 were developed only for the purpose of determining the adequacy of supply of total renewable fuel; they do not represent EPA's projection of precisely how the market will respond. As we said in the 2014–2016 final rule, any supply estimate we make for particular fuel types may be uncertain, but there is greater certainty that the overall volume requirements can be met given the flexibility in the market that is inherent in the RFS program.

C. Market Responses to the Advanced Biofuel and Total Renewable Fuel Volume Requirements

To meet the final volume requirements, the market will need to respond by some combination of increasing domestic production and/or imports of those biofuels that have fewer marketplace constraints, by expanding the infrastructure for distributing and consuming renewable fuel, and/or by improving the relative pricing of renewable fuels and conventional transportation fuels at the retail level to ensure that they are attractive to consumers. However, because the transportation fuel market is dynamic and complex, and the RFS program is only one of many factors that determine the relative types and amounts of renewable fuel that will be used, we cannot precisely predict the mix of different fuel types that will result. In this section we delineate a range of possible outcomes, and doing so provides a means of demonstrating that the volume requirements can reasonably be satisfied through multiple possible paths.

We evaluated a number of scenarios with varying levels of E0, E15, E85, imported sugarcane ethanol, advanced biodiesel and renewable diesel, and conventional biodiesel and renewable diesel. In doing so we sought to capture the range of possibilities for each individual source, based both on levels achieved in the past and how the market might respond to the applicable standards. Each of the rows in Table V.C–1 represents a scenario in which the total renewable fuel and advanced biofuel volume requirements would be satisfied.

TABLE V.C–1—VOLUME SCENARIOS ILLUSTRATING POSSIBLE COMPLIANCE WITH THE 2017 VOLUME REQUIREMENTS
[million gallons] [a b]

E85	E15	E0	Total ethanol [c]	Sugarcane ethanol	Total biodiesel and renewable diesel [d]	Minimum volume of advanced biodiesel and renewable diesel [d]
200	600	200	14,504	0	2,856	2,528
200	600	500	14,474	0	2,876	2,528
200	600	500	14,474	200	2,876	2,399
200	600	500	14,474	500	2,876	2,206

TABLE V.C–1—VOLUME SCENARIOS ILLUSTRATING POSSIBLE COMPLIANCE WITH THE 2017 VOLUME REQUIREMENTS—Continued

[million gallons] [a] [b]

E85	E15	E0	Total ethanol [c]	Sugarcane ethanol	Total biodiesel and renewable diesel [d]	Minimum volume of advanced biodiesel and renewable diesel [d]
200	600	500	14,474	800	2,876	2,012
200	1,200	200	14,535	500	2,836	2,206
330	600	500	14,559	800	2,820	2,012
330	1,200	200	14,621	0	2,780	2,528
330	1,200	200	14,621	200	2,780	2,399
330	1,200	200	14,621	500	2,780	2,206
330	1,200	200	14,621	800	2,780	2,012
330	1,200	500	14,590	200	2,800	2,399

[a] Assumes for the purposes of these scenarios that supply of other advanced biofuel other than ethanol, BBD and renewable diesel (*e.g.,* heating oil, naphtha, etc.) is 50 mill gal, and that the cellulosic biofuel final volume requirement is 311 mill gal, of which 12 mill gal is ethanol and the remainder is primarily biogas.

[b] Biodiesel + renewable diesel is given in physical gallons, and can be converted into ethanol-equivalent gallons by multiplying by 1.55 (see discussion of this conversion factor in Section IV.B.2). Other categories are given as ethanol-equivalent volumes.

[c] For the range of total ethanol shown in this table, the poolwide average ethanol content would range from 10.08% to 10.17%.

[d] Includes supply from both domestic producers as well as imports.

The scenarios in the tables above are not the only ways that the market could choose to meet the total renewable fuel and advanced biofuel volume requirements that we are establishing in this action. Indeed, other combinations are possible, with volumes higher than the highest levels we have shown above or, in some cases, lower than the lowest levels we have shown. The scenarios above cannot be treated as EPA's views on the only, or even most likely, ways that the market may respond to the 2017 volume requirements. Instead, the scenarios are merely illustrative of the various ways that it could play out. Our purpose in generating the list of scenarios above is only to illustrate a range of possibilities which demonstrate that the standards we are establishing in this action can reasonably be met.

We provided a similar table of volume scenarios in the NPRM, and stakeholders were strongly divided on whether those scenarios were achievable and whether they captured the most likely outcomes. Refiners generally said that most if not all of the scenarios were not achievable in 2017, expressing concern that the chosen volumes of E0 were lower than actual market demand and that the chosen volumes of other ethanol blends and renewable fuel sources were considerably higher than historical levels. Proponents of renewable fuels generally said that the provided scenarios were not demonstrative of the much higher renewable fuel volumes that were possible. Comments on reasonably attainable levels of specific ethanol blends and non-ethanol renewable fuel types are addressed in Section V.B above and in Sections 2.3 through 2.5 of the RTC document.

Several proponents of the ethanol industry said that the proposed standards would provide no incentive for greater volumes of E15 and/or E85 in 2017 compared to 2016, and no incentive for increased investment in the infrastructure that supports these higher ethanol blends. We disagree. The proposed volume requirement for total renewable fuel, and the implied volume for non-advanced renewable fuel, were both higher than the corresponding final volume requirements for 2016. While none of the applicable RFS program standards are specific to ethanol, the higher proposed volume requirements would have created greater incentives for growth in E15 and/or E85 in 2017 than existed in 2016. Moreover, we have increased the final volume requirement for total renewable fuel and the implied volume for non-advanced renewable fuel in this final rule, in comparison to the NPRM, providing additional incentives for expansion of E15 and/or E85.

One stakeholder representing conventional ethanol interests said that the volume scenarios in the NPRM demonstrated that 15 billion gallons of non-advanced renewable fuel were possible in 2017. To do this, the stakeholder pointed to the highest volumes in each category to construct a new scenario higher than the proposed volume requirements. While we are in fact finalizing standards for 2017 that include an implied volume of 15 billion gallons of non-advanced renewable fuel, we continue to believe, as we stated in the NPRM, that it would be inappropriate to construct a new scenario (as this commenter attempted) based on the highest volumes in each category that are shown in the tables above in order to argue for higher volume requirements. Doing so would result in summing of values that we have determined are higher than the reasonably attainable volumes of the different fuel categories, resulting in a total volume that we believe would be extremely unlikely to be reasonably attainable or appropriate. We have more confidence in the ability of the market to attain the volume requirements for advanced biofuel and total renewable fuel than we have in the ability of the market to achieve a specific level of, say, biodiesel, or E85. The probability that the upper limits of all sources shown in the tables above could be reasonably attained simultaneously is very small. For instance, if all volume levels in Table V.C–1 were equally likely, then there would be a less than 1% likelihood that the maximum levels could be attained simultaneously.[177]

We recognize that in some scenarios described in the NPRM and above, the volume of a particular category of renewable fuel exceeds the historical maximum or previously demonstrated production level. Stakeholders who believed that the proposed volume requirements were too high pointed to this fact as evidence that many, if not all, volume levels in the scenarios were not achievable. However, as stated in the NPRM, the fact that the scenarios

[177] For illustrative purposes only. We have not determined the relative likelihood of the different volume levels shown in Table V.C–1.

included volumes higher than historical levels cannot be treated as a reason for concluding that such levels are not achievable. The RFS program is intended to result in supply in any given year that is higher than in all previous years, and it is our determination that for 2017 this is reasonably attainable.

With regard to E85, under highly favorable conditions related to growth in the number of E85 retail stations, retail pricing, and consumer response to that pricing, it is possible that E85 volumes as high as 330 million gallons could be reached. For instance, growth in the number of retail stations offering E85 may increase more rapidly than we have estimated under USDA's Biofuels Infrastructure Partnership (BIP) grant program and the ethanol industry's Prime the Pump program. If so, the total number of retail stations offering E85 could perhaps increase from about 3,100 today to 4,800 in 2017 (average for the year), rather than the 4,300 we assumed above in Section V.B.1.iii. Also, it is possible that increases in the price of D6 RINs since the release of the 2014–2016 final rule can help to increase the E85 price discount relative to E10 if producers and marketers of E85 pass the value of the RIN to the prices offered to customers at retail, providing greater incentive to FFV owners to refuel with E85 instead of E15. Under such circumstances, an E85 price discount as high as 30% is possible. Indeed, E85 price discounts this high have been reached in the past in some locales.[178] Efforts to increase the visibility of E85, including expanded marketing and education, can also help to increase E85 sales. Sales volumes of E85 higher than 330 million gallons are very unlikely, but are possible if pump installations increase significantly and the market can overcome constraints associated with E85 pricing at retail and consumer responses to those prices.

Similarly, we believe that under favorable conditions, it is possible that E15 volumes as high as 1,200 million gallons could be reached in 2017. Again, the BIP program and Prime the Pump program could result in a higher growth rate for retail stations offering E15 than we have estimated, potentially reaching as high as 2,000 in 2017 (average for the year). Although for the purposes of estimating reasonably attainable E15 in 2017 we have estimated that sales of E15 would be 15% of all gasoline sales at stations selling both E10 and E15, it is possible that sales of E15 could be as high as 50% under favorable pricing conditions as described in Section V.B.1.ii. Also, additional terminals could produce E15 in 2017 beyond the four that we included in our estimate of reasonably attainable volumes of E15 in 2017.[179]

As the table above illustrates, the volume requirements could result in the consumption of 2.88 billion gallons of biodiesel and renewable diesel in 2017. This level is less than our estimate of the production capacity for all registered domestic biodiesel and renewable diesel production facilities, and approximately the same as the 2.9 billion gallons that we used in the context of determining whether there is adequate supply to meet the total renewable fuel volume requirement of 19.28 billion gallons in 2017. Given the necessarily imprecise nature of our estimate of supply of biodiesel and renewable diesel in the context of determining whether there will be adequate supply to meet the total renewable fuel volume requirement of 19.28 billion gallons in 2017, volumes as high as 2.88 billion gallons and potentially higher are possible.

Finally, out of the maximum of about 2.9 billion gallons of biodiesel and renewable diesel shown in Table V.C–1, more than 2.5 billion gallons could be advanced biodiesel. While this is slightly higher than the 2.4 billion gallons that we used in determining the advanced biofuel volume requirement, it could be supplied from current biodiesel domestic production capacity which is about 3 billion gallons, though this would possibly involve additional feedstock switching as discussed in Section IV.

D. Impacts of 2017 Standards on Costs

In this section we provide illustrative cost estimates for the 2017 standards. By ''illustrative costs,'' EPA means the cost estimates provided are not meant to be precise measures, nor do they attempt to capture the full impacts of this final rule. These estimates are provided solely for the purpose of showing how the cost to produce a gallon of a ''representative'' renewable fuel compares to the cost of petroleum fuel. There are a significant number of caveats that must be considered when interpreting these cost estimates. First, there are a number of different feedstocks that could be used to produce ethanol and biodiesel, and there is a significant amount of heterogeneity in the costs associated with these different feedstocks and fuels. Some fuels may be cost competitive with the petroleum fuel they replace; however, we do not have cost data on every type of feedstock and every type of fuel. Therefore, we do not attempt to capture this range of potential costs in our illustrative estimates.

Second, the costs and benefits of the RFS program as a whole are best assessed when the program is fully mature in 2022 and beyond.[180] We continue to believe that this is the case, as the annual standard-setting process encourages consideration of the program on a piecemeal (*i.e.,* year-to-year) basis, which may not reflect the long-term economic effects of the program. Thus, EPA did not quantitatively assess other direct and indirect costs or benefits of increased renewable fuel volumes such as infrastructure costs, investment, GHG emissions and air quality impacts, or energy security benefits, which all are to some degree affected by this final rule. While some of these impacts were analyzed in the 2010 final rulemaking which established the current RFS program, we have not fully analyzed these impacts for the 2017 volume requirements. We have framed the analyses we have performed for this final rule as ''illustrative'' so as not to give the impression of comprehensive estimates.

Third, at least two different scenarios could be considered the ''baseline'' for the assessment of the costs of this rule. One scenario would be the statutory volumes (*e.g.,* the volumes in the Clean Air Act 211(o)(2) for 2016) in which case this final rule would be reducing volumes, reducing costs as well as decreasing expected GHG benefits. For the purposes of showing illustrative overall costs of this rulemaking, we use the preceding year's standard as the baseline (*e.g.,* the baseline for the 2017 advanced standard is the 2016 advanced standard), an approach consistent with past practices in previous annual RFS rules.

EPA is providing cost estimates for three illustrative scenarios:

1. If the entire change in the advanced standards is met with soybean oil BBD

2. If the entire change in the advanced standards is met with sugarcane ethanol from Brazil

3. If the entire change in the total renewable fuel volume standards that can be satisfied with conventional (*i.e.,* non-advanced) renewable fuel is met with corn ethanol.

[178] For instance, data from the Fuels Institute indicates that 3% of E85 price discounts were above 30% at surveyed retail stations in 2015.

[179] HWRT Oil Company intends to eventually offer E15 from 17 additional terminals in addition to the four announced on July 19, 2016. ''HWRT & RFA Announce First-Ever Offering of Pre-blended E15,'' docket EPA–HQ–OAR–2016–0004.

[180] 77 FR 59477.

While a variety of biofuels could help fulfill the advanced standard beyond soybean oil BBD and sugarcane ethanol from Brazil, these two biofuels have been most widely used in the past. The same is true for corn ethanol vis-a-vis the non-advanced component of the total renewable fuel standard. We believe these scenarios provide illustrative costs of meeting the applicable 2017 standards.

For this analysis, we estimate the per gallon costs of producing biodiesel, sugarcane ethanol, and corn ethanol relative to the petroleum fuel they replace at the wholesale level, then multiply these per gallon costs by the difference in the volumes between the relevant 2017 standard and the previous 2016 standard for the advanced (for biodiesel and sugarcane ethanol) and non-advanced component of the total renewable fuel (for corn ethanol) categories. More background information on this section, including details of the data sources used and assumptions made for each of the scenarios, can be found in a Memorandum submitted to the docket.[181]

Because we are focusing on the wholesale level in each of the three scenarios, these comparisons do not consider taxes, retail margins, and any other costs or transfers that occur at or after the point of blending (*i.e.,* transfers are payments within society and are not additional costs). Further, as mentioned above we do not attempt to estimate potential costs related to infrastructure expansion with increased renewable fuel volumes (*e.g.,* the costs of providing pumps and storage tanks associated with higher level ethanol blends). In addition, because more ethanol gallons must be consumed to go the same distance as gasoline and more biomass-based diesel must be consumed to go the same distance as petroleum diesel due to each of the biofuels' lesser energy content, we consider the costs of ethanol and biomass-based diesel on an energy equivalent basis to their petroleum replacements (*i.e.,* per energy equivalent gallon).

For our first illustrative cost scenario, we estimate the costs of soybean-based biodiesel to meet the entire change in the advanced biofuel standard for 2017.[182] Table V.D–1 below presents the annual change in volumes being established by this rule, a range of illustrative cost differences between biomass-based diesel and petroleum-based diesel by individual gallon on a diesel gallon equivalent (DGE) basis, and multiplies those per gallon cost estimates by the volume of fuel displaced by the advanced standard on an energy equivalent basis to obtain an overall cost estimate of meeting the standard.

TABLE V.D–1—ILLUSTRATIVE COSTS OF SOYBEAN BIODIESEL TO MEET INCREASE IN ADVANCED BIOFUEL STANDARDS IN 2017

	2016	2017
Advanced Volume Required (Million Gallons)	3,610	4,280
Advanced Volume Required (Million Gallons as Biodiesel)	2,407	[183] 2,853
Annual Change in Volume Required (Million Gallons as Biodiesel)		447
(DGE) [184]		*(408)*
Cost Difference Between Soybean Biodiesel and Petroleum Diesel Per Gallon ($/DGE)		$1.98–$2.95
Annual Increase in Overall Costs (Million $)		[185] $807–$1,203

For our second illustrative cost scenario, we estimate the costs of Brazilian sugarcane ethanol to meet the entire change in the advanced biofuel standard for 2017. Table V.D–2 below presents the annual change in volumes established by this final rule, a range of illustrative cost differences between Brazilian sugarcane ethanol and wholesale gasoline on a per gasoline gallon equivalent (GGE) basis, and multiplies those per gallon cost estimates by the volume of fuel displaced by the advanced standard on an energy equivalent basis to obtain an overall cost estimate of meeting the standard.

TABLE V.D–2—ILLUSTRATIVE COSTS OF BRAZILIAN SUGARCANE ETHANOL TO MEET INCREASE IN ADVANCED BIOFUEL STANDARDS IN 2017

	2016	2017
Advanced Volume Required (Million Gallons)	3,610	4,280
Annual Change in Volume Required (Million Gallons)		670
(GGE) [186]		*(447)*
Cost Difference Between Sugarcane Ethanol and Gasoline Per Gallon ($/GGE)		$1.00–$2.16
Annual Increase in Overall Costs (Million $)		[187] $446–$966

[181] "Illustrative Costs Impact of the Final Annual RFS2 Standards, 2017", Memorandum from Michael Shelby and Aaron Sobel to EPA Docket EPA–HQ–OAR–2016–0004.

[182] Soybean biodiesel could meet the pre-established 2017 biomass-based diesel volume, which itself is a nested volume within the 2017 advanced biofuel RFS volume. Illustrative costs represent meeting all of the costs of the annual increase of the 2017 advanced standard using entirely soybean-based biodiesel as one scenario.

[183] EPA used a value of 1.5 when calculating the RIN equivalencies of soybean-based biodiesel for the purpose of this illustrative costs example. See section IV.B–2 for a more detailed explanation of the biodiesel and renewable diesel equivalence value used for the purpose of deriving the renewable fuel standard under the 2017 RFS rule.

[184] Due to the difference in energy content between biodiesel and diesel, one gallon of biodiesel is energy-equivalent to approximately 91% of a gallon of diesel; 447 million gallons of biodiesel is energy-equivalent to approximately 408 million gallons of diesel.

[185] Overall costs may not match per gallon costs times volumes due to rounding.

[186] Due to the difference in energy content between ethanol and gasoline, one gallon of ethanol is energy-equivalent to approximately 67% of a gallon of gasoline; 670 million gallons of ethanol is energy-equivalent to approximately 447 million gallons of gasoline.

[187] Overall costs may not match per gallon costs times volumes due to rounding.

For our third illustrative cost scenario, we assess the difference in cost associated with a change in the implied volumes available for conventional (*i.e.,* non-advanced) biofuels for 2017. We provide estimates of what the potential costs might be if corn ethanol is used to meet the entire change in implied conventional renewable fuel volumes. Table V.D–3 below presents the annual change in volumes established by this final rule, a range of illustrative cost differences between corn ethanol and the wholesale gasoline on a per gasoline gallon equivalent (GGE) basis, and multiplies those per gallon cost estimates by the volume of petroleum displaced on an energy equivalent basis by the change in implied conventional fuel volumes for an estimated overall cost in 2017.

TABLE V.D–3—ILLUSTRATIVE COSTS OF CORN ETHANOL TO MEET INCREASE IN THE CONVENTIONAL (*i.e.,* NON-ADVANCED) PORTION OF THE TOTAL RENEWABLE FUEL STANDARDS IN 2017

	2016	2017
Implied Conventional Volume (Million Gallons)	14,500	15,000
Annual Change in Implied Conventional Volume (Million Gallons)		500
(GGE) [188]		*(333)*
Cost Difference Between Corn Ethanol and Gasoline Per Gallon ($/GGE)		$0.72–$1.04
Annual Increase in Overall Costs (Million $)		[189] $240–$347

These illustrative cost estimates are not meant to be precise measures, nor do they attempt to capture the full impacts of the rule. These estimates are provided solely for the purpose of illustrating how the cost to produce renewable fuels could compare to the costs of producing petroleum fuels. There are several important caveats that must be considered when interpreting these costs estimates. First, there is a significant amount of heterogeneity in the costs associated with different feedstocks and fuels that could be used to produce renewable fuels; however, EPA did not attempt to capture this range of potential costs in these illustrative estimates. Second, EPA did not quantify other impacts such as infrastructure costs, job impacts, or investment impacts. If the illustrative costs from the Tables above, representing the range for combined advanced and non-advanced fuel volumes, were summed together they would range from $686–$1,550 million in 2017. It is important to note that these costs do not represent net benefits of the program.

For the purpose of this annual rulemaking, we have not quantified benefits for the 2017 standards. We do not have a quantified estimate of the GHG impacts for a single year (*e.g.,* 2017), and there are a number of benefits that are difficult to quantify, such as rural economic development, employment impacts, and national security benefits from more diversified fuel sources. When the RFS program is fully phased in, the program will result in considerable volumes of renewable fuels that will reduce GHG emissions in comparison to the fossil fuels which they replace. EPA estimated GHG, energy security, and air quality impacts and benefits in the 2010 RFS2 final rule assuming full implementation of the statutory volumes in 2022.[190]

VI. Biomass-Based Diesel Volume for 2018

In this section we discuss the final biomass-based diesel (BBD) applicable volume for 2018. We are establishing this volume in advance of those for other renewable fuel categories in light of the statutory requirement in CAA section 211(o)(2)(B)(ii) to establish the applicable volume of BBD for years after 2012 no later than 14 months before the applicable volume will apply. We are not at this time establishing the BBD percentage standards that would apply to obligated parties in 2018 but intend to do so in the Fall of 2017, after receiving EIA's estimate of gasoline and diesel consumption for 2018. Although the BBD applicable volume sets a floor for required BBD use, because the BBD volume requirement is nested within both the advanced biofuel and the total renewable fuel volume requirements, any ''excess'' BBD produced beyond the mandated 2018 BBD volume can be used to satisfy both of these other applicable volume requirements. Therefore, these other standards can also influence BBD production and use.

A. Statutory Requirements

The statute establishes applicable volume targets for years through 2022 for cellulosic biofuel, advanced biofuel, and total renewable fuel. For BBD, applicable volume targets are specified in the statute only through 2012. For years after those for which volumes are specified in the statute, EPA is required under CAA section 211(o)(2)(B)(ii) to determine the applicable volume of BBD, in coordination with the Secretary of Energy and the Secretary of Agriculture, based on a review of the implementation of the program during calendar years for which the statute specifies the volumes and an analysis of the following factors:

1. The impact of the production and use of renewable fuels on the environment, including on air quality, climate change, conversion of wetlands, ecosystems, wildlife habitat, water quality, and water supply;
2. The impact of renewable fuels on the energy security of the United States;
3. The expected annual rate of future commercial production of renewable fuels, including advanced biofuels in each category (cellulosic biofuel and BBD);
4. The impact of renewable fuels on the infrastructure of the United States, including deliverability of materials, goods, and products other than renewable fuel, and the sufficiency of infrastructure to deliver and use renewable fuel;
5. The impact of the use of renewable fuels on the cost to consumers of transportation fuel and on the cost to transport goods; and
6. The impact of the use of renewable fuels on other factors, including job creation, the price and supply of agricultural commodities, rural economic development, and food prices.

The statute also specifies that the volume requirement for BBD cannot be less than the applicable volume for calendar year 2012, which is 1.0 billion gallons. The statute does not, however, establish any other numeric criteria, or provide any guidance on how the EPA should weigh the importance of the often competing factors, and the overarching goals of the statute when

[188] 500 million gallons of ethanol is energy-equivalent to approximately 333 million gallons of gasoline.

[189] Overall costs may not match per gallon costs times volumes due to rounding.

[190] 75 FR 14670.

the EPA sets the applicable volumes of BBD in years after those for which the statute specifies such volumes. In the period 2013–2022, the statute specifies increasing applicable volumes of cellulosic biofuel, advanced biofuel, and total renewable fuel, but provides no guidance, beyond the 1.0 billion gallon minimum, on the level at which BBD volumes should be set.

B. Determination of Applicable Volume of Biomass-Based Diesel

1. BBD Production and Compliance Through 2015

One of the primary considerations in determining the biomass-based diesel volume for 2018 is a review of the implementation of the program to date, as it affects biomass-based diesel. This review is required by the CAA, and also provides insight into the capabilities of the industry to produce, import, export, and distribute BBD. It also helps us to understand what factors, beyond the BBD standard, may incentivize the production and import of BBD. The number of BBD RINs generated, along with the number of RINs retired due to export or for reasons other than compliance with the annual BBD standards from 2011–2015 are shown below.

TABLE VI.B.1–1—BIOMASS-BASED (D4) RIN GENERATION AND STANDARDS IN 2013–2017

[Million gallons] [191]

	BBD RINs generated	Exported BBD (RINs)	BBD RINs retired, non-compliance reasons	Available BBD RINs [a]	BBD standard (gallons)	BBD standard (RINs)
2011	1,692	110	98	1,483	800	1,200
2012	1,737	183	90	1,465	1,000	1,500
2013	2,739	298	101	2,341	1,280	1,920
2014	2,710	126	92	2,492	1,630	[b] 2,490
2015	2,796	133	32	2,631	1,730	[b] 2,655
2016	N/A	N/A	N/A	N/A	1,900	2,850
2017	N/A	N/A	N/A	N/A	2,000	3,000

[a] Available BBD RINs may not be exactly equal to BBD RINs Generated minus Exported RINs and BBD RINs Retired, Non-Compliance Reasons due to rounding.

[b] Each gallon of biodiesel qualifies for 1.5 RINs due to its higher energy content per gallon than ethanol. Renewable diesel qualifies for between 1.5 and 1.7 RINs per gallon. In 2014 and 2015 the number of RINs in the BBD Standard column is not exactly equal to 1.5 times the BBD volume standard as these standards were established based on actual RIN generation data for 2014 and a combination of actual data and a projection of RIN generation for the last three months of the year for 2015. Some of the volume used to meet the biomass-based diesel standard was renewable diesel, which generally has an equivalence value of 1.7.

In reviewing historical BBD RIN generation and use, we see that the number of RINs available for compliance purposes exceeded the volume required to meet the BBD standard in 2011 and 2013. Additional production and use of biodiesel was likely driven by a number of factors, including demand to satisfy the advanced biofuel and total renewable fuels standards, the biodiesel tax credit, and favorable blending economics. In 2012 the available BBD RINs were slightly less than the BBD standard. There are many reasons this may have been the case, including the temporary lapse of the biodiesel tax credit at the end of 2011.[192] The number of RINs available in 2014 and 2015 was approximately equal to the number required for compliance in those years. This is because the standards for these years were finalized at the end of November 2015 when RIN generation data were available for all of 2014 and much of 2015, and we exercised our authority to establish the required BBD volumes for these time periods to be approximately equal to the number of BBD RINs that were available (for past time periods) or were expected to be available (for the months of 2015 for which EPA did not yet have reliable data) in the absence of the influence of the RFS standards. While we do not yet have final compliance data for 2016, BBD RIN generation is currently on track to exceed the volume required by the BBD standard by a significant margin.[193] This strongly suggests that there is demand for these RINs to satisfy the advanced biofuel and/or total renewable fuel requirements.

2. Interaction Between BBD and Advanced Biofuel Standards

The BBD standard is nested within the advanced biofuel and total renewable fuel standards. This means that when an obligated party retires a BBD RIN (D4) to satisfy their BBD obligation, this RIN also counts towards meeting their advanced biofuel and total renewable fuel obligations. It also means that obligated parties may use BBD RINs in excess of their BBD obligations to satisfy their advanced biofuel and total renewable fuel obligations. Higher advanced biofuel and total renewable fuel standards, therefore, create demand for BBD, especially if there is an insufficient supply of other advanced or conventional renewable fuels to satisfy the standards, or if BBD RINs can be acquired at or below the price of other advanced or conventional biofuel RINs.[194]

In reviewing the implementation of the RFS program to date, it is apparent that the advanced biofuel and/or total renewable fuel volume requirements were in fact helping grow the market for volumes of biodiesel above the BBD standard. In 2013 the number of advanced RINs generated from fuels other than BBD and cellulosic biofuel was not large enough to satisfy the implied standard for ''other advanced'' biofuel (advanced biofuel needed to satisfy the advanced biofuel standard after the BBD and cellulosic biofuel standards are met), and additional volumes of BBD filled the gap (see Table

[191] Net BBD RINs Generated and BBD RINs Retired for Non-Compliance Reasons information from EMTS. Biodiesel Export information from EIA. *http://www.eia.gov/dnav/pet/pet_move_expc_a_EPOORDB_EEX_mbbl_a.htm*.

[192] The biodiesel tax credit was reauthorized in January 2013. It applied retroactively for 2012 and for the remainder of 2013. It was once again extended in December 2014 and applied retroactively to all of 2014 as well as to the remaining weeks of 2014. In December 2015 the biodiesel tax credit was once authorized and applied retro-actively for all of 2015 as well as through the end of 2016.

[193] ''Comparison of 2016 availability of RINs and 2016 standards,'' memorandum from David Korotney to docket EPA–HQ–OAR–2016–0004.

[194] The biodiesel blenders tax credit effectively reduced the cost of BBD, allowing it to be priced lower than many other advanced biofuels.

VI.B.2–1 below). In fact, the amount by which the available BBD RINs exceeded the 1.28 billion gallon BBD volume requirement (421 million RINs) was larger than the amount of such excess BBD needed, together with other types of advanced biofuels, to satisfy the advanced biofuel standard (278 million RINs; the number of advanced biofuel RINs required after subtracting the number of RINs generated to meet the BBD standard and the number of RINs generated for non-BBD advanced biofuels), suggesting that the additional increment was incentivized by the total renewable fuel standard. Preliminary data for 2016 similarly reveal the ability for the advanced and total renewable fuel standards to incentivize increased BBD production. The current RIN generation data suggest that BBD production is on track to exceed the BBD standard for 2016 by a significant margin, and that these excess BBD RINs will be needed to enable compliance with the advanced biofuel and total renewable fuel standards given the limited production of other advanced biofuels.[195] As discussed above, the 2014 and 2015 BBD standards were intended to reflect the full number of available BBD RINs in these years and were set in late 2015, at which point the number of available RINs in these years was largely known. We can therefore draw no conclusions about the ability for the advanced and total renewable fuel standards to incentivize BBD production from these years. While the available BBD RINs in 2012 were slightly less than the BBD standard despite the opportunity to contribute towards meeting the advanced and total renewable fuel standards, there are several factors beyond the RFS standards (2012 drought, expiration of the biodiesel tax credit, opportunities for increased ethanol blending as E10) that likely impacted BBD production in 2012. We continue to believe that the advanced biofuel and total renewable fuel standards can provide a strong incentive for increased BBD volume in the United States in excess of that required to satisfy the BBD standard (for further discussion on this issue see 80 FR 77492).

TABLE VI.B.2–1—BIOMASS-BASED DIESEL AND ADVANCED BIOFUEL RIN GENERATION AND STANDARDS

[Million RINs]

	Available BBD (RINs)	BBD standard (RINs)	Available D5 RINs (advanced biofuels) [a]	Opportunity for "Other Advanced" biofuels [b]
2011	1,483	1,200	225	150
2012	1,465	1,500	597	500
2013	2,341	1,920	552	830
2014	2,492	2,490	143	147
2015	2,631	2,655	147	102

[a] Does not include BBD or cellulosic biofuel RINs, which may also be used towards an obligated party's advanced biofuel obligation.

[b] Advanced biofuel that does not qualify as BBD or cellulosic biofuel; calculated by subtracting the number of required BBD RINs (BBD required volume × 1.5) and the number of required cellulosic biofuel RINs from the advanced biofuel volume requirement.

The prices paid for advanced biofuel and BBD RINs beginning in early 2013 through mid-2016 also support the conclusion that advanced biofuel and/or total renewable fuel standards provide a sufficient incentive for additional biodiesel volume beyond what is required by the BBD standard. Because the BBD standard is nested within the advanced biofuel and total renewable fuel standards, and therefore can help to satisfy three RVOs, we would expect the price of BBD RINs to exceed that of advanced and conventional renewable RINs.[196] If, however, BBD RINs are being used by obligated parties to satisfy their advanced biofuel and/or total renewable fuel obligations, above and beyond the BBD standard, we would expect the prices of conventional renewable fuel, advanced biofuel, and BBD RINs to converge to the price of the BBD RIN.[197] When examining RIN prices data from 2013 through mid-2016, shown in Figure VI.B.2–1 below, we see that throughout this entire time period the advanced RIN price and biomass-based diesel RIN prices were approximately equal. Similarly, throughout most of this time period the conventional renewable fuel and biomass-based diesel RIN prices were approximately equal. This suggests that the advanced biofuel standard and/or total renewable fuel standard was capable of incentivizing increased BBD volumes beyond the BBD standard in these years.[198] While final standards were not in place throughout 2014 and most of 2015, EPA had issued proposed rules for both of these years. In each year, the market response was to supply volumes of BBD that exceeded the proposed BBD standard in order to satisfy the advanced biofuel standard. Additionally, the RIN prices in these years strongly suggests that obligated parties and other market participants anticipated the need for BBD RINs to meet their advanced biofuel obligations, and responded by purchasing advanced biofuel and BBD RINs at approximately equal prices.

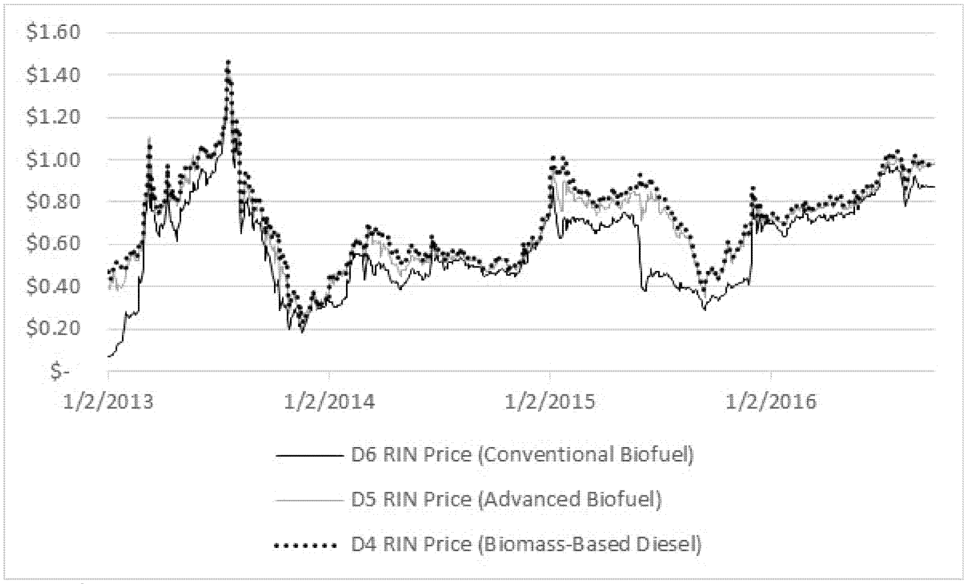
[195] "Comparison of 2016 availability of RINs and 2016 standards," memorandum from David Korotney to docket EPA–HQ–OAR–2016–0004.

[196] This is because when an obligated party retires a BBD RIN to help satisfy their BBD obligation, the nested nature of the BBD standard means that this RIN also counts towards satisfying their advanced and total renewable fuel obligations. Advanced RINs count towards both the advanced and total renewable fuel obligations, while conventional RINs (D6) count towards only the total renewable fuel obligation.

[197] We would still expect D4 RINs to be valued at a slight premium to D5 and D6 RINs in this case (and D5 RINs at a slight premium to D6 RINs) to reflect the greater flexibility of the D4 RINs to be used towards the BBD, advanced biofuel, and total renewable fuel standard. This pricing has been observed over the past several years.

[198] Although we did not issue a rule establishing the final 2013 standards until August of 2013, we believe that the market anticipated the final standards, based on EPA's July 2011 proposal and the volume targets for advanced and total renewable fuel established in the statute (76 FR 38844, 38843).

Figure VI.B.2-1
Current Year RIN Prices (2013-2016)[a]



[a] For a list of the eligible pathways for each D-code see Table 1 to §80.1426
RIN Price Data from OPIS (2013-2015) and Argus (2016)

In establishing the BBD and cellulosic standards as nested within the advanced biofuel standard, Congress clearly intended to support development of BBD and cellulosic biofuels, while also providing an incentive for the growth of other non-specified types of advanced biofuels. That is, the advanced biofuel standard provides an opportunity for other advanced biofuels (advanced biofuels that do not qualify as cellulosic biofuel or BBD) to be used to satisfy the advanced biofuel standard after the cellulosic biofuel and BBD standards have been met. Indeed, since Congress specifically directed growth in BBD only through 2012, leaving development of volume targets for BBD to EPA for later years while also specifying substantial growth in the cellulosic biofuel and advanced biofuel categories, we believe that Congress clearly intended for EPA to evaluate in setting BBD volume requirements after 2012 the appropriate rate of participation of BBD within the advanced biofuel standard.

When viewed in a long-term perspective, BBD can be seen as competing for research and development dollars with other types of advanced biofuels for participation as advanced biofuels in the RFS program. We believe that preserving space within the advanced biofuel standard for advanced biofuels that do not qualify as BBD or cellulosic biofuel provides the appropriate incentives for the continued development of these types of fuels. In addition to the long-term impact of our action in establishing the BBD volume requirements, there is also the potential for short-term impacts during the compliance years in question. By establishing BBD volume requirements at levels lower than the advanced biofuel volume requirements (and lower than the expected production of BBD to satisfy the advanced biofuel requirement), we are creating the potential for some competition between BBD and other advanced biofuels to satisfy the advanced biofuel volume standard. We continue to believe that preserving space under the advanced biofuel standard for non-BBD advanced biofuels, as well as BBD volumes in excess of the BBD standard, will help to encourage the development and production of a variety of advanced biofuels over the long term without reducing the incentive for additional volumes of BBD beyond the BBD standard in 2018. A variety of different types of advanced biofuels, rather than a single type such as BBD, would positively impact energy security (*e.g.,* by increasing the diversity of feedstock sources used to make biofuels, thereby reducing the impacts associated with a shortfall in a particular type of feedstock) and increase the likelihood of the development of lower cost advanced biofuels that meet the same GHG reduction threshold as BBD.[199]

While a single-minded focus on the ability of the advanced and total renewable fuel standards to incentivize increasing production of the lowest cost qualifying biofuels, regardless of fuel type, would suggest that a flat or even decreasing BBD volume requirement may be the optimal solution, this is not the only consideration. Despite many of these same issues being present in previous years, we have consistently increased the BBD standard each year. Our decisions to establish increasing BBD volumes each year have been made in light of the fact that while cellulosic biofuel production has fallen far short of the statutory volumes, the available supply of BBD in the United States has grown each year. This growing supply of BBD allowed EPA to establish higher advanced biofuel standards, and to realize the GHG benefits associated with greater volumes of advanced biofuel, than would otherwise have been possible in light of the continued shortfall in the availability of cellulosic biofuel. It is in this context that we determined that steadily increasing the BBD requirements was appropriate to encourage continued investment and innovation in the BBD industry, providing necessary assurances to the industry to increase production, while also serving the long term goal of the RFS statute to increase volumes of advanced biofuels over time.

[199] All types of advanced biofuel, including biomass-based diesel and cellulosic biofuel, must achieve lifecycle greenhouse gas reductions of at least 50%.

Although the BBD industry has performed well in recent years, we believe that for 2018 a continued appropriate increase in the BBD volume requirement will help provide stability to the BBD industry and encourage continued growth. This industry is currently the single largest contributor to the advanced biofuel pool, one that to date has been largely responsible for providing the growth in advanced biofuels envisioned by Congress. Nevertheless, many factors that impact the viability of the BBD industry in the United States, such as commodity prices and the biodiesel tax credit, remain uncertain. Continuing to increase the BBD volume requirement should help to provide market conditions that allow these BBD production facilities to operate with greater certainty. This result is consistent with the goals of the Act to increase the production and use of advanced biofuels (for further discussion of these issues see 80 FR 77492).

3. BBD Volume for 2018

With the considerations discussed in Section IV.B.2 in mind, as well as our analysis of the factors specified in the statute, we are setting the applicable volume of BBD at 2.1 billion gallons for 2018. This volume represents an annual increase of 100 million gallons over the applicable volume of BBD in 2017. We believe this is appropriate for the same reasons reflected in the December 14, 2015 final rule: To provide additional support for the BBD industry while allowing room within the advanced biofuel volume requirement for the participation of non-BBD advanced fuels. Although we are not setting the advanced biofuel volume requirement for 2018 at this time, we anticipate that the 2018 advanced biofuel requirement will be larger than the 2017 advanced biofuel volume requirement, and the 2018 BBD volume requirement reflects this anticipated approach. Our assessment of the required statutory factors, summarized in the next section and in a memorandum to the docket, supports this approach.[200]

We believe this approach strikes the appropriate balance between providing a market environment where the development of other advanced biofuels is incentivized, while also maintaining support for growth in BBD volumes. Given the volumes for advanced biofuel we anticipate requiring in 2018, setting the BBD standard in this manner would continue to allow a considerable portion of the advanced biofuel volume to be satisfied by either additional gallons of BBD or by other unspecified types of qualifying advanced biofuels.

C. Consideration of Statutory Factors for 2018

In this section we discuss our consideration of the statutory factors set forth in CAA section 211(o)(2)(B)(ii)(I)–(VI). As noted earlier in Section IV.B.2, the BBD volume requirement is nested within the advanced biofuel requirement and the advanced biofuel requirement is, in turn, nested within the total renewable fuel volume requirement. This means that any BBD produced beyond the mandated BBD volume can be used to satisfy both these other applicable volume requirements. The result is that in considering the statutory factors we must consider the potential impacts of increasing BBD in comparison to other advanced biofuels.[201] For a given advanced biofuel standard, greater or lesser BBD volume requirements do not change the amount of advanced biofuel used to displace petroleum fuels; rather, increasing the BBD requirement may result in the displacement of other types of advanced biofuels that could have been used to meet the advanced biofuels volume requirement.

Consistent with our 2017 approach in setting the final BBD volume requirement, EPA's primary assessment of the statutory factors for the final 2018 BBD applicable volume is that because the BBD requirement is nested within the advanced biofuel volume requirement, we expect that the final 2018 advanced volume requirement, when set next year, will largely determine the level of BBD production and imports that occur in 2018. Therefore, EPA continues to believe that the same overall volume of BBD would likely be supplied in 2018 regardless of the BBD volume we mandate for 2018 in this final rule. This assessment is based, in part, on our review of the RFS program implementation to date, as discussed above in Section VI.B.1–VI.B–2.

As we stated in our proposal, even though we are not setting the 2018 advanced biofuel volume requirement in this final rule, the final BBD volume requirement for 2018 that we are establishing in this action is not expected to impact the volume of BBD that is actually produced and imported during the 2018-time period. Thus we do not expect our final 2018 BBD volume requirement to result in a difference in the factors we are required to consider pursuant to CAA section 211(o)(2)(B)(ii)(I)–(VI). However, we note that our approach of setting BBD volume requirement at a higher level in 2018 (as we did in 2017), while still at a volume level lower than the anticipated overall production and consumption of BBD in 2018, is consistent with our evaluation of statutory factors in CAA sections 211(o)(2)(B)(ii) (I), (II) and (III), since we continue to believe that our decision on the BBD volume requirement can have a positive impact on the future development and marketing of other advanced biofuels and can also result in potential environmental and energy security benefits, while still sending a supportive signal to potential BBD investors, consistent with the objectives of the Act to encourage the continued growth in production and use of renewable fuels, and in particular, advanced renewable fuels.

Even though we are finalizing only the 2018 BBD volume requirement at this time and not the 2018 advanced biofuel requirement, we believe that our primary assessment with respect to the 2018 BBD volume requirement is appropriate, as is clear from the fact that the reasoning and analysis would apply even if we did not increase the 2018 advanced biofuel requirement above 2017 levels.[202] Nevertheless, we anticipate that the 2018 advanced biofuel requirement will be set to reflect reasonably attainable and appropriate volumes in the use of all advanced biofuels, similar to the approach used in this rule, and that the advanced biofuel volume standard will be larger in 2018 than in 2017.

As an additional supplementary assessment, we have considered the potential impacts of modifying the 2018 BBD volume requirement from the level of 2.1 billion gallons based on the assumption that in guaranteeing the BBD volume at any given level there could be greater use of BBD and a corresponding decrease in the use of other types of advanced biofuels. However, setting a BBD volume requirement higher or lower than 2.1

[200] "Memorandum to docket: Final Statutory Factors Assessment for the 2018 Biomass-Based Diesel (BBD) Applicable Volumes."

[201] While excess BBD production could also displace conventional renewable fuel under the total renewable standard, as long as the BBD applicable volume is significantly lower than the advanced biofuel applicable volume our action in setting the BBD applicable volume is not expected to displace conventional renewable fuel under the total renewable standard, but rather other advanced biofuels. See Table V. C–1.

[202] As explained in Section IV, in deriving the 2017 advanced biofuel applicable volume requirement, we assumed that 2.4 billion gallons of BBD (3.72 billion RINs) would be used to satisfy the 4.28 bill gal advanced biofuel requirement. Thus the mandated 2018 BBD applicable volume is less than we anticipate will actually be used in 2017.

billion gallons in 2018 would only be expected to impact BBD volumes on the margin, protecting to a lesser or greater degree BBD from being outcompeted by other advanced biofuels. In this supplementary assessment we have considered all of the statutory factors found in CAA section 211(2)(B)(ii), and as described in a memorandum to the docket,[203] our assessment does not appear, based on available information, to provide a reasonable basis for setting a higher or lower volume requirement for BBD than 2.1 billion gallons for 2018.

Overall and as described in our final memorandum to the docket, we have determined that both the primary assessment and the supplemental assessment of the statutory factors specified in CAA section 211(o)(2)(B)(ii)(I)–(VI) for the year 2018 does not provide significant support for setting the BBD standard at a level higher or lower than 2.1 billion gallons in 2018.

The EPA received numerous comments pertaining to the consideration of the statutory factors for the 2018 BBD volume requirement. Many of these comments were made previously in response to last year's proposal to set the 2017 BBD volume requirement at 2.0 billion as part of the renewable fuels program's annual rulemaking.[204] Below we reiterate our responses to a number of key issues which continue to be raised by the National Biodiesel Board (NBB). Additional comments and EPA responses can be found in the Response to Comment document that accompanies this final rule.

NBB restated its claim that we improperly based our consideration of the statutory factors on a comparison of BBD to other advanced biofuels, rather than to diesel fuel. They continued to suggest that setting the BBD standard at a higher level than proposed would actually result in BBD competing against diesel fuel, and therefore, EPA should analyze the impacts of displacing diesel fuel with BBD in its statutory factors analysis. We continue to disagree. In setting the advanced biofuel volume requirement, we have assumed reasonably attainable and appropriate volumes in BBD and other advanced biofuels. After determining that it is in the interest of the program, as described in Section VI.B.2 to set the BBD volume requirement at a level below anticipated BBD production and imports, so as to provide continued incentives for research and development of alternative advanced biofuels, it is apparent that excess BBD above the BBD volume requirement will compete with other advanced biofuels, rather than diesel.[205] The only way for EPA's action on the BBD volume requirement to result in a direct displacement of petroleum-based fuels, rather than other advanced biofuels, would be if the BBD volume requirement were set larger than the total renewable fuel requirement. However, since BBD is a type of advanced biofuel, and advanced biofuel is a type of renewable fuel, the BBD volume requirement could never be larger than the advanced requirement and the advanced biofuel requirement could never be larger than the total renewable fuel requirement.

NBB also continues to assert that our analysis of the desirability of setting the BBD volume requirement in a manner that would promote the development and use of a diverse array of advanced biofuels is prohibited by statute. We disagree with these comments and continue to believe that the statutory volumes of renewable fuel established by Congress in CAA section 211(o)(2)(B) provide an opportunity for other advanced biofuels (advanced biofuels that do not qualify as cellulosic biofuel or BBD) to be used to satisfy the advanced biofuel standard after the cellulosic biofuel and BBD standards have been met. Ensuring that a diversity of renewable biofuels are produced is consistent with CAA section 211 (o)(2)(A)(i), which requires that the EPA ''ensure that transportation fuel sold, or introduced into commerce in the United States . . . contains at least the applicable volume of renewable fuel, advanced biofuels, cellulosic biofuel, and biomass-based diesel . . .''. Because the BBD standard is nested within the advanced biofuel and total renewable fuel standards, when an obligated party retires a BBD RIN (D4) to satisfy their obligation, this RIN also counts towards meeting their advanced biofuel and total renewable fuel obligations. It also means that obligated parties may use BBD RINs in excess of their BBD obligations to satisfy their advanced biofuel and total renewable fuel obligations. To the extent that obligated parties are required to achieve compliance with the overall advanced biofuel standard using higher volumes of BBD D4 RINs, they forgo the use of other biofuels considered advanced biofuels to meet the advanced biofuel requirement. Therefore, the higher the BBD volume standard is, the lower the opportunity for other non-BBD advanced biofuels to compete for market share within the context of the advanced biofuel standard. When viewed in a long-term perspective, BBD can be seen as competing for research and development dollars with other types of advanced biofuels for participation as advanced biofuels in the RFS program.

Finally, NBB restated its argument that the EPA previously found statutory factors supported greater annual increases in BBD volume requirement for 2013 and the statutory factors analysis developed to justify the 2017 BBD and now the 2018 volume requirements contradicts the analysis EPA put forward in 2013. We disagree. As in 2013, we have determined that incremental increases in the 2018 BBD volume requirement are appropriate to provide continued support to the BBD industry. We did this in 2013, acknowledging the important role the industry thus far had played in providing advanced biofuels to the marketplace, and in furthering the GHG reduction objectives of the statute. We did not in 2013, and are not today, setting the BBD volume requirement at the maximum potential production volume of BBD.

VII. Percentage Standards for 2017

The renewable fuel standards are expressed as volume percentages and are used by each obligated party to determine their Renewable Volume Obligations (RVOs). Since there are four separate standards under the RFS program, there are likewise four separate RVOs applicable to each obligated party. Each standard applies to the sum of all non-renewable gasoline and diesel produced or imported. The percentage standards are set so that if every obligated party meets the percentages by acquiring and retiring an appropriate number of RINs, then the amount of renewable fuel, cellulosic biofuel, biomass-based diesel (BBD), and advanced biofuel used will meet the

[203] ''Memorandum to docket: Final Statutory Factors Assessment for the 2018 Biomass-Based Diesel (BBD) Applicable Volumes.''

[204] Renewable Fuel Standard Program: Standards for 2014, 2015, and 2016 and Biomass-Based Diesel Volume for 2017; Final Rule. 80 FR 77420.

[205] The possibility for competition between BBD and other types of advanced biofuels is not precluded by our setting the advanced biofuel requirement at a level that reflects reasonably attainable volumes of all advanced biofuel types, or by our setting the total renewable fuel volume requirement at a level that also reflects the reasonably achievable volume of all fuel types. Any of our estimates related to a particular fuel type could prove to be either an over or under estimate. We are confident that the sum of all individual estimates used in setting the applicable volumes for 2017 as well as the 2018 BBD volume requirement at an appropriate level are reasonable, and more accurate than our individual estimates for any particular fuel type. It is at the margin where our estimates regarding production and import of individual fuel types may be in error that competition between qualifying fuels can take place.

applicable volume requirements on a nationwide basis.

Sections III through V provide our rationale and basis for the volume requirements for 2017.[206] The volumes used to determine the percentage standards are shown in Table VII–1.

TABLE VII–1—VOLUMES FOR USE IN SETTING THE 2017 APPLICABLE PERCENTAGE STANDARDS

[Billion gallons]

Cellulosic biofuel	0.311
Biomass-based diesel [a]	2.00
Advanced biofuel	4.28
Renewable fuel	19.28

[a] Represents physical volume.

For the purposes of converting these volumes into percentage standards, we generally use two decimal places to be consistent with the volume targets as given in the statute, and similarly two decimal places in the percentage standards. However, for cellulosic biofuel we use three decimal places in both the volume requirement and percentage standards to more precisely capture the smaller volume projections and the unique methodology that in some cases results in estimates of only a few million gallons for a single producer.

A. Calculation of Percentage Standards

The formulas used to calculate the percentage standards applicable to producers and importers of gasoline and diesel are provided in § 80.1405. The formulas rely on estimates of the volumes of gasoline and diesel fuel, for both highway and nonroad uses, which are projected to be used in the year in which the standards will apply. The projected gasoline and diesel volumes are provided by EIA, and include ethanol and biodiesel used in transportation fuel. Since the percentage standards apply only to the non-renewable gasoline and diesel produced or imported, the volumes of ethanol and biodiesel are subtracted out of the EIA projections of gasoline and diesel.

Transportation fuels other than gasoline or diesel, such as natural gas, propane, and electricity from fossil fuels, are not currently subject to the standards, and volumes of such fuels are not used in calculating the annual percentage standards. Since under the regulations the standards apply only to producers and importers of gasoline and diesel, these are the transportation fuels used to set the percentage standards, as well as to determine the annual volume obligations of an individual gasoline or diesel producer or importer.

As specified in the March 26, 2010 RFS2 final rule, the percentage standards are based on energy-equivalent gallons of renewable fuel, with the cellulosic biofuel, advanced biofuel, and total renewable fuel standards based on ethanol equivalence and the BBD standard based on biodiesel equivalence. However, all RIN generation is based on ethanol-equivalence. For example, the RFS regulations provide that production or import of a gallon of qualifying biodiesel will lead to the generation of 1.5 RINs. The formula specified in the regulations for calculation of the BBD percentage standard is based on biodiesel-equivalence, and thus assumes that all BBD used to satisfy the BBD standard is biodiesel and requires that the applicable volume requirement be multiplied by 1.5. However, BBD often contains some renewable diesel, and a gallon of renewable diesel typically generates 1.7 RINs.[207] In addition, there is often some renewable diesel in the conventional renewable fuel pool. As a result, the actual number of RINs generated by biodiesel and renewable diesel is used in the context of our assessing reasonably attainable volumes for purposes of deriving the applicable volume requirements and associated percentage standards for advanced biofuel and total renewable fuel, and likewise in obligated parties' determination of compliance with any of the applicable standards. While there is a difference in the treatment of biodiesel + renewable diesel in the context of determining the percentage standard for BBD versus determining the percentage standard for advanced biofuel and total renewable fuel, it is not a significant one given our approach to determining the BBD volume requirement; o. Our intent in setting the BBD applicable volume is to provide an additional increment of guaranteed volume for BBD, but as described in Section VI.B, we do not expect the BBD standard to be binding. That is, we expect that actual supply of BBD, as well as supply of conventional biodiesel + renewable diesel, will be driven by the advanced biofuel and total renewable fuel standards.

B. Small Refineries and Small Refiners

In CAA section 211(o)(9), enacted as part of the Energy Policy Act of 2005, and amended by the Energy Independence and Security Act of 2007, Congress provided a temporary exemption to small refineries [208] through December 31, 2010. Congress provided that small refineries could receive a temporary extension of the exemption beyond 2010 based either on the results of a required DOE study, or based on an EPA determination of ''disproportionate economic hardship'' on a case-by-case basis in response to small refinery petitions. In reviewing petitions, EPA, in consultation with the Department of Energy, evaluates the impacts petitioning refineries would likely face in achieving compliance with the RFS requirements and how compliance would affect their ability to remain competitive and profitable.

EPA has granted some exemptions pursuant to this process in the past. However, at this time, no exemptions have been approved for 2017, and therefore we have calculated the percentage standards for this year without an adjustment for exempted volumes. Any requests for exemptions for 2017 that are approved after the final rule is released will not be reflected in the percentage standards that apply to all gasoline and diesel produced or imported in 2017. As stated in the final rule establishing the 2011 standards, ''EPA believes the Act is best interpreted to require issuance of a single annual standard in November that is applicable in the following calendar year, thereby providing advance notice and certainty to obligated parties regarding their regulatory requirements. Periodic revisions to the standards to reflect waivers issued to small refineries or refiners would be inconsistent with the statutory text, and would introduce an undesirable level of uncertainty for obligated parties.'' [209]

C. Final Standards

The formulas in § 80.1405 for the calculation of the percentage standards require the specification of a total of 14 variables covering factors such as the renewable fuel volume requirements, projected gasoline and diesel demand for all states and territories where the RFS program applies, renewable fuels projected by EIA to be included in the gasoline and diesel demand, and exemptions for small refineries. The values of all the variables used for this final rule are shown in Table VII.C–1.[210]

[206] The 2017 volume requirement for BBD was established in the 2014–2016 final rule.

[207] Although in some cases a gallon of renewable diesel generates either 1.5 or 1.6 RINs.

[208] A small refiner that meets the requirements of 40 CFR 80.1442 may also be eligible for an exemption.

[209] See 75 FR 76804 (December 9, 2010).

[210] To determine the 49-state values for gasoline and diesel, the amounts of these fuels used in Alaska is subtracted from the totals provided by DOE. The Alaska fractions are determined from the

TABLE VII.C–1—VALUES FOR TERMS IN CALCULATION OF THE 2017 STANDARDS [211]

[Billion gallons]

Term	Description	Value
RFV_{CB}	Required volume of cellulosic biofuel	0.311
RFV_{BBD}	Required volume of biomass-based diesel	2.00
RFV_{AB}	Required volume of advanced biofuel	4.28
RFV_{RF}	Required volume of renewable fuel	19.28
G	Projected volume of gasoline	143.61
D	Projected volume of diesel	53.15
RG	Projected volume of renewables in gasoline	14.35
RD	Projected volume of renewables in diesel	2.28
GS	Projected volume of gasoline for opt-in areas	0.00
RGS	Projected volume of renewables in gasoline for opt-in areas	0.00
DS	Projected volume of diesel for opt-in areas	0.00
RDS	Projected volume of renewables in diesel for opt-in areas	0.00
GE	Projected volume of gasoline for exempt small refineries	0.00
DE	Projected volume of diesel for exempt small refineries	0.00

Projected volumes of gasoline and diesel, and the renewable fuels contained within them, were provided by EIA and are consistent with the October, 2016 version of EIA's Short-Term Energy Outlook (STEO).[212] These projections reflect EIA's judgment of future demand volumes in 2017, accounting for the low oil price environment in 2016.

Using the volumes shown in Table VII.C–1, we have calculated the percentage standards for 2017 as shown in Table VII.C–2.

TABLE VII.C–2—FINAL PERCENTAGE STANDARDS FOR 2017

Cellulosic biofuel	0.173
Biomass-based diesel	1.67
Advanced biofuel	2.38
Renewable fuel	10.70

VIII. Assessment of Aggregate Compliance

A. Assessment of the Domestic Aggregate Compliance Approach

The RFS2 regulations contain a provision for renewable fuel producers who use planted crops and crop residue from U.S. agricultural land that relieves them of the individual recordkeeping and reporting requirements concerning the specific land from which their feedstocks were harvested. To enable this approach, EPA established a baseline number of acres for U.S. agricultural land in 2007 (the year of EISA enactment) and determined that as long as this baseline number of acres was not exceeded, it was unlikely that new land outside of the 2007 baseline would be devoted to crop production based on historical trends and economic considerations. We therefore provided that renewable fuel producers using planted crops or crop residue from the U.S. as feedstock in renewable fuel production need not comply with the individual recordkeeping and reporting requirements related to documenting that their feedstocks are renewable biomass, unless EPA determines through one of its annual evaluations that the 2007 baseline acreage of 402 million acres agricultural land has been exceeded.

In the final RFS2 regulations, EPA committed to make an annual finding concerning whether the 2007 baseline amount of U.S. agricultural land has been exceeded in a given year. If the baseline is found to have been exceeded, then producers using U.S. planted crops and crop residue as feedstocks for renewable fuel production would be required to comply with individual recordkeeping and reporting requirements to verify that their feedstocks are renewable biomass.

The Aggregate Compliance methodology provided for the exclusion of acreage enrolled in the Grassland Reserve Program (GRP) and the Wetlands Reserve Program (WRP) from the estimated total U.S. agricultural land. However, the 2014 Farm Bill terminated the GRP and WRP as of 2013 and USDA established the Agriculture Conservation Easement Program (ACEP) with wetlands and land easement components. The ACEP provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits. Under the Agricultural Land Easements (ACEP–ALE) component, USDA helps Indian tribes, state and local governments and non-governmental organizations protect working agricultural lands and limit non-agricultural uses of the land. Under the Wetlands Reserve Easements (ACEP–WRE) component, USDA helps to restore, protect and enhance enrolled wetlands. The WRP was a voluntary program that offered landowners the opportunity to protect, restore, and enhance wetlands on their property. The GRP was a voluntary conservation program the emphasized support for working grazing operations, enhancement of plant and animal biodiversity, and protection of grassland under threat of conversion to other uses.

USDA and EPA concur that the ACEP–WRE and ACEP–ALE represent a continuation in basic objectives and goals of the original WRP and GRP. Therefore, it was assumed in this rulemaking that acreage enrolled in the easement programs would represent a reasonable proxy of WRP and GRP acreage and was excluded when estimating total U.S. agricultural land.

Based on data provided by the USDA Farm Service Agency (FSA) and Natural Resources Conservation Service (NRCS), we have estimated that U.S. agricultural land reached approximately 380 million acres in 2016, and thus did not exceed the 2007 baseline acreage. This acreage estimate is based on the same methodology used to set the 2007 baseline acreage for U.S. agricultural land in the RFS2 final rulemaking, with the GRP and WRP substitution as noted above. Specifically, we started with FSA crop history data for 2016, from which we derived a total estimated acreage of 380,429,574 acres. We then subtracted the ACEP–ALE and ACEP–WRE enrolled areas by the end of Fiscal Year 2016, 313,284 acres, to yield an estimate

June 29, 2016 EIA State Energy Data System (SEDS), Energy Consumption Estimates.

[211] See ''Calculation of final % standards for 2017'' in docket EPA–HQ–OAR–2016–0004.

[212] ''EIA projections of transportation fuel for 2017,'' docket EPA–HQ–OAR–2016–0004.

of approximately 380 million acres of U.S. agricultural land in 2016. Note that these programs were still in place in 2016. The USDA data used to make this derivation can be found in the docket to this rule.[213]

B. Assessment of the Canadian Aggregate Compliance Approach

On March 15, 2011, EPA issued a notice of receipt of and solicited public comment on a petition for EPA to authorize the use of an aggregate approach for compliance with the Renewable Fuel Standard renewable biomass requirements, submitted by the Government of Canada. The petition requested that EPA determine that an aggregate compliance approach will provide reasonable assurance that planted crops and crop residue from Canada meet the definition of renewable biomass. After thorough consideration of the petition, all supporting documentation provided and the public comments received, EPA determined that the criteria for approval of the petition were satisfied and approved the use of an aggregate compliance approach to renewable biomass verification for planted crops and crop residue grown in Canada.

The Government of Canada utilized several types of land use data to demonstrate that the land included in their 124 million acre baseline is cropland, pastureland or land equivalent to U.S. Conservation Reserve Program land that was cleared or cultivated prior to December 19, 2007, and was actively managed or fallow and non-forested on that date (and is therefore RFS2 qualifying land). The total agricultural land in Canada in 2016 is estimated at 118.4 million acres. This total agricultural land area includes 94.6 million acres of cropland and summer fallow, 14.0 million acres of pastureland and 9.8 million acres of agricultural land under conservation practices. This acreage estimate is based on the same methodology used to set the 2007 baseline acreage for Canadian agricultural land in the RFS2 response to petition. The trigger point for further evaluation of the data for subsequent years, provided by Canada, is 124 million acres. The data used to make this calculation can be found in the docket to this rule.

[213] For the first time since 2013, USDA provided EPA with data on legacy acreage still covered by the discontinued GRP and WRP. Given this new data, EPA also estimated the total U.S. agricultural land taking the GRP and WRP acreage into account. In 2016, combined land under GRP and WRP totaled 2,966,122 acres. Factoring in the GRP, WRP, ACEP–WRE, and ACEP–ALE data yields an estimate of 377,150,168 acres or approximately 377 million total acres of U.S. agricultural land in 2016.

IX. Public Participation

Many interested parties participated in the rulemaking process that culminates with this final rule. This process provided opportunity for submitting written public comments following the proposal that we published on May 31, 2016 (81 FR 34778), and we also held a public hearing on June 9, 2016, at which many parties provided both verbal and written testimony. All comments received, both verbal and written, are available in EPA docket EPA–HQ–OAR–2016–0004 and we considered these comments in developing the final rule. Public comments and EPA responses are discussed throughout this preamble and in the accompanying RTC document, which is available in the docket for this action.

X. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

This action is an economically significant regulatory action that was submitted to the Office of Management and Budget (OMB) for review. Any changes made in response to OMB recommendations have been documented in the docket. The EPA prepared an analysis of illustrative costs associated with this action. This analysis is presented in Section V.D of this preamble.

B. Paperwork Reduction Act (PRA)

This action does not impose any new information collection burden under the PRA. OMB has previously approved the information collection activities contained in the existing regulations and has assigned OMB control numbers 2060–0637 and 2060–0640. The final standards will not impose new or different reporting requirements on regulated parties than already exist for the RFS program.

C. Regulatory Flexibility Act (RFA)

I certify that this action will not have a significant economic impact on a substantial number of small entities under the RFA. In making this determination, the impact of concern is any significant adverse economic impact on small entities. An agency may certify that a rule will not have a significant economic impact on a substantial number of small entities if the rule relieves regulatory burden, has no net burden, or otherwise has a positive economic effect on the small entities subject to the rule.

The small entities directly regulated by the RFS program are small refiners, which are defined at 13 CFR 121.201. We have evaluated the impacts of this final rule on small entities from two perspectives: As if the 2017 standards were a standalone action or if they are a part of the overall impacts of the RFS program as a whole.

When evaluating the standards as if they were a standalone action separate and apart from the original rulemaking which established the RFS2 program, then the standards could be viewed as increasing the volumes required of obligated parties between 2016 and 2017. To evaluate this rule from this perspective, EPA has conducted a screening analysis[214] to assess whether it should make a finding that this action would not have a significant economic impact on a substantial number of small entities. Currently-available information shows that the impact on small entities from implementation of this rule would not be significant. EPA has reviewed and assessed the available information, which suggests that obligated parties, including small entities, are generally able to recover the cost of acquiring the RINs necessary for compliance with the RFS standards through higher sales prices of the petroleum products they sell than would be expected in the absence of the RFS program.[215] [216] This is true whether they acquire RINs by purchasing renewable fuels with attached RINs or purchase separated RINs. Even if we were to assume that the cost of acquiring RINs were not recovered by obligated parties, and we used the maximum values of the illustrative costs discussed in Section V.D and the gasoline and diesel fuel volume projections and wholesale prices from the October 2016 version of EIA's Short-Term Energy Outlook, and current wholesale fuel prices, a cost-to-sales ratio test shows that the costs to small entities of the RFS standards are far less than 1% of the value of their sales.

[214] ''Updated Screening Analysis for the Final Renewable Fuel Standard Program Renewable Volume Obligations for 2017'', memorandum from Dallas Burkholder and Tia Sutton to EPA Air Docket EPA–HQ–OAR–2016–0004.

[215] For a further discussion of the ability of obligated parties to recover the cost of RINs see ''A Preliminary Assessment of RIN Market Dynamics, RIN Prices, and Their Effects,'' Dallas Burkholder, Office of Transportation and Air Quality, US EPA. May 14, 2015, EPA Air Docket EPA–HQ–OAR–2015–0111.

[216] Knittel, Christopher R., Ben S. Meiselman, and James H. Stock. ''The Pass-Through of RIN Prices to Wholesale and Retail Fuels under the Renewable Fuel Standard.'' Working Paper 21343. NBER Working Paper Series. Available online *http://www.nber.org/papers/w21343.pdf.*

While the screening analysis described above supports a certification that this rule would not have a significant economic impact on small refiners, we continue to believe that it is more appropriate to consider the standards as a part of ongoing implementation of the overall RFS program. When considered this way, the impacts of the RFS program as a whole on small entities were addressed in the RFS2 final rule (75 FR 14670, March 26, 2010), which was the rule that implemented the entire program required by the Energy Independence and Security Act of 2007 (EISA 2007). As such, the Small Business Regulatory Enforcement Fairness Act (SBREFA) panel process that took place prior to the 2010 rule was also for the entire RFS program and looked at impacts on small refiners through 2022.

For the SBREFA process for the RFS2 final rule, EPA conducted outreach, fact-finding, and analysis of the potential impacts of the program on small refiners, which are all described in the Final Regulatory Flexibility Analysis, located in the rulemaking docket (EPA–HQ–OAR–2005–0161). This analysis looked at impacts to all refiners, including small refiners, through the year 2022 and found that the program would not have a significant economic impact on a substantial number of small entities, and that this impact was expected to decrease over time, even as the standards increased. For gasoline and/or diesel small refiners subject to the standards, the analysis included a cost-to-sales ratio test, a ratio of the estimated annualized compliance costs to the value of sales per company. From this test, it was estimated that all directly regulated small entities would have compliance costs that are less than one percent of their sales over the life of the program (75 FR 14862).

We have determined that this final rule will not impose any additional requirements on small entities beyond those already analyzed, since the impacts of this final rule are not greater or fundamentally different than those already considered in the analysis for the RFS2 final rule assuming full implementation of the RFS program. As shown above in Tables I–1 and I.A–1 (and discussed further in Sections III, IV, and V), this rule establishes the 2017 volume requirements for cellulosic biofuel, advanced biofuel, and total renewable fuel at levels significantly below the statutory volume targets. This exercise of EPA's waiver authority reduces burdens on small entities, as compared to the burdens that would be imposed under the volumes specified in the Clean Air Act in the absence of waivers—which are the volumes that we assessed in the screening analysis that we prepared for implementation of the full program. Regarding the biomass-based diesel standard, we are increasing the volume requirement for 2018 over the statutory minimum value of 1 billion gallons. However, this is a nested standard within the advanced biofuel category, which we are significantly reducing from the statutory volume targets. As discussed in Section VI, we are setting the 2018 biomass-based diesel volume requirement at a level below what is anticipated will be produced and used to satisfy the reduced advanced biofuel requirement. The net result of the standards being established in this action is a reduction in burden as compared to implementation of the statutory volume targets, as was assumed in the RFS2 final rule analysis.

While the rule will not have a significant economic impact on a substantial number of small entities, there are compliance flexibilities in the program that can help to reduce impacts on small entities. These flexibilities include being able to comply through RIN trading rather than renewable fuel blending, 20% RIN rollover allowance (up to 20% of an obligated party's RVO can be met using previous-year RINs), and deficit carry-forward (the ability to carry over a deficit from a given year into the following year, providing that the deficit is satisfied together with the next year's RVO). In the RFS2 final rule, we discussed other potential small entity flexibilities that had been suggested by the SBREFA panel or through comments, but we did not adopt them, in part because we had serious concerns regarding our authority to do so.

Additionally, as we realize that there may be cases in which a small entity experiences hardship beyond the level of assistance afforded by the program flexibilities, the program provides hardship relief provisions for small entities (small refiners), as well as for small refineries.[217] As required by the statute, the RFS regulations include a hardship relief provision (at 40 CFR 80.1441(e)(2)) that allows for a small refinery to petition for an extension of its small refinery exemption at any time based on a showing that compliance with the requirements of the RFS program would result in the refinery experiencing a ''disproportionate economic hardship.'' EPA regulations provide similar relief to small refiners that are not eligible for small refinery relief. A small refiner may petition for a small refiner exemption based on a similar showing that compliance with the requirements of the RFS program would result in the refiner experiencing a ''disproportionate economic hardship'' (see 40 CFR 80.1442(h)). EPA evaluates these petitions on a case-by-case basis and may approve such petitions if it finds that a disproportionate economic hardship exists. In evaluating such petitions, EPA consults with the U.S. Department of Energy, and takes the findings of DOE's 2011 Small Refinery Study and other economic factors into consideration. EPA successfully implemented these provisions by evaluating petitions for exemption from 13 small refineries for the 2014 RFS standards.

Given that this final rule will not impose additional requirements on small entities, would decrease burden via a reduction in required volumes as compared to statutory volume targets, would not change the compliance flexibilities currently offered to small entities under the RFS program (including the small refinery hardship provisions we continue to successfully implement), and available information shows that the impact on small entities from implementation of this rule would not be significant viewed either from the perspective of it being a standalone action or a part of the overall RFS program, we have therefore concluded that this action would have no net regulatory burden for directly regulated small entities.

D. Unfunded Mandates Reform Act (UMRA)

This final action contains a federal mandate under UMRA, 2 U.S.C. 1531–1538, that may result in expenditures of $100 million or more for state, local and tribal governments, in the aggregate, or the private sector in any one year. Accordingly, the EPA has prepared a written statement required under section 202 of UMRA. This statement is presented in Section V.D in the form of illustrative cost estimates of the 2017 RFS standards. This action implements mandates specifically and explicitly set forth in CAA section 211(o) and we believe that this action represents the least costly, most cost-effective approach to achieve the statutory requirements of the rule.

This action is not subject to the requirements of section 203 of UMRA because it contains no regulatory requirements that might significantly or uniquely affect small governments.

[217] See CAA section 211(o)(9)(B).

E. Executive Order 13132: Federalism

This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

This action does not have tribal implications as specified in Executive Order 13175. This final rule will be implemented at the Federal level and affects transportation fuel refiners, blenders, marketers, distributors, importers, exporters, and renewable fuel producers and importers. Tribal governments would be affected only to the extent they produce, purchase, and use regulated fuels. Thus, Executive Order 13175 does not apply to this action.

G. Executive Order 13045: Protection of Children From Environmental Health Risks and Safety Risks

The EPA interprets Executive Order 13045 as applying only to those regulatory actions that concern environmental health or safety risks that the EPA has reason to believe may disproportionately affect children, per the definition of ''covered regulatory action'' in section 2–202 of the Executive Order. This action is not subject to Executive Order 13045 because it implements specific standards established by Congress in statutes (CAA section 211(o)) and does not concern an environmental health risk or safety risk.

H. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use

This action is not a ''significant energy action'' because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. This action establishes the required renewable fuel content of the transportation fuel supply for 2017, consistent with the CAA and waiver authorities provided therein. The RFS program and this rule are designed to achieve positive effects on the nation's transportation fuel supply, by increasing energy independence and lowering lifecycle greenhouse gas emissions of transportation fuel.

I. National Technology Transfer and Advancement Act (NTTAA)

This rulemaking does not involve technical standards.

J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations, and Low-Income Populations

The EPA believes that this action does not have disproportionately high and adverse human health or environmental effects on minority populations, low-income populations, and/or indigenous peoples, as specified in Executive Order 12898 (59 FR 7629, February 16, 1994). This final rule does not affect the level of protection provided to human health or the environment by applicable air quality standards. This action does not relax the control measures on sources regulated by the RFS regulations and therefore would not cause emissions increases from these sources.

K. Congressional Review Act (CRA)

This action is subject to the CRA, and the EPA will submit a rule report to each House of the Congress and to the Comptroller General of the United States. This action is a ''major rule'' as defined by 5 U.S.C. 804(2).

XI. Statutory Authority

Statutory authority for this action comes from section 211 of the Clean Air Act, 42 U.S.C. 7545. Additional support for the procedural and compliance related aspects of this final rule come from sections 114, 208, and 301(a) of the Clean Air Act, 42 U.S.C. 7414, 7542, and 7601(a).

List of Subjects in 40 CFR Part 80

Environmental protection, Administrative practice and procedure, Air pollution control, Diesel fuel, Fuel additives, Gasoline, Imports, Oil imports, Petroleum, Renewable fuel.

Dated: November 23, 2016.

Gina McCarthy,

Administrator.

For the reasons set forth in the preamble, EPA amends 40 CFR part 80 as follows:

PART 80—REGULATION OF FUELS AND FUEL ADDITIVES

■ 1. The authority citation for part 80 continues to read as follows:

Authority: 42 U.S.C. 7414, 7521, 7542, 7545, and 7601(a).

Subpart M—[Amended]

■ 2. Section 80.1405 is amended by adding new paragraph (a)(8) to read as follows:

§ 80.1405 What are the Renewable Fuel Standards?

(a) * * *

(8) *Renewable Fuel Standards for 2017.*

(i) The value of the cellulosic biofuel standard for 2017 shall be 0.173 percent.

(ii) The value of the biomass-based diesel standard for 2017 shall be 1.67 percent.

(iii) The value of the advanced biofuel standard for 2017 shall be 2.38 percent.

(iv) The value of the renewable fuel standard for 2017 shall be 10.70 percent.

* * * * *

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