ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 80

[EPA–HQ–OAR–2018–0167; FRL–9987–66–OAR]

RIN 2060–AT93

Renewable Fuel Standard Program: Standards for 2019 and Biomass-Based Diesel Volume for 2020

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 gasoline and diesel transportation fuel produced or imported in the year 2019. Relying on statutory waiver authority that is available when the projected cellulosic biofuel production volume is less than the applicable volume specified in the statute, EPA is establishing volume requirements for cellulosic biofuel, advanced biofuel, and total renewable fuel that are below the statutory volume targets. We are also establishing the applicable volume of biomass-based diesel for 2020.

DATES: This final rule is effective on February 11, 2019.

ADDRESSES: The EPA has established a docket for this action under Docket ID No. EPA–HQ–OAR–2018–0167. All documents in the docket are listed on the *https://www.regulations.gov* website. 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 is not available 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 affected categories include:

Category	NAICS [1] codes	SIC [2] codes	Examples of potentially affected 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).

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be affected by this action. This table lists the types of entities that EPA is now aware could potentially be affected by this action. Other types of entities not listed in the table could also be affected. To determine whether your entity would be affected by this action, you should carefully examine the applicability criteria in 40 CFR part 80. If you have any questions regarding the applicability of this 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. The statutory requirements for the RFS program were subsequently modified through the Energy Independence and Security Act of 2007 (EISA), leading to the publication of major revisions to the regulatory requirements on March 26, 2010.[1] EISA's stated goals include moving the United States (U.S.) toward ''greater energy independence and security [and] increase[ing] the production of clean renewable fuels.''[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 obligated parties must meet every year. In this action we are finalizing the applicable volumes for cellulosic biofuel, advanced biofuel, and total renewable fuel for 2019, and biomass-based diesel (BBD) for 2020.[3] We are also finalizing the annual percentage standards (also known as ''percent standards'') for cellulosic biofuel, BBD, advanced biofuel, and total renewable fuel that would apply to all gasoline and diesel produced or imported in 2019.[4]

Today, nearly all gasoline used for transportation purposes contains 10 percent ethanol (E10), and on average diesel fuel contains nearly 5 percent biodiesel and/or renewable diesel.[5] However, the market has fallen well short of the statutory volumes for cellulosic biofuel, resulting in shortfalls in the advanced biofuel and total renewable fuel volumes. In this action, we are finalizing a volume requirement for cellulosic biofuel at the level we project to be available for 2019, along with an associated applicable percentage standard. For advanced biofuel and total renewable fuel, we are finalizing reductions under the ''cellulosic waiver authority'' that would result in advanced biofuel and total renewable fuel volume requirements that are lower than the statutory targets by the same magnitude as the reduction in the cellulosic biofuel reduction. This would effectively maintain the implied statutory volumes for non-cellulosic advanced biofuel and conventional biofuel.[6]

The resulting final volume requirements for 2019 are shown in Table I–1 below. Relative to the levels finalized for 2018, the 2019 volume requirements for advanced biofuel and total renewable fuel would be higher by 630 million gallons. Approximately 130 million gallons of this increase would be due to the increase in the projected production of cellulosic biofuel in 2019 relative to 2018. The cellulosic biofuel volume is 37 million gallons greater than the proposed cellulosic biofuel volume for 2019. The advanced biofuel and total renewable fuel volumes are each 40 million gallons higher than the proposed volumes, as a result of an increased projection of cellulosic biofuel production in 2019 (see Section III for a further discussion of our cellulosic biofuel projection). We are also establishing the volume requirement for BBD for 2020 at 2.43 billion gallons. This volume is 330 million gallons higher than the volume for 2019.

TABLE I–1—FINAL VOLUME REQUIREMENTS [a]

	2018 [b]	2019 Statutory volumes	2019 Proposed volumes	2019 Final volumes	2020 Final volumes
Cellulosic biofuel (million gallons)	288	8,500	381	418	n/a
Biomass-based diesel (billion gallons)	2.1	≥1.0	N/A	[c] 2.1	[d] 2.43
Advanced biofuel (billion gallons)	4.29	13.00	4.88	4.92	n/a
Renewable fuel (billion gallons)	19.29	28.00	19.88	19.92	n/a

[a] All values are ethanol-equivalent on an energy content basis, except for BBD which is biodiesel-equivalent.
[b] The 2018 volume requirements for cellulosic biofuel, advanced biofuel, and renewable fuel were established in the 2018 final rule (82 FR 58486, December 12, 2017). The 2018 BBD volume requirement was established in the 2017 final rule (81 FR 89746, December 12, 2016).
[c] The 2019 BBD volume requirement was established in the 2018 final rule (82 FR 58486, December 12, 2017).
[d] EPA proposed 2.43 billion gallons of BBD in 2020 in the 2019 NPRM.

A. Summary of Major Provisions in This Action

This section briefly summarizes the major provisions of this final rule. We are finalizing applicable volume requirements and associated percentage standards for cellulosic biofuel, advanced biofuel, and total renewable fuel for 2019; for BBD we are finalizing the percentage standard for 2019 and the applicable volume requirement for 2020.

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

[2] Public Law 110–140, 121 Stat. 1492 (2007). Hereinafter, ''EISA.''

[3] The 2019 BBD volume requirement was established in the 2018 final rule.

[4] For a list of the statutory provisions for the determination of applicable volumes, see the 2018 final rule (82 FR 58486, December 12, 2017; Table I.A–2).

[5] Average biodiesel and/or renewable diesel blend percentages based on EIA's October 2018 Short Term Energy Outlook (STEO).

[6] The statutory total renewable fuel, advanced biofuel and cellulosic biofuel requirements for 2019 are 28.0, 13.0 and 8.5 billion gallons respectively. This implies a conventional renewable fuel applicable volume (the difference between the total renewable fuel and advanced biofuel volumes, which can be satisfied by with conventional (D6) RINs) of 15.0 billion gallons, and a non-cellulosic advanced biofuel applicable volume (the difference between the advanced biofuel and cellulosic biofuel volumes, which can be satisfied with advanced (D5) RINs) of 4.5 billion gallons.

1. Approach to Setting Volume Requirements

For advanced biofuel and total renewable fuel, we are finalizing reductions based on the ''cellulosic waiver authority'' that would result in advanced biofuel and total renewable fuel volume requirements that are lower than the statutory targets by the same magnitude as the reduction in the cellulosic biofuel applicable volume. This follows the same general approach as in the 2018 final rule. The volumes for cellulosic biofuel, advanced biofuel, and total renewable fuel exceed the required volumes for these fuel types in 2018.

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 Renewable Identification Numbers (RINs). Section III provides our assessment of the 2019 cellulosic biofuel volume, based on a projection of production that reflects a neutral aim at accuracy. Section IV describes our assessment of advanced biofuel and total renewable fuel. Finally, Section VI describes the 2020 BBD volume requirement, reflecting our analysis of a set of factors stipulated in CAA section 211(o)(2)(B)(ii).

2. Cellulosic Biofuel

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 this rule we are finalizing a cellulosic biofuel volume requirement of 418 million ethanol-equivalent gallons for 2019 based on our production projection. Our projection reflects consideration of the Energy Information Administration's (EIA) projection of cellulosic biofuel production in 2019; RIN generation data for past years and 2018 to date that is available to EPA through the EPA Moderated Transaction System (EMTS); the information we have received regarding individual facilities' capacities, production start dates, and biofuel production plans; a review of cellulosic biofuel production relative to EPA's projections in previous annual rules; and EPA's own engineering judgment. To project cellulosic biofuel production for 2019 we used the same basic methodology as in our proposed rule, described further in the 2018 final rule. However, we have used updated data to derive percentile values used in our production projection for liquid cellulosic biofuels and to derive the year-over-year change in the rate of production of compressed natural gas and liquified natural gas (CNG/LNG) derived from biogas that is used in the projection for CNG/LNG.

3. Advanced Biofuel

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.'' The conditions that caused us to reduce the 2018 volume requirement for advanced biofuel below the statutory target remain relevant in 2019. As for 2018, we investigated the projected availability of non-cellulosic advanced biofuels in 2019. We took into account the various constraints on the ability of the market to make advanced biofuels available, the ability of the standards we set to bring about market changes in the time available, the potential impacts associated with diverting biofuels and/or biofuel feedstocks from current uses to the production of advanced biofuel used in the U.S., the fact that the biodiesel tax credit is currently not available for 2019, the tariffs on imports of biodiesel from Argentina and Indonesia, as well as the cost of advanced biofuels. Based on these considerations we are reducing the statutory volume target for advanced biofuel by the same amount as we are reducing the statutory volume target for cellulosic biofuel. This results in an advanced biofuel volume requirement for 2019 of 4.92 billion gallons, which is 630 million gallons higher than the advanced biofuel volume requirement for 2018.

4. Total Renewable Fuel

We believe that the cellulosic waiver authority is best interpreted to require equal reductions in advanced biofuel and total renewable fuel. Consistent with our proposal, we are reducing total renewable fuel by the same as the reduction in advanced biofuel, such that the resulting implied volume requirement for conventional renewable fuel will be 15 billion gallons, the same as the implied volume requirement in the statute.

5. 2020 Biomass-Based Diesel

In EISA, Congress specified increasing applicable volumes of BBD through 2012. Beyond 2012 Congress stipulated that EPA, in coordination with DOE and USDA, was to establish the BBD volume taking into consideration implementation of the program during calendar years specified in the table in CAA 211(o)(B) and various specified factors, provided 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.[7] For 2016 and 2017, we set the BBD volume requirements at 1.9 and 2.0 billion gallons respectively. Finally, for 2018 and 2019 the BBD volume requirement was set at 2.1 billion gallons. In this rule we are finalizing an increase to the BBD volume for 2020 to 2.43 billion gallons.

Given current and recent market conditions, the advanced biofuel volume requirement is driving the production and use of biodiesel and renewable diesel volumes over and above volumes required through the separate BBD standard, and we expect this to continue. While EPA continues to believe it is appropriate to maintain the opportunity for other advanced biofuels to compete for market share, the vast majority of the advanced biofuel obligations in recent years have been satisfied with BBD. Thus, after a review of the implementation of the program to date and considering the statutory factors, we are establishing, in coordination with USDA and DOE, an applicable volume of BBD for 2020 of 2.43 billion gallons.[8]

6. Annual Percentage Standards

The renewable fuel standards are expressed as a volume percentage and are used by each refiner and importer of fossil-based gasoline or diesel to determine their renewable fuel volume obligations.

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

[7] 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.

[8] The final 330 million gallon increase for BBD would generate approximately 500 million RINs, due to the higher equivalence value of biodiesel (1.5 RINs/gallon) and renewable diesel (generally 1.7 RINs/gallon).

percentage standards are contained in the regulations at 40 CFR 80.1405. The percentage standards represent the ratio of the national applicable volume of renewable fuel volume to the national projected non-renewable gasoline and diesel volume less any gasoline and diesel attributable to small refineries granted an exemption prior to the date that the standards are set. The volume of transportation gasoline and diesel used to calculate the percentage standards was based on projections provided by EIA as required under the statute. The final applicable percentage standards for 2019 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 2019 PERCENTAGE STANDARDS

	Final percentage standards
Cellulosic biofuel	0.230
Biomass-based diesel	1.73
Advanced biofuel	2.71
Renewable fuel	10.97

B. RIN Market Operations

In the rulemaking notices proposing the 2018 and 2019 RFS volume requirements, we noted that various stakeholders had raised concerns regarding lack of transparency and potential manipulation in the RIN market. We asked for comment from the public on those issues, and received multiple suggestions from stakeholders in response. Since receiving those comments, we have continued to hold meetings with stakeholders on these topics, through which we have continued to hear various perspectives on RIN market operations and potential changes.

A number of the comments received in response to the 2019 Notice of Proposed Rulemaking (NPRM) suggested increasing the amount of data related to the RIN market that EPA makes publicly available. In response to these comments, we have made additional information available through our public website.[9] The website publishes data on a number of items of interest to stakeholders, including the number of small refinery exemption petitions received, granted, and denied by year; the fuel volume exempted by year; weekly volume-weighted average RIN prices by D-code;[10] and weekly aggregated RIN transaction volumes by D-code. We intend to update these data regularly going forward. We believe this additional information will increase the transparency of the RIN market, and improve EPA's administration of the RFS program.

We also received a number of comments on the potential impacts of changing the regulations related to who may purchase RINs, the duration for which RINs could be held, and other rules related to the buying, selling, or holding of RINs. On October 9, President Trump directed EPA to undertake a CAA rulemaking that would change certain elements of the RIN compliance system under the RFS program to improve both RIN market transparency and overall functioning of the RIN market. EPA is currently considering a number of regulatory reforms that could be included in the proposal, such as: Prohibiting entities other than obligated parties from purchasing separated RINs; requiring public disclosure when RIN holdings held by an individual actor exceed specified limits; limiting the length of time a non-obligated party can hold RINs; and changing the timelines that apply to obligated parties regarding when RINs must be retired for compliance purposes. We are not currently considering changing the point of obligation in the RFS program.[11] While we have determined that RIN market issues will be addressed separately and are not being considered as part of the present rulemaking, EPA will consider comments received on this topic on the proposed 2019 annual rule as we develop this separate action.

II. Authority and Need for Waiver of Statutory Applicable Volumes

The CAA provides EPA with the authority to enact volume requirements below the applicable volume targets specified in the statute under specific circumstances. This section discusses those authorities. As described in the executive summary, we are finalizing the volume requirement for cellulosic biofuel at the level we project to be available for 2019, and an associated applicable percentage standard. For advanced biofuel and total renewable fuel, we are establishing volume requirements and associated applicable percent standards, based on use of the ''cellulosic waiver authority'' that would result in advanced biofuel and total renewable fuel volume requirements that are lower than the statutory targets by the same magnitude as the reduction in the cellulosic biofuel reduction. This would effectively maintain the implied statutory volumes for non-cellulosic advanced biofuel and conventional renewable fuel.[12]

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 BBD 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, then EPA must reduce the applicable volume of cellulosic biofuel required to the projected production volume for that calendar year. In making this projection, EPA may not ''adopt a methodology in which the risk of overestimation is set deliberately to outweigh the risk of underestimation'' but must make a projection that ''takes neutral aim at accuracy.'' *API* v. *EPA,* 706 F.3d 474, 479, 476 (D.C. Cir. 2013). Pursuant to this provision, EPA has set the cellulosic biofuel requirement lower than the statutory volume for each year since 2010. As described in Section III.D, the projected volume of cellulosic biofuel production for 2019 is less than the 8.5 billion gallon volume target in the statute. Therefore, for 2019, we are requiring a cellulosic biofuel volume lower than the statutory applicable volume, in accordance with this provision.

CAA section 211(o)(7)(D)(i) also provides EPA with the authority to reduce the applicable volume of total renewable fuel and advanced biofuel in

[9] *https://www.epa.gov/fuels-registration-reporting-and-compliance-help/public-data-renewable-fuel-standard.*

[10] Each RIN has a ''D-code'' that identifies the category of fuel (D3 for cellulosic biofuel, D7 for cellulosic diesel, D4 for biomass-based diesel, D5 for advanced biofuel, or D6 for conventional biofuel) for which the RIN was generated.

[11] EPA previously considered, and ultimately denied, petitions for reconsideration of the point of obligation in the RFS program. See ''Denial of Petitions for Rulemaking to Change the RFS Point of Obligation'' EPA–420–R–17–008, November 2017.

[12] See supra n. 6.

years when it reduces the applicable volume of cellulosic biofuel under that provision. The reduction must be less than or equal to the reduction in cellulosic biofuel. For 2019, we are reducing the applicable volumes of advanced biofuel and total renewable fuel under this authority.

EPA has used the cellulosic waiver authority to lower the cellulosic biofuel, advanced biofuel and total renewable fuel volumes every year since 2014. Further discussion of the cellulosic waiver authority, and EPA's interpretation of it, can be found in the preamble to the 2017 final rule.[13] See also *API* v. *EPA,* 706 F.3d 474 (D.C. Cir. 2013) (requiring that EPA's cellulosic biofuel projections reflect a neutral aim at accuracy); *Monroe Energy* v. *EPA,* 750 F.3d 909 (D.C. Cir. 2014) (affirming EPA's broad discretion under the cellulosic waiver authority to reduce volumes of advanced biofuel and total renewable fuel); *Americans for Clean Energy* v. *EPA* (''*ACE*''), 864 F.3d 691 (D.C. Cir. 2017) (discussed below).

In *ACE,* the court evaluated EPA's use of the cellulosic waiver authority in the 2014–2016 annual rulemaking to reduce the advanced biofuel and total renewable fuel volumes for 2014, 2015, and 2016. There, EPA used the cellulosic waiver authority to reduce the advanced biofuel volume to a level that was reasonably attainable, and then provided a comparable reduction under this authority for total renewable fuel.[14] The Court of Appeals for the District of Columbia, relying on the analysis in *Monroe Energy,* reaffirmed that EPA enjoys ''broad discretion'' under the cellulosic waiver authority ''to consider a variety of factors—including demand-side constraints in the advanced biofuels market.'' [15] The Court noted that the only textual limitation on the use of the cellulosic waiver authority is that it cannot exceed the amount of the reduction in cellulosic biofuel.[16] The Court contrasted the general waiver authority under CAA section 211(o)(7)(A) and the biomass based diesel waiver authority under CAA section 211(o)(7)(E), which ''detail the considerations and procedural steps that EPA must take before waiving fuel requirements,'' with the cellulosic waiver authority, which identifies no factors regarding reductions in advanced and total renewable fuel other than the limitation that any such reductions may not exceed the reduction in cellulosic biofuel volumes.[17] The Court also concluded that the scope of EPA's discretionary authority to reduce advanced and total volumes is the same under the cellulosic waiver provision whether EPA is declining to exercise its authority to waive volumes, or choosing to do so.[18]

In this action we are using the cellulosic waiver authority to reduce the statutory volume targets for advanced biofuels and total renewable fuel by equal amounts, consistent with our long-held interpretation of this provision and our approach in setting the 2014–2018 standards. This approach considers the Congressional objectives reflected in the volume tables in the statute, and the environmental objectives that generally favor the use of advanced biofuels over non-advanced biofuels. See 81 FR 89752–89753 (December 12, 2016). See also 78 FR 49809–49810 (August 15, 2013); 80 FR 77434 (December 14, 2015). We are concluding, as described in Section IV, that it is appropriate for EPA to reduce the advanced biofuel volume under the cellulosic waiver authority by the same quantity as the reduction in cellulosic biofuel, and to provide an equal reduction under the cellulosic waiver authority in the applicable volume of total renewable fuel. We are taking this action both because we do not believe that the statutory volumes can be achieved, and because we do not believe that backfilling of the shortfall in cellulosic with advanced biofuel would be appropriate due to high costs, as well as other factors such as feedstock switching and/or diversion of foreign advanced biofuels. The volumes of advanced and total renewable fuel resulting from this exercise of the cellulosic waiver authority provide for an implied volume allowance for conventional renewable fuel of 15 billion gallons, and an implied volume allowance for non-cellulosic advanced biofuel of 4.5 billion gallons, equal to the implied statutory volumes for 2019. We also believe that the volume of renewable fuel made available after reductions using the cellulosic waiver authority is attainable, as discussed in Section IV.

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 volumes specified in the Act in whole or in part based on a petition by one or more States, by any person subject to the requirements of the Act, or by the EPA Administrator on his 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.

EPA received comments suggesting that EPA should use the general waiver to further reduce volumes under findings of inadequate domestic supply, and/or severe harm to the economy or environment. Based on our review of the comments and updated data, and consistent with EPA's rationale and decisions in setting the 2018 standards, we decline to exercise our discretion to reduce volumes under the general waiver authority. Further discussion of these issues is found in the RTC document and a memorandum to the docket.[19]

B. Treatment of Carryover RINs

Consistent with our approach in the final rules establishing the RFS standards for 2013 through 2018, we have also considered the availability and role of carryover RINs in evaluating whether we should exercise our discretion to use our waiver authorities in setting the volume requirements for 2019. Neither the statute nor EPA regulations specify how or whether EPA should consider the availability of carryover RINs in exercising the cellulosic waiver authority.[20] As noted in the context of the rules establishing the RFS standards for 2014 through 2018, we believe that a bank of carryover RINs is extremely important

[13] See 81 FR 89752–89753 (December 12, 2016).

[14] See 80 FR 77433–34 (December 14, 2015).

[15] *ACE,* 864 F.3d at 730.

[16] *Id.* at 733.

[17] *Id.*

[18] *Id.* at 734.

[19] See ''Endangered Species Act No Effect Finding and Determination of Severe Environmental Harm under the General Waiver Authority for the 2019 Final Rule'' Memorandum from EPA Staff to EPA Docket EPA–HQ–OAR–2018–0167.

[20] 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 percent of the obligated party's renewable volume obligation (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 newer vintage RINs that are then held for use in the next year. For example, if the volume of the collective carryover RIN bank is to remain unchanged from 2017 to 2018, then all of the vintage 2017 carryover RINs must be used for compliance in 2018, or they will expire. However, the same volume of 2018 RINs can then be ''banked'' for use in 2019.

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.[21] 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.[22] 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 (2.666 billion RINs or approximately 16 percent of the total renewable fuel volume requirement for 2013), 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.[23] EPA's approach to the consideration of carryover RINs in exercising our cellulosic waiver authority was affirmed in *Monroe Energy* and *ACE*.[24]

An adequate RIN bank serves to make the RIN market liquid. 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 or other shortfalls in renewable fuel production or distribution relative to petroleum fuel supply, 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 RFS program. Moreover, a significant drawdown of the carryover RIN bank leading to a scarcity of RINs may stop the market from functioning in an efficient manner (*i.e.,* one in which there are a sufficient number of reasonably available RINs for obligated parties seeking to purchase them), 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.[25]

1. Carryover RIN Bank Size

At the time of the 2019 NPRM, we estimated that there were approximately 3.06 billion total carryover RINs available and proposed that carryover RINs should not be counted on to avoid or minimize the need to reduce the 2019 statutory volume targets. We also proposed that the 2019 volume should not be set at levels that would intentionally lead to a drawdown in the bank of carryover RINs (*e.g.,* volumes that were significantly beyond the market's ability to supply renewable fuels).[26]

Since that time, obligated parties have performed their attest engagements and submitted revised compliance reports for the 2017 compliance year and we now estimate that there are currently approximately 2.59 billion total carryover RINs available,[27] a decrease of 470 million RINs from the 3.06 billion total carryover RINs that were estimated to be available in the 2019 NPRM.[28] This decrease in the total carryover RIN bank compared to that projected in the 2019 NPRM results from various factors, including market factors, regulatory and enforcement actions, and judicial proceedings. This estimate also includes the millions of RINs that were not required to be retired by small refineries that were granted hardship exemptions in recent years,[29] along with the RINs that Philadelphia Energy Solutions Refining and Marketing, LLC (''PESRM'') was not required to retire as part of its bankruptcy settlement agreement.[30] This total volume of carryover RINs is approximately 13 percent of the total renewable fuel volume requirement that EPA is finalizing for 2019, which is less than the 20 percent maximum limit permitted by the regulations to be carried over for use in complying with the 2019 standards.[31]

The above discussion applies to total carryover RINs; we have also considered the available volume of advanced biofuel carryover RINs. At the time of the 2019 NPRM, we estimated that there were approximately 700 million advanced carryover RINs available. Since that time, obligated parties have performed their attest engagements and submitted revised compliance reports for the 2017 compliance year and we now estimate that there are currently approximately 600 million advanced carryover RINs available,[32] a decrease of 100 million RINs from the 700 million total carryover RINs that were estimated to be available in the 2019 NPRM.[33] This volume of advanced carryover RINs is approximately 12 percent of the advanced renewable fuel volume requirement that EPA is finalizing for 2019, which is less than the 20 percent maximum limit permitted by the regulations to be carried over for use in complying with the 2019 standards.[34]

However, there remains considerable uncertainty surrounding the number of carryover RINs that will be available for use in 2019 for a number of reasons, including the potential impact of any future action to address the remand in *ACE,* the possibility of additional small

[21] See 80 FR 77482–87 (December 14, 2015), 81 FR 89754–55 (December 12, 2016), and 82 FR 58493–95 (December 12, 2017).

[22] See 72 FR 23900 (May 1, 2007), 80 FR 77482–87 (December 14, 2015), 81 FR 89754–55 (December 12, 2016), and 82 FR 58493–95 (December 12, 2017).

[23] See 78 FR 49794–95 (August 15, 2013).

[24] *Monroe Energy* v. *EPA,* 750 F.3d 909 (D.C. Cir. 2014), *ACE,* 864 F.3d at 713.

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

[26] See 83 FR 32024 (July 10, 2018).

[27] The calculations performed to estimate the number of carryover RINs currently available can be found in the memorandum, ''Carryover RIN Bank Calculations for 2019 Final Rule,'' available in the docket.

[28] See ''Carryover RIN Bank Calculations for 2019 NPRM,'' Docket Item No. EPA–HQ–OAR–2018–0167–0043.

[29] Information about the number of small refinery exemptions granted and the volume of RINs not required to be retired as a result of those exemptions can be found at *https://www.epa.gov/fuels-registration-reporting-and-compliance-help/rfs-small-refinery-exemptions.*

[30] Per PESRM's bankruptcy filings, PESRM had an RVO of 467 million RINs for 2017 (including its deficit carryforward from 2016). Pursuant to the settlement agreement, which was based on the unique facts and circumstances present in this case, including the insolvency and risk of liquidation, PESRM agreed to retire 138 million RINs to meet its 2017 RVO and the portion of its 2018 RVO during the bankruptcy proceedings (approximately 97 million RINs). See docket for PES Holdings, LLC, 1:18bk10122, ECF Document Nos. 244 (proposed settlement agreement), 347 (United States' motion to approve proposed settlement agreement), 376 (order approving proposed settlement agreement), and 510 (Stipulation between the Debtors and the United States on behalf of the Environmental Protection Agency relating to Renewable Identification Number Retirement Deadlines under Consent Decree and Environmental Settlement Agreement) (Bankr. D. Del.). PESRM has emerged from bankruptcy and EPA does not anticipate further relief being granted under the RFS program.

[31] See 40 CFR 80.1427(a)(5).

[32] The calculations performed to estimate the number of carryover RINs currently available can be found in the memorandum, ''Carryover RIN Bank Calculations for 2019 Final Rule,'' available in the docket.

[33] See ''Carryover RIN Bank Calculations for 2019 NPRM,'' Docket Item No. EPA–HQ–OAR–2018–0167–0043.

[34] See 40 CFR 80.1427(a)(5).

refinery exemptions, and the impact of 2018 RFS compliance on the bank of carryover RINs. In addition, we note that there have been enforcement actions in past years that have resulted in the retirement of carryover RINs to make up for the generation and use of invalid RINs and/or the failure to retire RINs for exported renewable fuel. Future enforcement actions could have similar results, and require that obligated parties and/or renewable fuel exporters 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 2019. In light of these uncertainties, the net result could be a bank of total carryover RINs larger or smaller than 13 percent of the 2019 total renewable fuel volume requirement, and a bank of advanced carryover RINs larger or smaller than 12 percent of the 2019 advanced biofuel volume requirement.

2. EPA's Decision Regarding the Treatment of Carryover RINs

We have evaluated the volume of carryover RINs currently available and considered whether they would justify a reduced use of our cellulosic waiver authority in setting the 2019 volume requirements in order to intentionally draw down the carryover RIN bank. We also carefully considered the comments received, including comments on the role of carryover RINs under our waiver authorities and the policy implications of our decision.[35] For the reasons described throughout Section II.B, we do not believe we should intentionally draw down the bank of carryover RINs and limit the exercise of our cellulosic waiver authority. The current bank of carryover RINs provides an important and necessary programmatic buffer that will both facilitate individual compliance and provide for smooth overall functioning of the program. 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. Therefore, for the reasons noted above and consistent with the approach we took in the final rules establishing the RFS standards for 2014 through 2018, we have decided to maintain our proposed approach and are making a determination to not set the 2019 volume requirements at levels that would envision an intentional drawdown in the bank of carryover RINs. 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.

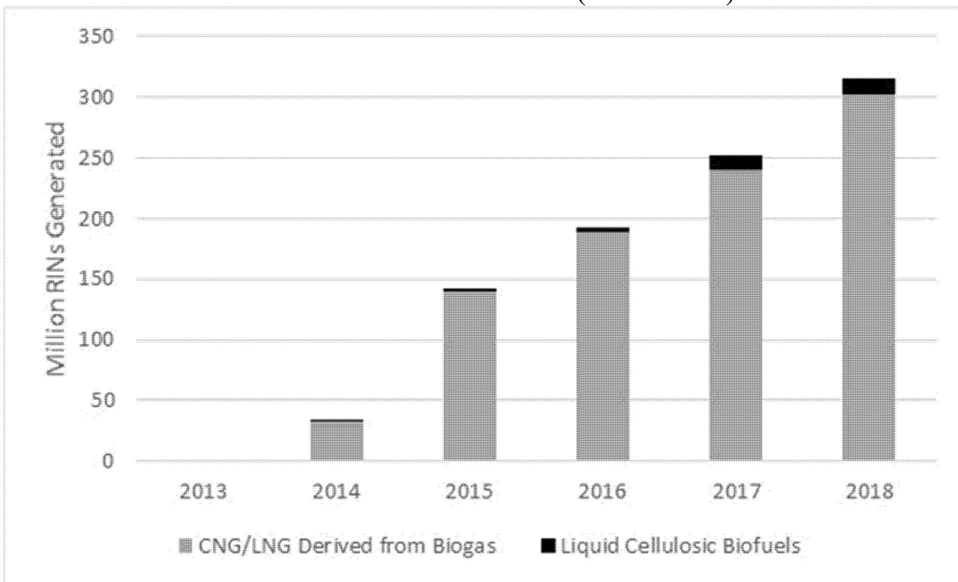
[35] In their comments on the 2019 NPRM, parties generally expressed two opposing points of view. Commenters representing obligated parties supported EPA's proposed decision to not assume a drawdown in the bank of carryover RINs in determining the appropriate volume requirements, reiterating the importance 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, stated that not accounting for carryover RINs goes against Congressional intent of the RFS program and deters investment in cellulosic and advanced biofuels. A full description of comments received, and our detailed responses to them, is available in the RTC document in the docket.

III. Cellulosic Biofuel Volume for 2019

In the past several years, production of cellulosic biofuel has continued to increase. Cellulosic biofuel production reached record levels in 2017, driven largely by CNG and LNG derived from biogas. Production volumes through September 2018 suggest production in 2018 will exceed production volumes in 2017.[36] Production of liquid cellulosic biofuel has also increased in recent years, even as the total production of liquid cellulosic biofuels remains much smaller than the production volumes of CNG and LNG derived from biogas. This section describes our assessment of the volume of cellulosic biofuel that we project will be produced or imported into the U.S. in 2019, and some of the uncertainties associated with those volumes.

[36] 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 municipal solid waste (MSW) digesters, and the cellulosic components of biomass processed in other waste digesters.

Figure III-1
Cellulosic RINs Generated (2013-2018)[a]



[a]Cellulosic RIN generation data from EMTS; 2018 volumes are projected based on data through September 2018

In order to project the volume of cellulosic biofuel production in 2019, we considered EIA's projection of cellulosic biofuel production in 2019, the accuracy of the methodologies used to project cellulosic biofuel production in previous years, data reported to EPA through EMTS, and information we collected through meetings with representatives of facilities that have produced or have the potential to produce qualifying volumes of cellulosic biofuel in 2019 for consumption as transportation fuel, heating oil, or jet fuel in the U.S.

There are two main elements to the cellulosic biofuel production projection: Liquid cellulosic biofuel and CNG/LNG derived from biogas. To project the range of potential production volumes of liquid cellulosic biofuel we used the same general methodology as the methodology used in the proposed rule, as well as the 2018 final rule. However, we have adjusted the percentile values used to select a point estimate within a projected production range for each group of companies based on updated information (through the end of September 2018) with the objective of improving the accuracy of the projections. To project the production of cellulosic biofuel RINs for CNG/LNG derived from biogas, we used the same general year-over-year growth rate methodology as in the 2019 proposed rule and 2018 final rule, with updated RIN generation data through September 2018. This methodology reflects the mature status of this industry, the large number of facilities registered to generate cellulosic biofuel RINs from these fuels, and EPA's continued attempts to refine its methodology to yield estimates that are as accurate as possible. This methodology is an improvement on the methodology that EPA used to project cellulosic biofuel production for CNG/LNG derived from biogas in the 2017 and previous years (see Section III.B below for a further discussion of the accuracy of EPA's methodology in previous years). The methodologies used to project the production of liquid cellulosic biofuels and cellulosic CNG/LNG derived from biogas are described in more detail in Sections III.D–1 and III.D–2 below.

The balance of this section is organized as follows. Section III.A provides a brief description of the statutory requirements. Section III.B reviews the accuracy of EPA's projections in prior years, and also discusses the companies the EPA assessed in the process of projecting qualifying cellulosic biofuel production in the U.S. in 2018 in Section III.B. Section III.C discusses EIA's projection of cellulosic biofuel production for 2019 and how this projection compares to EPA's projection. Section III.D discusses the methodologies used by EPA to project cellulosic biofuel production in 2019 and the resulting projection of 381 million ethanol-equivalent gallons.

A. Statutory Requirements

CAA section 211(o)(2)(B)(i)(III) states the statutory volume targets for cellulosic biofuel. The volume of cellulosic biofuel specified in the statute for 2019 is 8.5 billion gallons. The statute provides that if EPA determines, based on a letter provided to the EPA by EIA, that the projected volume of cellulosic biofuel production in a given year is less than the statutory volume, then EPA shall reduce the applicable volume of cellulosic biofuel to the projected volume available during that calendar year.[37]

In addition, if EPA reduces the required volume of cellulosic biofuel below the level specified in the statute, we may reduce the applicable volumes of advanced biofuels and total renewable fuel by the same or a lesser volume,[38] and we are also required to make cellulosic waiver credits

[37] CAA section 211(o)(7)(D)(i). The U.S. 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.'' *Id.* at 480, 479. EPA has consistently interpreted the term ''projected volume of cellulosic biofuel production'' in CAA section 211(o)(7)(D)(i) to include volumes of cellulosic biofuel likely to be made available in the U.S., including from both domestic production and imports (see 80 FR 77420 (December 14, 2015) and 81 FR 89746 (December 12, 2016)). We do not believe it would be reasonable to include in the projection all cellulosic biofuel produced throughout the world, regardless of likelihood of import to the U.S., since volumes that are not imported would not be available to obligated parties for compliance and including them in the projection would render the resulting volume requirement and percentage standards unachievable.

[38] CAA section 211(o)(7)(D)(i).

available.[39] Our consideration of the 2019 volume requirements for advanced biofuel and total renewable fuel is presented in Section IV.

B. Cellulosic Biofuel Industry Assessment

In this section, we first explain our general approach to assessing facilities or groups of facilities (which we collectively refer to as ''facilities'') that have the potential to produce cellulosic biofuel in 2019. We then review the accuracy of EPA's projections in prior years. Next, we discuss the criteria used to determine whether to include potential domestic and foreign sources of cellulosic biofuel in our projection for 2019. Finally, we provide a summary table of all facilities that we expect to produce cellulosic biofuel in 2019.

In order to project cellulosic biofuel production for 2019 we have tracked the progress of a number of potential cellulosic biofuel production facilities, located both in the U.S. and in foreign countries. 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 research and development (R&D) or pilot-scale facilities.[40] We considered a number of factors, including EIA's projection of cellulosic biofuel production in 2019, information from EMTS, the registration status of potential biofuel production facilities as cellulosic biofuel producers in the RFS program, publicly available information (including press releases and news reports), and information provided by representatives of potential cellulosic biofuel producers, in making our projection of cellulosic biofuel production for 2019. As discussed in greater detail below, our projection of liquid cellulosic biofuel is based on a facility-by-facility assessment of each of the likely sources of cellulosic biofuel in 2019, while our projection of CNG/LNG derived from biogas is based on an industry wide assessment. To make a determination of which facilities are most likely to produce liquid cellulosic biofuel and generate cellulosic biofuel RINs in 2019, each potential producer of liquid cellulosic biofuel was investigated further to determine the current status of its facilities and its likely cellulosic biofuel production and RIN generation volumes for 2019. Both in our discussions with representatives of individual companies 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.

1. Review of EPA's Projection of Cellulosic Biofuel in Previous Years

As an initial matter, it is useful to review the accuracy of EPA's past cellulosic biofuel projections. The record of actual cellulosic biofuel production and EPA's projected production volumes from 2015–2018 are shown in Table III.B–1 below. These data indicate that EPA's projection was lower than the actual number of cellulosic RINs made available in 2015,[41] higher than the actual number of RINs made available in 2016 and 2017, and lower than the actual number of RINs projected to be made available in 2018. The fact that the projections made using this methodology have been somewhat inaccurate, under-estimating the actual number of RINs made available in 2015 and 2018, and over-estimating in 2016 and 2017, reflects the inherent difficulty with projecting cellulosic biofuel production. It also emphasizes the importance of continuing to make refinements to our projection methodology in order to make our projections more accurate.

TABLE III.B.1–1—PROJECTED AND ACTUAL CELLULOSIC BIOFUEL PRODUCTION (2015–2018); MILLION GALLONS [a]

	Projected volume [b]			Actual production volume [c]		
	Liquid cellulosic biofuel	CNG/LNG derived from biogas	Total cellulosic biofuel [d]	Liquid cellulosic biofuel	CNG/LNG derived from biogas	Total cellulosic biofuel [d]
2015 [e]	2	33	35	0.5	52.8	53.3
2016	23	207	230	4.1	186.2	190.3
2017	13	298	311	11.8	239.5	251.3
2018 [f]	14	274	288	14.0	309.0	323.0

[a] As noted in Section III.A. above, EPA has consistently interpreted the term ''projected volume of cellulosic biofuel production'' to include volumes of cellulosic biofuel likely to be made available in the U.S., including from both domestic production and imports. The volumes in this table therefore include both domestic production of cellulosic biofuel and imported cellulosic biofuel.

[b] Projected volumes for 2015 and 2016 can be found in the 2014–2016 Final Rule (80 FR 77506, 77508, December 14, 2015); projected volumes for 2017 can be found in the 2017 Final Rule (81 FR 89760, December 12, 2016); projected volumes for 2018 can be found in the 2018 Final Rule (82 FR 58503, December 12, 2017).

[c] Actual production volumes are the total number of RINs generated minus the number of RINs retired for reasons other than compliance with the annual standards, based on EMTS data.

[d] Total cellulosic biofuel may not be precisely equal to the sum of liquid cellulosic biofuel and CNG/LNG derived from biogas due to rounding.

[e] Projected and actual volumes for 2015 represent only the final 3 months of 2015 (October–December) as EPA used actual RIN generation data for the first 9 months of the year.

[f] Actual production in 2018 is projected based on actual data from January–September 2018 and a projection of likely production for October–December 2018.

EPA's projections of liquid cellulosic biofuel were higher than the actual volume of liquid cellulosic biofuel produced each year from 2015 to 2017.[42] As a result of these over-projections, and in an effort to take into account the most recent data available and make the liquid cellulosic biofuel projections more accurate, EPA adjusted our methodology in the 2018 final

[39] See CAA section 211(o)(7)(D)(ii); 40 CFR 80.1456.

[40] For a further discussion of EPA's decision to focus on commercial scale facilities, rather than R&D and pilot scale facilities, see the 2019 proposed rule (83 FR 32031, July 10, 2018).

[41] EPA only projected cellulosic biofuel production for the final three months of 2015, since data on the availability of cellulosic biofuel RINs (D3+D7) for the first nine months of the year were available at the time the analyses were completed for the final rule.

[42] We note, however, that because the projected volume of liquid cellulosic biofuel in each year was very small relative to the total volume of cellulosic biofuel, these over-projections had a minimal impact on the accuracy of our projections of cellulosic biofuel for each of these years.

rule.[43] The adjustments to our methodology adopted in the 2018 final rule appear to have resulted in a projection that is very close to the volume of liquid cellulosic biofuel expected to be produced in 2018 based on data through September 2018. In this 2019 final rule we are again using percentile values based on actual production in previous years, relative to the projected volume of liquid cellulosic biofuel in these years (the approach first used in 2018). We have adjusted the percentile values to project liquid cellulosic biofuel production based on actual liquid cellulosic biofuel production in 2016 to 2018. Use of this updated data results in slightly different percentile values than we used to project production of liquid cellulosic biofuel in the 2019 proposed rule and the 2018 final rule. We believe that the use of the methodology (described in more detail in Section III.D.1 below), with the adjusted percentile values, results in a projection that reflects a neutral aim at accuracy since it accounts for expected growth in the near future by using historical data that is free of any subjective bias.

We next turn to the projection of CNG/LNG derived from biogas. For 2018, EPA for the first time used an industry-wide approach, rather than an approach that projects volumes for individual companies or facilities, to project the production of CNG/LNG derived from biogas. EPA used a facility-by-facility approach to project the production of CNG/LNG derived from biogas from 2015–2017. Notably this methodology resulted in significant over-estimates of CNG/LNG production in 2016 and 2017, leading EPA to develop the alternative industry wide projection methodology first used in 2018. This updated approach reflects the fact that this industry is far more mature than the liquid cellulosic biofuel industry, with a far greater number of potential producers of CNG/LNG derived from biogas. In such cases, industry-wide projection methods can be more accurate than a facility-by-facility approach, especially as macro market and economic factors become more influential on total production than the success or challenges at any single facility. The industry wide projection methodology slightly under-projected the production of CNG/LNG derived from biogas in 2018. However, the difference between the projected and actual production volume of these fuels was smaller than in 2017.

As described in Section III.D.2 below, EPA is again projecting production of CNG/LNG derived from biogas using the industry wide approach. We calculate a year-over-year rate of growth in the renewable CNG/LNG industry by comparing RIN generation for CNG/LNG derived from biogas from October 2016–September 2017 to the RIN generation for these same fuels from October 2017–September 2018 (the most recent month for which data are available). We then apply this year-over-year growth rate to the total number of cellulosic RINs generated and available to be used for compliance with the annual standards in 2017 to estimate the production of CNG/LNG derived from biogas in 2019.[44] We have applied the growth rate to the number of available 2017 RINs generated for CNG/LNG derived from biogas as data from this year allows us to adequately account for not only RIN generation, but also for RINs retired for reasons other than compliance with the annual standards. While more recent RIN generation data is available, the retirement of RINs for reasons other than compliance with the annual standards generally lags RIN generation, sometimes by up to a year or more.[45] Should this methodology continue to under predict in the future as it did in 2018, then we may need to revisit the methodology, but with only 2018 to compare to it is premature to make any adjustments.

2. Potential Domestic Producers

There are several companies and facilities[46] located in the U.S. 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 2019. The financial incentive provided by cellulosic biofuel RINs,[47] combined with the fact that to date nearly all cellulosic biofuel produced in the U.S. has been used domestically[48] and all the domestic facilities we have contacted in deriving our projections intend to produce fuel on a commercial scale for domestic consumption and plan to use approved pathways, gives us a high degree of confidence that cellulosic biofuel RINs will be generated for any fuel produced by domestic commercial scale facilities. To generate RINs, each of these facilities must be registered with EPA 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 domestic companies and facilities considered in our assessment of potential cellulosic biofuel producers in 2019 have already successfully completed facility registration, and have successfully generated RINs.[49] A brief description of each of the domestic companies (or group of companies for cellulosic CNG/LNG producers and the facilities using Edeniq's technology) that EPA believes may produce commercial-scale volumes of RIN generating cellulosic biofuel by the end of 2019 can be found in a memorandum to the docket for this final rule.[50] General information on each of these companies or group of companies considered in our projection of the potentially available volume of cellulosic biofuel in 2019 is summarized in Table III.B.3–1 below.

3. Potential Foreign Sources of Cellulosic Biofuel

In addition to the potential sources of cellulosic biofuel located in the U.S., there are several foreign cellulosic biofuel companies that may produce cellulosic biofuel in 2019. 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

[43] 82 FR 58486 (December 12, 2017).

[44] To project the volume of CNG/LNG derived from biogas in 2019 we multiply the number of 2017 RINs generated for these fuels and available to be used for compliance with the annual standards by the calculated growth rate to project production of these fuels in 2018, and then multiply the resulting number by the growth rate again to project the production of these fuels in 2019.

[45] We note that we do not ignore this more recent data, but rather use it to calculate the year-over-year growth rate used to project the production of CNG/LNG derived from biogas in 2019.

[46] The volume projection from CNG/LNG producers and facilities using Edeniq's production technology do not represent production from a single company or facility, but rather a group of facilities utilizing the same production technology.

[47] According to data from Argus Media, the price for 2018 cellulosic biofuel RINs averaged $2.40 in 2018 (through September 2018). Alternatively, obligated parties can satisfy their cellulosic biofuel obligations by purchasing an advanced (or biomass-based diesel) RIN and a cellulosic waiver credit. The price for 2017 advanced biofuel RINs averaged $0.55 in through September 2018 while the price for a 2018 cellulosic waiver credit is $1.96 (EPA–420–B–17–036).

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

[49] Most of the facilities listed in Table III.B.3–1 are registered to produce cellulosic (D3 or D7) RINs with the exception of several of the producers of CNG/LNG derived from biogas and Ensyn's Port-Cartier, Quebec facility.

[50] "Cellulosic Biofuel Producer Company Descriptions (November 2018)," memorandum from Dallas Burkholder to EPA Docket EPA–HQ–OAR–2018–0167.

companies would therefore be eligible to register their facilities under the RFS program and generate RINs for any qualifying fuel imported into the U.S. While these facilities may be able to generate RINs for any volumes of cellulosic biofuel they import into the U.S., demand for the cellulosic biofuels they produce is expected to be high in their own local markets.

EPA's projection of cellulosic biofuel production in 2019 includes cellulosic biofuel that is projected to be imported into the U.S. in 2019. For the purposes of this final rule we have considered all the registered foreign facilities under the RFS program to be potential sources of cellulosic biofuel in 2019. 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 U.S., cellulosic biofuel imports from foreign facilities not currently registered to generate cellulosic biofuel RINs are generally highly unlikely in 2019. For purposes of our 2019 cellulosic biofuel projection we have, with one exception (described below), excluded potential volumes from foreign cellulosic biofuel production facilities that are not currently registered under the RFS program.

Cellulosic biofuel produced at three foreign facilities (Ensyn's Renfrew facility, GranBio's Brazilian facility, and Raizen's Brazilian facility) generated cellulosic biofuel RINs for fuel exported to the U.S. in 2017 and/or 2018; projected volumes from each of these facilities are included in our projection of available volumes for 2019. EPA has also included projected volume from two additional foreign facilities. One of these facilities has completed the registration process as a cellulosic biofuel producer (Enerkem's Canadian facility). The other facility (Ensyn's Port-Cartier, Quebec facility), while not yet registered as a cellulosic biofuel producer, is owned by a Ensyn, a company that has previously generated cellulosic biofuel RINs using the same technology at a different facility. We believe that it is appropriate to include volume from these facilities in light of their proximity to the U.S., the proven technology used by these facilities, the volumes of cellulosic biofuel exported to the U.S. by the company in previous years (in the case of Ensyn), and the company's stated intentions to market fuel produced at these facilities to qualifying markets in the U.S. All of the facilities included in EPA's cellulosic biofuel projection for 2019 are listed in Table III.B.3–1 below.

4. Summary of Volume Projections for Individual Companies

General information on each of the cellulosic biofuel producers (or group of producers, for producers of CNG/LNG derived from biogas and producers of liquid cellulosic biofuel using Edeniq's technology) that factored into our projection of cellulosic biofuel production for 2019 is shown in Table III.B.3–1. This table includes both facilities that have already generated cellulosic RINs, as well as those that have not yet generated cellulosic RINs, but are projected to do so by the end of 2019. As discussed above, we have focused on commercial-scale cellulosic biofuel production facilities. Each of these facilities (or group of facilities) is discussed further in a memorandum to the docket.[51]

TABLE III.B.4–1—PROJECTED PRODUCERS OF CELLULOSIC BIOFUEL IN 2019

Company name	Location	Feedstock	Fuel	Facility capacity (million gallons per year) [52]	Construction start date	First production [53]
CNG/LNG Producers [54]	Various	Biogas	CNG/LNG	Various	Various	August 2014.
Edeniq	Various	Corn Kernel Fiber	Ethanol	Various	Various	October 2016.
Enerkem	Edmonton, AL, Canada	Separated MSW	Ethanol	10 [55]	2012	September 2017.[56]
Ensyn	Renfrew, ON, Canada	Wood Waste	Heating Oil	3	2005	2014.
Ensyn	Port-Cartier, QC, Canada	Wood Waste	Heating Oil	10.5	June 2016	January 2018.
GranBio	São Miguel dos Campos, Brazil.	Sugarcane bagasse	Ethanol	21	Mid 2012	September 2014.
Poet-DSM	Emmetsburg, IA	Corn Stover	Ethanol	20	March 2012	4Q 2015.
QCCP/Syngenta	Galva, IA	Corn Kernel Fiber	Ethanol	4	Late 2013	October 2014.
Raizen	Piracicaba City, Brazil	Sugarcane bagasse	Ethanol	11	January 2014	July 2015.

[51] "Cellulosic Biofuel Producer Company Descriptions (November 2018)," memorandum from Dallas Burkholder to EPA Docket EPA–HQ–OAR–2018–0167.

[52] The Facility Capacity is generally equal to the nameplate capacity provided to EPA by company representatives or found in publicly available information. Capacities are listed in physical gallons (rather than ethanol-equivalent gallons). 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 at the time of facility registration 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).

[53] 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.

[54] For more information on these facilities see "November 2018 Assessment of Cellulosic Biofuel Production from Biogas (2019)," memorandum from Dallas Burkholder to EPA Docket EPA–HQ–OAR–2018–0167.

[55] The nameplate capacity of Enerkem's facility is 10 million gallons per year. However, we anticipate that a portion of their feedstock will be non-biogenic MSW. RINs cannot be generated for the portion of the fuel produced from non-biogenic feedstocks. We have taken this into account in our production projection for this facility (See "November 2018 Liquid Cellulosic Biofuel Projections for 2018 CBI").

[56] This date reflects the first production of ethanol from this facility. The facility began production of methanol in 2015.

C. Projection From the Energy Information Administration

Section 211(o)(3)(A) of the CAA 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 12, 2018.[57] With regard to liquid cellulosic biofuel, the EIA estimated that the available volume in 2019 would be 10 million gallons.

In its letter, EIA did not identify the facilities on which their estimate of liquid cellulosic biofuel production was based. EIA did, however, indicate in the letter that it only included domestic production of cellulosic ethanol in their projections. These projections, therefore, do not include cellulosic biofuel produced by foreign entities and imported into the U.S., nor estimates of cellulosic heating oil or CNG/LNG produced from biogas, which together represent approximately 98 percent of our projected cellulosic biofuel volume for 2019. When limiting the scope of our projection to the companies assessed by EIA, we note that our volume projections are equal. EPA projects approximately 10 million gallons of liquid cellulosic biofuel will be produced domestically in 2019, all of which is expected to be cellulosic ethanol.

D. Cellulosic Biofuel Volume for 2019

1. Liquid Cellulosic Biofuel

For our 2019 liquid cellulosic biofuel projection, we use the same general approach as we have in projecting these volumes in previous years. We begin by first categorizing potential liquid cellulosic biofuel producers in 2019 according to whether or not they have achieved consistent commercial scale production of cellulosic biofuel to date. We refer to these facilities as consistent producers and new producers, respectively. Next, we define a range of likely production volumes for 2019 for each group of companies. Finally, we use a percentile value to project from the established range a single projected production volume for each group of companies in 2019. As in 2018, we calculated percentile values for each group of companies based on the past performance of each group relative to our projected production ranges. This methodology is briefly described here, and is described in detail in memoranda to the docket.[58]

We first separate the list of potential producers of cellulosic biofuel (listed in Table III.B.3–1) into two groups according to whether the facilities have achieved consistent commercial-scale production and cellulosic biofuel RIN generation. We next defined a range of likely production volumes for each group of potential cellulosic biofuel producers. For the final rule, we have updated the companies included in our projection, the categorization of these companies, and the low and high end of the potential production range for each company for 2019 based on updated information. 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 at the time our technical assessment was completed (October 2017–September 2018).[59] For potential producers that have not yet generated any cellulosic RINs, the low end of the range is zero. For the high end of the range, we considered a variety of factors, including the expected start-up date and ramp-up period, facility capacity, and the number of RINs the producer expects to generate in 2019.[60] The projected range for each group of companies is shown in Tables III.D.1–1 and III.D.1–2 below.[61]

TABLE III.D.1–1—2019 PRODUCTION RANGES FOR LIQUID CELLULOSIC BIOFUEL PRODUCERS WITHOUT CONSISTENT COMMERCIAL SCALE PRODUCTION

[Million ethanol-equivalent gallons]

Companies included	Low end of the range	High end of the range [a]
Enerkem, Ensyn (Port Cartier facility)	0	10

[a] Rounded to the nearest million gallons.

[57] ''EIA letter to EPA with 2019 volume projections 10–12–18,'' available in docket EPA–HQ–OAR–2018–0167.

[58] ''November 2018 Liquid Cellulosic Biofuel Projections for 2018 CBI'' and ''Calculating the Percentile Values Used to Project Liquid Cellulosic Biofuel Production for the 2019 FRM,'' memorandums from Dallas Burkholder to EPA Docket EPA–HQ–OAR–2018–0167.

[59] Consistent with previous years, we have considered whether there is reason to believe any of the facilities considered as potential cellulosic biofuel producers for 2019 is likely to produce a smaller volume of cellulosic biofuel in 2019 than in the previous 12 months for which data are available. At this time, EPA is not aware of any information that would indicate lower production in 2019 from any facility considered than in the previous 12 months for which data are available.

[60] As in our 2015–2018 projections, EPA calculated a high end of the range for each facility (or group of facilities) based on the expected start-up date and a six-month straight line ramp-up period. The high end of the range for each facility (or group of facilities) is equal to the value calculated by EPA using this methodology, or the number of RINs the producer expects to generate in 2019, whichever is lower.

[61] More information on the data and methods EPA used to calculate each of the ranges in these tables in contained in ''November 2018 Liquid Cellulosic Biofuel Projections for 2018 CBI'' memorandum from Dallas Burkholder to EPA Docket EPA–HQ–OAR–2018–0167. We have not shown the projected ranges for each individual company. This is because the high end of the range for some of these companies are based on the company's production projections, which they consider confidential business information (CBI). Additionally, the low end of the range for facilities that have achieved consistent commercial scale production is based on actual RIN generation data in the most recent 12 months, with is also claimed as CBI.

TABLE III.D.1–2—2019 PRODUCTION RANGES FOR LIQUID CELLULOSIC BIOFUEL PRODUCERS WITH CONSISTENT COMMERCIAL SCALE PRODUCTION

[Million ethanol-equivalent gallons]

Companies included	Low end of the range [a]	High end of the range [b]
Facilities using Edeniq's technology (registered facilities), Ensyn (Renfrew facility), Poet-DSM, GranBio, QCCP/Syngenta, Raizen	14	44

[a] Rounded to the nearest million gallons.

After defining likely production ranges for each group of companies, we next determined the percentile values to use in projecting a production volume for each group of companies. In this final rule we have calculated the percentile values using actual production data from January 2016 through September 2018 (the last month for which actual data is available) and projected production data for the remaining months of 2018 (October—December 2018). This approach is consistent with the approach taken in the 2018 final rule.

For each group of companies and for each year from 2016—2018, Table III.D.1–3 below shows the projected ranges for liquid cellulosic biofuel production (from the 2014–16, 2017, and 2018 final rules), actual production, and the percentile values that would have resulted in a projection equal to the actual production volume.

TABLE III.D.1–3—PROJECTED AND ACTUAL LIQUID CELLULOSIC BIOFUEL PRODUCTION IN 2016–2018

[Million gallons]

	Low end of the range	High end of the range	Actual production [62]	Actual percentile
New Producers: [63]				
2016	0	76	1.06	1st
2017	0	33	8.79	27th
2018	0	47	4.16	9th
Average [a]	N/A	N/A	N/A	12th
Consistent Producers: [64]				
2016	2	5	3.28	43rd
2017	3.5	7	3.02	−14th
2018	7	24	9.86	17th
Average [a]	N/A	N/A	N/A	15th

[a] We have not averaged the low and high ends of the ranges, or actual production, as we believe it is more appropriate to average the actual percentiles from 2016–2018 rather than calculating a percentile value for 2016–2018 in aggregate. This approach gives equal weight to the accuracy of our projections from 2016–2018, rather than allowing the average percentiles calculated to be dominated by years with greater projected volumes.

Based upon the above analysis, EPA has projected cellulosic biofuel production from new producers at the 12th percentile of the calculated range and from consistent producers at the 15th percentile.[65] These percentiles are calculated by averaging the percentiles that would have produced cellulosic biofuel projections equal to the volumes produced by each group of companies in 2016–2018. Prior to 2016, EPA used different methodologies to project available volumes of cellulosic biofuel, and thus believes it inappropriate to calculate percentile values based on projections from those years.[66]

EPA also considered whether or not to include the percentile value from 2016 in our calculation of the percentile value to use in projecting liquid cellulosic biofuel production in 2019. Including a larger number of years in our calculation of the percentile value for 2019 would result in a larger data set that is less susceptible to large fluctuations that result from unexpectedly high or low production volumes in any one year that may not be indicative of future production. However, including a larger number of years also necessarily requires including older data that may no longer reflect the likely production of liquid cellulosic biofuel in a future year, especially given the rapidly changing nature of this industry.

We ultimately decided to include data from 2016 in calculating the percentile values to project liquid cellulosic biofuel production in 2019, determining that there was significant value in including this additional data. Even though the liquid cellulosic biofuel industry has changed since 2016, these changes are not so significant as to render this data obsolete. In determining the percentile values to use for 2019 we have also decided to weight the observed actual percentile values from 2016–2018 equally. While the percentile

[62] Actual production is calculated by subtracting RINs retired for any reason other than compliance with the RFS standards from the total number of cellulosic RINs generated.

[63] Companies characterized as new producers in the 2014–2016, 2017, and 2018 final rules were as follows: Abengoa (2016), CoolPlanet (2016), DuPont (2016, 2017), Edeniq (2016, 2017), Enerkem (2018), Ensyn Port Cartier (2018), GranBio (2016, 2017), IneosBio (2016), and Poet (2016, 2017).

[64] Companies characterized as consistent producers in the 2014–2016, 2017, and 2018 final rules were as follows: Edeniq Active Facilities (2018), Ensyn Renfrew (2016–2018), GranBio (2018), Poet (2018), and Quad County Corn Processors/Syngenta (2016–2018).

[65] For more detail on the calculation of the percentile values used in this final rule see ''Calculating the Percentile Values Used to Project Liquid Cellulosic Biofuel Production for 2018 and 2019,'' available in EPA docket EPA–HQ–OAR–2018–0167.

[66] EPA used a similar projection methodology for 2015 as in 2016–2018, however we only projected cellulosic biofuel production volume for the final 3 months of the year, as actual production data were available for the first 9 months. We do not believe it is appropriate to consider data from a year for which 9 months of the data were known at the time the projection was made in determining the percentile values used to project volume over a full year.

value from 2018 represents the most recent data available, it is also dependent on the performance of a relatively small number of companies in a single year, as well as a projection of the performance of these facilities during the final three months of 2018. Using data from multiple years, especially years in which we have complete production data, is likely more representative of the future performance of these groups of companies than data from any single year.

Commenters generally supported EPA's use of updated data (data not available at the time of the proposed rule, but expected to be available for the final rule) in calculating the percentage standards for 2019. Several commenters objected to EPA's use of a single percentile value based on historical production performance for each group of companies. These commenters often described this approach as ''backwards looking'' and generally requested that EPA not discount facility's projected production at all, determine a unique percentile value for each facility based on facility specific factors, or return to the percentile values used in the 2016 and 2017 rules (25th percentile for new producers and 50th percentile for consistent producers).

EPA disagrees with the commenters characterization of the projection methodology used in this final rule as ''backwards looking.'' As discussed above, and in more detail in a memorandum to the docket,[67] EPA has used data specific to 2019 in determining the high end of the potential production range for these facilities. While we acknowledge that we have relied on data from previous years in calculating the percentile value we use to select a volume within the potential production range for each group of companies, we believe that this approach is appropriate and consistent with EPA's direction to project cellulosic biofuel volumes with a neutral aim at accuracy. We do not believe that we have significant data or expertise to individually consider all of the potential variables associated with each individual facility and produce a reasonably accurate projection. Indeed, in the early years of the RFS program (2010–2013) EPA attempted this approach with very poor results. Similarly, using the 25th and 50th percentiles to project potential production produced overly optimistic projections in both 2016 (0.5 million gallons actual production versus 2 million gallons projected production) and 2017 (4.1 million actual, 12 million projected). By contrast, the approach used in the 2018 rule, which is also the approach used in this action, produced a much more precise estimate (14 million actual, 14 million projected). We believe the approach used today is likely to produce a more accurate projection of liquid cellulosic biofuel production.[68] This approach is therefore appropriate for projecting liquid cellulosic biofuel production in 2019. As this approach incorporates new data each year, we anticipate that we will be able to use it consistently in future years. However, as in previous years, EPA will continue to monitor the success of this approach going forward and will make adjustments to increase accuracy as necessary.

Finally, we used these percentile values, together with the ranges determined for each group of companies discussed above, to project a volume for each group of companies in 2019. These calculations are summarized in Table III.D.1–4 below.

TABLE III.D.1–4—PROJECTED VOLUME OF LIQUID CELLULOSIC BIOFUEL IN 2019

[Million ethanol-equivalent 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	10	12th	1
Liquid Cellulosic Biofuel Producers; Producers with Consistent Commercial Scale Production	14	44	15th	19
Total	N/A	N/A	N/A	20

[a] Volumes rounded to the nearest million gallons.

2. CNG/LNG Derived From Biogas

For 2019, EPA is using the same methodology as in the 2018 final rule, an industry wide projection based on a year-over-year growth rate, to project production of CNG/LNG derived from biogas used as transportation fuel.[69] For this final rule, EPA has calculated the year-over-year growth rate in CNG/LNG derived from biogas by comparing RIN generation from October 2017 to September 2018 (the most recent 12 months for which data are available) to RIN generation in the 12 months that immediately precede this time period (October 2016 to September 2017). These RIN generation volumes are shown in Table III.D.2–1 below.

TABLE III.D.2–1—GENERATION OF CELLULOSIC BIOFUEL RINS FOR CNG/LNG DERIVED FROM BIOGAS

[Million gallons] [70]

RIN generation (October 2016–September 2017)	RIN generation (October 2017–September 2018)	Year-over-year increase
216	278	29.0%

[67] ''November 2018 Liquid Cellulosic Biofuel Projections for 2018 CBI,'' memorandum from Dallas Burkholder to EPA Docket EPA–HQ–OAR–2018–0167.

[68] The comments discussed in this paragraph are discussed in additional detail in Section 3.2.1 of the RTC document.

[69] Historically RIN generation for CNG/LNG derived from biogas has increased each year. It is possible, however, that RIN generation for these fuels in the most recent 12 months for which data are available could be lower than the preceding 12 months. We believe our methodology accounts for this possibility. In such a case, the calculated rate of growth would be negative.

[70] Further detail on the data used to calculate each of these numbers in this table, as well as the projected volume of CNG/LNG derived from biogas used as transportation fuel in 2019 can be found in ''November 2018 Assessment of Cellulosic Biofuel Production from Biogas (2019)'' memorandum from Dallas Burkholder to EPA Docket EPA–HQ–OAR–2018–0167.

EPA then applied this 29 percent year-over-year growth rate to the total number of 2017 cellulosic RINs generated and available for compliance for CNG/LNG. This methodology results in a projection of 399 million gallons of CNG/LNG derived from biogas in 2019.[71] We believe that projecting the production of CNG/LNG derived from biogas in this manner appropriately takes into consideration the actual recent rate of growth of this industry, and that this growth rate accounts for both the potential for future growth and the challenges associated with increasing RIN generation from these fuels in future years. This methodology may not be appropriate to use as the projected volume of CNG/LNG derived from biogas approaches the total volume of CNG/LNG that is used as transportation fuel, as RINs can be generated only for CNG/LNG used as transportation fuel. We do not believe that this is yet a constraint as our projection for 2019 is well below the total volume of CNG/LNG that is currently used as transportation fuel.[72]

EPA has also reviewed data on potential producers of CNG/LNG derived from biogas that is used as transportation fuel. Compared to EPA, these potential producers projected greater total production of CNG/LNG derived from biogas in 2019 based on the capacity of such projects. Since producers of CNG/LNG derived from biogas have historically over-estimated their production of these fuels, it would not be appropriate to simply adopt the capacity of these projects as our projection of CNG/LNG derived from biogas for 2019. The fact that the industry projections exceed EPA's projected volume, however, indicates that the volume of these fuels projected for 2019 can be satisfied by a combination of projects currently producing CNG/LNG derived from biogas for these purposes and projects expected to product biogas by the end of 2019.

A number of commenters requested that, in addition to projecting volume of CNG/LNG derived from biogas using a year-over-year growth rate, EPA project additional volume to account for new projects and those currently in development. We believe that the industry-wide projection methodology used in this final rule already adequately accounts for new facilities and those currently in development. The growth rate used to project the production of CNG/LNG derived from biogas in 2019 includes both increased production from existing facilities, as well as new facilities that began producing fuel in the last 12 months for which data are available. Thus, adding additional volume to account for new facilities would effectively be double counting production from new facilities.

Other commenters suggested that the industry wide projection was inappropriate, and that EPA should return to a facility-by-facility assessment, as was used to project CNG/LNG derived from biogas in 2016 and 2017. We believe that the mature nature of the industry producing CNG/LNG derived from biogas lends itself well to an industry-wide projection methodology and that this methodology can be more accurate than a facility-by-facility approach, especially as macro market and economic factors have apparently become more influential on total production than the success or challenges at any single facility; especially as producers are vying for business relationships with the same pool of CNG/LNG fueled transportation fleets to enable them to generate RINs. We further note that the facility-by-facility approach used to project production of CNG/LNG produced from biogas in 2016 and 2017 significantly over-estimated production of these fuels.

While our projection methodology uses a growth rate based on historical data it adequately anticipates higher production volumes in future years, including both increased production from existing facilities as well as production from new facilities. In this way it satisfies our charge to project future cellulosic biofuel production in a reasonable manner, and with neutrality, even though it does not consider all potential producers of these fuels on a facility-by-facility basis.

3. Total Cellulosic Biofuel in 2019

After projecting production of cellulosic biofuel from liquid cellulosic biofuel production facilities and producers of CNG/LNG derived from biogas, EPA combined these projections to project total cellulosic biofuel production for 2019. These projections are shown in Table III.D.3–1. Using the methodologies described in this section, we project that 418 million ethanol-equivalent gallons of cellulosic biofuel will be produced in 2019. We believe that projecting overall production in 2019 in the manner described above results in a neutral estimate (neither biased to produce a projection that is too high nor too low) of likely cellulosic biofuel production in 2019.

TABLE III.D.3–1—PROJECTED VOLUME OF CELLULOSIC BIOFUEL IN 2019

[Million gallons]

	Projected volume [a]
Liquid Cellulosic Biofuel Producers; Producers without Consistent Commercial Scale Production	1
Liquid Cellulosic Biofuel Producers; Producers with Consistent Commercial Scale Production	19
CNG/LNG Derived from Biogas	399
Total	[b] 418

[a] Volumes rounded to the nearest million gallons.

[b] Total projection of cellulosic biofuel appears less than the sum of the projected volume for each group of companies due to rounding.

[71] To calculate this value, EPA multiplied the number of 2017 RINs generated and available for compliance for CNG/LNG derived from biogas (239.5 million), by 1.290 (representing a 29 percent year-over-year increase) to project production of CNG/LNG in 2018, and multiplied this number (309 million RINs) by 1.290 again to project production of CNG/LNG in 2019.

[72] EPA projects that 538 million ethanol-equivalent gallons of CNG/LNG will be used as transportation fuel in 2019 based on EIA's October 2018 Short Term Energy Outlook (STEO). To calculate this estimate, EPA used the Natural Gas Vehicle Use from the STEO Custom Table Builder (0.12 billion cubic feet/day in 2019). This projection includes all CNG/LNG used as transportation fuel from both renewable and non-renewable sources. EIA does not project the amount of CNG/LNG from biogas used as transportation fuel. To convert billion cubic feet/day to ethanol-equivalent gallons EPA used conversion factors of 946.5 British Thermal Units (BTU) per cubic foot of natural gas (lower heating value, per calculations using ASTM D1945 and D3588) and 77,000 BTU of natural gas per ethanol-equivalent gallon per 40 CFR 80.1415(b)(5).

Further discussion of the companies expected to produce cellulosic biofuel and make it commercially available in 2019 can be found in a memorandum to the docket.[73]

IV. Advanced Biofuel and Total Renewable Fuel Volumes for 2019

The national volume targets for advanced biofuel and 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) and (II). Congress set annual renewable fuel volume targets that envisioned growth at a pace that far exceeded historical growth and, for years after 2011, prioritized that growth as occurring principally in advanced biofuels (contrary to previous growth patterns where most growth was in conventional renewable fuel). Congressional intent is evident in the fact that the implied statutory volume requirement for conventional renewable fuel is 15 billion gallons for all years after 2014, while the advanced biofuel volume requirements, driven largely by growth in cellulosic biofuel, continue to grow each year through 2022 to a total of 21 billion gallons.

Due to a shortfall in the availability of cellulosic and advanced biofuel, and consistent with our long-held interpretation of the cellulosic waiver authority as best interpreted and applied by providing equal reductions in advanced biofuel and total renewable fuel, we are reducing the statutory volume targets for both advanced biofuel and total renewable fuel for 2019 using the full extent of the cellulosic waiver authority.

In this Section we discuss our use of the discretion afforded by the cellulosic waiver authority at CAA 211(o)(7)(D)(i) to reduce volumes of advanced biofuel and total renewable fuel. We first discuss our assessment of advanced biofuel and the considerations that have led us to conclude that the advanced biofuel volume target in the statute should be reduced by the full amount permitted under the cellulosic waiver authority. We then address total renewable fuel in the context of our interpretation, articulated in previous annual rulemakings, that advanced biofuel and total renewable fuel should be reduced by the same amount under the cellulosic waiver authority. We also address several comments we received in response to the July 10, 2018 proposal; the remaining comments are addressed in a separate RTC document.

To begin, we have evaluated the capabilities of the market and are making a finding that the 13.0 billion gallons specified in the statute for advanced biofuel cannot be reached in 2019. 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 percent or more, and as described in Section III, we project that it will fall far short of the statutory target of 8.5 billion gallons in 2019. For this and other reasons described in this section we are reducing the advanced biofuel statutory target by the full amount of the shortfall in cellulosic biofuel for 2019.

In previous years when we have used the cellulosic waiver authority, we have determined the extent to which we should reduce advanced biofuel volumes by taking into account the availability of advanced biofuels, their energy security and greenhouse gas (GHG) impacts, the availability of carryover RINs, the apparent intent of Congress as reflected in the statutory volumes tables to substantially increase the use of advanced biofuels over time, as well as factors such as increased costs associated with the use of advanced biofuels and the increasing likelihood of adverse unintended impacts associated with use of advanced biofuel volumes achieved through diversion of foreign fuels or substitution of advanced feedstocks from other uses to biofuel production. Until the 2018 standards rule, the consideration of these factors led us to conclude that it was appropriate to set the advanced biofuel standard in a manner that would allow the partial backfilling of missing cellulosic volumes with non-cellulosic advanced biofuels.[74] For the 2018 standards, we placed a greater emphasis on cost considerations in the context of balancing the various considerations, ultimately concluding that partial backfilling with non-cellulosic advanced biofuels was not warranted and the applicable volume requirement for advanced biofuel should be based on the maximum reduction permitted under the cellulosic waiver authority.

Although we continue to believe that the factors earlier considered in exercising the cellulosic waiver authority are relevant and appropriate, we project that there will be insufficient reasonably attainable volumes of non-cellulosic advanced biofuels in 2019 to allow any backfilling for missing volumes of cellulosic biofuel.[75] As a result of this projection, the high cost of advanced biofuels, and our consideration of carryover RINs, we are reducing the statutory volume target for advanced biofuel by the same amount as the reduction in cellulosic biofuel. This will result in the non-cellulosic component of the advanced biofuel volume requirement being equal to the implied statutory volume target of 4.5 billion gallons in 2019.

Several stakeholders commented that it was inappropriate for EPA to change its policy with regard to backfilling of missing cellulosic biofuel with other advanced biofuel as it had done prior to 2018. However, in making such comments, stakeholders misinterpreted our approach in those years. While we permitted some backfilling, we did so only after considering such factors as described above. The approach we have taken for the 2019 volume requirements is no different than it was in previous years, though the outcome of that approach is different due to the different circumstances.

We note that the predominant non-cellulosic advanced biofuels available in the near term are advanced biodiesel and renewable diesel.[76] We expect limited growth in the availability of feedstocks used to produce these fuel types, absent the diversion of these feedstocks from other uses. In addition, we expect diminishing incremental GHG benefits and higher per gallon costs as the required volumes of advanced biodiesel and renewable diesel increase. These outcomes are a result of the fact that the lowest cost and most easily available feedstocks are typically used first, and each additional increment of advanced biodiesel and renewable diesel requires the use of feedstocks that are generally incrementally more costly and/or more difficult to obtain. Moreover, to the extent that higher advanced biofuel requirements cannot be satisfied through growth in the production of advanced biofuel feedstocks, they would instead be satisfied through a re-direction of such feedstocks from competing uses. Products (other than qualifying advanced biofuels) that were

[73] ''Cellulosic Biofuel Producer Company Descriptions (November 2018),'' memorandum from Dallas Burkholder to EPA Docket EPA–HQ–OAR–2018–0167.

[74] For instance, see 81 FR 89750 (December 12, 2016).

[75] As described further below, ''reasonably attainable'' volumes are not merely those that can be attained given available biofuel production capacity and feedstocks, but also take into consideration factors such as costs and feedstock and/or fuel diversions that could create disruptions in other markets.

[76] While sugarcane ethanol, as well as a number of other fuel types, can also contribute to the supply of advanced biofuel, in recent years supply of these other advanced biofuels has been considerably lower than supply of advanced biodiesel or renewable diesel. See Table IV.B.3–1.

formerly produced using these feedstocks are likely to be replaced by products produced using the lowest cost alternatives, likely derived from palm oil (for food and animal feed) or petroleum sources (non-edible consumer products). This in turn could increase the lifecycle GHG emissions associated with these incremental volumes of non-cellulosic advanced biofuel, since fuels produced from both palm oil and petroleum have higher estimated lifecycle GHG emissions than qualifying advanced biodiesel and renewable diesel.[77] There would also likely be market disruptions and increased burden associated with shifting feedstocks among the wide range of companies that are relying on them today and which have optimized their processes to use them. Higher advanced biofuel standards could also be satisfied by diversion of foreign advanced biofuel from foreign markets, and there would also be an increased likelihood of adverse unintended impacts associated with such diversions. Taking these considerations into account, we believe, as discussed in more detail below, that it is appropriate to exercise our discretion under the cellulosic waiver authority to set the advanced biofuel volume requirement at a level that would minimize such diversions.

Furthermore, several other factors have added uncertainty regarding the volume of advanced biofuels that we project are attainable in 2019. The first is the fact that the tax credit for biodiesel has not been renewed for 2019. The second is the final determination by the Department of Commerce that tariffs should be imposed on biodiesel imports from Argentina and Indonesia, and the potential for those tariffs to increase.[78][79] Finally, China has recently imposed new tariffs on soybean imports. Each of these factors is discussed in more detail in Section IV.B.3 below.

We believe that the factors and considerations noted above are all appropriate to consider under the broad discretion provided under the cellulosic waiver authority, and that consideration of these factors supports our use of this authority. Many of the considerations discussed in this final rule are related to the availability of non-cellulosic advanced biofuels (*e.g.,* historic data on domestic supply, expiration of the biodiesel blenders' tax credit, potential imports of biodiesel in light of the Commerce Department's determination on tariffs on biodiesel imports from Argentina and Indonesia, potential imports of sugarcane ethanol, and anticipated decreasing growth in production of feedstocks for advanced biodiesel and renewable diesel), while others focus on the potential benefits and costs of requiring use of available volumes (*e.g.,* relative cost of advanced biofuels in comparison to the petroleum fuels they displace, GHG reduction benefits, and energy security benefits).

As discussed in further detail in the following sections, our assessment of advanced biofuel suggests that achieving the implied statutory volume target for non-cellulosic advanced biofuel in 2019 (4.5 billion gallons) is attainable. While it may also be possible that a volume of non-cellulosic advanced biofuel greater than 4.5 billion gallons may be attainable, a volume equal to or higher than 4.5 billion gallons would likely result in the diversion of advanced feedstocks from other uses or diversion of advanced biofuels from foreign sources, and thus is not reasonably attainable. In that case, our assessment of other factors, such as cost and GHG impacts, indicate that while such higher volumes may be attainable, it would not be appropriate to set the advanced biofuel volume requirement so as to require use of such volumes to partially backfill for missing cellulosic volumes.

The impact of our exercise of the cellulosic waiver authority is that after waiving the cellulosic biofuel volume down to the projected available level, and applying the same volume reduction to the statutory volume target for advanced biofuel, the resulting volume requirement for advanced biofuel for 2019 would be 630 million gallons more than the applicable volume used to derive the 2018 percentage standard. Furthermore, after applying the same reduction to the statutory volume target for total renewable fuel, the volume requirement for total renewable fuel would also be 630 million gallons more than the applicable volume used to derive the 2018 percentage standard.

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 establishing a 2019 applicable volume for cellulosic biofuel of 418 million gallons, representing a reduction of 8,082 million gallons from the statutory target of 8,500 million gallons. As a result, 8,082 million gallons is the maximum volume reduction for advanced biofuel and total renewable fuel that is permissible using the cellulosic waiver authority. Use of the cellulosic waiver authority to this maximum extent would result in volumes of 4.92 and 19.92 billion gallons for advanced biofuel and total renewable fuel, respectively.

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

[Million gallons]

	Advanced biofuel	Total renewable fuel
Statutory target	13,000	28,000
Maximum reduction permitted under the cellulosic waiver authority	8,082	8,082
Lowest 2019 volume requirement permitted using only the cellulosic waiver authority	4,918	19,918

We are authorized under the cellulosic waiver authority to reduce the advanced biofuel and total renewable fuel volumes "by the same or a lesser" amount as the reduction in the cellulosic biofuel volume.[80] As discussed in Section II.A, EPA has broad discretion in using the cellulosic

[77] For instance, see the draft GHG assessment of palm oil biodiesel and renewable diesel at 77 FR 4300 (January 27, 2012).

[78] "Affirmative Final Antidumping Duty Determinations on Biodiesel From Argentina and Indonesia," available in docket EPA–HQ–OAR–2018–0167.

[79] "US adds more duties on biodiesel from Argentina & Indonesia," Reuters article available in docket EPA–HQ–OAR–2018–0167.

waiver authority in instances where its use is authorized under the statute, since Congress did not specify factors that EPA must consider in determining whether to use the authority to reduce advanced biofuel or total renewable fuel, nor what the appropriate volume reductions (within the range permitted by statute) should be. This broad discretion was affirmed in both *Monroe* and *ACE*.[81] Thus, we have the authority set the 2019 advanced biofuel volume requirement at a level that is designed to partially backfill for the shortfall in cellulosic biofuel. However, based on our consideration of a number of relevant factors, we are using the full extent of the cellulosic waiver authority in deriving volume requirements for 2019.

B. Attainable Volumes of Advanced Biofuel

We have considered both attainable and reasonably attainable volumes of advanced biofuel to inform our exercise of the cellulosic waiver authority. As used in this rulemaking, both ''reasonably attainable'' and ''attainable'' are terms of art defined by EPA.[82] Volumes described as ''reasonably attainable'' are those that can be reached with minimal market disruptions, increased costs, and/or reduced GHG benefits, and with minimal diversion of advanced biofuels or advanced biofuel feedstocks from existing uses. We use this phrase in today's action in the same way that we used it in previous actions. Volumes described as ''attainable,'' in contrast, are those we believe can be reached, but would likely result in market disruption, higher costs, and/or reduced GHG benefits. Neither ''reasonably attainable'' nor ''attainable'' are meant to convey the ''maximum achievable'' level, which as we explained in the 2017 final rule, we do not consider to be an appropriate target under the cellulosic waiver authority.[83] Finally, we note that our assessments of the ''reasonably attainable'' and ''attainable'' volumes of non-cellulosic advanced biofuels are not intended to be as exacting as our projection of cellulosic biofuel production, described in Section III of this rule.

As in prior rulemakings, we begin by considering what volumes of advanced biofuels are reasonably attainable. In *ACE,* the Court noted that in assessing what volumes are ''reasonably attainable,'' EPA had considered the availability of feedstocks, domestic production capacity, imports, and market capacity to produce, distribute, and consume renewable fuel.[84] These considerations include both demand-side and supply-side factors.[85] We are taking a similar approach for 2019, with the added consideration of the possibility that higher volume requirements would lead to ''feedstock switching'' or diversion of advanced biofuels from use in other countries. We also took these factors into account in setting the 2017 and 2018 volume requirements, and we continue to believe that they are appropriate considerations under the broad discretion provided by the cellulosic waiver authority. We are establishing the advanced biofuel volume requirement at a level that would seek to minimize such feedstock/fuel diversions within the discretion available under the cellulosic waiver authority.

Our individual assessments of reasonably attainable volumes of each type of advanced biofuel reflect this approach. As discussed in further detail in this section, we find that 100 million gallons of advanced ethanol, 60 million gallons of other advanced biofuels, and 2.61 billion gallons of advanced biodiesel and renewable diesel are reasonably attainable. Together with our projected volume of 418 million gallons of cellulosic biofuel, the sum of these volumes falls short of 4.92 billion gallons, which is the lowest advanced biofuel requirement that EPA can require under the cellulosic waiver authority.

Therefore, we also have considered whether the market can nonetheless make available 4.92 billion gallons of advanced biofuel, notwithstanding likely feedstock/fuel diversions. That is, we assess whether 4.92 billion gallons is merely ''attainable,'' as opposed to reasonably attainable. In particular, we assess whether additional volumes of advanced biodiesel and renewable diesel are attainable. We conclude that 2.8 billion gallons of advanced biodiesel and renewable diesel are attainable, notwithstanding potential feedstock/fuel diversions. This quantity of advanced biodiesel and renewable diesel, together with the cellulosic biofuel, sugarcane ethanol, and other advanced biofuels described above, would enable the market to make available 4.92 billion gallons of advanced biofuels.

1. Imported Sugarcane Ethanol

The predominant available source of advanced biofuel other than cellulosic biofuel and BBD is imported sugarcane ethanol. Imported sugarcane ethanol from Brazil is the predominant form of imported ethanol and the only significant source of imported advanced ethanol. In setting the 2018 standards, we estimated that 100 million gallons of imported sugarcane ethanol would be reasonably attainable.[86] This was a reduction from the 200 million gallons we had assumed for 2016 and 2017, and was based on a combination of data from 2016 and part of 2017 as well as an attempt to balance the lower-than-expected imports from recent data with indications that higher volumes were possible based on older data. We also noted the high variability in ethanol import volumes in the past (including of Brazilian sugarcane ethanol), increasing gasoline consumption in Brazil, and variability in Brazilian production of sugar as reasons that it would be inappropriate to assume that sugarcane ethanol imports would reach the much higher levels suggested by some stakeholders.

Since the 2018 final rule, new data reveals a continued trend of low imports. At the time of the 2018 standards final rule, we had used available data from a portion of 2017 to estimate that import volumes of sugarcane ethanol were likely to fall significantly below the 200 million gallons we had assumed when we set the 2017 standards. Import data for all of 2017 is now available, and indicates that imports of sugarcane ethanol reached just 77 million gallons. Moreover, EIA data on monthly ethanol imports in 2018 through July indicate that no ethanol was imported.[87]

[80] CAA section 211(o)(7)(D)(i).

[81] See *ACE,* 864 F.3d at 730–35 (citing *Monroe,* 750 F.3d 909, 915–16).

[82] Our consideration of ''reasonably attainable'' volumes is not intended to imply that ''attainable'' volumes are unreasonable or otherwise inappropriate. As we explain in this section, we believe that an advanced biofuel volume of 4.92 billion gallons, although not reasonably attainable, is attainable, and that establishing such volume is an appropriate exercise of our cellulosic waiver authority.

[83] 81 FR 89762 (December 12, 2016). The maximum achievable volume may be relevant to our consideration of whether to exercise the general waiver authority on the basis of inadequate domestic supply. In 2019, we have determined that the after exercising our cellulosic waiver authority the advanced biofuel volume is achievable, and therefore further reductions using the general waiver authority on the basis of inadequate domestic supply are not necessary.

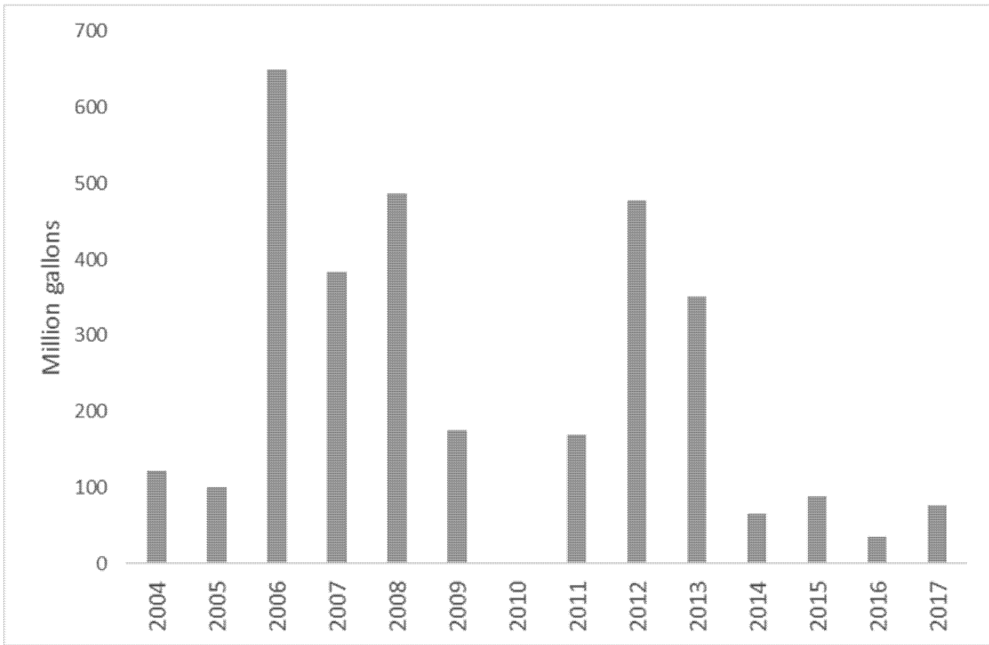
[84] See *ACE,* 864 F.3d at 735–36.

[85] See id. at 730–35.

[86] 82 FR 58507 (December 12, 2017).

[87] However, EIA data on weekly imports of ethanol does indicate that some ethanol was imported in August and October of 2018, totaling 37 million gallons. This volume was not reflected in the monthly EIA data as of September 28, 2018.

Figure IV.B.1-1
Historical Sugarcane Ethanol Imports



Source: "US Imports of Fuel Ethanol from EIA," docket EPA-HQ-OAR-2018-0167. Includes imports directly from Brazil and those that are transmitted through the Caribbean Basin Initiative and Central America Free Trade Agreement (CAFTA).

While it is difficult to predict imports for 2019, we believe it would be reasonable not to increase the assumed volume above 100 million gallons for purposes of determining whether an advanced biofuel volume requirement of 4.92 billion gallons is reasonably attainable for 2019. Although the advanced biofuel volume requirement for 2019 is about 630 million gallons higher than that for 2018, creating some incentive for increases in imports, we note that an even larger increase in the required volume of advanced biofuel between 2016 and 2017 was accompanied by only a very small increase in imports of sugarcane ethanol, from 34 million gallons in 2016 to 77 million gallons in 2017. Moreover, the E10 blendwall and the fact that imported sugarcane ethanol typically costs more than corn ethanol create disincentives for increasing imports above the levels in recent years, though the difference in RIN values between conventional and advanced ethanol may offset the cost difference to some degree.[88] Even so, we do not believe it would be appropriate to reduce the volume of imported sugarcane ethanol below 100 million gallons for the purposes of determining the 2019 volume requirement for advanced biofuel because imports have typically been higher in the second half of the year compared to the first half of the year, and have reached considerably more than 100 million gallons in the past.[89] Taking all of these considerations into account, we are using 100 million gallons of imported sugarcane ethanol for the purposes of projecting reasonably attainable volumes of advanced biofuel for 2019.[90] This level reflects a balancing of the information available to EPA at this time; both the lower import volumes that have occurred more recently with the higher volumes that are possible based on earlier years and under the influence of the higher standards in 2019. Additional discussion on this topic can be found in the RTC document.

We note that the future projection of imports of sugarcane ethanol is inherently imprecise, and that actual imports in 2019 could be lower or higher than 100 million gallons. Factors that could affect import volumes include uncertainty in the Brazilian political climate, weather and harvests in Brazil, world ethanol demand and prices, constraints associated with the E10 blendwall in the U.S., world demand for and prices of sugar, and the cost of sugarcane ethanol relative to that of corn ethanol. After considering these factors, and in light of the high degree of variability in historical imports of sugarcane ethanol, we believe that 100 million gallons is reasonably attainable for 2019.

2. 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 volumes of advanced biofuel for 2019. These other advanced biofuels include non-cellulosic CNG, naphtha, heating oil, and domestically-produced advanced ethanol. However, the supply of these fuels has been relatively low in the last several years.

[88] For example, see the relative costs of imported sugarcane ethanol and corn ethanol in Tables V.D–2 and V.D–3 in the final rulemaking that established the 2017 standards (81 FR 89746, December 12, 2016).

[89] ''US Imports of Fuel Ethanol from EIA,'' available in docket EPA–HQ–OAR–2018–0167.

[90] We note that even if sugarcane ethanol imports fall below our projection of 100 million gallons in 2019, the advanced biofuel volume would still be achievable. For example, if sugarcane ethanol imports were only 50 million gallons in 2019, the market could still supply 4.5 billion gallons of non-cellulosic advanced biofuel by supplying an additional 33 million gallons of advanced biodiesel.

TABLE IV.B.2–1—HISTORICAL SUPPLY OF OTHER ADVANCED BIOFUELS

[Million ethanol-equivalent gallons]

	CNG/LNG	Heating oil	Naphtha	Domestic ethanol	Total [a]
2013	26	0	3	23	52
2014	20	0	18	26	64
2015	0	1	24	25	50
2016	0	2	26	27	55
2017	2	2	32	26	62

[a] Excludes consideration of D5 renewable diesel, as this category of renewable fuel is considered as part of BBD in Section IV.B.3 below.

The downward trend over time in CNG/LNG from 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).[91] Total supply of these other advanced biofuels has exhibited no consistent trend during 2013 to 2017. Based on data from EMTS for these same categories of biofuel in 2018 through August, we estimate that total RIN generation in 2018 will be approximately the same as in 2017.[92] Based on this historical record, we believe that 60 million gallons is reasonably attainable in 2019.

We recognize that the potential exists for additional volumes of advanced biofuel from sources such as jet fuel, liquefied petroleum gas (LPG), butanol, and liquefied natural gas (as distinct from CNG), as well as non-cellulosic CNG from biogas produced in digesters. However, since they have been produced, if at all, in only de minimis and sporadic amounts in the past, we do not have a reasonable basis for projecting substantial volumes from these sources in 2019.[93]

3. Biodiesel and Renewable Diesel

Having projected the production volume of cellulosic biofuel, and the reasonably attainable volumes of imported sugarcane ethanol and ''other'' advanced biofuels, we next assess the potential supply of advanced biodiesel and renewable diesel. First, we calculate the amount of advanced biodiesel and renewable diesel that would need to be supplied to meet the advanced requirement were we to exercise our maximum discretion under the cellulosic authority: 2.8 billion gallons. This calculation, shown in Table IV.B.3–1 below, helps inform the exercise of our waiver authorities. Second, we consider the historical supply of these fuels and the impact of the biodiesel tax policy on advanced biodiesel and renewable diesel use in the U.S. Next, we consider factors that could potentially limit the supply of advanced biodiesel including the production capacity of advanced biodiesel and renewable diesel production facilities, the ability for the market to distribute and use these fuels, the availability of feedstocks to produce these fuels, and fuel imports and exports. Based on our projection of the domestic growth in advanced biodiesel and renewable diesel feedstocks we project a reasonably attainable volume of 2.61 billion gallons of advanced biodiesel and renewable diesel in 2019. Since this volume is lower than the 2.8 billion gallons we calculated would need to be supplied to meet the advanced requirement were we to exercise our maximum discretion under the cellulosic authority, we finally consider if additional supplies of advanced biodiesel and renewable diesel are attainable. Ultimately, we conclude that a volume of at least 2.8 billion gallons of advanced biodiesel and renewable diesel is attainable in 2019. We note that we have not attempted to determine the maximum attainable volume of these fuels. While the maximum attainable volume of advanced biodiesel and renewable diesel in 2019 is greater than 2.8 billion gallons we do not believe it would be appropriate to require a greater volume of these fuels (by establishing a higher advanced biofuel volume for 2019) due to the high cost and the increased likelihood of adverse unintended impacts associated with these fuels.

Calculating the volume of advanced biodiesel and renewable diesel that would be needed to meet the volume of advanced biofuel for 2019 is an important benchmark to help inform EPA's consideration of our waiver authorities. In situations where the reasonably attainable volume of biodiesel and renewable diesel exceeds the volume of these fuels that would be needed to meet the volume of advanced biofuel after reducing the advanced biofuel volume by the same amount as the cellulosic biofuel volume, as was the case in 2017 and 2018, EPA may consider whether or not to allow additional volumes of these fuels to backfill for missing cellulosic biofuel volumes. In situations where the reasonably attainable volume of advanced biodiesel and renewable diesel is less than the volume of these fuels that would be needed to meet the volume of advanced biofuel after reducing the advanced biofuel volume by the same amount as the cellulosic biofuel volume, EPA may consider whether or not to use additional waiver authorities, to the extent available, to make further reductions to the advanced biofuel volume.

[91] 79 FR 42128 (July 18, 2014).

[92] See ''Projecting Advanced Biofuel Production and Imports for 2018 (November 2018)'' Memorandum from Dallas Burkholder to EPA Docket EPA–HQ–OAR–2018–0167.

[93] No RIN-generating volumes of these other advanced biofuels were produced in 2017, and less than 1 million gallons total in prior years.

TABLE IV.B.3–1—DETERMINATION OF VOLUME OF BIODIESEL AND RENEWABLE DIESEL NEEDED IN 2019 TO ACHIEVE 4.92 BILLION GALLONS OF ADVANCED BIOFUEL

[Million ethanol-equivalent gallons except as noted]

Lowest 2019 advanced biofuel volume requirement permitted using under the cellulosic waiver authority	4,918
Cellulosic biofuel	418
Imported sugarcane ethanol	100
Other advanced	60
Calculated advanced biodiesel and renewable diesel needed (ethanol-equivalent gallons/physical gallons) [94]	4,340/2,800

Having calculated the volume of advanced biodiesel and renewable diesel that would need to be supplied to meet the volume of advanced biofuel for 2019 after reducing the advanced biofuel volume by the same amount as the cellulosic biofuel volume, EPA next projected the reasonably attainable volume of these fuels for 2019. With regard to advanced biodiesel and renewable diesel, there are many different factors that could potentially influence the reasonably attainable volume of these fuels used as transportation fuel or heating oil in the U.S. These factors include the availability of qualifying biodiesel and renewable diesel feedstocks, the production capacity of biodiesel and renewable diesel facilities (both in the U.S. and internationally), and the availability of imported volumes of these fuels.[95] A review of the volumes of advanced biodiesel and renewable diesel used in previous years is especially useful in projecting the potential for growth in the production and use of such fuels, since for these fuels there are a number of complex and inter-related factors beyond simply the total production capacity for biodiesel and renewable diesel (including the availability of advanced feedstocks, the expiration of the biodiesel tax credit, recent tariffs on biodiesel from Argentina and Indonesia, and other market-based factors) that are likely to affect the supply of advanced biodiesel and renewable diesel.

In addition to a review of the volumes of advanced biodiesel and renewable diesel used in previous years, we believe the likely growth in production of feedstocks used to produce these fuels, as well as the total projected available volumes of these feedstocks, are important factors to consider. This is because while there are many factors that could potentially limit the production and availability of these fuels, the impacts of increasing production of advanced biodiesel and renewable diesel on factors such as costs, energy security, and GHG emissions are expected to vary depending on whether the feedstocks used to produce these fuels are sourced from waste sources or by-products of other industries (such as the production of livestock feed or ethanol production), are sourced from increased oilseed production, or are sourced from the diversion of feedstocks from existing uses. The energy security and GHG reduction value associated with the growth in the use of advanced biofuels is greater when these fuels are produced from waste fats and oils or feedstocks that are byproducts of other industries (such as soybean oil from soybeans primarily grown as animal feed), rather than a switching of existing advanced feedstocks from other uses to renewable fuel production or the diversion of advanced biodiesel and renewable diesel from foreign markets. This is especially true if the parties that previously used the advanced biofuel or feedstocks replace these oils with low cost palm oil [96] or petroleum derived products, as we believe would likely be the case in 2019.[97] In this case the global production of advanced biodiesel and renewable diesel would not increase, and the potential benefits associated with increasing the diversity of the supply of transportation fuel (energy security) and the production of additional volumes of advanced biodiesel and renewable diesel (low GHG sources of transportation fuel) would be reduced.

Before considering the projected growth in the production of qualifying feedstocks that could be used to produce advanced biodiesel and renewable diesel, as well as the total volume of feedstocks that could be used to produce these fuels, it is helpful to review the volumes of biodiesel and renewable diesel that have been used in the U.S. in recent years. While historic data and trends alone are insufficient to project the volumes of biodiesel and renewable diesel that could be provided in future years, historic data can serve as a useful reference in considering future volumes. Past experience suggests that a high percentage of the biodiesel and renewable diesel used in the U.S. (from both domestic production and imports) qualifies as advanced biofuel.[98] In previous years, biodiesel and renewable diesel produced in the U.S. have been almost exclusively advanced biofuel.[99] Imports of advanced biodiesel increased through 2016, but were lower in 2017 and 2018, as seen in Table IV.B.2–1. Volumes of imported advanced biodiesel and renewable diesel have varied significantly from year to year, as they are impacted both by domestic and foreign policies, as well as many economic factors.

[94] To calculate the volume of advanced biodiesel and renewable diesel that would generate the 4.34 billion RINs needed to meet the advanced biofuel volume EPA divided the 4.34 billion RINs by 1.55. 1.55 is the approximate average (weighted by the volume of these fuels expected to be produced in 2019) of the equivalence values for biodiesel (generally 1.5) and renewable diesel (generally 1.7).

[95] 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 refer 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). While cellulosic diesel (D7) also contributed towards an obligated party's advanced biofuel obligation, these fuels are discussed in Section III rather than in this section. 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 40 CFR 80.1426 or in petition approvals issued pursuant to section 80.1416, that can be used to produce fuel that qualifies for D4 or D5 RINs. These feedstocks include, for example, 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 section 80.1426).

[96] For instance, see the draft GHG assessment of palm oil biodiesel and renewable diesel at 77 FR 4300 (January 27, 2012).

[97] We believe palm or petroleum derived products would likely be used replace advanced biodiesel and renewable diesel diverted to the U.S. as these products are currently the lowest cost sources.

[98] From 2011 through 2017 approximately 95 percent of all biodiesel and renewable diesel supplied to the U.S. (including domestically-produced and imported biodiesel and renewable diesel) qualified as advanced biodiesel and renewable diesel (11,701 million gallons of the 12,323 million gallons) according to EMTS data.

[99] From 2011 through 2017 over 99.9 percent of all the domestically produced biodiesel and renewable diesel supplied to the U.S. qualified as advanced biodiesel and renewable diesel (10,089 million gallons of the 10,096 million gallons) according to EMTS data.

TABLE IV.B.3–2—ADVANCED (D4 AND D5) BIODIESEL AND RENEWABLE DIESEL FROM 2011 TO 2017

[Million gallons] [a]

	2011	2012	2013	2014 [b]	2015 [b]	2016	2017	2018 [c]
Domestic Biodiesel (Annual Change)	967 (N/A)	1,014 (+47)	1,376 (+362)	1,303 (−73)	1,253 (−50)	1,633 (+380)	1,573 (−60)	1,896 (+323)
Domestic Renewable Diesel (Annual Change)	58 (N/A)	11 (−47)	92 (+81)	155 (+63)	175 (+20)	221 (+46)	258 (+37)	255 (−3)
Imported Biodiesel (Annual Change)	44 (N/A)	40 (−4)	156 (+116)	130 (−26)	261 (+131)	561 (+300)	462 (−99)	212 (−250)
Imported Renewable Diesel (Annual Change)	0 (N/A)	28 (+28)	145 (+117)	129 (−16)	121 (−8)	170 (+49)	193 (+23)	197 (+4)
Exported Biodiesel and Renewable Diesel (Annual Change)	48 (N/A)	102 (+54)	125 (+23)	134 (+9)	133 (−1)	129 (−4)	157 (+28)	103 (−54)
Total (Annual Change)	1,021 (N/A)	991 (−30)	1,644 (+653)	1,583 (−61)	1,677 (+94)	2,456 (+779)	2,329 (−127)	2,457 (+128)

[a] All data 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 volume in each year.

[b] RFS required volumes for these years were not established until December 2015.

[c] Data for 2018 is based on actual production and import data through September 2018, and a projection for October–December 2018. For more information on how the volumes for 2018 were determined see ''Projecting Advanced Biofuel Production and Imports for 2018 (November 2018)'' Memorandum from Dallas Burkholder to EPA Docket EPA–HQ–OAR–2018–0167.

TABLE IV.B.3–3—CONVENTIONAL (D6) BIODIESEL AND RENEWABLE DIESEL FROM 2011 TO 2017

[Million gallons] [a]

	2011	2012	2013	2014 [b]	2015 [b]	2016	2017	2018 [c]
Domestic Biodiesel (Annual Change)	0 (N/A)	0 (+0)	6 (+6)	1 (−5)	0 (+0)	0 (+0)	0 (+0)	0 (+0)
Domestic Renewable Diesel (Annual Change)	0 (N/A)	0 (+0)	0 (+0)	0 (+0)	0 (+0)	0 (+0)	0 (+0)	0 (+0)
Imported Biodiesel (Annual Change)	0 (N/A)	0 (+0)	31 (+31)	52 (+21)	74 (+22)	113 (+39)	0 (−113)	0 (+0)
Imported Renewable Diesel (Annual Change)	0 (N/A)	0 (+0)	53 (+53)	0 (−53)	106 (+106)	43 (−63)	144 (+101)	123 (−21)
Exported Biodiesel and Renewable Diesel (Annual Change)	0 (N/A)	0 (+0)	0 (+0)	0 (+0)	0 (+0)	1 (+1)	0 (−1)	0 (+0)
Total (Annual Change)	0 (N/A)	0 (+0)	90 (+90)	53 (−37)	180 (+127)	155 (−25)	144 (−11)	123 (−21)

[a] All data 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 volume in each year.

[b] RFS required volumes for these years were not established until December 2015.

[c] Data for 2018 is based on actual production and import data through September 2018, and a projection for October–December 2018. For more information on how the volumes for 2018 were determined see ''Projecting Biodiesel and Renewable Diesel Production and Imports for 2018 (November 2018)'' Memorandum from Dallas Burkholder to EPA Docket EPA–HQ–OAR–2018–0167.

Since 2011, the year-over-year changes in the volume of advanced biodiesel and renewable diesel used in the U.S. have varied greatly, from a low of 127 million fewer gallons from 2016 to 2017 to a high of 779 million additional gallons from 2015 to 2016. These changes were likely influenced by multiple 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, biofuel policies in both the U.S. and foreign 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 779 million gallons of advanced biodiesel and renewable diesel would be reasonable to expect from 2018 to 2019, nor does it indicate that the low (or negative) growth rates observed in other years would recur in 2019. Rather, these data illustrate both the magnitude of the changes in advanced biodiesel and renewable diesel in previous years and the significant variability in these changes.

The historic data indicates that the biodiesel tax policy in the U.S. can have a significant impact on the volume of biodiesel and renewable diesel used in the U.S. in any given year.[100] While the biodiesel blenders tax credit has applied in each year from 2010 to 2017, it has only been prospectively in effect during the calendar year in 2011, 2013 and 2016, while other years it has been applied retroactively. The biodiesel blenders tax credit expired at the end of 2009 and was re-instated in December 2010 to apply retroactively in 2010 and extend through the end of 2011. Similarly, after expiring at the end of 2011, 2013, and 2014 the tax credit was re-instated in January 2013 (for 2012 and 2013), December 2014 (for 2014), December 2015 (for 2015 and 2016), and February 2018 (for 2017). Each of the years in which the biodiesel blenders tax credit was in effect during the calendar year (2013 and 2016) resulted in significant increases in the volume of advanced biodiesel and renewable diesel used in the U.S. over the previous year (653 million gallons and 779 million gallons respectively). However, following these large increases in 2013 and 2016, there was little to no growth in the use of advanced biodiesel and renewable diesel in the following years, only 33 million gallons from 2013 to 2015 and negative 127 million gallons from 2016 to 2017. This decrease from 2016 to 2017 occurred even though the required volume of advanced biofuel increased from 3.61 in 2016 to 4.28 billion gallons in 2017. This pattern is likely the result of both accelerated production and/or importation of biodiesel and renewable diesel in the final few months of years during which the tax credit was available to take advantage of the expiring tax credit, as well as relatively lower volumes of biodiesel and renewable diesel production and import in 2014, 2015,

[100] The status of the tax credit does not impact our assessment of the reasonably attainable volume of advanced biodiesel and renewable diesel in 2019 as our assessment is primarily based on feedstock availability. The status of the tax credit may affect the maximum attainable volume of these fuels, but our assessment demonstrates that 2.8 billion gallons of advanced biodiesel and renewable diesel is attainable whether or not the tax credit is renewed prospectively (or retrospectively) for 2019.

and 2017 than would have occurred if the tax credit had been in place.[101]

Some commenters stated that the tax credit has no impact on the potential supply of advanced biodiesel and renewable diesel. They generally argued that while the tax credit impacted the cost of biodiesel, as well as the RIN price needed to make advanced biodiesel and renewable diesel cost competitive with petroleum diesel, the RIN price was ultimately capable of incentivizing the production and use of advanced biodiesel and renewable diesel with or without the tax credit. We recognize that this is theoretically true; because the RIN prices vary with the supply and demand for RINs, the RIN price can rise to provide the same value as the tax credit in its absence. However, we note that it is this very aspect of the price of RINs, the potential that RIN prices may rise or fall depending on market conditions, that can hinder their ability to incentivize increased production and use of advanced biodiesel and renewable diesel. Further, higher advanced biofuel RIN prices can incentivize the production of other advanced fuels if these fuels can be produced at a price that is cost competitive with advanced biodiesel and renewable diesel. Conversely, the tax credit provides a fixed price incentive for all biodiesel and renewable diesel blended into the diesel fuel pool in the U.S., and is not available to other advanced biofuels. Ultimately, as discussed above the supply of biodiesel and renewable diesel is likely to be influenced by a number of factors, including the 2019 RFS volume requirements, the advanced and BBD RIN prices, expectations about the availability of the biodiesel blenders tax credit, and a number of other market-based factors.

The historical data suggests that the supply of advanced biodiesel and renewable diesel could potentially increase from the projected 2.54 billion gallons in 2018 to 2.8 billion gallons in 2019 (the projected volume needed to meet the advanced biofuel volume for 2019 after reducing the statutory advanced biofuel volume by the same amount as the cellulosic biofuel reduction). This would represent an increase of approximately 250 million gallons from 2018 to 2019, slightly higher than the average increase in the volume of advanced biodiesel and renewable diesel used in the U.S. from 2011 through 2017 (218 million gallons per year) and significantly less than the highest annual increase during this time (779 million gallons from 2015 to 2016).

After reviewing the historical volume of advanced biodiesel and renewable diesel used in the U.S. and considering the possible impact of the expiration of the biodiesel tax credit (discussed above), EPA next considers other factors that may impact the production, import, and use of advanced biodiesel and renewable diesel in 2019. The production capacity of registered advanced biodiesel and renewable diesel production facilities is highly unlikely to limit the production of these fuels, as the total production capacity for biodiesel and renewable diesel at registered facilities in the U.S. (4.1 billion gallons) exceeds the volume of these fuels that are projected to be needed to meet the advanced biofuel volume for 2019 after exercising the cellulosic waiver authority (2.8 billion gallons).[102] Significant registered production also exists internationally. Similarly, the ability for the market to distribute and use advanced biodiesel and renewable diesel appears unlikely constrain the growth of these fuels to a volume lower than 2.8 billion gallons. The investments required to distribute and use this volume of biodiesel and renewable diesel are expected to be modest, as this volume is less than 200 million gallons greater than the volume of biodiesel and renewable diesel produced, imported, and used in the U.S. in 2016.

Conversely, the availability of advanced feedstocks that can be used to produce advanced biodiesel and renewable diesel, as well as the availability of imported advanced biodiesel and renewable diesel, may be limited in 2019. We acknowledge that an increase in the required use of advanced biodiesel and renewable diesel could be realized through a diversion of advanced feedstocks from other uses, or a diversion of advanced biodiesel and renewable diesel from existing markets in other countries. Furthermore, the volume of advanced biodiesel and renewable diesel and their corresponding feedstocks projected to be produced globally exceeds the volume projected to be required in 2019 (2.8 billion gallons of advanced biodiesel and renewable diesel and the corresponding volume of advanced feedstocks) by a significant margin.[103] It is also the case that actions unrelated to the RFS program, such as recent tariffs on soybeans exported to China, could result in increased supplies of domestic biodiesel feedstocks.[104] However, we expect that further increases in advanced biofuel and renewable fuel volumes would be increasingly likely to incur adverse unintended impacts.

We perceive the net benefits to be lower both because of the potential disruption and associated cost impacts to other industries resulting from feedstock switching, and the potential adverse effect on lifecycle GHG emissions associated with feedstocks for biofuel production that would have been used for other purposes and which must then be backfilled with other feedstocks. Similarly, increasing the supply of biodiesel and renewable diesel to the U.S. by diverting fuel that would otherwise have been used in other countries results in higher lifecycle GHG emissions than if the supply of these fuels was increased by an increased collection of waste fats and oils or increased production of feedstocks that are byproducts of other industries, especially if this diversion results in increased consumption of petroleum fuels in the countries that would have otherwise consumed the biodiesel or renewable diesel. By focusing our assessment of the potential growth in the attainable volume of biodiesel and renewable diesel on the expected growth in the production of advanced feedstocks (rather than the total supply of these feedstocks in 2018, which would include feedstocks currently being used for non-biofuel purposes), we are attempting to minimize the incentives for the RFS program to increase the supply of advanced biodiesel and renewable diesel through feedstock switching or diverting biodiesel and renewable diesel from foreign markets to the U.S.

Advanced biodiesel and renewable diesel feedstocks include both waste oils, fats, and greases; and oils from planted crops. We received many comments from parties projecting that

[101] We also acknowledge that EPA not finalizing the required volumes of renewable fuel under the RFS program for 2014 and 2015 until December 2015 likely affected the volume of advanced biodiesel and renewable diesel supplied in these years. Further, the preliminary tariffs on biodiesel imported from Argentina and Indonesia announced in August 2017 likely negatively affected the volume of biodiesel supplied in 2017.

[102] The production capacity of the sub-set of biodiesel and renewable diesel producers that generated RINs in 2017 is approximately 3.1 billion gallons. See ''Biodiesel and Renewable Diesel Registered Capacity (May 2018)'' Memorandum from Dallas Burkholder to EPA Docket EPA–HQ–OAR–2018–0167.

[103] The October 2018 WASDE projects production of vegetable oils in 2017/2018 in the World to be 203.33 million metric tons. This quantity of vegetable oil would be sufficient to produce approximately 58.1 billion gallons of biodiesel and renewable diesel. Global production of biodiesel is projected to be 38.0 billion liters (10.0 billion gallons) according to the 2018 OECD–FAO Agricultural Outlook.

[104] The potential impacts of this tariff on the availability of biodiesel feedstocks is discussed in our discussion of available vegetable oils below.

available feedstocks from both of these sources are expected to increase in 2019. We agree that increases in the availability of advanced feedstocks would in 2019 and we have projected the magnitude of these increases using the best available data, including data received in comments on this rule. The projected growth in advanced feedstocks, however, is expected to be modest relative to the volume of these feedstocks that are currently being used to produce biodiesel and renewable diesel. Most of the waste oils, fats, and greases that can be recovered economically are already being recovered and used in biodiesel and renewable diesel production or for other purposes. The availability of animal fats will likely increase with beef, pork, and poultry production. Most of the vegetable oil used to produce advanced biodiesel and renewable diesel that is sourced from planted crops comes from crops primarily grown for purposes other than providing feedstocks for biodiesel and renewable diesel, such as for livestock feed, with the oil that is used as feedstock for renewable fuel production a co-product or by-product.[105] This is true for soybeans and corn, which are the two largest sources of feedstock from planted crops used for biodiesel production in the U.S.[106] We do not believe that the increased demand for soybean oil or corn oil caused by a higher 2019 advanced biofuel standard would result in an increase in soybean or corn prices large enough to induce significant changes in agricultural activity.[107] However, we acknowledge that production of these feedstocks is likely to increase as crop yields, oil extraction rates, and demand for the primary products increase in 2019.

We believe the most reliable source for projecting the expected increase in vegetable oils in the U.S. is USDA's World Agricultural Supply and Demand Estimates (WASDE). At the time of our assessment for this final rule, the most current version of the WASDE is from October 2018. The projected increase in vegetable oil production in the U.S. from 2017/2018 to 2018/2019 is 0.14 million metric tons per year. This additional quantity of vegetable oils could be used to produce approximately 40 million additional gallons of advanced biodiesel or renewable diesel in 2019 relative to 2018.[108] We recognize that oilseed production is projected in increase by a much greater amount (6.89 million metric tons).[109] However, it is the vegetable oil, rather than oilseed production, that is of relevance as an advanced biodiesel and renewable diesel feedstock.

A number of commenters mentioned the tariffs recently enacted by China on soybean exports from the U.S. as a potential source of additional feedstock for advanced biodiesel and renewable diesel. The potential impacts of these tariffs are significant, as approximately 25 percent of the U.S. soybean crop is currently exported to China.[110] However, the duration and ultimate impacts of these tariffs on total exports of U.S. soybeans are highly uncertain. In recent months, the price premium for soybeans from Brazil (the largest global exporter of soybeans), which are not impacted by the tariffs, have increased to approximately $2 per bushel.[111] A likely result of this price premium is that countries other than China will turn to U.S. sources of soybeans, rather than sourcing soybeans from Brazil. Ultimately, the tariffs could have little impact on the overall exports of soybeans from the U.S.

The most recent WASDE report projects that exports of oilseeds will decrease by approximately 2 million metric tons (approximately 3 percent) from 2017/2018 to 2018/2019. In addition, the WASDE projects that exports of vegetable oils will decrease by 0.10 million metric tons during this same time period. The October WASDE appears to take the recent tariffs into account, as there is a notable decrease in the expected trade of oilseeds in the recent WASDE projections relative to WASDE projections made prior to the announcement of Chinese tariffs on U.S. soybeans.[112] If the 2 million metric tons of soybeans were crushed to produce vegetable oil, this oil, along with the 0.10 million metric ton decrease in vegetable oil exports, could be used to produce approximately 130 million gallons of biodiesel and renewable diesel, less than 6 percent of the current market.[113] We believe this is a reasonable estimate of the volume of biodiesel and renewable diesel that could be produced from a decrease in exports of oilseeds and vegetable oil from the U.S. in 2019. However, any biodiesel and renewable diesel produced from soybeans previously exported to China are necessarily diverted from other uses (even if the reason for this diversion is the tariffs, rather than the RFS program), and are therefore more likely to have the adverse unintended impacts associated with diverted feedstocks. We therefore have not included this potential volume increase in our assessment of the reasonably attainable volume of these fuels in 2019. These feedstocks are a likely source of additional supply of advanced biodiesel and renewable diesel that could contribute towards satisfying the difference between the reasonably attainable volume of these fuels and the 2.8 billion gallons of these fuels projected to be used to satisfy the advanced biofuel volume for 2019. We further note that even if the 130 million gallons of biodiesel and renewable diesel that could be produced from a

[105] For example, corn oil is a co-product of corn grown primarily for feed or ethanol production, while soy and canola are primarily grown as livestock feed.

[106] According to EIA data 6,230 million pounds of soy bean oil and 1,579 million pounds of corn oil were used to produce biodiesel in the U.S. in 2017. Other significant sources of feedstock were yellow grease (1,471 million pounds), canola oil (1,452 million pounds), and white grease (591 million pounds). Numbers from EIA's September 2018 Monthly Biodiesel Production Report.

[107] This position is supported by several commenters, including the South Dakota Soybean Association (EPA–HQ–OAR–2018–0167–0389), the International Council on Clean Transportation (EPA–HQ–OAR–2018–0167–0531), and the Union of Concerned Scientists (EPA–HQ–OAR–2018–0167–0535).

[108] 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 soybean oil (*http://extension.missouri.edu/p/G1990*), which is the largest source of feedstock used to produce advanced biodiesel and renewable diesel. Conversion rates for other types of vegetable oils used to produce biodiesel and renewable diesel are similar to those for soybean oil.

[109] *World Agricultural Supply and Demand Estimates.* United States Department of Agriculture. October 11, 2018.

[110] Hart, Chad and Schulz, Lee. *China's Importance in U.S. Ag Markets.* CARD Agricultural Policy Review. Available online: *https://www.card.iastate.edu/ag_policy_review/article/?a=41.*

[111] Durisin, Megan and Dodge, Sam. *Why Soybeans Are at the Heart of the U.S.-China Trade War.* Bloomberg. Published July 5, 2018. Updated July 9, 2018.

[112] Projected trade of oilseeds decreased from 63.46 million metric tons for 2018/2019 in the June 2018 WASDE report to 57.20 million metric tons for 2018/2019 in the October 2018 WASDE.

[113] To calculate the quantity of oil that can be produced from 2 million metric tons of oilseeds we converted this total to approximately 73 million bushels of soybeans, assuming 60 pounds per bushel. We then calculated that this quantity of soybeans could produce approximately 800 million pounds of oil assuming each bushel of soybeans produced 11 pounds of oil. To this, we added the approximately 220 million pounds (0.10 million metric tons) of decreased exports of vegetable oils for a total of 1.02 billion pounds of vegetable oils. Finally, we divided this total by 7.7 pounds of vegetable oil per gallon of biodiesel (or renewable diesel) to estimate that 130 million gallons of biodiesel and renewable diesel could be produced from these feedstocks. Support for the 7.7 pounds of vegetable oil per gallon of biodiesel conversion factor can be found here: *http://extension.missouri.edu/p/G1990. All other conversion factors are from* Irwin, S. "The Value of Soybean Oil in the Soybean Crush: Further Evidence on the Impact of the U.S. Biodiesel Boom." *farmdoc daily* (7):169, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, September 14, 2017.

decrease in exports of oilseeds and vegetable oil from the U.S. in 2019 were included in our projection of the reasonably attainable volume of advanced biodiesel and renewable diesel, this projection would still be less than 2.8 billion gallons.

In addition to virgin vegetable oils, we also expect increasing volumes of distillers corn oil [114] to be available for use in 2019. The WASDE report does not project distillers corn oil production, so EPA must use an alternative source to project the growth in the production of this feedstock. For this final rule EPA is using results from the World Agricultural Economic and Environmental Services (WAEES) model to project the growth in the production of distillers corn oil.[115] In assessing the likely increase in the availability of distillers corn oil from 2018 to 2019, the authors of the WAEES model considered the impacts of an increasing adoption rate of distillers corn oil extraction technologies at domestic ethanol production facilities, as well as increased corn oil extraction rates enabled by advances in this technology. The WAEES model projects that production of distillers corn oil in 2018 will increase by approximately 120 million pounds from the 2017/2018 to the 2018/2019 agricultural marketing year. This quantity of feedstock could be used to produce approximately 15 million gallons of biodiesel or renewable diesel. We believe it is reasonable to use these estimates from the WAEES model for these purposes.

While much of the increase in advanced biodiesel and renewable diesel feedstocks produced in the U.S. from 2018 to 2019 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, as many of these feedstocks that can be recovered economically are already being used to produce biodiesel or renewable diesel, or in other markets. In fact, the WAEES model projects an increase of only 5 million gallons in the volume of biodiesel produced from feedstocks other than soybean oil, canola oil, and distillers corn oil from 2018 to 2019.[116] Conversely, an assessment conducted by LMC in 2017 and submitted in comments on our proposed rule projected that the waste oil supply in the U.S. could increase by approximately 2.4 million metric tons from 2016 to 2022.[117] This estimate represents a growth rate of approximately 0.4 billion tons per year, or enough feedstock to produce approximately 115 million gallons of biodiesel and renewable diesel per year. This estimate, however, only accounts for potential sources of feedstock, and not for the economic viability of recovering waste oils. While we acknowledge that additional waste oils could be collected in 2019, these waste oils will only be collected if it is economically viable to do so. Neither the results of the WAEES model, nor the future prices of soybean oil,[118] suggest the prices for waste oils will increase to a level that will incentivize significantly more wasted oil collection in 2019 relative to previous years. We have therefore included an additional 5 million gallons of advanced biodiesel and renewable diesel from wasted oils in our assessment of the reasonably attainable volume for 2019, consistent with the results of the WAEES model.

In total, we expect that increases in feedstocks produced in the U.S. are sufficient to produce approximately 60 million more gallons of advanced biodiesel and renewable diesel in 2019 relative to 2018. This number includes 40 million gallons from increased vegetable oil production, 15 million gallons from increased corn oil production, and 5 million gallons from increased waste oil collection. This number does not include additional volumes related to decreases in exported volumes of soybeans to China as a result of tariffs and/or increased collection of waste oils. Decreased exports of soybeans and soybean oil, represent feedstocks diverted from use in other countries, while any increase in the collection of waste oils is highly uncertain. Our projection also does not consider factors which could potentially decrease the availability of advanced biofuel feedstocks that could be used to produce biodiesel or renewable diesel, such as an increase in the volume of vegetable oils used in food markets or other non-biofuel industries. In our 2018 final rule, we determined that 2.55 billion gallons of advanced biodiesel and renewable diesel were reasonably attainable in 2018,[119] therefore our projection of the reasonably attainable volume of advanced biodiesel and renewable diesel in 2019 is 2.61 billion gallons.

EPA's projections of the growth of advanced feedstocks does not, however, suggest that the total supply of advanced biodiesel and renewable diesel to the U.S. in 2018 will be limited to 2.61 billion gallons. Rather, this is the volume of these fuels that we project could be supplied while seeking to minimize quantities of advanced feedstocks or biofuels from existing uses. The October 2018 WASDE reports that production of vegetable oil in the U.S. in the 2018/2019 market year will be sufficient to produce approximately 3.5 billion gallons of biodiesel and renewable diesel (including both advanced and conventional biofuels) if the entire volume of vegetable oil was used to produce these fuels. Additional advanced biodiesel and renewable diesel could be produced from waste fats, oils, and greases. The global production of vegetable oil projected in the 2018/2019 marketing year would be sufficient to produce approximately 58.1 billion gallons of biodiesel and renewable diesel (including both advanced and conventional biofuels).[120] While it would not be reasonable to assume that all, or even a significant portion, of global vegetable oil production could be available to produce biodiesel or renewable diesel supplied to the U.S. for a number of reasons,[121] the large global supply of vegetable oil strongly suggests that under the right market conditions 2.8 billion gallons of advanced biodiesel and renewable diesel is attainable in 2019. Reaching these levels, however, may result in the diversion of advanced feedstocks currently used in other markets and/or the import of biodiesel and renewable diesel from these feedstocks.

Further, the supply of advanced biodiesel and renewable diesel to the U.S. in 2019 could be increased by

[114] Distillers corn oil is non-food grade corn oil produced by ethanol production facilities.

[115] For the purposes of this rule, EPA relied on WAEES modeling results submitted as comments by the National Biodiesel Board on the 2019 proposed rule (Kruse, J., ''Implications of an Alternative Advanced and Biomass Based Diesel Volume Obligation for Global Agriculture and Biofuels'', August 13, 2018, World Agricultural Economic and Environmental Services (WAEES)).

[116] Id.

[117] LMC International. *Global Waste Grease Supply.* August 2017.

[118] CME Group Soybean Oil Futures Quotes. Accessed online October 23, 2018.

[119] 82 FR 58512 (December 12, 2017).

[120] The October 2018 WASDE projects production of vegetable oils in 2018/19 in the U.S. and the World to be 12.27 and 203.33 million metric tons respectively. To convert projected vegetable oil production to potential biodiesel and renewable diesel production we have used a conversion of 7.7 pounds of feedstock per gallon of biodiesel.

[121] These reasons include the demand for vegetable oil in the food, feed, and industrial markets both domestically and globally; constraints related to the production, import, distribution, and use of significantly higher volumes of biodiesel and renewable diesel; and the fact that biodiesel and renewable diesel produced from much of the vegetable oil available globally would not qualify as an advanced biofuel under the RFS program.

approximately 150 million gallons if all of the exported volumes of these fuels were used domestically. Diverting this fuel to markets in the U.S. may be complicated, however, as doing so would likely require higher prices for these fuels in the U.S. (to divert the fuels from foreign markets that are presumably more profitable currently). It may also be more difficult and costly to distribute this additional volume of biodiesel and renewable diesel to domestic markets than the current foreign markets. Finally, reducing advanced biodiesel and renewable diesel exports may indirectly result in the decreased availability of imported volumes of these fuels, as other countries seek to replace volumes previously imported from the U.S.

EPA next considered potential changes in the imports of advanced biodiesel and renewable diesel produced in other countries. In previous years, significant volumes of foreign produced advanced biodiesel and renewable diesel have been supplied to markets in the U.S. (see Table IV.B.2–1 above). These significant imports were likely the result of a strong U.S. demand for advanced biodiesel and renewable diesel, supported by the RFS standards, the low carbon fuel standard (LCFS) in California, the biodiesel blenders tax credit, and the opportunity for imported biodiesel and renewable diesel to realize these incentives. As in 2018, we have not included the potential for increased volumes of imported advanced biodiesel and renewable diesel in our projection of the reasonably attainable volume for 2019. There is a far higher degree of uncertainty related to the availability and production of advanced biodiesel and renewable diesel in foreign countries, as this supply can be impacted by a number of unpredictable factors such as the imposition of tariffs and increased incentives for the use of these fuels in other countries (such as tax incentives or blend mandates). EPA also lacks the data necessary to determine the quantity of these fuels that would otherwise be produced and used in other countries, and thus the degree to which the RFS standards are simply diverting this fuel from use in other countries as opposed to incentivizing additional production.

The RFS requirements and California's LCFS are expected to continue to provide an incentive for imports of advanced biodiesel and renewable diesel in 2019. Several other factors, however, may negatively impact the volume of these fuels imported in 2019. In February 2018 the biodiesel blenders tax credit, which had expired at the end of 2016, was retroactively reinstated for biodiesel blended in 2017 but was not extended to apply to biodiesel blended in 2018 or 2019.[122] Perhaps more significantly, in December 2017 the U.S. International Trade Commission adopted tariffs on biodiesel imported from Argentina and Indonesia.[123] According to data from EIA,[124] no biodiesel was imported from Argentina or Indonesia since September 2017, after a preliminary decision to impose tariffs on biodiesel imported from these countries was announced in August 2017. Biodiesel imports from these countries were significant prior to the imposition of tariffs, accounting for over 550 million gallons in 2016 and approximately 290 million gallons in 2017.

Despite these tariffs, imports of biodiesel and renewable diesel have not ceased. From January to June 2018, biodiesel and renewable diesel imports (according to EIA data) are approximately 172 million gallons, suggesting an annual volume of approximately 390 million gallons if the current import rates and seasonal trends hold through the end of the year.[125] This suggests that imported volumes of advanced biodiesel and renewable diesel from countries other than Argentina and Indonesia may increase by approximately 100 million gallons in 2018 (from approximately 290 million gallons in 2017). However overall imports have not returned to the levels observed prior to the tariffs. At this time, the ultimate impact these tariffs will have on overall imports of advanced biodiesel and renewable diesel to the U.S. remains uncertain. It appears likely that imports of advanced biodiesel and renewable diesel from other countries not impacted by these tariffs will continue to increase, however these increases may not be sufficient to replace all of the biodiesel imported from Argentina and Indonesia in previous years by 2019.

In addition to EPA's assessment of the market's ability to produce, import, distribute, and use the 2.8 billion gallons of advanced biodiesel and renewable diesel projected to be used in 2019 to meet the advanced biofuel volume requirement, EPA compared the projected increase in these fuels to the increases observed in recent years. While each year's circumstances are unique, a projected increase comparable to pas increases further confirms that the volume is attainable. Domestic production of advanced biodiesel and renewable diesel in 2016 and 2017 was approximately 1.85 billion gallons, and is expected to increase to approximately 2.15 billion gallons in 2018 based on production data through September 2018. Of this total, approximately 150 million gallons of domestically produced biodiesel was exported in 2016 and 2017. If imported biodiesel and renewable diesel volumes continue to increase through 2019 by approximately 100 million gallons per year (to approximately 500 million gallons in 2019) domestic production would need to increase by approximately 300 million gallons in 2019 to reach a total advanced biodiesel and renewable diesel supply of 2.8 billion gallons by 2019.[126] This growth is attainable, as it is approximately equal to the increase in the domestic production of advanced biodiesel and renewable diesel from 2017 to 2018 (approximately 300 million gallons), and significantly lower than the rate of growth observed in previous years (for example the increase of 653 million gallons from 2012 to 2013 or the increase of 779 million gallons from 2015 to 2016). We note, however, that using this volume of advanced biodiesel and renewable diesel in the U.S. may result in the diversion of advanced biodiesel and renewable diesel and/or feedstocks used to produce these fuels, as advanced biodiesel and renewable diesel that is currently exported may instead be used in the U.S. and alternative sources for significant volumes of these fuels would need to be found.

After a careful consideration of the factors discussed above, EPA has determined that the 2.8 billion gallons of advanced biodiesel and renewable diesel projected needed to satisfy the implied statutory volume for non-cellulosic advanced biofuel in 2019 (4.5 billion gallons) are attainable. The total

[122] Bipartisan Budget Act of 2018, Public Law 115–123, 132 Stat. 64 sections 40406, 40407, and 40415 (2018).

[123] "Biodiesel from Argentina and Indonesia Injures U.S. Industry, says USITC," Available online at: *https://www.usitc.gov/press_room/news_release/2017/er1205ll876.htm.*

[124] See "U.S. Imports of Biodiesel" available in docket EPA–HQ–OAR–2018–0167.

[125] See "U.S. Imports of Biodiesel" available in docket EPA–HQ–OAR–2018–0167 and "Projecting Biodiesel and Renewable Diesel Production and Imports for 2018 (November 2018)" Memorandum from Dallas Burkholder to EPA Docket EPA–HQ–OAR–2018–0167.

[126] This estimate assumes that the U.S. continues to export approximately 150 million gallons of biodiesel per year in 2019. Alternatively, if the U.S. consumes all domestically produced biodiesel and renewable diesel, rather than exporting any of this fuel, domestic production of advanced biodiesel and renewable diesel would have to increase by approximately 150 million gallons in 2019. This volume is approximately equal to the increase in the domestic production of advanced biodiesel and renewable diesel from 2018 to 2019, which we also believe is attainable.

production capacity of registered biodiesel and renewable diesel producers is significantly higher than 2.8 billion gallons, even if only those facilities that generated RINs for advanced biodiesel and renewable diesel in 2017 are considered (3.1 billion gallons). This volume (2.8 billion gallons) is only 200 million gallons higher than the total volume of biodiesel and renewable diesel supplied in 2016 (approximately 2.6 billion gallons), strongly suggesting that production capacity and the ability to distribute and use biodiesel and renewable diesel will not limit the supply of advanced biodiesel and renewable diesel to a volume below 2.8 billion gallons in 2018. Sufficient feedstocks are expected to be available to produce this volume of advanced biodiesel and renewable diesel in 2019, however doing so may result in some level of diversion of advanced feedstocks and/or advanced biodiesel and renewable diesel from existing uses. Finally, the increase in the production and import of advanced biodiesel and renewable diesel projected from 2018 to 2019 is comparable to (or has been exceeded) by the increases observed in recent years. While we do not believe it will be necessary, in the event that the supply of advanced biodiesel and renewable diesel falls short of the projected 2.8 billion gallons in 2019, obligated parties could rely on the significant volume of carryover advanced RINs projected to be available in 2019 (See Section II.B for a further discussion of carryover RINs).

C. Volume Requirement for Advanced Biofuel

In exercising the cellulosic waiver authority for 2017 and earlier, we determined it was appropriate to require a partial backfilling of missing cellulosic volumes with volumes of non-cellulosic advanced biofuel we determined to be reasonably attainable, notwithstanding the increase in costs associated with those decisions.[127] For the 2018 standards, in contrast, we placed a greater emphasis on cost considerations in the context of balancing the various considerations, ultimately concluding that the applicable volume requirement should be based on the maximum reduction permitted under the cellulosic waiver authority. For 2019 we concluded that while it may be possible that more than 4.92 billion gallons of advanced biofuel is attainable in 2019, requiring additional volumes would lead to higher costs, and would likely result in feedstock switching and/or diversion of foreign advanced biofuels.[128] We do not believe that it would be appropriate to set the advanced biofuel volume requirement higher than 4.92 billion gallons given that it could lead to these results.

We further note that while there is some uncertainty in the volume of advanced biofuel that may be attainable or reasonably attainable, even if greater volumes of advanced biofuel are attainable or reasonably attainable, the high cost of these fuels provides sufficient justification for our decision to reduce the advanced biofuel volume for 2019 by the maximum amount under the cellulosic waiver authority. In Section V we present illustrative cost projections for sugarcane ethanol and soybean biodiesel in 2019, the two advanced biofuels that would be most likely to provide the marginal increase in volumes of advanced biofuel in 2019 in comparison to 2018. Sugarcane ethanol results in a cost increase compared to gasoline that ranges from $0.39–$1.04 per ethanol-equivalent gallon. Soybean biodiesel results in a cost increase compared to diesel fuel that ranges from $0.74–$1.23 per ethanol-equivalent gallon. The cost of these renewable fuels is high as compared to the petroleum fuels they displace.

Based on the information presented above, we believe that 4.92 billion gallons of advanced biofuel is attainable in 2019. After a consideration of the projected volume of cellulosic biofuel and reasonably attainable volumes of imported sugarcane ethanol and other advanced biofuels, we determined that 2.8 billion gallons of advanced biodiesel and renewable diesel would be needed to reach 4.92 billion gallons of advanced biofuel. Based on a review of the factors relevant to the supply of advanced biodiesel and renewable diesel as discussed in Section IV.B.2 above, including historic production and import data, the production capacity of registered biodiesel and renewable diesel producers, and the availability of advanced feedstocks, we have determined that 2.8 billion gallons of advanced biodiesel and renewable diesel is attainable in 2019.

However, we also acknowledge that 2.8 billion gallons of advanced biodiesel and renewable diesel is higher than the approximately 2.5 billion gallons projected to be supplied in 2018 based on available data through September 2018. While 2.8 billion gallons would require an increase in supply of approximately 300 million gallons between 2018 and 2019, this is approximately equal to the increase in domestic production of these fuels from 2017 to 2018, and approximately 100 million gallons less than the increase in the supply of advanced biodiesel and renewable diesel between 2017 and 2018 after adjusting for imported volumes of these fuels from Argentina and Indonesia in 2017.[129] Nevertheless, there is some uncertainty regarding whether the market will actually supply 2.8 billion gallons in 2019.

In the event that the market does not supply this volume, the carryover RIN bank represents a source of RINs that could help obligated parties meet an advanced biofuel volume requirement of 4.92 billion gallons in 2019 if the market fails to supply sufficient advanced biofuels in 2019. As discussed in greater detail in Section II.B.1 of the preamble, carryover RINs provide obligated parties compliance flexibility in the face of substantial uncertainties in the transportation fuel marketplace, and provide a liquid and well-functioning RIN market upon which success of the entire program depends. We currently estimate that there are approximately 620 million advanced carryover RINs available.

In response to the proposal, we received comments supporting our proposed volume requirement of 4.92 billion gallons, as well as comments requesting higher or lower volumes. EPA's assessment of these comments is provided in the RTC document.

It should be noted that by exercising the full cellulosic waiver authority for advanced biofuel, the implied statutory volume target for non-cellulosic advanced biofuel of 4.5 billion gallons in 2019 would be maintained. This represents an increase of 0.5 billion gallons from the 2018 volume requirements.

[127] See, *e.g.,* Renewable Fuel Standards for 2014, 2015 and 2016, and the Biomass-Based Volume for 2017: Response to Comments (EPA–420–R–15–024, November 2015), pages 628–631, available in docket EPA–HQ–OAR–2015–0111–3671.

[128] There will likely be some feedstock switching and/or diversion of foreign advanced biofuels to achieve an advanced biofuel volume of 4.92 billion gallons. However, further reductions in the advanced biofuel volume requirement would require the use of the general waiver authority, which we do not believe is warranted.

[129] To calculate the increase in the supply of advanced biodiesel and renewable diesel between 2017 and 2018 after adjusting for imported volumes of these fuels from Argentina and Indonesia in 2017, we subtracted the volume of biodiesel imported from Argentina and Indonesia in 2017 from the total volume of these fuels supplied in 2017 and compared this volume of advanced biodiesel and renewable diesel supplied in 2018. There have been no imports of biodiesel from Argentina and Indonesia since August 2017, when tariffs on biodiesel imported from these countries were announced.

D. Volume Requirement for Total Renewable Fuel

As discussed in Section II.A.1, we believe that the cellulosic waiver provision is best interpreted to reduce the advanced biofuel and total renewable fuel volumes by equal amounts. For the reasons we have previously articulated, we believe this interpretation is consistent with the statutory language and best effectuates the objectives of the statute. If we were to reduce the total renewable fuel volume requirement by a lesser amount than the advanced biofuel volume requirement, we would effectively increase the opportunity for conventional biofuels to participate in the RFS program beyond the implied statutory volume of 15 billion gallons. Applying an equal reduction of 8.12 billion gallons to both the statutory target for advanced biofuel and the statutory target for total renewable fuel results in a total renewable fuel volume of 19.92 billion gallons as shown in Table IV.A–1.[130] This volume of total renewable fuel results in an implied volume of 15 billion gallons of conventional fuel, which is the same as in the 2018 final rule.

In response to the July 10, 2018 proposal, some stakeholders said that EPA had not evaluated whether 19.92 billion gallons of total renewable fuel was attainable as it did for advanced biofuel. As a result, they indicated that EPA had not fulfilled its responsibilities under the statute and had not given stakeholders meaningful opportunity to evaluate the proposed volume requirement. In response, we note first of all that we proposed, and are finalizing, the maximum reduction possible under the cellulosic waiver authority, and thus no additional reductions are possible under that authority. Secondly, while the general waiver authority does provide a means for further reductions in the applicable volume requirement for total renewable fuel, the record before us does not indicate that a waiver is warranted as described in Section II of the RTC.

Notwithstanding the fact that we did not propose to use, and in this final rule are not using the general waiver authority, we did in fact provide a description of the ways in which the market could make 19.92 billion gallons volume of total renewable fuel available in 2019 in a memorandum to the docket.[131] Some stakeholders pointed specifically to a lack of any analysis of the volumes of E0, E15, and E85 as a reason that the assessment in that memorandum was insufficient. However, the supply and use of these gasoline-ethanol blends is strongly influenced by consumer demand. We noted in the proposal that, regardless of the outcome of such an assessment, we were precluded from waiving volumes due to inadequate domestic supply insofar as our assessment depended on a consideration of demand-side factors.

More importantly, an analysis of the volumes of E0, E15, and E85 that could be supplied in 2019 was not necessary to determine whether the volume requirement of 19.92 billion gallons could be reached.[132] This is because it is the total volume of ethanol that can be consumed that is the relevant consideration in evaluating the reasonableness of 19.92 billion gallons, not the specific volumes of E0, E15, and E85.[133] To this end, we began with the assumption that the nationwide average ethanol concentration could reach 10.11 percent in 2019 because it had reached this same level in 2017. In the context of a market wherein nearly all gasoline contains 10 percent ethanol, the average ethanol concentration provides a better indication of the net effect of all E0, E15, and E85 without the need to estimate the volumes of each. In essence, our assumption that the average ethanol concentration would be at least 10.11 percent provided a surrogate for attempting to separately estimate volumes of E0, E15, and E85, which would contain a high degree of uncertainty. Thus, as a result our use of the average ethanol content is both more straightforward and more robust. In addition to a consideration of the volumes of non-ethanol renewable fuel that could be available in 2019, our consideration of 10.13 percent nationwide average ethanol concentration led us to a proposed determination that the market could make available 19.88 billion gallons of total renewable fuel in 2019. Following this same approach, the updated market impacts for this final rule similarly demonstrates that the market can make available 19.92 billion gallons of total renewable fuel in 2019.

V. Impacts of 2019 Volumes on Costs

In this section, EPA presents its assessment of the illustrative costs of the final 2019 RFS rule. It is important to note that these illustrative costs do not attempt to capture the full impacts of this final rule. We frame the analyses we have performed for this rule as ''illustrative'' so as not to give the impression of comprehensive estimates. These estimates are provided 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 illustrative cost estimates. For example, there are many different feedstocks that could be used to produce biofuels, and there is a significant amount of heterogeneity in the costs associated with these different feedstocks and fuels. Some renewable 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.

Illustrative cost estimates are provided below for this final rule. The volumes for which we have provided cost estimates and are described in Sections III and IV, and result from reducing the cellulosic, advanced, and total renewable fuel volume requirements using the cellulosic waiver authority under CAA section 211(o)(7)(D)(i). For this rule we examine two different cases. In the first case, we provide illustrative cost estimates by comparing the final 2019 renewable fuel volumes to 2019 statutory volumes. In the second case, we examine the final 2019 renewable fuel volumes to the final 2018 renewable fuel volumes to estimate changes in the annual costs of the final 2019 RFS volumes in comparison to the 2018 volumes.

[130] EPA also considered the availability of carryover RINs in determining whether reduced use of the cellulosic waiver authority would be warranted. For the reasons described in Section II.B, we do not believe this to be the case.

[131] ''Updated market impacts of biofuels in 2019,'' memorandum from David Korotney to docket EPA–HQ–OAR–2018–0167. In prior actions including the 2019 proposed rule and the 2018 annual rule proposal, similar analyses indicated that the market was capable of both producing and consuming the required volume of renewable fuels, and that as a result there was no basis for finding an inadequate domestic supply of total renewable fuel. See 82 FR 34229 & n.82 (July 21, 2017). Given the D.C. Circuit's decision in *ACE,* however, assessment of demand-side constraints is no longer relevant for determining inadequate domestic supply. However, we believe consideration of the ways that the market could make this volume available may still be generally relevant to whether and how EPA exercises its waiver authorities, such as our consideration of whether the volumes will cause severe economic harm.

[132] Cf. *API,* 706 F.3d at 481 (''Nothing in the text of § 7545(o)(7)(D)(i), or any other applicable provision of the Act, plainly requires EPA to support its decision not to reduce the applicable volume of advanced biofuels with specific numerical projections.'').

[133] Importantly, EPA is not requiring the use of any specific ethanol blend; rather, the market chooses which biofuels and blends to use to satisfy the biofuel standards. See 42 U.S.C. 7545(o)(2)(A)(iii)(II)(bb) (the RFS program ''shall not'' ''impose any per-gallon obligation for the use of renewable fuel'').

A. Illustrative Costs Analysis of Exercising the Cellulosic Waiver Authority Compared to the 2019 Statutory Volumes Baseline

In this section, EPA provides illustrative cost estimates that compare the final 2019 cellulosic biofuel volume requirements to the 2019 cellulosic statutory volume that would be required absent the exercise of our cellulosic waiver authority under CAA section 211(o)(7)(D)(i).[134] As described in Section III, we are finalizing a cellulosic volume of 418 million gallons for 2019, using our cellulosic waiver authority to waive the statutory cellulosic volume of 8.5 billion gallons by 8.082 billion gallons. Estimating the cost savings from volumes that are not projected to be produced is inherently challenging. EPA has taken the relatively straightforward methodology of multiplying this waived cellulosic volume by the wholesale per-gallon costs of cellulosic biofuel production relative to the petroleum fuels they displace.

While there may be growth in other cellulosic renewable fuel sources, we believe it is appropriate to use cellulosic ethanol produced from corn kernel fiber as the representative cellulosic renewable fuel. The majority of liquid cellulosic biofuel in 2019 is expected to be produced using this technology, and application of this technology in the future could result in significant incremental volumes of cellulosic biofuel. In addition, as explained in Section III, we believe that production of the major alternative cellulosic biofuel—CNG/LNG derived from biogas—is limited to approximately 538 million gallons due to a limitation in the number of vehicles capable of using this form of fuel.[135]

EPA uses a ''bottom-up'' engineering cost analysis to quantify the costs of producing a gallon of cellulosic ethanol derived from corn kernel fiber. There are multiple processes that could yield cellulosic ethanol from corn kernel fiber. EPA assumes a cellulosic ethanol production process that generates biofuel using distiller's grains, a co-product of generating corn starch ethanol that is commonly dried and sold into the feed market as distillers dried grains with solubles (DDGS), as the renewable biomass feedstock. We assume an enzymatic hydrolysis process with cellulosic enzymes to break down the cellulosic components of the distiller's grains. This process for generating cellulosic ethanol is similar to approaches currently used by industry to generate cellulosic ethanol at a commercial scale, and we believe these cost estimates are likely representative of the range of different technology options being developed to produce ethanol from corn kernel fiber. We then compare the per-gallon costs of the cellulosic ethanol to the petroleum fuels that would be replaced at the wholesale stage, since that is when the two are blended together.

These cost estimates do not consider taxes, retail margins, or other costs or transfers that occur at or after the point of blending (transfers are payments within society and are not additional costs). We do not attempt to estimate potential cost savings related to avoided infrastructure costs (*e.g.,* the cost savings of not having to provide pumps and storage tanks associated with higher-level ethanol blends). When estimating per-gallon costs, we consider the costs of gasoline on an energy-equivalent basis as compared to ethanol, since more ethanol gallons must be consumed to travel the same distance as on gasoline due to the ethanol's lower energy content.

Table V.A–1 below presents the cellulosic fuel cost savings with this final rule that are estimated using this approach.[136] The per-gallon cost difference estimates for cellulosic ethanol ranges from $0.27–$2.80 per ethanol-equivalent gallon.[137] Given that cellulosic ethanol production is just starting to become commercially available, the cost estimates have a significant range. Multiplying those per-gallon cost differences by the amount of cellulosic biofuel waived in this final rule results in approximately $2.2–$23 billion in cost savings.

TABLE V.A–1—ILLUSTRATIVE COSTS OF EXERCISING THE CELLULOSIC WAIVER AUTHORITY COMPARED TO THE 2019 STATUTORY VOLUMES BASELINE

Cellulosic Volume Required (Million Ethanol-Equivalent Gallons)	418
Change in Required Cellulosic Biofuel from 2019 Statutory Volume (Million Ethanol-Equivalent Gallons)	(8,082)
Cost Difference Between Cellulosic Corn Kernel Fiber Ethanol and Gasoline Per Gallon ($/Ethanol-Equivalent Gallons) [138]	$0.27–$2.80
Annual Change in Overall Costs (Million $) [139]	$(2,200)–$(23,000)

B. Illustrative Costs of the 2019 Volumes Compared to the 2018 RFS Volumes Baseline

In this section, we provide illustrative cost estimates for EPA exercising its cellulosic waiver authority to reduce statutory cellulosic volumes for 2019 (with corresponding reductions to the advanced and total renewable fuel volumes) compared to the final 2018 RFS volumes. This results in an increase in cellulosic volumes for the 2019 RFS of 130 gallons (ethanol-equivalent) and an increase in the non-cellulosic advanced biofuel volumes for 2019 of 500 million gallons (ethanol-equivalent).

1. Cellulosic Biofuel

We anticipate that the increase in the final 2019 cellulosic biofuel volumes would be composed of 5 million gallons of liquid cellulosic biofuel and 125

[134] Since the implied non-cellulosic advanced biofuel and implied conventional renewable fuel volumes are unchanged from the statutory implied volumes, see supra note, there is no need to estimate cost impacts for these volumes.

[135] EPA projects that 538 million ethanol-equivalent gallons of CNG/LNG will be used as transportation fuel in 2019 based on EIA's October 2018 Short Term Energy Outlook (STEO). To calculate this estimate, EPA used the Natural Gas Vehicle Use from the STEO Custom Table Builder (0.12 billion cubic feet/day in 2019). This projection includes all CNG/LNG used as transportation fuel from both renewable and non-renewable sources. EIA does not project the amount of CNG/LNG from biogas used as transportation fuel. To convert billion cubic feet/day to ethanol-equivalent gallons EPA used conversion factors of 946.5 BTU per cubic foot of natural gas (lower heating value, per calculations using ASTM D1945 and D3588) and 77,000 BTU of natural gas per ethanol-equivalent gallon per 40 CFR 80.1415(b)(5).

[136] Details of the data and assumptions used can be found in a Memorandum available in the docket entitled ''Cost Impacts of the Final 2019 Annual Renewable Fuel Standards'', Memorandum from Michael Shelby, Dallas Burkholder, and Aaron Sobel available in docket EPA–HQ–OAR–2018–0167.

[137] For the purposes of the cost estimates in this section, EPA has not attempted to adjust the price of the petroleum fuels to account for the impact of the RFS program, since the changes in the renewable fuel volume are relatively modest. Rather, we have simply used the wholesale price projections for gasoline and diesel as reported in EIA's October 2018 STEO.

[138] For this table and all subsequent tables in this section, approximate costs in per gallon cost difference estimates are rounded to the cents place.

[139] For this table and all subsequent tables in this section, approximate resulting costs (other than in per-gallon cost difference estimates) are rounded to two significant figures.

million gallons of CNG/LNG derived from landfill biogas. Based upon the methodology outlined in Section V.A, we use corn kernel fiber as the representative liquid cellulosic biofuel to develop cost estimates of cellulosic ethanol. We estimate a cost difference between cellulosic corn fiber-derived ethanol and gasoline of $0.27–$2.80 on an ethanol-equivalent gallon basis. Next, the per-gallon costs of cellulosic renewable fuel are multiplied by the 5 million gallon increase between the final 2019 cellulosic volume and the final 2018 cellulosic RFS volume requirements to estimate the total costs from the increase in cellulosic ethanol.

For CNG/LNG-derived cellulosic biogas, we provide estimates of the cost of displacing natural gas with CNG/LNG derived from landfill biogas to produce 125 million ethanol-equivalent gallons of cellulosic fuel. To estimate the cost of production of CNG/LNG derived from landfill gas (LFG), EPA uses Version 3.2 of the Landfill Gas Energy Cost Model, or LFG cost-Web. EPA ran the financial cost calculator for projects with a design flow rate of 1,000 and 10,000 cubic feet per minute with the suggested default data. The costs estimated for this analysis exclude any pipeline costs to transport the pipeline quality gas, as well as any costs associated with compressing the gas to CNG/LNG. These costs are not expected to differ significantly between LFG or natural gas. In addition, the cost estimates excluded the gas collection and control system infrastructure at the landfill, as EPA expects that landfills that begin producing high BTU gas in 2019 are very likely to already have this infrastructure in place.[140]

To estimate the illustrative cost impacts of the change in CNG/LNG derived from LFG, we compared the cost of production of CNG/LNG derived from LFG in each case to the projected price for natural gas in 2019 in EIA's October 2018 STEO.[141] Finally, we converted these costs to an ethanol-equivalent gallon basis. The resulting cost estimates are shown in Table V.B.2–1. Adding the cost of cellulosic ethanol to the costs of CNG/LNG landfill gas, the total costs of the final 2019 cellulosic volume compared to 2018 RFS cellulosic volume range from $(2.9)–$23 million.

2. Advanced Biofuel

EPA provides a range of illustrative cost estimates for the increases in the advanced standard of 500 million ethanol-equivalent gallons using two different advanced biofuels. In the first scenario, we assume that all the increase in advanced biofuel volumes is comprised of soybean oil BBD. In the second scenario, we assume that all the increase in the advanced volume is comprised of sugarcane ethanol from Brazil.

Consistent with the analysis in previous annual RFS volume rules, a ''bottom-up'' engineering cost analysis is used that quantifies the costs of producing a gallon of soybean-based biodiesel and then compares that cost to the energy-equivalent gallon of petroleum-based diesel. We compare the cost of biodiesel and diesel fuel at the wholesale stage, since that is when the two are blended together and represents the approximate costs to society absent transfer payments and any additional infrastructure costs. On this basis, EPA estimates the costs of producing and transporting a gallon of biodiesel to the blender in the U.S.

To estimate the illustrative costs of sugarcane ethanol, we compare the cost of sugarcane ethanol and gasoline at the wholesale stage, since that is when the two are blended together and represents the approximate costs to society absent transfer payments and any additional infrastructure costs (*e.g.,* blender pumps). On this basis, EPA estimates the costs of producing and transporting a gallon of sugarcane ethanol to the blender in the U.S. More background information on the cost assessment described in this Section, including details of the data sources used and assumptions made for each of the scenarios, can be found in a Memorandum available in the docket.[142]

Table V.B.2–1 below also presents estimates of per energy-equivalent gallon costs for producing: (1) Soybean biodiesel (in ethanol-equivalent gallons) and (2) Brazilian sugarcane ethanol, relative to the petroleum fuels they replace at the wholesale level. For each of the fuels, these per-gallon costs are then multiplied by the increase in the 2019 non-cellulosic advanced volume relative to the 2018 final advanced standard volume to obtain an overall cost increase of $190–$610 million.

In addition, in Table V.B.2–1, we also present estimates of the total cost of this final rule relative to 2018 RFS fuel volumes. We add the increase in cost of the final 2019 cellulosic standard volume, $(2.9)–$23 million, with the additional costs of the increase in non-cellulosic advanced biofuel volumes resulting from the final 2019 advanced standard volume, $190–$610 million. The overall total costs of this final rule range from $190–$630 million (after rounding to two significant figures).

TABLE V.B.2–1—ILLUSTRATIVE COSTS OF THE 2019 VOLUMES COMPARED TO THE 2018 RFS VOLUMES BASELINE

Cellulosic Volume	
Corn Kernel Fiber Cellulosic Ethanol Costs:	
Cost Difference Between Cellulosic Corn Kernel Fiber Ethanol and Gasoline Per Gallon ($/Ethanol-Equivalent Gallons)	$0.27–$2.80
Change in Volume (Million Ethanol-Equivalent Gallons)	5
Annual Increase in Overall Costs (Million $)	$1.4–$14
CNG/LNG Derived from Biogas Costs:	
Cost Difference Between CNG/LNG Derived from Landfill Biogas and Natural Gas Per Gallon ($/Ethanol-Equivalent Gallons)	$(0.03)–$0.07
Change in Volume (Million Ethanol-Equivalent Gallons)	125
Annual Increase in Overall Costs (Million $)	$(4.3)–$9.0
Range of Annual Increase in Costs with Cellulosic Volume (Million $)	$(2.9)–$23

[140] Details of the data and assumptions used can be found in a Memorandum available in the docket entitled ''Cost Impacts of the Final 2019 Annual Renewable Fuel Standards'', Memorandum from Michael Shelby, Dallas Burkholder, and Aaron Sobel available in docket EPA–HQ–OAR–2018–0167.

[141] Henry Hub Spot price estimate for 2019. EIA, Short Term Energy Outlook (STEO) available in docket EPA–HQ–OAR–2018–0167.

[142] Details of the data and assumptions used can be found in a Memorandum available in the docket entitled ''Cost Impacts of the Final 2019 Annual Renewable Fuel Standards'', Memorandum from Michael Shelby, Dallas Burkholder, and Aaron Sobel available in docket EPA–HQ–OAR–2018–0167.

TABLE V.B.2–1—ILLUSTRATIVE COSTS OF THE 2019 VOLUMES COMPARED TO THE 2018 RFS VOLUMES BASELINE—Continued

Advanced Volume	
Soybean Biodiesel Scenario:	
Cost Difference Between Soybean Biodiesel and Petroleum Diesel Per Gallon ($/Ethanol-Equivalent Gallons)	$0.74–$1.23
Change in Volume (Million Ethanol-Equivalent Gallons)	500
Annual Increase in Overall Costs (Million $)	$370–$610
Brazilian Sugarcane Ethanol Scenario:	
Cost Difference Between Sugarcane Ethanol and Gasoline Per Gallon ($/Ethanol-Equivalent Gallons)	$0.39–$1.04
Change in Volume (Million Ethanol-Equivalent Gallons)	500
Annual Increase in Overall Costs (Million $)	$190–$520
Range of Annual Increase in Overall Costs with Non-Cellulosic Advanced Volume (Million $)	$190–$610
Cellulosic and Advanced Volumes	
Range of Annual Increase in Overall Costs with Cellulosic and Advanced Volume (Million $) [143]	$190–$630

The annual volume-setting process encourages consideration of the RFS program on a piecemeal (*i.e.,* year-to-year) basis, which may not reflect the full, long-term costs and benefits of the program. For the purposes of this final rule, other than the estimates of costs of producing a ''representative'' renewable fuel compared to cost of petroleum fuel, EPA did not quantitatively assess other direct and indirect costs or benefits of changes in renewable fuel volumes. These direct and indirect costs and benefits may include infrastructure costs, investment, climate change impacts, air quality impacts, and energy security benefits, which all are to some degree affected by the annual volumes. For example, we do not have a quantified estimate of the lifecycle GHG or energy security benefits for a single year (*e.g.,* 2019). Also, there are impacts that are difficult to quantify, such as rural economic development and employment changes from more diversified fuel sources, that are not quantified in this rulemaking. While some of these impacts were analyzed in the 2010 final rulemaking that established the current RFS program,[144] we have not analyzed these impacts for the 2019 volume requirements.

VI. Biomass-Based Diesel Volume for 2020

In this section we discuss the BBD applicable volume for 2020. We are setting 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 setting the BBD percentage standards that would apply to obligated parties in 2020 but intend to do so in late 2019, after receiving EIA's estimate of gasoline and diesel consumption for 2020. At that time, we will also set the percentage standards for the other renewable fuel types for 2020. 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 BBD produced beyond the mandated 2020 BBD volume can be used to satisfy both of these other applicable volume requirements.

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 specified in the statute for calendar year 2012, which is 1.0 billion gallons.[145] 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 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.

In establishing the BBD and cellulosic standards as nested within the advanced biofuel standard, Congress clearly intended to support development of BBD and especially cellulosic biofuels, while also providing an incentive for the growth of other non-specified types of advanced biofuels. In general, the advanced biofuel standard provides an

[143] Summed costs are presented using two significant figures.

[144] RFS2 Regulatory Impact Analysis (RIA). U.S. EPA 2010, Renewable Fuel Standard Program (RFS2) Regulatory Impact Analysis. EPA–420–R–10–006. February 2010. Docket EPA–HQ–OAR–2009–0472–11332.

[145] See CAA section 211(o)(2)(B)(v).

opportunity for other advanced biofuels (advanced biofuels that do not qualify as cellulosic biofuel or BBD) to compete with cellulosic biofuel and BBD to satisfy the advanced biofuel standard after the cellulosic biofuel and BBD standards have been met.

B. Review of Implementation of the Program and the 2020 Applicable Volume of Biomass-Based Diesel

One of the primary considerations in determining the BBD volume for 2020 is a review of the implementation of the program to date, as it affects BBD. 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. Table VI.B.1–1 below shows, for 2011–2017, the number of BBD RINs generated, the number of RINs retired due to export, the number of RINs retired for reasons other than compliance with the annual BBD standards, and the consequent number of available BBD RINs; and for 2011–2019, the BBD and advanced biofuel standards.

TABLE VI.B.1–1—BIOMASS-BASED DIESEL (D4) RIN GENERATION AND ADVANCED BIOFUEL AND BIOMASS-BASED DIESEL STANDARDS IN 2011–2019

[Million RINs or gallons] [146]

	BBD RINs generated	Exported BBD (RINs)	BBD RINs retired, non-compliance reasons	Available BBD RINs [a]	BBD standard (gallons)	BBD standard (RINs)	Advanced biofuel standard (RINs)
2011	1,692	110	98	1,483	800	1,200	1,350
2012	1,737	183	90	1,465	1,000	1,500	2,000
2013	2,739	298	101	2,341	1,280	1,920	2,750
2014	2,710	126	92	2,492	1,630	[b] 2,490	2,670
2015	2,796	133	32	2,631	1,730	[b] 2,655	2,880
2016	4,008	203	52	3,753	1,900	2,850	3,610
2017	3,849	244	35	3,570	2,000	3,000	4,280
2018 [c]	3,898	154	40	3,740	2,100	3,150	4,290
2019	N/A	N/A	N/A	N/A	2,100	3,150	4,920

[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, but generally has an equivalence value of 1.7. While some fuels that qualify as BBD generate more than 1.5 RINs per gallon, EPA multiplies the required volume of BBD by 1.5 in calculating the percent standard per 80.1405(c). In 2014 and 2015 however, 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, rather than by multiplying the required volume of BBD by 1.5. Some of the volume used to meet the BBD standard in these years was renewable diesel, with an equivalence value higher than 1.5.

[c] "2018 BBD RINs generated," "Exported BBD," and "BBD RINs retired, Non-Compliance Reasons" are projected based on data through September 2018.

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, 2012, 2013, 2016 and 2017. 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,[147] and favorable blending economics. The number of RINs available in 2014 and 2015 was approximately equal to the number required for compliance in those years, as the standards for these years were finalized at the end of November 2015 and EPA's intent at that time was to set the standards for 2014 and 2015 to reflect actual BBD use.[148] In 2016, with RFS standards established prior to the beginning of the year and the blenders tax credit in place, available BBD RINs exceeded the volume required by the BBD standard by 859 million RINs (30 percent). In 2017, the RFS standards were established prior to the beginning of the year, and the blenders tax credit was only applied retroactively; even without the certainty of a tax credit, the available BBD RINs exceeded the volume required by the BBD standard by 570 million RINs (19 percent). Extrapolated data for 2018 also indicates that available BBD RINs will exceed the BBD standard. This indicates that in certain circumstances there is demand for BBD beyond the required volume of BBD. We also note that while EPA has consistently established the required volume in such a way as to allow non-BBD fuels to compete for market share in the advanced biofuel category, since 2016 the vast majority of non-cellulosic advanced biofuel used to satisfy the advanced biofuel obligations has been BBD.

The prices paid for advanced biofuel and BBD RINs beginning in early 2013 through September 2018 (the last month for which data are available) 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.[149] If,

[146] Available BBD RINs Generated, Exported BBD RINs, and BBD RINs Retired for Non-Compliance Reasons information from EMTS.

[147] 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 authorized and applied retroactively for all of 2015 as well as through the end of 2016. In February 2018 the biodiesel tax credit was authorized and applied retroactively for all of 2017.

[148] See 80 FR 77490–92, 77495 (December 14, 2015).

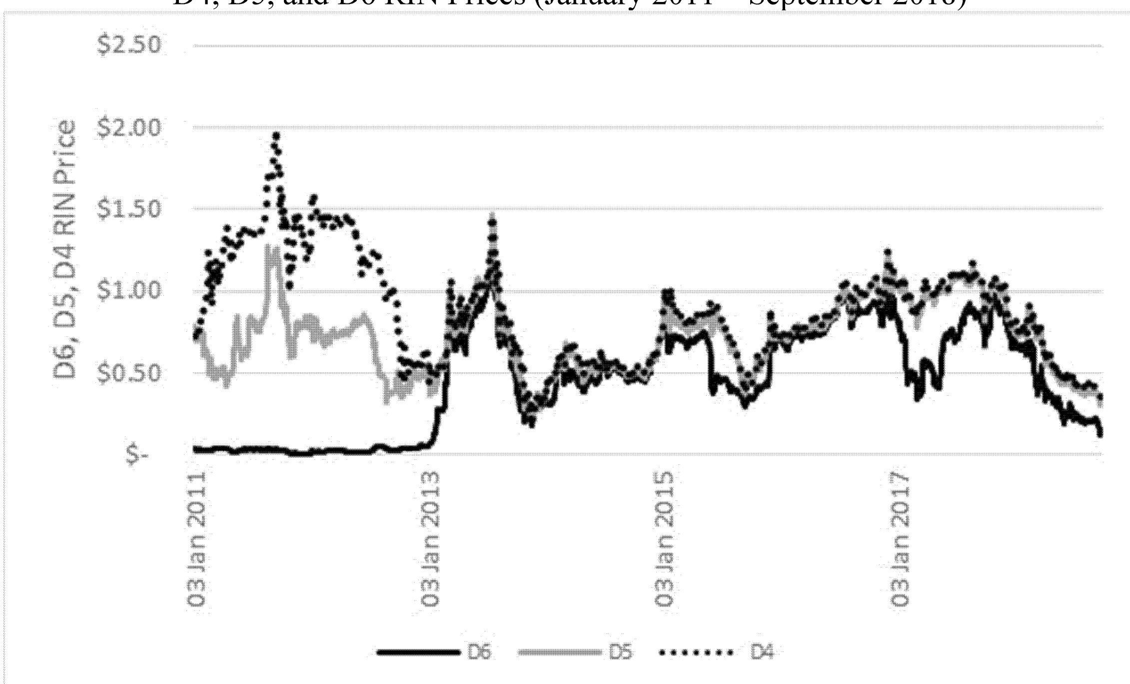
[149] This is because when an obligated party retires a BBD RIN (D4) to help satisfy their BBD obligation,

Continued

however, BBD RINs are being used (or are expected to be used) by obligated parties to satisfy their advanced biofuel obligations, above and beyond the BBD standard, we would expect the prices of advanced biofuel and BBD RINs to converge.[150] Further, if BBD RINs are being used (or are expected to be used) to satisfy obligated parties' total renewable fuel obligation, above and beyond their BBD and advanced biofuel requirements, we would expect the price for all three RIN types to converge.

When examining RIN price data from 2012 through September 2018, shown in Figure VI.B.2–1 below, we see that beginning in early 2013 and through September 2018 the advanced RIN price and BBD RIN prices were approximately equal. Similarly, from early 2013 through late 2016 the conventional renewable fuel and BBD RIN prices were approximately equal. This suggests that the advanced biofuel standard and/or total renewable fuel standard are capable of incentivizing increased BBD volumes beyond the BBD standard. The advanced biofuel standard has incentivized additional volumes of BBD since 2013, while the total standard had incentivized additional volumes of BBD from 2013 through 2016.[151] While final standards were not in place throughout 2014 and most of 2015, EPA had issued proposed rules for both of these years.[152] In each year, the market response was to supply volumes of BBD that exceeded the proposed BBD standard in order to help satisfy the proposed advanced and total biofuel standards.[153] 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 and total biofuel obligations, and responded by purchasing advanced biofuel and BBD RINs at approximately equal prices. We do note, however, that in 2012 the BBD RIN price was significantly higher than both the advanced biofuel and conventional renewable fuel RIN prices. In 2012 the E10 blendwall had not yet been reached, and it was likely more cost effective for most obligated parties to satisfy the portion of the advanced biofuel requirement that exceeded the BBD and cellulosic biofuel requirements with advanced ethanol.

Figure VI.B.2-1
D4, D5, and D6 RIN Prices (January 2011 – September 2018)



RIN Price Source: Argus Media Group

In raising the 2013 BBD volume above the 1 billion gallon minimum mandated by Congress, the EPA sought to "create greater certainty for both producers of BBD and obligated parties" while also acknowledging that, "the potential for somewhat increased costs is appropriate in light of the additional certainty of GHG reductions and enhanced energy security provided by the advanced biofuel volume requirement of 2.75 billion gallons." [154] Unknown at that

the nested nature of the BBD standard means that this RIN also counts towards satisfying their advanced and total renewable fuel obligations. Advanced RINs (D5) count towards both the advanced and total renewable fuel obligations, while conventional RINs (D6) count towards only the total renewable fuel obligation.

[150] 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.

[151] 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 July 1, 2011).

[152] See 80 FR 33100 (2014–16 standards proposed June 10, 2015); 78 FR 71732 (2014 standards proposed Nov. 29, 2013).

[153] EPA proposed a BBD standard of 1.28 billion gallons (1.92 billion RINs) for 2014 in our November 2013 proposed rule. The number of BBD RINs available in 2014 was 2.67 billion. EPA proposed a BBD standard of 1.70 billion gallons (2.55 billion RINs) for 2015 in our June 2015 proposed rule. The number of BBD RINs available in 2015 was 2.92 billion.

[154] 77 FR 59458, 59462 (September 27, 2012).

time was the degree to which the required volumes of advanced biofuel and total renewable fuel could incentivize volumes of BBD that exceeded the BBD standard. In 2012 the available supply of BBD RINs exceeded the required volume of BBD by a very small margin (1,545 million BBD RINs were made available for compliance towards meeting the BBD requirement of 1,500 million BBD RINs). The remainder of the 2.0 billion-gallon advanced biofuel requirement was satisfied with advanced ethanol, which was largely imported from Brazil.[155] From 2012 to 2013 the statutory advanced biofuel requirement increased by 750 million gallons. If EPA had not increased the required volume of BBD for 2013, and the advanced biofuel standard had proved insufficient to increase the supply of BBD beyond the statutory minimum of 1.0 billion gallons, an additional 750 million gallons of non-BBD advanced biofuels beyond the BBD standard would have been needed to meet the advanced biofuel volume requirement.

The only advanced biofuel other than BBD available in appreciable quantities in 2012 and 2013 was advanced ethanol, the vast majority of which was imported sugarcane ethanol. EPA had significant concerns as to whether or not the supply of advanced ethanol could increase this significantly (750 million gallons) in a single year. These concerns were heightened by the approaching E10 blendwall, which had the potential to increase the challenges associated with supplying increasing volumes of ethanol to the U.S. If neither BBD volumes nor advanced ethanol volumes increased sufficiently, EPA was concerned that some obligated parties might be unable to acquire the advanced biofuel RINs necessary to demonstrate compliance with their RVOs in 2013. Therefore, as discussed above, EPA increased the volume requirement for BBD in 2013 to help create greater certainty for BBD producers (by ensuring demand for their product above the 1.0 billion gallon statutory minimum) and obligated parties (by ensuring that sufficient RINs would be available to satisfy their advanced biofuel RVOs). Since 2013, however, EPA has gained significant experience implementing the RFS program. As discussed above, RIN generation data has consistently demonstrated that the advanced biofuel volume requirement, and to a lesser degree the total renewable fuel volume requirement, are capable of incentivizing the supply of BBD above and beyond the BBD volume requirement. The RIN generation data also show that while EPA has consistently preserved the opportunity for fuels other that BBD to contribute towards satisfying the required volume of advanced biofuel, these other advanced biofuels have not been supplied in significant quantities since 2013.

TABLE VI.B.1–2—OPPORTUNITY FOR AND RIN GENERATION OF "OTHER" ADVANCED BIOFUELS

[Million RINs]

	Opportunity for "other" advanced biofuels[a]	Available advanced (D5) RINs	Available BBD (D4) RINs in excess of the BBD requirement[b]
2011	150	225	283
2012	500	597	-35
2013	829	552	421
2014[c]	192	143	2
2015[c]	162	147	−24
2016	530	97	903
2017	969	144	570
2018[d]	852	121	590

[a] The required volume of "other" advanced biofuel is calculated by subtracting the number of cellulosic biofuel and BBD RINs required each year from the number of advanced biofuel RINs required. This portion of the advanced standard can be satisfied by advanced (D5) RINs, BBD RINs in excess of those required by the BBD standard, or cellulosic RINs in excess of those required by the cellulosic standard.

[b] The available BBD (D4) RINs in excess of the BBD requirement is calculated by subtracting the required BBD volume (multiplied by 1.5 to account for the equivalence value of biodiesel) required each year from the number of BBD RINs available for compliance in that year. This number does not include carryover RINs, nor do we account for factors that may impact the number of BBD RINs that must be retired for compliance, such as differences between the projected and actual volume of obligated gasoline and diesel.

[c] The 2014 and 2015 volume requirements were established in November 2015 and were set equal to the number of RINs projected to be available for each year.

[d] Available Advanced RINs and available D4 RINs in excess of the BBD requirement are projected based on data through September 2018.

In 2014 and 2015, EPA set the BBD and advanced standards at actual RIN generation, and thus the space between the advanced biofuel standard and the biodiesel standard was unlikely to provide an incentive for "other" advanced biofuels. EPA now has data on the amount of "other" advanced biofuels produced in 2016 and 2017 as shown in the table above. For 2016 and 2017, the gap between the BBD standard and the advanced biofuel provided an opportunity for "other" advanced biofuels to be generated to satisfy the advanced biofuel standard. While the RFS volumes created the opportunity for up to 530 million and 969 million gallons of "other" advanced for 2016 and 2017 respectively to be used to satisfy the advanced biofuel obligation, only 97 million and 144 million gallons of "other" advanced biofuels were generated. This is significantly less than the volumes of "other" advanced available in 2012–2013. Despite creating space within the advanced biofuel standard for "other" advanced, in recent years, only a small fraction of that space has been filled with "other" advanced, and BBD continues to fill most of the gap between the BBD standard and the advanced standard.

Thus, while the advanced biofuel standard is sufficient to drive biodiesel volume separate and apart from the BBD standard, there would not appear to be a compelling reason to increase the "space" maintained for "other" advanced biofuel volumes. The overall

[155] 594 million advanced ethanol RINs were generated in 2012.

volume of non-cellulosic advanced biofuel in this final rule increases by 500 million gallons for 2019. Increasing the BBD volume by the same amount would preserve the space already available for other advanced biofuels to compete.

At the same time, the rationale for preserving the ''space'' for ''other'' advanced biofuels remains. We note that the BBD industry in the U.S. and abroad has matured since EPA first increased the required volume of BBD beyond the statutory minimum in 2013. To assess the maturity of the biodiesel industry, EPA compared information on BBD RIN generation by company in 2012 and 2017 (the most recent year for which complete RIN generation by company is available). In 2012, the annual average RIN generation per company producing BBD was about 11 million RINs (about 7.3 million gallons) with approximately 50 percent of companies producing less than 1 million gallons of BBD a year.[156] The agency heard from multiple commenters during the 2012 and 2013 rulemakings that higher volume requirements for BBD would provide greater certainty for the emerging BBD industry and encourage further investment. Since that time, the BBD industry has matured in a number of critical areas, including growth in the size of companies, the consolidation of the industry, and more stable funding and access to capital. In 2012, the BBD industry was characterized by smaller companies with dispersed market share. By 2017, the average BBD RIN generation per company had climbed to almost 33 million RINs (22 million gallons) annually, a 3-fold increase. Only 33 percent of the companies produced less than 1 million gallons of BBD in 2017.[157]

We are conscious of public comments claiming that BBD volume requirements that are a significant portion of the advanced volume requirements effectively disincentivize the future development of other promising advanced biofuel pathways.[158] A variety of different types of advanced biofuels, rather than a single type such as BBD, would increase 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.[159]

We received comments from stakeholders suggesting that the BBD volume standard is unique, as it is required to be set 14 months prior to beginning of the compliance year, in contrast to the advanced standard which is often modified only a month prior to the compliance year. These commenters suggested that EPA should therefore increase the BBD standard to allow for industry to utilize the 14-month notice to make investments. EPA acknowledges this unique aspect of the BBD volume, but still believes a volume of 2.43 billion appropriately provides a floor for guaranteed BBD volume, while also providing space for other advanced biofuels to compete in the market. Based on our review of the data, and the nested nature of the BBD standard within the advanced standard, we conclude that the advanced standard continues to drive the ultimate volume of BBD supplied. However, given that BBD has been the predominant source of advanced biofuel in recent years and the 500 million gallon increase in non-cellulosic advanced biofuel we are finalizing in this rule, we are setting a volume of 2.43 billion gallons of BBD for 2020.

We recognize that the space for other advanced biofuels in 2020 will ultimately depend on the 2020 advanced biofuel volume. While EPA is not establishing the advanced biofuel volume for 2020 in this action, we anticipate that the non-cellulosic advanced biofuel volume for 2020, when established, will be greater than 3.65 billion gallons (equivalent to 2.43 billion gallons of BBD, after applying the 1.5 equivalence ratio). This expectation is consistent with our actions in previous years. Accordingly, we expect that the 2020 advanced biofuel volume, together with the 2020 BBD volume established today, will continue to preserve a considerable portion of the advanced biofuel volume that could be satisfied by either additional gallons of BBD or by other unspecified and potentially less costly types of qualifying advanced biofuels.

C. Consideration of Statutory Factors Set Forth in CAA Section 211(o)(2)(B)(ii)(I)–(VI) for 2020 and Determination of the 2020 Biomass-Based Diesel Volume

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.[160] 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 or decreasing BBD in comparison to other advanced biofuels.[161] 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. EPA is increasing the BBD volume for 2020 to 2.43 billion gallons from 2.1 billion gallons in 2019 based on our review of the statutory factors and the other considerations noted above and in the 2020 BBD Docket Memorandum. This increase, in conjunction with the statutory increase of 500 million gallons of non-cellulosic advanced biofuel in 2019, would preserve a gap for ''other'' advanced biofuels, that is the difference between the advanced biofuel volume and the sum of the cellulosic biofuel and BBD volumes. This would allow other advanced biofuels to continue to compete with excess volumes of BBD for market share under the advanced biofuel standard, while also supporting further growth in the BBD industry.

Consistent with our approach in setting the final BBD volume requirement for 2019, EPA's primary assessment of the statutory factors for the 2020 BBD applicable volume is that because the BBD requirement is nested within the advanced biofuel volume requirement, we expect that the 2020 advanced volume requirement, when set next year, will determine the level of BBD use, production and imports that occur in 2020.[162] Therefore, EPA

[156] ''BBD RIN Generation by Company 2012, 2016, and 2017 CBI,'' available in EPA docket EPA–HQ–OAR–2018–0167.

[157] Id.

[158] See, *e.g.,* Comments from Advanced Biofuel Association, available in EPA docket EPA–HQ–2018–0167–1277.

[159] All types of advanced biofuel, including BBD, must achieve lifecycle GHG reductions of at least 50 percent. See CAA section 211(o)(1)(B)(i), (D).

[160] See CAA section 211(o)(2)(B)(i)(IV), (II).

[161] While excess BBD production could also displace conventional renewable fuel under the total renewable standard, as long as the BBD applicable volume is 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. We acknowledge, however, that under certain market conditions excess volumes of BBD may also be used to displace conventional biofuels.

[162] Even though we are not establishing the 2020 advanced biofuel volume requirement as part of this rulemaking, we expect that, as in the past, the 2020 advanced volume requirement will be higher than the 2020 BBD requirement, and, therefore, that the BBD volume requirement for 2020 would not be expected to impact the volume of BBD that is

continues to believe that approximately the same overall volume of BBD would likely be supplied in 2020 even if we were to mandate a somewhat lower or higher BBD volume for 2020 in this final rule. Thus, we do not expect our 2020 BBD volume requirement to result in a significant difference in the factors we consider pursuant to CAA section 211(o)(2)(B)(ii)(I)–(VI) in 2020.

As an additional assessment, we considered in the 2020 BBD docket memorandum [163] the potential impacts on the statutory factors of selecting an applicable volume of BBD other than 2.43 billion gallons in 2020 and also in the longer term. While BBD volumes and resulting impact on the statutory factors found in 211(o)(2)(B)(ii), will not likely be significantly impacted by the 2020 BBD standard in the short term, leaving room for growth of other advanced could have a beneficial impact on certain statutory factors in the long term. Even if BBD volumes were to be impacted by the 2020 BBD standard, setting a requirement higher or lower than 2.43 billion gallons in 2020 would only be expected to affect BBD volumes and the statutory factors found in CAA section 211(o)(2)(B)(ii)(I)–(VI) minimally in 2020. However, we find that over a longer timeframe, providing support for other advanced biofuels could have beneficial effects for a number of the statutory factors.

With the considerations discussed above in mind, as well as our analysis of the factors specified in the statute, we are setting the applicable volume of BBD at 2.43 billion gallons for 2020. This increase, in conjunction with the statutory increase of 500 million gallons of non-cellulosic advanced biofuel in 2019, would continue to preserve a significant gap between the advanced biofuel volume and the sum of the cellulosic biofuel and BBD volumes. This would allow other advanced biofuels to continue to compete with excess volumes of BBD for market share under the advanced biofuel standard. We believe this volume sets the appropriate floor for BBD, and that the volume of advanced biodiesel and renewable diesel actually used in 2020 will be driven by the level of the advanced biofuel and total renewable fuel standards that the Agency will establish for 2020. It also recognizes that while maintaining an opportunity for other advanced biofuels is important, the vast majority of the advanced biofuel used to comply with the advanced biofuel standard in recent years has been BBD. Based on information now available from 2016 and 2017, despite providing a significant degree of space for ''other'' advanced biofuels, smaller volumes of ''other'' advanced have been utilized to meet the advanced standard. EPA believes that the BBD standard we are finalizing today still provides sufficient incentive to producers of ''other'' advanced biofuels, while also acknowledging that the advanced standard has been met predominantly with biomass-based diesel. Our assessment of the required statutory factors, as well as the implementation of the program, supports a volume of 2.43 billion gallons.

VII. Percentage Standards for 2019

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.

Sections II through V provide our rationale and basis for the final volume requirements for 2019.[164] The volumes used to determine the percentage standards are shown in Table VII–1.

TABLE VII–1—VOLUMES FOR USE IN DETERMINING THE FINAL 2019 APPLICABLE PERCENTAGE STANDARDS

Cellulosic biofuel	Million ethanol-equivalent gallons	418
Biomass-based diesel	Billion gallons	2.1
Advanced biofuel	Billion ethanol-equivalent gallons	4.92
Renewable fuel	Billion ethanol-equivalent gallons	19.92

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

To calculate the percentage standards, we are following the same methodology for 2019 as we have in all prior years. The formulas used to calculate the percentage standards applicable to producers and importers of gasoline and diesel are provided in 40 CFR 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 projections of 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 renewable fuel 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 under 40 CFR 80.1407.

As specified in the RFS2 final rule,[165] 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

actually used, produced and imported during the 2020-time period.

[163] ''Memorandum to docket: Statutory Factors Assessment for the 2020 Biomass-Based Diesel (BBD) Applicable Volumes.'' See Docket EPA–HQ–OAR–2018–0167.

[164] The 2019 volume requirement for BBD was established in the 2018 final rule.

[165] See 75 FR 14670 (March 26, 2010).

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 in order to calculate a percentage standard that is on the same basis (*i.e.,* ethanol-equivalent) as the other three standards. However, BBD often contains some renewable diesel, and a gallon of renewable diesel typically generates 1.7 RINs.[166] 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 assessment of 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 and 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. Our intent in setting the BBD applicable volume is to provide a level of guaranteed volume for BBD, but as described in Section VI.B, we do not expect the BBD standard to be binding in 2019. That is, we expect that actual supply of BBD, as well as supply of conventional biodiesel and 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 [167] 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, determines whether the small refinery has demonstrated disproportionate economic hardship, and may grant refineries exemptions upon such demonstration.

EPA has granted exemptions pursuant to this process in the past. However, at this time no exemptions have been approved for 2019, and therefore we have calculated the percentage standards for 2019 without any adjustment for exempted volumes. We are maintaining our approach that any exemptions for 2019 that are granted 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 2019.

C. Final Standards

The formulas in 40 CFR 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.[168]

TABLE VII.C–1—VALUES FOR TERMS IN CALCULATION OF THE FINAL 2019 STANDARDS [169]

[Billion gallons]

Term	Description	Value
RFV_{CB}	Required volume of cellulosic biofuel	0.418
RFV_{BBD}	Required volume of biomass-based diesel	2.10
RFV_{AB}	Required volume of advanced biofuel	4.92
RFV_{RF}	Required volume of renewable fuel	19.92
G	Projected volume of gasoline	142.62
D	Projected volume of diesel	56.31
RG	Projected volume of renewables in gasoline	14.53
RD	Projected volume of renewables in diesel	2.75
GS	Projected volume of gasoline for opt-in areas	0
RGS	Projected volume of renewables in gasoline for opt-in areas	0
DS	Projected volume of diesel for opt-in areas	0
RDS	Projected volume of renewables in diesel for opt-in areas	0
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 in a letter to EPA that is required under the statute, and represent consumption values from the October 2018 version of EIA's Short-Term Energy Outlook.[170]

Using the volumes shown in Table VII.C–1, we have calculated the final percentage standards for 2019 as shown in Table VII.C–2.

TABLE VII.C–2—FINAL PERCENTAGE STANDARDS FOR 2019

Cellulosic biofuel	0.230
Biomass-based diesel	1.73
Advanced biofuel	2.71

[166] Under 40 CFR 80.1415(b)(4), renewable diesel with a lower heating value of at least 123,500 Btu/gallon is assigned an equivalence value of 1.7. A minority of renewable diesel has a lower heating value below 123,500 BTU/gallon and is therefore assigned an equivalence value of 1.5 or 1.6 based on applications submitted under 40 CFR 80.1415(c)(2).

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

[168] To determine the 49-state values for gasoline and diesel, the amount of these fuels used in Alaska is subtracted from the totals provided by EIA because petroleum-based fuels used in Alaska do not incur RFS obligations. The Alaska fractions are determined from the June 29, 2018 EIA State Energy Data System (SEDS), Energy Consumption Estimates.

[169] See ''Calculation of final % standards for 2019'' in docket EPA–HQ–OAR–2018–0167.

[170] ''EIA letter to EPA with 2019 volume projections 10–12–18,'' available in docket EPA–HQ–OAR–2018–0167.

TABLE VII.C–2—FINAL PERCENTAGE STANDARDS FOR 2019—Continued

Renewable fuel	10.97

VIII. Administrative Actions

A. Assessment of the Domestic Aggregate Compliance Approach

The RFS regulations specify an ''aggregate compliance'' approach for demonstrating that planted crops and crop residue from the U.S. complies with the ''renewable biomass'' requirements that address lands from which qualifying feedstocks may be harvested.[171] In the 2010 RFS2 rulemaking, 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. The regulations specify, therefore, that renewable fuel producers using planted crops or crop residue from the U.S. as feedstock in renewable fuel production need not undertake individual recordkeeping and reporting related to documenting that their feedstocks come from qualifying lands, 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 2010 RFS2 rulemaking, 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 is a voluntary program that 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 that 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, in preparing this year's assessment of the total U.S. acres of agricultural land, the acreage enrolled in the ACEP–WRE and ACEP–ALE was excluded.

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 381 million acres in 2018, 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 2018, from which we derived a total estimated acreage of 381,694,332 acres. We then subtracted the ACEP–ALE and ACEP–WRE enrolled areas by the end of Fiscal Year 2018, 798,023 acres, to yield an estimate of 380,896,309 acres or approximately 381 million acres of U.S. agricultural land in 2018. The USDA data used to make this derivation can be found in the docket to this rule.[172] [173]

B. Assessment of the Canadian Aggregate Compliance Approach

The RFS regulations specify a petition process through which EPA may approve the use of an aggregate compliance approach for planted crops and crop residue from foreign countries.[174] On September 29, 2011, EPA approved such a petition from the Government of Canada.

The total agricultural land in Canada in 2018 is estimated at 118.5 million acres; below the 2007 baseline of 123 million acres. This total agricultural land area includes 96.3 million acres of cropland and summer fallow, 12.4 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 EPA's response to Canada's petition. The data used to make this calculation can be found in the docket to this rule.

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 July 3, 2018 (83 FR 31098), and we also held a public hearing on July 18, 2018, at which many parties provided both verbal and written testimony. All comments received, both verbal and written, are available in Docket ID No. EPA–HQ–OAR–2018–0167 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. EPA prepared an analysis of illustrative costs associated with this action. This analysis is presented in Section V of this preamble.

[171] 40 CFR 80.1454(g).

[172] USDA also provided EPA with 2018 data from the discontinued GRP and WRP programs. Given this data, EPA estimated the total U.S. agricultural land both including and omitting the GRP and WRP acreage. In 2018, combined land under GRP and WRP totaled 2,975,165 acres. Subtracting the GRP, WRP, ACEP–WRE, and ACEP–ALE acreage yields an estimate of 377,921,144 acres or approximately 378 million total acres of U.S. agricultural land in 2018. Omitting the GRP and WRP data yields approximately 381 million acres of U.S. agricultural land in 2018.

[173] In providing the 2018 agricultural land data to EPA, USDA provided updated data from 2017. An explanation of this data and a revised estimate of 2017 total U.S. agricultural land can be found in the docket to this rule.

[174] 40 CFR 80.1457.

B. Executive Order 13771: Reducing Regulations and Controlling Regulatory Costs

This action is considered an Executive Order 13771 regulatory action. Details on the estimated costs of this final rule can be found in EPA's analysis of the illustrative costs associated with this action. This analysis is presented in Section V of this preamble.

C. 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.

D. 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 2019 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 cellulosic biofuel volume by 130 million gallons and the advanced biofuel and total renewable fuel volume requirements by 630 million gallons between 2018 and 2019. To evaluate the impacts of the volume requirements on small entities relative to 2018, we have conducted a screening analysis [175] to assess whether we should make a finding that this action will 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 will not be significant. We have reviewed and assessed the available information, which shows 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.[176] This is true whether they acquire RINs by purchasing renewable fuels with attached RINs or purchase separated RINs. The costs of the RFS program are thus generally being passed on to consumers in the highly competitive marketplace. 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 of this preamble and the gasoline and diesel fuel volume projections and wholesale prices from the October 2018 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 percent of the value of their sales.

While the screening analysis described above supports a certification that this rule will 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, which was the rule that implemented the entire program as required by EISA 2007.[177] 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, we 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, we 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, March 26, 2010).

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 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. This final rule increases the 2019 cellulosic biofuel volume requirement by 130 million gallons and the advanced biofuel and total renewable fuel volume requirements by 630 million gallons relative to the 2018 volume requirements, but those volumes remain significantly below the statutory volume targets analyzed in the RFS2 final rule. Compared to the burden that would be imposed under the volumes that we assessed in the screening analysis for the RFS2 final rule (*i.e.,* the volumes specified in the Clean Air Act), the volume requirements proposed in this rule reduce burden on small entities. Regarding the BBD standard, we are increasing the volume requirement for 2020 by 330 million gallons relative to the 2019 volume requirement we finalized in the 2018 final rule. While this volume is an increase over the statutory minimum value of 1 billion gallons, the BBD standard 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 2020 BBD 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 finalized 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

[175] "Screening Analysis for the Final Renewable Fuel Standards for 2019," memorandum from Dallas Burkholder, Nick Parsons, and Tia Sutton to EPA Air Docket EPA–HQ–OAR–2018–0167.

[176] For a further discussion of the ability of obligated parties to recover the cost of RINs see "Denial of Petitions for Rulemaking to Change the RFS Point of Obligation," EPA–420–R–17–008, November 2017.

[177] 75 FR 14670 (March 26, 2010).

on small entities. These flexibilities include being able to comply through RIN trading rather than renewable fuel blending, 20 percent RIN rollover allowance (up to 20 percent 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, we realize that there may be cases in which a small entity may be in a difficult financial situation and the level of assistance afforded by the program flexibilities is insufficient. For such circumstances, the program provides hardship relief provisions for small entities (small refiners), as well as for small refineries.[178] 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 the refinery is experiencing a ''disproportionate economic hardship.'' EPA regulations provide similar relief to small refiners that are not eligible for small refinery relief (see 40 CFR 80.1442(h)). EPA has currently identified a total of 9 small refiners that own 11 refineries subject to the RFS program, all of which are also small refineries.

We evaluate 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, we consult with the U.S. Department of Energy and consider the findings of DOE's 2011 Small Refinery Study and other economic factors. To date, EPA has adjudicated petitions for exemption from 29 small refineries for the 2017 RFS standards (8 of which were owned by a small refiner).[179]

In sum, this final rule will not change the compliance flexibilities currently offered to small entities under the RFS program (including the small refinery hardship provisions we continue to implement) and available information shows that the impact on small entities from implementation of this rule will 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 will have no net regulatory burden for directly regulated small entities.

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

[179] EPA is currently evaluating 7 additional 2017 petitions (1 of which is owned by a small refiner) and 15 additional 2018 petitions (7 of which are owned by a small refiner), bringing the total number of petitions for 2017 to 36 and for 2018 to 15. More information on Small Refinery Exemptions is available on EPA's public website at: *https://www.epa.gov/fuels-registration-reporting-and-compliance-help/rfs-small-refinery-exemptions.*

E. Unfunded Mandates Reform Act (UMRA)

This action does not contain an unfunded mandate of $100 million or more as described in UMRA, 2 U.S.C. 1531–1538, and does not significantly or uniquely affect small governments. 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.

F. 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.

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

This action does not have tribal implications as specified in Executive Order 13175. This action 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 will be affected only to the extent they produce, purchase, or use regulated fuels. Thus, Executive Order 13175 does not apply to this action.

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

EPA interprets Executive Order 13045 as applying only to those regulatory actions that concern environmental health or safety risks that 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.

I. 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 2019, 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 security and lowering lifecycle GHG emissions of transportation fuel.

J. National Technology Transfer and Advancement Act (NTTAA)

This rulemaking does not involve technical standards.

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

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 regulatory action 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 will not cause emissions increases from these sources.

L. Congressional Review Act (CRA)

This action is subject to the CRA, and 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 comes 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 30, 2018.

Andrew R. Wheeler,

Acting Administrator.

For the reasons set forth in the preamble, EPA is amending 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—Renewable Fuel Standard

■ 2. Section 80.1405 is amended by adding paragraph (a)(10) to read as follows:

§ 80.1405 What are the Renewable Fuel Standards?

(a) * * *

(10) *Renewable Fuel Standards for 2019.*

(i) The value of the cellulosic biofuel standard for 2019 shall be 0.230 percent.

(ii) The value of the biomass-based diesel standard for 2019 shall be 1.73 percent.

(iii) The value of the advanced biofuel standard for 2019 shall be 2.71 percent.

(iv) The value of the renewable fuel standard for 2019 shall be 10.97 percent.

* * * * *

[FR Doc. 2018–26566 Filed 12–10–18; 8:45 am]

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