

We've made some changes to EPA.gov. If the information you are looking for is not here, you may be able to find it on the EPA Web Archive or the January 19, 2017 Web Snapshot.



Overview for Renewable Fuel Standard

On this page:

- [Program structure](#)
- [Fuel pathways](#)
- [Program compliance basics](#)

Program Structure

The Renewable Fuel Standard (RFS) program was created under the Energy Policy Act of 2005 (EPAct), which amended the Clean Air Act (CAA). The Energy Independence and Security Act of 2007 (EISA) further amended the CAA by expanding the RFS program. EPA implements the program in consultation with U.S. Department of Agriculture and the Department of Energy.

The RFS program is a national policy that requires a certain volume of renewable fuel to replace or reduce the quantity of petroleum-based transportation fuel, heating oil or jet fuel. The four renewable fuel categories under the RFS are:

- Biomass-based diesel
- Cellulosic biofuel
- Advanced biofuel
- Total renewable fuel

The 2007 enactment of EISA significantly increased the size of the program and included key changes, including:

- Boosting the long-term goals to 36 billion gallons of renewable fuel
- Extending yearly volume requirements out to 2022
- Adding explicit definitions for renewable fuels to qualify (e.g., renewable biomass, GHG emissions)
- Creating grandfathering allowances for volumes from certain existing facilities
- Including specific types of waiver authorities

Volumes provided in the statute are in the following table:

visited on 1/12/2018

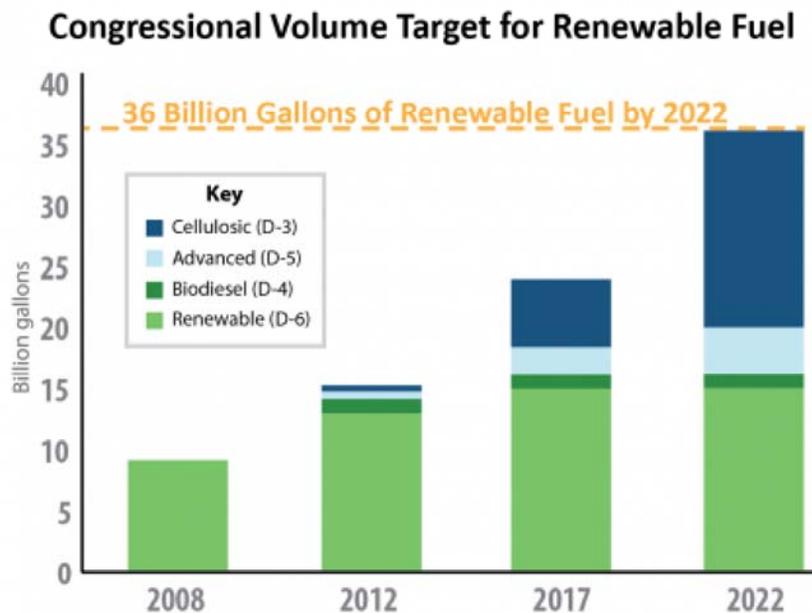
Volume Standards as Set Forth in EISA					
Year	Cellulosic Biofuel	Biomass-Based Diesel	Advanced Biofuel	Total Renewable Fuel	"Conventional" Biofuel
2009	NA	0.5	0.6	11.1	10.5
2010	0.1	0.65	0.95	12.95	12.0
2011	0.25	0.8	1.35	13.95	12.6
2012	0.5	1.0	2.0	15.2	13.2
2013	1.0	*	2.75	16.55	13.8
2014	1.75	*	3.75	18.15	14.4
2015	3.0	*	5.5	20.5	15.0
2016	4.25	*	7.25	22.25	15.0
2017	5.5	*	9.0	24.0	15.0
2018	7.0	*	11.0	26.0	15.0
2019	8.5	*	13.0	28.0	15.0
2020	10.5	*	15.0	30.0	15.0
2021	13.5	*	18.0	33.0	15.0
2022	16.0	*	21.0	36.0	15.0

visited on 1/12/2018

Volume Standards as Set Forth in EISA					
Year	Cellulosic Biofuel	Biomass-Based Diesel	Advanced Biofuel	Total Renewable Fuel	"Conventional" Biofuel
<p>*statute sets 1 billion gallons minimum, but EPA may raise requirement</p> <p>Note: There is no statutory volume requirement for "conventional" biofuel. The conventional volumes in the table are calculated (total - advanced) and are certain biofuels that do not qualify as advanced.</p>					

The Clean Air Act provides EPA authority to adjust cellulosic, advanced and total volumes set by Congress as part of the annual rule process.

The statute also contains a general waiver authority that allows the Administrator to waive the RFS volumes, in whole or in part, based on a determination that implementation of the program is causing severe economic or environmental harm, or based on inadequate domestic supply.



Click the image for a larger version.

Fuel Pathways

visited on 1/12/2018

For a fuel to qualify as a renewable fuel under the RFS program, EPA must determine that the fuel qualifies under the statute and regulations. Among other requirements, fuels must achieve a reduction in greenhouse gas (GHG) emissions as compared to a 2005 petroleum baseline.

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

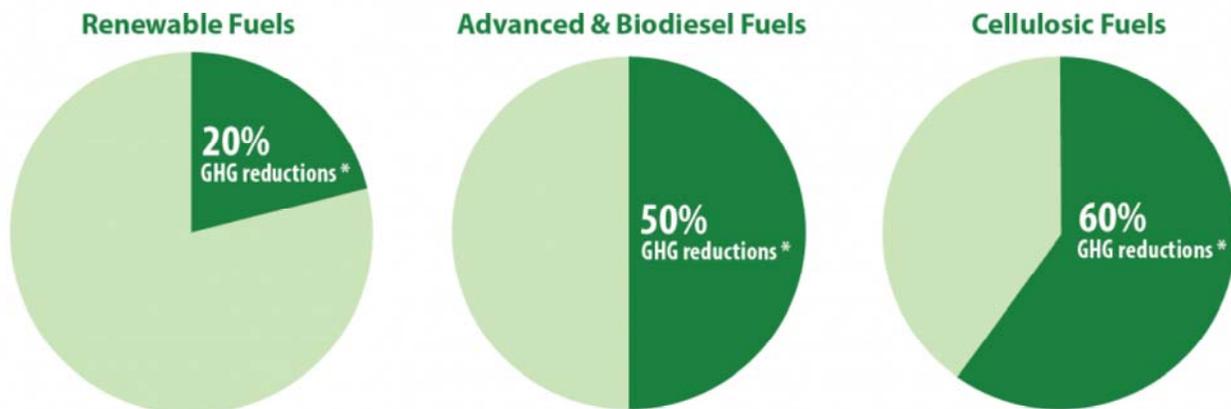
- Biomass-based diesel must meet a 50% lifecycle GHG reduction
- Cellulosic biofuel must be produced from cellulose, hemicellulose, or lignin and must meet a 60% lifecycle GHG reduction
- Advanced biofuel can be produced from qualifying renewable biomass (except corn starch) and must meet a 50% GHG reduction
- Renewable (or conventional) fuel typically refers to ethanol derived from corn starch and must meet a 20% lifecycle GHG reduction threshold

Lifecycle GHG reduction comparisons are based on a 2005 petroleum baseline as mandated by EISA. Biofuel facilities (domestic and foreign) that were producing fuel prior to enactment of EISA in 2007 are “grandfathered” under the statute, meaning these facilities are not required to meet the GHG reductions.

EPA continues to review and approve new pathways, including for fuels made with advanced technologies or with new feedstocks. Certain biofuels are similar enough to gasoline or diesel that they do not have to be blended, but can be simply “dropped in” to existing petroleum-based fuels. These drop-in biofuels directly replace petroleum-based fuels and hold particular promise for the future.

Lifecycle Greenhouse Gas (GHG) Emissions

GHG emissions must take into account direct and significant indirect emissions, including land use change.



* compared to a 2005 petroleum baseline

Click the image for a larger version.

[Learn more about fuel pathway under the RFS program.](#)

visited on 1/12/2018

Program Compliance Basics

Obligated parties under the RFS program are refiners or importers of gasoline or diesel fuel. Compliance is achieved by blending renewable fuels into transportation fuel, or by obtaining credits (called “Renewable Identification Numbers”, or RINs) to meet an EPA-specified Renewable Volume Obligation (RVO).

EPA calculates and establishes RVOs every year through rulemaking, based on the CAA volume requirements and projections of gasoline and diesel production for the coming year. The standards are converted into a percentage and obligated parties must demonstrate compliance annually.

Each fuel type is assigned a “D-code” – a code that identifies the renewable fuel type – based on the feedstock used, fuel type produced, energy inputs and GHG reduction thresholds, among other requirements. The four categories of renewable fuel have the following assigned D-codes:

- Cellulosic biofuel is assigned a D-code of 3 (e.g., cellulosic biofuel) or D-code of 7 (cellulosic diesel)
- Biomass-based diesel is assigned a D-code of 4
- Advanced biofuel is assigned a D-code of 5
- Renewable fuel (non-advanced/conventional biofuel) is assigned a D-code of 6 (grandfathered fuels are also assigned a D-code of 6)

“Renewable identification numbers” or RINs are the credits that obligated parties use to demonstrate compliance with the standard. Obligated parties must obtain sufficient RINs for each category in order to demonstrate compliance with the annual standard.

More information on RINs:

- RINs are generated when a producer makes a gallon of renewable fuel
- At the end of the compliance year, obligated parties use RINs to demonstrate compliance
- RINs can be traded between parties
- Obligated parties can buy gallons of renewable fuel with RINs attached. They can also buy RINs on the market
- Obligated parties can carry over unused RINs between compliance years. They may carry a compliance deficit into the next year. This deficit must be made up the following year.

The RFS program’s four renewable fuel standards are nested within each other. In other words, the fuel with a higher GHG reduction threshold can be used to meet the standards for a lower GHG reduction threshold. For example, fuels or RINs for advanced biofuel (i.e., cellulosic, biodiesel or sugarcane ethanol) can be used to meet the total renewable fuel standards (i.e., corn ethanol).

The table below shows which RIN type and D-code can be used to demonstrate compliance with the four categories of fuel that together comprise an obligated parties’ renewable volume obligation (RVO):

D-Code	Cellulosic Biofuel	Biomass-Based Diesel	Advanced Biofuel	Total Renewable Fuel
---------------	---------------------------	-----------------------------	-------------------------	-----------------------------

visited on 1/12/2018

D-Code	Cellulosic Biofuel	Biomass-Based Diesel	Advanced Biofuel	Total Renewable Fuel
3	X		X	X
4		X	X	X
5			X	X
6				X
7	X		X	X

For cellulosic standards, an additional flexibility is provided. Cellulosic waiver credits (CWC) are offered by EPA at a price determined by formula in the statute. Obligated parties have the option of purchasing CWCs plus an advanced RIN in lieu of blending cellulosic biofuel or obtaining a cellulosic RIN.

[Learn more about RFS program compliance at Fuels Registration, Reporting and Compliance Help.](#)

LAST UPDATED ON JUNE 7, 2017