

US: FUELS: RENEWABLE FUEL STANDARD

History

The first Renewable Fuel Standard (RFS1) was created under the Energy Policy Act of 2005 and included small targets for blending ethanol in gasoline. On February 3, 2010, the United States Environmental Protection Agency (EPA) released major revisions to the National Renewable Fuel Standard. The new rule (RFS2), which incorporates changes mandated by the 2007 Energy Independence and Security Act (EISA), is a major amendment of the original RFS1 standard.

RFS2 regulates renewable fuels (biofuels) in the entire US and relies on life cycle analysis (LCA) as a tool to regulate fuels, incorporating greenhouse gas (GHG) emissions from indirect land use change (ILUC) in their LCA framework.

Efforts are underway to establish regional low carbon fuel standards in Northeast and Mid-Atlantic States, as well as in Midwestern states. These regional initiatives are likely to be modeled after the California Low Carbon Fuel Standard (LCFS).

Recent developments in the implementation phases of RFS2 and LCFS and the status of emerging LCF policy initiatives at regional levels are detailed in an ICCT policy update on LCFS.

Biofuel production in the U.S. is also supported through various tax credits.

RFS Standards

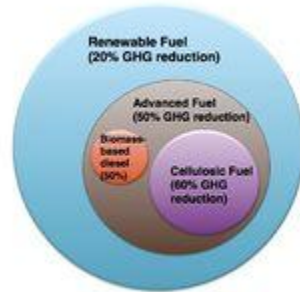
RFS2 represents a hybrid approach that superimposes a performance-based standard on a set of volumetric targets. In contrast to RFS1, which was limited to gasoline, the new rule expands the RFS program to cover gasoline and diesel intended for use in highway and nonroad vehicles and engines. RFS2 classifies renewable fuels according to four nonexclusive categories, based on GHG-reduction thresholds and feedstock types, and sets volumetric requirements for each. The categories are:

- Renewable fuels - minimum 20% GHG reduction
- Advanced biofuels - minimum 50% GHG reduction, and cannot be produced from corn starch
- Biomass-based diesel - minimum 50% GHG reduction
- Cellulosic biofuel - minimum 60% GHG reduction, must be produced from cellulosic feedstocks

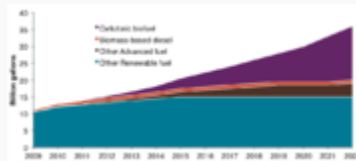
Cellulosic biofuel and biomass-based diesel are exclusive, but each fulfill the requirements for Advanced and Renewable Fuels (see diagram). Cellulosic diesel may qualify for either cellulosic or biomass-based diesel RINs. The required volumes for each category increase over time (see figure).

The RFS2 rule set volumes for biomass-based diesel through 2012 only, with a requirement of 1 billion gallons that year; in subsequent years EPA may set a volume mandate at or greater than 1 billion gallons. The volume requirements for 2013 are shown in the table below.

Technical information on biofuel specifications can be found at US: Fuels: Biodiesel specifications.



Schematic of biofuel categories under the RFS2



RFS2 volumes over time

Final Volumes for 2013			
Fuel	Actual Volume	Ethanol Equivalent Volume*	Percentage Standard
Cellulosic biofuel	6 mil gal	10.45 mil gal	0.008%
Biomass-based diesel	1.28 bil gal	1.92 bil gal	1.12%
Advanced biofuel	2.75 bil gal	2.0 bil gal	1.60%
Renewable fuel	16.55 bil gal	16.55 bil gal	9.63%
Notes:			

*Biodiesel and cellulosic diesel have equivalence values of 1.5 and 1.7 ethanol equivalent gallons respectively. As a result, ethanol-equivalent volumes are larger than actual volumes for cellulosic biofuel and biomass based diesel.

On November 8, EPA released its proposed rulemaking for the 2014 Renewable Fuel Obligation. As in previous years, they revised the cellulosic mandate downward to reflect limited availability. But for the first time, EPA also proposed reducing the overall advanced biofuel mandate and the renewable fuel mandate. EPA reduced the renewable fuel mandate even further, under a separate waiver authority, due to "low supply" of renewable fuel. EPA interprets "low supply" of renewable fuel broadly, to include limited ability to supply biofuels to vehicles that can consume them. This is effectively an acknowledgement that E15 and E85 infrastructure is currently inadequate to meet the original targets. EPA will accept comments on these proposed volumes for 60 days following publication of the proposal in the Federal Register.

Original and proposed volumes for 2014, ethanol equivalent volumes

Fuel	Original volume (statute)	Proposed volume
Cellulosic biofuel	1.75 bil gal	17 mil gal
Biomass-based diesel	1.5+ bil gal*	1.92 bil gal
Advanced biofuel	3.75 bil gal	2.2 bil gal
Renewable fuel	18.15 bil gal	15.21 bil gal

Notes:

*The statute did not set volumes for biomass-based diesel beyond 2012, but specified it must be at least 1.0 billion gallons (1.5 billion gallons ethanol equivalent) in years 2013-2022.

RIN trading system

For every gallon of biofuel created, the producer earns one Renewable Identification Number (RIN) that is specific to the biofuel category (e.g. Renewable RIN, Cellulosic RIN). RINs are awarded based on energy content; for instance one gallon of biodiesel earns 1.5 RINs because it has a higher energy density. The RIN remains attached to the biofuel, and once the biofuel is blended into road fuel, the RIN can be sold or traded.

At the time the RFS2 was finalized, there was no commercial production of cellulosic biofuel, and so the regulation stipulates that in years when projected production of cellulosic biofuel falls short of that year's target, EPA should issue a revised target to match availability. EPA is then required to issue cellulosic waiver credits equivalent to the revised volume mandate. Obligated parties (fuel blenders and suppliers) may fulfill their revised obligation for cellulosic biofuel with either cellulosic RINs or waiver credits. The cellulosic requirement has been revised downward for every year of the RFS2. In 2012, EPA revised the original requirement of 500 million gallons to 10.5 million gallons and thus issued 10.5 million cellulosic waiver credits. Actual production in that year was 20,069 gallons, falling short of the revised target.^[1]

Assessment of greenhouse gas reductions of biofuels

To assess the GHG reduction of specific biofuel pathways, EPA uses an economic model to assess the marginal increase in emissions in a scenario in which a given volume of a biofuel is supplied compared to one in which a lower volume of biofuel is supplied. This modeling accounts for system wide changes throughout the global agricultural sector. For example, if corn is used for renewable fuel in the U.S., this may raise the international price of corn and result in cropland expansion to produce more corn in other countries. This effect is referred to as "indirect land use change" (iLUC). RFS is the first national regulation adopted anywhere in the world that recognizes the potential for significant contributions to lifecycle GHG emissions from ILUC. (At the state level, California has already incorporated ILUC GHG emissions in carbon-intensity calculations under its LCFS.)

For a biofuel pathway to qualify under a certain category in the RFS, it must exceed a GHG reduction threshold. Renewable fuels (e.g. corn ethanol) must reduce GHG emissions by at least 20% compared to gasoline or diesel. Advanced fuels (e.g. Brazilian sugarcane), including biomass-based diesel (e.g. soy biodiesel) must reduce GHG emissions by at least 50%. Cellulosic fuels (e.g. corn stover ethanol) must reduce emissions by at least 60%.

The combination of volumetric targets, corresponding GHG-reduction threshold requirements, and incorporation of GHG emissions from indirect land-use change is expected to reduce annual GHG emissions by 138 million metric tons (MMT) in 2022, although uncertainties remain, particularly with regard to ILUC GHG emissions. Under the new requirements, renewables will displace 13.6 billion gallons of gasoline and diesel, with net economic and human health benefits of \$8.5 to \$21.5 billion in 2022. According to ICCT estimate, if the goal of producing 16 billion gallons of cellulosic ethanol were to be met by 2022, RFS2 may reduce the carbon intensity of regulated fuels by 6.5% relative to their carbon intensity in 2009.

Source:

http://transportpolicy.net/index.php?title=US:_Fuels:_Renewable_Fuel_Standard