Renewable Identification Numbers:

A Guideline for Water Resource Recovery Facilities

Authors: David Wrightsman (Energy Systems Group), Karri Ving (SFPUC), Manon Fisher (SFPUC)

Background

The renewable fuel standard (RFS) was approved under the Energy Policy Act of 2005 and expanded through the Energy Independence and Security Act of 2007. Congress created the RFS program to reduce greenhouse gas (GHG) emissions and expand the nation's renewable fuels sector while reducing reliance on imported oil. The RFS program requires that a certain volume of renewable fuel be used to replace or reduce the quantity of petroleum-based transportation fuel, heating oil, or jet fuel being used in the market. The four renewable fuel categories under the RFS are:

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

Fuel Pathways

In order for a fuel to qualify as a renewable fuel under the RFS program, the fuel must achieve a reduction in GHG emissions as compared to a 2005 petroleum baseline, and must be determined by the EPA as meeting statute requirements. The EPA has approved fuel pathways under all four categories of renewable fuel, the most important for the water and wastewater industry being compressed natural gas from water resource recovery facility (WRRF) digesters to vehicle fuel.

RFS Compliance Basics

Importers of gasoline or diesel fuel are considered "Obligated Parties" under the RFS program. To comply, these obligated parties must blend renewable fuel into petroleum-based fuel, or obtain credits called Renewable Identification Numbers, or RINs, to meet their specified volume obligation. Each fuel type is assigned a "D-code" that identifies the renewable fuel type. The D-code is assigned based on the feedstock used, fuel type produced, energy input, and GHG reduction threshold.

Obligated parties must obtain sufficient RINs for each category of fuel in order to demonstrate compliance with the standard. They can do so through the purchase and use of "wet" gallons of renewable fuel (which have an associated RIN), or through RIN credits that can be purchased on the market from other obligated parties or renewable fuel producers.

Table 1. RIN Classification Codes

Category	Code	Description of Process / Fuel
Cellulosic Biofuel	D3	Any process that converts cellulosic biomass to fuel: ethanol, renewable gasoline, **biogas-derived CNG and LNG**
Biomass-Derived Diesel	D4	Biodiesel, renewable diesel, jet fuel, heating oil
Advanced Biofuels	D5	Biodiesel, renewable diesel, sugarcane ethanol, heating oil, waste digester-derived CNG and LNG
Renewable Fuel	D6	Corn ethanol
Cellulosic Diesel	D7	Cellulosic diesel, jet fuel heating oil

Data Source: *https://www.epa.gov/renewable-fuel-standard-program/approved-pathways-renewable-fuel*

Biogas from landfills, municipal WRRF digesters, agricultural digesters, separated municipal solid waste digesters, and biogas from the cellulosic components of other biomass process in other waste digesters count as a D3 RIN. However waste digester CNG and LNG not derived from cellulosic biomass counts as a D5 RIN. The fuel type that comes out of the cellulosic conversion process can be classified as RNG, or renewable electricity, and it will still meet the D3 code. The 2007 expansion of the RFS extended the yearly volume requirements for cellulosic biofuel out to 2022, by which time obligated parties volume requirements will expand to 16 billion gallons – up from the 4.25 billion required in 2016.

RIN Value and Impact on Biogas Production

RINs are generated when a producer makes a gallon of renewable fuel. RINs can be attached to the gallon of purchased fuel, or may instead be purchased on the market as a tradable credit. It has been determined that the gallon equivalency of biogas is equal to 77,000 BTU.

Traditionally the most economical end use of biogas produced through digestion at WRRFs was on-site co-generation and electrical use, or sale to the power grid. With the increased volume of biogas-based transportation fuels used for compliance with the RFS, the financial incentive to produce transportation fuel has also increased. According to the EPA, the net number of D-3 RINs generated in 2014 was nearly 33 million.

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To clarify the added benefit of RINs to a biogas project, consider a WRRF that produces biogas. This facility is deciding whether to continue running a co-gen system, or switch to production of transportation fuel. If they were to switch, the biogas from an anaerobic digester would need to be cleaned, compressed, stored and put into a vehicle. Cleaning consists of removal of hydrogen sulfides, moisture, particulates, and carbon dioxide to increase the energy value. Compression is also required to inject the fuel into a vehicle. Usually compressed natural gas (CNG) fueling stations increase the pressure to 4500 pounds per square inch to fill vehicle storage tanks.

If this facility produces (RNG) at $2.00 per gasoline gallon equivalent, displacing gasoline at $2.50 per gallon, they would yield a savings of $0.50 per gallon. This margin may not be sufficient for a facility to move forward with such a radical change to their operations and business model. However, with the addition of RINs, there is the potential to increase that profit margin.

Table 2 displays the RIN price index for March 2016. Using the spot price of $1.84 per RIN, the WRRF would theoretically be able to increase their savings, or revenue, by another $1.84 per gallon from the sale of the RIN credit. This, in addition to the original $0.50 saving associated with switching to RNG, yields the facility $2.34 per GGE of RNG.

Generating, Separating, and Selling RIN Credits

RINs are generated and transferred in the EPA Moderated Transaction System (EMTS) and do not exist outside EMTS. The EMTS data flow supports the reporting of all RIN transactions including the generation, separation, purchase and sale, and retirement of RINs. The following information is required to generate a RIN:

- Quantity of temperature-corrected fuel volume
- Pathway information: fuel type, process
- Originating facility
- Type of feedstock utilized
- Quantity of feedstock utilized to create fuel
- Fuel production data

With this information the RIN is created, and the fuel and RIN are sold. Product transfer documents are then created and sent to the buyer. When consumed as a commodity, the physical fuel must be separated from the RIN. Once separated from the fuel, the RIN can then be traded in the secondary market. Obligated parties purchase RINs from the market and retire the RINs to fulfill their Renewable Volume Obligation (RVO).

The value of RINs increases if an additional voluntary step is taken to develop a third-party review. This review is called a Quality Assurance Plan (QAP). RINs with an associated QAP can be traded at a premium because they provide an affirmative defense against fraud. RINs with a QAP are marketed in EMTS as Q-RINs.

RIN value, like any commodity, fluctuates. In addition, RIN value changes by category, as shown in Table 2. Daily market values can be found on various websites, but generally require subscriptions to access the data.

Table 2. National Renewable Fuel Co-Product Price Index March 2016

RIN Category	Code	Spot Price ($)	Previous	4 Week Avg.
Cellulosic	**D3/D7**			
Current Yr		1.8400	1.3300	1.4575
Previous Yr		1.3400	0.6400	0.8150
Biodiesel	**D4**			
Current Yr		0.7700	0.8025	0.7813
Previous Yr		0.7800	0.8025	0.7850
Advanced Biofuel	**D5**			
Current Yr		0.7550	0.7825	0.7675
Previous Yr		0.7525	0.7775	0.7600
Ethanol	**D6**			
Current Yr		0.7510	0.7600	0.7266
Previous Yr		0.7125	0.7575	0.7256

Data Source: *http://www.opisnet.com/images/productsamples/EBISnewsletter-sample.pdf*

Market Trends – What does the future hold?

According to released EPA RIN generation data for January 2016, a net total of 1.44 billion RINs were generated during the month, including nearly 1.74 million cellulosic D3 RINs. While the cellulosic RIN market is relatively new, the numbers show promise of a rapidly expanding market. These numbers are likely due to the increase in RVOs that obligated parties are subject to under the RFS as shown in Figure 1.

As such, an ever-increasing number of WRRFs are pursuing the conversion of biogas into compressed natural gas or liquefied natural gas due to the increase in the compliance obligations of the RFS. Projects that previously did not make economic sense for WRRFs now offer enough incentive through the RIN market.

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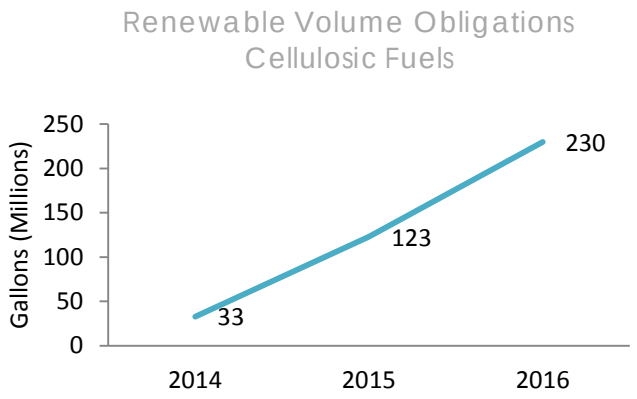

Figure 1. Cellulosic fuel renewable volume obligations
Data Source:
http://www.progressivefuelslimited.com/web_data/PFL_RIN_Recap.pdf

SOURCES

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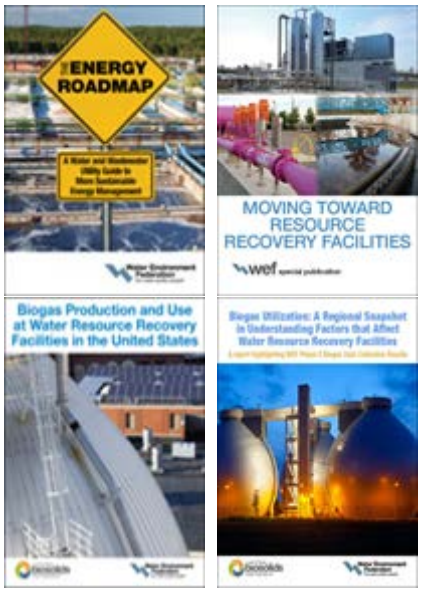
2. EPA website: http://www2.epa.gov/renewable-fuel-standard-program/renewable-identification-numbers-rins-under-renewable-fuel-standard
3. EPA registration website: http://www2.epa.gov/fuels-registration-reporting-and-compliance-help/registration-fuel-programs
4. EPA RIN QAP program announcement: http://www2.epa.gov/sites/production/files/2015-08/documents/420f14042.pdf
5. EPA Moderated Transaction System (EMTS) : http://www.exchangenetwork.net/data-exchange/epa-moderated-transaction-system/
6. Biomass magazine "The Cellulosic-RIN Revolution": http://biomassmagazine.com/articles/11571/the-cellulosic-rin-revolution

UPCOMING FACT SHEETS

1. How to Enter the RIN Market as a WRRF
2. RINs or Q-RINs

ADDITIONAL RESOURCES AT E-WEF.ORG



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