RNG Policy and Regulations

January 14th and 15th
Asheville and Raleigh, North Carolina
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Why EcoEngineers?

Audits of **Over 165 Biofuel Plants** in **20 Countries**

Over **2.9 Billion** Gallons of Biofuel Capacity Under Management

Over **91 Producers** have enrolled in the **RIN Compliance Program**

Assisted Registration & Preparation for more than **100 LCFS Pathway Projects**

One of the **FIRST USEPA** Recognized RIN Quality Assurance Programs

Transacted over **3.0 Billion** RINs in 2018

1.1 Billion EcoEngineers Q-RINs in 2018

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Renewable Fuel Standard (RFS)

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RFS Key Definitions

USEPA: United States Environmental Protection Agency. Federal agency that sets and enforces the RFS

RFS: Renewable Fuel Standard. Federal program under 40 CFR 80 Subpart M, sets goal of 36 billion gallons of renewable transportation fuel by 2022

RVO: Renewable Volume Obligation. Each obligated party is obligated to meet its RVO by demonstrating that it has retired a sufficient number of RINs to satisfy its obligation

Fuel Pathway: The feedstock, production process, fuel type, and D-code in a production facility registration under the RFS

EMTS: USEPA-Moderated Transaction System, online system for completing all RIN transactions under the RFS

RIN: Renewable Identification Number. A unique number generated to represent a volume of renewable fuel; the “currency” of the RFS

RFS Key Definitions

GHG: Greenhouse Gases. These gases have potential to warm the atmosphere

D-Code: Code assigned to RINs generated from renewable fuel. The D-code used must be specified in Table 1 (§80.1426), which corresponds to the pathway that describes the producer's operations.

QAP: Quality Assurance Plan. The list of elements checked to verify that RINs generated are valid. Designates RINs as Q-RINs if in compliance under a QAP

CDX: Central Data Exchange. The USEPA's electronic reporting and registration site

Part 79: Registration under the Fuel and Fuel Additive Registration (FFARS). Required for liquid fuels

Part 80: Registration under 40 CFR 1450. Includes the specific pathway and fuel type; requires an independent third-party engineering review and CDX Registration

Obligated Parties: Any refiner that produces or imports gasoline or diesel fuel. An obligated party is required to demonstrate that it has satisfied all RVO requirements.

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Goals of the RFS Program

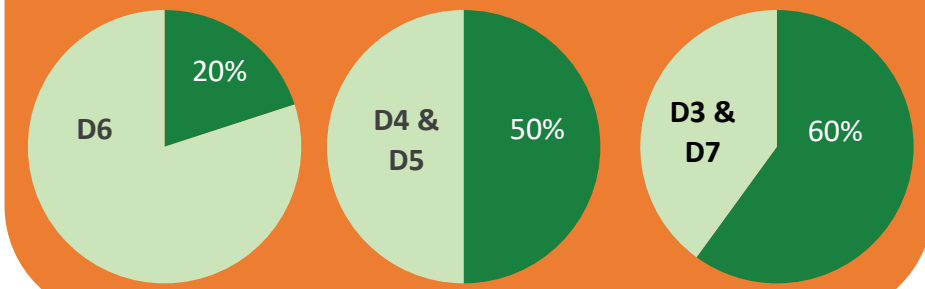
- Replace a portion of fossil fuels used in transportation in the U.S. with biofuels
- Reduce U.S. dependence on foreign oil sources
- Incentivize the development of advanced biofuels (GHG reduction of 50% or more)
- **36 BILLION GALLONS OF RENEWABLE FUEL BY 2022**
- Current RVO schedule is set till 2022 (program does not sunset in 2022)

RFS Program Overview

Renewable Fuel Producers

Renewable Fuel

RINs



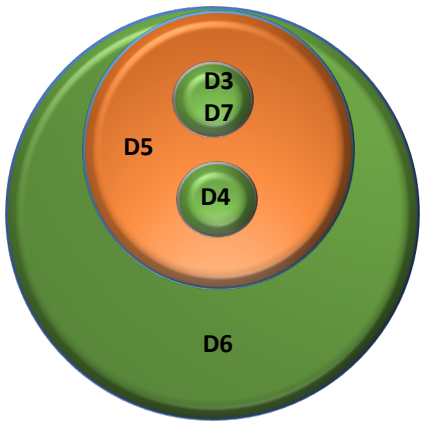
Blended

Fuel Market

Separated

Obligated Parties

Used for Compliance



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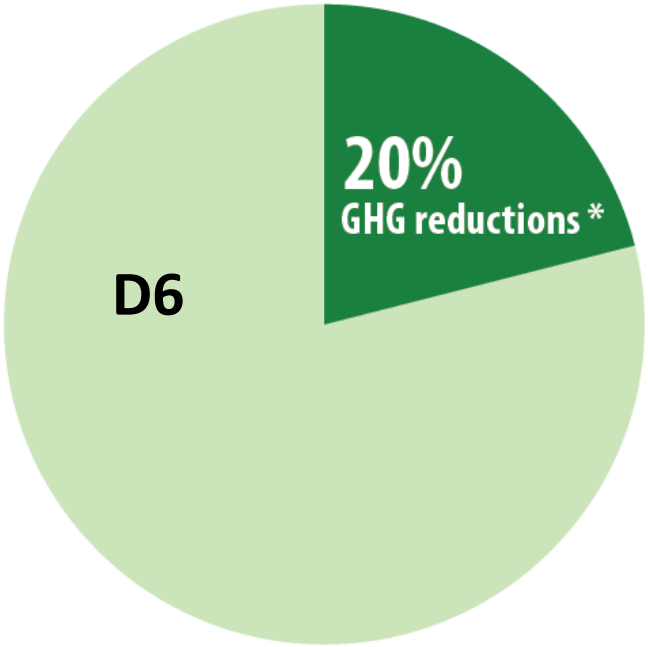
Fuel Categories and D-Codes

Lifecycle Greenhouse Gas (GHG) Emissions

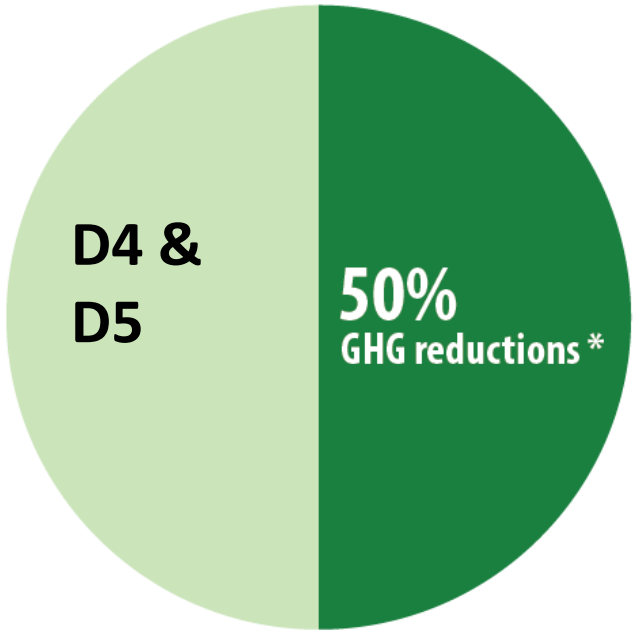
GHG emissions must take into account direct and significant indirect emissions, including land use change.

Renewable Fuels



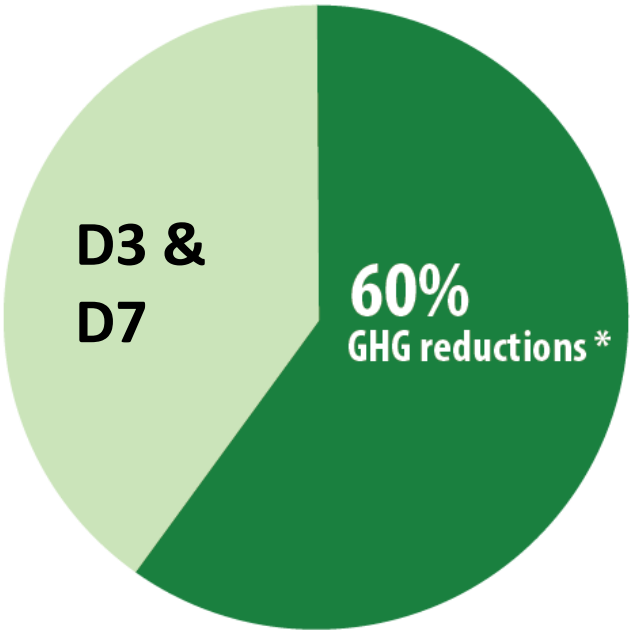
Corn Ethanol, Other Grandfathered Biofuels

Advanced & Biodiesel Fuels



Sugarcane Ethanol, Renewable Diesel, CNG/LNG/ Biodiesel

Cellulosic Fuels



Cellulosic Ethanol, Cellulosic Diesel, Renewable CNG/LNG/Electricity

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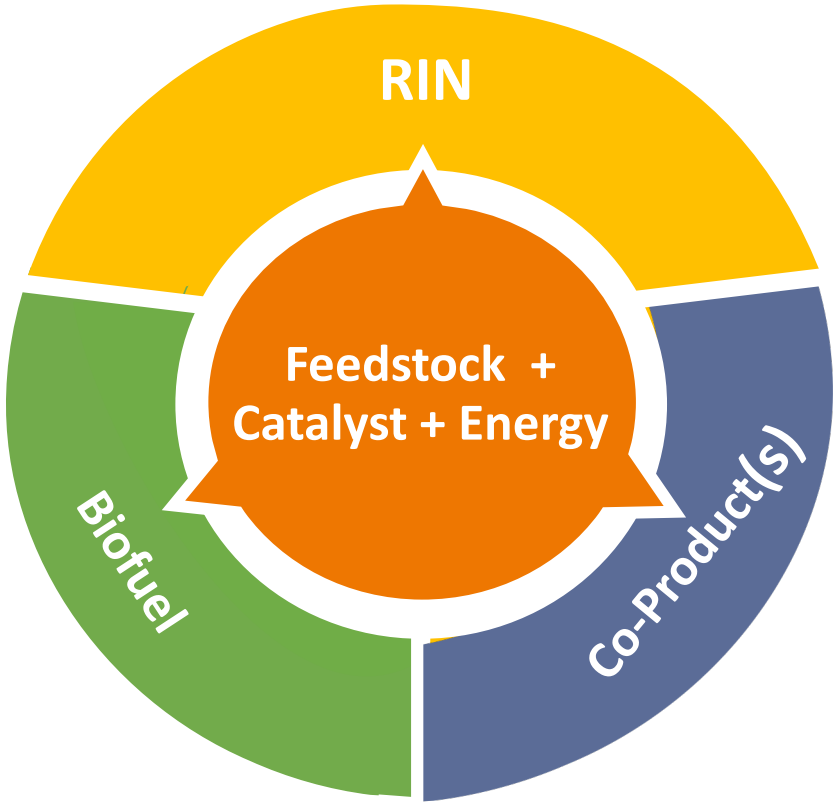
A RIN is Proof that Biofuels Were Used in Transportation

- A RIN is proof of biofuel blending and is a compliance instrument
- A tradable environmental attribute
- 1 RIN = Heating value of 1 gallon of ethanol (77,000 Btu LHV)
- Strict rules of generation/separation/trading
- EMTS is the platform where RINs are generated, separated and sold
- Petroleum refiners and importers are required to prove compliance



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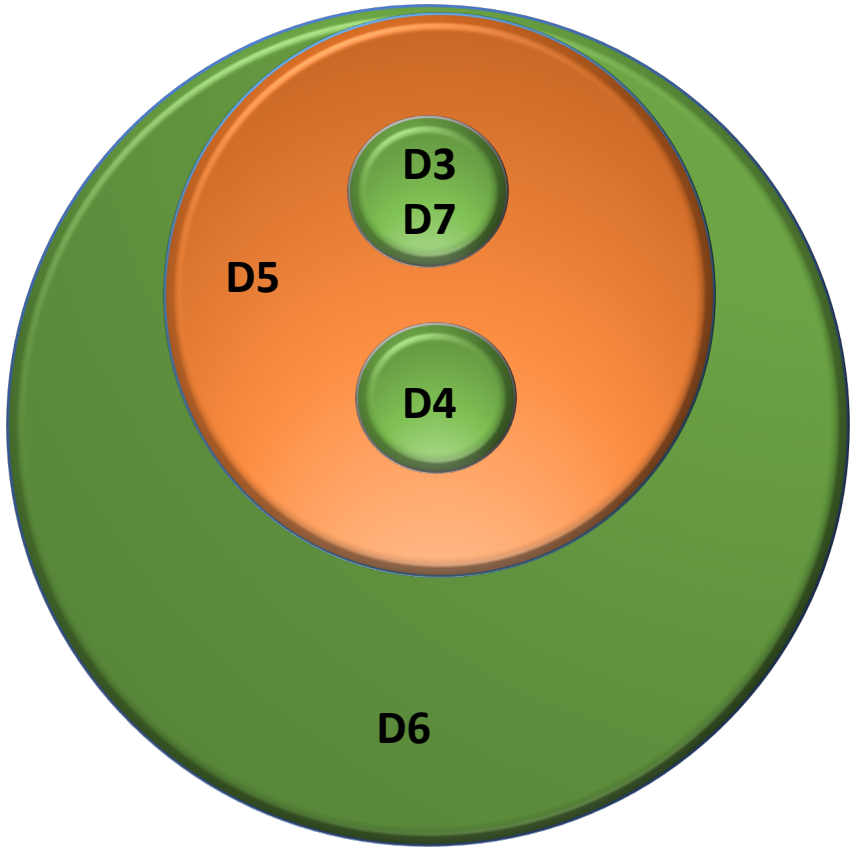
Renewable Volume Obligations (RVOs) are "Nested"

Fuel Type	RIN Used to Prove Compliance	2020 RVO (BG)
Cellulosic Biofuel	D3 , D7	0.59
Biomass-Based Diesel	D4, D7	2.43 BD GAL 3.65 RINS
Remaining Advanced Biofuel	D3, D4, D5, D7	2.2
Sub Total 2020 RVO		**5.09**
Remaining Renewable Fuel	D3, D4, D5, D6, D7	15.00
Total 2020 RVO		**20.09**



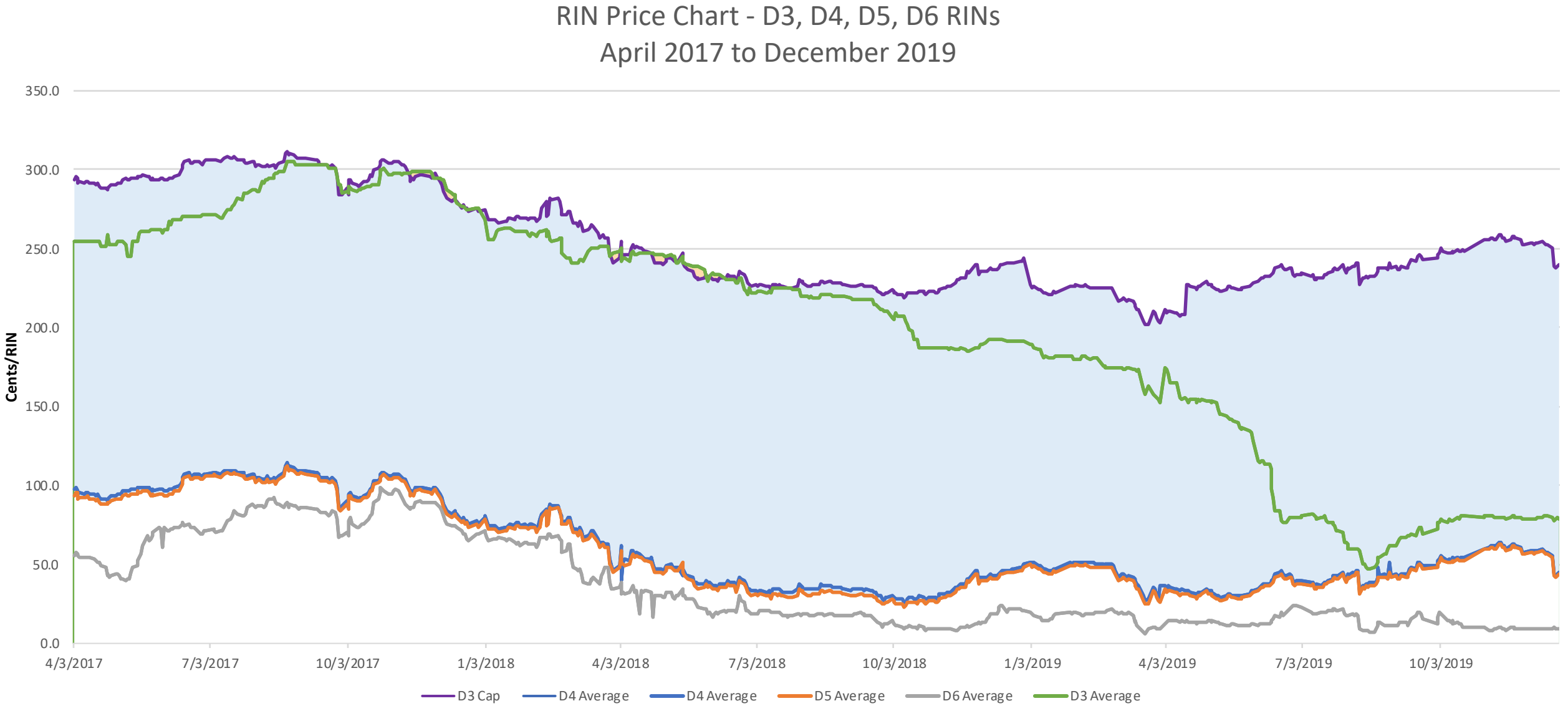
Petroleum Refiners and Fuel Importers are Obligated Parties

- Obligated parties acquire RINs by:
  - Physical blending of renewable fuel with RINs, or
  - Purchases of separated RINs without physical fuel
- Obligated RVO is calculated continuously
- RINs acquired are “retired” within EMTS to demonstrate compliance
- 20% of current year RVOs can be met with prior year RINs
- RINs must be used for compliance in the calendar year they were generated or the following calendar year

$$RVO_{DCODE} = \% * DV_i$$

Final 2019 % Standards		
D-Code	Fuel Type	%
3	Cellulosic Biofuel	0.34%
4	Biomass-Based Diesel	2.10%
5	Advanced Biofuel	2.93%
6	Renewable Fuel	11.56%

RIN Price History



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Low Carbon Fuel Standard (LCFS)

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LCFS Key Definitions

CARB: California Air Resources Board. Established LCFS, implements program and has rulemaking authority over LCFS program

LCFS: Low Carbon Fuel Standard. Created with AB 32, 20% reduction by 2030

CI: Carbon Intensity. the amount of life-cycle greenhouse gas emissions, per unit of fuel energy, expressed in grams of carbon dioxide equivalent per megajoule (g CO_2e/MJ)

Life-cycle GHG: Aggregate quantity of greenhouse gas emissions related to the full fuel life cycle. From feedstock generation to fuel end use

CA-GREET 3.0 (aka GREET): Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation Model used for life-cycle analysis in the LCFS program

Fuel Pathway: The life cycle of renewable fuel registered with CARB. The pathway has a defined CI score and is facility-specific

LCFS Key Definitions

AFP: Alternative Fuels Portal. The LCFS online registration system for facilities, fuel pathway applications, FPCs, and FTMs

FPC: Fuel Pathway Code. The identifier in the LRT-CBTS that applies to a specific fuel pathway approved pursuant to section 95488

Verification Body: An entity accredited by CARB that can perform validation or verification services to entities required to contract for validation and verification

LRT: LCFS Reporting Tool. LCFS platform for quarterly, annual reporting, and credit generation and transactions

LCFS Credit: Credits generated by fuels with a CI below the annual goal of the LCFS program

Regulated Parties: Companies that produce or import transportation fuel into California. Regulated parties are responsible for reporting on a quarterly and annual basis

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Goals of the LCFS Program

- **Reduce GHG Emissions from transportation fuels in California by 20% by 2030**
- Incentivize the development of low carbon fuels
  - Performance-based — Giving credit for advanced fuels that reduce GHG emissions
  - Fuel neutral — No fuel-type-specific goals
- The LCFS is an example for other programs to follow worldwide
- CARB works in partnership with other programs
  - Oregon Clean Fuels Program (CFP)
  - Puget Sound Clean Air Agency (Currently in rulemaking)

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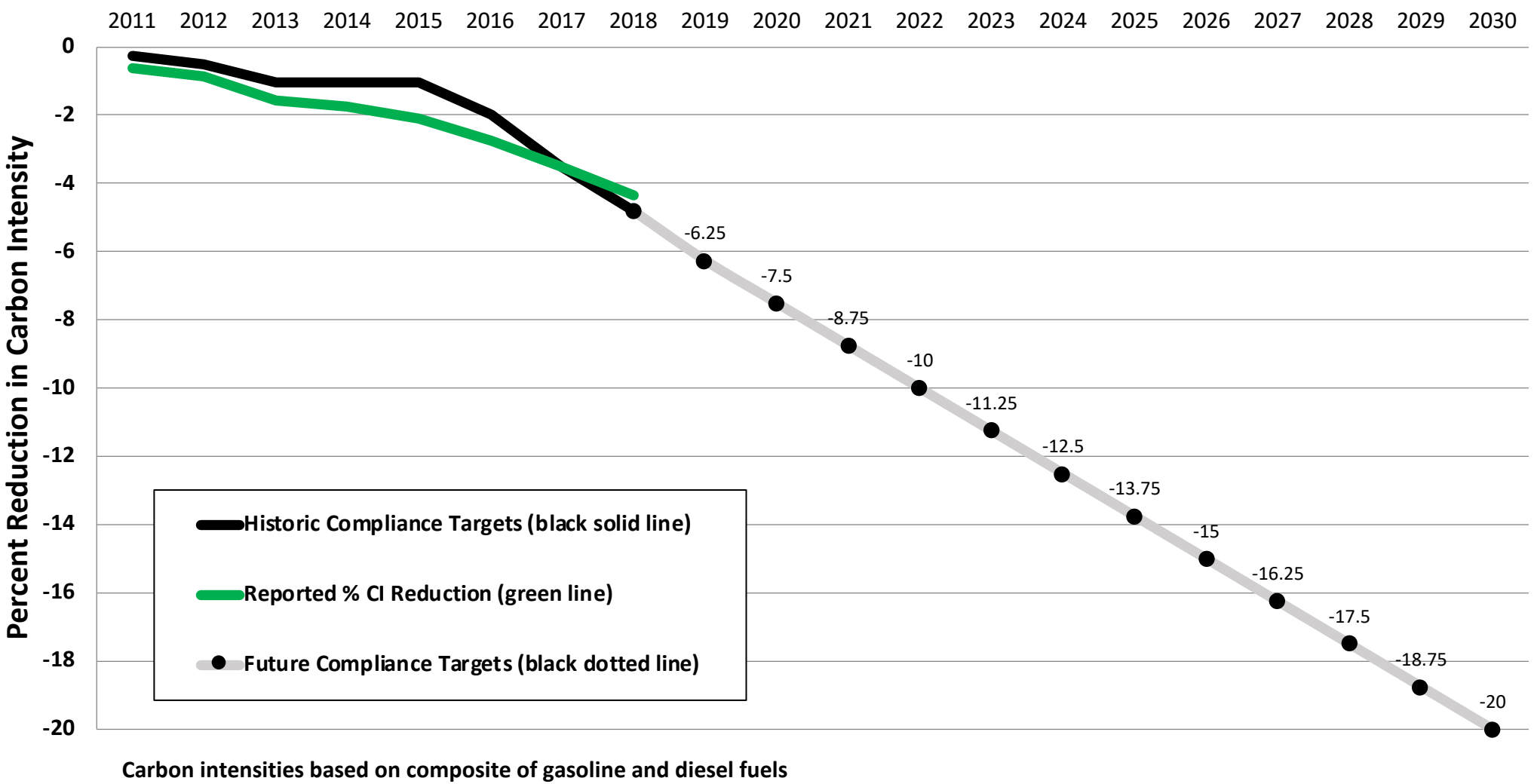
Compliance Curve Suggests Impending Credit Crunch



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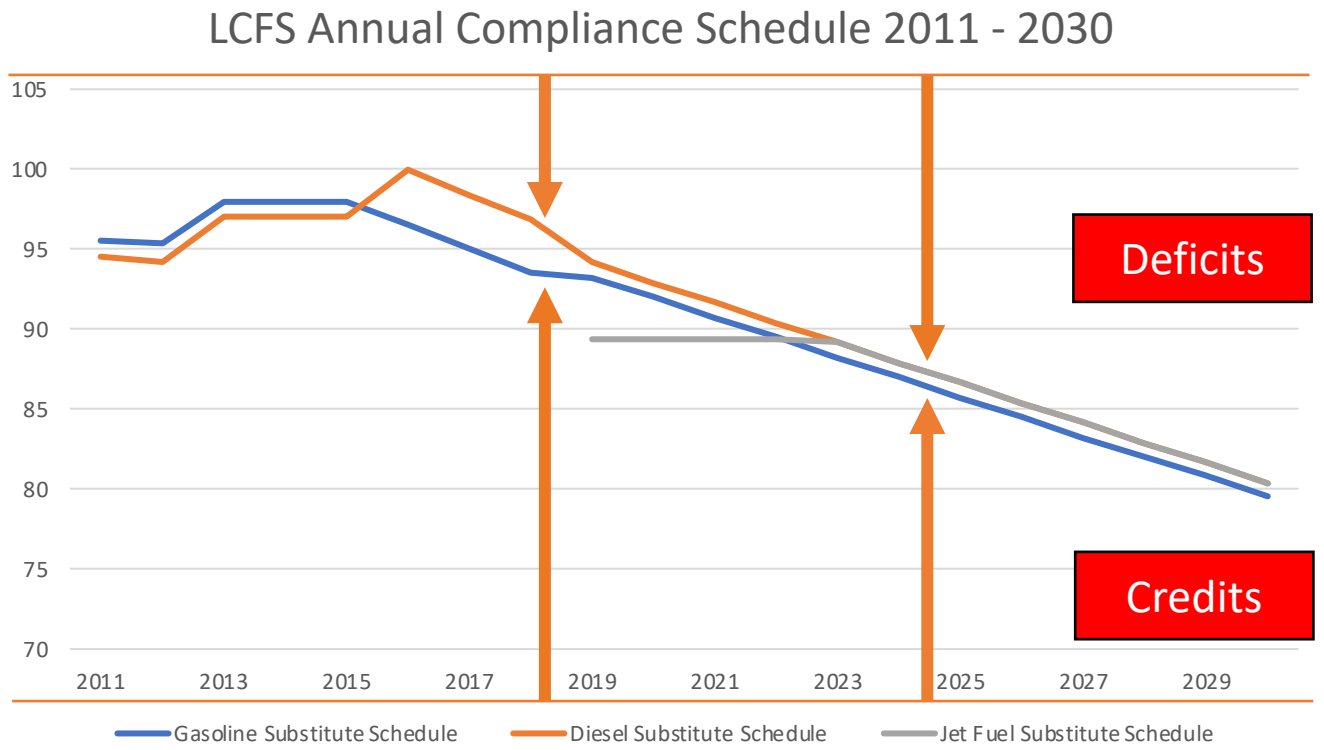
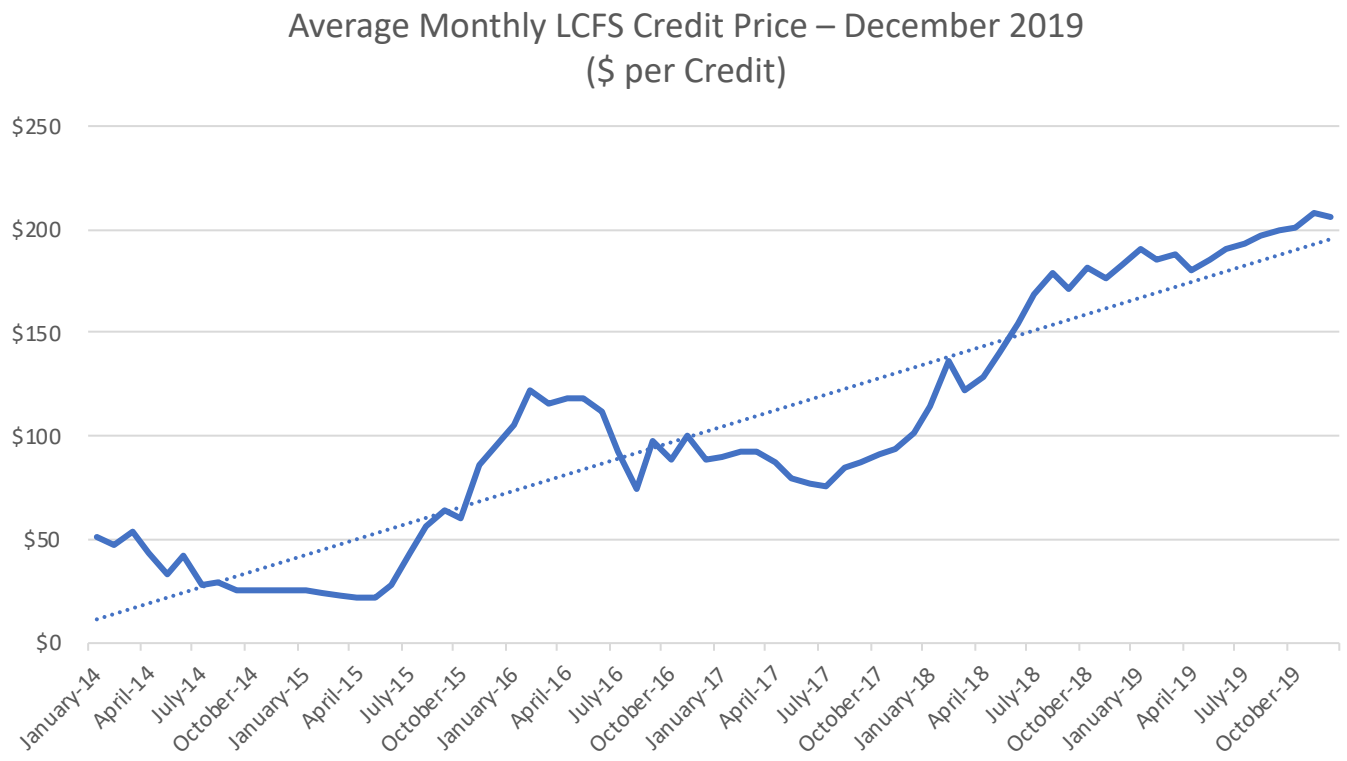
California Market Demands LCFS Credits Due to Annual Compliance Schedule

- LCFS credits in high demand in California due to steep annual compliance goals of LCFS program
- Deficits made worse because renewable fuels earn fewer credits over time. Three potential solutions:
  - More renewable fuel
  - Less fossil fuel
  - Lower CI fuel
- Continuous improvement necessary to stay competitive in LCFS Market



LCFS Credit Characteristics

- $200 price ceiling (adjusted for inflation)
- No floor
- No expiration date
- Brokers can represent regulated parties, but cannot take title to credits or act independently



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CI score Has a Direct Impact on Credit and Revenue Generation

Diesel Compliance Year	RNG CI Under LCFS	RNG Volume* (ft^3)	Market Value of CI Credits	Number of LCFS Credits generated	Total Value of Credits	$/MMBtu
2019	-275	1,000,000	$185.00	373	$68,900	$68.97
2019	0	1,000,000	$185.00	83	$15,300	$15.30
2019	20	1,000,000	$185.00	61	$11,400	$11.39
2019	40	1,000,000	$185.00	40	$7,500	$7.49

The Significance of the RFS and LCFS to RNG Projects

Value of WWTP RNG (D3 + LCFS)		
Value of Gas	$3.00	10%
Value of Federal Credits (RINs) - $1.65	$19.35	60%
Value of California Credits (LCFS) - $190 MT, 30 CI	$10.00	30%
Total	**$32.35**	**100%**

Value of Food Waste (D5, No LCFS)		
Value of Gas	$3.00	36%
Value of Federal Credits (RINs) - $0.45 D5 RIN	$5.25	64%
Value of California Credits (LCFS)	$ -	-
Total	**$8.25**	**100%**

Value of Dairy RNG (D3 + LCFS)		
Value of Gas	$3.00	3%
Value of Federal Credits (RINs) - $1.65	$19.35	22%
Value of California Credits (LCFS) - $190 MT, -250 CI	$65.00	75%
Total	**$87.35**	**100%**

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Please reach out with any questions:
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