Following Biogas from Source to Credit Generation

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Launched in 2005, Element Markets has become a leading marketer of environmental commodities in the U.S., and was selected as Energy Risk “Emissions House of the Year” for 2014

- Leading marketer of environmental commodities with a focus on Emissions, GHG, Renewable Credits (Energy and Transportation), and Biomethane
- Over $1,600,000,000 in environmental commodities transacted since inception
- EM provides Environmental Asset Management Services for over 8,000 MW of generation and 18 Landfill Projects
- Customer base of over 700 companies within the environmental markets

**Business Units**

- **Renewable Energy Group**
  - Biogas Marketing
  - Credit Marketing

- **Greenhouse Gas (GHG) and Emissions Services**
  - GHG Offset Projects
  - Credit Marketing
Element Markets Introduction

Key Achievements in RFS and LCFS Markets

**Renewable Fuel Standard**

- We have registered 6 pipeline-injected landfill biogas facilities under RFS with 1 more currently pending
- Over 40 million RINs transacted to date
- Registered as a **RIN generator** with several Biogas production facilities
- **EPA-approved system** for demonstrating qualifying use of Biogas for RIN generation

**Low Carbon Fuel Standard (LCFS)**

- First to register landfill biogas facility with a specific Carbon Intensity
- Registered 7 different pipeline-injected landfill biogas pathways under LCFS with several more pending
  - All applications and GREET preparations done with in-house staff
Introduction to RFS and LCFS

RFS and LCFS Both Incentivize Renewable Fuels in Transportation

Renewable Fuel Standard (RFS)
- **Goal:** to reach **36,000,000,000 gallons of renewable fuel** in the fuel pool by 2022
- Enforced by EPA Renewable Identification Numbers (RINs) represent 1 ethanol-gallon-equivalent of renewable fuel
- Biogas earns **11.727 RINs/dth**

Low-Carbon Fuel Standard (LCFS)
- **Goal:** to **reduce the carbon intensity** of California fuels by 10% by 2020
- Enforced by California Air Resources Board (state)
- **LCFS credits** represent 1 metric ton of CO₂ emissions reductions
- **Carbon intensity** is grams of CO₂ emitted per MJ
- Biogas earns ~ **0.034 Incremental LCFS credits/dth**, depending on carbon intensity

**Renewable transportation fuels used in California generate both RINs and LCFS Credits so long as the fuel is transported and consumed in CA**
How to Become a RIN Generator
Overview of Registration Steps under the RFS

Elements of RFS Application

- Registrant’s Application Package to EPA
- Third Party Engineering Review
- Initial QAP Review

Recordkeeping and Biogas Tracking Procedures

RIN Generation Protocol

- Documents on metering of fuel distribution
- Any conversion factors necessary for VRIN calculation
- Biogas supply and fuel production capacities

Process Heat Fuel Supply Plan

Physical Pathway Demonstration

- Pipeline mapping GIS Information
- Pipeline statements or other information on interconnections
- List and geographic position of biogas and fuel facilities
RFS Engineering Review

Main requirements

- The review is to be performed by a third-party Professional Engineer
- Site visits are necessary for all facilities upstream from pipeline gas injection
- During desk audit, PE reviews all contracts, proposed recordkeeping and RIN generation protocol

Sample data requirements for Third Party Engineering Review – Landfill Gas Facility

- Applicable regulatory permits for landfill and gas processing facility (e.g. Title V)
- Extraction wells map/layout
- Up-to-date process diagram (e.g., P&ID, block diagram, etc.)
- Current analyses of landfill gas and product gas injected into the pipeline
- Gas production records reflecting peak capacity
- Specification of metering system used at pipeline injection point and records of calibration
- Utility bills and/or fossil fuels invoices for energy use by the project
How to Become an LCFS Credit Generator
Overview of Registration Steps under the LCFS

Elements of LCFS Application

Fuel Pathway Code Application Package to CARB

- Application forms and required appendices
- GREET modeling with support for inputs made
- Application Narrative
- Technical Data on biogas and fuel facilities

Fuel Transport Mode Application Package to CARB

- Strict and formalized process
- Executed attestations and BoL's of production/delivery are required during registration
- Contact information for each party (e.g. pipeline system operator) required
- Required for receipt of final credits

- RFS Engineering Review
- List of all combustion-powered equipment
- Equipment technical specifications
- Fuel production/sale documentation and meter data for the last 24 months
- Raw landfill gas documentation and/or meter data for the last 24 months
- Information on gas sent to TOX/Flare
- Distance of LFG wells from processing plant (either for each well or average)
Registration Schedule

Approximate timeframe of registration steps under RFS and LCFS

- **RFS Registration**
  - Engineering Review
  - Application Drafting
  - EPA Submittal
  - EPA Approval
  - RIN Generation Starts

- **QAP Verification**
  - Scheduling
  - Baseline Audit
  - QAP Ready

- **LCFS Registration**
  - Application Drafting
  - ARB Approval
  - LCFS Generation Starts

- 1st Month
- 2nd Month
- 3rd Month
- 4th Month
**Compliance under RFS and LCFS**

*Documents and tracking steps necessary for LNG credit generation*

- **LFG Plant**
  - Biogas Injection
  - Biogas production and injection to pipeline is metered

- **Gas Delivery**
  - Gas is to be delivered in a manner and time consistent with the transport from injection to withdrawal point

- **LNG Producer**
  - Biogas Injection
  - Gas is sold to LNG Producer, rights to credit generation are clearly established

- **End User**
  - LNG used as transportation fuel

**Documentation**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Contracts for the sale of biogas rights; Monthly invoices by LFG Plant</td>
</tr>
<tr>
<td>2</td>
<td>Pipeline statements with utility-grade meter data of biogas injection</td>
</tr>
<tr>
<td>3</td>
<td>Attestations establishing delivery of biogas rights</td>
</tr>
<tr>
<td>4</td>
<td>Pipeline statements of gas sale and transport</td>
</tr>
<tr>
<td>5</td>
<td>Possible Physical Transport Path demonstrated to EPA</td>
</tr>
<tr>
<td>6</td>
<td>Pipeline statements with utility-grade meter data of gas delivery</td>
</tr>
<tr>
<td>7</td>
<td>Contract for the sale of biogas rights; Attestations establishing delivery of biogas rights</td>
</tr>
<tr>
<td>8</td>
<td>LNG Producer's attestation of delivered fuel quantity equal to or greater than the amount of biogas conveyed</td>
</tr>
<tr>
<td>9</td>
<td>Contract or supporting attestation with end user establishing transportation use</td>
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</tbody>
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Structure of the RIN Market

Nested System of RIN retirement

- Obligated parties meet compliance by submitting a quantity of Renewable Identification Numbers (RINs) equivalent to their Renewable Volume Obligations (RVOs) for each of the four standards.
- RINs are measured in ethanol equivalent gallons.
- Each batch of renewable fuel generated is assigned a “D Code”, based on the feedstock and the fuel production process.

- A Biogas RIN qualifies as a D3 RIN (Cellulosic Biofuel), which satisfies both the D3 and the D5 (Advanced Biofuel) categories, so the sales price for a D3 RIN is a negotiated discount value to the D3 Waiver Credit Value + the D5 Value.
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“Emissions House of the Year – 2010 & 2014” by Energy Risk

Energy Risk Environmental Rankings
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• #1 U.S. Voluntary GHG Credit Dealer
• #2 Renewable Energy Credit Dealer
  • #1 NOx & SO2 Dealer

Environmental Finance Magazine
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• Runner-Up, Best Trading Company of North American GHG Markets (California)
  • Best Trading NOx & SO₂ Company Emission Credits