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Opportunities in the Biogas Marketplace

May 2017

CONFIDENTIAL AND PROPRIETARY

"Emissions House of the Year"

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Launched in 2005, Element Markets has become a leading producer and marketer of renewable natural gas and environmental commodities in the US.

- Transacted over $1.6 billion in environmental commodities since inception
- Currently provides environmental asset management services for over 6,000 MW and 18 landfill gas projects
- Extensive expertise in the major North American Biogas Market
- Customer base of over 800 companies within the environmental markets
- Robust back-office and risk management practices for ease of execution

Marketing

Emissions & GHG Credits

- Largest regional marketer of emission credits in US
- Offset project developer managing 18 GHG projects
- Transacted over 40 million tonnes of GHG credits

Renewable Energy Credits

- Active in all compliance and voluntary REC markets in North America
- Transacted over 19 million RECs
- Have transacted RECs in 38 different markets

Biogas & RINs

- Currently Marketing Biogas from 6 different Projects + More Pending
- Successfully Generating RINs and LCFS from Biogas
- Over 50 million RINs transacted

Biogas Marketing

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- Element Markets has been a leading marketer of Biogas since 2009.
- The company has transacted over 9MM dekatherms of Biogas since inception, with large sales to the generation, transportation, and voluntary markets.
- Registered as a RIN generator with several Biogas production facilities.
- 9 Biogas facilities registered under RFS with 3 additional pending.
- Master Sales Agreements in place with all of the major Obligated Parties.

Three Business Lines

Biogas to Electricity

- Supplies Biogas to RPS markets
- Strong relationships with Municipal and Utility Buyers.

Biogas to Transportation

- Supplies biogas to CNG and LNG to producer
- Markets RINs and LCFS credit generated from CNG and LNG production
- Provides Asset Management Services for EPA and CARB compliance

Biogas for Voluntary (CDP, Green-e)

- Pioneered the supply of biogas to voluntary buyers.
- Markets Green-e approved biogas derived Environmental Attributes as a low cost solution
- Markets long term, fixed priced biogas to voluntary buyers

Transaction History

- EM was of the largest suppliers of RPS qualifying biogas to the California Market (Contracts sold)
- Over 50 million RINs transacted to date
- First to register landfill biogas facility with a specific Carbon Intensity under LCFS
- Largest Supplier of D3 RINs to 2 of the 3 largest refiners in US
- Supplied over 3MM dekatherms of biogas credits to voluntary buyers.
- Contract 15 year off-take with Fortune 10 buyer for biogas needs associated with fuel cells (contract sold)

Key Points of the US Renewable Fuel Standard

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- The RFS program is a federal 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
- Mandatory participants are called “obligated parties” and consists of US refiners and importers of gasoline and diesel
- There are 4 renewable fuel types – each assigned a category code under the RFS2
    - Cellulosic biofuel - classified a D3 (e.g., cellulosic biofuel) or D7 (cellulosic diesel)
    - Biomass-based diesel - classified a D4
    - Advanced biofuel - classified a D5
    - Renewable fuel (non-advanced/conventional biofuel) - classified a D6
- Renewable Identification Numbers (RINs) are the credits that obligated parties use to demonstrate compliance
- Obligated parties must obtain sufficient RINs for each category in order to demonstrate compliance with the annual obligation
- The EPA resets the Renewable Volume Obligation (RVO) annually thereby establishing the number of RINs each Obligated Party must retire for the following calendar year
- There is no “sunset” date to RFS

Introduction to RFS and LCFS

RFS and LCFS Both Incentivize Renewable Fuels in Transportation

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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 CO_2 emissions reductions
- **Carbon intensity** is grams of CO_2 emitted per MJ
- Biogas earns ~ **0.02 Incremental LCFS credits/dth**, depending on carbon intensity*

** 0.02 LCFS credits are incremental to LCFS credits generated from natural gas LNG and CNG when reporting under EM's pathway.*

Renewable transportation fuels used in California generate both RINs and LCFS Credits so long as the fuel is transported and consumed in CA

RFS Volume Standards
Target Volume of 36 Billion by 2022

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Volume Standards as Set Forth in EISA [billion gallons]

EPA sets actual standards each November; standards below are as published in the Act

Conventional Renewable Fuels + Total Advanced = Total Renewable Fuels

Total Advanced = Cellulosic Advanced + Advanced Biomass Based Diesel + Non-Cellulosic Advanced

Year	Conventional Renewable Fuels (D6)	Advanced Biofuels (D3, D4, D5)				Total Renewable Fuels (D3, D4, D5, D6)
		Cellulosic Biofuel (D3)	Biomass-Based Diesel (D4)	Non-Cellulosic Advanced (D5)	Total Advanced Biofuels	
2008	9.0					9.0
2009	10.5		0.5	0.1	0.6	11.1
2010	12.0	0.1	0.65	0.2	0.95	12.95
2011	12.6	0.25	0.80	0.3	1.35	13.95
2012	13.2	0.5	1.0	0.5	2.0	15.2
2013	13.8	1.0	1.0	0.75	2.75	16.55
2014	14.5	1.75	1.0	1.00	3.75	18.15
2015	15.0	3.0	1.0	1.50	5.5	20.5
2016	15.0	4.25	1.0	2.00	7.25	22.25
2017	15.0	5.5	1.0	2.50	9.0	24.0
2018	15.0	7.0	1.0	3.00	11.0	26.0
2019	15.0	8.5	1.0	3.50	13.0	28.0
2020	15.0	10.5	1.0	3.50	15.0	30.0
2021	15.0	13.5	1.0	3.50	18.0	33.0
2022	15.0	16.0	1.0	4.00	21.0	36.0

EPA set 2017 RVO at 311 MM; a 35% increase over 2016. Market is currently pacing short with 32MM reported as of March 31

RFS - Renewable Pathways

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- Biomethane is the **feedstock**, CNG and LNG produced with Biomethane will produce either a Cellulosic Biofuel or an Advanced Biofuel
    - In either case, biomethane must be injected into a common carrier pipeline for delivery to CNG/LNG facilities or used at an on-site CNG/LNG facility
    - Production facilities must be registered with the EPA prior to producing qualified fuels
- CNG/LNG Cellulosic Biofuel (D3) can be produced from the following feedstock sources:
    - Landfill biomethane
    - Separated municipal solid waste digester biomethane
    - Municipal wastewater treatment facility digester biomethane
    - Agricultural digesters biomethane (manure, crop residues, separated yard waste)
- Advanced Biofuel (D5) can be produced from biomethane derived from protein production byproducts and/or separated food waste anaerobic digesters

Biomethane CNG/LNG Pathway

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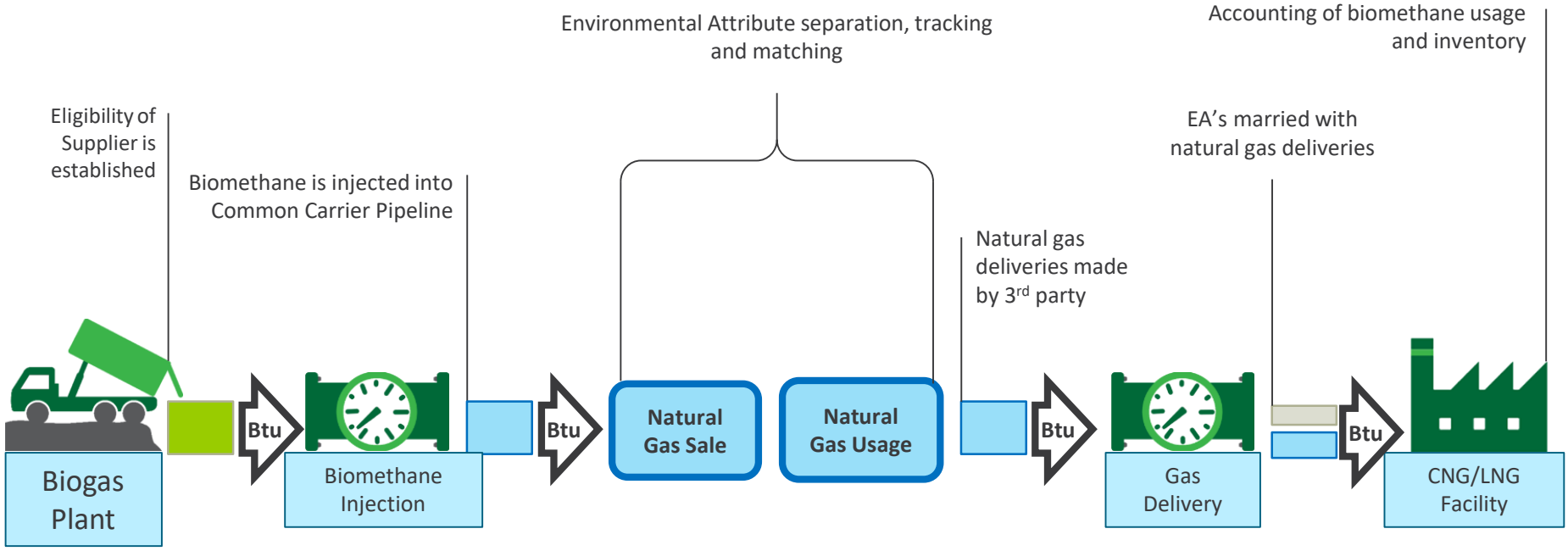

D O C U M E N T A T I O N

Sales Contracts; Monthly invoices by Biogas Plant; Documentation establishing plant eligibility approved by EPA	Pipeline statements with utility-grade meter data of biogas injection; Producer attestation establishing quantity and transfer of Environmental Attributes	Invoices and/or pipeline statements of Natural Gas sales and purchase; Stringent accounting of Environmental Attributes	Pipeline statements with utility-grade meter data of natural gas delivery;	Data on the facility's gas consumption, inventory and sales; Documentation needed for verification Documentation for banking/inventory of Biogas

Lookback at Biomethane Gross Yields

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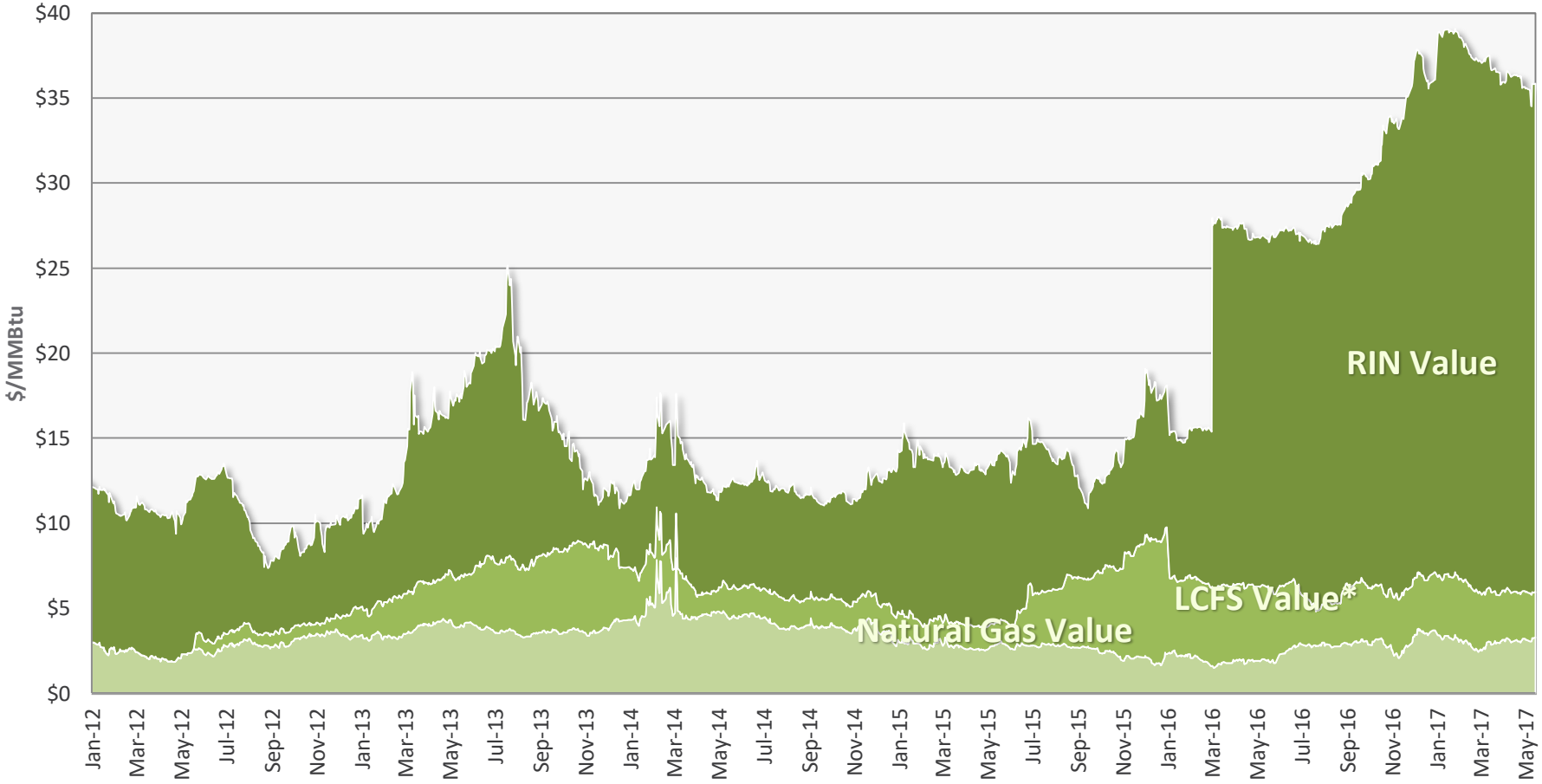
Total Value from Biogas



There are market costs associated with credit generation that are not accounted for in this slide

Contracting for Biomethane Offtake

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- Producer needs to identify and determine the level of financial and contractual risk they are willing to take:
  - Financial Considerations
    - Debt Coverage; Operating Cashflow needs
    - Ability to handle volatility of commodities markets
  - Contractual Risks
    - Minimum delivery requirements
    - Project Registration with EPA – Registrant becomes the RIN Generator and takes on associated risks of generation, record keeping and EPA required audits
  - Marketing Consideration
    - Supply chain management
      - Gas scheduling, management and delivery
      - CNG/LNG Conversion
  - Monetization of Credits
      - Offtake contracts with Obligated Parties

Contract Structures

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- Fixed Price Structure
  - Fixed price paid for every MMBtu of Biomethane Delivered
    - Usually at steep discount to spot market
    - Will have minimum delivery requirements with liquated damages
    - Possible Change in Law termination clause
    - Facility has no participation in EA revenue but must agree to provide documentation and allow for site visits
    - Necessary for financing
- Variable Structure
  - Revenue Share
    - Seller transfers biomethane to marketer in return for the majority of the net margin
    - Seller can retain EPA registration or allow marketer to be the Registrant
    - Higher upside but market risk
    - Not useful for financing
- Hybrid Structure
  - Floor Price for biomethane plus share of EA revenue
    - Provides certainty of break even cashflow
    - Allows for some upside with no downside

How Biomethane Moves in the Market

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- Biomethane and associated Environmental Attributes are received by marketer at pipeline injection point
- Marketer delivers biomethane to their portfolio of contracted renewable fuel tolling facilities, where biomethane is used to produce Cellulosic biofuel-(CNG/LNG)
    - Tolling facilities may include California capacity, where LCFS credits can be generated in addition to RINs
- Biomethane is delivered via exchange - biomethane injection can be directly matched to delivery, without the need for owning pipeline capacity
- Once Cellulosic Biofuel is dispensed, renewable fuel credits (e.g. RINs & LCFS credits) are generated, usually by marketer
    - LNG – Bill of Lading and Buyer Attestation
    - CNG – Meter Data and Buyer Attestation
- Marketer then transacts either directly with obligated parties or through the secondary broker market
- **<u>You can import from Canada into the US and qualify under both RFS and LCFS</u>**

THANK YOU

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"US Emissions House of the Year", 2014 and 2010 by Energy Risk

Energy Risk Environmental Rankings

- #1 U.S. Regional Greenhouse Gas Dealer
- #1 U.S. Voluntary GHG Credit Dealer
- #2 Renewable Energy Credit Dealer
- #1 NOx & SO_2 Dealer

Environmental Finance Magazine

- Best Trading Company in North American Renewable Energy
- Runner- Up, Best Trading Company of North American GHG Markets (California)
- Best Trading NOx & SO_2 Company Emission Credits