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Renewable Natural Gas: Current Trends and Opportunities

Prepared for: Center Point Energy
May 23, 2017

Agenda

1. Introduction
2. The Biogas Opportunity
3. RFS 101
4. Closing Comments

01

Introduction

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Creating Sustainable Solutions For The World

**Audit**

- RFS and LCFS
- QAP
- Q-RIN
- Custom Audit Protocol
- Engineering Reviews
- Carbon Intensity Verification

**Compliance**

- Eco-RIN Management
- RIN Academy

**Consulting**

- Compliance Strategy
- Pathway Petitions
- Sustainability Programs
- RFS, LCFS & CFP Registration
- Regulatory Advocacy
- Technology Integration
- Efficient Producer
- GREET Modeling
- Biomass Mapping
- Waste Shed Studies
- Feasibility Studies
- Feedstock Agreements
- Utility Negotiations
- Q-RIN
- Offtake Consulting

**360 Biogas Solution**

SERVICES

Audits of
OVER 150
BIOFUEL PLANTS
in **20 COUNTRIES**



OVER
1.7 BILLION
GALLONS OF BIOFUEL CAPACITY
UNDER MANAGEMENT

OVER
50

PRODUCERS
have enrolled in
RIN COMPLIANCE
PROGRAM

WHY ECOENGINEERS?**ECOENGINEERS**

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ONE OF THE FIRST
USEPA RECOGNIZED
RIN Quality Assurance Programs

Assisted
REGISTRATION
& **PREPARATION**
for over **60 LCFS**
PATHWAY PROJECTS



TRANSACTIONED OVER
3.6 BILLION
RINS IN 2016

9.9 MILLION RINS
PROCESSED EACH DAY
on our automated platform



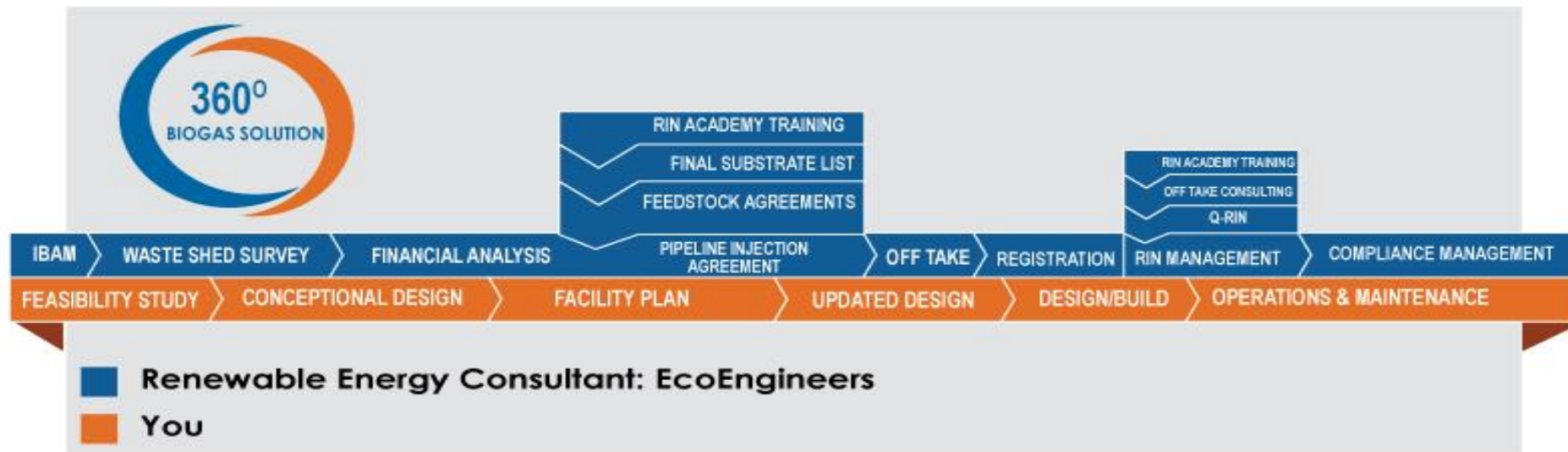
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Pioneering work that that is building out the biogas industry

- Economic Impact Analyses
- Biomass Asset Mapping
- Wasteshed Analysis
- Substrate Analysis & BMP
- Feedstock Agreements
- Financial Analysis and ROI
- Biogas & Waster-Energy Nexus
- Pipeline Injection Agreements
- Technology Selection
- Off-Take Options
- Compliance Training & Education
- RFS, LCFS, CFP Compliance



02

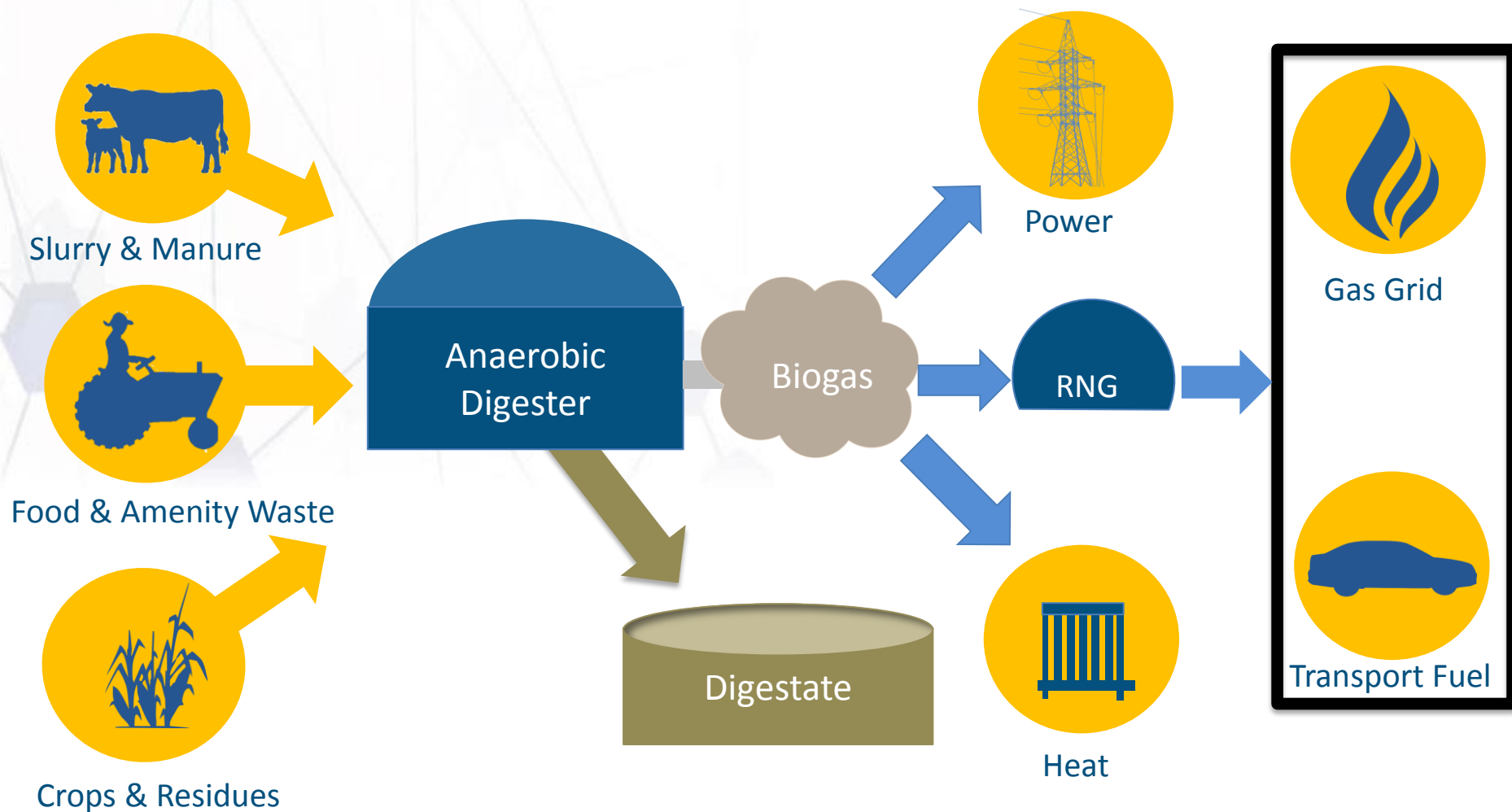
The Biogas Opportunity

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Methane From Biogas is Renewable Natural Gas (RNG)





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Evolution of Biogas Uses



Boilers



Power Generation



CNG Vehicle Fueling



Pipeline Injection

Raw to moderately upgraded

Pipeline quality

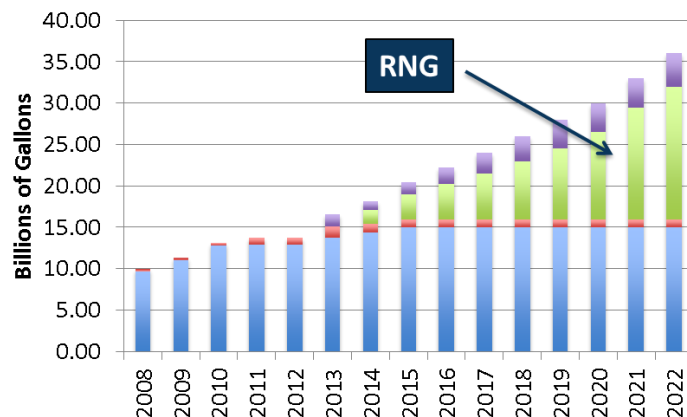


Carbon Credits Add Significant Value To RNG

One MMBTU of Pipeline Quality Biogas Produced in the Midwest and Used for Transportation in California

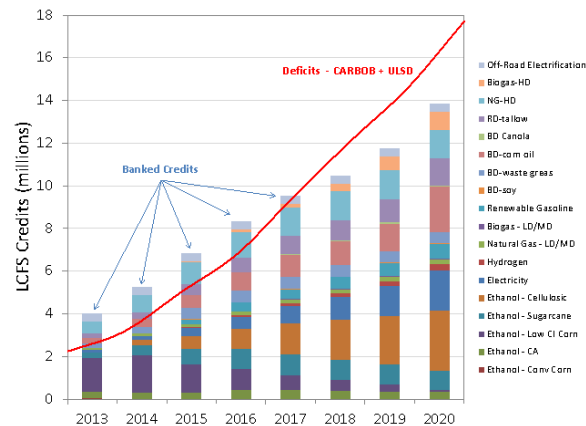
Value of Gas	\$3.00	9%
Value of Federal Credits (RINs)	\$22.20	69%
Value of California Credits (LCFS)	\$6.85	21%
Total	\$32.05	100%

RFS



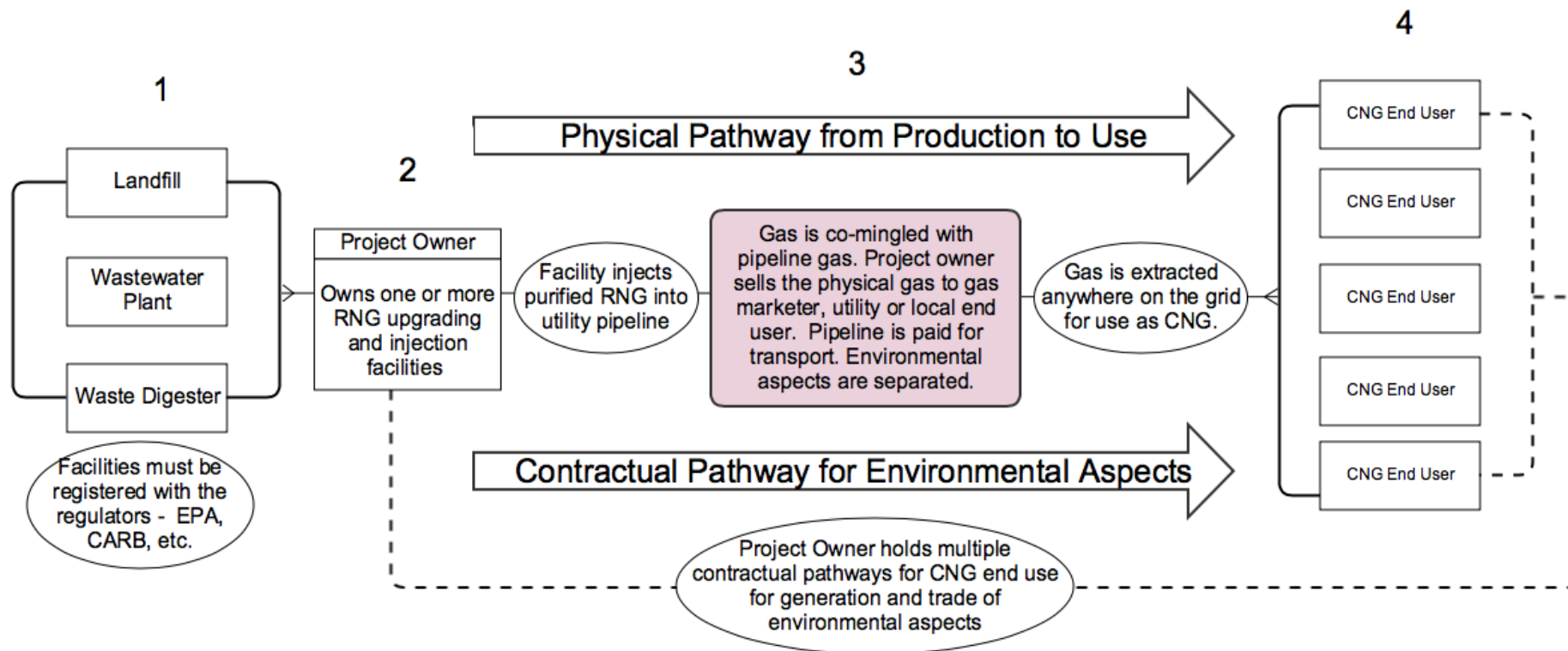
CAP & TRADE

LCFS





The Process



03

The Renewable Fuel Standard

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The Renewable Fuel Standard (RFS)

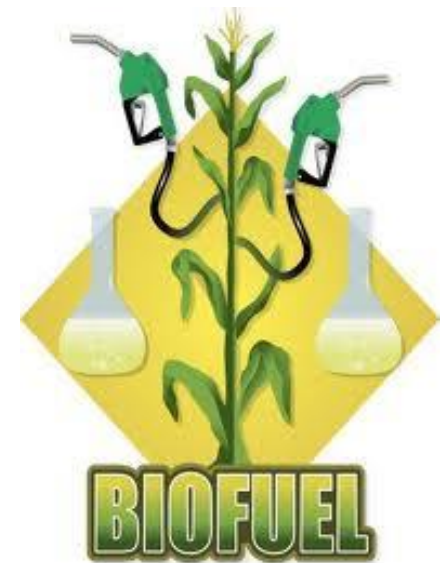
**The RFS requires the blending of Renewable Fuels with
the nation's motor vehicle fuel supply**

Origins in EISA and RFS1 (2005-07)

RFS 2 promulgated in July 2010

Four renewable fuel categories

36 billion gallon goal for 2022





Fuel Category	Fuel	GHG Reduction Requirement	RIN Code
Cellulosic Biofuels	Renewable CNG/LNG , cellulosic ethanol, cellulosic naphtha, cellulosic diesel, etc.	60%	D3 / D7
Biomass-based Diesel	Biodiesel, renewable diesel, etc.	50%	D4
Advanced Biofuels	Renewable CNG/LNG , sugarcane ethanol, renewable heating oil, etc.	50%	D5
Renewable Fuel	Corn ethanol, etc.	20% or less	D6



Current RFS Volume Mandates (BGY)

Year	Cellulosic Fuels D3/D7	Biomass-based Diesel D4	Advanced Biofuels D5	Renewable Fuel D6	Total Renewable Fuel
2014	0.033	1.63	2.67	13.61	16.28
2015	0.123	1.73	2.88	14.05	16.93
2016	0.230	1.90	3.61	14.50	18.11
2017	0.311	2.00	4.28	15.00	19.28
2018	tbd	2.10	11	15.00	26.00
2019	tbd	tbd	13	15.00	28.00
2020	tbd	tbd	15	15.00	30.00
2021	tbd	tbd	18	15.00	33.00
2022	tbd	tbd	21	15.00	36.00

Renewable Volume Obligations (RVO's) set by the EPA create demand for clean fuel credits called RINS.



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RIN Generation & RVOs (Billion RIN Gallons)

Year	Cellulosic Fuels D3/D7	Biomass-based Diesel D4	Advanced Biofuels D5	Renewable Fuel D6	Total Renewable Fuel
2014	0.033	1.63	2.67	13.61	16.28
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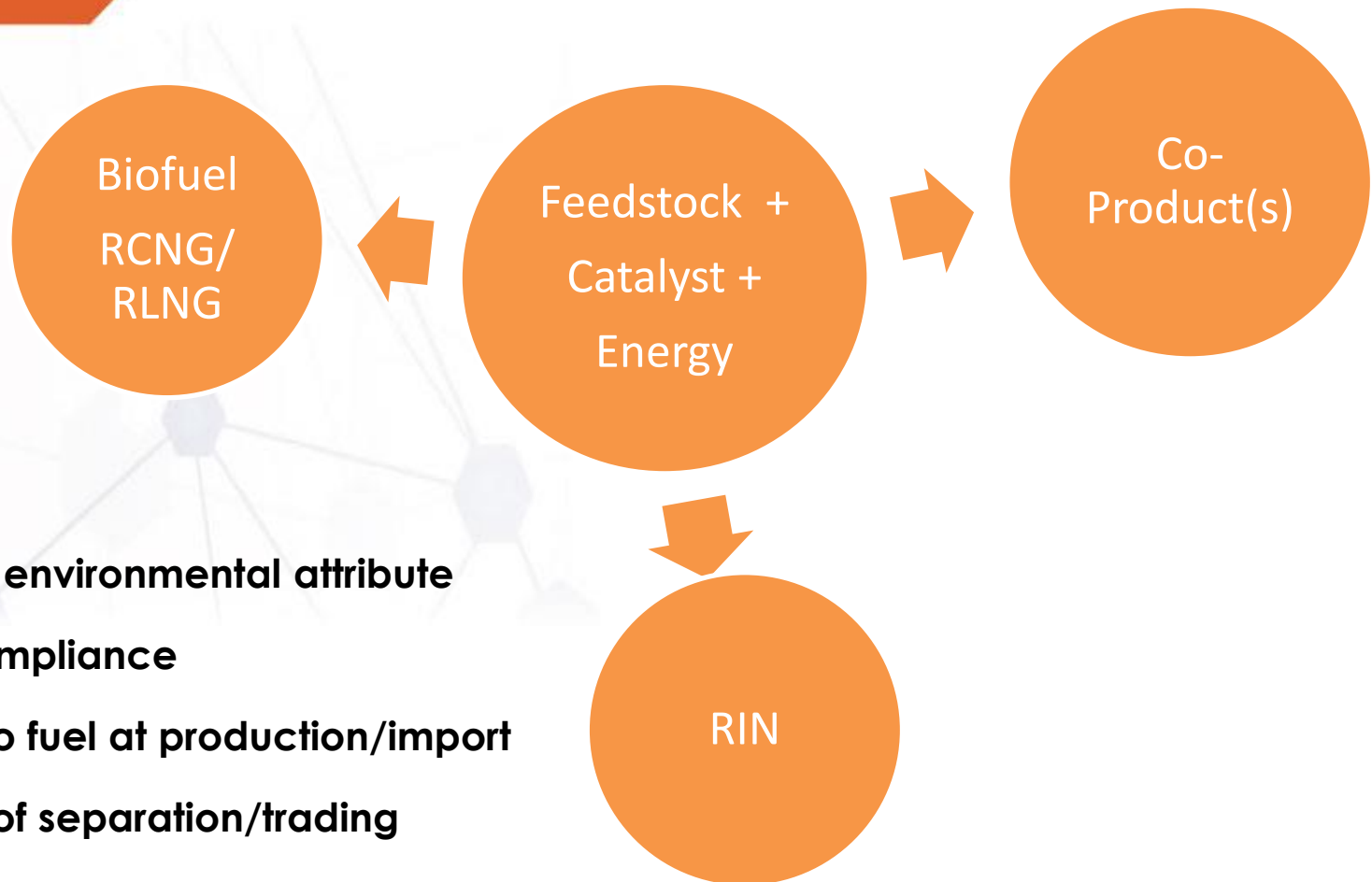
The opportunity for
biogas and other
advanced fuels



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A RIN is Proof That Biofuels Were Used in Transportation



- A tradable environmental attribute
- Proof of compliance
- Attached to fuel at production/import
- Strict rules of separation/trading



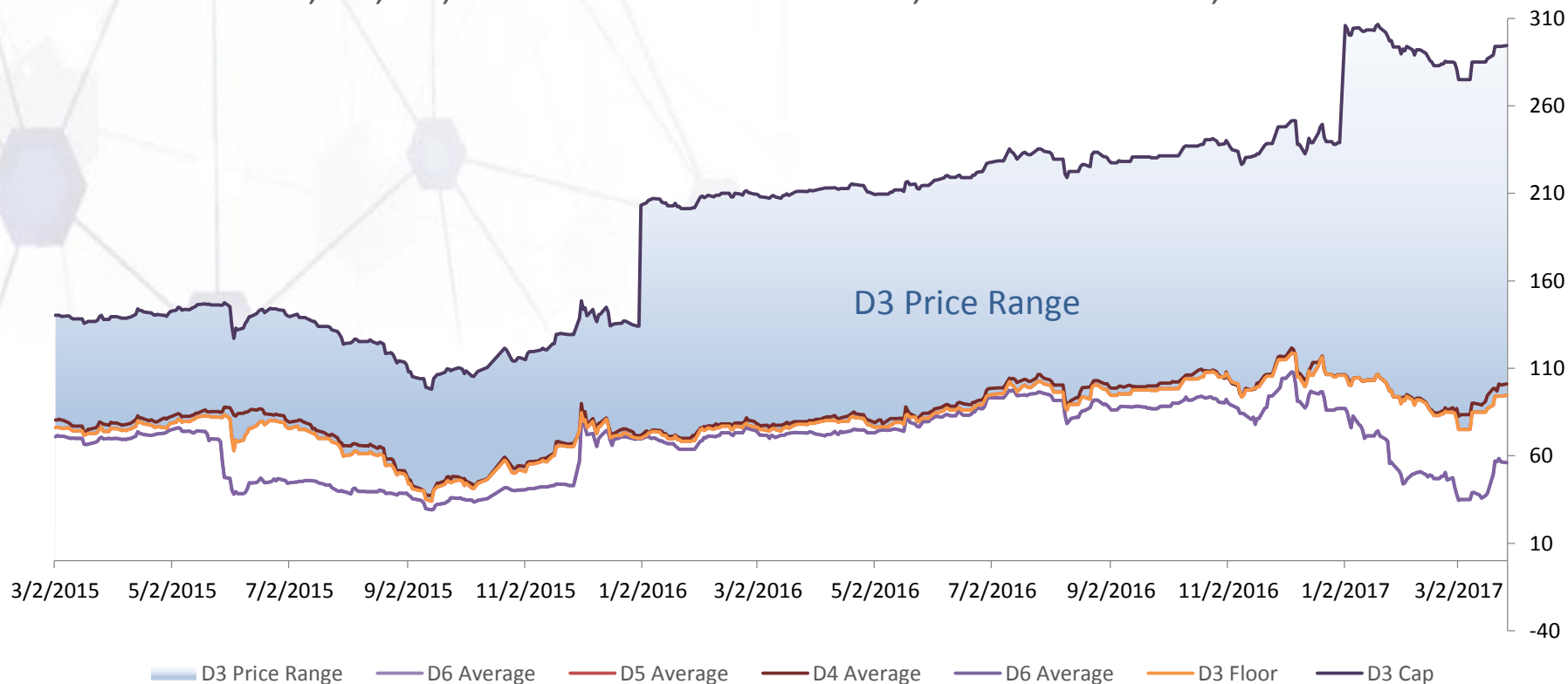
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RIN Values Can Be Volatile

RIN Values are Driven by Regulatory Uncertainty, Supply-Demand Fundamentals and Perceptions of Quality

D3, D4, D5, and D6 RIN Prices March 2, 2015 - March 23, 2017





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Petroleum Refiners & Importers Required To Prove Compliance

An Obligated Party (OP) must acquire RINs to prove biofuel blending obligations were fulfilled.

An OP is:

- A refiner that produces gasoline or diesel fuel within the 48 contiguous states or Hawaii during a compliance period
- An importer that imports gasoline or diesel fuel into the 48 contiguous states or Hawaii during a compliance period.
- A party that simply blends renewable fuel into gasoline or diesel fuel is not an obligated party.





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How to Enter the Market

Planning

Fuel Pathway and feedstock
Establish physical and contractual pathways for RNG from to end use

RFS Registration

Engineering Review
Regulatory review and approval

QAP (3rd Party Monitoring)

QAP protocol submitted
Review of production records
Review of CNG metering records
Site visits

RIN Generation

Ongoing reporting – Daily, Quarterly and Annual – to regulators

04

Closing Comments





Consumer Demand

- 69% of HN millennials place greater worth in putting their money toward companies that show a high level of corporate social responsibility.
- Companies with renewable energy or sustainability targets in 2016:
 - 71% of Fortune 100
 - 43% of Fortune 500
 - 22 companies with commitments to power all of their operations with renewable energy

Profit

- Environmental credits compress payback period and make investments in sustainability profitable.

Corporate sustainability is a rapidly expanding set of standards for the 21st century





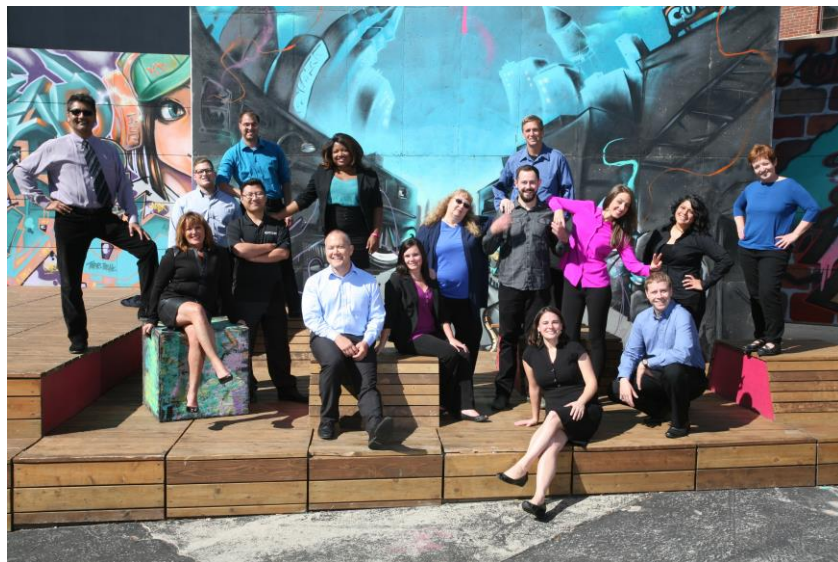
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We Can Help You Navigate The Complexity Of Energy Regulations

We Create Sustainable Solutions for the World

1. We will give you the tools and confidence to navigate the New Energy Economy
 - Conduct a comprehensive economic, technical and regulatory review of RNG opportunities
 - Develop strategy and facility plan to execute on selected projects
 - Measure and mitigate your carbon footprint
2. Our training and support make compliance with clean fuel regulations easy
3. We can connect you to carbon credit and fuel markets

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Future of Fueling





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