

FYI in 45 RINs 101:

Get Paid for Your Biogas

Panelists:

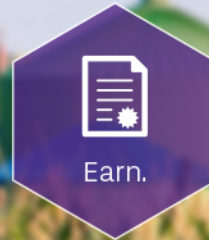
Dru Whitlock

Dustin Craig

Moderated by:

Andrew Beaton

February 21, 2018

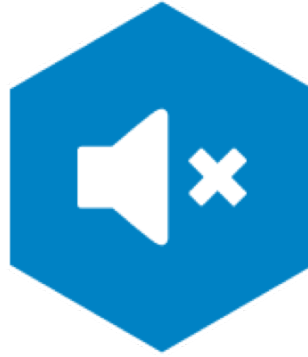


**CDM
Smith.**

Before We Begin...



**Recording
in progress**



**All phones
are on mute**



**Questions
encouraged**

Today's discussion will focus on

- ▶ What are RINs and how do they work?
- ▶ How can facilities generate and sell RINs?
- ▶ What technologies can bring your biogas up to renewable fuel standards?
- ▶ What is the outlook for the RINs market?

Our Panel

Panelists



Dru Whitlock, PE
Vice President, Environmental Engineer



Dustin Craig, PE
Principal, Environmental Engineer

Moderator



Andrew Beaton
Moderator



Biogas Basics

Facilities That Generate Biogas

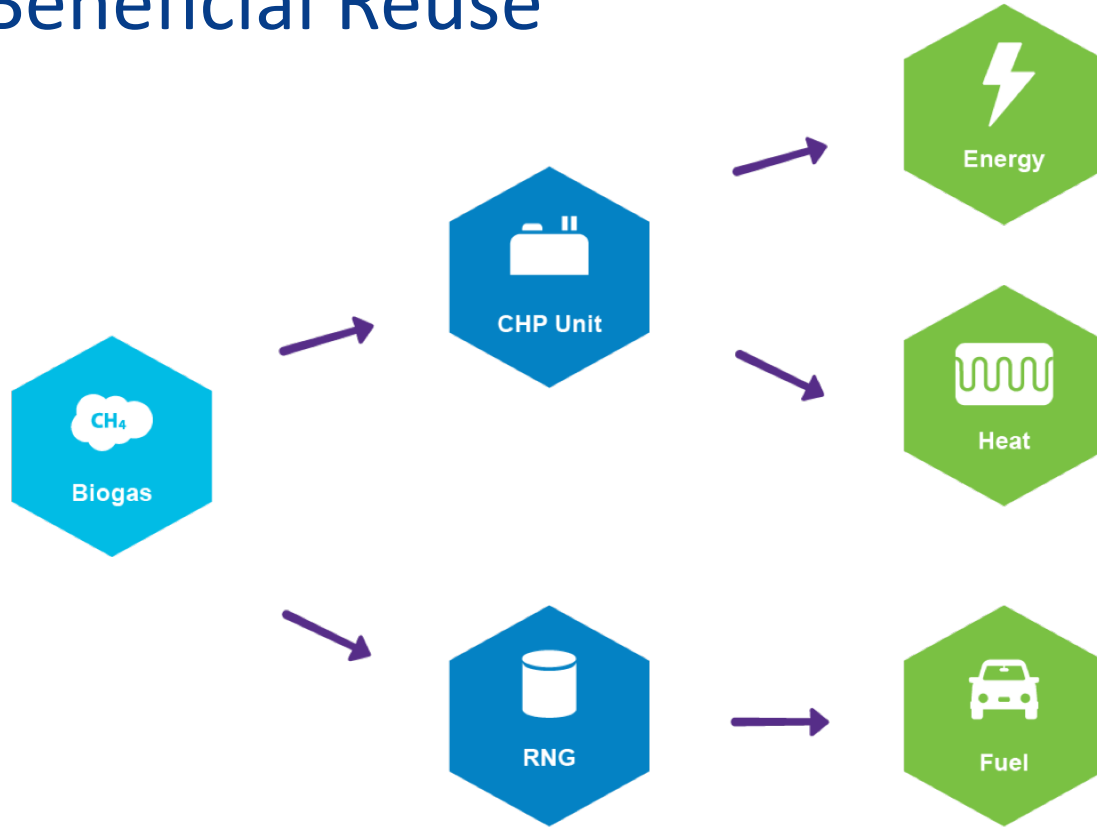


Wastewater
Facilities/
POTWs

CAFOs, Dairy,
Food &
Beverage

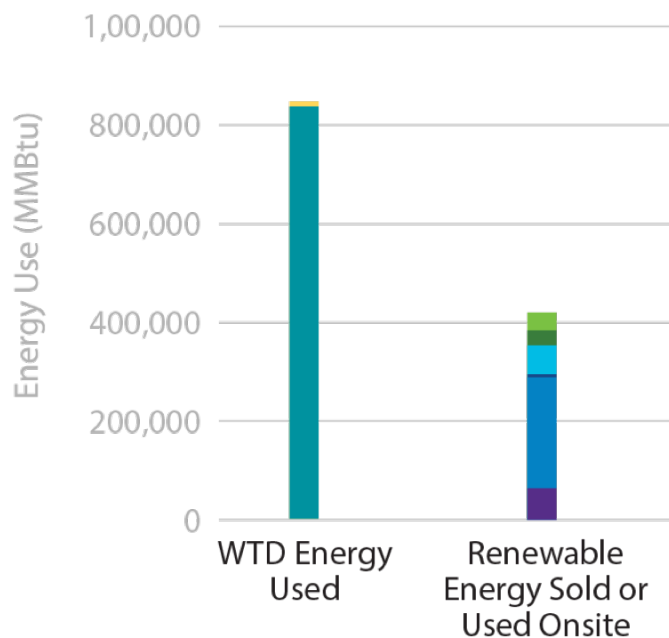
Solid Waste
Facilities

Biogas Beneficial Reuse



King County, WA

Renewable Energy Production vs. Use



- Energy Used to Produce Renewables
(West/South)
- Total Energy Used
(Renewables + Purchased)
- Recovered Heat Used
(West Point)
- Biogas Used
(West Point Raw Sewage Pumps and Boilers)
- Biogas Used
(South Plant Boiler)
- Electricity Generated and Used
(South Plant Cogen)
- Biogas Sold
(South Plant Gas Scrubber - Export to Pipeline)
- Electricity Sold
(West Point Cogen - Export to SCL beginning 2013)



RINs 101

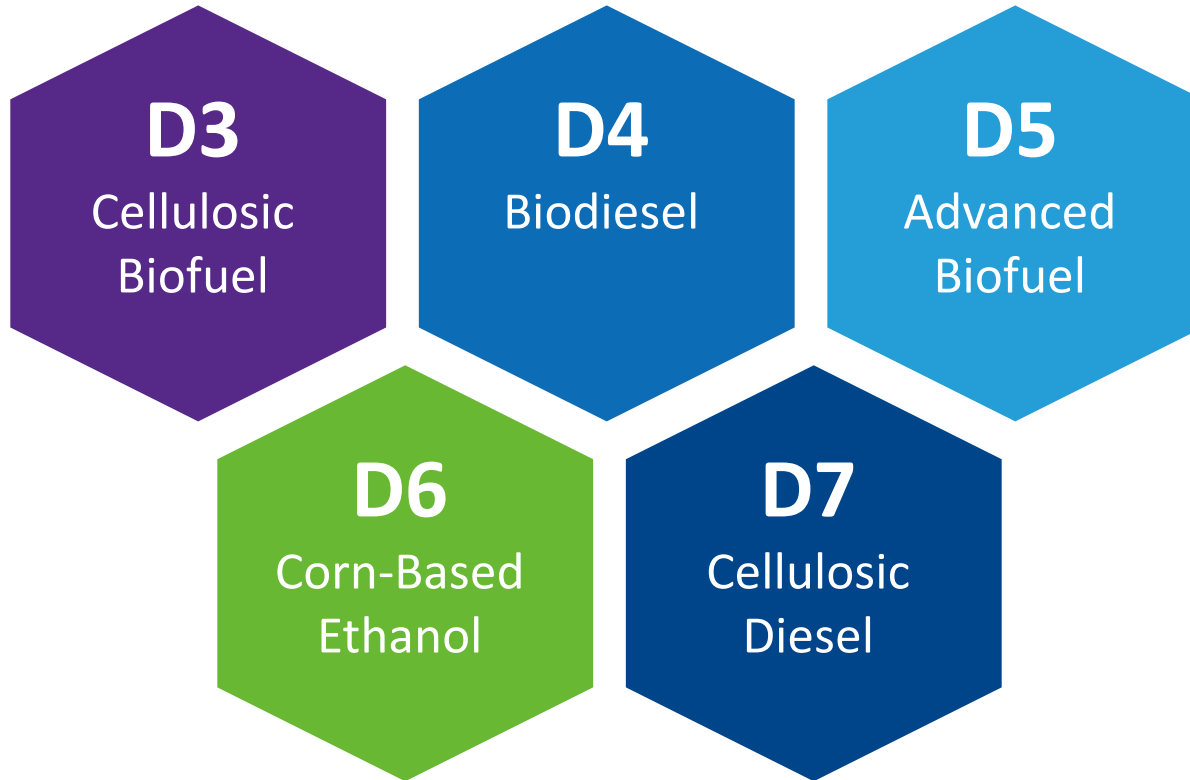
EPA's Renewable Fuel Standard

In Billions of GGEs (Gasoline Gallon Equivalents)

1 GGE = the energy content of 1 gallon of gasoline

Fuel	Cellulosic Fuels	Biomass Based	Advanced Biofuels	Renewable Fuel	
Year	D3/D7	D4	D5	D6	Total
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	1.9	3.61	14.5	18.11
2017	0.311	2	4.28	15	19.28
2018	0.288	2.1	4.29	15	19.29
2019	tbd	tbd	13	15	28
2020	tbd	tbd	15	15	30
2021	tbd	tbd	18	15	33
2022	tbd	tbd	21	15	36
2023	tbd	tbd	tbd	tbd	tbd

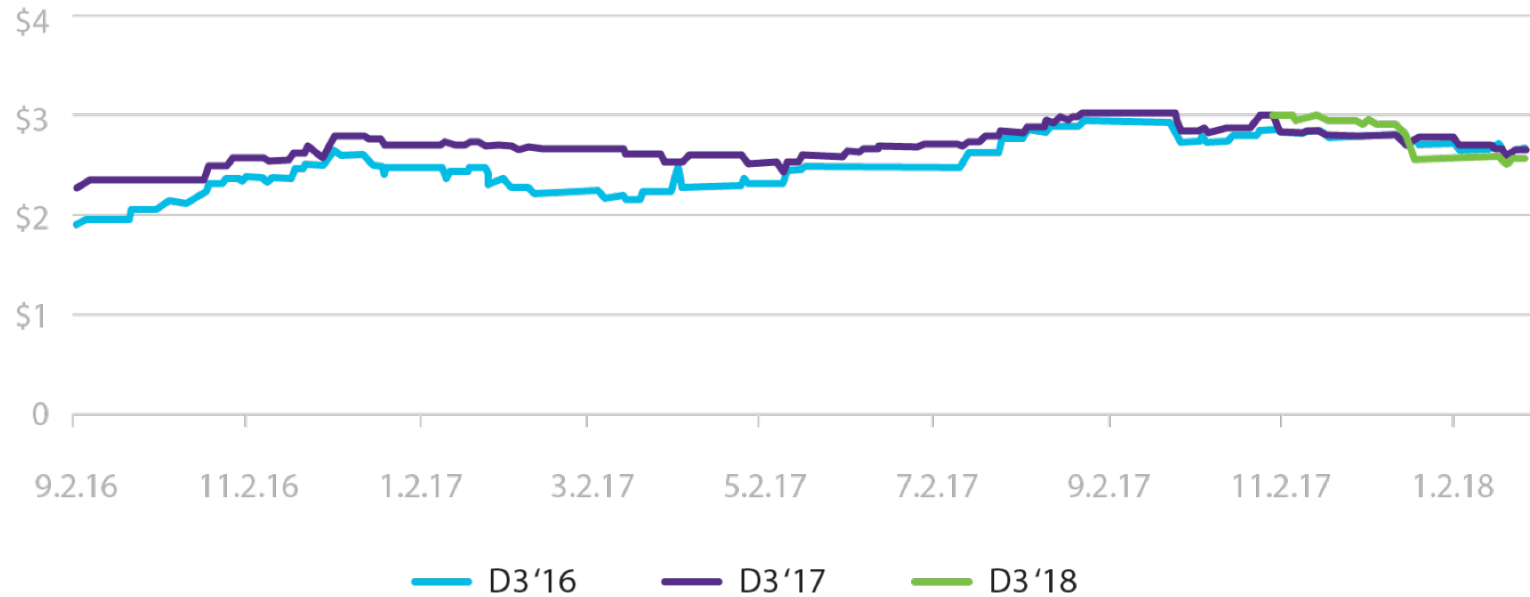
5 RIN Categories



Renewable Fuel Standard – D3 RINs

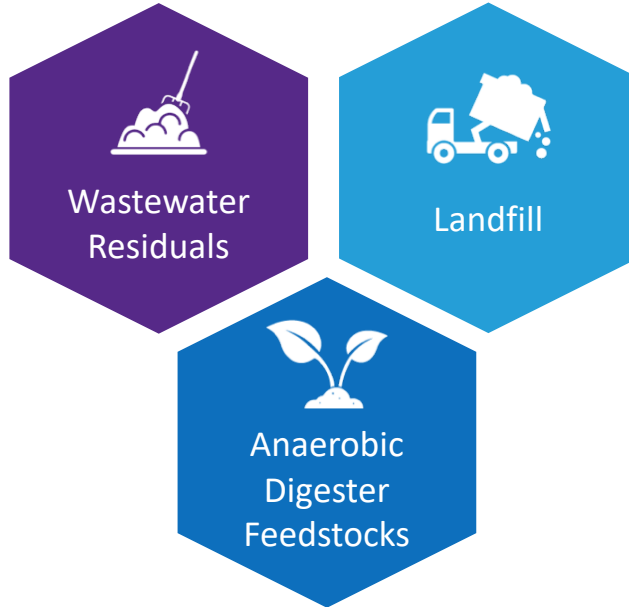
- ▶ 11.7 RIN/MMBtu
- ▶ \$2.90/D3 RIN
- ▶ $\$2.90/\text{D3 RIN} * 11.7 \text{ RIN/MMBtu} = \$34/\text{MMBtu}$
- ▶ CA LCFS = \$6.5/MMBtu
- ▶ Fossil NG value is approximately = \$3/MMBtu

D3 RIN Prices



Cellulosic Material

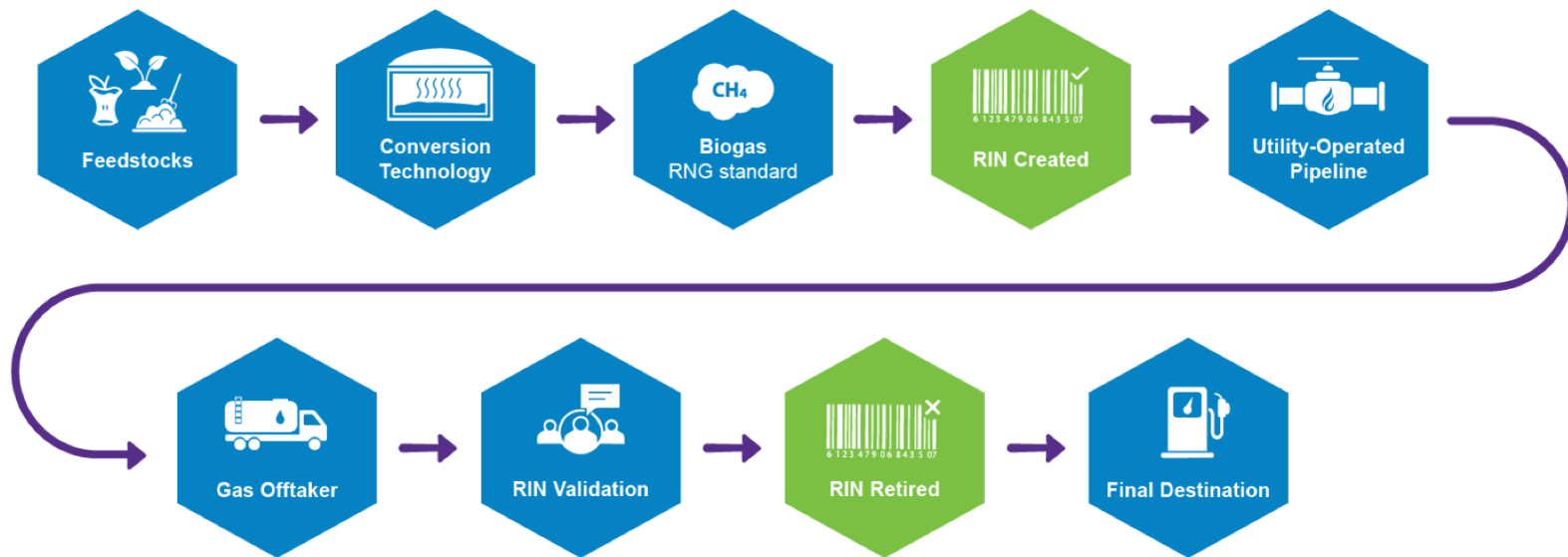
Included



Not Included



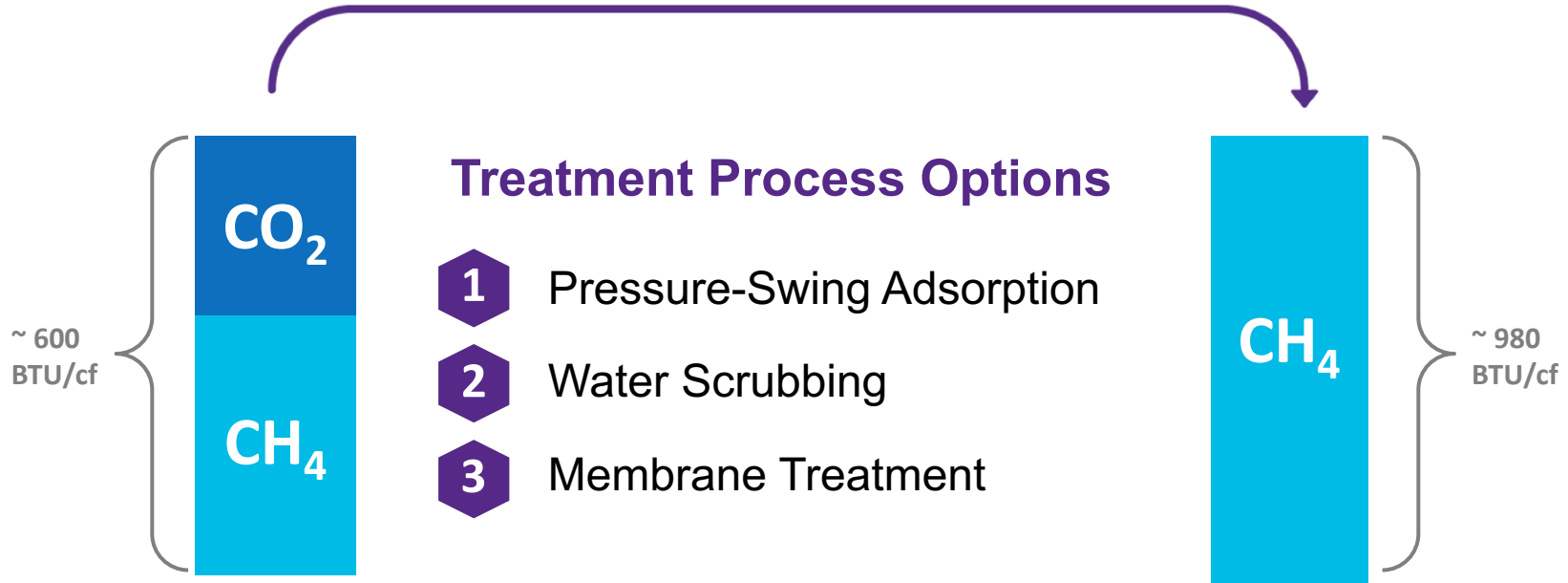
Journey of a RIN





Technologies: How Does Biogas Become RNG?

Biogas → Renewable Natural Gas (RNG)





Des Moines Case Study

Des Moines Water Reclamation Authority

60+ mgd

facility

~500,000

residents

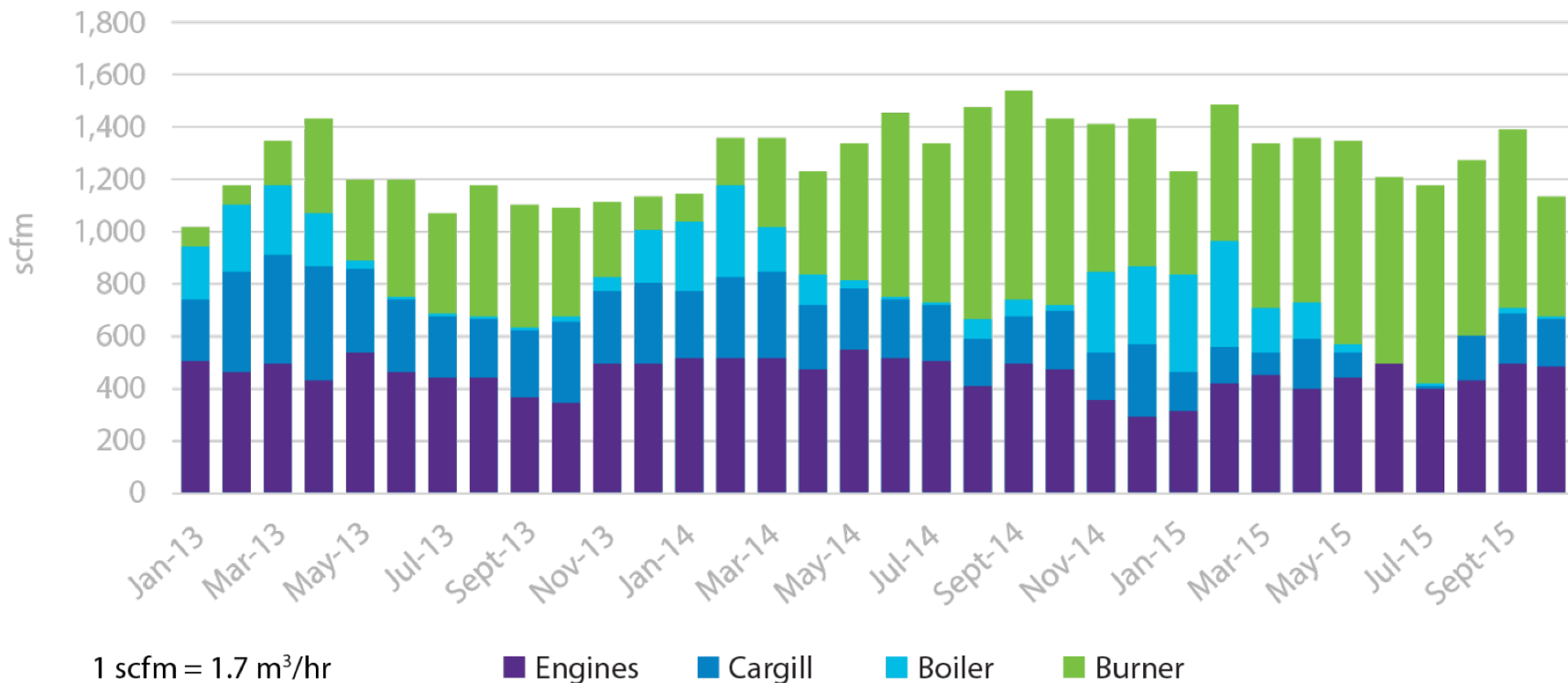
\$20M

Anaerobic digestion
improvements

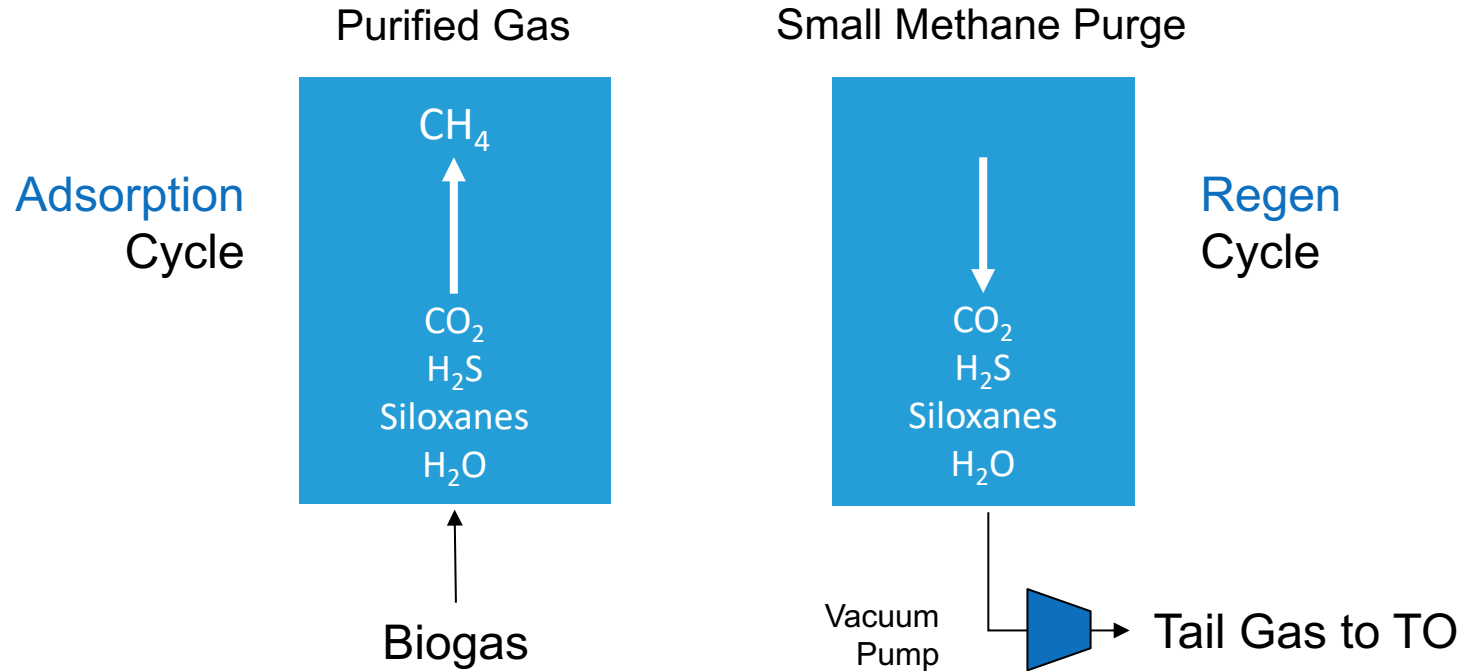




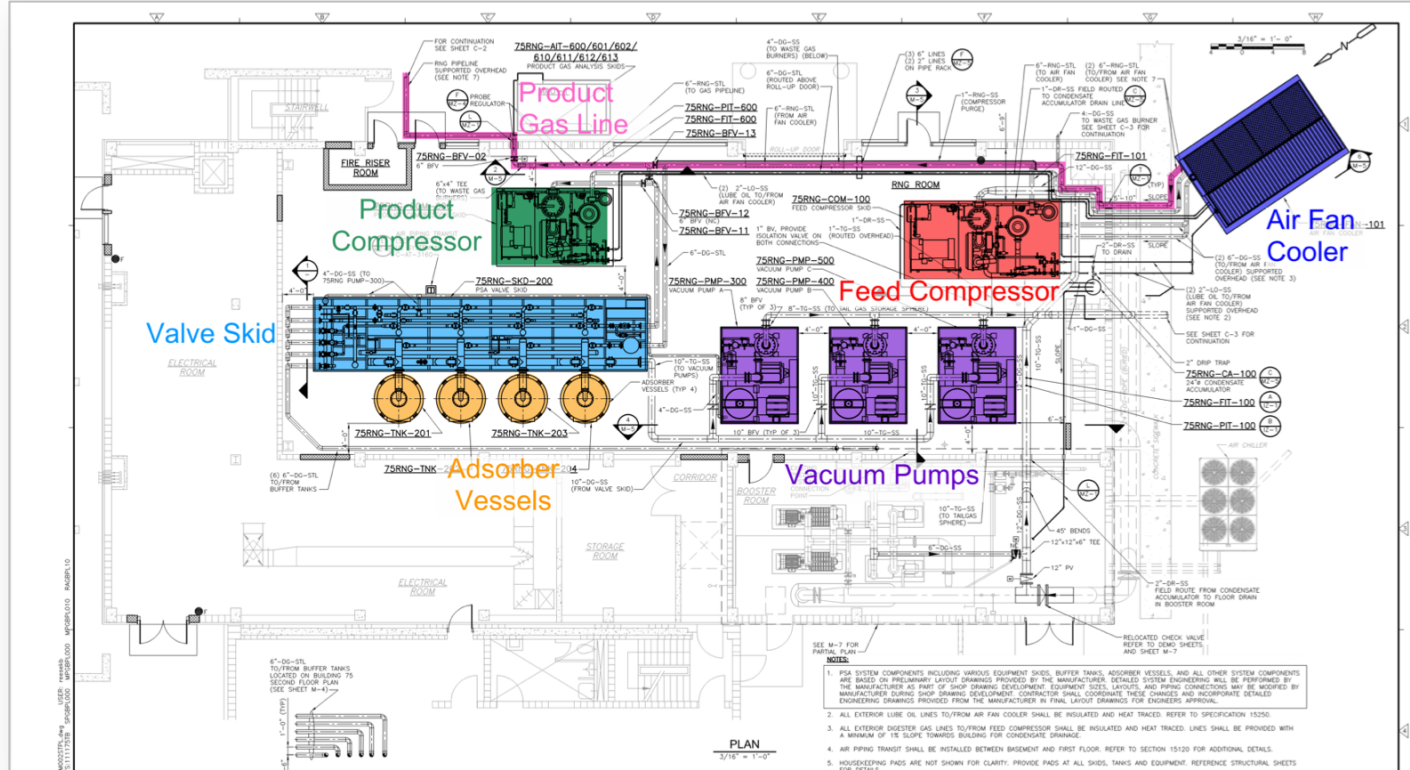
Average Digester Utilization



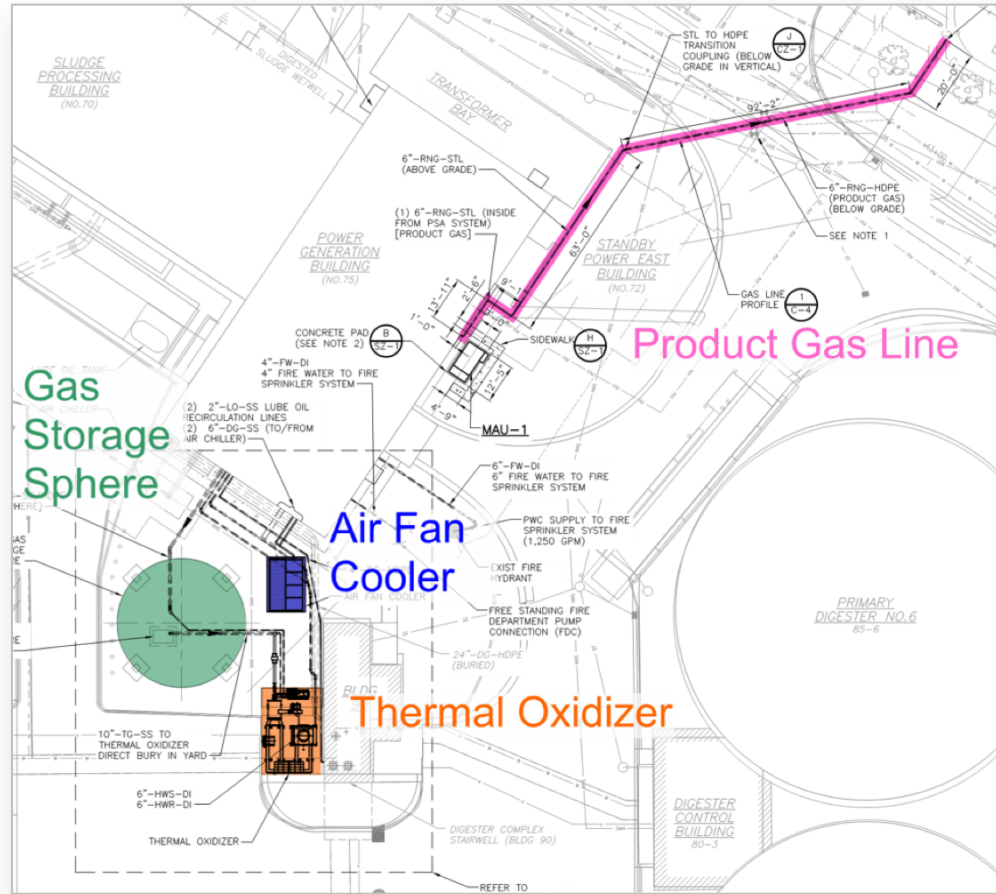
Pressure Swing Adsorption



Site Plan



Site Plan





Current Project Status

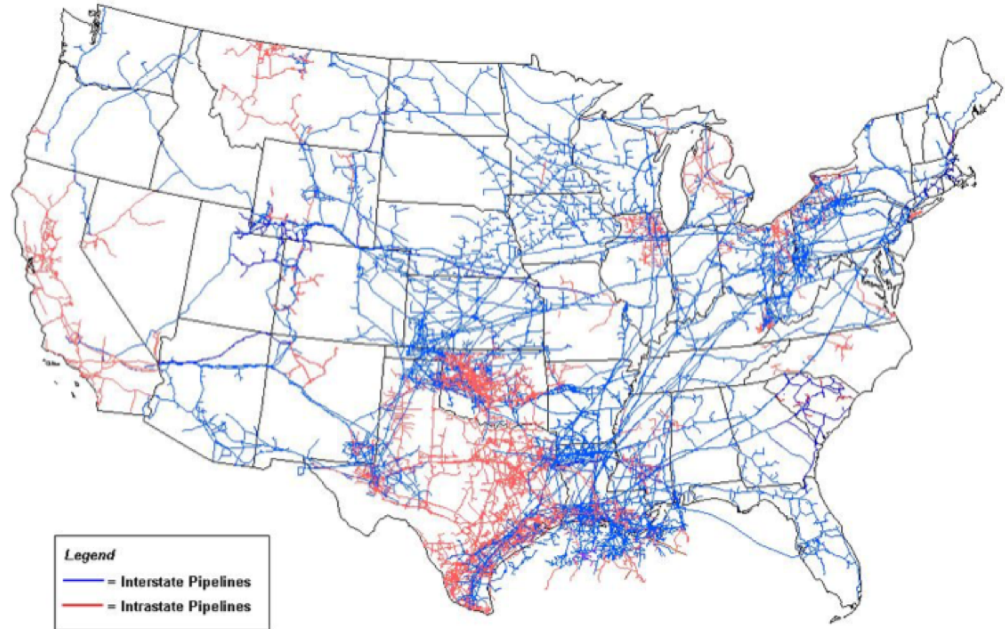
- ▶ Currently at 90% design
- ▶ Construction duration: approximately 1.5 years
- ▶ Construction capital costs \$13-14M
- ▶ Project payback of ~4-5 years



Deciding if RINs Are Right For You

Partnering with Gas Utilities

- ▶ More than 210 pipeline systems
- ▶ 305,000 miles of interstate/intrastate transmission
- ▶ 1,400+ compressor stations
- ▶ 1,400 interconnection points
- ▶ 400 underground storage facilities
- ▶ 49 import/export locations
- ▶ 8 LNG import facilities



Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System

Other Important Considerations

- ▶ EPA must approve pathway from producer → user
- ▶ RIN buyers require extensive documentation and credit
- ▶ RIN pricing can be volatile
- ▶ Uncertain future of regulation

The Future of the Renewable Fuel Standard

- ▶ RFS is a robust program, generally expanded since inception
- ▶ RFS has bipartisan congressional support
- ▶ D3 RIN value is currently very attractive, but will likely decrease
- ▶ D3/D5 combined production complicates valuation ... and feedstock to biogas derivation methodology has yet to be approved
- ▶ eRINs could be valuable, but pathways and mechanisms are awaiting EPA approval



Final Thoughts



Questions & Answers

Contact Information

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Thank You