



An Introduction to RINs and RNG

March 29th, 2018

Agenda

- Renewable Fuel Standard (RFS)
- Renewable Identification Number (RINs)
- RINs Market and Pricing
- State Considerations
- Renewable Natural Gas (RNG)
- Key Risks Considerations

Renewable Fuels Standard

Renewable Fuels Standard

- The Renewable Fuel Standard (RFS) is a federal program to reduce greenhouse gas emissions, expand the nation’s renewable fuel sector, and reduce reliance on foreign oil.
 - Developed and managed by the EPA
 - The policy is linked to **transportation** fuels only
- Requires *refiners or importers* of fuel to comply by blending a minimum amount of renewable fuels into traditional fuel.
 - These entities are called “obligated parties”.

Renewable Fuels Standard

- Regulatory environment
 - RFS is a federal law and requires an act of congress to appeal
 - Originally enacted in 2005 and amended in 2007
 - Policy framework in place for 15 years
 - Post 2022 there is uncertainty around policy framework

Renewable Fuels Standard

- Flawed from the beginning:
 - Created under a mix of competing interests: agricultural, petroleum, environmental, and national-security
 - Set volume requirements under *forecasted* transportation fuel use, not percentage of an *adjusted* forecast
 - 50% of RFS volume requirements were set on a fuel with no commercial history (cellulosic biofuels)

Renewable Identification Numbers (RINs)

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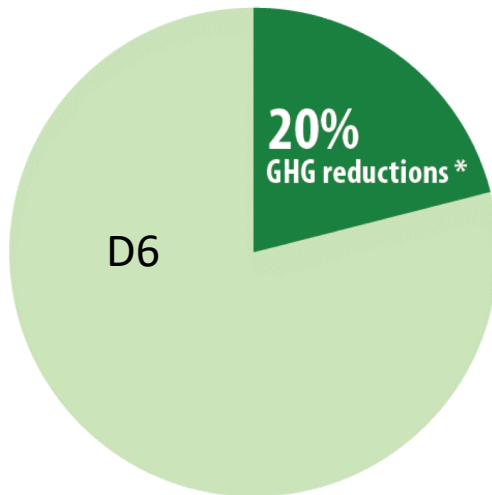
- Compliance with the RFS can be met by blending actual renewable fuel or by acquiring Renewable Identification Numbers (RINs)
- Loosely akin to RECs
- RINs are credits that are the “currency” of the RFS program
 - Renewable fuel producers generate RINs
 - Market participants can trade RINs
 - Obligated parties obtain RINs then ultimately retire them
- RINs can be bundled (with fuel) or traded unbundled

Renewable Identification Numbers (RINs)

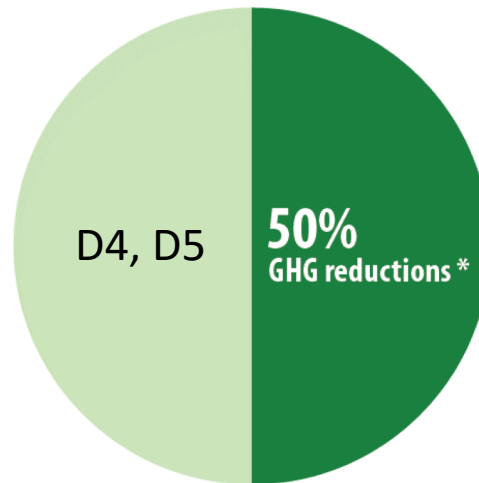
Lifecycle Greenhouse Gas (GHG) Emissions

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

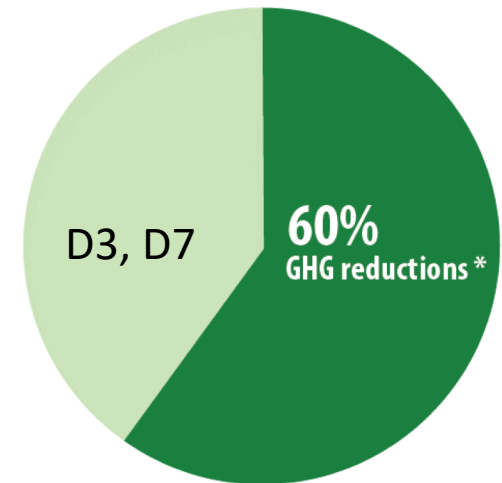
Renewable Fuels



Advanced & Biodiesel Fuels



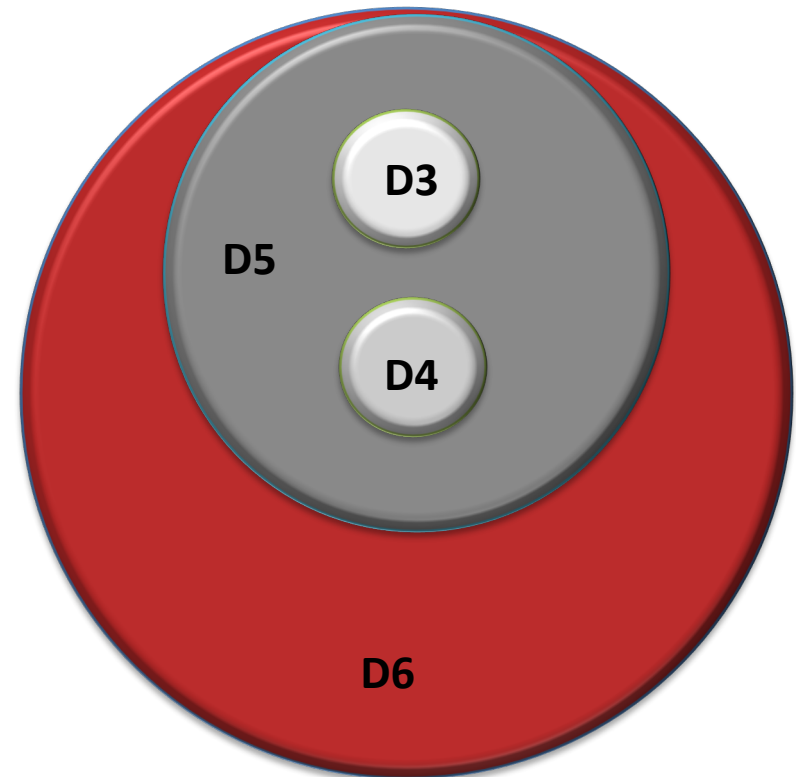
Cellulosic Fuels



* compared to a 2005 petroleum baseline

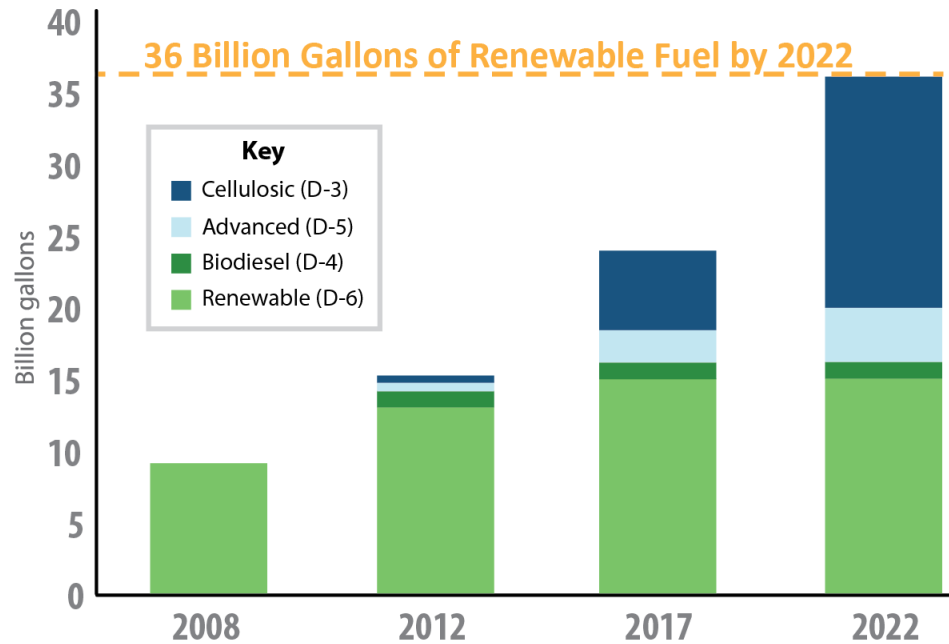
Renewable Identification Numbers (RINs)

Fuel Type	RIN Used to Prove Compliance	2018 RVO (BG)
Cellulosic Biofuel	D3	0.288
Biomass Based Diesel	D4	3.15
Advanced Biofuel	D3, D4, D5	0.852
Sub Total 2018 RVO		4.29
Renewable Fuel	D3, D4, D5, D6	15.00
Total Renewable Fuel		19.29



Renewable Identification Numbers (RINs)

Congressional Volume Target for Renewable Fuel



Renewable Identification Numbers (RINs)



Renewable Identification Numbers (RINs)

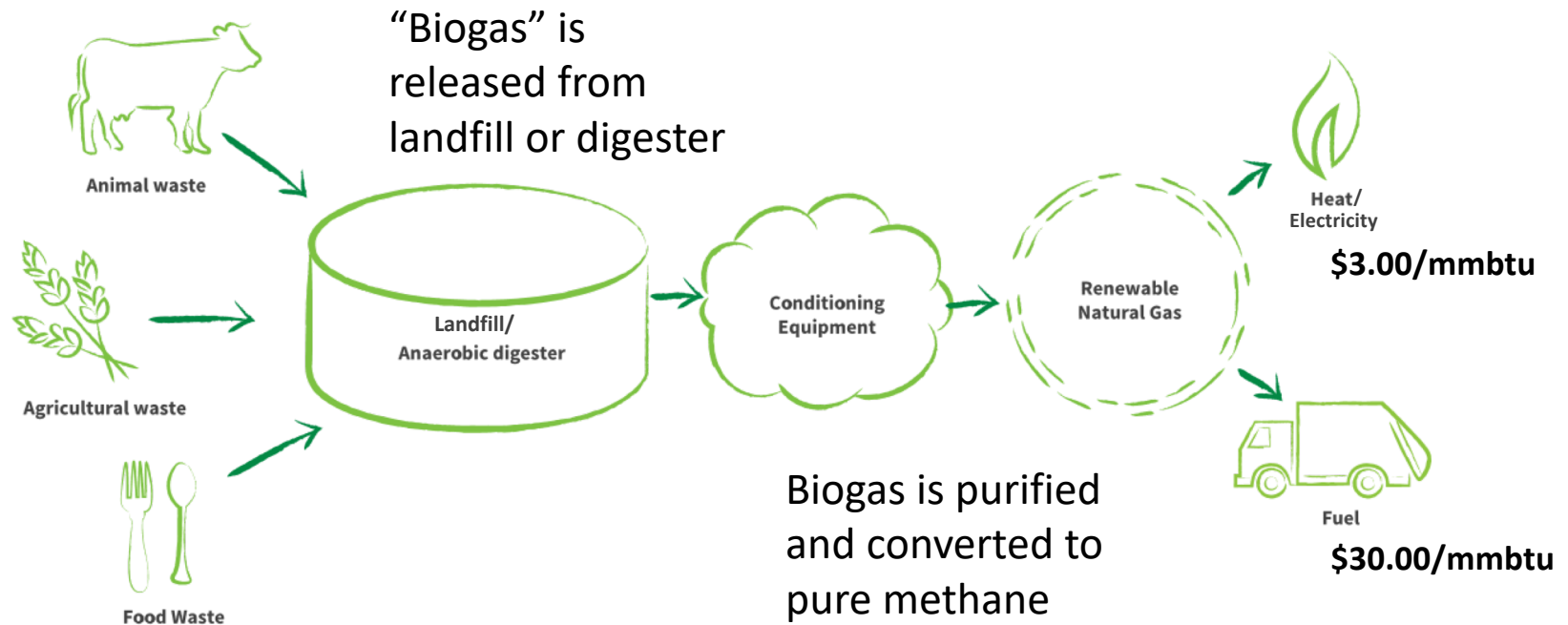
- Cellulosic Waiver Credit
- RINs Bank
- Q-RINs
 - Fraud
 - Who's liable?
- EMTS
- Tax Credit

State Incentives

- In addition to federal incentives there are state incentives
 - Low Carbon Fuel Standard Credits (LCFS)
 - California and Oregon
 - Value based on Carbon Intensity (CI)
- These are value additive to federal incentives
 - This is a crowded field and costs/barriers to entry can be high

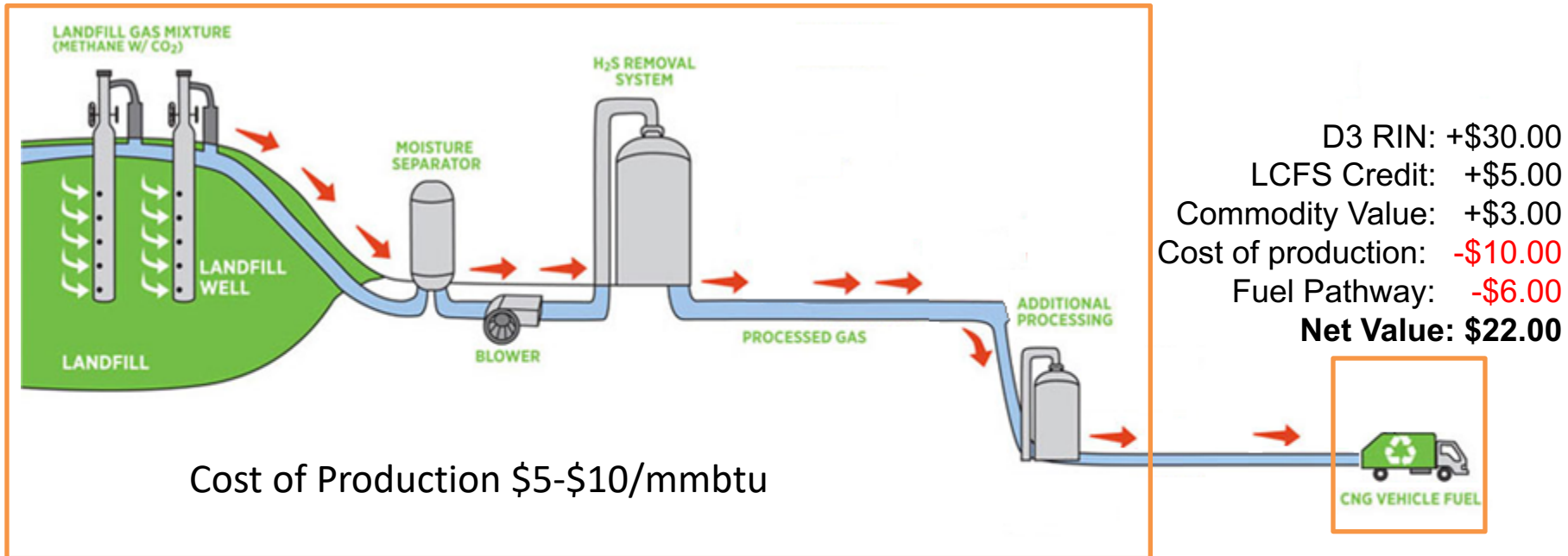
Renewable Natural Gas (RNG)

What is Renewable Natural Gas?



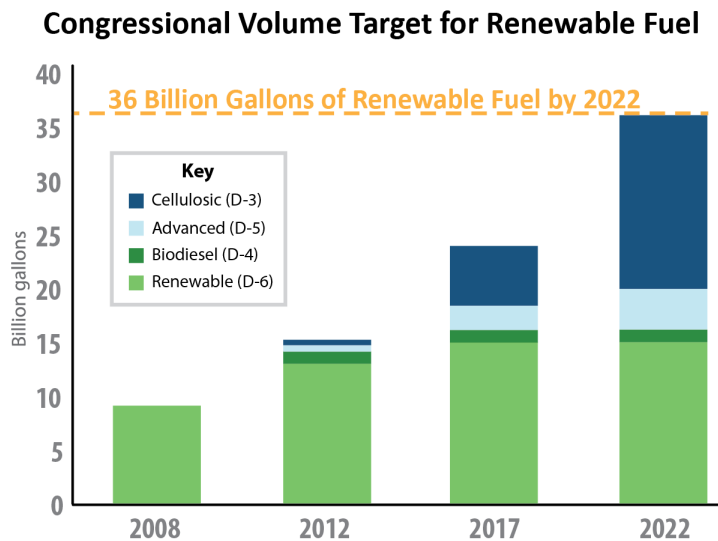
- RNG captures methane that would otherwise go into the atmosphere – methane is 20x-30x more potent greenhouse gas than CO₂.

RNG Revenue Stream



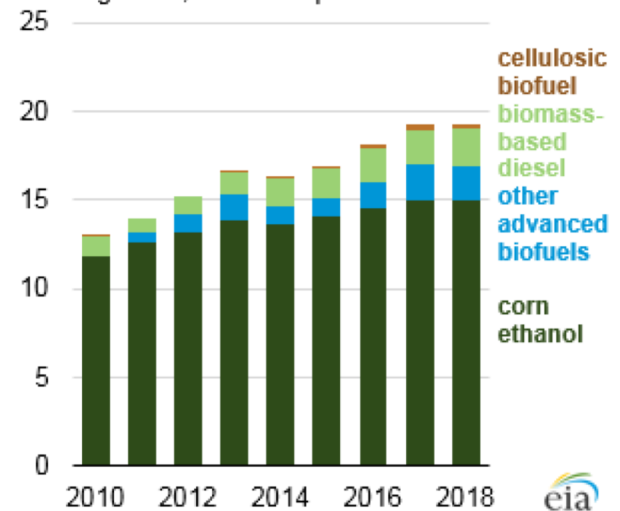
Shifting "Demand"

Initial target volumes per RFS
(2007)

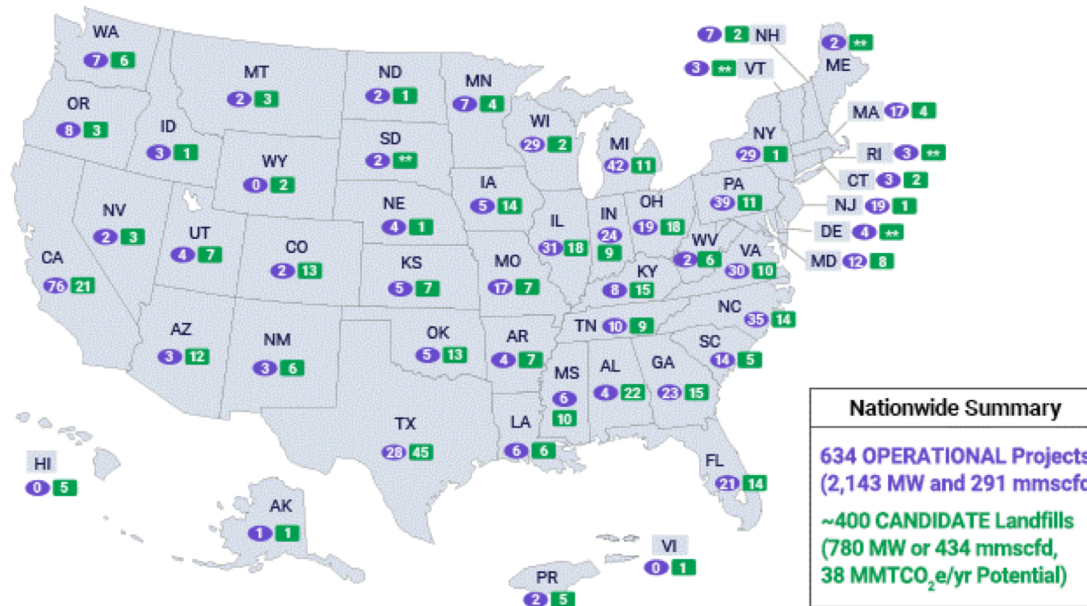


Actual volumes

Renewable fuel standard volume requirements
billion gallons, ethanol equivalent

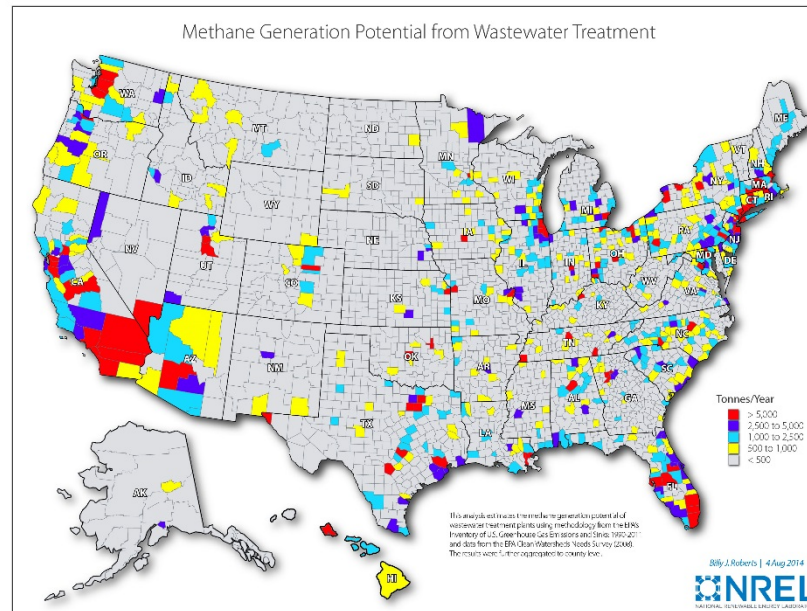


Market Fundamentals - Supply



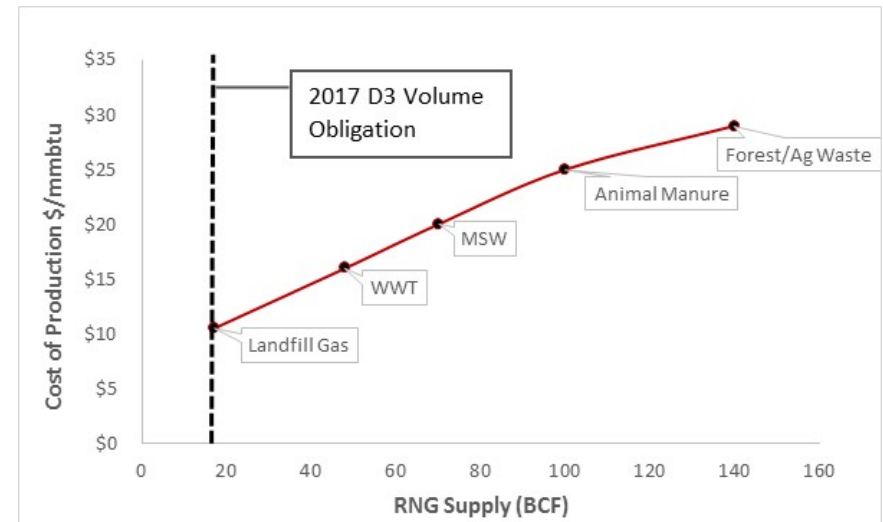
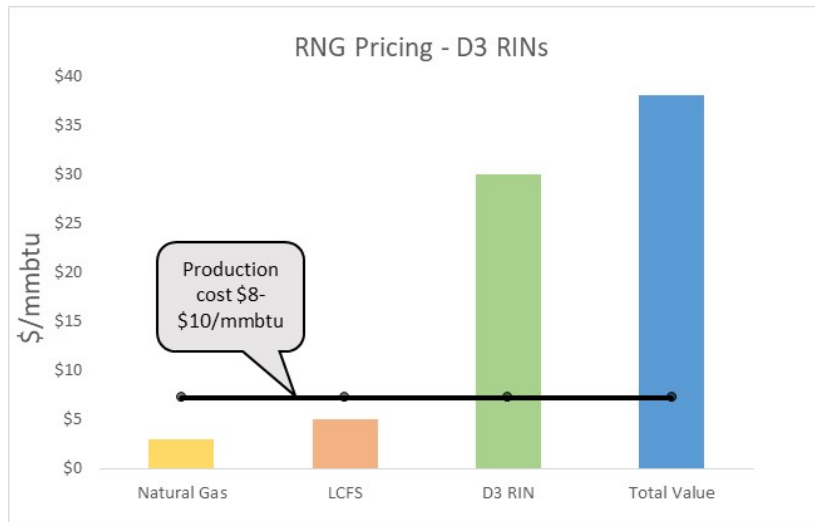
- There are currently 636 landfills with onsite power generation and another 450 project candidates
- There are currently 48 RNG projects in place and over 1,000 more potential projects available
- Within TEA's client list there are at least 20 candidate landfill projects

Market Fundamentals - Supply



- Wastewater treatment potential: There are 1,200 current projects and 3,500 potential projects that could be converted to RNG

Pricing vs Supply Stack



- Pricing is clearly incentivizing new development but there are inherent hurdles to development
- Supply is up ~25% year-over-year

Discussion – Q&A

RINs – Risk Considerations

- Developer, trader, obligated party, operator
- Fundamentally driven?
- Political risks largest driver
 - Especially D6 RINs
- Demand is set by regulation...and changes
- Supply side risks?
 - D4 and D3 likely