



How to Double Your Dollars for Biogas

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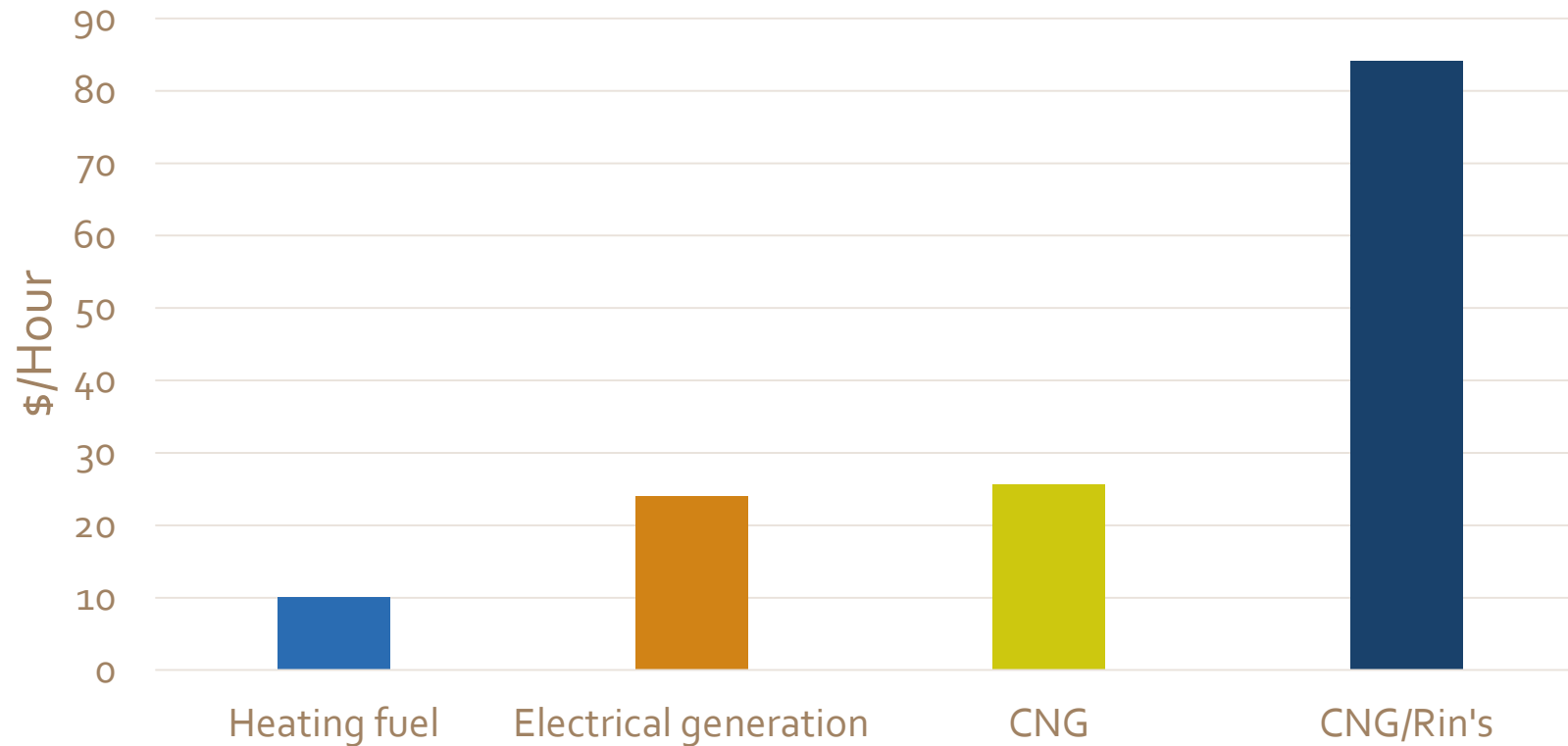


Agenda

- Renewable Natural Gas
- Renewable Fuel Standard
- Define Renewable Identification Numbers (RIN)
- RIN pathways
- So what?
- Export Paths
- Tips
- Resources

So What?

Comparison of Biogas Utilization



Assumptions:	
2 \$/gallon diesel fuel	
100 Scfm biogas	
600 btu/cf	
0.06 \$/kwh average electric cost	
80% Boiler efficiency	
\$/dktherm average natural	
3.5 gas cost	
2.5 \$/RIN value	

Renewable Fuel Standard

- Energy Policy Act of 2005 and expanded through the Energy Independence and Security Act of 2007.
- Reduce greenhouse gas (GHG) emissions and expand the nation's renewable fuels sector while reducing reliance on imported oil.
- EPA set numbers for each category of pathway

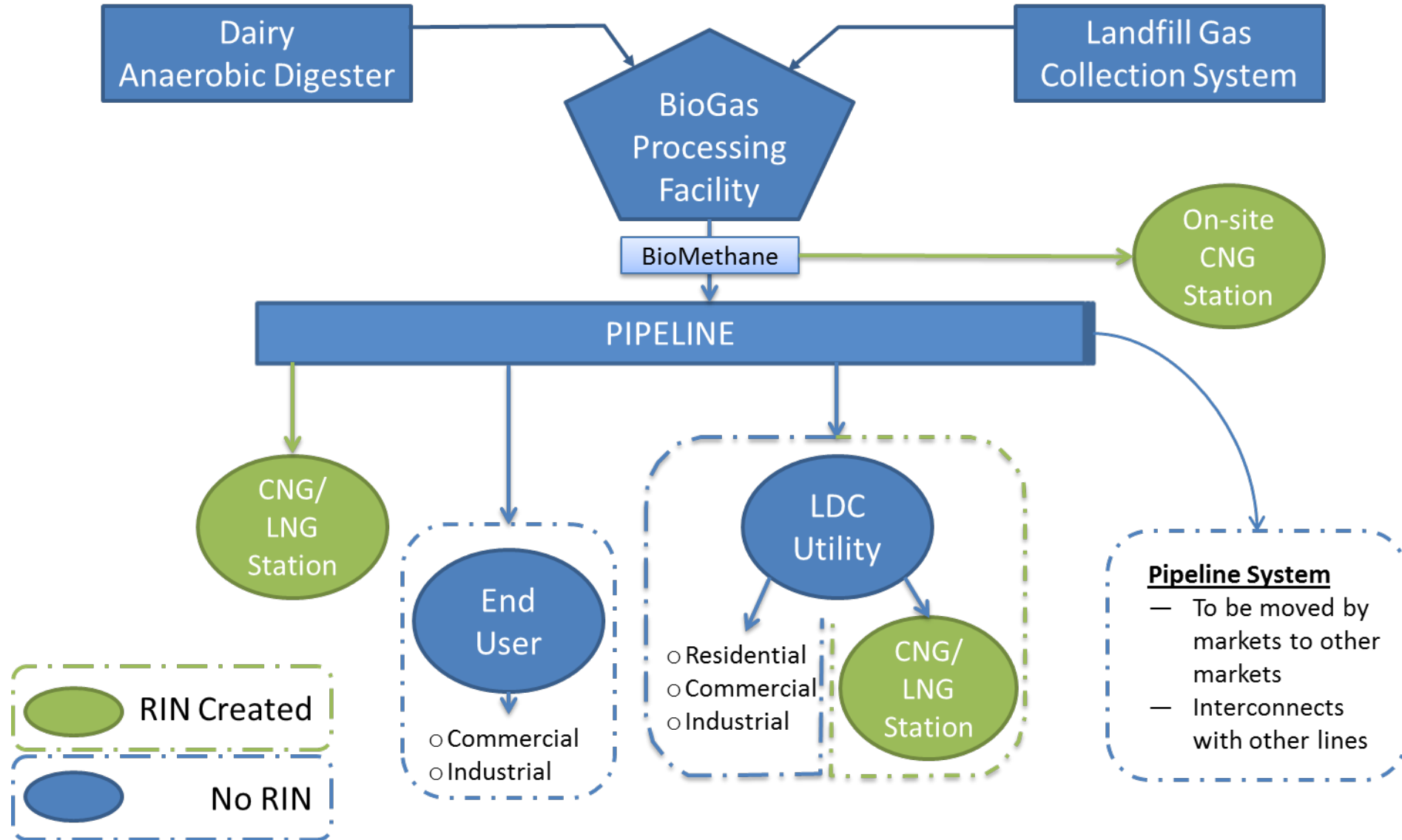
Pathways – Advanced Biofuels

Category	Code	Description
Cellulosic	D3	Any process that converts cellulosic biomass to fuel: ethanol, renewable gasoline, biogas-derived CNG and LNG
Biomass	D4	Biodiesel, renewable diesel, jet fuel, heating oil
Advanced Biofuel	D5	Biodiesel, renewable diesel, sugarcane ethanol, heating oil, waste digester-derived CNG and LNG
Renewable Fuel	D6	Corn ethanol
Cellulosic Diesel	D7	Cellulosic diesel, jet fuel heating oil

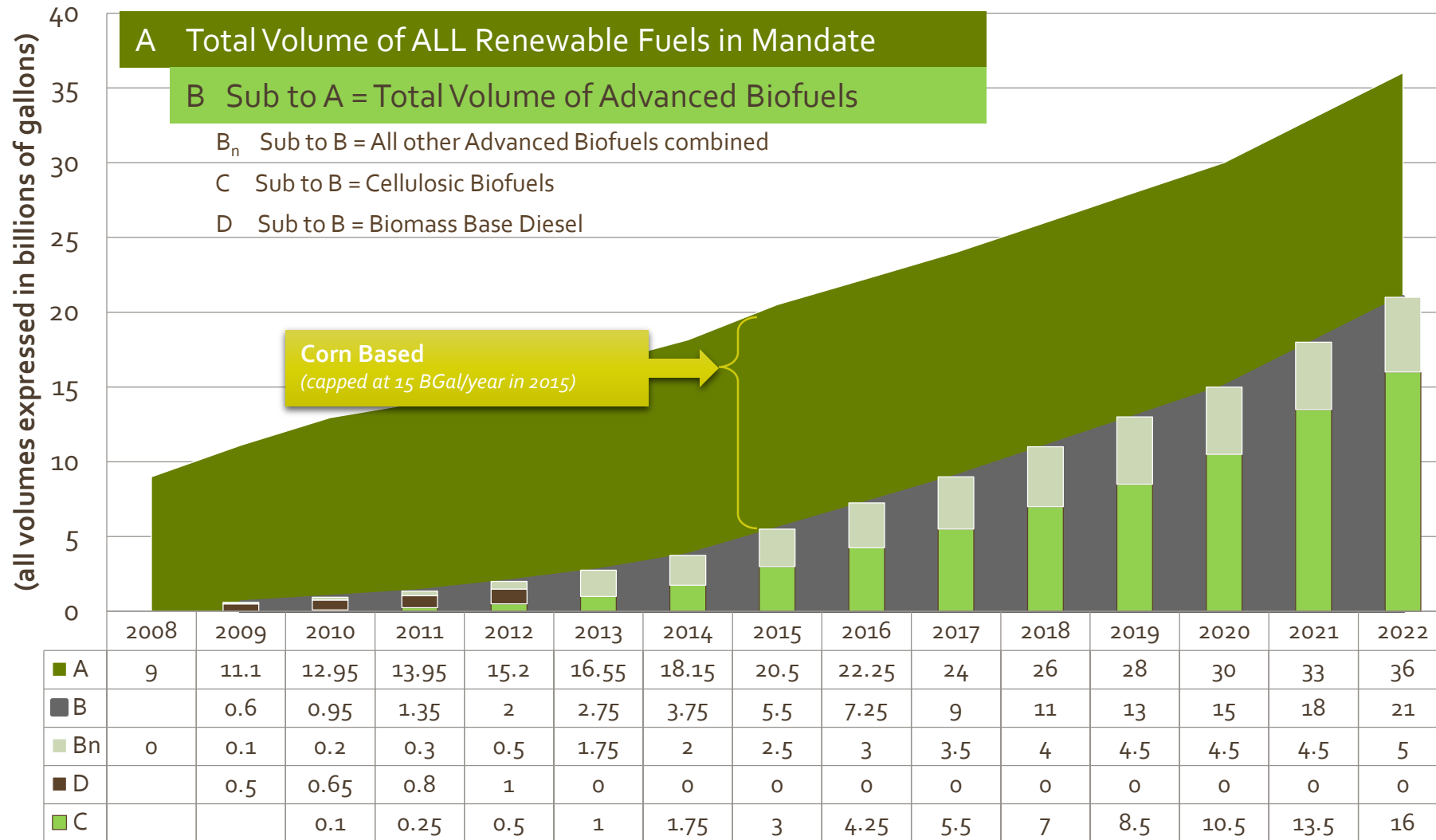
Define Renewable Identification Numbers (RIN)

- RIN = 77,000 Btu
- Created when dispensed into a vehicle
- A tradeable commodity

Where RINs are Created



RFS2 Renewable Fuel Mandates



* After 2022 (and after 2012 for Biomass-Based Diesel (BBD)), EPA will set the applicable volumes for each of the fuel categories, taking various economic, environmental and energy security factors into consideration. EISA specifies that the continuing BBD mandate cannot be less than one billion gallons per year

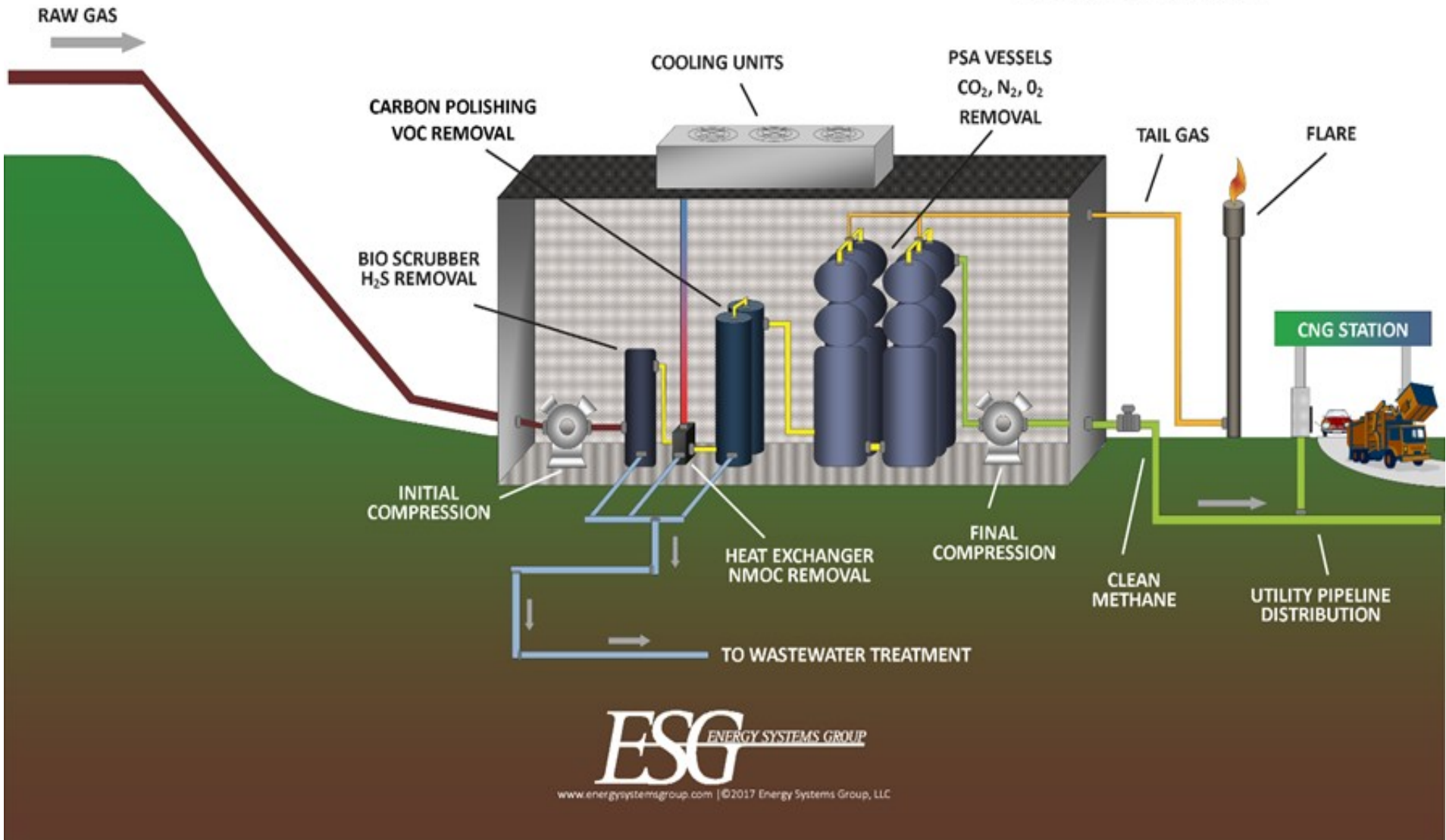
What is in biogas?

Average composition of municipal anaerobic digester biogas

Components		Wastewater treatment plants sludge	Vehicle Fuel	Renewable Natural Gas
Methane	CH ₄ % vol	60-75	Yes	Yes
Carbon Dioxide	CO ₂ % vol	33-19	No	No
Nitrogen	N ₂ % vol	1	Yes	No
Oxygen	O ₂ % vol	0.5	No	No
Water	H ₂ O % vol	6	No	No
Hydrogen Sulfide	H ₂ S ppm	1000 - 4000	No	No
Siloxane	SiO _x ppm	0-2000	No	No

Digester Gas to Renewable Natural Gas

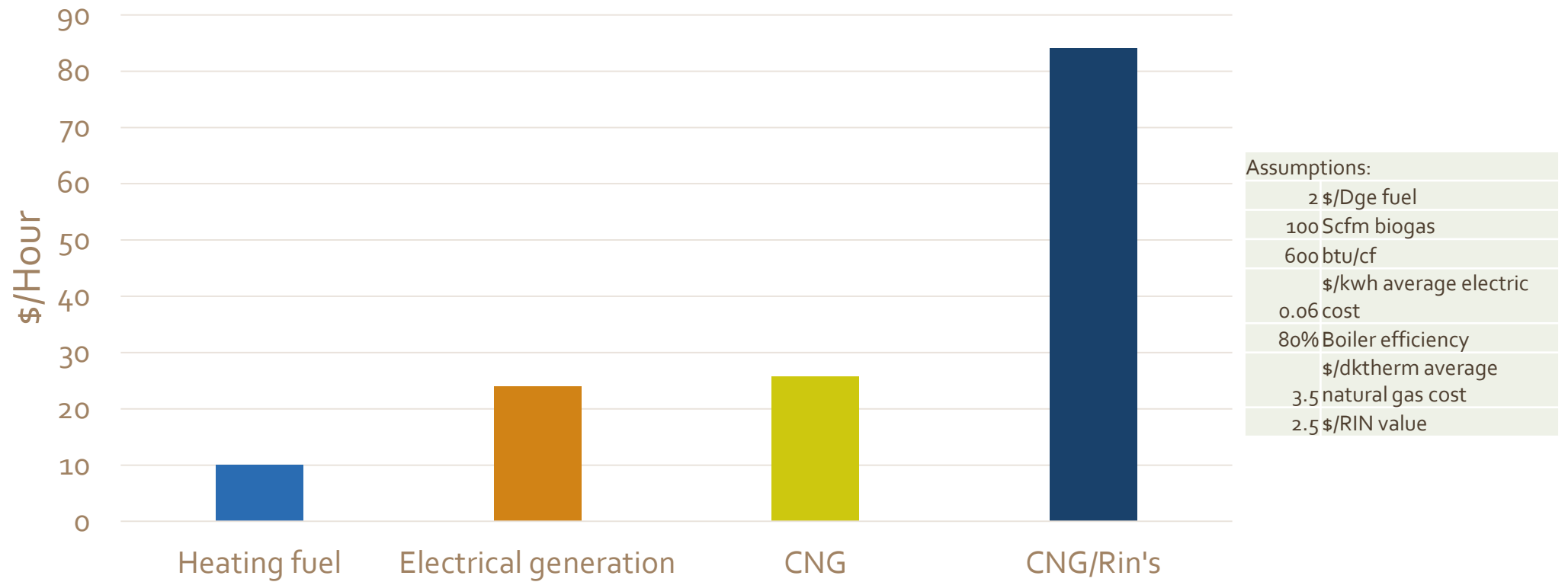
HIGH BTU FACILITY



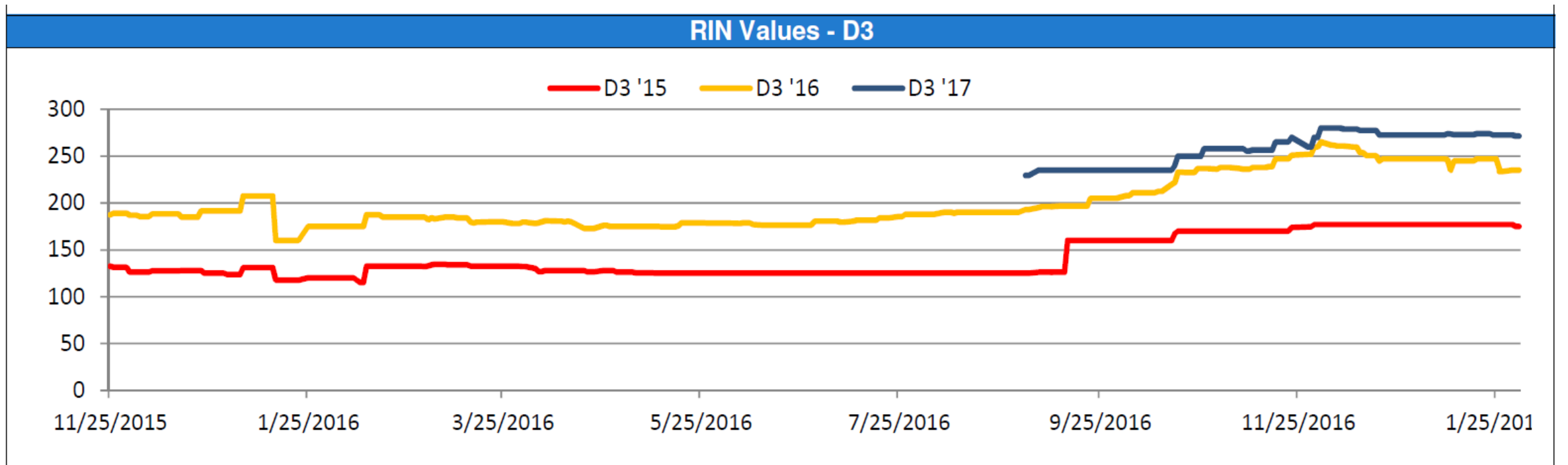
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So What?

Comparison of Biogas Utilization



D3 Values



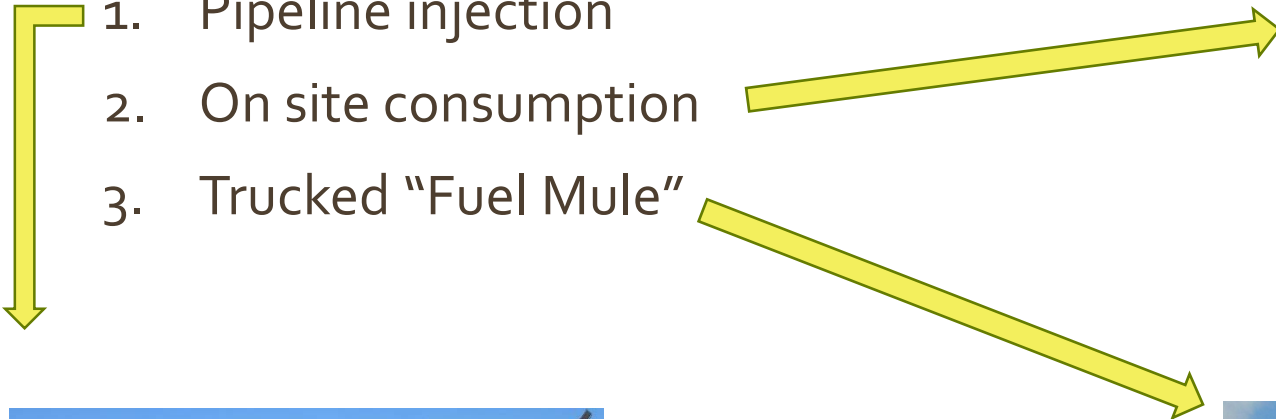
http://www.progressivefuelslimited.com/web_data/PFL_RIN_Recap.pdf

Qualified RIN

- Market is moving to Q-RIN's which require a Qualified Assurance Plan
- Verification of feedstocks, verification that volumes produced are consistent with amount of feedstocks processed, and verification that RINs generated are appropriately categorized and match the volumes produced
- Annual audits of renewable fuel production facilities, including minimum frequency, site visits, review of records, and reporting
- Define the conditions under which a regulated party could assert an affirmative defense to civil liability for transferring or using an invalid RIN
- Identification of the party who are responsible for replacing invalid RINs with valid RINs and the timing of such replacement
- A limited exemption for calendar years 2014, 2015, and 2016 that exempts two percent of a party's Renewable Volume Obligation (RVO) from the replacement requirement if the RINs were used for compliance and were verified through a QAP
- Changes to the EPA Moderated Transaction System (EMTS) that would accommodate the quality assurance program

Export Paths

1. Pipeline injection
2. On site consumption
3. Trucked "Fuel Mule"



Lafayette, IN



Atlanta, GA



<http://www.ultimatecng.com>

Tips

- Get a renewable fuel consultant
- Gas interconnection requirements vary widely
- Secure long term off-take agreement
- Use standard contract for off-take agreement
- Find local fleets for regional partnerships
- Flare gas can be used for heating
- Watch co-digestion. Other feedstocks can push you to D5
- Onsite consumption may have lower quality threshold than pipeline injection

Sources

- WEF Factsheet http://wrrfdata.org/NBP/Newsletter/wp-content/uploads/2016/09/WEF_Biofuels_RINs_Final-Draft-v31-AUG-2016final.pdf
- American Biogas Council
<https://www.americanbiogascouncil.org/>
- Coalition for Renewable Natural Gas
<http://www.rngcoalition.com/>



Thank you

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