Renewable Natural Gas
SWANAPalooza 2019

The Hunter Group, LLC
Renewable Energy and Environmental Consulting
New Iberia, Louisiana

EPA LMOP Special Session 1 – Panel Discussion
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INTRODUCTION

- The Hunter Group, LLC
  - 20 years in renewable energy market
  - EPA Landfill Methane Outreach Program (LMOP) Project of the Year Award recipient in 2010
  - Design, Build, Management of the 3rd largest supply of RNG in US Market from private landfill in Louisiana
  - Member of Coalition of Renewable Natural Gas
  - Vice Chair of Gas Utilization for Solid Waste Association of North America (SWANA)
  - Owner of RNG Hybrid facility in Tennessee
Industry Definitions

- **Biogas**: a mixture of carbon dioxide (CO₂) and hydrocarbons, primarily methane (CH₄) gas, from the biological decomposition of organic materials.
- **Syngas**: a gas mixture composed primarily of hydrogen (H₂) and carbon monoxide (CO), along with hydrocarbons from the thermochemical decomposition of organic or inorganic materials.
- **Conditioned Biogas**: medium-BTU biogas that is stripped of some trace contaminants and water, but maintains the relative mix of carbon dioxide (CO₂) and methane (CH₄). (50% CH₄ / 40% CO₂ / BAL O₂,N)
- **Biomethane**: biogas-derived, high-BTU gas that is predominately methane after the biogas is upgraded to remove most of the contaminants and a majority of the carbon dioxide (CO₂) and nitrogen (N₂) found in biogas.
- **Renewable Natural Gas (RNG)**: biomethane that is upgraded to natural gas pipeline quality standards such that it may blend with, or substitute for, geologic natural gas.
- **Renewable Compressed Natural Gas (R-CNG)**: RNG that is compressed to a high pressure, often for use as a transportation fuel.
- **Renewable Liquefied Natural Gas (R-LNG)**: RNG that is converted to liquid form, often for use as a transportation fuel.
RNG FEEDSTOCKS AND PRODUCTION

- **Landfill Gas.** 1,750 + landfills. (Smallest 150 scfm)
- 450 + LFGTE Electricity Production Facilities and over 90 RNG facilities today.
- **Agriculture Waste.** 8,000 Large Farms and Dairies.
  - especially cow and hog manure.
  - 500 head. 150 head with mixed with organics.
- **Waste Water.** 17,000 WWTP Facilities.
  - 100,000 residents.
- **Food Waste.** +66.5 Million Tons per year.
MARKET DYNAMICS

- 637 Landfill Gas Projects (LMOP – All); 398 “Candidate” Projects
MARKET DYNAMICS

- **265** Livestock ADs (AgStar – Dairy, Hog, Poultry, Beef, Mixed)
RNG FEEDSTOCKS AND PRODUCTION

- Agriculture Biogas differs from Landfill Methane in production capabilities and certain constituents such as sulfur and methane.
- Most AD projects are on a scale of raw gas production from 75 SCFM to 1000 SCFM versus landfills that usually produce from 1000 to 10,000 SCFM.
- AD methane is usually richer in heat value from 600 to 700 BTU/SCF versus landfill at 450 to 550 BTU/SCF.
RNG FEEDSTOCKS AND PRODUCTION

- **RNG Technologies**
  - Membrane
  - Pressure Swing Adsorption (PSA)
  - Solvent
  - Water Wash
- Proven capability of producing pipeline quality renewable natural gas
- Project size and interconnection gas quality requirements can impact technology selection
RNG INTERCONNECTION AND APPLICATION

- Common challenge of removing high levels of CO2 and Nitrogen in order to meet pipeline quality standards.
- RNG has advanced monitoring and control capabilities.
- More than 80 RNG projects injecting RNG into natural gas pipeline system.
- Minimum Heating Value 950 – 990 BTU; higher than 980 BTU very difficult due to lack of higher chain hydrocarbons.
- Utilities need education and you need partners in the industry to support RNG development.
RNG INTERCONNECTION AND APPLICATION

- Total Inerts range from 3-6%.
- PHMSA safety and general gas transportation guidelines are the norm.
- Interconnects exist on all types of LDC, Intrastate and Interstate pipeline networks.
- Standard use of gas chromatograph.
- Daily communications between the operator and the pipeline personnel is typical.
Don’t sweat the biogas constituents as all technologies remove these issues long before pipeline injection. Education of the utility is paramount to success.

Consider RNG interconnects as if they are small NG producers using typical gas sales with NASEB, Transaction Confirmation and Facilities Interconnect Agreements.

Utilities are learning and have growing interest in purchase of RNG.
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