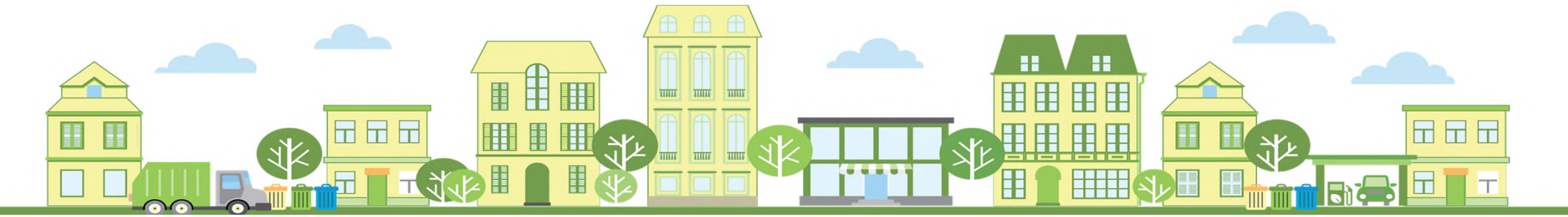
Renewable Natural Gas

SWANAPalooza 2019

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

EPA LMOP Special Session 1 – Panel Discussion

David Mauney, The Hunter Group



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

SWANA® Solid Waste Association of North America

TRG TENNESSEE RENEWABLE GROUP

RiverBirch LLC
2000 South Kenner Road • Avondale, LA 70094

LANDFILL METHANE OUTREACH PROGRAM

THE COALITION FOR RENEWABLE NATURAL GAS

Industry Definitions

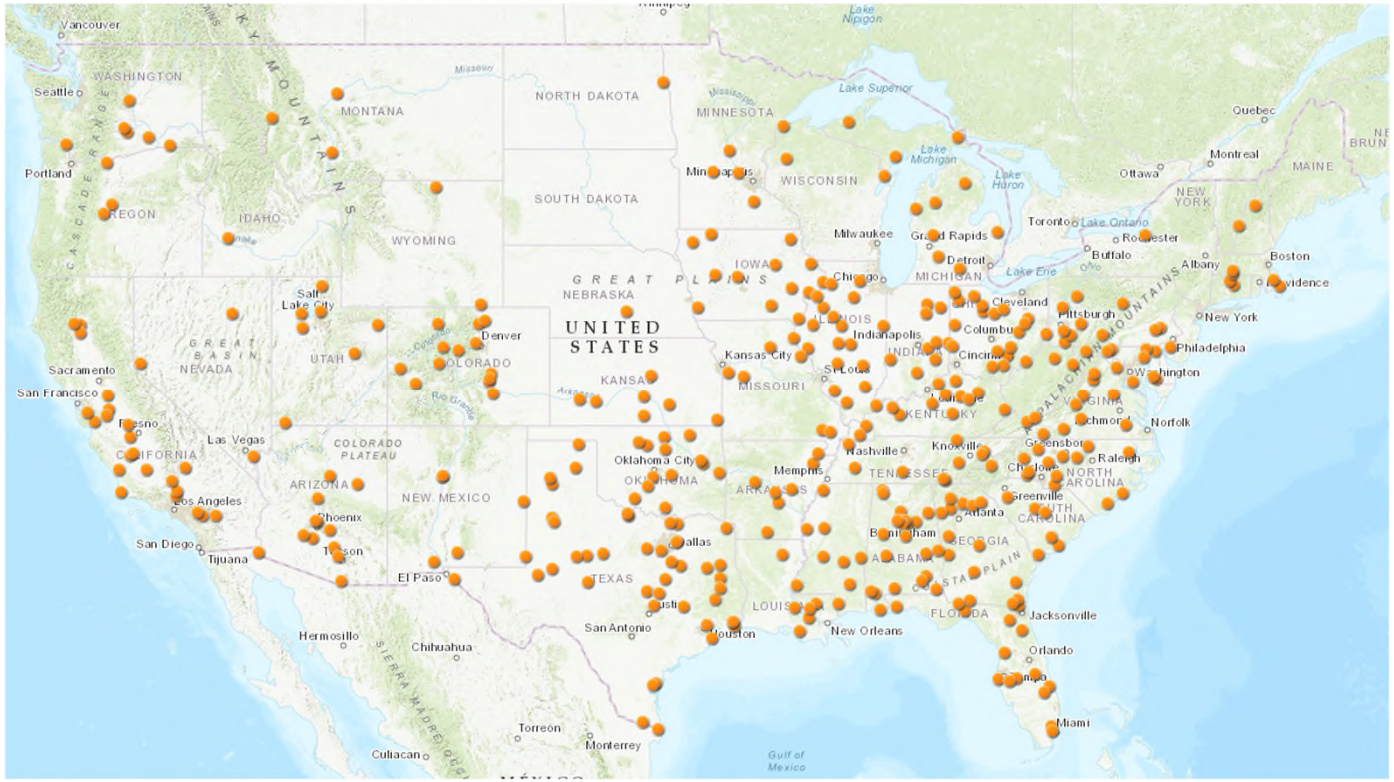
- ***Biogas:*** *a mixture of carbon dioxide (CO_2) and hydrocarbons, primarily methane (CH_4) gas, from the biological decomposition of organic materials.*
- ***Syngas:*** *a gas mixture composed primarily of hydrogen (H_2) and carbon monoxide (CO), along with hydrocarbons from the thermochemical decomposition 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 (CO_2) and methane (CH_4). (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 (CO_2) and nitrogen (N_2) 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

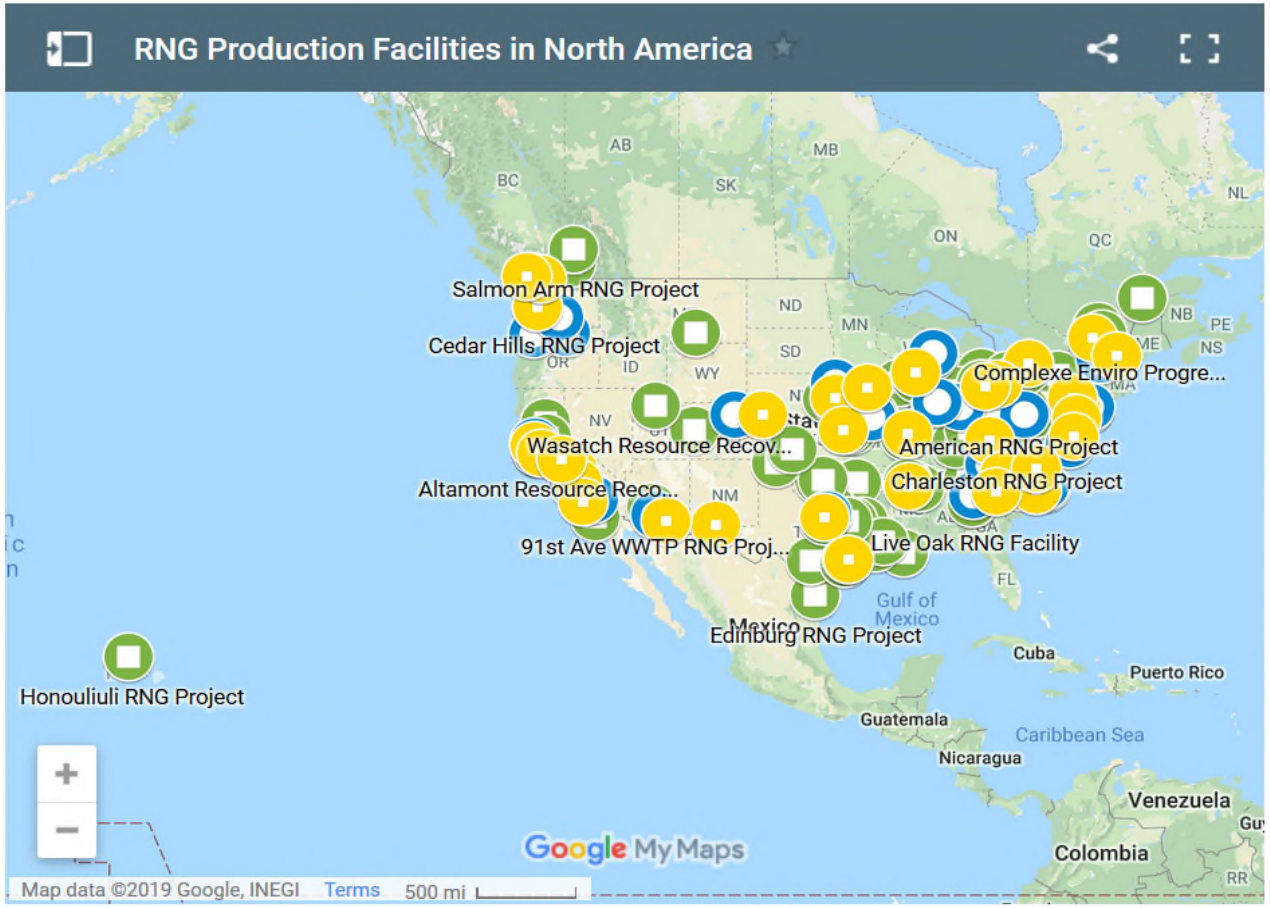
- **Landfill Gas.** 1,750 + landfills. (Smallest 150 scfm)
- 450 + LFGTE Electricity Production Facilities and over 90 RNG facilities today.
- **Agriculture Waste.** 8,000 Large Farms and Dairies.
  - especially cow and hog manure.
  - 500 head. 150 head with mixed with organics.
- **Waste Water.** 17,000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



RNG PRODUCTION FACILITY COUNTER

95 OPERATIONAL/ONLINE (U.S. - 85, CANADA - 10)

22 UNDER CONSTRUCTION (U.S.)

40 IN SUBSTANTIAL DEVELOPMENT (U.S. - 32, CANADA - 8)

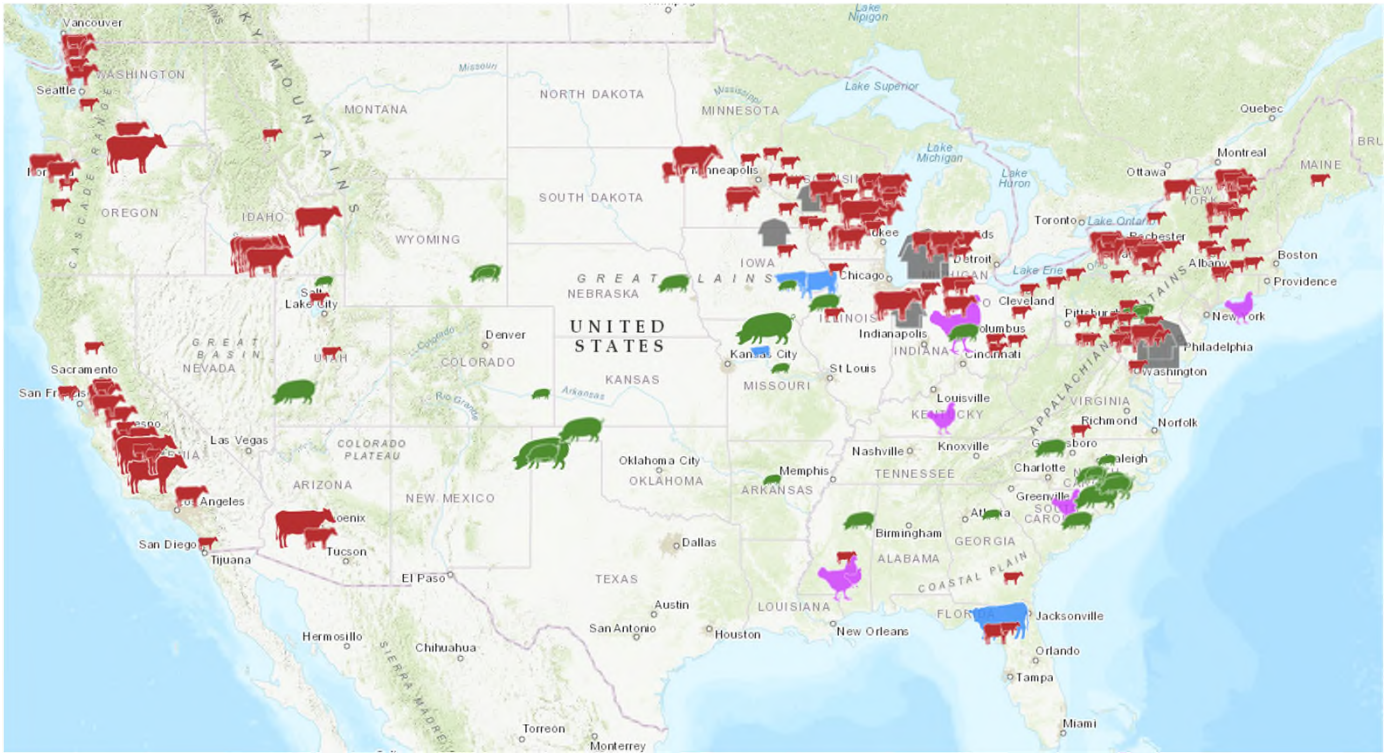
MAP KEY

Operational / Online

Under Construction

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.

RNG INTERCONNECTION AND APPLICATION

- 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

Contact Details

- David Mauney
  - thehuntergroupllc@gmail.com
  - davidmauney@tennesseerenewable.com
  - dmauney@rngaenergygroup.com
  - 337.577.2010 mobile
  - 337-365-6002 office
  - 337-365-6052 fax
- RNG Coalition
  - RNGCoalition.com
  - 916.588.3033