RECs and RINs – The RPS Opportunities for Biogenic Carbon

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Definitions:

- Biogenic Carbon is **non-fossilized and biodegradable organic material** originating from plants, animals, or microorganisms such as residues and waste from agriculture, forestry, and municipal waste; including gases and liquids recovered from the decomposition of these organic materials.

- A RIN is a 38 character numeric code that is assigned to each gallon of renewable fuel produced. Based on ethanol gallon equivalents.

- A REC is created when 1 MWh of electricity is generated from a renewable source.
Why Biogenic Carbon?

• Waste-based carbon, in the form of organic wastes like food wastes, agricultural wastes, and municipal sewerage, are immense resources (problems) in the U.S.

• These resources are infinitely renewable.

• Much of this carbon is already a contributor to atmospheric carbon emissions.

• Utilizing organic waste as fuel through waste conversion processes reduces an existing emission while also displacing fossil-based carbon emissions.

• Many existing utility plants can start today
Methane Capture Potential – Combined Sources
Municipal WWTPs, Landfills, Agriculture
The Differentiator:

• All organic waste conversion systems create fuel, not electrons!

• Fuel provides flexibility:
  • Storage
  • Transportation
  • Electricity
  • Manufacturing Chemicals

• Organic waste conversion to bioenergy provides tremendous flexibility in emissions impacts.

Here’s how:
Expanding our Views on Emissions

Source: EPA
All emission estimates from the *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2013*
How Biogenic Carbon Systems solve Emissions Reduction Challenges

• Direct generation systems (solar, wind, hydro) require the energy take at the time of generation, not when there is greatest demand.

• Requires battery systems for storage and leveling out peaks.

• Biogas systems can connect to existing natural gas infrastructure – if demand exceeds supply, natural gas can fill the shortfall. Easy to track.
How Biogenic Carbon Systems solve Emissions Reduction Challenges

• For electricity, if supply exceeds demand, use of biogas for fuel provides alternate outlet.
  • Easy to track via RINs
• Storage achieved at source; feedstock is potential energy
• Eliminates Electric Utility fears of over-buying RECs to ensure compliance.
• Provides stability to REC and RIN markets.
So What’s Missing? What’s Needed?

• Currently, REPs tend to favor Electricity, not “Energy”

• Expanding the “E” provides opportunity to utilize an optimum balance of renewable energy sources to address emissions:
  • Solar, Wind, and Hydro to create electrons where practical
  • Biogas to fill the gaps in demand
  • Fossil natural gas as the backstop

• Development of bioenergy fuel motivators – buying decisions, infrastructure.
State RPS Task List:

1. Assess your potential!
   • If you do not have data on existing renewable energy potential that includes all reasonable sources, you must do this.

2. Develop a strawman balanced portfolio
   • It may be wrong, but start somewhere and make it better

3. Identify barriers and roadblocks
   • Outreach and Education
   • Stakeholder involvement

4. Implement strategy to overcome barriers
NC “All Bioenergy” Facilities Map (with NG Pipelines)

- Minor Munie WWTP’s
- Major Munie WWTP’s
- MSW Landfills
- Dairy Farms
- Wet Poultry Systems
- Swine Farms
8 of the top 10 Biomethane potential States have an RPS