

Parallel paths for developing RNG production facilities Lawrence, KS



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The Landfill Group

Company Overview

The Landfill Group offers a comprehensive solution to the Biogas industry through our three branded operating businesses: Enerdyne Power Systems, Advance One Development and Advanced Biogas Systems



- Develops, owns, operates and consults on landfill gas to energy projects
 - National footprint with projects throughout the U.S.
- Current portfolio includes five operating LFG projects with various end uses:
 - Electricity
 - High Btu
 - Medium Btu



- Provides complete landfill gas construction services including:
 - Wellfield construction
 - Plant construction
 - Equipment installation
- Ability to operate nationally with General Contractor Licenses in multiple states



- Manufacturer of equipment for the Landfill Gas Industry
- Product offering includes:
 - Blower / Flare Skids
 - Siloxane removal
 - Gas dehydration
 - Hydrogen Sulfide removal
 - O2 Removal
 - CO2 Removal
 - Custom Fabrication

RNG Project Development Challenges

There are many challenges in the development of an RNG project. The following have been identified as the most significant.

- Scale and Gas Flow
 - RNG scales up well not down
 - Need Well field to produce expected flows
- Wellfield Control is critical
 - Nitrogen removal
 - Compliance
 - Optimized capture of methane
- Capex and Interconnection
 - Expensive technology
 - Access to pipeline / Interconnect costs
 - Financing
- Speed to Market
 - Lots of projects in development with limited market
 - RFS?
 - Short and long term market stability

Renewable Power Producers

Project Overview

Renewable Power Producers (“RPP”) is a landfill gas to high-btu renewable natural gas plant that came online in August 2017

Project Summary

- Located at the Hamm Sanitary Landfill in Lawrence, KS
- Project converts raw landfill gas to high-btu pipeline quality renewable natural gas
- Plant inlet design capacity 2500 scfm, expandable to 4000 scfm
- End use is vehicle fuel market as part of EPA’s renewable fuels program
- 2019 expected production is over 4 million gallons of cellulosic biofuel
- ~10 month construction period (well field, plant and pipeline)

Renewable Power Producers

Gas Collection System

- Construction of GCCS commenced in October 2016 and was completed in January 2017
- Over 150 collection points
- Combination of vertical and horizontal wells
- All work completed internally by our affiliate company Advance One Development



Renewable Power Producers

Processing Equipment

- Construction of facility commenced in December 2017 and was completed in July 2017
- Major processing equipment manufactured by our internal affiliate Advanced Biogas Systems



Renewable Power Producers

Pipeline

- Construction of pipeline commenced in November 2016 and was completed in February 2017
- 7.2 Miles from plant outlet to pipeline natural gas transmission tap
- 11 Private Easements
- 2 Levee Crossings
- 1 Airport Crossing
- 4-1/2" High Pressure Steel line



Renewable Power Producers

Commercial Operations

Before –
January 2017



After –
August 2017



RPP Improvements/ Lessons Learned

Things we have implemented to improve facility and RNG production

- Membrane Installation
 - Increased capture of methane
- Increased compression capacity
 - Excess of 3000 CFM inlet
- Provided by Advanced Biogas Systems
- Wellfield Control
 - Automated process
- Wellfield Expansion
 - 30+ wells
- Process Improvements
 - Monitoring systems
 - Temperature modifications for certain processes



Renewable Power Producers

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