Converting Waste into Energy

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Landfill Gas Overview

• As trash decomposes, it produces landfill gas ("LFG") which is primarily methane (i.e. the same basic compound in natural gas)

• Environmental concerns – gas migration; explosion hazard, groundwater impact

• However, unlike natural gas which is almost pure methane, landfill gas is generally comprised of only 50% methane;
  – Medium Btu Content: 400-500Btu

LFG can be converted to High Btu Gas: 900+ Btu
HSL: Landfill Gas Field
HSL: Landfill Gas Field
• Construction of GCCS commenced in October 2016 and was completed in January 2017
• Over 150 collection points
• Combination of vertical and horizontal wells
Landfill Gas to High Btu Gas

- The landfill gas treatment process removes CO2, O2, N2, H2S, moisture and other contaminants so that the resulting gas meets/exceeds natural gas parameters
- Once the process has been completed, gas is then brought up to a high pressure and injected into a natural gas pipeline for sale to the associated end user
Landfill Gas Collection
High Btu Gas Plant
High Btu Gas Plant
High BTU System Layout
High BTU System Layout
Landfill Gas Treatment

- Inbound Landfill Gas
- H2O - Chilling Removes Water
- H2S - Sulfa Trap - Sacrificial media
- Siloxane - Silica Gel - Regenerated media
- CO2 - Pressure Swing Adsorption - Alumina - Xebec system
- O2 - Palladium Catalytic Converter
- Final Dehydration
- Outbound CH4 Methane
HSL: Serpentine SEM Route
HSL: Pipeline Connection
• 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
Landfill Recovery/Fuel Conversion Benefits

GHG Reduction from Landfill GCCS: 185,000 US Tons CO2e/year

CNG Replacing Diesel Gallons = 2,400,000 gallon equivalents/year

Metric Tons of CO2e Reduction @ CNG Pump = 22,000 US Tons compared to diesel

CNG Replacing Gasoline Gallons = 2,700,000 gallon equivalents/year

Metric Tons of CO2e Reduction @ CNG Pump = 20,000 US Tons compared to gasoline
Project and Community Benefits

- Constructed Plant and Infrastructure Using Many Local Contractors
- High tech employment
- Community Involvement and Education
- Zero Tax Abatements requested
- Zero Public Financing requested
- No Rate Increase To Our Customers
## Exemptions and Viability

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<th>Number of Petitions Received</th>
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Source: EPA
• Questions??
High Btu Gas Process Flow