A Mutually Beneficial Relationship

Waste-to-Energy EPC for the Federal Government

July 2022
Waste to Energy with Anaerobic Digestion
Digester Expertise

20+ Beverage digesters
10+ Food digesters
5+ Manure digesters
5+ Combined waste digesters
75+ Biogas projects
Waste to Energy with Landfills
Biogas Project Experience

- 95+ Projects in 35+ States
- 65+ Projects with Landfills
- 245 MW Produced
- 42,850+ SCFM Biogas Upgraded
- +10,000 SCFM Under Construction
- $500 Million Total Installed Cost
Biogas Upgrading Technology For Combined Heat & Power

- Full energy utilization boosting efficiency of biogas projects
- Capture heat for digester heating and other process heat needs
- Supplement electric needs or operate in full island mode during power outage
Making Natural Gas

- Agricultural
- Wastewater/Waste
- Landfill
- Industrial
- CNG Fuel
- Pipeline-quality natural gas
- Biogas Conveyance
# Biogas Upgrading Technology For Renewable Natural Gas

<table>
<thead>
<tr>
<th>Material of Construction</th>
<th>Biogas Range (SCFM)</th>
<th>Methane Yield</th>
<th>CapEx</th>
<th>OpEx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Membrane (3 Stage)</td>
<td>100 – 3,000</td>
<td>99% +</td>
<td>Low</td>
<td>Intermediate</td>
</tr>
<tr>
<td>Pressure Swing Adsorption (PSA)</td>
<td>300 – 2,600</td>
<td>98% +</td>
<td>Intermediate</td>
<td>Low</td>
</tr>
<tr>
<td>Amine Wash</td>
<td>700 +</td>
<td>99% +</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Water Wash</td>
<td>1,000 +</td>
<td>98% +</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>

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3-Stage Membrane
Pressure Swing Adsorption
Amine Upgrading
Water Wash Upgrading
- Regional food waste to anaerobic digestion
- Convert source separated organics to biogas/RNG
- Material handling experience
- Overcome challenges related to fluctuating incoming COD or Loading
- Evaluate potential feedstocks
Municipal Solid Waste Digestion (MSW)

- Alliance with world leading MSW digestion technology through Integrated Biogas Alliance
Green Waste Digestion

- High Solids Plug Flow Digester
- Landfill Diversion of Organic Fraction Municipal Solid Waste
WWTP Sludge to Compressed Natural Gas

- Trend away from WWTP to Resource Recovery Facilities
- Convert wastewater sludge to biogas/RNG/CNG
- Utilize existing infrastructure
- Integrate well with facility operations
- Potential to co-digest food waste
Our Questions

- How is your waste being managed now?
- What waste do you have available to you?
- How is your energy being managed now? (Provider, already making your own?)
- What are your renewable energy goals?