BIOGAS FOR CARBON OFFSET SYMPOSIUM

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VP of Marketing & Business Development
About Hawaii Gas

- Founded in 1904
- Hawaii’s only gas utility
- ~325 employees
- ~70,000 customers
- Supply gas to all islands

Largest propane supply company in Hawaii

Bulk propane storage on all islands

Produce synthetic natural gas (SNG) and distribute through 1,100 mile pipeline system on Oahu
Diverse Fuel Supply Stabilizes Prices and Improves Reliability

- **SNG** (Primary Fuel)
- **Propane / Air** (SNG Backup)
- **Containerized LNG** (Up to 30%)
- **Renewable Natural Gas** (Honouliuli WWTP)
Renewable Natural Gas (RNG) is the term that is used to describe pipeline-quality biomethane produced from biomass.

It is interchangeable with natural gas and fully compatible with existing natural gas pipeline infrastructure.

RNG is produced by removing the carbon dioxide (CO₂), moisture and other unwanted components from biogas.
RNG Comes from 3 Local Sources, and Can Be Carbon Negative

**Waste Water Treatment Plants:** Predictable and consistent supply of feedstock

**Landfills:** Biogas can be expensive to process/clean due to contaminants. Supply is local and available

**Agricultural Crops:** Provides a scalable pathway to larger-scale biogas use in Hawaii today. Highly attractive but land use challenges exist
How RNG is Made

Energy Crops

Food Waste/Manure

Waste Water

Landfill Methane

Anaerobic Digestion

Clean/Process/Inject

Pipeline
Overhead View
Water Removal System
Activated Carbon Vessels
2-stage Membranes
Gas Analyzer
HMI (Human/Machine Interface)
RNG as a Carbon Neutral Fuel

Advantages of RNG:
- Eliminates the release of sequestered carbon by replacing SNG with RNG
- Eliminates flared methane at WWTP’s and Landfills
- Recycles previously wasted energy

[Diagram showing carbon positive, carbon neutral, carbon negative]

- Fossil Fuels
- Water, Wind, Solar
- Biomass, Energy Crops
4,280 metric tons of CO2 eliminated annually

- Prior to the project, both the biogas and SNG were burned, now only the biomethane is burned.
- CO2 is eliminated from fossil fuel sources
**Honouliuli Wastewater Treatment Plant**

### Actual Production

<table>
<thead>
<tr>
<th></th>
<th>Therms Produced</th>
<th>BTU’s</th>
<th>Energy Equiv (barrels)</th>
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<tbody>
<tr>
<td>FEB</td>
<td>31,062</td>
<td>3,106,200,000</td>
<td>535 eliminated</td>
</tr>
<tr>
<td>MAR</td>
<td>53,743</td>
<td>5,374,300,000</td>
<td>926 eliminated</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Total Cost to Build</th>
<th>Electrical Use</th>
<th>Op Cost (Elec+AC)</th>
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<tbody>
<tr>
<td>~$3.2M</td>
<td>1.2kWh/therm</td>
<td>~$0.45/therm</td>
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Mahalo