HAWAI'I GAS

THE CLEAN ENERGY COMPANY

GOOD ENERGY WITH HAWAI'I GAS

BIOGAS FOR CARBON OFFSET SYMPOSIUM

Aaron Kirk

VP of Marketing & Business Development

About Hawaii Gas

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

- 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

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

SNG
(Primary Fuel)

Propane / Air
(SNG Backup)

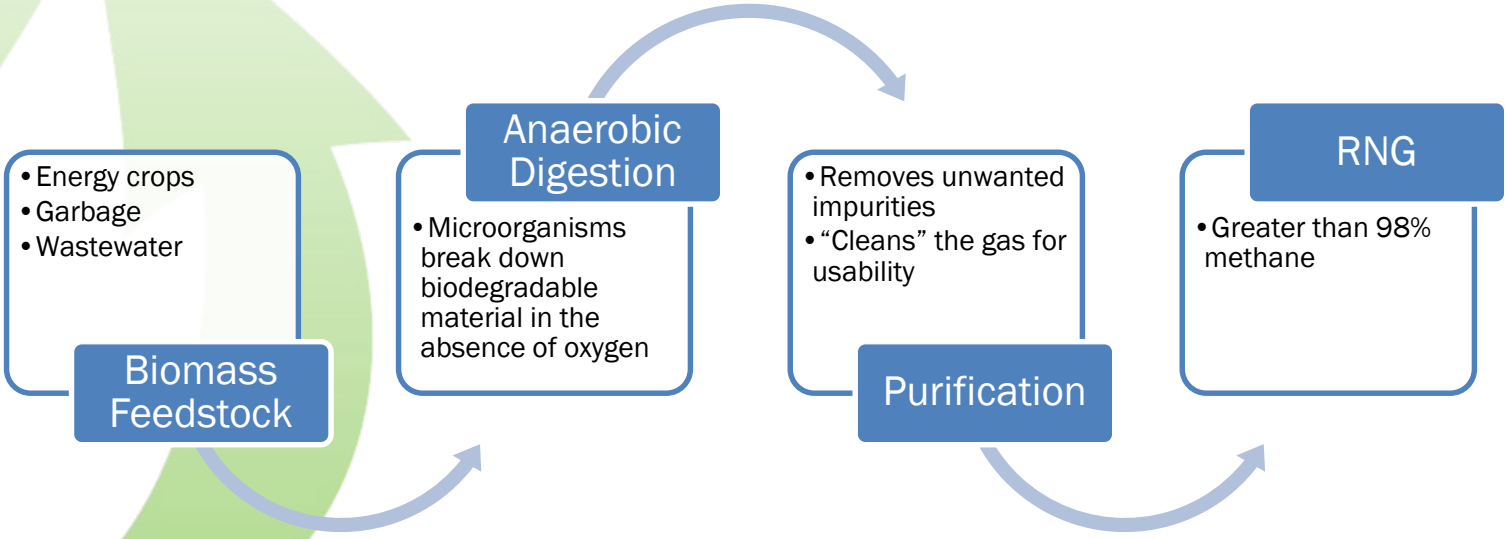
Containerized LNG
(Up to 30%)

Renewable Natural Gas
(Honouliuli WWTP)

What is Renewable Natural Gas?

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

- 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 (CO_2), moisture and other unwanted components from biogas



RNG Comes from 3 Local Sources, and Can Be Carbon Negative

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

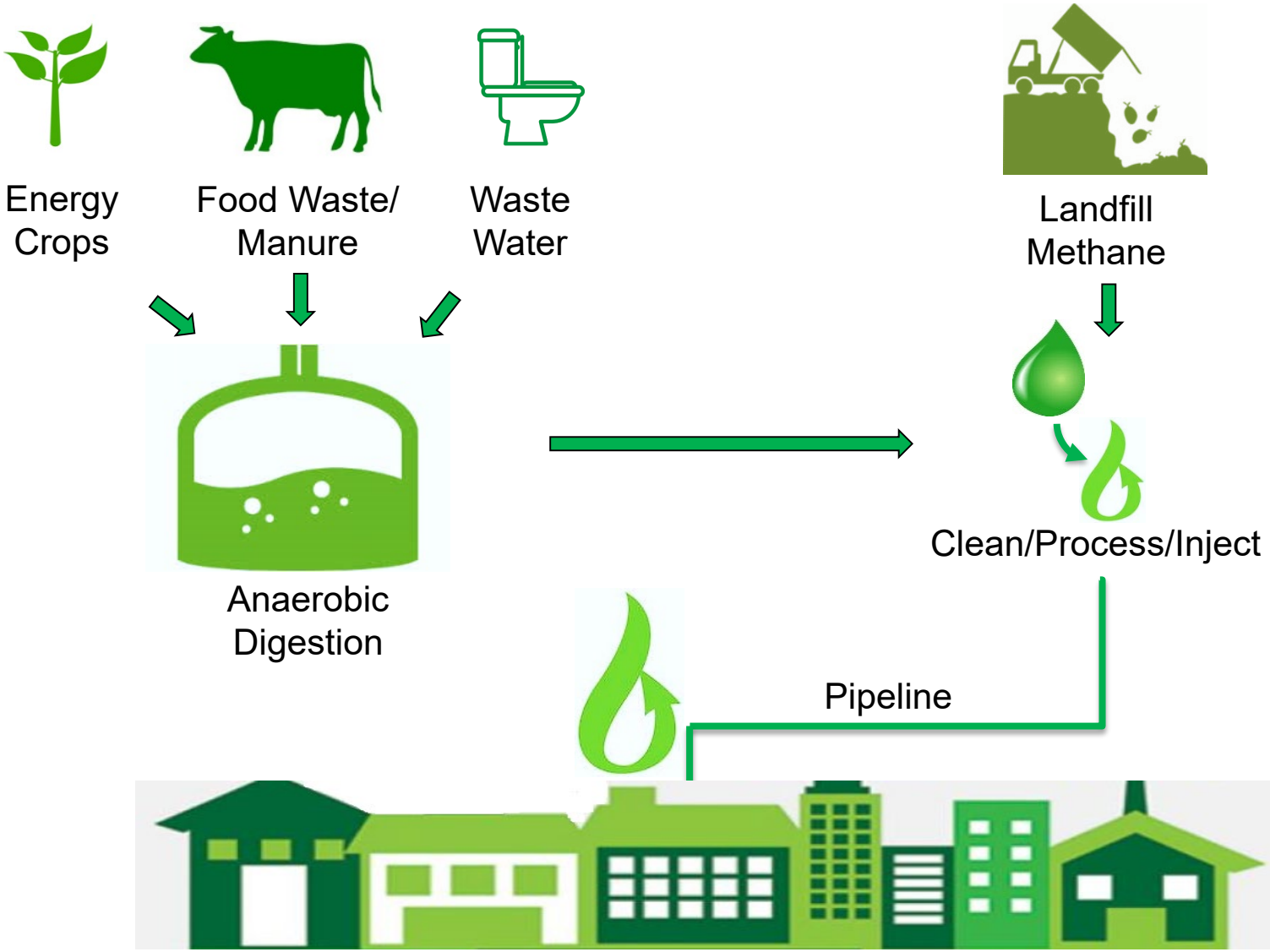
Waste Water Treatment Plants: Predictable and consistent supply of feedstock

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

HAWAI'I GAS
THE CLEAN ENERGY COMPANY



Overhead View

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

Water Removal System

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

Activated Carbon Vessels

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

Compressor

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

2-stage Membranes

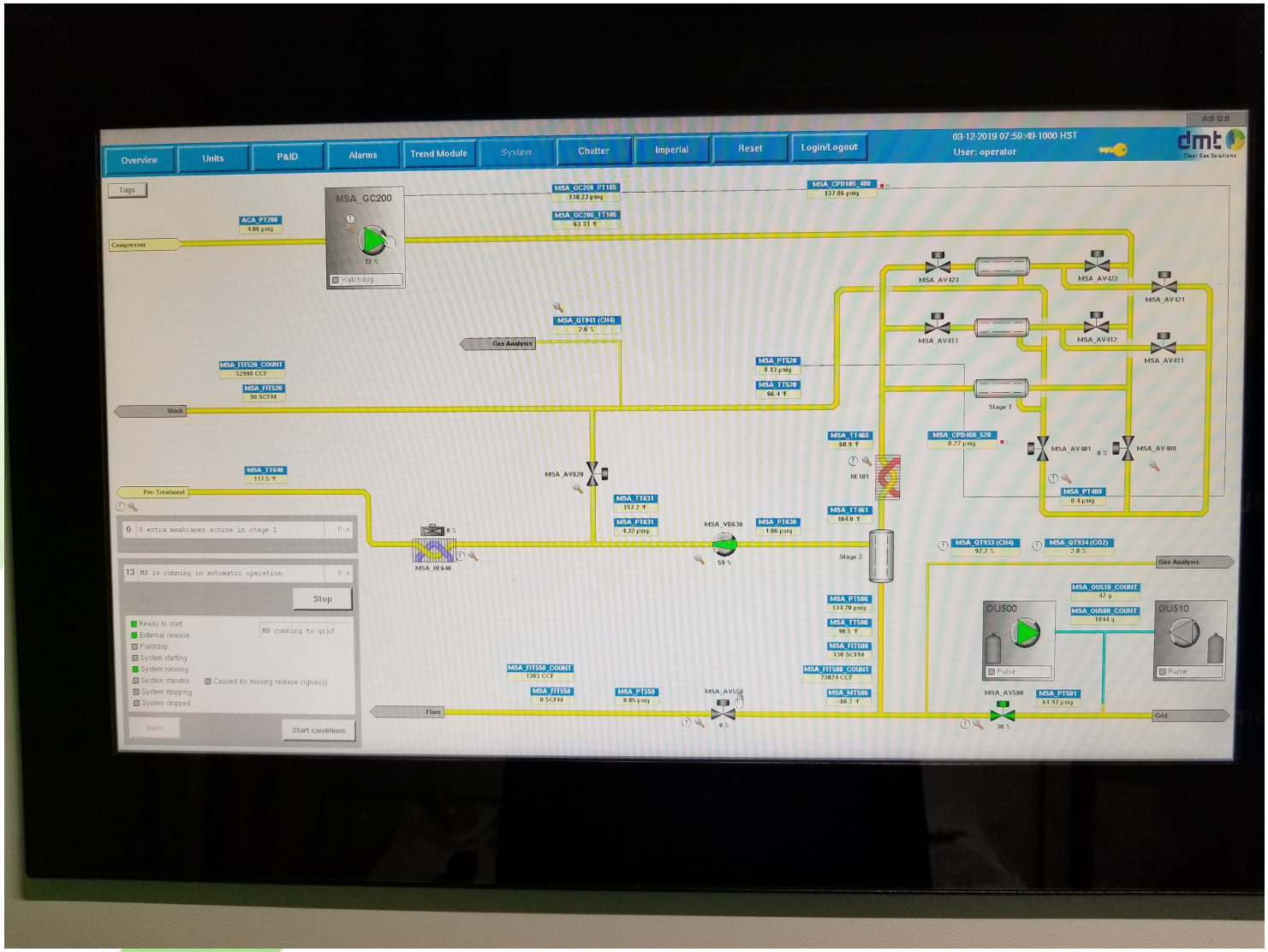
HAWAI'I GAS
THE CLEAN ENERGY COMPANY

Gas Analyzer

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

HMI (Human/Machine Interface)

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

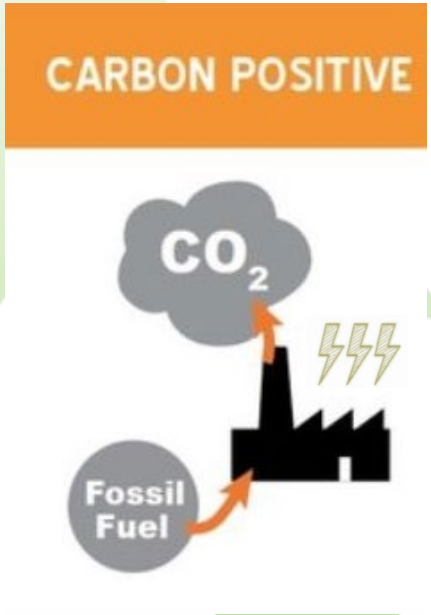


RNG as a Carbon Neutral Fuel

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

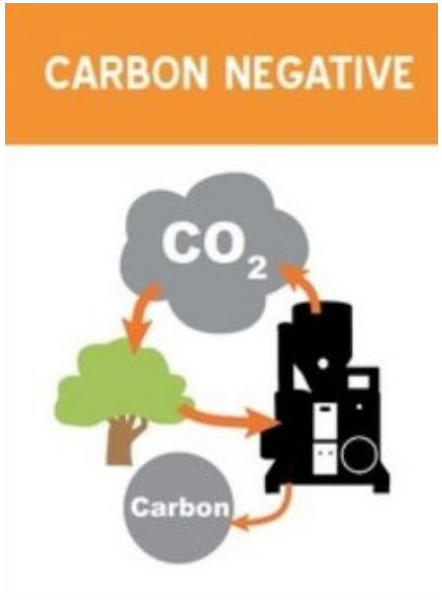
Advantages of RNG:

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



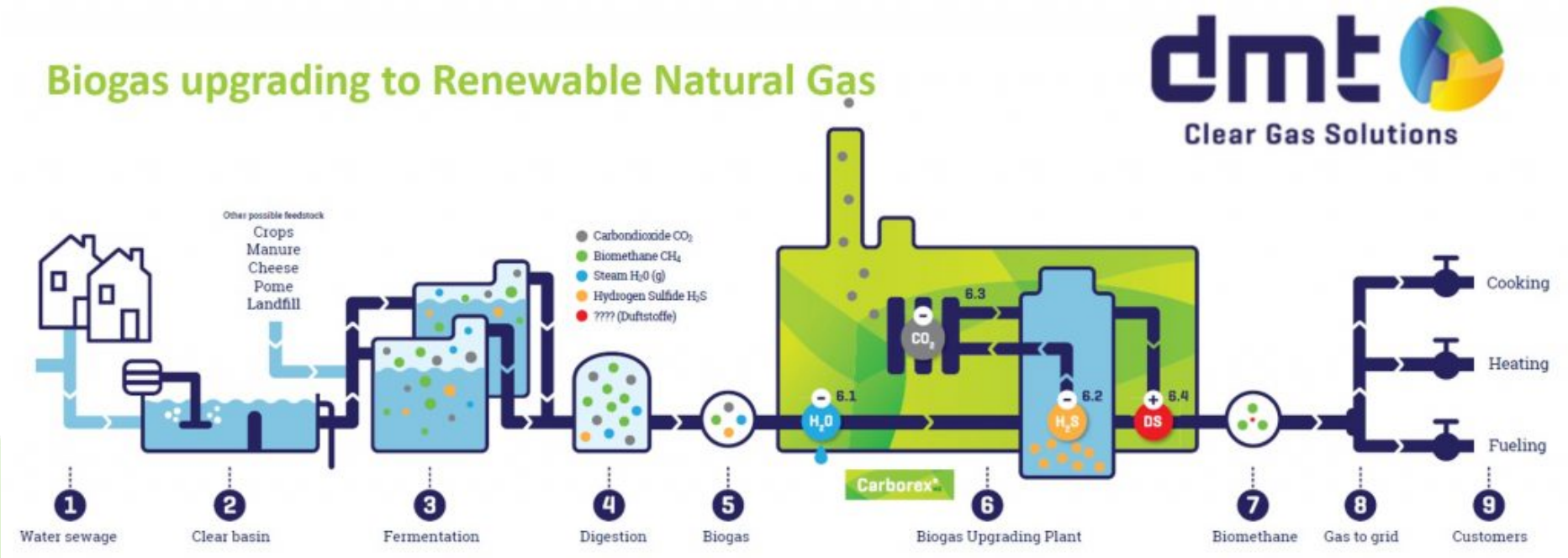
Fossil Fuels

Water, Wind, Solar



Biomass, Energy Crops

Biogas Upgrading



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

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

Actual Production

	Therms Produced	BTU's	Energy Equiv (barrels)
FEB	31,062	3,106,200,000	535 eliminated
MAR	53,743	5,374,300,000	926 eliminated

Total Cost to Build	Electrical Use	Op Cost (Elec+AC)
~$3.2M	1.2kWh/ therm	~$0.45/ therm

Mahalo

HAWAI'I GAS
THE CLEAN ENERGY COMPANY

GOOD ENERGY WITH HAWAI'I GAS