



March 31, 2020

VIA ELECTRONIC FILING

The Honorable Chair and Members of
the Hawaii Public Utilities Commission
465 South King Street
Kekuanoa Building, Room 103
Honolulu, Hawaii 96813

Re: Hawaii Revised Statutes (HRS) § 269-45, Gas Utility Companies Renewable Energy Report

To the Honorable Public Utilities Commission of the State of Hawaii:

In accordance with HRS § 269-45, The Gas Company, LLC, doing business as Hawaii Gas, hereby files its Annual Renewable Energy Report for 2019. Portions of the report have been redacted in accordance with HRS § 269-45(a).¹

Sincerely,

Alicia Moy
President & CEO
Hawaii Gas

¹ HRS § 269-45(a) states in part, "Due to the proprietary nature of the information required by paragraphs (3) and (4), that information shall be held in confidence by the commission; provided that any information obtained by the commission under this section, including confidential information, shall be made available to the department of business, economic development, and tourism or its authorized representative, which shall safeguard the confidentiality of that information."

Hawaii Gas

2019 Renewable Energy Report

Overview

The Gas Company, LLC, doing business as Hawaii Gas (Hawaii Gas), has prepared this Annual Renewable Energy Report for the Hawaii Public Utilities Commission (PUC) in accordance with Hawaii Revised Statutes (HRS) § 269-45.

Hawaii Gas' utility gas operations consist of the purchase, production, transmission, distribution, and sale of utility gas, which includes synthetic natural gas (SNG), renewable natural gas (RNG), propane, and liquefied natural gas (LNG), which are clean-burning fuels that produce significantly lower levels of carbon emissions than other hydrocarbon fuels, such as oil and coal. Hawaii Gas provides a safe, reliable, and economical source of energy to approximately 70,000 residential and commercial customers throughout the State, with almost half of those customers served by the utility system on Oahu.

SNG is produced using naphtha, a byproduct or waste of the existing oil refining process in Hawaii, steam, water and hydrogen (in large part from recycled wastewater). The production process is approximately 85% efficient, whereas electricity generation from oil-derived fuels is approximately 32% efficient. As a result, natural gas delivers nearly three times more energy to the end-user per barrel of oil as compared to electricity produced from oil. In 2019, an additional 905,837¹ barrels of oil were avoided by the fact that Hawaii Gas customers on Oahu used gas energy instead of electricity, which is predominately sourced from oil. This amounts to a savings of \$72,542,492 based on an average cost of \$80.08 per barrel of low sulfur fuel oil.²

Current Non-Petroleum Resources

Hawaii Gas produces SNG using mainly a blend of liquid naphtha, steam, water and hydrogen gas, along with other gas feedstocks. Previously, Hawaii Gas' Renewable Energy Report focused on the thermal percentage of SNG output from *renewable* hydrogen excluding some of the non-petroleum feedstocks. This would have accounted for 4.27% in 2019 using the older methodology.

With the addition of RNG from the Honouliuli Wastewater Treatment Plant (WWTP) Project and its related effect on feedstock supplies, Hawaii Gas conducted further analysis of our

¹ See Attachment 1.

² Id.

feedstock accounting process and determined that *all* non-petroleum feedstocks should be included in this report.

Hawaii Gas' non-petroleum feedstocks include not only the hydrogen made from recycled water at the Honouliuli WWTP, and RNG from the Honouliuli WWTP Biogas Project, but also the water and a portion of the carbon monoxide used to produce SNG at the SNG Plant. Under a revised methodology looking at total non-petroleum feedstocks, in 2019, total non-petroleum feedstocks accounted for 11.4% of the total feedstock used to produce SNG and RNG, based on a thermal ratio.

Since water does not have thermal heat content, it should also be noted that non-petroleum feedstocks, based on a molar ratio, accounted for 44% of the total feedstock used to produce SNG and RNG³. For a more thorough explanation of the methodology behind this assessment, please see Attachment 2.

About Renewable Natural Gas

Hawaii Gas is committed to using as much renewable gas in our pipelines as possible, and we continue to do our part to meet Hawaii's 2045 carbon neutrality goal, together, in an affordable, resilient, and sustainable way for our ratepayers and Hawaii's communities. RNG is chemically equivalent to natural gas and is produced by purifying raw biogas to obtain a methane content of at least 96%. Today, raw biogas is produced at several landfills and wastewater treatment plants in Hawaii through the breakdown of organic matter by microorganisms. The resulting biogas contains approximately 60% methane and 40% carbon dioxide. According to the Argonne National Laboratory GREET model, RNG made from organic materials is carbon-neutral to carbon-negative.

In December 2018, Hawaii Gas commissioned the Honouliuli WWTP Biogas Project, in partnership with the City and County of Honolulu, which allows Hawaii Gas to purchase raw biogas and upgrade it to pipeline quality RNG for direct injection into Hawaii Gas' utility pipeline system. Approximately 800,000 therms per year of RNG is expected to be supplied to Hawaii Gas' pipeline through this project, although actual amounts depend on availability of supply from the City and County of Honolulu, and potential interruptions due to maintenance or emergency conditions, such as the current pandemic. The Honouliuli WWTP Biogas Project was awarded American Biogas Council's 2019 Project of the Year. During its first year ramping up operations, Hawaii Gas produced 381,529 therms of RNG from the Honouliuli WWTP.

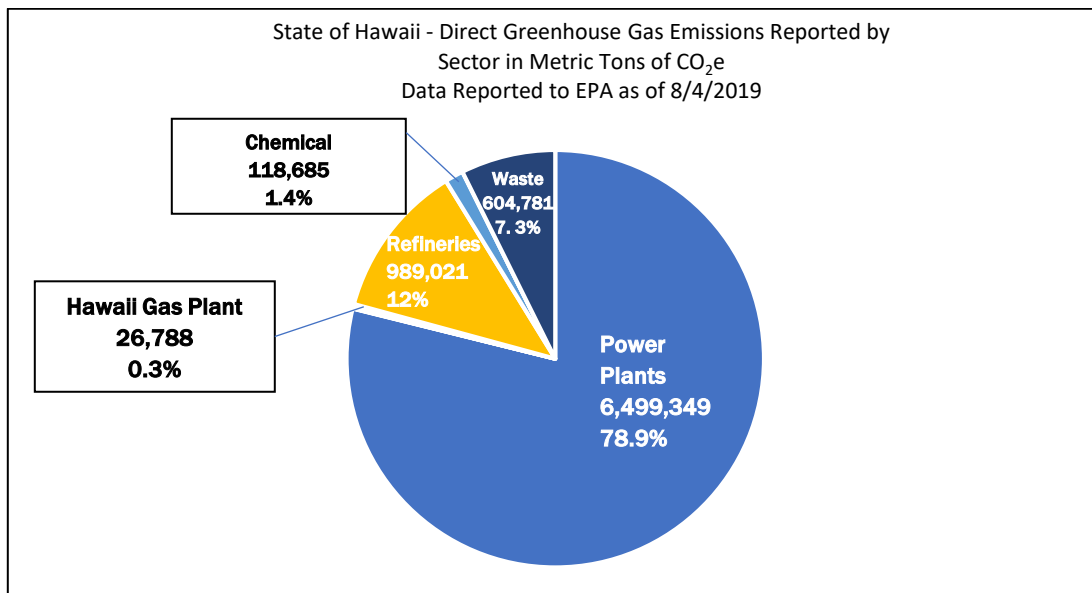
³ See Attachment 1

Hawaii Gas continues to work with various partners, including the City and County of Honolulu, to evaluate other biogas resources, which could contribute additional RNG to Hawaii Gas' fuel mix. However, while some incremental improvements in biogas production technology have been made, these resources are generally not scalable due to capacity limits. That's why Hawaii Gas is strongly supportive of a study regarding renewable gas to determine availability, feasibility, and costs of the use of renewable gas by gas utility companies.

In addition to biogas from landfills and WWTPs, Hawaii Gas continues to assess the use of energy crops to produce biogas, which is the only RNG feedstock source that is potentially scalable. To minimize the cost of producing biogas from energy crops, it is key to select an energy crop that: 1) maximizes energy production per acre of land; 2) minimizes water requirements; and 3) utilizes the most efficient pre-treatment, digester, and purification technology available. In 2019, Hawaii Gas continued to conduct scientific and market studies to research the viability of energy crops coupled with advanced treatment and anaerobic digestion technology.

About Greenhouse Gases

Hawaii Gas captures the majority of the CO₂ produced from the SNG production process and sells it to a third party that manufactures locally produced carbonated beverages, dry ice, and cement and concrete products. For 2018, Greenhouse Gas Emissions data from the Environmental Protection Agency's website illustrates that Hawaii Gas' SNG Plant accounts for roughly one-third of one percent of greenhouse gases emitted in Hawaii⁴:



⁴ Source: EPA's Facility Level Information on Greenhouse Gases as of 8/4/19. <https://ghgdata.epa.gov/ghgp/main.do>

Key Accomplishments

- In 2019, Hawaii Gas produced 381,529 therms of RNG from the Honouliuli WWTP Project.
- Honouliuli WWTP RNG project was awarded American Biogas Council's 2019 Project of the Year.
- In 2019, Hawaii Gas continued and narrowed discussions with potential RNG producers in response to its July 2018 request for proposals (RFP).
- In 2019, Hawaii Gas continued to conduct scientific and market studies to research the viability of energy crops coupled with advanced treatment and anaerobic digestion technology.

Summary

Hawaii Gas continues to aggressively pursue cost-effective renewable energy projects to reduce its own reliance on imported oil. A key priority for Hawaii Gas continues to be diversification of its fuel supplies into clean and renewable fuels. Hawaii Gas plays a vital role in Hawaii's energy portfolio by providing clean and cost-effective energy to commercial and residential customers. We are committed to Hawaii's clean energy goals, and will continue to look toward new, innovative, and economic ways to incorporate renewable energy sources and support the State's renewable energy future, while also reducing greenhouse gas emissions and aiding in waste diversion.

Attachment 1: Renewable Energy Report Summary for Renewable Non-Petroleum Feedstocks (using New Methodology)

Confidential - Pursuant to HRS § 269-45(a)

2019 Annual Report to the Hawaii Public Utilities Commission		
Date:	Feb-20	
2019 Renewable Energy Production Report to the Public Utilities Commission		
For the production of natural gas, biogas, biofuels, or biofeedstocks for use by the State gas utility		Barrel of Oil Equivalent (BOE)
		(5,446,140 BTU/bbl)
Percentage of total feedstock comprised of petroleum feedstock	55.77%	
Percentage of total feedstock comprised of non-petroleum feedstock ¹	44.23%	
The energy quantity in therms produced from petroleum feedstock Annual Therms		
The energy quantity in therms produced from non-petroleum feedstock Annual Therms ²		
The energy quantity in therms produced from Honouliuli WWTP Annual Therms ²		
Total		
Barrels of imported oil saved by using SNG instead of electricity ³		905,837
	\$ / barrel	
Dollars saved on imported oil for the Hawaiian economy	\$80.08	\$72,542,492
For every 1 (one) barrel of therm equivalent SNG, it would require 2.813 barrels of oil for generator fuel		
As an example for heating water, if electrical cost would be \$100, the SNG cost would be \$35.54 (higher conversion efficiency).		
Footnote		
¹	Moles of non-petroleum feedstock / total moles petroleum and non-petroleum feedstock	
²	RNG produced at Honouliuli WWTP + Hydrogen produced in the reformer and water shift reactor from Water.	
³	Calculated from plant conversion efficiencies with hot water production	

CONFIDENTIAL
Pursuant to HRS § 269-45(a)

Attachment 2: Methodology Description

Hawaii Gas notes that the Renewable Energy Report format as provided under HRS § 269-45, follows a methodology common for electric utility direct combustion, and heat rate power production applications, which are different than the unique chemical conversions of liquids, gases and catalytic chemical processes, used to produce SNG.

The non-petroleum feedstock calculations for the SNG Plant focused on the chemical reactions associated with the gasification, hydrogen reformer, and shift converter processes used to produce SNG. As provided in this report, the non-petroleum feedstocks used to produce SNG as part of these processes are water, hydrogen (portion), and carbon monoxide (portion). The portion of the hydrogen that is non-petroleum based is made from recycled water. The portion of the carbon monoxide that is non-petroleum based is made from recycled water in the reformer.