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DEPT. COMM. NO. 457

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COMMISSIONER
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PUBLIC UTILITIES COMMISSION
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April 19, 2021

The Honorable Ronald D. Kouchi,
President and Members of the Senate
Thirty-First State Legislature
State Capitol, Room 409
Honolulu, Hawaii 96813

The Honorable Scott K. Saiki, Speaker
and Members of the House of
Representatives
Thirty-First State Legislature
State Capitol, Room 431
Honolulu, Hawaii 96813

Dear President Kouchi, Speaker Saiki, and Members of the Legislature:

For your information and consideration, I am transmitting a copy of the **Hawaii Gas 2020 Renewable Energy Report as required by HRS §269-45**. In accordance with Section 93-16, Hawaii Revised Statutes, I am also informing you that the report may be viewed electronically at <https://puc.hawaii.gov/reports/energy-reports>.

Sincerely,

A handwritten signature in black ink, appearing to read "James P. Griffin".

James P. Griffin, Ph.D.
Chair

Enclosures



March 31, 2021

Via E-Filing

The Honorable Chair and Members of
the Public Utilities Commission of the State of Hawaii
465 South King Street
Kekuanao'a 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, dba Hawaii Gas hereby submits its Annual Renewable Energy Report for 2020. Portions of this report have been redacted in accordance with HRS § 269-45(a).¹

Sincerely,

/s/ Jacob Matson

Jacob L. Matson
Assistant General Counsel, Regulatory & Litigation
The Gas Company, LLC, dba Hawaii Gas

cc: Office of the Consumer Advocate

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

2020 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 during combustion 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. 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 2020, an additional 720,595¹ 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 savings of \$43,271,750 based on an average cost of \$60.05 per barrel of 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. Since 2000, approximately 50% of the hydrogen used to produce SNG has been from recycled water from the Honouliuli Wastewater Treatment Plant. Recycled water is combined with methane and other gases to produce hydrogen and additional methane in Hawaii Gas' utility processes. In 2020, the non-petroleum feedstock portion, based upon molar calculations, was 52.15% of the total feedstock used to produce SNG and RNG.³

¹ See Attachment 1.

² Id.

³ Id.

About Renewable Natural Gas

Hawaii Gas is committed to integrating as much cost-effective RNG and zero carbon hydrogen into its fuel supply mix as possible, and to do its part to help meet Hawaii's goal of carbon neutrality by 2045, in an affordable, resilient, and sustainable way for our customers and Hawaii's communities. RNG is chemically equivalent to natural gas and is produced by capturing and purifying previously flared raw biogas to obtain a methane content of at least 96.4%. Today, raw biogas is produced at several landfills and wastewater treatment plants (WWTPs) in Hawaii through the anaerobic 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 & 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. The Honouliuli WWTP Biogas Project was awarded the American Biogas Council's 2019 Project of the Year. In 2020, Hawaii Gas upgraded 421,164 therms of biogas to biomethane from the Honouliuli WWTP Biogas Project, despite the impact of the COVID-19 pandemic on overall utility demand and biogas production.

Hawaii Gas is still considering additional potential partnerships with the City & County of Honolulu for 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 feedstock limits. This is 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 biomethane, which are the only RNG feedstock sources that are potentially scalable in Hawaii. To minimize the cost of producing biomethane 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 2020, Hawaii Gas continued to collect scientific and market data through confidential agreements to assess the viability of energy crops projects coupled with advanced treatment and anaerobic digestion technology.

Key Accomplishments

- In 2020, Hawaii Gas upgraded 421,164 therms from biogas to biomethane (RNG).
- In 2020, Hawaii Gas continued to work with RNG developers who conduct scientific and market studies to research the viability of energy crops projects coupled with advanced treatment and anaerobic digestion technology.
- In 2020, Hawaii Gas evaluated the potential solutions and responses to the capture and upgrading of biogas flared at Waimanalo Gulch Landfill and Sand Island WWTP, should an RFP be issued for these two facilities.

Calculations

In 2020, the Honouliuli WWTP Biogas Project represented around 2% of Hawaii Gas' total feedstock, produced 421,164 therms, and was 100% non-petroleum. With the inclusion of Honouliuli, the total supply molar ratio of non-petroleum feedstock in 2020 was 52.15%, and the total supply molar ratio of petroleum feedstock was 47.85%.

With the inclusion of Honouliuli, the total energy quantity of non-petroleum feedstock in 2020 was [REDACTED] therms, and the total energy quantity of petroleum feedstock was [REDACTED] therms.

Hawaii Gas retained a third-party to perform and validate the mole percentage calculations provided in this report. The methodology consists in balancing three reactions (gasification, hydrogen reformer, shift converter). In the production of SNG and hydrogen, which are components in Hawaii Gas' final SNG stream, naphtha petroleum feedstock and water from a renewable source are used in the production. As such, the analysis focuses on three elements (C, H, O) and calculates the proportions for each reactant in feedstock (in mole).

For this report, Hawaii Gas used the same material (molar) balances and followed the same methodology used in its 2019 Renewable Energy Report, with modifications to input volumes and compositions to match the 2020 values.

Summary

Hawaii Gas continues to aggressively pursue cost-effective local renewable energy projects to reduce Hawaii's reliance on imported oil. A key priority for Hawaii Gas continues to be integrating as much cost-effective RNG and zero carbon hydrogen into its fuel supply mix as possible, in an affordable, resilient, and sustainable way for our customers and Hawaii's communities. 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 and carbon neutrality goals, and will continue to look toward new,

Hawaii Gas
2020 Renewable Energy Report

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

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

THE GAS COMPANY	
The Gas Company, LLC	
Suite 1800	
745 Fort Street	
Honolulu, Hawaii 96813	
Date:	Feb 2021
2020 Renewable Energy Production Report to the Public Utilities Commission	
Mole Percentage of total feedstock used to produce natural gas, biogas, biofuels, or biofeedstocks for use by the gas utility in the State that is comprised of petroleum feedstock	47.85%
Feedstock used comprised of petroleum feedstock	
Mole Percentage of total feedstock used to produce natural gas, biogas, biofuels, or biofeedstocks for use by the gas utility in the State that is comprised of non- petroleum feedstock	52.15%
Feedstock used comprised of non-petroleum feedstock ¹	
The energy quantity in therms of natural gas, biogas, or gallons of biofuels, or biofeedstocks produced from petroleum feedstock for use by the gas utility within the State	██████████ Annual Therms
The energy quantity in therms of natural gas, biogas, or gallons of biofuels, or biofeedstocks produced from non-petroleum feedstock for use by the gas utility within the State	██████████ Annual Therms ²
720,595	Barrels of Oil saved by using SNG instead of electricity ³
\$ 60.05	2020 Avg Cost per Barrel Oil
\$ 43,271,750	Savings
Footnote	¹ Plant basis (HHV) - R-hydrogen therm / Plant Feedstock therm
	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

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.

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COMMISSION

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