



HAWAII GAS
THE CLEAN ENERGY COMPANY

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PUBLIC UTILITIES
COMMISSION

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HAND DELIVER

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 2017. Portions of the
report have been redacted in accordance with HRS § 269-45(a).¹

Sincerely,

Lori Y. Sun
Associate General Counsel
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

2017 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), liquefied natural gas (LNG), propane, and by the end of 2018, renewable natural gas (RNG). SNG, LNG, propane, and RNG, are clean-burning fuels that produce significantly lower levels of carbon emissions than other hydrocarbon fuels, such as oil and coal. Utility 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 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 2017, an additional 878,826¹ 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 \$49,477,897 based on an average cost of \$56.30 per barrel of low sulfur fuel oil.²

Current Non-Fossil Fuel Resources

Hawaii Gas produces SNG using a blend of naphtha and hydrogen, along with other 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 2017, hydrogen produced from reclaimed water accounted for 3.0% of the total feedstock used to produce SNG.³

¹ See Attachment 1.

² *Id.*

³ *Id.*

In addition, 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 and dry ice.

About Renewable Natural Gas

Hawaii Gas is committed to increasing the use of RNG in Hawaii. 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 (WWTPs) 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 September 2017, Hawaii Gas received approval from the PUC to proceed with the Honouliuli WWTP Biogas Project, 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.

In addition, Hawaii Gas is currently working with the City and County of Honolulu to evaluate additional 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. Even if Hawaii Gas had access to all the biogas produced at landfills and WWTPs on Oahu, Hawaii Gas still would only be able to displace a small portion of utility gas demand with RNG.

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 2017, Hawaii Gas conducted scientific and market studies to research the viability of energy crops coupled with advanced treatment and anaerobic digestion technology. Hawaii Gas continues to assess different varieties of energy crops and new and innovative pre-treatment and digester technologies to identify the best approach for scalable and reasonably feasible RNG production in Hawaii.

Key Accomplishments

- In September 2017, the PUC approved the Honouliuli WWTP Biogas Project. In December 2017, Hawaii Gas completed the Environmental Assessment and submitted it to the City and County of Honolulu for approval, publication, and comments. In January 2018, the Hawaii Department of Health issued the air permit for the project.
- In 2017, Hawaii Gas conducted 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
 Confidential - Pursuant to HRS § 269-45(a)

Annual Report to the Hawaii Public Utilities Commission		
Date:	February 2018	
2017 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	97.0%	
Percentage of total feedstock comprised of non-petroleum feedstock ^{1&2}	3.0%	
The energy quantity in therms produced from petroleum feedstock Annual Therms		
The energy quantity in therms produced from non-petroleum feedstock Annual Therms ²		
Total		
Barrels of imported oil saved by using SNG instead of electricity ³		878,826
	\$ / barrel	
Dollars saved on imported oil for the Hawaiian economy ⁴	\$56.30	\$49,477,897
For every 1 (one) barrel of therm equivalent SNG, it would require 2.813 barrels of oil for generator fuel . ⁵		
As an example for heating water, if electrical cost would be \$100, the SNG cost would be \$35.54 (higher conversion efficiency).		
Footnote		
¹	Hydrogen produced in the reformer and water shift reactor from Reclaimed Wastewater. Therms based off feedstock flow.	
²	Plant stoichiometric basis (HHV) - R-hydrogen therm / Plant Feedstock therm - Use of recycled water from Honouliuli Wastewater Treatment Plant	
³	Calculated from plant conversion efficiencies with hot water production.	
⁴	Average \$56.30/LSFO barrel (\$10.34/MMBTU) from HECO Monthly reports Jan thru Dec 2017.	
⁵	For every Barrel Therm Equivalent of SNG produced there is a savings of 1.728 Barrels of Oil saved (54.4614 therms / barrel).	

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 Pursuant to HRS § 269-45(a)