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PUBLIC UTILITIES
COMMISSION

March 29, 2019

HAND DELIVER

The Honorable Chair and Members of
the Hawaii Public Utilities Commission
465 South King Street
Kekuaonoa 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 2018. 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

2018 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), liquefied natural gas (LNG), and propane. SNG, RNG, LNG, and propane, 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 2018, an additional 878,953¹ 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 \$72,411,745 based on an average cost of \$82.38 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

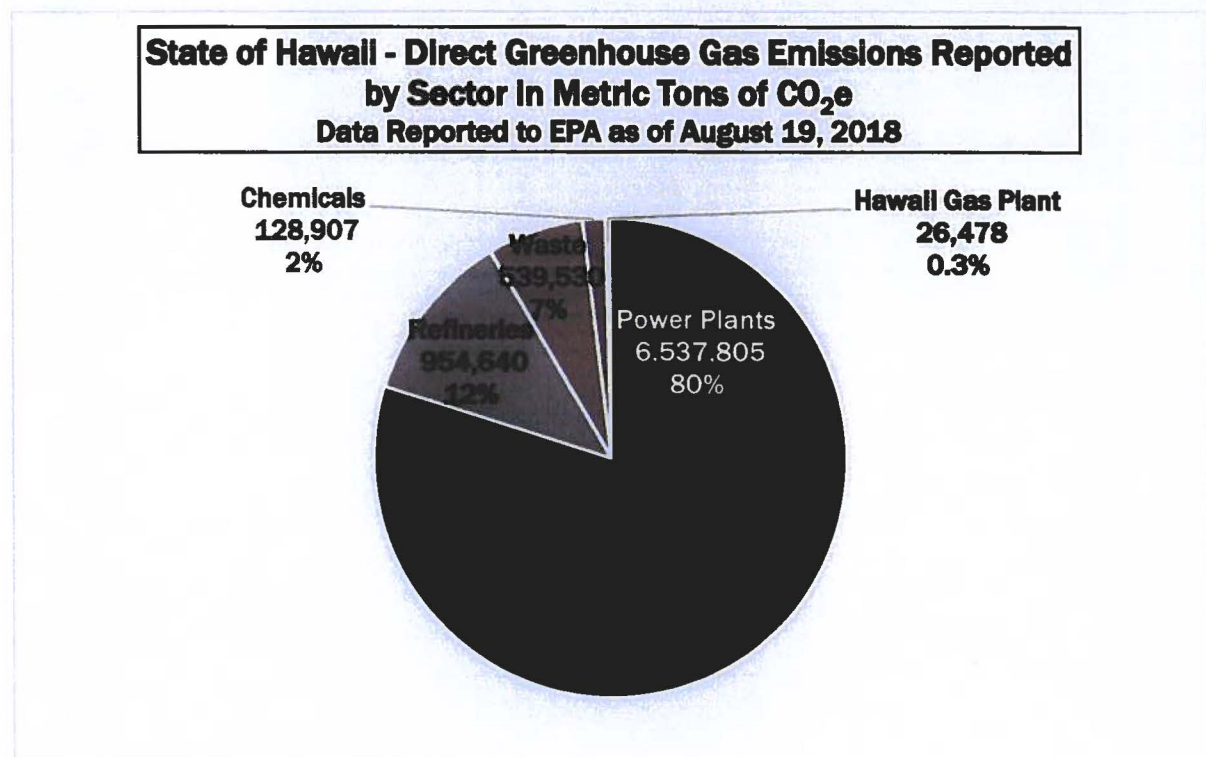
¹ See Attachment 1.

² Id.

Hawaii Gas' utility processes. In 2018, hydrogen produced from reclaimed water accounted for 3.04% of the total feedstock used to produce SNG.³

In addition, Hawaii Gas captures the majority of the CO₂ produced from the SNG production process and sells it to a third-party for manufacture of locally produced carbonated beverages, dry ice, and future cement use.

2017 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 gas emitted in Hawaii:⁴



About Renewable Natural Gas (RNG)

Hawaii Gas is committed to increasing the use of RNG in Hawaii. RNG is chemically equivalent to natural gas, but it is produced from renewable sources. RNG is produced by

³ Id.

⁴ Source: EPA's Facility Level Information on Greenhouse Gases as of 8/19/18. <https://ghgdata.epa.gov/ghgp/main.do>

purifying raw biogas to obtain a methane content of at least 96%. In Hawaii, raw biogas is produced at several landfills and wastewater treatment plants (WWTPs) 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 December 2018, Hawaii Gas commissioned the project which is now producing RNG from raw biogas and injecting the RNG into the utility pipeline system.

Hawaii Gas is also currently working 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. Even so, it is worthwhile to pursue access to all biogas currently being unused at landfills and WWTPs on Oahu. Customers prefer gas because of its affordability, reliability and efficiency. Maximizing RNG production allows customers the option to use renewable fuel without the added cost of changing out their favored gas appliances.

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 2018, Hawaii Gas continued to conduct scientific and market studies to research the viability of energy crops coupled with advanced treatment and anaerobic digestion technology. Hawaii Gas made initial contact with landowners who are willing to test the crop with the first planting anticipated for 2019. 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 December 2018, Hawaii Gas commissioned the Honouliuli WWTP Biogas Project which is producing RNG from raw biogas for use by utility customers on Oahu.
- In July 2018, Hawaii Gas issued a request for proposals (RFP) to purchase RNG as a way to continue to diversify its fuel supply and support the state's clean energy goals. The RFP seeks 80,000 therms of raw biogas and/or biomethane per day from both local and national suppliers. Hawaii Gas is currently reviewing the responses of the RFP finalists.
- In 2018, Hawaii Gas continued to conduct scientific and market studies to research the viability of energy crops coupled with advanced treatment and anaerobic digestion technology. Hawaii Gas made initial contact with landowners who are willing to test the crop with the first planting anticipated for 2019.
- In 2018, Hawaii Gas made advances in the study of hydrogen as a fuel, including the submission of an application for inclusion in a U.S. Department of Energy pilot program researching the use of Fibre-Reinforced Polymer (FRP) spoolable line pipe to both deliver and store hydrogen at pressures up to 2500 psi. Participants to be announced in 2019.

Summary

Hawaii Gas is committed to continuing to pursue initiatives that curb Hawaii Gas' already low greenhouse gas emissions profile. In addition, Hawaii Gas is focused on the development of affordable, resilient and sustainable pathways to achieve carbon neutrality by 2045. 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. Hawaii Gas remains 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 to close the carbon loop.

Attachment 1: Renewable Energy Report Summary
Confidential - Pursuant to HRS § 269-45(a)

Annual Report to the Hawaii Public Utilities Commission			
Date:	Mar-19		
2018 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)
			(5,445,140 BTU/bbl)
Percentage of total feedstock comprised of petroleum feedstock	96.96%		
Percentage of total feedstock comprised of non-petroleum feedstock ^{1&2}	3.04%		
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 ³			
Total			
Barrels of imported oil saved by using SNG instead of electricity ⁴		878,953	
	\$ / barrel		
Dollars saved on imported oil for the Hawaiian economy ⁵	\$82.38	\$72,411,745	
For every 1 (one) barrel of therm equivalent SNG, it would require 2.813 barrels of oil for generator fuel. ⁶			
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 December's 2018 RNG production at Honouliuli WWTP - Plant started Partial month			
⁴ Calculated from plant conversion efficiencies with hot water production.			
⁵ DBEDT Monthly Energy Data - missing Oct, Nov and Dec data. http://dbedt.hawaii.gov/economic/energy-trends-2/			
⁶ For every Barrel Therm Equivalent of SNG produced there is a savings of 1.728 Barrels of Oil saved (54.4614 therms / barrel).			

CONFIDENTIAL
Pursuant to HRS § 269-45(a)