The State of CHP: Hawaii

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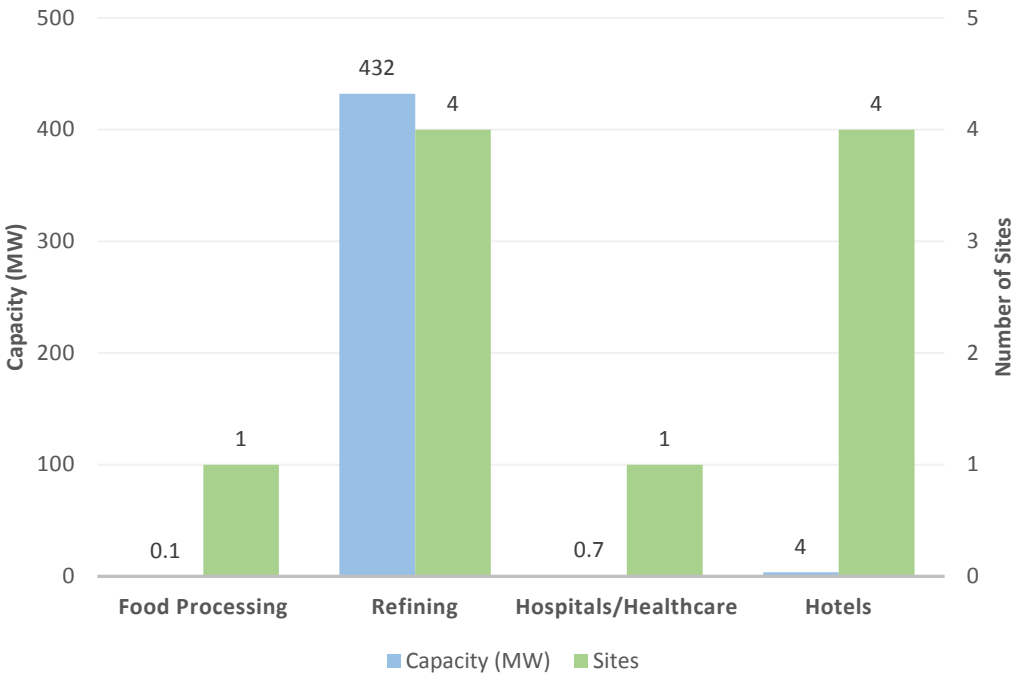
Hawaii Installed Base of CHP

U.S. DOE Combined Heat and Power Installation Database

Sector	*Installations*	*Capacity (MW)*
Industrial	5	432
Commercial/Institutional	5	4
Other	0	0
Total	**10**	**437**

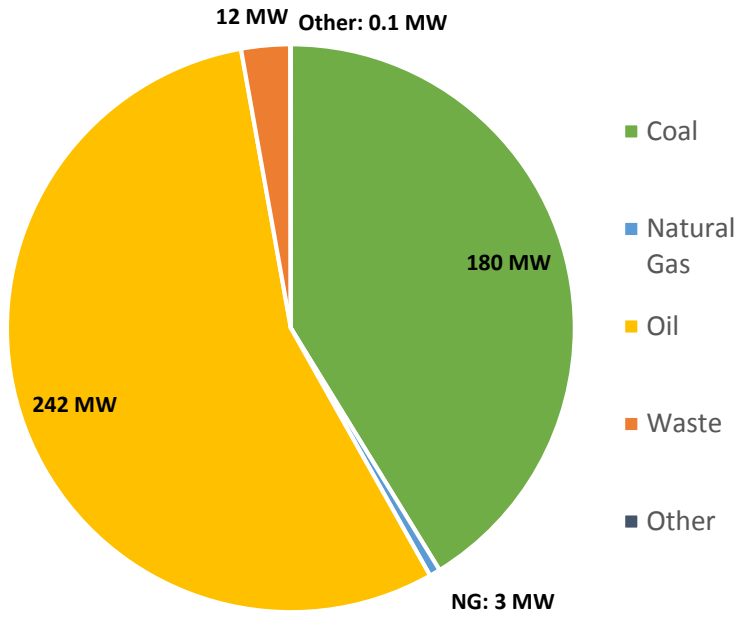
The Pacific CHP Technical Assistance Partnership has compiled information on certain illustrative CHP projects in Hawaii. You can access these by visiting the Department of Energy's CHP Project Profiles Database.

Hawaii CHP by Application



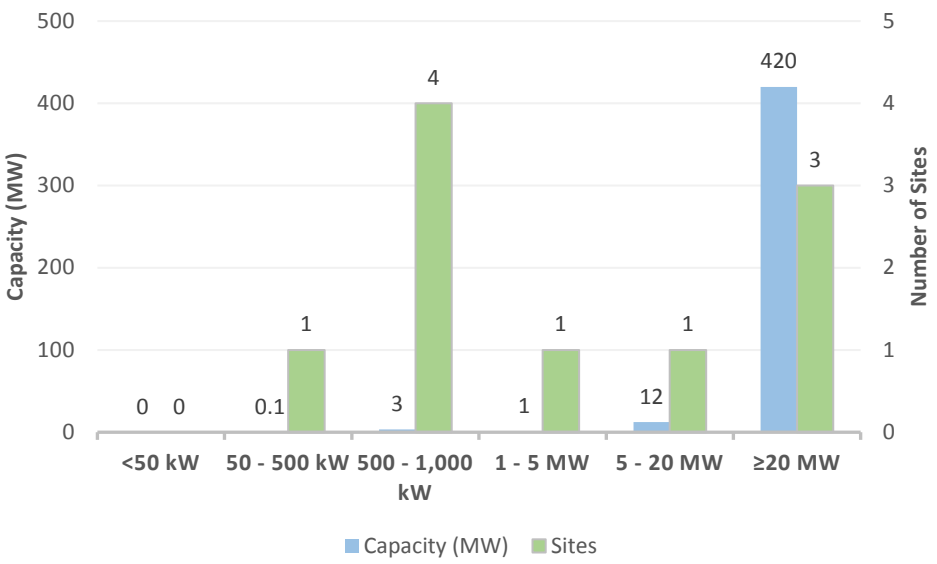
Source: DOE CHP Installation Database (U.S. installations as of Dec. 31, 2016)

Hawaii CHP Capacity (MW) by Fuel Type



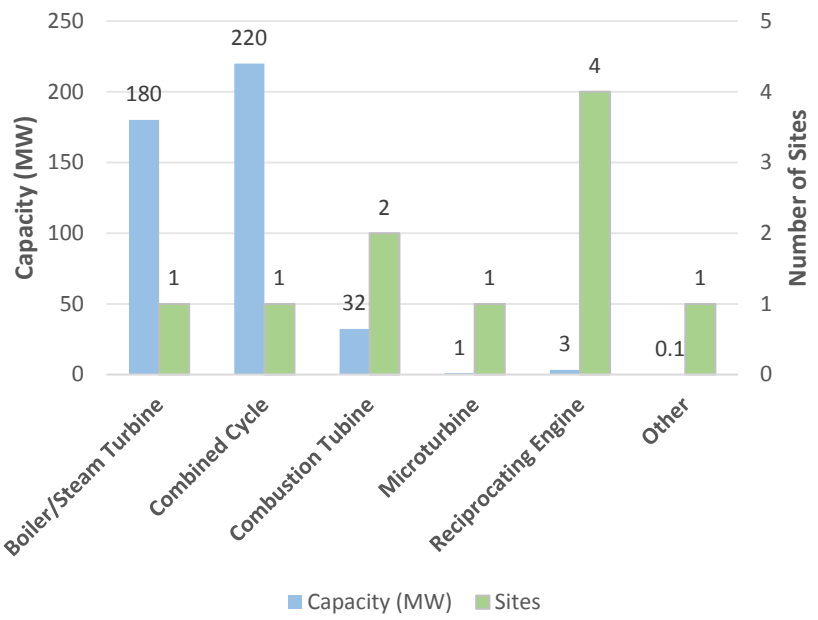
Source: DOE CHP Installation Database (U.S. installations as of Dec. 31, 2016)

Hawaii CHP by Size Range



Source: DOE CHP Installation Database (U.S. installations as of Dec. 31, 2016)

Hawaii CHP by Technology



Source: DOE CHP Installation Database (U.S. installations as of Dec. 31, 2016)

Combined Heat and Power (CHP) – sometimes referred to as cogeneration – is an efficient and clean approach to generating on-site electric power and useful thermal energy from a single fuel source.

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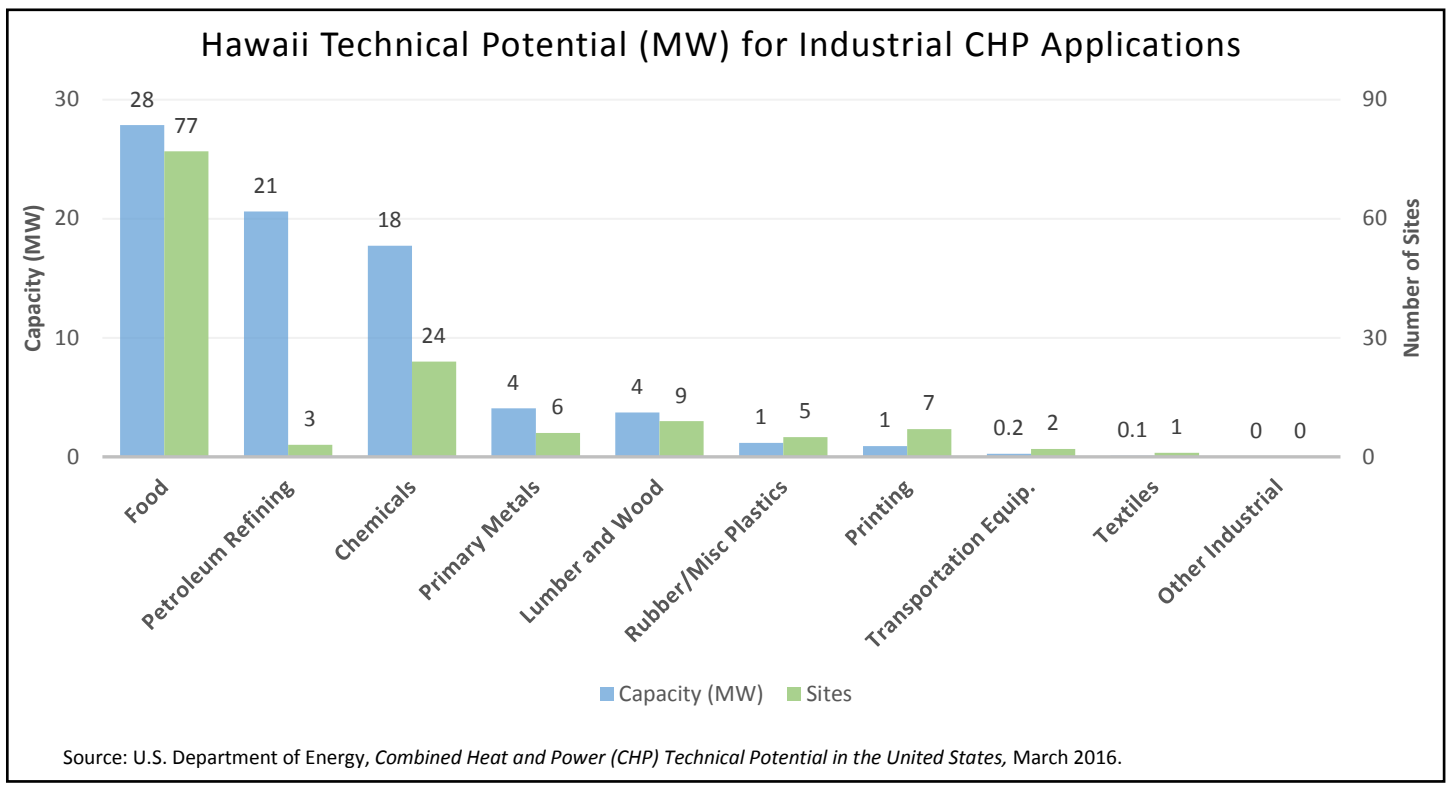
Hawaii Technical Potential for New CHP Installations

U.S. DOE Analysis: Combined Heat and Power (CHP) Technical Potential in the United States

Sector	*Potential Sites*	*Potential Capacity (MW)*
Industrial	134	76
Commercial/Institutional	1,158	486
Total	**1,292**	**563**

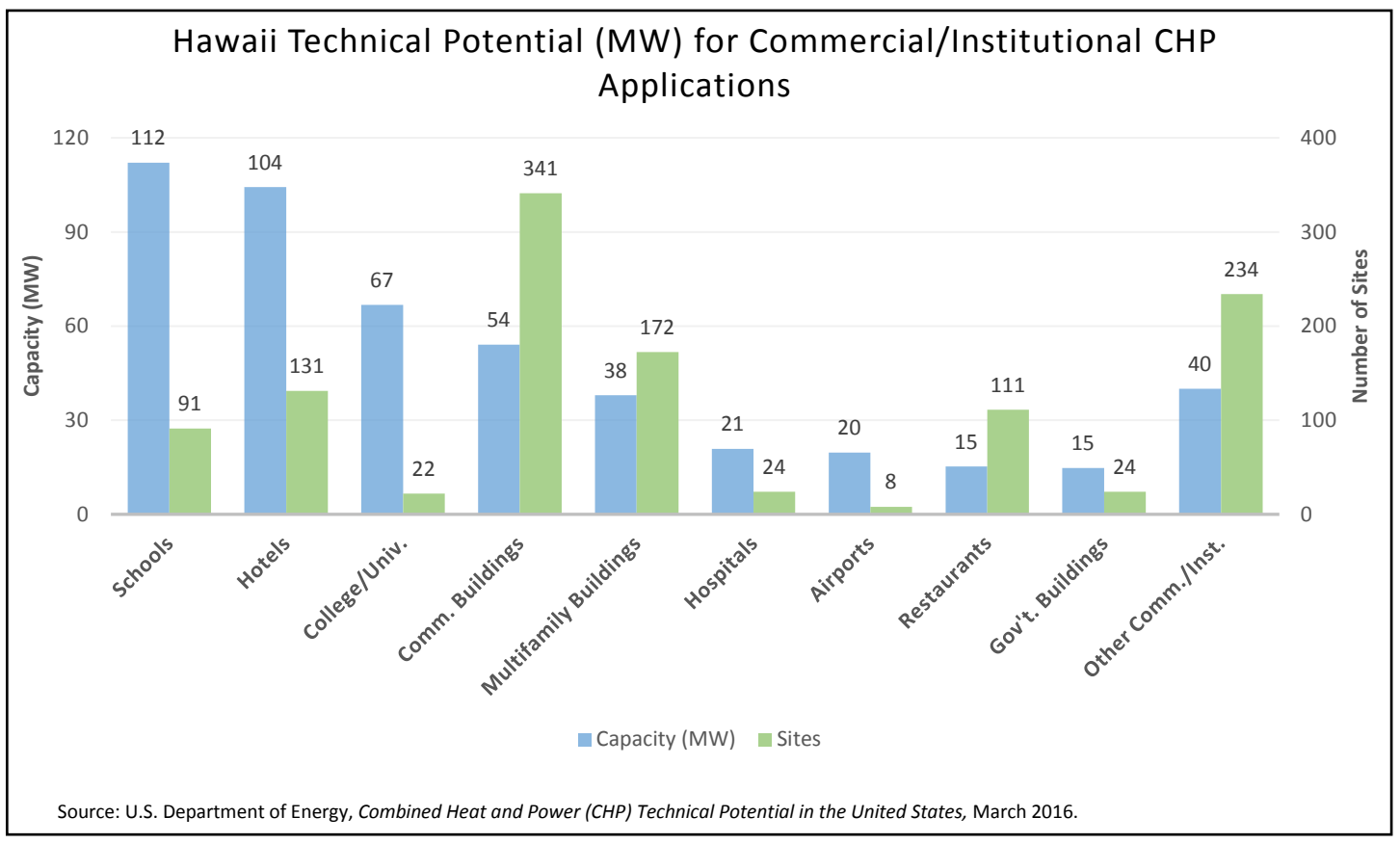


Source: U.S. Department of Energy, *Combined Heat and Power (CHP) Technical Potential in the United States,* March 2016.

Technical Potential by CHP Size Range for Top Five Industrial Sectors

	50-500 kW		0.5 - 1 MW		1 - 5 MW		5 - 20 MW		>20 MW		Total	
Application	**Sites**	**MW**	**Sites**	**MW**	**Sites**	**MW**	**Sites**	**MW**	**Sites**	**MW**	**Total Sites**	**Total MW**
Food	60	10	10	7	7	11	0	0	0	0	77	28
Chemicals	17	2	3	2	3	7	1	7	0	0	24	18
Petroleum Refining	0	0	0	0	2	7	1	13	0	0	3	21
Primary Metals	5	1	0	0	1	3	0	0	0	0	6	4
Lumber and Wood	7	1	0	0	2	2	0	0	0	0	9	4
Other Industrial	15	2	0	0	0	0	0	0	0	0	15	2
Total	104	17	13	9	15	30	2	20	0	0	134	76

Source: U.S. Department of Energy, *Combined Heat and Power (CHP) Technical Potential in the United States,* March 2016.



Source: U.S. Department of Energy, *Combined Heat and Power (CHP) Technical Potential in the United States,* March 2016.

Technical Potential by CHP Size Range for Top Five Commercial/Institutional Sectors

	50-500 kW		0.5 - 1 MW		1 - 5 MW		5 - 20 MW		>20 MW		Total	
Application	**Sites**	**MW**	**Sites**	**MW**	**Sites**	**MW**	**Sites**	**MW**	**Sites**	**MW**	**Total Sites**	**Total MW**
Schools	0	0	46	40	45	72	0	0	0	0	91	112
Hotels	77	12	23	15	29	62	2	15	0	0	131	104
College/Univ.	8	1	2	2	9	25	2	15	1	25	22	67
Commercial Buildings	246	12	76	30	19	11	0	0	0	0	341	54
Multifamily Buildings	122	9	44	22	7	7	0	0	0	0	172	38
Other Comm./Inst.	358	48	17	11	25	41	1	10	0	0	401	111
Total	811	83	208	120	134	219	5	40	1	25	1,158	486

Source: U.S. Department of Energy, *Combined Heat and Power (CHP) Technical Potential in the United States,* March 2016.

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Hawaii CHP Economics

The most important indicators for CHP economics are electricity and gas prices. For most potential CHP installations, natural gas and electricity rates for host facilities will fall within the range of average commercial and industrial prices. Lower energy prices may be possible for large CHP applications.

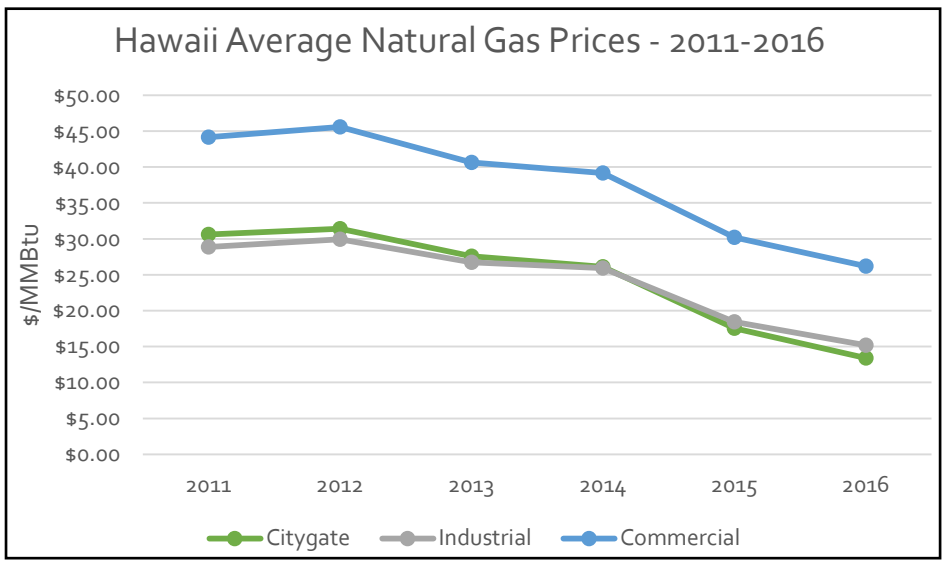
Hawaii Natural Gas Prices

Hawaii Average Gas Prices - 2016

Sector	*HI Price ($/MMBtu)*	*U.S. Price ($/MMBtu)*
Citygate*	13.40	3.75
Industrial	15.20	3.39
Commercial	26.21	7.22

Source: U.S. Energy Information Administration, "Natural Gas Prices", https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_SHI_a.htm

The EIA industrial natural gas price is a full tariff rate, and most large consumers are purchasing gas commodities from marketers at a lower rate.



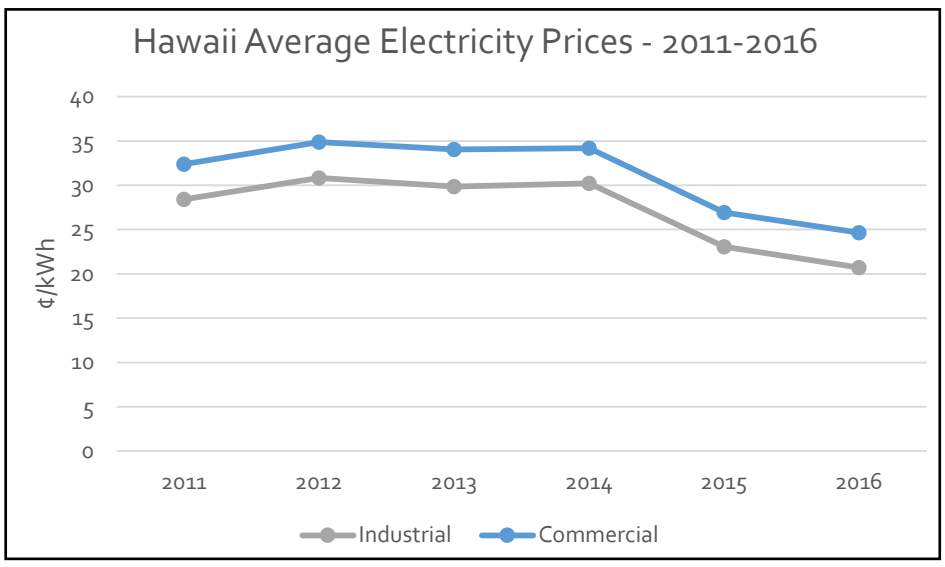
Hawaii Electricity Prices

Hawaii Average Electricity Prices - 2016

Sector	*HI Price (¢/kWh)*	*U.S. Price (¢/kWh)*
Industrial	20.70	6.75
Commercial	24.64	10.37

Source: U.S. Energy Information Administration, "Electricity Data Browser", https://www.eia.gov/electricity/data.cfm

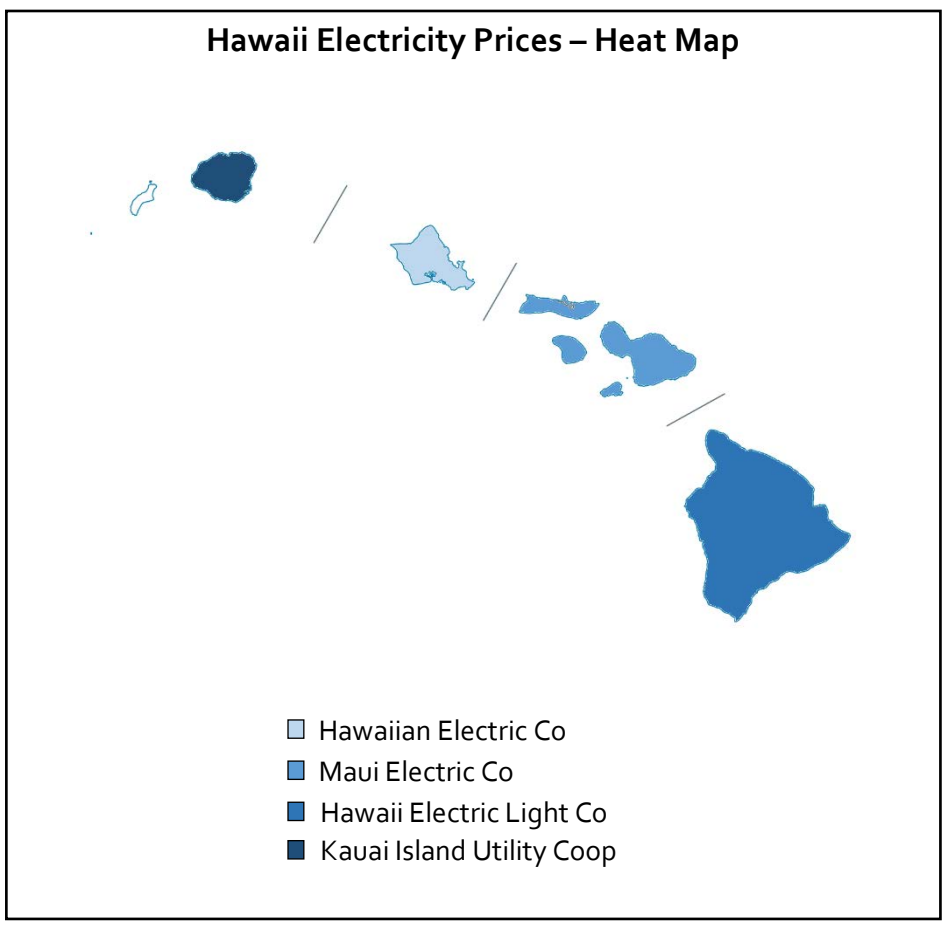
Electricity rates can vary greatly by utility and facility size range. The rates below from EIA represent general averages; individual facility rates may vary.



Hawaii Average Delivered Electricity Prices by Utility

Utility	*Industrial Price (¢/kWh)*	*Commercial Price (¢/kWh)*	*Average Price** (¢/kWh)*
Kauai Island Utility Coop	31.00	34.18	32.59
Hawaii Electric Light Co	27.65	32.80	30.23
Maui Electric Co	27.76	31.57	29.67
Hawaiian Electric Co	21.63	24.84	23.24

Source: U.S. Energy Information Administration, "Annual retail price of electricity by utility", https://www.eia.gov/electricity/data.cfm



*Citygate is a point or measuring station at which a distributing gas utility receives gas from a NG pipeline company or transmission system.

**Average of commercial and industrial electricity prices as reported by EIA.

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Installed CHP | CHP Technical Potential | CHP Economics | CHP Partners

Department of Energy CHP Partnerships

Pacific CHP Technical Assistance Partnership

U.S. Department of Energy
CHP Technical Assistance Partnerships
PACIFIC

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CHP for Resiliency Accelerator

The U.S. DOE is collaborating with a group of cities, states, and utilities who are actively pursuing CHP as a consideration in resiliency planning for critical infrastructure in their jurisdictions. This has included defining resiliency, identifying critical infrastructure, and assessing CHP opportunities. This process is being documented in a Resiliency Planning Tool. For more information: CHP for Resiliency Accelerator Website.

- Currently, there are no CHP for Resiliency Accelerator partners in Hawaii.

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