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Section 17

ENERGY AND SCIENCE

This section presents statistics on fuel resources, energy production and consumption, the electric and gas utility industries, research and development, and scientific, engineering, and technological resources. Related series are cited in Sections 12 (utility employment), 14 (prices), and 18 (gasoline consumption).

Information on energy and science can be obtained from reports and records of the U.S. Department of Energy; U.S. Patent and Trademark Office; U.S. Bureau of Labor Statistics; National Science Foundation; Hawaii State Department of Taxation; Hawaii State Department of Commerce and Consumer Affairs; Hawaii State Department of Business, Economic Development & Tourism, Hawaii State Energy Office; University of Hawaii, Institute of Astronomy; and individual utility companies. *Historical Statistics of Hawaii*, Section 19, presents data for earlier years.

Table 17.01-- CONSUMPTION OF ENERGY, BY SOURCE (PHYSICAL UNITS): 1992 TO 2023

Year	Coal (1,000 short tons)	Natural gas (billion cubic feet) 1/	Petroleum (1,000 barrels)	Hydroelectric power (million kWh) 2/	Fuel ethanol (1,000 barrels) 3/
1992	303	3	46,655	61	-
1993	691	3	41,392	56	-
1994	704	3	44,843	139	-
1995	895	3	43,842	98	-
1996	930	3	41,631	104	-
1997	933	3	39,829	115	-
1998	822	3	40,493	121	-
1999	801	3	39,662	115	-
2000	816	3	40,591	103	-
2001	829	3	41,479	101	-
2002	748	3	44,772	95	-
2003	784	3	46,861	91	-
2004	797	3	49,098	94	-
2005	740	3	51,267	96	344
2006	714	3	51,564	120	392
2007	764	3	52,905	92	501
2008	840	3	42,397	84	930
2009	791	3	42,472	113	1,065
2010	803	3	46,356	70	804
2011	783	3	47,367	93	933
2012	803	3	46,173	115	847
2013	753	3	46,470	78	874
2014	831	3	44,785	94	948
2015	747	3	45,635	121	1,147
2016	787	3	45,280	91	1,152
2017	759	3	47,091	66	1,162
2018	734	3	46,978	97	1,131
2019	717	3	47,435	95	1,158
2020	670	2	33,806	99	913
2021	634	3	40,205	115	1,042
2022	380	3	43,439	110	1,053
2023	-	3	45,279	93	1,069

1/ Includes supplemental gaseous fuels.

2/ Conventional hydroelectric power. Does not include pumped-storage hydroelectricity.

3/ Includes denaturant.

Source: U.S. Department of Energy, Energy Information Administration, State Energy Data System (SEDS) "State Energy Consumption Estimates, Selected Years, 1960-2020, Hawaii CT1" (June 2022) <https://www.eia.gov/state/seds/sep_use/notes/use_print.pdf> accessed June 30, 2022; and State Energy Data System (SEDS) <<https://www.eia.gov/state/seds/seds-data-fuel.php?sid=US>> accessed June 6, 2025.

Table 17.02-- CONSUMPTION OF ENERGY, BY SOURCE: 1985 TO 2023

[Trillion Btu]

Year	Total 1/	Fossil fuels			Renewable energy					Fossil fuels (as commingled)	
		Coal	Natural gas 3/	Petroleum	Hydro- electric power 4/	Biomass	Geo- thermal	Solar/PV 5/	Wind	Natural gas 3/ 6/	Motor gasoline 3/ 2/
1985	247.8	1.1	-	232.1	0.3	14.2	0.1	-	-	2.7	39.9
1990	320.7	0.7	-	292.8	0.3	25.9	(8/)	0.9	0.1	3.0	45.5
1995	294.3	19.9	-	252.3	0.3	19.8	0.8	1.2	0.1	2.9	49.0
2000	270.7	17.7	0.1	235.2	0.4	15.2	0.9	1.3	0.1	3.0	48.3
2005	322.6	16.5	0.2	293.8	0.3	9.6	0.8	1.3	(8/)	2.9	57.0
2006	7/ 324.5	16.1	0.2	295.5	0.4	7/ 10.0	0.7	1.4	0.3	2.9	59.8
2007	7/ 334.0	17.1	0.2	303.5	0.3	7/ 9.8	0.8	1.5	0.8	3.0	58.3
2008	7/ 272.8	18.1	0.1	239.1	0.3	12.0	0.8	1.7	0.8	2.8	54.5
2009	7/ 272.2	17.1	0.2	239.0	0.4	7/ 12.4	0.6	1.8	0.9	2.7	55.1
2010	293.8	17.1	0.2	7/ 262.1	0.2	7/ 10.6	0.7	1.9	0.9	2.7	50.6
2011	7/ 297.7	16.1	0.2	7/ 266.1	0.3	7/ 11.0	0.8	2.2	1.2	2.7	56.4
2012	7/ 290.7	16.6	0.2	7/ 258.7	0.4	10.0	0.9	2.7	1.3	2.8	53.6
2013	7/ 293.5	15.3	0.2	7/ 259.9	0.3	7/ 11.8	0.9	3.4	1.7	2.9	54.4
2014	7/ 285.4	17.2	0.2	7/ 249.6	0.3	7/ 11.3	0.9	4.0	2.0	2.8	54.8
2015	7/ 288.4	15.6	0.2	7/ 253.4	0.4	7/ 11.5	0.8	4.3	2.1	2.9	55.9
2016	7/ 289.1	16.4	0.2	7/ 251.4	0.3	7/ 12.8	0.9	4.9	2.2	3.0	56.7
2017	7/ 295.5	14.9	0.2	7/ 261.3	0.2	7/ 10.0	1.1	5.9	1.8	3.0	56.4
2018	7/ 294.2	14.4	0.2	7/ 260.8	0.3	7/ 10.0	0.4	6.2	2.1	3.2	55.4
2019	7/ 296.6	14.2	0.2	7/ 263.8	0.3	7/ 9.5	(8/)	6.7	1.8	3.1	55.7
2020	7/ 219.4	13.3	0.2	7/ 187.5	0.3	7/ 8.2	(8/)	7.8	2.0	2.3	43.5
2021	7/ 255.8	12.6	0.1	223.0	0.4	7/ 8.8	0.6	8.0	2.2	2.6	49.3
2022	270.3	7.7	0.2	7/ 242.0	0.4	7/ 8.8	0.7	8.4	2.1	2.7	49.7
2023	272.9	0.0	0.2	251.7	0.3	8.9	0.7	9.0	2.2	2.7	50.4

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Table 17.02-- CONSUMPTION OF ENERGY, BY SOURCE: 1985 TO 2023 -- Con.

1/ Excluding fossil fuels as commingled.

2/ Including fuel ethanol.

3/ Supplemental gaseous fuels (SGF) and fuel ethanol are consumed with natural gas and motor gasoline, respectively. In this table, natural gas excluding SGF and motor gasoline excluding fuel ethanol are presented so that a fossil fuel total can be calculated. Natural gas including SGF and motor gasoline including fuel ethanol are presented separately for reference.

4/ Conventional hydroelectric power. Does not include pumped-storage hydroelectricity.

5/ Solar thermal and photovoltaic energy.

6/ Including supplemental gaseous fuels.

7/ Revised from previous *Data Book*.

8/ Value less than +0.05 and greater than -0.05.

Source: U.S. Department of Energy, Energy Information Administration, State Energy Data System (SEDS) "State Energy Consumption Estimates, Selected Years, 1960-2023, Hawaii CT2" (June 2025) <https://www.eia.gov/state/seds/sep_use/notes/use_print.pdf> accessed July 8, 2025; and State Energy Data System (SEDS): 2023 <<https://www.eia.gov/state/seds/seds-data-fuel.php?sid=US>> accessed July 8, 2025.

Table 17.03-- CONSUMPTION OF ENERGY, BY END-USE SECTOR: 1960 TO 2023

[Trillion Btu]

Year	Residential 1/	Commercial 1/ 2/ 3/	Industrial 1/ 2/	Transportation 3/	Electric power 1/ 4/
1960	7.1	5.3	20.5	61.8	17.4
1965	9.8	7.0	34.0	79.0	27.4
1970	15.4	12.5	42.9	125.3	43.0
1975	18.9	14.5	49.8	130.5	58.6
1980	21.0	20.0	74.0	146.7	69.6
1985	19.9	18.3	66.8	142.9	69.5
1990	30.6	37.1	98.4	154.5	105.6
1995	30.7	34.0	91.6	138.0	103.5
2000	32.4	36.6	76.7	125.1	106.3
2005	32.8	39.3	71.4	179.1	102.2
2006	32.9	39.9	70.4	4/ 181.3	102.3
2007	33.1	39.1	67.6	194.4	102.3
2008	32.4	39.6	64.4	4/ 136.4	99.5
2009	32.3	39.4	67.7	132.8	97.1
2010	31.6	38.8	66.7	156.7	95.5
2011	31.1	39.4	4/ 65.8	161.3	95.0
2012	29.6	36.9	4/ 63.1	4/ 161.0	90.5
2013	27.9	37.8	4/ 63.2	4/ 164.5	87.2
2014	27.9	37.9	62.1	4/ 157.5	86.6
2015	27.7	38.0	4/ 61.7	4/ 160.9	85.9
2016	28.0	37.9	4/ 60.5	4/ 162.6	85.7
2017	28.8	38.9	58.0	4/ 169.9	85.2
2018	29.1	38.6	54.1	4/ 172.4	84.3
2019	29.5	39.0	54.1	4/ 173.9	84.3
2020	30.9	35.0	44.8	4/ 108.6	79.6
2021	4/ 30.7	4/ 36.4	4/ 46.6	142.6	80.3
2022	4/ 30.2	4/ 36.8	4/ 47.7	4/ 155.9	81.4
2023	29.4	35.7	46.9	161.8	79.0

1/ Beginning in 1980, adjusted for the double-counting of supplemental gaseous fuels, which are included in both natural gas and the other fossil fuels from which they are mostly derived, but should be counted only once in net energy and total.

2/ Small amounts of solar thermal and photovoltaic energy consumed in the commercial sector cannot be separately identified and are included in residential consumption.

3/ From 1981 through 1992, includes fuel ethanol blended into motor gasoline that is not included in the motor gasoline column.

4/ Revised from previous *Data Book*.

Source: U.S. Department of Energy, Energy Information Administration, State Energy Data System (SEDS) "State Energy Consumption Estimates, Selected Years, 1960-2023, Hawaii CT4-CT8, (June 2025) and earlier editions <https://www.eia.gov/state/seds/sep_use/notes/use_print.pdf> accessed July 8, 2025; and State Energy Data System (SEDS): 2023 <<https://www.eia.gov/state/seds/seds-data-fuel.php?sid=US#TotalEnergy>> accessed July 8, 2025.

**Table 17.04-- PRIMARY ENERGY CONSUMPTION AND ELECTRICITY
SALES, TOTAL AND PER CAPITA: 1997 TO 2023**

Year	Primary energy consumption		Electricity sales by utilities	
	Total (billion Btu)	Per capita (million Btu)	Total (1,000 kWh)	Per capita (kWh) 1/
1997	270,917	223.6	9,363	7,728
1998	270,821	222.9	9,261	7,621
1999	267,015	220.6	9,381	7,751
2000	270,704	223.1	9,691	7,986
2001	1/ 267,970	218.6	9,785	7,981
2002	1/ 283,505	228.7	9,892	7,980
2003	1/ 299,086	1/ 239.0	10,391	8,305
2004	1/ 312,623	245.5	10,732	8,426
2005	1/ 322,560	249.5	10,539	8,152
2006	1/ 324,507	247.8	10,568	8,069
2007	1/ 334,047	1/ 253.9	10,585	8,046
2008	1/ 272,843	1/ 204.8	10,390	7,799
2009	1/ 272,233	1/ 202.1	10,126	7,519
2010	1/ 293,799	215.4	10,017	7,343
2011	1/ 297,688	1/ 215.8	9,962	7,221
2012	1/ 290,679	1/ 208.3	9,639	6,909
2013	1/ 293,465	1/ 208.3	9,503	6,745
2014	1/ 285,390	1/ 201.6	9,475	6,695
2015	1/ 288,390	1/ 202.7	9,511	6,684
2016	1/ 289,064	1/ 202.3	9,445	6,610
2017	1/ 295,483	1/ 207.2	9,324	6,540
2018	1/ 294,240	1/ 206.8	9,337	6,561
2019	1/ 296,556	1/ 209.5	9,453	6,678
2020	1/ 219,357	1/ 151.2	8,797	6,061
2021	1/ 255,846	1/ 176.8	8,936	6,176
2022	1/ 270,303	1/ 187.7	9,039	6,276
2023	272,874	189.3	8,927	6,194

1/ Revised from previous *Data book*.

Source: U.S. Department of Energy, Energy Information Administration, State Energy Data System (SEDS) <<http://www.eia.gov/state/seds/seds-data-fuel.cfm?sid=HI>> accessed June 27, 2025 and calculations by Hawaii State Department of Business, Economic Development and Tourism.

Table 17.05-- PRIMARY ENERGY CONSUMPTION, BY SOURCE: 2008 TO 2023[Billion Btu. Components may not sum to totals due to rounding. Revised from previous *Data Book*]

Year	Total	Petroleum	Coal	Natural gas	Renewable
2008	272,843	239,055	18,095	148	15,545
2009	272,233	238,955	17,083	167	16,028
2010	293,799	262,136	17,117	161	14,385
2011	297,688	266,086	16,080	158	15,364
2012	290,679	258,667	16,572	187	15,252
2013	293,465	259,890	15,306	197	18,072
2014	285,390	249,595	17,241	167	18,386
2015	288,390	253,425	15,632	196	19,137
2016	289,064	251,439	16,431	162	21,032
2017	295,483	261,256	14,948	163	19,116
2018	294,240	260,753	14,367	192	18,927
2019	296,556	263,777	14,179	228	18,371
2020	219,357	187,496	13,281	199	18,381
2021	255,846	223,014	12,566	133	20,134
2022	270,303	241,994	7,680	159	20,471
2023	272,874	251,676	-	152	21,046
Year	Biomass	Solar	Wind	Geothermal	Hydro
2008	11,953	1,678	819	807	288
2009	12,401	1,806	858	579	384
2010	10,635	1,928	891	692	240
2011	10,961	2,151	1,163	772	318
2012	9,976	2,696	1,291	898	391
2013	11,752	3,391	1,717	946	267
2014	11,264	3,953	1,974	874	321
2015	11,536	4,302	2,091	794	413
2016	12,770	4,875	2,181	895	310
2017	10,037	5,930	1,815	1,108	225
2018	9,998	6,163	2,054	1/ 383	329
2019	9,503	6,732	1,806	1/ 8	323
2020	8,169	7,813	2,021	1/ 41	337
2021	8,816	8,046	2,245	635	392
2022	8,806	8,437	2,134	719	376
2023	8,915	8,985	2,164	665	318

1/ In May 2018, the Puna Geothermal Venture facility shut down due to a volcanic eruption and reopened in October 2020. Residual fuel was used during the closure period.

Source: U.S. Department of Energy, Energy Information Administration, State Energy Data System (SEDS) <<http://www.eia.gov/state/seds/seds-data-fuel.cfm?sid=HI>> accessed June 27, 2025 and calculations by Hawaii State Department of Business, Economic Development and Tourism.

Table 17.06-- ELECTRICITY GENERATION, BY SOURCE: 2010 TO 2023

[Millions of kWh generated]

Year	Total	Petroleum	Coal	Wind	Biomass 1/
2010	10,836.000	8,087.300	1,545.500	261.100	283.500
2011	10,723.300	7,923.900	1,424.000	340.800	312.600
2012	10,469.300	7,482.800	1,537.300	378.200	281.000
2013	10,267.100	7,222.800	1,403.800	503.300	329.400
2014	10,204.200	6,925.900	1,511.200	578.600	334.000
2015	10,119.500	7,023.200	1,337.400	612.800	320.900
2016	9,948.800	6,640.300	1,497.400	639.100	359.500
2017	9,813.000	6,633.600	1,375.700	532.100	292.800
2018	9,796.800	6,748.900	1,311.200	601.900	305.500
2019	9,750.000	6,864.200	1,301.900	529.300	291.500
2020	9,079.000	6,149.200	1,165.100	592.200	256.200
2021	9,182.200	6,155.200	1,084.600	657.900	282.600
2022	9,337.400	6,655.200	647.800	625.400	277.100
2023	9,194.200	7,159.500	-	634.200	287.600
Year	Geothermal	Hydro	Other gases 2/	Solar	Others 3/
2010	200.600	70.400	21.900	1.800	363.900
2011	223.900	93.100	35.300	3.600	366.100
2012	261.000	114.600	47.000	4.600	362.700
2013	274.800	78.300	41.300	19.500	393.900
2014	253.800	94.100	62.200	39.300	405.000
2015	230.300	121.200	50.200	54.400	369.200
2016	260.100	90.800	51.000	88.500	322.100
2017	322.600	66.100	52.000	175.000	363.100
2018	110.100	96.500	55.700	184.600	382.300
2019	(4/)	94.500	5.600	268.100	394.700
2020	9.600	98.800	2.900	484.000	320.800
2021	183.800	115.000	-	507.200	195.900
2022	208.300	110.100	-	555.000	258.500
2023	192.600	93.300	-	652.800	174.000

1/ Biomass includes biogenic municipal solid waste, other biomass liquid (biofuel), other biomass solids agricultural by-products, and wood and wood waste.

2/ Other gases include blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels.

3/ Others include other fuel, including but not limited to non-biogenic municipal solid waste and energy storage.

4/ In May 2018, the Puna Geothermal Venture facility shut down due to a volcanic eruption and reopened in October 2020. Residual fuel was used during the closure period.

Source: U.S. Department of Energy, Energy Information Administration, Form EIA-923 detailed data with previous form data (EIA-906/920)<<https://www.eia.gov/electricity/data/eia923/>> accessed June 14, 2025 and calculations by Hawaii State Department of Business, Economic Development and Tourism.

Table 17.07-- ELECTRICITY PRODUCTION, BY SOURCE AND BY ISLAND: 2023

[Million kWh. Components may not sum to total due to rounding]

Island	Total	Petroleum	Coal	Wind	Biomass 1/
State total	9,194.20	7,159.50	-	634.20	287.60
Hawaii	1,057.80	621.00	-	103.00	81.60
Maui	1,023.50	810.10	-	212.20	-
Lanai	35.10	35.10	-	-	-
Molokai	31.10	31.10	-	-	-
Oahu	6,547.00	5,437.70	-	283.50	164.00
Kauai	464.10	224.50	-	-	42.10
Not specified	35.50	-	-	35.50	-
Island	Geothermal	Hydro	Other gases 2/	Solar	Others 3/
State total	192.60	93.30	-	652.80	174.00
Hawaii	192.60	25.80	-	33.90	-
Maui	-	-	-	1.30	-0.20
Lanai	-	-	-	-	-
Molokai	-	-	-	-	-
Oahu	-	-	-	484.80	177.00
Kauai	-	67.50	-	132.80	-2.80
Not specified	-	-	-	-	-

1/ Biomass includes biogenic municipal solid waste, other biomass liquid (biofuel), other biomass solids agricultural by-products, and wood and wood waste.

2/ Other gases include blast furnace gas, propane gas, and other manufactured and waste gases derived from fossil fuels.

3/ Other includes other fuel, including but not limited to non-biogenic municipal solid waste and energy storage.

Source: U.S. Department of Energy, Energy Information Administration, Form EIA-923 detailed data with previous form data (EIA-906/920) <<https://www.eia.gov/electricity/data/eia923/>> accessed June 14, 2025 and calculations by Hawaii State Department of Business, Economic Development and Tourism.

**Table 17.08 -- FUEL, ELECTRICITY, AND TOTAL ENERGY EXPENDITURES
BY SOURCE: 1995 TO 2023**

[Millions of dollars]

Year	Total energy expenditures	Primary energy expenditures	Electricity additions	Retail electricity expenditures	Electricity fuel cost
1995	2,202.7	1,470.2	732.4	1,017.7	285.3
1996	2,305.8	1,532.5	773.4	1,119.7	346.3
1997	2,272.6	1,455.8	816.7	1,152.7	336.0
1998	2,092.5	1,296.7	795.8	1,054.4	258.6
1999	2,163.2	1,379.8	783.4	1,106.5	323.1
2000	2,705.1	1,863.0	842.2	1,341.2	499.0
2001	2,779.2	1,891.1	888.2	1,353.4	465.2
2002	2,688.2	1,882.7	805.5	1,300.2	494.7
2003	3,335.9	2,341.4	994.5	1,478.9	484.4
2004	4,024.6	2,886.3	1,138.3	1,654.9	516.6
2005	4,996.9	3,892.2	1,104.6	1,897.8	793.2
2006	5,729.1	4,535.9	1,193.2	2,152.2	959.0
2007	6,177.1	4,994.8	1,182.3	2,213.3	1,031.0
2008	6,828.5	5,297.3	1,531.1	2,978.3	1,447.2
2009	4,804.8	3,540.0	1,264.8	2,111.7	846.9
2010	1/ 6,203.9	1/ 4,870.9	1,333.0	2,473.3	1,140.3
2011	1/ 8,071.8	1/ 6,573.4	1,498.4	3,090.5	1,592.1
2012	1/ 8,278.3	1/ 6,679.1	1,599.2	3,219.0	1,619.8
2013	1/ 8,198.2	1/ 6,527.0	1,671.2	3,153.6	1,482.4
2014	1/ 7,750.8	1/ 5,964.5	1,786.2	3,159.3	1,373.1
2015	1/ 5,881.6	1/ 4,182.8	1,698.7	2,474.9	776.2
2016	1/ 5,199.5	1/ 3,564.7	1,634.8	2,242.6	607.8
2017	1/ 5,818.6	1/ 4,169.8	1,648.8	2,416.2	767.4
2018	1/ 6,812.8	1/ 5,064.2	1,748.6	2,710.1	961.5
2019	1/ 6,715.5	1/ 4,926.6	1,788.9	2,700.5	911.6
2020	1/ 4,685.3	1/ 2,901.4	1,783.9	2,412.7	628.8
2021	1/ 6,344.0	1/ 4,545.5	1,798.5	2,696.6	898.1
2022	1/ 9,294.7	1/ 7,377.0	1,917.7	3,574.9	1,657.2
2023	8,580.3	6,590.0	1,990.3	3,431.0	1,440.7

1/ Revised from previous *Data Book*.

Source: U.S. Department of Energy, Energy Information Administration, State Energy Data System (SEDS) <<http://www.eia.gov/state/seds/seds-data-fuel.cfm?sid=HI>> accessed June 14, 2025; and calculations by the Hawaii State Department of Business, Economic Development and Tourism.

Table 17.09-- ELECTRIC UTILITIES: 2013 TO 2024

Year	Customers, Dec. 31			Power sold (1,000 kWh)		
	Total	Residen- tial 1/	Other	Total	Residen- tial 1/	Other
2013	488,456	423,281	65,175	9,500,990	2,608,786	6,892,205
2014	492,358	426,862	65,496	9,406,166	2,538,865	6,867,301
2015	494,631	429,084	65,547	9,388,577	2,558,285	6,830,292
2016	497,292	431,496	65,796	9,284,424	2,496,694	6,787,729
2017	499,664	435,104	64,560	9,135,531	2,503,831	6,631,700
2018	500,794	436,545	64,249	9,139,886	2,585,508	6,554,378
2019	503,515	439,022	64,493	9,200,694	2,620,536	6,580,158
2020	506,484	442,170	64,314	8,535,501	2,702,575	5,832,926
2021	509,307	444,596	64,711	8,696,259	2,677,818	6,018,441
2022	508,566	443,737	64,829	8,814,222	2,607,153	6,207,069
2023	510,645	446,136	64,509	8,693,061	2,536,033	6,157,028
2024	511,854	447,400	64,454	8,691,326	2,489,142	6,202,184

Year	Average annual use (kWh) 2/		Average rate (dollars per kWh)		Revenues (\$1,000)		
	Residen- tial 1/	Other	Residen- tial 1/	Other	Total	Residen- tial 1/	Other
2013	6,163	105,749	0.36887	0.31787	3,153,166	962,308	2,190,858
2014	5,948	104,851	0.37342	0.32126	3,154,227	948,062	2,206,164
2015	5,962	104,204	0.29918	0.24909	2,466,759	765,399	1,701,360
2016	5,786	103,163	0.27819	0.22555	2,225,520	694,564	1,530,956
2017	5,755	102,722	0.29967	0.24800	2,394,971	750,316	1,644,655
2018	5,923	102,015	0.32999	0.28000	2,688,400	853,198	1,835,202
2019	5,969	102,029	0.32612	0.27612	2,671,502	854,599	1,816,903
2020	6,112	90,694	0.31256	0.26807	2,408,354	844,710	1,563,644
2021	6,023	93,005	0.34032	0.29076	2,661,260	911,321	1,749,938
2022	5,875	95,745	0.43935	0.38605	3,541,686	1,145,440	2,396,246
2023	5,684	95,444	0.43423	0.37252	3,394,854	1,101,214	2,293,640
2024	5,564	96,227	0.43841	0.36319	3,343,848	1,091,272	2,252,576

1/ "Residential" refers to single-metered residential customers which may include condominiums for visitor use but excludes master-metered apartment and condominium buildings used by residents which are classified as commercial customers.

2/ Based on number of customers at end of year.

Source: Hawaii State Department of Commerce and Consumer Affairs, Division of Consumer Advocacy; The Hawaii State Department of Business, Economic Development and Tourism, Strategic Industries Division; Monthly Financial Reports issued by utility companies (Hawaiian Electric Company, Maui Electric Company, Hawaii Electric Light Company and Kauai Island Utility Cooperative); calculations by Hawaii State Department of Business, Economic Development and Tourism; and records.

Table 17.10-- ELECTRIC UTILITIES, BY ISLAND: 2024

Island	Customers, Dec. 31			Power sold (1,000 kWh)		
	Total	Residen- tial 1/	Other	Total	Residen- tial 1/	Other
State total	511,854	447,400	64,454	8,691,326	2,489,142	6,202,184
Oahu	310,336	276,620	33,716	6,134,550	1,505,403	4,629,147
Hawaii	90,522	78,933	11,589	1,046,702	427,915	618,787
Kauai	39,318	30,147	9,171	472,467	193,728	278,740
Lanai	1,732	1,470	262	33,294	8,188	25,106
Maui	66,675	57,504	9,171	975,279	342,832	632,447
Molokai	3,271	2,726	545	29,034	11,076	17,958

Island	Average annual use (kWh) 2/		Average rate (dollars per kWh)		Revenues (\$1,000)		
	Residen- tial 1/	Other	Residen- tial 1/	Other	Total	Residen- tial 1/	Other
State total	5,564	96,227	0.438	0.363	3,343,848	1,091,272	2,252,576
Oahu	5,442	137,298	0.429	0.346	2,246,676	645,376	1,601,301
Hawaii	5,421	53,394	0.483	0.431	473,556	206,726	266,830
Kauai	6,426	30,394	0.413	0.390	188,806	79,983	108,823
Lanai	5,570	95,824	0.504	0.502	16,732	4,126	12,606
Maui	5,962	68,962	0.436	0.402	403,922	149,457	254,465
Molokai	4,063	32,951	0.506	0.476	14,156	5,605	8,551

1/ 'Residential' refers to single-metered residential customers which may include condominiums for visitor use but excludes master-metered apartment and condominium buildings used by residents which are classified as commercial customers.

2/ Based on number of customers at end of year.

Source: *Monthly Financial Reports* issued by utility companies (Hawaiian Electric Company, Maui Electric Company, Hawaii Electric Light Company and Kauai Island Utility Cooperative) and calculations by the Hawaii State Department of Business, Economic Development and Tourism.

Table 17.11-- GAS UTILITIES: 2013 TO 2024

[Excludes bottled gas]

Year	Customers, Dec. 31			Gas sold (million therms)		
	Total	Residen- tial 1/	Other	Total	Residen- tial 1/	Other
2013	35,116	31,412	3,704	33.1	4.4	28.7
2014	35,186	31,463	3,723	33.1	4.3	28.8
2015	35,248	31,482	3,766	34.1	4.3	29.8
2016	35,408	31,574	3,834	35.5	4.3	31.2
2017	35,494	31,638	3,856	36.2	4.3	31.8
2018	35,694	31,794	3,900	37.6	4.4	33.2
2019	35,826	31,906	3,920	37.1	4.2	32.9
2020	35,990	32,137	3,853	27.4	4.4	23.1
2021	35,983	32,112	3,871	31.4	4.5	26.9
2022	35,925	31,987	3,938	33.7	4.3	29.4
2023	35,871	32,010	3,861	34.0	4.2	29.8
2024	35,467	31,607	3,860	34.0	4.3	29.7

Year	Average annual use (therms) 2/		Average rate (dollars per therm)		Revenues (\$1,000,000)		
	Residen- tial 1/	Other	Residen- tial 1/	Other	Total	Residen- tial 1/	Other
2013	141	7,737	5.45	3.91	136.3	24.2	112.1
2014	137	7,738	5.48	3.89	135.8	23.6	112.2
2015	136	7,909	4.68	2.94	107.6	20.1	87.5
2016	138	8,129	4.31	2.50	96.8	18.7	78.0
2017	160	6,895	4.08	2.19	107.1	19.7	87.4
2018	138	8,511	5.09	3.13	126.1	22.3	103.9
2019	131	8,391	5.36	3.13	125.5	22.4	103.1
2020	136	5,983	4.83	2.82	86.2	21.1	65.0
2021	140	6,960	5.70	3.63	123.3	25.6	97.7
2022	133	7,475	6.76	4.65	165.7	28.8	136.9
2023	130	7,725	6.36	4.18	151.2	26.5	124.7
2024	135	7,689	5.96	3.87	140.3	25.5	114.8

1/ 'Residential' refers to single-metered residential customers which may include condominiums for visitor use but excludes master-metered apartment and condominium buildings used by residents which are classified as commercial customers.

2/ Based on number of customers at end of year.

Source: Hawaii State Department of Commerce and Consumer Affairs, Division of Consumer Advocacy and records; Hawaii State Department of Business, Economic Development and Tourism, Strategic Industries Division and records; Hawaii Gas The Clean Energy Company, *Hawaii Gas Utility Monthly Financial Reports*; calculations by Hawaii State Department of Business, Economic Development and Tourism.

Table 17.12-- GAS UTILITIES, BY ISLAND: 2024

[Excludes bottled gas]

Island	Customers, December 31			Gas sold (1,000 therms)		
	Total	Residen- tial 1/	Other	Total	Residen- tial 1/	Other
State total	35,467	31,607	3,860	33,957	4,278	29,679
Oahu	31,384	27,929	3,455	30,161	3,490	26,671
Hawaii	2,045	1,721	324	2,648	439	2,209
Kauai	1,136	1,105	31	328	210	118
Lanai	24	24	-	7	7	-
Maui	814	764	50	803	122	682
Molokai	64	64	-	10	10	-

Island	Average annual use per customer (therms) 2/		Average rate (dollars per therm)		Revenues (\$1,000)		
	Residen- tial 1/	Other	Residen- tial 1/	Other	Total	Residen- tial 1/	Other
State total	135	7,689	5.96	3.87	140,327	25,516	114,811
Oahu	125	7,720	6.27	4.02	129,146	21,886	107,260
Hawaii	255	6,817	4.53	2.50	7,520	1,987	5,532
Kauai	190	3,794	4.68	2.58	1,288	984	304
Lanai	271	-	4.49	(NA)	29	29	-
Maui	159	13,632	4.75	2.52	2,294	579	1,716
Molokai	163	-	4.86	(NA)	51	51	-

NA Not available.

1/ 'Residential' refers to single-metered residential customers which may include condominiums for visitor use but excludes master-metered apartment and condominium buildings used by residents which are classified as commercial customers.

2/ Based on number of customers at end of year.

Source: Hawai'i Gas The Clean Energy Company, *Hawaii Gas Utility Monthly Financial Reports*; and Hawaii State Department of Business, Economic Development & Tourism, calculations and records.

**Table 17.13-- SERVICE PROVIDED BY HAWAIIAN ELECTRIC COMPANY, INC.
ON OAHU: 1993 TO 2024**

Year	Number of customers, Dec. 31		Net input (1,000 kWh) 1/	Electricity sales (1,000 kWh)	Average annual residential use (kWh) 2/	Average residential rate (dollars per kWh)	Generating capability Dec. 31 (1,000 kW) 3/
	Total	Residential only					
1993	263,478	230,192	7,029,839	6,607,424	7,581	0.11414	1,669
1994	264,992	232,115	7,222,978	6,797,364	7,681	0.11342	1,669
1995	269,307	235,905	7,359,195	6,962,794	7,732	0.12302	1,669
1996	271,602	237,860	7,499,202	7,091,147	7,868	0.12944	1,669
1997	271,801	238,825	7,424,259	7,040,291	7,773	0.13360	1,669
1998	272,675	239,945	7,299,149	6,938,326	7,603	0.12556	1,669
1999	275,467	242,579	7,356,725	6,997,936	7,654	0.12741	1,669
2000	278,260	245,027	7,589,409	7,211,760	7,793	0.14477	1,669
2001	280,911	247,672	7,643,288	7,276,681	7,816	0.14255	1,669
2002	283,161	249,896	7,757,699	7,390,367	8,050	0.13859	1,669
2003	286,677	253,033	7,908,957	7,522,230	8,224	0.14888	1,669
2004	288,456	254,797	8,126,998	7,732,834	8,481	0.15690	1,669
2005	291,580	257,804	8,104,303	7,721,296	8,360	0.17673	1,712
2006	292,988	259,098	8,104,872	7,700,605	8,248	0.20063	1,722
2007	294,591	260,583	8,089,115	7,675,355	8,214	0.20519	1,727
2008	293,740	259,929	7,950,649	7,555,962	7,868	0.28892	1,727
2009	295,282	261,630	7,761,597	7,377,537	7,759	0.21533	1,847
2010	296,422	262,635	7,657,018	7,277,229	7,540	0.25474	1,817
2011	296,800	263,384	7,593,813	7,242,311	7,319	0.32041	1,817
2012	297,529	264,047	7,310,995	6,975,996	6,729	0.35101	1,817
2013	299,528	265,772	7,187,329	6,858,536	6,283	0.34625	1,840
2014	301,953	268,056	7,101,879	6,781,665	6,036	0.35479	1,848
2015	302,958	269,207	7,086,141	6,754,083	6,052	0.28019	1,735
2016	304,261	270,451	6,963,058	6,660,195	5,856	0.26069	1,735
2017	304,948	271,065	6,854,689	6,548,697	5,829	0.28215	1,735
2018	305,456	269,981	6,807,785	6,525,670	5,917	0.31194	1,794
2019	306,368	270,683	6,833,764	6,563,104	6,002	0.31065	1,794
2020	307,378	271,747	6,473,516	6,183,093	6,355	0.28763	1,794
2021	308,721	272,889	6,435,738	6,169,654	6,009	0.32493	1,794
2022	306,978	271,104	6,495,139	6,210,797	5,758	0.43452	1,614
2023	309,631	273,841	4/ 6,409,332	6,138,100	5,586	0.43238	1,614
2024	309,828	264,263	6,607,535	6,125,334	5,469	0.43333	1,516

1/ Net generation plus purchased power.

2/ Based on average number of customers during the year.

3/ Gross capability including firm purchase power.

4/ Revised from previous *Data Book*.

Source: Hawaiian Electric Company, Inc., records.

**Table 17.14-- UTILITY SERVICE PROVIDED BY THE GAS COMPANY ON
OAHU: 1991 TO 2024**

Year	Customers, Dec. 31		Sales (1,000 therms) 1/		Average annual residential usage (therms) 1/
	Total	Residential	Total	Residential	
1991	32,487	29,278	30,866	5,331	182
1992	32,598	29,375	30,528	5,285	180
1993	33,206	29,984	30,027	5,287	176
1994	33,597	30,344	30,762	5,372	177
1995	33,472	30,492	30,582	5,332	175
1996	33,914	30,668	30,339	5,203	170
1997	33,800	30,574	29,836	5,176	169
1998	33,705	30,497	29,930	5,284	173
1999	33,614	30,384	30,830	5,154	170
2000	33,613	30,383	31,619	5,054	166
2001	33,625	30,403	31,071	4,990	164
2002	33,446	30,202	30,852	4,962	164
2003	33,252	29,990	30,470	4,781	159
2004	33,231	29,964	31,011	4,701	157
2005	32,991	29,744	30,965	4,641	156
2006	32,776	29,519	30,935	4,530	153
2007	32,673	29,434	31,219	4,447	151
2008	32,358	29,123	29,930	4,320	148
2009	32,179	28,951	28,957	4,263	147
2010	32,109	28,867	28,823	4,197	145
2011	32,121	28,872	29,266	4,059	141
2012	31,875	28,622	29,563	4,036	141
2013	31,730	28,481	29,711	3,923	138
2014	31,766	28,504	29,703	3,790	133
2015	31,772	28,475	30,642	3,768	132
2016	31,829	28,469	32,109	3,807	134
2017	31,828	28,442	32,549	3,748	132
2018	31,861	28,442	33,654	3,729	131
2019	31,880	28,447	33,268	3,564	125
2020	31,972	28,598	24,316	3,757	131
2021	31,930	28,540	27,808	3,727	131
2022	31,850	28,445	29,756	3,496	123
2023	31,817	28,390	30,010	3,422	121
2024	31,384	27,960	30,161	3,494	125

1/ Includes liquefied petroleum gas.

Source: The Gas Company LLC, formerly The Gas Company, Inc., records.

Table 17.15-- LIQUID FUEL TAX BASE: 2010 TO 2023

[In thousands of gallons. Liquid fuel sold in a given month is usually reported the following month.
Annual totals accordingly refer to fuel sold during a 12-month period ending November 30]

Year reported	All types		Gasoline	Diesel oil	
	Total	Excluding aviation		Non-hwy.	Hwy. use
2010	820,268	638,300	416,134	132,451	51,512
2011	881,047	671,169	449,606	133,480	47,237
2012	900,993	673,513	444,638	151,509	47,674
2013	866,768	635,587	446,571	107,415	51,235
2014	902,720	665,707	447,267	137,449	45,921
2015	899,923	698,487	457,535	157,018	45,248
2016	844,235	671,751	461,719	136,249	46,245
2017	945,406	697,345	476,901	139,233	48,092
2018	930,729	665,805	463,671	116,955	47,573
2019	969,494	700,513	465,325	141,648	46,766
2020	723,690	579,900	372,276	136,243	40,848
2021	880,782	622,555	414,423	131,118	45,175
2022	970,230	662,188	419,799	156,974	52,591
2023	963,711	669,575	426,682	164,082	44,970

Year reported	Liquefied petroleum gas		Aviation fuel	Small boats		Other fuel 1/
	Off hwy.	Hwy. use		Gasoline	Diesel oil	
2010	-	62	181,968	787	947	36,406
2011	-	50	209,878	1,103	4,022	35,672
2012	-	35	227,480	1,144	399	28,113
2013	-	23	231,181	1,390	1,257	27,696
2014	-	22	237,012	1,565	2,763	30,721
2015	-	16	201,435	1,571	2,658	34,442
2016	-	12	172,483	541	3,221	23,765
2017	-	7	248,061	1,034	3,422	28,656
2018	-	26	264,923	1,567	2,625	33,387
2019	-	8	268,981	1,382	3,321	42,062
2020	-	2	143,790	1,188	3,382	25,948
2021	-	20	258,228	744	5,000	26,074
2022	-	20	308,042	1,278	4,370	27,155
2023	-	2	294,136	1,222	2,984	29,634

1/ Includes ethanol, methanol, biodiesel, naphtha, compressed natural gas, and liquefied natural gas.

Source: Hawaii State Department of Taxation, Tax Research & Planning, *Liquid Fuel Tax Base & Tax Collections*, Calendar Year 2023 (annual) <https://tax.hawaii.gov/stats/a5_3txcolrpt/> accessed June 20, 2025.

Table 17.16-- LIQUID FUEL TAX BASE, BY COUNTY: 2022 AND 2023

[In thousands of gallons. Liquid fuel sold in a given month is usually reported the following month.
Annual totals accordingly refer to fuel sold during a 12-month period ending November 30]

Type of fuel and year	State total	Honolulu County	Maui County	Hawaii County	Kauai County
2022					
Total	970,229.5	471,232.0	225,807.8	189,874.0	83,315.8
Gasoline	419,799.4	244,605.5	63,690.5	82,204.4	29,298.9
Diesel oil, non-hwy.	156,974.4	61,939.6	54,016.4	32,579.3	8,439.2
Diesel oil, hwy. use	52,591.4	31,417.8	5,882.6	12,222.4	3,068.6
Liq. pet. gas, hwy. use	19.9	17.9	0.1	1.1	0.8
Small boats, gasoline	1,277.9	883.8	66.9	327.1	-
Small boats, diesel oil	4,369.8	4,369.8	-	-	-
Aviation fuel	308,041.5	126,789.7	101,879.3	49,710.6	29,662.0
Other fuel 1/	27,155.3	1,207.9	272.1	12,829.0	12,846.3
2023					
Total	963,710.6	481,924.9	209,875.6	190,048.4	81,861.7
Gasoline	426,682.3	252,858.1	61,444.4	82,784.9	29,594.9
Diesel oil, non-hwy.	164,082.4	69,297.2	54,483.5	30,881.0	9,420.8
Diesel oil, hwy. use	44,969.6	23,712.7	6,045.3	12,199.0	3,012.6
Liq. pet. gas, hwy. use	1.5	2.6	-1.5	0.4	-
Small boats, gasoline	1,221.7	834.4	47.1	340.2	-
Small boats, diesel oil	2,983.6	2,983.6	-	-	-
Aviation fuel	294,135.7	130,916.5	87,666.7	49,182.7	26,369.8
Other fuel 1/	29,633.8	1,319.9	190.1	14,660.1	13,463.6

1/ Includes ethanol, methanol, biodiesel, naphtha, compressed natural gas, and liquefied natural gas.

Source: Hawaii State Department of Taxation, Tax Research & Planning, *Liquid Fuel Tax Base & Tax Collections*, Calendar Year, ending December 31, 2022 and 2023 <https://tax.hawaii.gov/stats/a5_3txcolrpt/> accessed June 20, 2025.

Table 17.17-- GASOLINE STATIONS (NAICS 447), BY COUNTY: 1998 TO 2023

[Statistics are based on the North American Industry Classification System (NAICS)]

Year	State total	City and County of Honolulu	Hawaii County	Kauai County	Maui County
1998	350	219	67	19	45
1999	334	206	63	19	46
2000	328	207	61	20	40
2001	322	204	61	17	40
2002	321	200	62	19	40
2003	314	194	63	19	38
2004	294	181	60	18	35
2005	301	188	59	19	35
2006	305	190	63	17	35
2007	289	179	58	14	38
2008	281	177	57	14	33
2009	277	169	58	15	35
2010	283	168	58	17	40
2011	283	168	61	16	38
2012	283	174	58	14	37
2013	286	176	58	15	37
2014	284	171	57	17	39
2015	284	166	57	23	38
2016	264	153	54	20	37
2017	248	141	56	16	35
2018	244	139	55	16	34
2019	246	140	53	19	34
2020	248	144	52	16	36
2021	253	144	57	16	36
2022	262	147	56	20	39
2023	238	121	60	19	38

Source: U.S. Census Bureau, County Business Patterns, Table CB2300CBP <<http://data.census.gov/>>
accessed July 7, 2025.

Table 17.18-- BOILERS AND PRESSURE VESSELS, BY ISLAND: JULY 2, 2024

[As of July 2, 2024. Data is no longer comparable to previous *Data Book* as data is now real time]

Island and year	Total	Power boilers	Heating boilers	Pressure vessels
State total	10,176	381	2,815	6,980
Hawaii	1,482	65	428	989
Maui	1,186	50	370	766
Lanai	65	3	24	38
Molokai	43	1	10	32
Oahu	7,066	243	1,856	4,967
Kauai	334	19	127	188

Source: Hawaii State Department of Labor and Industrial Relations, Hawaii Occupational Safety & Health Division (HIOSH), Boiler and Elevator Inspection Branch, records.

**Table 17.19-- FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT
FOR R&D PLANT IN HAWAII: 2000 TO 2022**

[Millions of dollars. For fiscal year ending September 30]

Year	Total	R&D	R&D plant
2000	236.1	234.3	1.8
2001	438.5	435.7	2.8
2002	434.7	428.3	6.4
2003	415.8	413.9	1.9
2004	495.2	488.2	7.0
2005	644.1	600.3	43.8
2006	385.9	380.3	5.6
2007	387.2	379.2	8.0
2008	350.9	347.8	3.1
2009	412.8	387.5	25.3
2010	427.5	389.4	38.1
2011	426.9	403.6	23.3
2012	397.9	382.5	15.4
2013	361.0	348.0	13.0
2014	341.7	326.5	15.2
2015	319.6	305.4	14.2
2016	298.6	283.8	14.8
2017	290.2	275.4	14.8
2018	460.5	441.3	19.2
2019	436.2	411.9	24.3
2020	400.0	393.9	6.1
2021	491.9	485.9	6.0
2022	376.6	371.2	5.4

Source: National Science Foundation/Division of Science Resources Statistics, *Federal Funds for Research and Development* (annual) <<https://ncesdata.nsf.gov/fedfunds>> accessed November 21, 2024.

Table 17.20-- PRIVATE SECTOR TECHNOLOGY JOBS, 2016 TO 2023 AND AVERAGE EARNINGS, 2023

[Jobs include both wage and salary jobs and proprietors' jobs]

	Jobs								Average Annual Earnings in 2023 (\$) 1/
	2016	2017	2018	2019	2020	2021	2022	2023	
Technology sector	27,645	27,530	27,924	27,645	27,500	28,609	29,391	31,549	107,272
Engineering and related services	6,251	6,224	6,470	6,468	6,632	6,871	6,822	7,118	119,450
Computer system design and related services	6,446	6,565	6,481	6,129	5,958	6,325	6,595	6,792	118,677
Technical consulting services	4,535	4,713	5,170	5,354	5,378	5,515	5,724	6,645	77,459
Information and telecom technology	5,207	5,106	4,951	4,659	4,528	4,603	4,940	5,505	113,405
Medical labs and imaging centers	1,774	1,731	1,806	1,815	1,805	1,935	1,941	1,950	83,502
R & D services (e/ Biotechnology)	1,455	1,269	1,170	1,184	1,187	1,259	1,235	1,338	110,779
Technology equipment distribution	683	683	859	857	857	906	940	949	146,035
Other technology manufacturing	490	435	361	424	434	482	452	492	80,815
Biotechnology	507	461	381	332	371	377	367	392	123,214
Alternative power generation	243	262	204	301	258	240	252	277	149,124
Chemical and pharmaceutical manufacturing	55	82	71	122	93	96	125	90	110,125

1/ Earnings includes wages and salaries, supplements to wages and salaries, and proprietor's income.

Source: Hawaii State Department of Business, Economic Development and Tourism, "Hawaii's Targeted & Emerging Industries 2024 Update Report"

<http://dbedt.hawaii.gov/economic/reports_studies/emerging-industries/>.

Table 17.21-- TECHNOLOGY AND SCIENCE INDEX, BY STATE: 2022

[The State Technology and Science Index observes 79 unique indicators that are categorized into the five major components shown below]

State	Average score	Ranking					
		Overall	Human capital invest.	Risk capital & entrepreneurial infrast.	Research & dev't inputs	Tech. concentration & dynamism	Tech. & science workforce
Massachusetts	86.08	1	1	4	1	6	4
California	80.00	2	6	2	5	2	5
Colorado	78.89	3	8	6	6	3	2
Maryland	77.67	4	2	26	2	7	3
Utah	76.84	5	3	3	12	1	10
Washington	74.97	6	12	8	13	4	1
Delaware	74.83	7	9	1	4	10	9
Virginia	69.59	8	5	19	14	5	8
Connecticut	69.38	9	4	9	8	14	11
New Hampshire	64.97	10	14	24	3	13	16
North Carolina	62.52	11	24	7	11	16	18
New Jersey	62.44	12	18	10	19	14	11
Minnesota	61.72	13	7	17	25	22	7
Oregon	59.74	14	16	22	22	25	6
Pennsylvania	59.05	15	12	16	7	33	17
Arizona	57.15	16	29	14	18	8	31
Michigan	56.67	17	19	36	10	26	13
Texas	56.12	18	36	11	31	9	22
New York	56.11	19	10	12	15	21	38
New Mexico	54.46	20	30	38	16	19	14
Illinois	52.60	21	11	15	17	28	35
Georgia	51.89	22	26	21	32	11	33
Rhode Island	50.77	23	15	29	9	44	28
Wisconsin	50.66	24	27	33	20	29	19
Idaho	50.42	25	38	18	35	12	24
Vermont	50.38	26	17	32	27	22	29
Alabama	48.30	27	35	41	24	24	21
Montana	48.03	28	32	25	26	37	22
Kansas	47.29	29	25	43	36	20	20
Ohio	46.83	30	33	28	23	39	25
Wyoming	46.16	31	34	23	30	30	29
Indiana	44.96	32	20	40	21	31	38
Iowa	44.52	33	23	35	29	45	26
Nebraska	44.46	34	21	20	38	38	32
Missouri	42.02	35	31	27	33	36	40
Alaska	41.73	36	37	50	34	27	15

Continued on next page.

Table 17.21-- TECHNOLOGY AND SCIENCE INDEX, BY STATE: 2022 -- Con.

State	Average score	Ranking					
		Overall	Human capital invest.	Risk capital & entrepreneurial infrast.	Research & dev't inputs	Tech. concentration & dynamism	Tech. & science workforce
Hawaii	41.57	37	39	42	28	33	27
Florida	40.99	38	42	13	41	17	46
Nevada	38.91	39	48	5	49	17	48
Tennessee	37.36	40	41	31	39	35	36
South Dakota	36.88	41	28	29	40	43	44
North Dakota	34.65	42	21	47	37	41	42
South Carolina	33.94	43	44	38	43	32	36
Maine	32.61	44	40	45	42	39	34
Kentucky	30.71	45	45	34	45	42	43
Oklahoma	27.38	46	50	44	44	45	41
West Virginia	24.53	47	43	49	47	48	45
Arkansas	23.19	48	49	37	50	45	50
Louisiana	22.34	49	46	46	46	49	47
Mississippi	17.49	50	46	48	48	50	49

Source: Milken Institute *State Technology and Science Index: Sustaining America's Innovation Economy 2022* <<http://statetechandscience.org/statetech.taf?page=state-ranking>> accessed June 20, 2023.

Table 17.22-- RESEARCH AND NON-RESEARCH EXTRAMURAL FUNDING FOR THE UNIVERSITY OF HAWAII: 1993 TO 2024

[Fiscal year ending June 30. Research and non-research awards received through the Office of Research Services, University of Hawaii, and non-competitive awards from the U.S. Department of Agriculture]

Year	Total		Research		Non-research	
	Awards	Amount (dollars)	Awards	Amount (dollars)	Awards	Amount (dollars)
1993	1,146	131,075,215	636	61,059,928	510	70,015,287
1994	1,322	142,563,794	755	77,763,782	567	64,800,012
1995	1,147	139,199,221	616	70,222,653	531	68,976,568
1996	1,191	134,469,155	697	76,698,552	494	57,770,603
1997	1,255	160,859,800	724	89,131,636	531	71,728,164
1998	1,300	159,948,612	763	91,746,988	537	68,201,624
1999	1,254	164,168,101	707	92,737,645	547	71,430,456
2000	1,379	180,629,855	767	102,845,010	612	77,784,845
2001	1,405	216,233,918	835	132,833,308	570	83,400,610
2002	1,629	252,370,477	971	141,875,022	658	110,495,455
2003	1,646	323,868,218	976	190,374,465	670	133,493,753
2004	1,675	328,982,431	1,002	199,944,709	673	129,037,722
2005	1,742	354,127,142	1,022	209,196,531	720	144,930,611
2006	1,785	433,360,395	1,068	236,708,881	717	196,651,514
2007	1,778	354,031,667	1,081	209,909,883	697	144,121,784
2008	1,758	367,580,150	1,093	211,778,184	665	155,801,966
2009	1,990	413,963,739	1,147	246,546,713	843	167,417,026
2010	1,944	452,408,669	1,161	255,734,059	783	196,674,610
2011	1,799	488,597,908	1,070	281,745,764	729	206,852,144
2012	1,727	435,874,967	1,039	256,980,266	688	178,894,701
2013	1,801	409,783,318	1,006	222,207,539	795	187,575,779
2014	1,774	392,314,955	1,081	238,286,786	693	154,028,169
2015	1,823	425,650,338	1,080	236,114,373	743	189,535,965
2016	1,855	391,334,528	1,025	199,840,628	830	191,493,900
2017	1,886	387,001,705	1,077	209,249,788	809	177,751,917
2018	1,879	386,311,703	1,072	215,982,321	807	170,329,382
2019	1,925	421,852,160	1,069	222,860,456	856	198,991,704
2020	1,879	450,439,249	1,079	229,664,292	800	220,774,957
2021	1,963	485,528,926	1,061	238,259,645	902	247,269,281
2022	1,931	505,019,134	1,017	269,968,449	914	235,050,685
2023	1,615	520,735,668	867	249,492,006	748	271,243,662
2024	1,889	615,738,238	987	282,703,399	902	336,042,670

Source: University of Hawaii, Office of Research Services, *Executive Managerial Report* (1992 to 2018) <<http://http://www.ors.hawaii.edu/index.php/reports/annual-executive-managerial-reports/111-reports/annual-reports/391-2017-2018-annual-report>> accessed May 22, 2019; *Board of Regents Monthly Reports* (Q1-Q4 annual from 2019) <<https://research.hawaii.edu/reports/reports/>> accessed June 9, 2025 and records.

**Table 17.23-- RESEARCH AND DEVELOPMENT EXPENDITURES AT
HIGHER EDUCATION INSTITUTIONS: 1998 TO 2023**

[In thousands of dollars. For fiscal year ending June 30]

Year	Total	Federally financed	State and local government financed	Business 1/	Nonprofit	Institutionally financed	All other sources
1998 2/	148,007	86,886	37,002	10,949	(NA)	13,170	-
1999 2/	156,810	93,418	35,111	13,021	(NA)	15,260	-
2000 2/	161,300	95,419	35,474	11,158	(NA)	19,249	-
2001 2/	156,976	97,716	33,125	7,232	(NA)	18,903	-
2002 2/	172,664	119,381	31,062	9,971	(NA)	12,232	18
2003 2/	184,602	148,662	11,822	6,931	(NA)	17,171	16
2004 3/	241,346	191,252	8,815	21,234	(NA)	19,892	153
2005 3/	240,247	199,135	7,077	12,155	(NA)	21,282	598
2006 3/	257,478	210,097	8,933	12,551	(NA)	25,888	9
2007 3/	274,373	215,806	15,534	22,080	(NA)	16,352	4,601
2008 3/	278,751	200,385	18,192	26,928	(NA)	28,132	5,114
2009 3/	300,302	211,256	17,479	30,357	(NA)	32,198	9,012
2010 4/	317,942	208,540	23,669	24,315	7,989	45,016	8,413
2011 4/	363,887	241,686	22,399	23,362	11,019	57,502	7,919
2012 4/	335,704	215,593	16,406	21,389	6,642	67,934	7,740
2013 4/	343,802	241,600	11,812	73,645	3,863	6,270	6,612
2014 4/	330,897	212,525	8,115	3,436	6,759	89,409	10,653
2015 4/	332,233	213,763	14,140	6,702	9,748	85,793	2,087
2016 4/	318,134	201,809	15,402	5,834	12,110	80,463	2,516
2017 4/	301,204	189,719	14,660	2,084	13,013	77,502	4,226
2018 4/	297,975	186,527	20,096	950	14,579	73,459	2,364
2019 4/	301,419	186,601	20,297	1,967	13,150	77,733	1,671
2020 4/	298,285	184,034	19,383	2,802	13,022	77,557	1,487
2021 4/	294,913	178,662	20,848	2,826	11,595	79,701	1,281
2022 4/	301,272	190,232	17,913	2,750	12,717	76,959	701
2023 4/	339,716	215,599	17,577	3,887	21,781	79,211	1,661

NA Not available.

1/ Category titled 'Industry financed' before 2010.

2/ Survey includes institutions with doctoral programs in S&E, are HBCUs with R&D expenditures in S&E, or are master's or bachelor's degree-granting institutions that expend at least \$150,000 in separate R&D in S&E.

3/ Survey includes S&E bachelor's and higher degree-granting institutions that reported at least \$150,000 in separately budgeted R&D expenditures in S&E.

4/ Survey includes institutions which grant a bachelor's degree or higher, expend at least \$150,000 in separately budgeted R&D, and were geographically separate campuses headed by a president, chancellor, or equivalent.

Source: National Science Foundation, Division of Science Resources Statistics, *Higher Education Research and Development Survey*: Fiscal Year (annual) <<https://www.nsf.gov/statistics/srvyherd/>> accessed June 9, 2025.

Table 17.24-- PATENTS ISSUED TO HAWAII RESIDENTS: 1992 TO 2020

Year	Patents	Year	Patents	Year	Patents
1992	81	2002	91	2012	131
1993	106	2003	96	2013	146
1994	99	2004	86	2014	160
1995	84	2005	58	2015	166
1996	104	2006	101	2016	178
1997	93	2007	82	2017	153
1998	93	2008	101	2018	136
1999	97	2009	96	2019	155
2000	93	2010	144	2020	161
2001	107	2011	128		

Source: U.S. Patent and Trademark Office, Electronic Information Products Division / PTMT, *Patent Counts by Country/State and Year, All Patents, All Types, January 1, 1977 -- December 31, 2015* (December 2015) <http://www.uspto.gov/web/offices/ac/ido/oeip/taf/cst_all.htm> accessed May 8, 2017; and *Patent Counts by Origin and Type Calendar Year* (Annual) <https://www.uspto.gov/web/offices/ac/ido/oeip/taf/reports_stco.htm> accessed August 8, 2022; and records.

**Table 17.25-- ASTRONOMY AND RELATED FACILITIES AT
THE SUMMITS OF MAUNAKEA FOR 2016 AND HALEAKALA FOR 2017**

[Categories may not sum to totals due to rounding]

Facility and year (mirror diameter in meters)	Capital cost (\$ mil) 1/	Annual operating cost (\$ mil)	County based staff	Opera- tional
Maunakea observatories, 2016				
Total	601	72.4	501	(X)
UH 2.2-m (Optical/Infrared)	5	1.0	6	1970
Canada-France-Hawaii 3.6-m (Optical/Infrared)	30	7.5	49	1979
NASA IRTF 3.0-m (Infrared)	10	5.1	19	1979
UKIRT 3.8-m (Infrared)	5	2.2	6	1979
James Clerk Maxwell 15-m Submillimeter	32	4.5	36	1986
VLBA Antenna 25-m (Radio)	7	0.4	2	1992
W.M. Keck Observatory (Keck I & II)				
10-m x 2 (Optical/Infrared)	170	14.2	125	1992/1996
Subaru 8-m (Optical/Infrared)	170	17.0	101	1999
Fredrick C. Gillett Gemini 8-m (Optical/Infrared)	92	15.0	83	1999
Submillimeter Array 8x6-m	80	5.5	23	2003
Maunakea Observatories Support Services	(X)	2/ 5.4	51	1980
Haleakala observatories, 2017				
Total	749	40.7	202	(X)
Mees Solar Observatory	1	0.2	1	1963
Haleakala Observatories Projects	(X)	0.2	2	(X)
Maui Space Surveillance Site (MSSS) 3/	250	26.3	117	1965
Ground-Based Electro-Optical Deep Space Surveillance (GEODSS)	25	6.1	16	1983
Faulkes 2-m Telescope	10	0.6	2	2003
Transportable Laser Ranging System (TLRS4)	1	0.8	5	2005
Panoramic Survey Telescope And Rapid Response System (Pan-STARRS)	110	5.6	11	2009
UH Haleakala Support Facilities	9	1.2	15	1962/2008
Daniel K. Inouye Solar Telescope (DKIST)	344	4/ 18.0	35	(5/)

X Not applicable.

1/ Historical cost, not adjusted for inflation, and not including subsequent capital improvements for Maunakea Observatories.

2/ Only \$1.9 million are included in total, as the other \$3.5 million are part of facility operating costs.

3/ Formerly Air Force Maui Optical Station (AMOS).

4/ Operational cost of 18 million not included in the total.

5/ DKIST was scheduled to be operational by 2020. However, data are not yet available.

Source: University of Hawaii at Manoa, Institute for Astronomy, records.