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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, Strategic Industries Division; University of Hawaii, Institute of Astronomy; and individual utility companies. *Historical Statistics of Hawaii*, Section 19, presents data for earlier years. Data for the nation as a whole can be found in the *Statistical Abstract of the United States: 2009*, Sections 16 and 19.

**Table 17.01-- CONSUMPTION OF ENERGY, BY SOURCE
(PHYSICAL UNITS): 1960 TO 2006**

Year	Coal 1/ (1,000 short tons)	Natural gas 2/ (billion cubic feet)	Petroleum (1,000 barrels)	Hydroelectric power 3/ (million kWh)
1960	-	-	16,844	27
1961	-	-	20,074	24
1962	-	-	19,015	20
1963	-	-	19,931	23
1964	-	-	21,257	115
1965	-	-	22,478	105
1966	-	-	25,113	112
1967	-	-	28,252	108
1968	-	-	31,456	94
1969	-	-	33,007	100
1970	-	-	34,105	108
1971	-	-	36,734	89
1972	-	-	37,753	91
1973	-	-	38,826	95
1974	-	-	36,739	92
1975	-	-	37,097	89
1976	-	-	38,047	93
1977	-	-	40,326	86
1978	-	-	40,945	84
1979	-	-	44,660	90
1980	-	3	43,562	86
1981	-	3	38,811	80
1982	47	3	35,706	90
1983	42	3	36,291	84
1984	38	2	37,297	82
1985	46	2	40,006	86
1986	16	2	39,044	78
1987	63	3	39,389	82
1988	50	3	45,902	81
1989	32	3	48,021	56
1990	29	3	50,015	80
1991	45	3	45,758	71
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	39,824	115
1998	822	3	40,484	121
1999	801	3	39,662	115
2000	816	3	40,591	103

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**Table 17.01-- CONSUMPTION OF ENERGY, BY SOURCE
(PHYSICAL UNITS): 1960 TO 2006-- Con.**

Year	Coal 1/ (1,000 short tons)	Natural gas 2/ (billion cubic feet)	Petroleum (1,000 barrels)	Hydroelectric power 3/ (million kWh)
2001	829	3	41,479	101
2002	748	3	45,068	95
2003	837	3	46,963	91
2004	857	3	49,029	94
2005	805	3	4/ 51267	96
2006	797	3	51,579	120

1/ The continuity of these data series estimates may be affected by changing data sources and estimation methodologies.

2/ Includes supplemental gaseous fuels.

3/ Conventional hydroelectric power. Includes pumped-storage hydroelectricity, which cannot be separately identified, from 1960 through 1989.

4/ Revised from previous *Data Book*.

Source: U.S. Department of Energy, Energy Information Administration, State Energy Data System (SEDS) Table 7. Energy Consumption Estimates by Source, Selected Years, 1960-2006, Hawaii
<http://www.eia.doe.gov/emeu/states/hf.jsp?incfile=sep_use/total/use_tot_hi.html&mstate=HAWAII>
accessed June 24, 2009.

Table 17.02-- CONSUMPTION OF ENERGY, BY SOURCE: 1960 TO 2006

[Trillion Btu]

Year	Total	Coal 1/	Natural gas 2/	Petroleum	Hydro-electric power 3/	Biomass 1/ 4/	Other 1/ 5/
1960	94.9	-	-	94.6	0.3	-	-
1961	113.8	-	-	113.5	0.3	-	-
1962	108.3	-	-	108.1	0.2	-	-
1963	114.3	-	-	113.9	0.2	0.2	-
1964	123.5	-	-	122.1	1.2	0.2	-
1965	130.6	-	-	129.3	1.1	0.2	-
1966	145.5	-	-	144.2	1.2	0.1	-
1967	163.9	-	-	162.5	1.1	0.3	-
1968	182.8	-	-	181.1	1.0	0.7	-
1969	190.9	-	-	189.1	1.0	0.7	-
1970	197.0	-	-	195.4	1.1	0.4	-
1971	211.7	-	-	210.4	0.9	0.3	-
1972	218.1	-	-	216.6	0.9	0.6	-
1973	224.3	-	-	222.8	1.0	0.5	-
1974	212.1	-	-	210.6	1.0	0.6	-
1975	214.4	-	-	212.9	0.9	0.6	-
1976	220.0	-	-	218.4	1.0	0.7	-
1977	233.3	-	-	231.9	0.9	0.5	-
1978	236.9	-	-	235.7	0.9	0.3	-
1979	256.6	-	-	255.3	0.9	0.3	-
1980	6/ 262.4	-	6/ -	249.6	0.9	11.9	-
1981	236.7	-	-	223.2	0.8	12.7	-
1982	218.3	1.1	-	203.7	0.9	12.4	-
1983	221.3	1.0	-	205.4	0.9	14.0	-
1984	232.6	0.9	-	216.1	0.9	14.3	0.4
1985	6/ 248.7	1.1	6/ -	232.1	0.9	14.2	0.4
1986	245.5	0.4	-	227.6	0.8	16.3	0.4
1987	249.6	1.6	0.2	228.9	0.9	17.8	0.3
1988	289.8	1.2	-	268.0	0.8	19.4	0.3
1989	309.9	0.8	-	280.1	0.6	27.0	1.5
1990	6/ 321.4	0.7	6/ -	292.7	0.8	25.9	1.2
1991	6/ 295.1	1.1	6/ -	266.5	0.7	25.4	1.4
1992	6/ 306.0	6.8	6/ -	272.4	0.6	24.9	1.3
1993	6/ 284.7	15.6	6/ -	239.7	0.6	24.4	4.5
1994	6/ 301.4	15.7	6/ -	258.3	1.4	20.7	5.2
1995	6/ 299.6	19.9	6/ -	252.6	1.0	19.8	6.3
1996	6/ 285.9	20.4	6/ -	238.9	1.1	19.1	6.6
1997	6/ 276.2	20.5	6/ -	230.5	1.2	17.4	6.6
1998	6/ 275.9	18.2	6/ -	233.4	1.2	16.5	6.5
1999	6/ 271.7	17.7	6/ -	229.9	1.2	17.0	6.0
2000	6/ 276.2	17.7	6/ 0.1	235.2	1.1	15.2	7.1

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Table 17.02-- CONSUMPTION OF ENERGY, BY SOURCE: 1960 TO 2006-- Con.

[Trillion Btu]

Year	Total	Coal 1/	Natural gas 2/	Petro-leum	Hydro-electric power 3/	Biomass 1/ 4/	Other 1/ 5/
2001	6/ 272.4	17.8	6/ 0.1	239.8	1.0	6/ 8.0	5.7
2002	6/ 287.3	16.6	6/ 0.1	259.2	1.0	6/ 7.5	2.9
2003	6/ 304.9	19.3	6/ 0.1	270.1	0.9	6/ 9.3	5.2
2004	6/ 318.3	19.3	6/ 0.2	282.6	0.9	6/ 9.3	6.0
2005	6/ 328.8	18.0	6/ 0.2	295.2	1.0	6/ 8.2	6.3
2006	6/ 332.2	18.0	6/ 0.2	297.2	1.2	6/ 8.5	7.0

1/ The continuity of these data series estimates may be affected by changing data sources and estimation methodologies.

2/ Excludes supplemental gaseous fuels.

3/ Conventional hydroelectric power. Includes pumped-storage hydroelectricity, which cannot be separately identified, from 1960 through 1989.

4/ Wood and waste. Prior to 2001, includes non-biomass waste.

5/ Geothermal, wind, photovoltaic, solar thermal energy and net imports of electricity.

6/ Revised from previous *Data Book*.

Source: U.S. Department of Energy, Energy Information Administration, State Energy Data System (SEDS) Table 7. Energy Consumption Estimates by Source, Selected Years, 1960-2006, Hawaii
<http://www.eia.doe.gov/emeu/states/hf.jsp?incfile=sep_use/total/use_tot_hi.html&mstate=HAWAII>
accessed June 24, 2009.

**Table 17.03-- CONSUMPTION OF ENERGY BY END-USE SECTOR:
1960 TO 2006**

[Trillion Btu]

Year	Residential	Commercial 1/	Industrial	Transportation	Electric power 2/
1960	7.3	5.2	20.6	61.8	17.6
1961	7.5	5.4	26.8	74.0	19.4
1962	8.0	5.5	28.7	66.1	21.4
1963	8.9	6.0	29.9	69.5	24.2
1964	9.6	6.6	32.4	74.8	26.7
1965	10.1	6.8	34.7	79.0	27.6
1966	10.8	7.4	35.8	91.5	29.7
1967	12.1	8.0	38.7	105.1	31.3
1968	13.1	8.8	38.9	122.0	35.0
1969	14.9	9.8	41.0	125.1	38.7
1970	16.4	11.6	43.7	125.3	43.2
1971	17.8	11.4	43.6	138.8	47.7
1972	19.6	12.7	49.3	136.5	54.1
1973	20.0	13.5	50.0	140.9	55.6
1974	20.3	13.3	49.9	128.7	57.5
1975	19.6	13.8	50.4	130.5	58.8
1976	21.3	15.3	51.8	131.7	62.5
1977	21.8	16.8	53.4	141.3	65.2
1978	21.8	17.4	53.1	144.6	66.8
1979	22.9	18.1	59.2	156.4	67.7
1980	3/ 21.9	3/ 19.1	74.7	146.7	69.7
1981	21.7	17.2	73.7	124.1	69.9
1982	20.3	16.0	79.7	102.2	66.9
1983	21.0	16.2	66.3	117.9	68.6
1984	20.0	18.2	65.1	129.3	70.6
1985	3/ 20.2	3/ 18.2	67.4	4/ 142.9	70.0
1986	20.7	20.8	77.0	127.1	72.9
1987	22.2	23.5	79.7	124.1	76.6
1988	23.3	36.7	88.9	140.9	81.9
1989	3/ 25.7	3/ 35.8	93.9	154.5	86.6
1990	3/5/ 31.0	3/5/ 36.9	5/ 98.9	154.5	5/ 105.9
1991	3/ 26.4	3/ 28.5	89.0	151.2	88.7
1992	3/ 30.5	3/ 37.7	93.7	144.1	99.3
1993	3/ 30.2	3/ 31.0	93.1	130.4	101.1
1994	3/ 31.3	3/ 35.4	94.7	140.0	104.3
1995	3/ 32.2	3/ 35.2	94.1	138.2	108.0
1996	3/ 33.0	3/ 34.6	96.7	121.6	110.0
1997	3/ 33.3	3/ 35.9	3/ 89.8	117.2	110.0
1998	3/ 34.2	3/ 45.5	3/ 81.7	114.6	108.2
1999	3/ 33.7	3/ 36.0	3/ 78.9	123.1	108.9
2000	3/ 34.7	3/ 37.2	3/ 79.1	125.2	111.3

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**Table 17.03-- CONSUMPTION OF ENERGY BY END-USE SECTOR:
1960 TO 2006-- Con.**

[Trillion Btu]

Year	Residential	Commercial 1/	Industrial	Transportation	Electric power 2/
2001	3/ 33.8	3/ 36.3	3/ 70.3	132.0	3/ 107.5
2002	3/ 35.7	3/ 38.6	3/ 71.1	141.8	3/ 111.7
2003	3/ 35.0	3/ 39.5	3/ 66.8	163.6	3/ 111.0
2004	3/ 36.0	3/ 43.5	3/ 67.0	171.7	3/ 113.1
2005	3/ 36.6	3/ 41.8	3/ 71.1	179.4	3/ 112.2
2006	36.9	42.5	71.1	181.6	113.0

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

2/ Replaces Electric Utilities of previous years.

3/ Revised from previous *Data Book*.

4/ There is a discontinuity between 1980 and 1981 due to the expanded coverage of renewable energy sources beginning in 1981.

5/ There is a discontinuity between 1988 and 1989 due to the expanded coverage of renewable energy sources beginning in 1989.

Source: U.S. Department of Energy, Energy Information Administration, State Energy Data System (SEDS) Consumption, 1960-2006, Hawaii

<http://www.eia.doe.gov/emeu/states/state.html?q_state_a=hi&q_state=HAWAII> accessed June 24, 2009.

Table 17.04-- PRIMARY ENERGY CONSUMPTION AND ELECTRICITY SALES, TOTAL AND PER CAPITA: 1991 TO 2007

Year	Primary energy consumption		Electricity sales by utilities	
	Total (trillion Btu)	Per capita 1/ (million Btu)	Total (1,000 kWh)	Per capita 1/ (kWh)
1991	322.9524	257.895	8,564,032	6,839
1992	339.0912	266.652	8,666,889	6,815
1993	307.7465	242.731	8,657,903	6,829
1994	327.4778	253.897	8,948,458	6,938
1995	315.1186	242.754	9,187,430	7,078
1996	315.9492	242.308	9,378,962	7,193
1997	315.9927	237.959	9,345,281	7,037
1998	302.8773	227.023	9,261,070	6,942
1999	308.4009	231.455	9,379,808	7,040
2000	325.2151	243.680	9,690,598	7,261
2001	304.6372	228.518	9,776,882	7,334
2002	306.2823	227.434	9,958,768	7,395
2003	320.3960	236.768	10,206,405	7,542
2004	324.0634	235.974	10,508,642	7,652
2005	324.5542	232.981	10,538,507	7,565
2006	318.7241	226.428	10,567,913	7,508
2007 2/	328.6137	233.700	10,585,038	7,528

1/ Based on estimated de facto population.

2/ Preliminary.

Source: Hawaii State Department of Business, Economic Development & Tourism, Strategic Industries Division, Energy Branch, records.

**Table 17.05-- PRIMARY ENERGY CONSUMPTION, BY SOURCE:
1990 TO 2007**

[Trillion Btu]

Year	Total	Petroleum	Biomass	Solar hot water
1990	312.1304	284.4906	18.1200	2.3400
1991	322.9524	294.6222	17.9000	2.3000
1992	339.0912	305.7758	16.9840	2.3000
1993	307.7465	266.9516	16.8310	2.3000
1994	327.4778	285.5010	16.3660	2.3000
1995	315.1186	273.9590	11.8232	2.8386
1996	315.9492	277.1298	10.3994	3.1225
1997	315.9927	278.3480	8.9527	3.1225
1998	302.8773	269.1272	7.5220	3.1225
1999	308.4009	272.4720	9.2784	3.5483
2000	325.2151	290.2354	7.1331	3.5483
2001	304.6372	273.7797	3.4243	3.6792
2002	306.2823	272.8375	5.5584	4.0214
2003	320.3960	284.4207	6.0847	4.0687
2004	324.0634	287.7538	6.1256	4.3053
2005	324.5542	291.5014	5.2839	4.4945
2006	318.7241	283.6873	5.5054	4.6364
2007 1/	328.6137	290.3796	6.5719	4.7311

Year	Hydroelectric	Coal	Wind	Geothermal	Solid waste
1990	1.0700	0.8900	0.2900	-	4.9298
1991	1.0000	0.8000	0.3060	-	6.0242
1992	0.7226	6.9207	0.2573	0.0168	6.1140
1993	0.8024	13.2237	0.2352	1.5988	5.8038
1994	1.5300	13.5599	0.2251	1.8060	6.1898
1995	1.0632	16.5249	0.2364	2.3045	6.3688
1996	1.1332	16.9294	0.2244	2.3566	4.6539
1997	0.9544	16.7772	0.1796	2.3633	5.2950
1998	0.7654	14.7665	0.2159	2.2782	5.0796
1999	1.2410	14.5187	0.1738	2.0255	5.1432
2000	0.9481	15.4724	0.1794	2.5855	5.1086
2001	1.0439	15.7719	0.1809	2.1356	4.6107
2002	1.0318	17.1440	0.1354	0.7637	4.7791
2003	0.7962	18.2279	0.1137	1.8181	4.8467
2004	0.9034	17.8472	0.0788	2.1765	4.8533
2005	1.1463	15.5778	0.0692	2.2801	4.2010
2006	1.2983	15.8569	0.8466	2.1937	4.6995
2007 1/	1.3147	16.5933	2.5006	2.3756	4.1469

1/ Preliminary.

Source: Hawaii State Department of Business, Economic Development & Tourism, Strategic Industries Division, Energy Planning & Policy Branch, records.

Table 17.06-- ELECTRICITY GENERATION BY SOURCE: 1989 TO 2007

[Millions of kWh generated]

Year	Total	Petroleum	Biomass	MSW 1/	Hydroelectric
1989	9,280	8,511	614	-	100
1990	9,566	8,589	538	-	105
1991	9,610	8,664	495	-	92
1992	10,104	8,556	460	-	67
1993	10,219	7,576	435	349	78
1994	10,341	7,793	423	379	148
1995	10,563	7,853	292	383	103
1996	10,742	8,027	270	326	110
1997	10,424	7,805	226	371	93
1998 2/	10,455	8,009	178	364	87
1999	10,719	8,144	333	361	113
2000	12,008	9,360	211	362	99
2001	10,839	8,449	153	275	109
2002	10,858	8,651	137	300	99
2003	10,978	8,548	174	338	71
2004	11,654	9,071	181	325	101
2005	11,676	9,135	174	337	111
2006	11,701	9,110	170	388	127
2007	51,240	8,670	155	303	94

Year	Geothermal	Wind	Coal	PV 3/	Other 4/
1989	14	41	-	-	(5/)
1990	-	28	-	-	306
1991	-	30	-	-	329
1992	1	21	-	-	999
1993	155	24	1,592	(5/)	10
1994	175	22	1,382	(5/)	19
1995	223	23	1,674	(5/)	12
1996	228	22	1,740	(5/)	19
1997	229	17	1,663	(5/)	20
1998 2/	220	21	1,553	(5/)	20
1999	196	13	1,541	(5/)	18
2000	250	17	1,695	(5/)	14
2001	207	18	1,616	6/ 1	12
2002	74	13	1,580	-	4
2003	176	13	1,658	6/ 2	-
2004	211	8	1,757	6/ 2	-
2005	221	7	1,691	(5/)	-
2006	212	82	1,612	6/ 2	-
2007	230	238	1,578	6/ 8	-

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Table 17.06-- ELECTRICITY GENERATION BY SOURCE: 1989 TO 2007 -- Con.

- 1/ Electricity generated from Honolulu municipal solid waste plant.
 - 2/ Electricity generated from photovoltaic.
 - 3/ From 1989 to 1992, includes electricity production by coal, geothermal (a test well which ceased operation in 1989), and photovoltaic.
 - 4/ Less than 500,000 kWh.
 - 5/ Preliminary.
 - 6/ Data may not be complete.
- Source: Hawaii State Department of Business, Economic Development & Tourism, Strategic Industries Division, records; Hawaii State Department of Commerce and Consumer Affairs, records; Hawaii Agriculture Research Center, records.

**Table 17.07-- ELECTRICITY PRODUCTION, BY SOURCE, BY ISLAND:
2007**

[Million kWh]

Island	Total	Petroleum	Biomass	MSW 1/	Hydroelectric
State total	11,274	8,668	156	303	94
Hawaii	1,259	870	-	-	42
Maui	1,385	1,067	115	-	13
Lanai	32	32	-	-	-
Molokai	39	39	-	-	-
Oahu	8,293	6,440	34	303	-
Kauai	266	220	7	-	39
Island	Wind	Geothermal	Coal	PV 2/ 3/	Other
State total	238	230	1,578	8	-
Hawaii	112	230	-	4.4	-
Maui	126	-	62	1.3	-
Lanai	-	-	-	-	-
Molokai	-	-	-	-	-
Oahu	-	-	1,516	1.7	-
Kauai	-	-	-	0.5	-

1/ Electricity generated from Honolulu municipal solid waste plant.

2/ Electricity generated from photovoltaic.

3/ Data may not be complete.

Source: Hawaii State Department of Business, Economic Development & Tourism, Strategic Industries Division, records; Hawaii State Department of Commerce and Consumer Affairs, records.

Table 17.08 -- FUEL, ELECTRICITY, AND TOTAL ENERGY EXPENDITURES BY SOURCE: 1991 TO 2007

[Millions of dollars]

Year	Total energy expenditures	Fuel expenditures			Plus: electricity expenditures by customers	Minus: electric utility fuel expenditures 1/
		Total	Electric utility	Other		
1991	2,217.5	1,736.4	304.8	1,431.6	785.9	304.8
1992	2,340.3	1,760.0	238.2	1,521.8	818.5	238.2
1993	2,369.9	1,660.4	213.3	1,447.1	922.8	213.3
1994	2,397.0	1,642.5	201.4	1,441.1	955.9	201.4
1995	2,459.4	1,645.2	223.5	1,421.7	1,037.7	223.5
1996	2,712.0	1,843.9	268.9	1,575.0	1,137.0	268.9
1997	2,756.5	1,863.6	276.2	1,587.4	1,169.2	276.2
1998	2,442.9	1,580.2	210.9	1,369.3	1,073.6	210.9
1999	2,544.6	1,656.2	234.7	1,421.5	1,123.1	234.7
2000	3,305.5	2,339.9	394.2	1,945.7	1,359.8	394.2
2001	3,373.4	2,377.2	374.9	2,002.3	1,371.1	374.9
2002	3,078.5	2,073.0	333.5	1,739.5	1,339.0	333.5
2003	3,690.9	2,605.7	400.0	2,205.6	1,485.2	400.0
2004	4,346.1	3,213.9	524.5	2,689.4	1,656.8	524.5
2005	5,492.9	4,258.5	693.5	3,565.0	1,927.9	693.5
2006 2/	6,169.1	4,728.0	749.1	3,978.9	2,190.2	749.1
2007	6,208.3	4,803.6	848.7	3,954.9	2,253.4	848.7

1/ Electric utility fuel expenditures are subtracted from the sum of total fuel expenditures and electricity expenditures by customers to avoid double counting when calculating total energy expenditures.

2/ Preliminary.

Source: Hawaii State Department of Business, Economic Development & Tourism, Strategic Industries Division, Energy Planning & Policy Branch, records.

Table 17.09-- ELECTRIC UTILITIES: 1995 TO 2008

Year	Customers, Dec. 31			Power sold (1,000 kWh)		
	Total	Residen- tial 1/	Other	Total	Residen- tial 1/	Other
1995	409,983	352,589	57,394	9,187,430	2,597,010	6,590,419
1996	413,830	356,205	57,625	9,378,962	2,669,654	6,709,308
1997	415,964	358,683	57,281	9,345,281	2,659,248	6,686,033
1998	418,989	361,429	57,560	9,261,070	2,634,172	6,626,899
1999	424,603	366,273	58,330	9,379,808	2,683,408	6,696,400
2000	430,354	370,928	59,426	9,690,598	2,764,619	6,925,980
2001	436,150	376,054	60,096	9,776,882	2,802,432	6,974,450
2002	441,323	380,608	60,715	9,958,768	2,921,563	7,037,206
2003	449,354	387,162	62,192	10,206,405	3,024,509	7,181,897
2004	455,278	391,567	63,711	10,508,642	3,156,499	7,352,142
2005	463,088	398,332	64,756	10,538,507	3,164,029	7,374,478
2006	469,013	403,278	65,735	10,567,913	3,180,852	7,387,061
2007	475,104	408,923	66,181	10,585,038	3,200,675	7,384,363
2008	476,124	410,477	65,647	10,390,012	3,085,183	7,304,829

Year	Average annual use (kWh) 2/		Average rate (dollars per kWh)		Revenues (\$1,000)		
	Residen- tial	Other	Residen- tial	Other	Total	Residen- tial	Other
1995	7,366	114,828	0.13337	0.10490	1,037,702	346,359	691,343
1996	7,495	116,431	0.14272	0.11268	1,137,045	381,011	756,034
1997	7,414	116,723	0.14839	0.11584	1,169,134	394,603	774,531
1998	7,288	115,130	0.13884	0.10682	1,073,610	365,719	707,891
1999	7,326	114,802	0.14312	0.11037	1,123,126	384,043	739,083
2000	7,453	116,548	0.16409	0.13083	1,359,756	453,650	906,106
2001	7,452	116,055	0.16336	0.13095	1,371,113	457,797	913,317
2002	7,676	115,906	0.15703	0.12508	1,338,980	458,781	880,199
2003	7,812	115,479	0.16743	0.13629	1,485,234	506,399	978,835
2004	8,061	115,398	0.18031	0.14793	1,656,764	569,162	1,087,601
2005	7,943	113,881	0.20656	0.17280	1,927,872	653,568	1,274,304
2006	7,887	112,376	0.23358	0.19590	2,190,152	742,994	1,447,158
2007	7,827	111,578	0.24122	0.20061	2,253,432	772,065	1,481,368
2008	7,516	111,274	0.32497	0.27809	3,033,951	1,002,582	2,031,369

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, records.

Table 17.10-- ELECTRIC UTILITIES, BY ISLAND: 2008

Island	Customers, Dec. 31			Gross System Peak 2/	Power sold (1,000 kWh)		
	Total	Residential 1/	Other	(mW)	Total	Residential 1/	Other
State total	476,124	410,477	65,647	(X)	10,390,012	3,085,183	7,304,829
Oahu	293,740	259,929	33,811	1,227.0	7,555,962	2,048,728	5,507,234
Hawaii	79,606	66,188	13,418	202.4	1,141,030	441,413	699,617
Kauai	35,713	27,435	8,278	74.3	453,791	160,479	293,312
Lanai	1,648	1,413	235	5.3	29,138	8,120	21,018
Maui	62,266	52,922	9,344	199.0	1,176,505	414,006	762,499
Molokai	3,151	2,590	561	6.0	33,586	12,437	21,149
Island	Average annual use (kWh) 3/		Average rate (dollars per kWh)		Revenues (\$1,000)		
	Residential 1/	Other	Residential 1/	Other	Total	Residential 1/	Other
State total	7,516	111,274	0.32497	0.27809	3,033,951	1,002,582	2,031,369
Oahu	7,882	162,883	0.28892	0.24628	1,948,243	591,916	1,356,327
Hawaii	6,669	52,140	0.40883	0.37842	445,214	180,462	264,752
Kauai	5,849	35,433	0.42075	0.41570	189,451	67,522	121,929
Lanai	5,747	89,438	0.44089	0.44362	12,904	3,580	9,324
Maui	7,823	81,603	0.37117	0.35394	423,546	153,668	269,878
Molokai	4,802	37,699	0.43692	0.43307	14,593	5,434	9,159

X Not applicable.

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/ System peak is the maximum amount of energy required by the electrical system at a point in time. The island electrical systems are not interconnected, therefore, peaks are reported separately for each island.

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

Source: Hawaii State Department of Commerce and Consumer Affairs, Division of Consumer Advocacy, records.

Table 17.11-- GAS UTILITIES: 1995 TO 2008

[Excludes bottled gas]

Year	Customers, Dec. 31			Gas sold (1,000 therms)		
	Total	Residential 1/	Other	Total	Residential 1/	Other
1995	36,619	32,950	3,669	33,740	5,793	27,948
1996	36,641	33,020	3,621	33,531	5,642	27,888
1997	36,575	32,977	3,598	32,980	5,603	27,377
1998	36,225	32,630	3,595	33,095	5,702	27,393
1999	36,363	32,757	3,606	34,099	5,577	28,522
2000	36,404	32,804	3,600	34,820	5,477	29,343
2001	36,431	32,833	3,598	34,159	5,401	28,758
2002	36,236	32,629	3,607	33,974	5,357	28,617
2003	36,046	32,415	3,631	33,556	5,170	28,386
2004	36,049	32,413	3,636	34,241	5,087	29,154
2005	35,850	32,229	3,621	34,249	5,041	29,208
2006	35,793	32,164	3,629	34,340	4,983	29,357
2007	35,692	32,078	3,614	34,685	4,933	29,752
2008	35,364	31,752	3,612	33,100	4,807	28,293

Year	Average annual use (therms) 2/		Average rate (dollars per therm)		Revenues (\$1,000)		
	Residential 1/	Other	Residential 1/	Other	Total	Residential 1/	Other
1995	176	7,617	1.79670	1.25158	45,386	10,407	34,979
1996	171	7,702	2.10399	1.33578	49,124	11,872	37,252
1997	170	7,609	2.29075	1.40013	51,167	12,835	38,332
1998	175	7,620	2.16236	1.25934	46,826	12,329	34,497
1999	170	7,910	2.17266	1.24026	47,491	12,116	35,375
2000	167	8,151	2.45358	1.48560	57,031	13,439	43,592
2001	165	7,993	2.59225	1.56297	58,949	14,001	44,948
2002	164	7,934	2.87341	1.50635	58,500	15,393	43,107
2003	159	7,818	3.05760	1.71228	64,412	15,807	48,605
2004	157	8,018	3.23468	1.87938	71,245	16,453	54,792
2005	156	8,066	3.64213	2.26578	84,539	18,360	66,179
2006	155	8,090	3.87417	2.46238	91,593	19,305	72,288
2007	154	8,232	3.93554	2.52524	94,545	19,414	75,131
2008	151	7,833	4.89349	3.46955	121,687	23,523	98,164

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, records.

Table 17.12-- GAS UTILITIES, BY ISLAND: 2008

[Excludes bottled gas]

Island	Customers, December 31			Gas sold (1,000 therms)		
	Total	Residen- tial 1/	Other	Total	Residen- tial 1/	Other
State total	35,364	31,752	3,612	33,100	4,807	28,293
Oahu	32,180	28,943	3,237	29,920	4,319	25,601
Hawaii	1,788	1,495	293	2,301	290	2,011
Kauai	792	792	0	90	90	-
Lanai	9	9	-	1	1	-
Maui	513	431	82	774	93	681
Molokai	82	82	-	14	14	-

Island	Average annual use (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	151	7,833	4.89349	3.46955	121,687	23,523	98,164
Oahu	149	7,909	4.91063	3.52451	111,440	21,209	90,231
Hawaii	194	6,863	4.93103	2.96818	7,399	1,430	5,969
Kauai	114	-	4.86667	-	438	438	-
Lanai	-	-	-	-	5	5	-
Maui	216	8,305	4.08602	2.88399	2,344	380	1,964
Molokai	171	-	4.35714	-	61	61	-

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, records.

**Table 17.13-- SERVICE PROVIDED BY HAWAIIAN ELECTRIC COMPANY, INC.,
ON OAHU: 1991 TO 2008**

Year	Number of customers, Dec. 31		Net input 1/ (1,000 kWh)	Electricity sales (1,000 kWh)	Average annual residential use 2/ (kWh)	Average residential rate (dollars per kWh)	Generating capability Dec. 31 3/ (1000 kW)
	Total	Residential only					
1991	255,176	223,304	6,876,964	6,538,952	7,610	0.09354	1,440
1992	257,442	225,229	7,061,157	6,650,449	7,711	0.09925	1,666
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

1/ Net generation plus purchased power.

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

3/ Gross capability including firm purchase power.

Source: Hawaiian Electric Company, Inc., records.

**Table 17.14-- UTILITY SERVICE PROVIDED BY THE GAS COMPANY
ON OAHU: 1991 TO 2008**

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	32,649	29,413	31,346	4,459	152
2008	32,358	29,123	29,920	4,318	148

1/ Includes liquefied petroleum gas.

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

Table 17.15-- LIQUID FUEL TAX BASE: 1996 TO 2008

[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
1996	1,147,866	588,896	394,989	160,102	29,864
1997	955,834	585,400	400,435	150,737	30,109
1998	954,860	597,410	394,674	169,930	28,983
1999	969,434	621,832	384,260	201,664	32,098
2000	1,053,114	684,247	400,920	246,426	33,282
2001	962,973	627,076	409,910	179,000	34,018
2002	994,141	646,185	429,613	175,096	36,157
2003	835,991	587,927	452,499	91,988	37,004
2004	1,066,808	727,943	459,321	220,562	43,223
2005	972,642	647,843	454,115	146,922	43,440
2006	869,789	657,355	472,658	131,665	50,065
2007	1/ 1,016,128	1/ 780,475	480,632	215,503	66,030
2008	920,042	710,863	443,918	158,894	57,613

Year reported	Liquefied petroleum gas		Aviation fuel	Small boats		Other fuel
	Off hwy.	Hwy. use		Gasoline	Diesel oil	
1996	3,249	413	558,969	50	228	(X)
1997	3,587	328	370,433	41	164	(X)
1998	3,280	383	357,450	9	151	(X)
1999	3,326	360	347,602	4	119	(X)
2000	3,250	332	368,867	2	35	(X)
2001	3,783	310	335,897	9	47	(X)
2002	4,991	267	347,956	5	40	16
2003	5,739	391	248,065	2	22	281
2004	3,368	246	338,866	8	16	1,200
2005	1,222	300	324,799	15	42	1,786
2006	1	142	212,434	23	45	2,756
2007	(2/)	108	235,653	262	626	17,314
2008	-	96	209,179	452	5,004	44,886

X Not applicable.

1/ Revised from previous *Data Book*.

2/ 272 gallons.

Source: Hawaii State Department of Taxation, Tax Research & Planning, "Liquid Fuel Tax Base & Tax Collections" (annual); 2007 data revised September 16, 2008; 2008 data revised January 29, 2009

<http://www.hawaii.gov/tax/a5_3txcolrptarchive.htm> accessed May 12, 2009.

Table 17.16-- LIQUID FUEL TAX BASE, BY COUNTY: 2008

[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	State total	City and Co. of Honolulu	County of Maui	County of Hawaii	County of Kauai
Total	920,042	544,052	139,746	151,657	84,587
Gasoline	443,918	277,976	62,215	74,580	29,147
Diesel oil, non-hwy.	158,894	115,723	15,730	8,310	19,130
Diesel oil, hwy. use	57,613	31,416	8,084	15,062	3,050
Liq. pet. gas, off hwy.	-	-	-	-	-
Liq. pet. gas, hwy. use	96	79	7	6	5
Small boats, gasoline	452	289	10	143	10
Small boats, diesel oil	5,004	3,929	175	529	370
Aviation fuel	209,179	112,744	53,199	26,154	17,083
Other fuel	44,886	1,896	325	26,873	15,792

Source: Hawaii State Department of Taxation, Tax Research & Planning, "Liquid Fuel Tax Base & Tax Collections - CY Ending December 31, 2008 Revised" <http://www.hawaii.gov/tax/a5_3txcolrptarchive.htm> accessed May 12, 2009.

**Table 17.17-- GASOLINE STATIONS (NAICS 447), BY COUNTY:
1998 TO 2006**

[Excludes most government employees, railroad employees, and self-employed persons. Statistics based on the North American Industry Classification System (NAICS) which replaced the Standard Industrial Classification (SIC) system used in the *County Business Patterns* prior to 1998. Therefore, comparability between the current data and data prior to 1998 may be limited]

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

Source: U.S. Census Bureau, *County Business Patterns, Hawaii* (annual). See also <http://censtats.census.gov/cbpnaic/cbpnaic.shtml> accessed December 2, 2008.

**Table 17.18-- BOILERS AND PRESSURE VESSELS, BY ISLAND:
2007 AND 2008**

[As of December 31]

Island	Total	Power boilers	Heating boilers	Pressure vessels
2007				
State total	10,597	493	2,315	7,789
Hawaii	1,426	72	317	1,037
Maui	1,270	60	289	921
Lanai	41	2	8	31
Molokai	52	2	9	41
Oahu	7,269	318	1,601	5,350
Kauai	539	39	91	409
2008				
State total	10,549	495	2,267	7,787
Hawaii	1,354	65	281	1,008
Maui	1,279	66	291	922
Lanai	35	1	8	26
Molokai	47	2	11	34
Oahu	7,308	322	1,587	5,399
Kauai	526	39	89	398

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 AND FOR R&D PLANT IN HAWAII: 1997 TO 2006

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

Year	R&D	R&D plant	Year	R&D	R&D plant
1997	150.7	3.0	2002	375.2	6.4
1998	164.5	1.5	2003	349.6	1.9
1999	198.8	9.3	2004	392.6	7.0
2000	209.7	1.8	2005	384.4	43.8
2001	293.1	2.8	2006	340.1	5.6

Source: National Science Foundation/Division of Science Resources Statistics, *Federal Funds for Research and Development*, various issues, and records.

Table 17.20-- PRIVATE SECTOR TECHNOLOGY JOBS AND EARNINGS: 2002 TO 2008

[Jobs includes paid employees and proprietors. Earnings include wages/salaries and benefits]

	2002	2003	2004	2005	2006	2007	2008	% Change in jobs 2007-08	Average annual earnings 2008
Technology sector total	20,589	20,968	21,589	22,973	23,455	23,597	24,267	2.84	65,655
Technology manufacturing	699	551	384	562	586	605	716	18.35	72,073
Technology equipment distribution	854	843	854	893	816	806	871	8.06	77,263
Information and telecommunications technology services	2,196	2,046	2,237	2,278	2,383	2,333	2,196	-5.87	61,301
Engineering and related services	4,212	4,376	4,424	4,513	4,673	4,814	4,842	0.58	71,649
Computer services	5,587	5,908	6,194	6,281	6,629	6,450	6,583	2.06	67,965
Technical consulting services	2,980	2,815	2,911	3,598	3,423	3,546	3,760	6.03	52,159
Research & development services	2,714	2,947	3,050	3,252	3,320	3,356	3,604	7.39	70,946
Medical and diagnostic testing	1,347	1,482	1,535	1,596	1,625	1,687	1,695	0.47	55,240
Biotechnology 1/	3,050	3,124	3,296	3,676	3,834	3,784	3,927	3.78	55,288

1/ Includes selected elements of the eight technology sector industry groups based on the definition of biotechnology established by established by the national industry group, BIO.

Source: Hawaii State Department of Business, Economic Development and Tourism, Economic Information Branch, records.

**Table 17.21-- SHARE OF TECHNOLOGY SECTOR JOBS, BY COUNTY:
1999 AND 2001**

[In percent, unless otherwise specified]

Year	Total State Job (number)	State	Hawaii	Maui	Honolulu	Kauai	County unknown
1999	12,417	100	7	8	80	4	1
2001	13,553	100	6	8	82	4	< 1

Source: Hawaii State Department of Business, Economic Development & Tourism, DBEDT e-reports "Hawaii's Expanding Tech Sector", May 2001; DBEDT e-Reports "Hawaii's Technology Sector in 2001", November 2002 <<http://www.hawaii.gov/dbedt/tech02/index.html>> accessed January 14, 2003.

Table 17.22-- TOP 30 STATES FOR TECHNOLOGY AND SCIENCE INDEX: 2002, 2004 AND 2008

[The State Technology and Science Index observes 77 unique indicators that are categorized into five major components. These components are human capital investment, research and development inputs, risk capital and entrepreneurial infrastructure, technology and science work force and technology concentration and dynamism. Ranked by largest number in 2008]

City and state	Average score			State ranking		
	2002	2004	2008	2002	2004	2008
Massachusetts	84.9	84.4	82.6	1	1	1
Maryland	77.9	78.2	80.0	4	4	2
Colorado	80.6	78.8	78.3	2	3	3
California	80.4	78.9	74.6	3	2	4
Washington	71.8	69.9	72.1	6	6	5
Virginia	73.3	72.3	70.3	5	5	6
Connecticut	68.6	66.3	70.2	8	10	7
Utah	68.3	66.5	69.2	9	9	8
New Hampshire	63.4	63.5	67.9	13	12	9
Rhode Island	57.3	64.0	66.7	21	11	10
Minnesota	65.9	67.5	64.1	10	8	11
New Jersey	70.0	69.1	63.4	7	7	12
Pennsylvania	59.8	60.4	63.2	16	16	13
Delaware	65.5	62.5	62.3	11	13	14
New York	64.5	60.7	62.2	12	15	15
New Mexico	57.9	61.8	61.9	20	14	16
Arizona	58.6	58.5	61.3	18	17	17
North Carolina	58.9	57.3	59.6	17	20	18
Vermont	46.1	56.0	58.8	31	22	19
Texas	60.4	54.9	57.8	14	23	20
Illinois	58.4	56.6	57.2	19	21	21
Wisconsin	53.7	51.8	57.1	25	27	22
Oregon	55.5	57.8	56.2	23	19	23
Kansas	56.9	53.1	54.2	22	26	24
Georgia	60.2	58.1	53.3	15	18	25
Michigan	54.5	54.0	52.3	24	25	26
Idaho	51.0	49.1	51.4	26	30	27
Hawaii	34.0	40.1	51.2	43	39	28
Alabama	45.0	42.4	50.0	33	36	29
Missouri	47.5	48.1	49.6	28	31	30

Source: Milken Institute "State Technology and Science Index: Enduring Lessons for the Intangible Economy June 2008 " State Overall Ranking <<http://www.milkeninstitute.org/tech/tech.taf?sub=tsi>> accessed June 23, 2008.

**Table 17.23-- RESEARCH AND NON-RESEARCH EXTRAMURAL FUNDING,
FOR THE UNIVERSITY OF HAWAII: 1991-1992 TO 2007-2008**

[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]

Fiscal year ending June 30	Total		Research		Non-research	
	Awards	Amount (dollars)	Awards	Amount (dollars)	Awards	Amount (dollars)
1991-1992	1,221	124,876,638	703	65,791,624	518	59,085,014
1992-1993	1,146	131,075,215	636	61,059,928	510	70,015,287
1993-1994	1,322	142,563,794	755	77,763,782	567	64,800,012
1994-1995	1,147	139,199,221	616	70,222,653	531	68,976,568
1995-1996	1,191	134,469,155	697	76,698,552	494	57,770,603
1996-1997	1,255	160,859,800	724	89,131,636	531	71,728,164
1997-1998	1,300	159,948,612	763	91,746,988	537	68,201,624
1998-1999	1,254	164,168,101	707	92,737,645	547	71,430,456
1999-2000	1,379	180,629,855	767	102,845,010	612	77,784,845
2000-2001	1,405	216,233,918	835	132,833,308	570	83,400,610
2001-2002	1,629	252,370,477	971	141,875,022	658	110,495,455
2002-2003	1,646	323,868,218	976	190,374,465	670	133,493,753
2003-2004	1,675	328,982,431	1,002	199,944,709	673	129,037,722
2004-2005	1,742	354,127,142	1,022	209,196,531	720	144,930,611
2005-2006	1,785	433,360,395	1,068	236,708,881	717	196,651,514
2006-2007	1,778	354,031,667	1,081	209,909,883	697	144,121,784
2007-2008	1,758	367,580,150	1,093	211,778,184	665	155,801,966

Source: University of Hawaii, Office of Research Services, *2006-2007 Executive Managerial Report* and previous reports <http://www.hawaii.edu/ors/filecabinet_managerial_report.htm> accessed June 24, 2009.

Table 17.24-- RESEARCH AND DEVELOPMENT EXPENDITURES AT DOCTORATE-GRANTING INSTITUTIONS: FISCAL YEAR 1991 TO 2006

[In thousands of dollars]

Year	Total	Federally financed	State and local government financed	Industry financed	Institutionally financed	All other sources
1991	78,166	44,857	27,321	856	3,391	1,741
1992	80,258	47,684	26,775	337	3,319	2,143
1993	73,961	41,362	27,099	151	3,109	2,240
1994	70,079	39,392	25,204	434	3,290	1,759
1995	78,429	44,238	26,789	299	3,738	3,365
1996	111,202	66,902	31,826	8,088	4,386	-
1997	120,107	72,421	28,440	5,944	13,297	5
1998	148,007	86,886	37,002	10,949	13,170	-
1999	156,810	93,418	35,111	13,021	15,260	-
2000	161,300	95,419	35,474	11,158	19,249	-
2001	156,976	97,716	33,125	7,232	18,903	-
2002	172,664	119,381	31,062	9,971	12,232	18
2003	184,602	148,662	11,822	6,931	17,171	16
2004	241,346	191,252	8,815	21,234	19,892	153
2005	240,247	199,135	7,077	12,155	21,282	598
2006	257,478	210,097	8,933	12,551	25,888	9

Source: National Science Foundation, Division of Science Resources Statistics, *Academic Research and Development Expenditures: Fiscal Year" (annual)*,
 <<http://www.nsf.gov/statistics/rdexpenditures/>> accessed November 6, 2008.

Table 17.25-- PATENTS ISSUED TO HAWAII RESIDENTS: 1988 TO 2008

Calendar year	Patents	Calendar year	Patents	Calendar year	Patents
1988	62	1995	84	2002	91
1989	71	1996	104	2003	96
1990	85	1997	93	2004	86
1991	80	1998	93	2005	58
1992	81	1999	97	2006	101
1993	106	2000	93	2007	82
1994	99	2001	107	2008	101

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, 2008* (March 2009) <http://www.uspto.gov/web/offices/ac/ido/oeip/taf/cst_all.pdf> accessed June 25, 2009.

**Table 17.26-- ASTRONOMY AND RELATED FACILITIES AT
THE SUMMITS OF MAUNA KEA AND HALEAKALA: 2008**

Facility (mirror diameter in meters)	Capital cost 1/ (\$ mil)	Annual operating cost (\$ mil)	County based staff	Opera- tional
Mauna Kea observatories:				
UH 2.2-m (Optical/Infrared)	5	1.2	7	1970
Canada-France-Hawaii 3.6-m (Optical/Infrared)	30	7.5	49	1979
NASA IRTF 3.0-m (Infrared)	10	4.0	16	1979
United Kingdom 3.8-m (Infrared)	5	3.3	27	1979
James Clerk Maxwell 15-m Submillimeter	32	3.8	27	1986
Caltech 10.4-m Submillimeter	10	2.6	11	1986
VLBA Antenna 25-m (Radio)	7	0.3	2	1992
W.M. Keck Observatory (Keck I & II) 10-m x 2 (Optical/Infrared)	170	13.0	130	1992/1996
Subaru (Japan National Large Telescope) 8-m (Optical/Infrared)	170	18.4	96	1999
Fredrick C. Gillett Gemini 8m (Optical/Infrared)	92	13.3	105	1999
Submillimeter Array 8x6-m	80	5.0	27	2003
Mauna Kea Observatories Support Services	(X)	2/ 3.9	30	1980
Total	611	72.4	527	
Haleakala observatories:				
Mees Solar Observatory	0.5	0.10	2	1968
Haleakala Observatories Projects	(NA)	0.42	5	1979
Maui Space Surveillance Site (MSSS) 3/ Advanced Electro-Optical System	200.0	16.00	120	1979
3.7-m Telescope (AEOS)	50.0	15.00	55	1997
Faulkes 2-m Telescope	5.0	0.40	2	2003
Transportable Laser Ranging System (TLRS4)	0.6	0.40	4	2005
Panoramic Survey Telescope And Rapid Response System (Pan-STARRS) PS1 @ LURE Observatory	15.0	3.00	9	2009
Haleakala Support Facilities	(NA)	0.38	9	(NA)
Total	261.1	35.70	208	

NA Not available.

X Not applicable.

1/ Historical cost, not adjusted for inflation, and not including subsequent capital improvements for Mauna Kea Observation.

2/ Not included in the total since derived from facility operating costs.

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

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