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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: 2011*, Sections 16 and 19.

**Table 17.01-- CONSUMPTION OF ENERGY, BY SOURCE  
(PHYSICAL UNITS): 1960 TO 2008**

Year	Coal (1,000 short tons)	Natural gas 1/ (billion cubic feet)	Petroleum (1,000 barrels)	Hydroelectric power 2/ (million kWh)	Fuel ethanol 3/
1960	-	-	16,844	27	(NA)
1961	-	-	20,074	24	(NA)
1962	-	-	19,015	20	(NA)
1963	-	-	19,931	23	(NA)
1964	-	-	21,257	115	(NA)
1965	-	-	22,478	105	(NA)
1966	-	-	25,113	112	(NA)
1967	-	-	28,252	108	(NA)
1968	-	-	31,456	94	(NA)
1969	-	-	33,007	100	(NA)
1970	-	-	34,105	108	(NA)
1971	-	-	36,734	89	(NA)
1972	-	-	37,753	91	(NA)
1973	-	-	38,826	95	(NA)
1974	-	-	36,739	92	(NA)
1975	-	-	37,097	89	(NA)
1976	-	-	38,047	93	(NA)
1977	-	-	40,326	86	(NA)
1978	-	-	40,945	84	(NA)
1979	-	-	44,660	90	(NA)
1980	-	3	43,562	86	(NA)
1981	-	3	38,811	80	(NA)
1982	47	3	35,706	90	(NA)
1983	42	3	36,291	84	(NA)
1984	38	2	37,297	82	(NA)
1985	46	2	40,006	86	(NA)
1986	16	2	39,044	78	(NA)
1987	63	3	39,389	82	(NA)
1988	50	3	45,902	81	(NA)
1989	32	3	48,021	56	(NA)
1990	29	3	50,015	80	(NA)
1991	45	3	45,758	71	(NA)
1992	303	3	46,655	61	(NA)
1993	691	3	41,392	56	(NA)
1994	704	3	44,843	139	(NA)
1995	895	3	43,842	98	(NA)
1996	930	3	41,631	104	(NA)
1997	933	3	39,829	115	(NA)
1998	822	3	40,493	121	(NA)
1999	801	3	39,662	115	(NA)
2000	816	3	40,591	103	(NA)

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**Table 17.01-- CONSUMPTION OF ENERGY, BY SOURCE  
(PHYSICAL UNITS): 1960 TO 2008-- Con.**

Year	Coal (1,000 short tons)	Natural gas 1/ (billion cubic feet)	Petroleum (1,000 barrels)	Hydroelectric power 2/ (million kWh)	Fuel ethanol 3/
2001	829	3	41,479	101	(NA)
2002	748	3	44,772	95	(NA)
2003	837	3	46,686	91	(NA)
2004	857	3	49,098	94	(NA)
2005	805	3	51,267	96	341
2006	4/ 778	3	51,554	120	390
2007	4/ 850	3	52,897	92	497
2008	937	3	42,569	84	918

NA Not available.

1/ Includes supplemental gaseous fuels.

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

3/ Includes denaturant.

4/ Revised from previous Data Book.

Source: U.S. Department of Energy, Energy Information Administration, State Energy Data System (SEDS) Table 7a. Energy Consumption Estimates for Major Energy Sources in Physical Units, Selected Years, 1960-2008, Hawaii <[http://www.eia.doe.gov/emeu/states/hf.jsp?incfile=sep\\_use/total/use\\_tot\\_hia.html&mstate=HAWAII](http://www.eia.doe.gov/emeu/states/hf.jsp?incfile=sep_use/total/use_tot_hia.html&mstate=HAWAII)> accessed April 5, 2011.

**Table 17.02-- CONSUMPTION OF ENERGY, BY SOURCE: 1960 TO 2008**

[Trillion Btu]

Year	Total 1/	Fossil fuels			Renewable energy					Fossil fuels (as commingled)	
		Coal	Natural gas 2/	Petro- leum	Hydro- electric power 3/	Biomass	Geo- thermal	Solar/PV 4/	Wind	Natural Gas 2/ 5/	Motor Gasoline 2/ 6/
1960	94.9	-	-	94.6	0.3	-	-	(NA)	(NA)	-	18.0
1961	113.8	-	-	113.5	0.3	-	-	(NA)	(NA)	-	18.6
1962	108.3	-	-	108.1	0.2	-	-	(NA)	(NA)	-	19.5
1963	114.3	-	-	113.9	0.2	0.2	-	(NA)	(NA)	-	19.7
1964	123.5	-	-	122.1	1.2	0.2	-	(NA)	(NA)	-	20.3
1965	130.6	-	-	129.3	1.1	0.2	-	(NA)	(NA)	-	21.4
1966	145.5	-	-	144.2	1.2	0.1	-	(NA)	(NA)	-	22.6
1967	163.9	-	-	162.5	1.1	0.3	-	(NA)	(NA)	-	23.8
1968	182.8	-	-	181.1	1.0	0.7	-	(NA)	(NA)	-	25.6
1969	190.9	-	-	189.1	1.0	0.7	-	(NA)	(NA)	-	27.2
1970	197.0	-	-	195.4	1.1	0.4	-	(NA)	(NA)	-	29.9
1971	211.7	-	-	210.4	0.9	0.3	-	(NA)	(NA)	-	30.8
1972	218.1	-	-	216.6	0.9	0.6	-	(NA)	(NA)	-	32.6
1973	224.3	-	-	222.8	1.0	0.5	-	(NA)	(NA)	-	34.7
1974	212.1	-	-	210.6	1.0	0.6	-	(NA)	(NA)	-	34.4
1975	214.4	-	-	212.9	0.9	0.6	-	(NA)	(NA)	-	35.5
1976	220.0	-	-	218.4	1.0	0.7	-	(NA)	(NA)	-	36.9
1977	233.3	-	-	231.9	0.9	0.5	-	(NA)	(NA)	-	38.9
1978	236.9	-	-	235.7	0.9	0.3	-	(NA)	(NA)	-	40.1
1979	256.6	-	-	255.3	0.9	0.3	-	(NA)	(NA)	-	39.4
1980	262.4	-	-	249.6	0.9	11.9	-	(NA)	(NA)	3.0	38.0
1981	236.7	-	-	223.2	0.8	12.7	-	(NA)	(NA)	2.8	37.7
1982	218.3	1.1	-	203.7	0.9	12.4	-	(NA)	(NA)	2.8	38.1
1983	221.3	1.0	-	205.4	0.9	14.0	-	(NA)	-	2.7	38.0
1984	232.6	0.9	-	216.1	0.9	14.3	0.4	-	-	2.4	39.5
1985	248.7	1.1	-	232.1	0.9	14.2	0.4	-	-	2.7	39.9
1986	245.5	0.4	-	227.6	0.8	16.3	0.4	-	-	2.7	41.4
1987	249.6	1.6	0.2	228.9	0.9	17.8	0.3	-	-	2.8	43.0
1988	289.8	1.2	-	268.0	0.8	19.4	0.3	-	-	2.8	44.5
1989	309.9	0.8	-	280.1	0.6	27.0	0.3	0.8	0.3	2.9	46.0
1990	321.4	0.7	-	292.7	0.8	25.9	(7/)	0.9	0.3	3.0	45.5
1991	295.1	1.1	-	266.5	0.7	25.4	(7/)	1.0	0.4	2.9	47.1
1992	306.0	6.8	-	272.4	0.6	24.9	(7/)	1.0	0.2	2.9	46.6
1993	284.7	15.6	-	239.7	0.6	24.4	3.2	1.1	0.2	2.8	47.6
1994	301.4	15.7	-	258.3	1.4	20.7	3.9	1.2	0.2	2.9	48.9
1995	299.6	19.9	-	252.6	1.0	19.8	4.9	1.2	0.2	2.9	49.1
1996	285.9	20.4	-	238.9	1.1	19.1	5.1	1.3	0.2	2.8	48.9
1997	276.2	20.5	-	230.5	1.2	17.4	5.1	1.3	0.2	2.7	48.8
1998	276.0	18.2	-	233.5	1.2	16.5	5.0	1.3	0.2	2.8	48.7
1999	271.7	17.7	-	229.9	1.2	17.0	4.4	1.4	0.2	2.9	46.7
2000	276.2	17.7	0.1	235.2	1.1	15.2	5.5	1.4	0.2	3.0	48.4

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**Table 17.02-- CONSUMPTION OF ENERGY, BY SOURCE: 1960 TO 2008-- Con.**

[Trillion Btu]

Year	Total 1/	Fossil fuels			Renewable energy					Fossil fuels (as commingled)	
		Coal	Natural gas 2/	Petro-leum	Hydro-electric power 3/	Biomass	Geo-thermal	Solar/PV 4/	Wind	Natural Gas 2/ 5/	Motor Gasoline 2/ 6/
2001	272.4	17.8	0.1	239.8	1.0	7.9	4.3	1.3	(7/)	2.9	50.6
2002	285.6	16.6	0.1	257.5	1.0	7.5	1.5	1.4	(7/)	2.9	54.3
2003	303.3	19.3	0.1	268.5	0.9	9.3	3.8	1.4	(7/)	2.9	55.2
2004	318.7	19.3	0.2	283.0	0.9	9.3	4.5	1.5	0.1	2.9	56.0
2005	328.8	18.0	0.2	294.0	1.0	9.4	4.7	1.6	0.1	2.9	57.3
2006	331.2	17.5	0.2	295.7	1.2	9.6	4.5	1.8	0.8	2.9	60.2
2007	343.2	19.0	0.2	304.5	0.9	9.4	4.8	2.0	2.4	3.0	59.2
2008	283.8	20.2	0.1	241.2	0.8	11.5	4.9	2.6	2.4	2.8	55.7

1/ Excluding fossil fuels as commingled.

2/ Supplemental gaseous fuels (SGF) and fuel ethanol are consumed with natural gas and motor gasoline, respectively.

On 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.

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

4/ Solar thermal and photovoltaic energy.

5/ Including Supplemental Gaseous Fuels.

6/ Including Fuel Ethanol.

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

Source: U.S. Department of Energy, Energy Information Administration, State Energy Data System (SEDS)

Table 7b. Energy Consumption Estimates by Source, Selected Years, 1960-2008, Hawaii

<[http://www.eia.doe.gov/emeu/states/hf.jsp?incfile=sep\\_use/total/use\\_tot\\_hicb.html&mstate=HAWAII](http://www.eia.doe.gov/emeu/states/hf.jsp?incfile=sep_use/total/use_tot_hicb.html&mstate=HAWAII)>

accessed April 5, 2011.

**Table 17.03-- CONSUMPTION OF ENERGY BY END-USE SECTOR:  
1960 TO 2008**

[Trillion Btu]

<b>Year</b>	<b>Residential 1/ 2/</b>	<b>Commercial 1/ 3/ 4/ 5/</b>	<b>Industrial 1/ 4/ 5/</b>	<b>Transportation 1/ 4/</b>	<b>Electric power 1/ 2/</b>
1960	6/ 7.1	6/ 5.3	20.6	61.8	17.6
1961	6/ 7.3	6/ 5.6	26.8	74.0	19.4
1962	6/ 7.7	6/ 5.8	28.7	66.1	21.4
1963	6/ 8.7	6/ 6.3	29.9	69.5	24.2
1964	6/ 9.4	6/ 6.9	32.4	74.8	26.7
1965	6/ 9.9	6/ 7.0	34.7	79.0	27.6
1966	6/ 10.5	6/ 7.7	35.8	91.5	29.7
1967	6/ 11.7	6/ 8.4	38.7	105.1	31.3
1968	6/ 12.6	6/ 9.2	38.9	122.0	35.0
1969	6/ 14.0	6/ 10.7	41.0	125.1	38.7
1970	6/ 15.4	6/ 12.5	43.7	125.3	43.2
1971	6/ 16.7	6/ 12.5	43.6	138.8	47.7
1972	6/ 18.6	6/ 13.7	49.3	136.5	54.1
1973	6/ 19.0	6/ 14.5	50.0	140.9	55.6
1974	6/ 19.3	6/ 14.3	49.9	128.7	57.5
1975	6/ 18.9	6/ 14.5	50.4	130.5	58.8
1976	6/ 20.2	6/ 16.3	51.8	131.7	62.5
1977	6/ 20.7	6/ 17.9	53.4	141.3	65.2
1978	6/ 20.7	6/ 18.4	53.1	144.6	66.8
1979	6/ 21.4	6/ 19.6	59.2	156.4	67.7
1980	6/ 21.0	6/ 20.0	74.7	146.7	69.7
1981	6/ 20.9	6/ 18.0	73.7	124.1	69.9
1982	6/ 19.6	6/ 16.8	79.7	102.2	66.9
1983	6/ 20.0	6/ 17.1	66.3	117.9	68.6
1984	6/ 19.8	6/ 18.4	65.1	129.3	70.6
1985	6/ 20.0	6/ 18.4	67.4	142.9	70.0
1986	6/ 20.5	6/ 21.0	77.0	127.1	72.9
1987	6/ 22.0	6/ 23.8	79.7	124.1	76.6
1988	6/ 23.1	6/ 37.0	88.9	140.9	81.9
1989	6/ 25.4	6/ 36.1	93.9	154.5	86.6
1990	6/ 30.7	6/ 37.2	98.9	154.5	105.9
1991	6/ 26.1	6/ 28.8	89.0	151.2	88.7
1992	6/ 29.6	6/ 38.6	93.7	144.1	99.3
1993	6/ 30.1	6/ 31.2	93.1	130.4	101.1
1994	6/ 31.1	6/ 35.6	94.7	140.0	104.3
1995	6/ 32.0	6/ 35.3	94.1	138.2	108.0
1996	6/ 32.8	6/ 34.8	96.7	121.6	110.0
1997	6/ 32.9	6/ 36.3	89.8	117.3	110.0
1998	6/ 33.1	6/ 46.6	81.7	114.6	108.2
1999	6/ 33.1	6/ 36.6	78.9	123.1	108.9
2000	6/ 33.8	6/ 38.1	79.1	125.2	111.3

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**Table 17.03-- CONSUMPTION OF ENERGY BY END-USE SECTOR:  
1960 TO 2008-- Con.**

[Trillion Btu]

<b>Year</b>	<b>Residential 1/ 2/</b>	<b>Commercial 1/ 3/ 4/ 5/</b>	<b>Industrial 1/ 4/ 5/</b>	<b>Transportation 1/ 4/</b>	<b>Electric power 1/ 2/</b>
2001	6/ 32.9	6/ 37.2	70.3	132.0	107.5
2002	6/ 34.8	6/ 39.5	71.1	140.2	111.7
2003	6/ 34.3	6/ 40.2	66.8	162.0	111.0
2004	6/ 35.4	6/ 44.1	67.0	172.1	113.1
2005	6/ 35.9	6/ 42.5	71.1	179.4	112.2
2006	6/ 36.4	6/ 43.3	6/ 69.9	181.6	113.0
2007	6/ 37.1	6/ 43.0	6/ 67.8	195.3	114.4
2008	36.7	43.6	65.0	138.5	111.6

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

2/ 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.

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

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

5/ 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.

6/ Revised from previous *Data Book*.

Source: U.S. Department of Energy, Energy Information Administration, State Energy Data System (SEDS) Consumption, 1960-2008, Hawaii

<[http://www.eia.doe.gov/emeu/states/state.html?q\\_state\\_a=hi&q\\_state=HAWAII](http://www.eia.doe.gov/emeu/states/state.html?q_state_a=hi&q_state=HAWAII)> accessed April 15, 2011.



**Table 17.04-- PRIMARY ENERGY CONSUMPTION AND ELECTRICITY SALES, TOTAL AND PER CAPITA: 1991 TO 2009**

[Include photovoltaic]

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	2/ 243.780	9,690,598	2/ 7,264
2001	304.6372	2/ 229.053	9,776,882	2/ 7,351
2002	306.2823	2/ 228.312	9,958,768	2/ 7,423
2003	320.3960	2/ 237.877	10,206,405	2/ 7,578
2004	324.0634	2/ 237.010	10,508,642	2/ 7,689
2005	324.5737	2/ 234.199	10,538,507	2/ 7,604
2006	322.7571	2/ 228.266	10,567,913	2/ 7,568
2007	330.2127	2/ 236.776	10,585,038	2/ 7,590
2008	301.4710	2/ 217.216	10,390,012	2/ 7,486
2009	287.2016	2/ 206.469	10,125,935	2/ 7,280

1/ Based on estimated de facto population.

2/ Revised from previous *Data Book*.

3/ Preliminary.

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

**Table 17.05-- PRIMARY ENERGY CONSUMPTION, BY SOURCE:  
1991 TO 2009**

[Trillion Btu]

Year	Total	Petroleum	Biomass	Solar hot water
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	328.2610	290.1559	6.8140	4.7311
2008	301.3199	258.1509	8.8310	5.2042
2009 1/	286.8396	244.0992	8.8118	5.7499

  

Year	Hydroelectric	Coal	Wind	Geothermal	Solid waste
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	0.9617	16.5752	2.5006	2.3756	4.1469
2008	0.9373	17.8834	2.4686	2.4216	5.4229
2009 1/	1.0799	16.5746	3.4414	1.7319	5.3509

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: 1990 TO 2009**

[Millions of kWh generated]

Year	Total	Petroleum	Biomass	MSW 1/	Hydroelectric
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	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	11,268	8,670	155	303	94
2008	11,392	8,702	133	329	91
2009 6/	11,119	8,598	130	322	114

  

Year	Geothermal	Wind	Coal	PV 2/	Other 3/
1990	-	28	-	-	306
1991	-	30	-	-	329
1992	1	21	-	-	999
1993	155	24	1,592	(4/)	10
1994	175	22	1,382	(4/)	19
1995	223	23	1,674	(4/)	12
1996	228	22	1,740	(4/)	19
1997	229	17	1,663	(4/)	20
1998	220	21	1,553	(4/)	20
1999	196	13	1,541	(4/)	18
2000	250	17	1,695	(4/)	14
2001	207	18	1,616	5/ 1	12
2002	74	13	1,580	-	4
2003	176	13	1,658	5/ 2	-
2004	211	8	1,757	5/ 2	-
2005	221	7	1,691	5/ 2	-
2006	212	82	1,612	5/ 4	-
2007	230	238	1,578	5/ 8	-
2008	234	240	1,648	5/ 15	-
2009 6/	168	252	1,500	5/ 36	-

Continued on next page.

**Table 17.06-- ELECTRICITY GENERATION BY SOURCE: 1990 TO 2009 -- 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/ Data may not be complete.

6/ Preliminary.

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:  
2009**

[Million kWh]

<b>Island</b>	<b>Total</b>	<b>Petroleum</b>	<b>Biomass</b>	<b>MSW 1/</b>	<b>Hydroelectric</b>
State total	11,119	8,598	130	322	114
Hawaii	1,227	847	-	-	60
Maui	1,353	1,068	92	-	18
Lanai	28	27	-	-	-
Molokai	36	36	-	-	-
Oahu	8,007	6,202	28	322	-
Kauai	469	417	10	-	36

  

<b>Island</b>	<b>Wind</b>	<b>Geothermal</b>	<b>Coal</b>	<b>PV 2/ 3/</b>	<b>Other</b>
State total	252	168	1,500	36.41	-
Hawaii	142	168	-	9.56	-
Maui	110	-	60	4.77	-
Lanai	-	-	-	1.39	-
Molokai	-	-	-	-	-
Oahu	-	-	1,440	15.67	-
Kauai	-	-	-	5.02	-

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 2009**

[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	6,169.1	4,728.0	749.1	3,978.9	2,190.2	749.1
2007	6,152.9	4,748.2	848.7	3,899.5	2,253.4	848.7
2008	8,422.8	6,714.0	1,325.1	5,388.9	3,033.9	1,325.1
2009 2/	6,028.1	4,603.9	723.9	3,880.0	2,148.1	723.9

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: 1997 TO 2010**

Year	Customers, Dec. 31			Power sold (1,000 kWh)		
	Total	Residen- tial 1/	Other	Total	Residen- tial 1/	Other
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
2009	478,588	413,641	64,947	10,125,935	3,055,242	7,070,693
2010	480,918	416,141	64,777	10,013,104	2,989,437	7,023,667

  

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
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
2009	7,386	108,869	0.24202	0.19923	2,148,123	739,416	1,408,707
2010	7,184	108,428	0.28101	0.23857	2,515,731	840,066	1,675,665

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, Hawaii State Department of Business, Economic Development and Tourism, Strategic Industries Division, records.

**Table 17.10-- ELECTRIC UTILITIES, BY ISLAND: 2010**

Island	Customers, Dec. 31			Gross System Peak 2/	Power sold (1,000 kWh)		
	Total	Residential 1/	Other	(mW)	Total	Residential 1/	Other
State total	480,918	416,141	64,777	(X)	10,013,105	2,989,437	7,023,668
Oahu	296,422	262,635	33,787	1,200.0	7,277,229	1,975,743	5,301,486
Hawaii	80,695	67,837	12,858	190.6	1,109,783	430,942	678,841
Kauai	36,062	27,834	8,228	76.5	434,534	159,426	275,108
Lanai	1,620	1,391	229	4.8	24,967	7,377	17,590
Maui	62,992	53,848	9,144	203.8	1,135,141	403,908	731,233
Molokai	3,127	2,596	531	5.7	31,451	12,041	19,410
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	7,184	108,428	0.28101	0.23857	2,515,731	840,066	1,675,665
Oahu	7,523	156,909	0.25474	0.21542	1,645,328	503,302	1,142,026
Hawaii	6,353	52,795	0.35308	0.32348	371,746	152,157	219,589
Kauai	5,728	33,436	0.36757	0.35075	155,095	58,600	96,495
Lanai	5,303	76,812	0.37102	0.37470	9,328	2,737	6,591
Maui	7,501	79,969	0.29453	0.27890	322,903	118,962	203,941
Molokai	4,638	36,554	0.35778	0.36182	11,331	4,308	7,023

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 Business, Economic Development and Tourism, Strategic Industries Division, records.



**Table 17.11-- GAS UTILITIES: 1997 TO 2010**

[Excludes bottled gas]

Year	Customers, Dec. 31			Gas sold (1,000 therms)		
	Total	Residential 1/	Other	Total	Residential 1/	Other
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
2009	35,449	31,821	3,628	31,924	4,746	27,178
2010	35,317	31,656	3,661	32,279	4,742	27,537

  

Year	Average annual use (therms) 2/		Average rate (dollars per therm)		Revenues (\$1,000)		
	Residential 1/	Other	Residential 1/	Other	Total	Residential 1/	Other
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
2009	149	7,491	4.18816	2.68055	92,729	19,877	72,852
2010	150	7,522	4.98652	3.27435	113,810	23,644	90,166

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, Hawaii State Department of Business, Economic Development and Tourism, Strategic Industries Division, records.

**Table 17.12-- GAS UTILITIES, BY ISLAND: 2010**

[Excludes bottled gas]

Island	Customers, December 31			Gas sold (1,000 therms)		
	Total	Residen- tial 1/	Other	Total	Residen- tial 1/	Other
State total	35,317	31,656	3,661	32,279	4,742	27,537
Oahu	32,066	28,807	3,259	28,974	4,224	24,750
Hawaii	1,785	1,486	299	2,274	305	1,969
Kauai	858	841	17	140	91	49
Lanai	17	17	-	1	1	-
Maui	513	427	86	877	108	769
Molokai	78	78	-	13	13	-

  

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	150	7,522	4.98652	3.27435	113,810	23,644	90,166
Oahu	147	7,594	5.03657	3.35294	104,261	21,276	82,985
Hawaii	205	6,586	4.72953	2.58894	6,540	1,442	5,098
Kauai	108	2,895	4.83755	2.74896	574	439	135
Lanai	75	-	6.14759	-	8	8	-
Maui	252	8,941	3.91045	2.53368	2,369	421	1,948
Molokai	163	-	4.57941	-	58	58	-

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 Business, Economic Development and Tourism, Strategic Industries Division, records.

**Table 17.13-- SERVICE PROVIDED BY HAWAIIAN ELECTRIC COMPANY, INC.,  
ON OAHU: 1991 TO 2010**

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
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

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 2010**

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 2/	32,673	29,434	31,219	4,447	151
2008 2/	32,358	29,123	29,930	4,320	148
2009 2/	32,179	28,951	28,957	4,263	147
2010	32,109	28,867	28,823	4,197	145

1/ Includes liquefied petroleum gas.

2/ Revised from previous *Data Book*.

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

**Table 17.15-- LIQUID FUEL TAX BASE: 1997 TO 2010**

[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
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	1,018,233	782,580	480,632	230,812	1/ 52,826
2008	920,042	710,863	443,918	158,894	57,613
2009	898,720	713,534	438,849	166,209	53,437
2010	820,268	638,300	416,134	132,451	51,512

  

Year reported	Liquefied petroleum gas		Aviation fuel	Small boats		Other fuel
	Off hwy.	Hwy. use		Gasoline	Diesel oil	
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	1/ -	108	235,653	262	626	17,314
2008	-	96	209,179	452	5,004	44,886
2009	-	66	185,185	1,215	1,324	52,434
2010	-	62	181,968	787	947	36,406

X Not applicable.

1/ Revised from previous *Data Book*.

Source: Hawaii State Department of Taxation, Tax Research & Planning, "Liquid Fuel Tax Base & Tax Collections" (annual); 2007 data revised March 17, 2010; 2008 data revised March 17, 2010

<[http://www6.hawaii.gov/tax/a5\\_3txcolrptarchive.htm](http://www6.hawaii.gov/tax/a5_3txcolrptarchive.htm)> accessed June 3, 2011.

**Table 17.16-- LIQUID FUEL TAX BASE, BY COUNTY: 2010**

[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	820,268	486,897	127,422	131,942	74,007
Gasoline	416,134	266,360	55,491	69,327	24,956
Diesel oil, non-hwy.	132,451	98,051	12,988	6,559	14,853
Diesel oil, hwy. use	51,512	26,864	7,672	12,431	4,545
Liq. pet. gas, hwy. use	62	49	4	6	4
Small boats, gasoline	787	546	-	241	-
Small boats, diesel oil	947	157	24	443	323
Aviation fuel	181,968	93,123	51,060	23,095	14,690
Other fuel	36,406	1,748	183	19,839	14,635

Source: Hawaii State Department of Taxation, Tax Research & Planning, "Liquid Fuel Tax Base & Tax Collections - CY Ending December 31, 2009" <[http://www6.hawaii.gov/tax/a5\\_3txcolrptarchive.htm](http://www6.hawaii.gov/tax/a5_3txcolrptarchive.htm)> accessed June 3, 2011.

**Table 17.17-- GASOLINE STATIONS (NAICS 447), BY COUNTY:  
1998 TO 2008**

[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]

<b>Year</b>	<b>State total</b>	<b>City and County of Honolulu</b>	<b>Hawaii County</b>	<b>Kauai County</b>	<b>Maui County</b>
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

Source: U.S. Census Bureau, *County Business Patterns, Hawaii* (annual). See also <http://factfinder.census.gov/> accessed January 10, 2011.

**Table 17.18-- BOILERS AND PRESSURE VESSELS, BY ISLAND:  
2009 AND 2010**

[As of December 31]

<b>Island</b>	<b>Total</b>	<b>Power boilers</b>	<b>Heating boilers</b>	<b>Pressure vessels</b>
2009				
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
2010				
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: 1998 TO 2007**

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

Year	R&D	R&D plant	Year	R&D	R&D plant
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
2002	375.2	6.4	2007	343.6	8.0

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 WAGES: 2002 TO 2010**

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

	2002	2003	2004	2005	2006	2007	2008	2009	2010	Earnings in 2010
Technology sector	20,090	20,489	21,126	22,495	23,075	24,172	24,882	25,142	24,943	67,617
Computer services	5,331	5,644	5,917	5,985	6,378	6,350	6,497	6,571	6,486	69,621
Engineering and related services	4,189	4,351	4,381	4,445	4,619	4,838	4,872	4,753	4,524	83,349
Information and telecommunication technology	2,239	2,065	2,283	2,348	2,457	2,493	2,340	2,160	2,087	64,431
Medical and diagnostic testing	1,335	1,482	1,533	1,592	1,625	1,718	1,719	1,708	1,739	57,477
Research & development services	2,749	2,920	3,023	3,221	3,295	3,401	3,679	4,027	4,131	67,759
Biotech R&D 1/	1,252	1,342	1,409	1,556	1,613	1,464	1,548	1,840	2,060	50,326
Technical consulting services	2,684	2,626	2,736	3,389	3,201	3,874	4,057	4,138	4,112	51,547
Technology equipment distribution	856	844	852	890	815	805	879	867	837	80,405
Technology manufacturing	707	557	401	625	685	693	839	918	1,026	63,220

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

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

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

[In percent, unless otherwise specified]

<b>Year</b>	<b>Total state jobs (number)</b>	<b>State</b>	<b>Hawaii</b>	<b>Maui</b>	<b>Honolulu</b>	<b>Kauai</b>	<b>County unknown</b>
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://hawaii.gov/dbedt/info/economic/data\\_reports/e-reports/tech11-02.pdf](http://hawaii.gov/dbedt/info/economic/data_reports/e-reports/tech11-02.pdf)> accessed January 14, 2003.

**Table 17.22-- TOP 30 STATES FOR TECHNOLOGY AND  
SCIENCE INDEX: 2010**

[The State Technology and Science Index observes 79 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]

City and state	Average score	State ranking
Massachusetts	82.6	1
Maryland	77.1	2
Colorado	75.7	3
California	73.9	4
Utah	71.3	5
Washington	70.2	6
New Hampshire	68.7	7
Virginia	68.1	8
Connecticut	66.6	9
Delaware	63.3	10
New Jersey	63.0	11
Minnesota	62.7	12
North Carolina	61.4	13
Pennsylvania	60.8	14
Arizona	60.2	15
New York	59.5	16
Vermont	59.3	17
New Mexico	59.1	18
Texas	58.3	19
Illinois	57.1	20
Oregon	56.5	21
Rhode Island	55.5	22
Kansas	55.5	23
Wisconsin	55.0	24
Georgia	51.7	25
Michigan	50.7	26
Idaho	49.8	27
Indiana	49.7	28
Ohio	49.5	29
Missouri	48.4	30
<b>Hawaii</b>	<b>43.9</b>	<b>36</b>

Source: Milken Institute "State Technology and Science Index: Enduring Lessons for the Intangible Economy January 2011 " 2010 Overall Ranking, State Overall Ranking <<http://www.milkeninstitute.org/tech/tech2010.taf>> accessed May 23, 2011.

**Table 17.23-- RESEARCH AND NON-RESEARCH EXTRAMURAL FUNDING,  
FOR THE UNIVERSITY OF HAWAII: 1991-1992 TO 2009-2010**

[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
2008-2009	1,990	413,963,739	1,147	246,546,713	843	167,417,026
2009-2010	1,944	452,408,669	1,161	255,734,059	783	196,674,610

Source: University of Hawaii, Office of Research Services, *2009-2010 Online Executive Managerial Report* <<http://www.ors.hawaii.edu/index.php/reports?catid=106&id=173>> accessed May 12, 2011 and previous reports.

**Table 17.24-- RESEARCH AND DEVELOPMENT EXPENDITURES AT DOCTORATE-GRANTING INSTITUTIONS: 1991 TO 2008**

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

<b>Year</b>	<b>Total</b>	<b>Federally financed</b>	<b>State and local government financed</b>	<b>Industry financed</b>	<b>Institutionally financed</b>	<b>All other sources</b>
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
2007	274,373	215,806	15,534	22,080	16,352	4,601
2008	278,751	200,385	18,192	26,928	28,132	5,114

Source: National Science Foundation, Division of Science Resources Statistics, Academic Research and Development Expenditures: Fiscal Year (annual) Table 17  
<http://www.nsf.gov/statistics/rdexpenditures/> accessed January 10, 2011.

**Table 17.25-- PATENTS ISSUED TO HAWAII RESIDENTS: 1990 TO 2010**

<b>Year</b>	<b>Patents</b>	<b>Year</b>	<b>Patents</b>	<b>Year</b>	<b>Patents</b>
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
1995	84	2002	91	2009	96
1996	104	2003	96	2010	144

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, 2010* (March 2011) <[http://www.uspto.gov/web/offices/ac/ido/oeip/taf/cst\\_all.pdf](http://www.uspto.gov/web/offices/ac/ido/oeip/taf/cst_all.pdf)> accessed May 23, 2011.

**Table 17.26-- ASTRONOMY AND RELATED FACILITIES AT  
THE SUMMITS OF MAUNA KEA AND HALEAKALA: 2010**

Facility (mirror diameter in meters)	Capital cost 1/ (\$ mil)	Annual operating cost (\$ mil)	County based staff	Opera- tional
Mauna Kea observatories				
Total	611	72.4	527	(X)
UH 2.2-m (Optical/Infrared)	5	1.2	5	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
Haleakala observatories				
Total	261.1	35.70	208	(X)
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)

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.