

Section 17

ENERGY AND SCIENCE

This section presents statistics relating to electrical, gas and petroleum power and energy, and to scientific resources.

Electricity sales exceeded 5.6 billion kilowatt-hours in 1976, or 7,500 per residential customer. The total has doubled since 1967. Manufactured gas sales reached 35.6 million therms in 1976, 69 percent above the figure ten years earlier. Residential rates in 1976 averaged 4.8 cents per kilowatt-hour and 83 cents per therm, both well above the corresponding rates several years earlier.

The liquid fuel tax base for 1976 was approximately 850 million gallons, compared with 883 million in 1973 and 481 million in 1966. The 1976 total included 296 million gallons of gasoline, 457 million of aviation fuel, and 93 million of diesel oil.

Total energy consumption in 1973 (the most recent available year) amounted to 192 trillion British thermal units, compared with 93 trillion BTU a decade earlier. Transportation accounted for 60 percent of the 1973 total.

The State is well served with scientific resources. A 1976 inventory reported 384 companies and agencies with research or scientific capabilities. Employment in these organizations was more than 34,000. Sixty-one patents were granted to Hawaii residents in 1975, the largest number on record.

Information on communications, energy and science can be obtained from reports and records of the U.S. Bureau of Mines, Federal Energy Administration, Federal Power Commission, Hawaii State Department of Taxation, Hawaii State Department of Regulatory Agencies, Public Utilities Division, and individual utility companies. Detailed statistics on energy consumption, with special emphasis on petroleum products, appear in *Energy Use in Hawaii*, published by the Department of Planning and Economic Development in 1974. *Hawaii's Scientific Resources, 1977 Directory*, issued by DPED in 1977, contains information on scientific organizations and facilities in the Islands. Data for the nation as a whole can be found in the *Statistical Abstract of the United States: 1976*, Sections 19 and 20.

Table 240.—ELECTRIC UTILITIES: 1966 TO 1976

| Year | Customers, Dec. 31 | | 1,000 KWH sold | | | Average annual use (KWH) ¹ | | Ave. rate (dollars/KWH) | | Installed capacity (KW) |
|------------|--------------------|--------|----------------|-------------|-----------|---------------------------------------|---------|-------------------------|---------|-------------------------|
| | Residential | Other | Total | Residential | Other | Residential | Other | Residential | Other | |
| 1966 | 160,784 | 29,492 | 2,639,866 | 912,616 | 1,727,250 | 5,676 | 58,567 | .027290 | .019949 | 830,644 |
| 1967 | 166,256 | 30,161 | 2,832,468 | 989,785 | 1,842,684 | 5,953 | 61,109 | .027039 | .020037 | 829,157 |
| 1968 | 171,346 | 30,821 | 3,109,256 | 1,083,233 | 2,026,023 | 6,322 | 65,735 | .026803 | .020022 | 894,532 |
| 1969 | 178,569 | 31,761 | 3,426,052 | 1,174,502 | 2,251,550 | 6,577 | 70,890 | .026548 | .019647 | 896,271 |
| 1970 | 186,282 | 32,721 | 3,758,094 | 1,270,732 | 2,487,362 | 6,822 | 76,017 | .026810 | .020113 | 1,007,021 |
| 1971 | 193,043 | 33,471 | 4,167,127 | 1,375,308 | 2,791,819 | 7,124 | 83,410 | .028229 | .021493 | 1,016,350 |
| 1972 | 201,903 | 34,406 | 4,562,568 | 1,493,840 | 3,068,728 | 7,399 | 89,192 | .02849 | .02172 | 1,135,055 |
| 1973 | 210,740 | 35,515 | 4,867,850 | 1,581,855 | 3,285,995 | 7,506 | 92,524 | .03077 | .02367 | 1,266,600 |
| 1974 | 219,633 | 36,268 | 5,113,906 | 1,635,978 | 3,477,928 | 7,449 | 95,895 | .03493 | .02704 | 1,419,892 |
| 1975 | 226,836 | 36,980 | 5,334,755 | 1,676,438 | 3,658,317 | 7,391 | 98,927 | .04586 | .03794 | 1,454,359 |
| 1976 | 232,070 | 37,965 | 5,615,209 | 1,750,618 | 3,864,592 | 7,543 | 101,794 | .04796 | .03934 | 1,454,359 |

¹ Based on number of customers at end of year.

Source: Hawaii State Public Utilities Division, *Historical Data, Gas and Electric Utilities, State of Hawaii, 1959 to 1968* (unpagged), and records.

Table 241.—SERVICE PROVIDED BY HAWAIIAN ELECTRIC CO., INC., ON OAHU: 1970 TO 1976

| Year | Number of customers, December 31 | | Net input ¹ (1,000 KWH) | Power sold (1,000 KWH) | Average annual residential use ² (KWH) | Average residential rate ² (dollars per KWH) | Installed capacity ³ (KW) 31 December |
|------------|----------------------------------|------------------|------------------------------------|------------------------|---|---|--|
| | Total | Residential only | | | | | |
| 1970 | 168,531 | 144,854 | 3,494,059 | 3,275,673 | 7,478 | 0.02438 | 811,700 |
| 1971 | 174,300 | 150,285 | 3,844,325 | 3,600,728 | 7,776 | 0.02555 | 811,700 |
| 1972 | 180,794 | 156,249 | 4,175,342 | 3,942,679 | 8,108 | 0.02584 | 902,600 |
| 1973 | 187,321 | 162,180 | 4,407,460 | 4,189,397 | 8,191 | 0.02812 | 1,005,200 |
| 1974 | 194,043 | 168,525 | 4,641,204 | 4,393,616 | 8,110 | 0.03063 | 1,140,180 |
| 1975 | 198,598 | 172,839 | 4,793,015 | 4,555,118 | 7,999 | 0.04313 | 1,140,180 |
| 1976 | 201,974 | 175,581 | 5,038,487 | 4,761,592 | 8,082 | 0.04385 | 1,140,180 |

¹ Net generated plus purchased power.

² Based on average number of customers during the year.

³ Maximum generator nameplate.

Source: Hawaiian Electric Co., Inc., records.

Table 242.—ELECTRIC UTILITIES, BY ISLANDS: 1976

| County or island | Customers, Dec. 31 | | | Installed capacity, Dec. 31 (KW) | Power sold (1,000 KWH) | | |
|-------------------|--------------------|-------------|--------|----------------------------------|------------------------|-------------|-----------|
| | Total | Residential | Other | | Total | Residential | Other |
| State total | 270,035 | 232,070 | 37,965 | 1,454,359 | 5,615,209 | 1,750,618 | 3,864,592 |
| Oahu | 201,974 | 175,581 | 26,393 | 1,209,400 | 4,761,592 | 1,419,044 | 3,342,548 |
| Hawaii | 29,794 | 24,533 | 5,261 | 124,300 | 362,608 | 146,748 | 215,860 |
| Kauai | 13,559 | 11,414 | 2,145 | 39,900 | 155,834 | 56,722 | 99,112 |
| Maui County | 24,708 | 20,542 | 4,166 | 80,759 | 335,175 | 128,103 | 207,072 |
| Lanai | 854 | 682 | 172 | — | 5,814 | 3,616 | 2,198 |
| Maui | 21,969 | 18,412 | 3,557 | 72,890 | 310,439 | 114,664 | 195,776 |
| Molokai | 1,885 | 1,448 | 437 | 7,869 | 18,921 | 9,823 | 9,098 |

| County or island | Average annual use ¹ (KWH) | | Average rate (dollars per KWH) | | Revenue (\$1,000) | | |
|-------------------|---------------------------------------|---------|--------------------------------|---------|-------------------|-------------|---------|
| | Residential | Other | Residential | Other | Total | Residential | Other |
| State total | 7,543 | 101,794 | 0.04796 | 0.03934 | 235,999 | 83,957 | 152,042 |
| Oahu | 8,082 | 126,645 | 0.04385 | 0.03524 | 180,013 | 62,224 | 117,789 |
| Hawaii | 5,982 | 41,030 | 0.06641 | 0.06312 | 23,370 | 9,746 | 13,624 |
| Kauai | 4,969 | 46,206 | 0.07333 | 0.07513 | 11,606 | 4,159 | 7,446 |
| Maui County | 6,236 | 49,705 | 0.06111 | 0.06366 | 21,010 | 7,828 | 13,182 |
| Lanai | 5,303 | 12,778 | 0.06698 | 0.07889 | 416 | 242 | 173 |
| Maui | 6,228 | 55,040 | 0.06037 | 0.06215 | 19,090 | 6,993 | 12,167 |
| Molokai | 6,784 | 20,820 | 0.06750 | 0.09247 | 1,504 | 663 | 841 |

¹Based on number of customers at end of year.

Source: Hawaii State Department of Regulatory Agencies, Public Utilities Division, records.

Table 243.—GAS UTILITIES: 1966 TO 1976

[Data limited to Honolulu Gas Co., Ltd., and its successor organization, Gasco, Inc. Excludes bottled gas.]

| Year | Customers | | Gas sold (1,000 therms) | | | Ave. ann. use (therms) | | Average rate (dollars per therm) | |
|------------|-------------|-------|-------------------------|-------------|--------|------------------------|--------|----------------------------------|---------|
| | Residential | Other | Total | Residential | Other | Residential | Other | Residential | Other |
| 1966 | 34,956 | 1,355 | 21,019 | 11,171 | 9,848 | 320 | 7,268 | 0.3626 | 0.2185 |
| 1967 | 35,000 | 1,382 | 22,547 | 11,348 | 11,198 | 324 | 8,103 | 0.3618 | 0.2179 |
| 1968 | 34,955 | 1,300 | 23,570 | 11,331 | 12,240 | 324 | 9,415 | 0.3618 | 0.2169 |
| 1969 | 34,829 | 1,305 | 25,649 | 11,848 | 13,801 | 340 | 10,576 | 0.3588 | 0.2156 |
| 1970 | 32,163 | 3,979 | 27,831 | 10,891 | 16,940 | 339 | 4,257 | 0.3619 | 0.2227 |
| 1971 | 32,072 | 4,081 | 30,445 | 9,279 | 21,167 | 289 | 5,187 | 0.3699 | 0.2308 |
| 1972 | 31,806 | 4,277 | 33,322 | 9,321 | 24,000 | 293 | 5,612 | 0.36843 | 0.22681 |
| 1973 | 31,142 | 4,639 | 34,540 | 8,931 | 25,609 | 287 | 5,520 | 0.37518 | 0.23121 |
| 1974 | 30,620 | 4,608 | 34,363 | 8,096 | 26,267 | 264 | 5,700 | 0.68361 | 0.52267 |
| 1975 | 30,236 | 4,449 | 35,594 | 8,230 | 27,364 | 272 | 6,151 | 0.81723 | 0.63583 |
| 1976 | 29,873 | 4,391 | 35,568 | 8,121 | 27,447 | 272 | 6,251 | 0.82767 | 0.63369 |

Source: Hawaii State Department of Regulatory Agencies, Public Utilities Division, *Historical Data, Gas and Electric Utilities, State of Hawaii, 1959 to 1968* (unpaged), and records.

Table 244.—GAS UTILITY SERVICE BY GASCO, INC., FOR OAHU: 1966 TO 1976

| Calendar year | Customers ¹ | | Gas sold (1,000 therms) ² | | Average annual residential usage (therms) ² |
|---------------|------------------------|-------------|--------------------------------------|-------------|--|
| | Total | Residential | Total | Residential | |
| 1966 | 34,168 | 32,819 | 20,297 | 10,544 | 321 |
| 1967 | 34,237 | 32,862 | 21,708 | 10,701 | 326 |
| 1968 | 34,079 | 32,787 | 22,668 | 10,666 | 325 |
| 1969 | 33,908 | 32,611 | 24,659 | 11,102 | 340 |
| 1970 | 33,851 | 29,880 | 26,696 | 10,026 | 336 |
| 1971 | 33,691 | 29,621 | 29,082 | 8,290 | 280 |
| 1972 | 33,479 | 29,256 | 31,643 | 8,258 | 282 |
| 1973 | 33,142 | 28,813 | 32,610 | 8,041 | 279 |
| 1974 | 32,455 | 28,200 | 32,166 | 7,522 | 267 |
| 1975 | 31,856 | 27,778 | 32,885 | 7,600 | 274 |
| 1976 | 31,443 | 27,429 | 32,649 | 7,490 | 276 |

¹ As of December 31. Data for residential customers, 1966-1970, may include a few commercial accounts.

² Includes liquefied petroleum gas.

Source: Gasco, Inc., records.

Table 245.—GAS UTILITIES, BY ISLANDS: 1976
 [Excludes bottled gas.]

| Island | Customer, Dec. 31 | | | Gas sold (therms) | | |
|-------------------|-------------------|-------------|-------|-------------------|-------------|------------|
| | Total | Residential | Other | Total | Residential | Other |
| State total | 34,264 | 29,873 | 4,391 | 35,568,366 | 8,121,265 | 27,447,101 |
| Oahu | 31,443 | 27,434 | 4,009 | 32,648,549 | 7,493,748 | 25,154,801 |
| Hawaii | 2,192 | 1,868 | 324 | 2,335,709 | 471,235 | 1,864,474 |
| Kauai | 230 | 230 | — | 67,215 | 67,215 | — |
| Maui | 399 | 341 | 58 | 516,893 | 89,067 | 427,826 |

| Island | Average annual use (therms) ¹ | | Average rate (dollars per therm) | | Revenues (\$1,000) | | |
|-------------------|--|-------|----------------------------------|---------|--------------------|-------------|--------|
| | Residential | Other | Residential | Other | Total | Residential | Other |
| State total | 272 | 6,251 | 0.82767 | 0.63369 | 24,115 | 6,722 | 17,393 |
| Oahu | 273 | 6,275 | 0.83788 | 0.64035 | 22,387 | 6,279 | 16,108 |
| Hawaii | 252 | 5,755 | 0.71182 | 0.55523 | 1,371 | 335 | 1,035 |
| Kauai | 292 | — | 0.72463 | — | 49 | 49 | — |
| Maui | 261 | 7,376 | 0.65937 | 0.58417 | 309 | 59 | 250 |

¹ Based on number of customers at end of year.

Source: Hawaii State Department of Regulatory Agencies, Public Utilities Division, records.

Table 246.—TYPICAL RESIDENTIAL UTILITY MONTHLY RATES, BY ISLAND: JANUARY 1977

| Utility and usage | Oahu | Hawaii ¹ | Kauai | Maui | Molokai | Lanai |
|--|-------|---------------------|-------|-------|---------|-------|
| Water: | | | | | | |
| 5/8-inch meter, 5,000 gallons . . | 5.20 | 5.90 | 4.50 | 3.55 | 3.55 | 2.95 |
| 5/8-inch meter, 10,000 gallons . . | 6.55 | 8.55 | 7.00 | 5.60 | 5.60 | 4.65 |
| 1-inch meter, 20,000 gallons . . | 11.50 | 16.85 | 15.00 | 11.70 | 11.70 | 9.30 |
| 1½ inch meter, 50,000 gallons | 23.10 | 37.50 | 35.00 | 26.25 | 26.25 | 22.00 |
| Electricity: | | | | | | |
| 100 kilowatt-hours | 8.03 | 13.08 | 10.77 | 10.75 | 12.25 | 10.94 |
| 250 kilowatt-hours | 15.26 | 23.24 | 21.74 | 20.28 | 21.84 | 20.76 |
| 500 kilowatt-hours | 25.10 | 36.58 | 37.84 | 33.36 | 35.84 | 34.32 |
| Gas: | | | | | | |
| 10 therms | 6.81 | 8.01 | 7.91 | 6.19 | ... | ... |
| 25 therms | 17.24 | 16.39 | 16.97 | 14.35 | ... | ... |
| 50 therms | 34.58 | 29.61 | 31.79 | 27.67 | ... | ... |
| 100 therms | 69.68 | 56.36 | 61.64 | 54.52 | ... | ... |
| Telephone:² | | | | | | |
| Individual line | 9.50 | 8.50 | 8.10 | 8.10 | 6.95 | 6.25 |
| Two-party line | 7.80 | 7.15 | 6.85 | 6.85 | 5.90 | 5.35 |

¹Water rates are those for South Hilo, North and South Kohala, and Ka'u; for other districts, add 12¢ per 1,000 gallons.

²Plus 5 percent Federal excise tax.

Source: Hawaii State Public Utilities Commission; Honolulu Board of Water Supply; Hawaii County Department of Water Supply; Kauai County Department of Water; Maui County Department of Water Supply; Koele Company, Inc.

Table 247.—BOILERS AND PRESSURE VESSELS: DECEMBER 31, 1976

| Island | Power boilers | Heating boilers | Pressure vessels ¹ |
|-----------------------|------------------|--------------------|----------------------------------|
| State total | 663 | 2,347 | 3,968 |
| Hawaii | 95 | 233 | 627 |
| Maui | 61 | 158 | 500 |
| Lanai | 3 | 2 | 26 |
| Molokai | 6 | 22 | 23 |
| Oahu | 452 | 1,817 | 2,574 |
| Kauai | 46 | 115 | 218 |

¹ Five cubic feet or more.

Source: Hawaii State Department of Labor and Industrial Relations, Division of Occupational Safety and Health, records.

Table 248.—LIQUID FUEL TAX BASE: 1966 TO 1976
(In thousands of gallons. Excludes residual fuel, used in the generation of electrical power.)

| Year reported ¹ | All types | Gasoline | Diesel oil | | Liq. pet. gas | | Aviation fuel | Small boats | |
|----------------------------|-----------|----------|------------|----------|---------------|----------|---------------|-------------|------------|
| | | | Non-hwy. | Hwy. use | Off-hwy. | Hwy. use | | Gasoline | Diesel oil |
| 1966 | 481,361 | 177,627 | 40,039 | 5,506 | 414 | 122 | 256,175 | 238 | 1,241 |
| 1967 | 572,354 | 188,717 | 39,569 | 5,511 | 457 | 139 | 336,359 | 250 | 1,351 |
| 1968 | 619,803 | 197,663 | 41,213 | 6,566 | 781 | 253 | 371,686 | 227 | 1,415 |
| 1969 | 743,255 | 223,088 | 49,147 | 7,703 | 674 | 242 | 460,753 | 226 | 1,424 |
| 1970 | 754,632 | 235,178 | 58,129 | 8,029 | 814 | 274 | 450,474 | 214 | 1,519 |
| 1971 | 809,628 | 250,191 | 57,405 | 8,852 | 1,044 | 579 | 489,767 | 231 | 1,559 |
| 1972 | 827,825 | 261,452 | 65,163 | 9,523 | 1,231 | 702 | 487,743 | 264 | 1,747 |
| 1973 | 882,932 | 281,122 | 74,608 | 11,159 | 1,909 | 453 | 511,502 | 280 | 1,899 |
| 1974 | 824,653 | 270,267 | 75,124 | 11,539 | 2,093 | 789 | 463,728 | 312 | 801 |
| 1975 | 839,289 | 284,552 | 75,120 | 12,710 | 1,823 | 1,380 | 462,384 | 411 | 908 |
| 1976 | 850,261 | 295,704 | 79,884 | 13,561 | 1,858 | 1,054 | 456,819 | 464 | 917 |

¹ Liquid fuel sold in a given month is usually reported the following month. Annual totals accordingly refer to fuel sold in a 12-month period ended November 30.

Source: Hawaii State Department of Taxation, "Tax Base for Certain Taxes," "Comparison of Liquid Fuel Tax Collections & Distribution for Two Years," and "Liquid Fuel Tax Base and Tax Collections" (annual reports).

Table 249.—DOMESTIC DEMAND FOR PETROLEUM PRODUCTS: 1967 TO 1975
(Barrels daily)

| Calendar year | Total | Usage | | Product | | | |
|-------------------------|--------|-----------------------|----------|----------|----------|-------------------|-----------------------------|
| | | Military ¹ | Civilian | Gasoline | Jet fuel | Residual fuel oil | Other products ² |
| 1967 ³ | 64,517 | 567 | 63,950 | 13,206 | 21,855 | 23,901 | 5,555 |
| 1968 | 71,700 | 753 | 70,947 | 13,674 | 25,637 | 26,585 | 5,804 |
| 1969 | 77,710 | 1,743 | 75,967 | 14,394 | 28,988 | 27,389 | 6,939 |
| 1970 | 79,622 | 3,321 | 76,301 | 14,901 | 31,373 | 26,460 | 6,888 |
| 1971 | 85,592 | 1,051 | 84,541 | 16,187 | 32,332 | 30,156 | 6,917 |
| 1972 | 90,480 | 2,671 | 87,809 | 17,333 | 32,688 | 31,735 | 8,724 |
| 1973 | 93,025 | 3,460 | 89,565 | 18,058 | 33,778 | 31,907 | 9,282 |
| 1974 | 89,860 | 5,164 | 84,696 | 19,661 | 30,241 | 30,704 | 9,254 |
| 1975 | 87,970 | 3,121 | 84,849 | 17,858 | 30,605 | 30,532 | 8,975 |

¹ Excludes imports and direct shipments.

² Liquefied gases, kerosine, distillate fuel oil, lubricating oils and greases, asphalt and road oil, etc.

³ Earliest year available.

Source: U.S. Bureau of Mines, "District V Military and Civilian Petroleum Demand," *Mineral Industry Surveys* (for 1967 to 1969) and "Crude Petroleum, Petroleum Products, and Natural Gas Liquids in P.A.D. District V," *Mineral Industry Surveys* (for 1970 and later years).

Table 250.—DOMESTIC DEMAND FOR PETROLEUM PRODUCTS: 1974 AND 1975
(Barrels daily)

| Item | Total | | Military ¹ | | All other | |
|---|--------|--------|-----------------------|-------|-----------|--------|
| | 1974 | 1975 | 1974 | 1975 | 1974 | 1975 |
| Total petroleum | 89,860 | 87,970 | 5,164 | 3,121 | 84,696 | 84,849 |
| Liquified gases | 789 | 1,134 | — | — | 789 | 1,134 |
| Fuel uses | 789 | 1,134 | — | — | 789 | 1,134 |
| Other | — | — | — | — | — | — |
| Gasoline | 19,661 | 17,858 | 1,482 | 154 | 18,179 | 17,704 |
| Motor | 19,477 | 17,644 | 1,482 | 154 | 17,995 | 17,490 |
| Aviation | 184 | 214 | — | — | 184 | 214 |
| Special naphthas and solvents . | 118 | 121 | — | — | 118 | 121 |
| Jet fuel | 30,241 | 30,605 | 2,638 | 2,759 | 27,603 | 27,846 |
| Naphtha-type | 3,690 | 2,759 | 2,638 | 2,759 | 1,052 | — |
| Kerosine-type | 26,551 | 27,846 | — | — | 26,551 | 27,846 |
| Kerosine | 55 | 38 | — | 3 | 55 | 35 |
| Distillate fuel oil | 6,534 | 5,871 | 1,044 | 205 | 5,490 | 5,666 |
| Lubricating oils and greases . | 268 | 244 | — | — | 268 | 244 |
| Residual fuel oil | 30,704 | 30,532 | — | — | 30,704 | 30,532 |
| Asphalt and road oil | 1,019 | 1,099 | — | — | 1,019 | 1,099 |
| All other finished and unfinished oils | — | — | — | — | — | — |
| Still gas | 471 | 468 | — | — | 471 | 468 |

¹Excludes imports and direct shipments.

Source: U.S. Bureau of Mines, "Crude Petroleum, Petroleum Products, and Natural Gas Liquids in P.A.D. District V, Year 1975," *Mineral Industry Surveys*, March 8, 1977, pp. 3-4.

Table 251.—ENERGY CONSUMPTION, BY TYPE AND CONSUMING SECTOR: 1960 TO 1974
(In trillion British thermal units)

| Year | Gross consumption | | | | | | | | Utility electricity distributed | Net consumption |
|------------|-------------------------|-----------------------------|-------------|--------------------------|------------|-----------------------------|----------------|----------------------------|---------------------------------|-----------------|
| | Total gross consumption | By energy type ¹ | | By consuming sector | | | | | | |
| | | Petroleum products | Hydro-power | Household and commercial | Industrial | Transportation ² | Electric power | Miscellaneous ² | | |
| 1960 | 76.1 | 75.9 | 0.2 | 1.4 | 8.7 | 41.8 | 23.1 | 1.1 | 6.2 | 59.2 |
| 1961 | 94.5 | 94.3 | 0.2 | 3.5 | 11.5 | 54.3 | 24.3 | 0.9 | 6.9 | 77.1 |
| 1962 | 86.0 | 85.8 | 0.2 | 4.2 | 10.1 | 43.5 | 26.1 | 2.1 | 7.4 | 67.3 |
| 1963 | 93.4 | 93.1 | 0.3 | 4.2 | 9.2 | 49.9 | 27.7 | 2.4 | 7.8 | 73.5 |
| 1964 | 103.7 | 103.3 | 0.4 | 3.7 | 10.4 | 57.1 | 30.4 | 2.1 | 8.6 | 81.9 |
| 1965 | 109.6 | 109.3 | 0.3 | 4.1 | 10.5 | 60.7 | 30.9 | 3.4 | 9.2 | 87.9 |
| 1966 | 122.0 | 121.7 | 0.3 | 4.0 | 10.8 | 70.5 | 33.2 | 3.5 | 9.9 | 98.7 |
| 1967 | 135.1 | 134.8 | 0.3 | 4.0 | 7.5 | 81.6 | 31.4 | 10.6 | 10.6 | 114.3 |
| 1968 | 152.1 | 151.9 | 0.2 | 5.1 | 11.3 | 97.5 | 34.6 | 3.6 | 11.7 | 129.2 |
| 1969 | 163.3 | 163.0 | 0.3 | 6.5 | 13.4 | 103.7 | 38.5 | 1.2 | 12.9 | 137.7 |
| 1970 | 169.9 | 169.7 | 0.2 | 7.9 | 14.0 | 104.0 | 43.0 | 1.0 | 14.1 | 141.0 |
| 1971 | 180.7 | 180.5 | 0.2 | 6.7 | 12.8 | 113.3 | 47.5 | 0.4 | 15.6 | 148.8 |
| 1972 | 186.3 | 186.1 | 0.2 | 6.2 | 13.3 | 111.6 | 52.8 | 2.4 | 17.3 | 150.8 |
| 1973 | 192.4 | 192.2 | 0.2 | 5.8 | 12.5 | 115.6 | 55.5 | 3.0 | 18.2 | 155.1 |
| 1974 | 184.9 | 184.7 | 0.2 | 5.9 | 10.6 | 107.5 | 57.5 | 3.4 | 19.2 | 146.6 |

¹No consumption of anthracite, bituminous coal and lignite, natural gas, or nuclear power was recorded in this period.

²Highway use of distillate fuel oil included in "miscellaneous" in 1967.

Source follows next table.

Table 252.—PETROLEUM CONSUMPTION, BY TYPE AND CONSUMING SECTOR: 1964, 1973 AND 1974

| Petroleum product and consuming sector | Thousand barrels | | | Trillion British thermal units | | |
|--|------------------|--------|--------|--------------------------------|-------|-------|
| | 1964 | 1973 | 1974 | 1964 | 1973 | 1974 |
| Total | 17,739 | 33,303 | 32,008 | 103.3 | 192.2 | 184.7 |
| Type of petroleum: | | | | | | |
| Gasoline | 4,414 | 6,589 | 6,615 | 23.2 | 34.6 | 34.7 |
| Jet fuel | 3,468 | 11,970 | 10,601 | 19.7 | 67.9 | 60.1 |
| Kerosine | 48 | 41 | 75 | 0.2 | 0.2 | 0.4 |
| Distillate fuel oil | 1,769 | 1,839 | 1,997 | 10.3 | 10.7 | 11.6 |
| Residual fuel oil | 7,539 | 11,580 | 11,495 | 47.3 | 72.8 | 72.3 |
| Liquefied petroleum gases | 259 | 941 | 966 | 1.0 | 3.7 | 3.9 |
| Asphalt | 242 | 343 | 259 | 1.6 | 2.3 | 1.7 |
| Consuming sector: | | | | | | |
| Household and commercial | 636 | 1,143 | 1,145 | 3.7 | 5.8 | 5.9 |
| Industrial | 1,731 | 2,144 | 1,851 | 10.4 | 12.5 | 10.6 |
| Transportation | 10,246 | 20,718 | 19,337 | 57.1 | 115.6 | 107.5 |
| Electric power | 4,783 | 8,816 | 9,137 | 30.0 | 55.3 | 57.3 |
| Miscellaneous | 343 | 482 | 538 | 2.1 | 3.0 | 3.4 |

Source of tables 251 and 252: U.S. Bureau of Mines, *Historical Fuels and Energy Consumption Data, 1960-72, United States by States and Census Districts West of the Mississippi*, by L.H. Crump (Information Circular 8705, 1976), pp. 72-77; *Fuels and Energy Data: United States by States and Census Divisions, 1973*, by L.H. Crump (Information Circular 8722, 1976), pp. 41 and 93; and *Fuels and Energy Data: United States by States and Census Divisions, 1974*, by L.H. Crump (Information Circular 8739, 1977), pp. 53 and 144.

Table 253.—ENERGY USED IN AGRICULTURE: 1974

| Subject | Units | Amounts |
|-----------------------------|-------------------------|---------|
| All energy used | Billion BTU's | 6,511 |
| Crops | Billion BTU's | 6,214 |
| Sugar cane | Billion BTU's | 4,667 |
| Pineapples | Billion BTU's | 345 |
| Other and unspecified | Billion BTU's | 1,202 |
| Livestock | Billion BTU's | 297 |
| Gasoline | 1,000 gallons | 8,976 |
| Diesel | 1,000 gallons | 6,493 |
| Fuel oil | 1,000 gallons | 40 |
| LP gas | 1,000 gallons | 173 |
| Natural gas | 1,000 MCF | — |
| Coal | Tons | — |
| Electricity | Million KWH's | 707 |
| Invested ¹ | Billion BTU's | 2,043 |
| Irrigation, total | Billion BTU's | 2,465 |
| Gasoline | 1,000 gallons | 723 |
| Electricity | Million KWH's | 696 |
| Fertilizers, total | Billion BTU's | 1,882 |
| Nitrogen | 1,000 lbs. ² | 52,944 |
| Phosphate | 1,000 lbs. ² | 22,835 |
| Potash | 1,000 lbs. ² | 25,407 |
| Pesticides, total | Billion BTU's | 161 |
| Herbicide | 1,000 lbs. ³ | 857 |
| Insecticide | 1,000 lbs. ³ | 595 |
| Fungicide and other | 1,000 lbs. ³ | — |

¹ Energy required to manufacture fertilizers and pesticides (including carrier solution).

² Of (N), (P2O5), and (K2O).

³ Of active ingredient.

Source: Federal Energy Administration, *Energy and U.S. Agriculture: 1974 Data Base*, Vol. 1 (September 1976), pp. 69-72.

Table 254.—SCIENTIFIC ORGANIZATIONS AND RESOURCES: 1976

| Type of organization | Number of organizations | Employment | | |
|--|-------------------------|------------|--------------|-----------|
| | | Total | Professional | Technical |
| Total employing organizations | 384 | 34,449 | 7,346 | 10,729 |
| Organizations with scientific capabilities | 98 | 14,528 | 2,447 | 3,253 |
| Computer science companies | 54 | 2,510 | 697 | 1,096 |
| R & D and allied companies | 43 | 1,541 | 453 | 400 |
| Testing laboratories | 31 | 1,060 | 305 | 288 |
| Private research agencies | 39 | 778 | 299 | 118 |
| Government agencies | 119 | 14,032 | 3,145 | 5,574 |
| Federal civilian | 24 | 1,424 | 257 | 715 |
| Military | 10 | 6,118 | 676 | 3,705 |
| State, except University of Hawaii | 36 | 3,218 | 1,087 | 613 |
| University of Hawaii | 33 | 1,497 | 756 | 294 |
| County | 16 | 1,775 | 369 | 247 |

| Subject | Number | Subject | Number |
|----------------------------------|---------|---|--------|
| Professional associations: | | Colleges and universities: | |
| Number of associations | 44 | Number of units | 34 |
| Regular membership | 11,749 | Full-time enrollment ¹ | 37,770 |
| Associate membership | 753 | Part-time enrollment ¹ | 38,805 |
| Scientific libraries: | | Business and technical schools: | |
| Number of libraries | 22 | Number of units | 4 |
| Number of scientific books | 846,436 | Full-time enrollment ¹ | 763 |
| | | Part-time enrollment ¹ | 162 |

¹Spring 1976. Because of differences in coverage and definition, these data differ from those in Section 3.

Source: Hawaii State Department of Planning and Economic Development, *Hawaii's Scientific Resources, 1977 Directory*, 8th edition (1977), p. 5.

**Table 255.—PATENTS GRANTED TO HAWAII
RESIDENTS: 1970 TO 1976**

| Year | Patents |
|-------------------------|---------|
| 1970 | 50 |
| 1971 | 37 |
| 1972 | 26 |
| 1973 | 50 |
| 1974 ¹ | 55 |
| 1975 ¹ | 61 |
| 1976 | 43 |

¹ Fiscal year ended June 30. Includes reissues.

Source: *Annual Report of the Commissioner of Patents*;
U.S. Department of Commerce, news release PAT 77-3
(March 17, 1977).