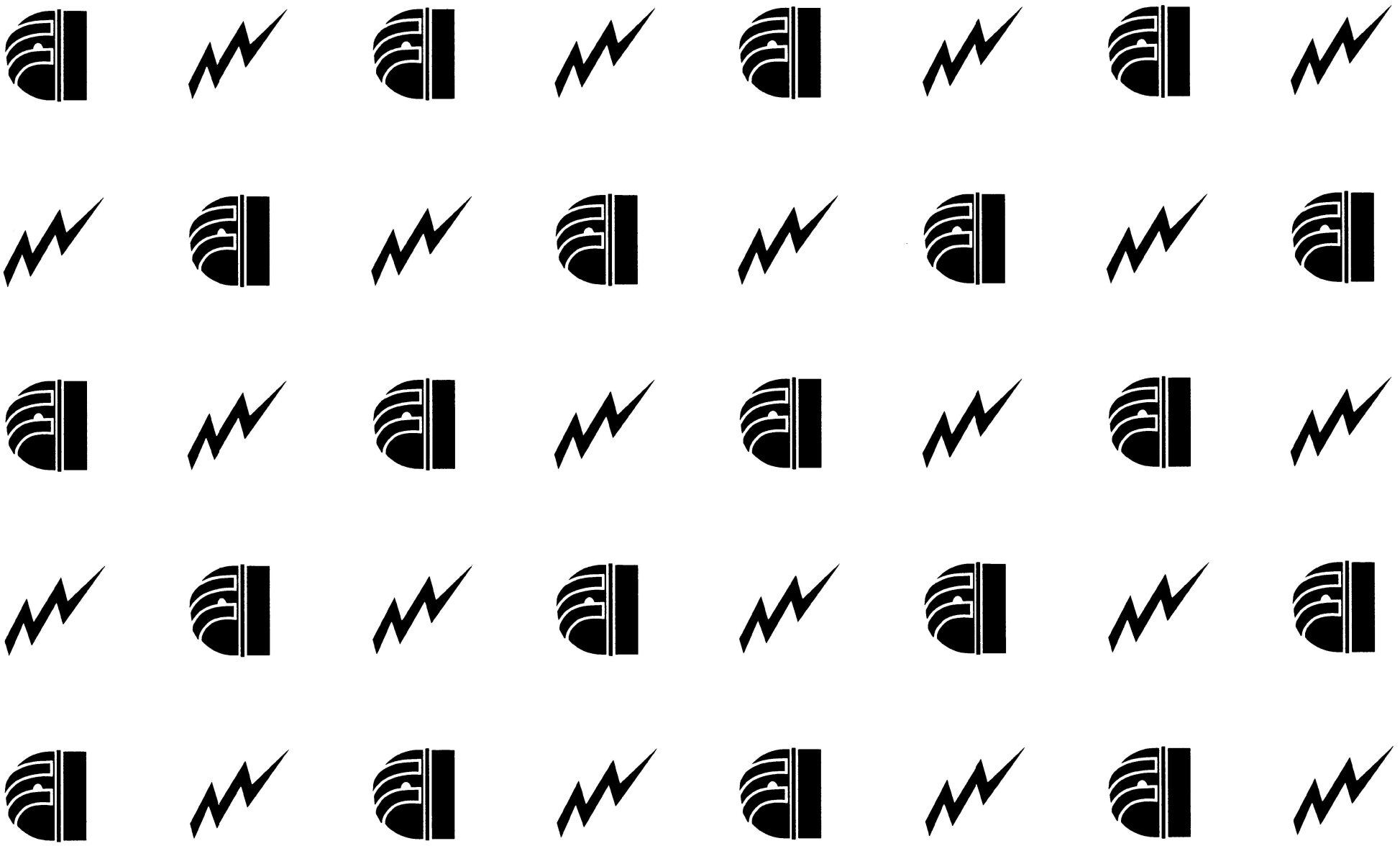
Energy & Science



Section 7

ENERGY & SCIENCE

The growth in Maui County's population is reflected in the utilities. Consumption and use of electricity, gas, utilities, and water have all increased dramatically over the last decade. This section details those statistics on electricity, gas, water production and consumption.

Ongoing scientific endeavors include observation of astronomical and man-made space objects from the summit of Mt. Haleakalā.

7.1.1

TELESCOPES AT THE SUMMITS OF MAUNA KEA AND HALEAKALĀ

Facility (mirror diameter in meters)	Capital Cost ($ mil)[1]	Annual Operating Cost ($ mil)	County Based Staff	Operational
Mauna Kea Observatories:				
UH 2.2-m (Optical/Infrared)	5	1.0	6	1970
Canada-France-Hawai'i 3.6-m (Optical/Infrared)	30	7.4	49	1979
NASA IRTF 3.0-m (Infrared)	10	5.1	19	1979
UKIRT 3.8-m (Infrared)	5	2.2	6	1979
James Clerk Maxwell 15-m Submillimeter	32	4.7	36	1986
VLBA Antenna 25-m (Radio)	7	0.4	2	1992
W.M. Keck Observatory (Keck I & II)				
10-m x 2 (Optical/Infrared)	170	14.2	125	1992/1996
Subaru (Japan National Large Telescope)				
8-m (Optical/Infrared)	170	17.0	101	1999
Fredrick C. Gillett Gemini 8m (Optical/Infrared)	92	15.0	83	1999
Submillimeter Array 8x6-m	80	5.5	23	2003
Mauna Kea Observatories Support Services	X	5.4[2]	51	1980
Total	**601**	**72.4**	**501**	
Haleakalā Observatories:				
Mees Solar Observatory	1	0.2	1	1963
Haleakalā Observatories Projects	X	0.2	2	NA
Maui Space Surveillance Site (MSSS)	250	26.3	117	1965
Ground-Based Electro-Optical Deep Space				
Surveillance (GEODSS)	25	6.1	16	1983
Faulkes 2-m Telescope	10	0.6	2	2003
Transportable Laser Ranging System (TLRS4)	1	0.5	5	2005
Panoramic Survey Telescope And Rapid				
Response System (Pan-STARRS)	110	5.6	11	2009
Haleakalā Support Facilities	9	1.2	15	1962/2008
Daniel K. Inouye Solar Telescope (DKIST)[3]	344	18.0[4]	35	
Total	**749**	**40.7**	**202**	

X Not applicable. Note: 2016 data for Mauna Kea and 2017 data for Haleakala.

1. Historical cost, not adjusted for inflation, and not including subsequent capital improvements for Mauna Kea Observation.
2. Only $1.9 million of this included in total as the other $3.5 million are part of facility operating costs.
3. Daniel K. Inouye Solar Telescope was scheduled to be operational by 2020. However, data are not yet available.
4. Operational cost of $18 million not included in the total.

SOURCE: UNIVERSITY OF HAWAI'I AT MANOA, INSTITUTE FOR ASTRONOMY.

7.1.2

ELECTRIC UTILITIES
MAUI COUNTY

	2019	2020	2021	2022	2023
Customers, Dec 31					
Total					
Maui Island	67,526	68,286	68,757	68,910	67,452
Molokaʻi	3,248	3,269	3,273	3,275	3,285
Lānaʻi	1,748	1,749	1,758	1,748	1,760
Maui County	**72,522**	**73,304**	**73,788**	**73,933**	**72,497**
Residential					
Maui Island	57,758	58,533	58,907	58,963	57,951
Molokaʻi	2,706	2,721	2,723	2,730	2,742
Lānaʻi	1,493	1,495	1,500	1,485	1,495
Maui County	**61,957**	**62,749**	**63,130**	**63,178**	**62,188**
Other					
Maui Island	9,768	9,753	9,850	9,947	9,501
Molokaʻi	542	548	550	545	543
Lānaʻi	255	254	258	263	265
Maui County	**10,565**	**10,555**	**10,658**	**10,755**	**10,309**
Peak Demand (mW)[1]					
Maui Island	207.1	184.0	188.9	199.4	NA
Molokaʻi	6.0	5.9	5.8	5.8	NA
Lānaʻi	6.1	6.1	6.1	6.0	NA
Power Sold (1,000 kWh)					
Total					
Maui Island	1,064,751	898,268	983,972	1,025,930	983,211
Molokaʻi	29,612	29,053	28,995	28,650	28,257
Lānaʻi	32,975	31,367	34,699	34,745	33,514
Maui County	**1,127,338**	**958,688**	**1,047,666**	**1,089,325**	**1,044,982**
Residential					
Maui Island	376,193	358,351	378,983	377,600	356,446
Molokaʻi	10,666	11,429	11,548	11,404	11,179
Lānaʻi	8,321	8,460	8,815	8,615	8,414
Maui County	**395,180**	**378,240**	**399,347**	**397,619**	**376,039**
Other					
Maui Island	688,559	539,917	604,989	648,330	626,765
Molokaʻi	18,945	17,624	17,448	17,246	17,078
Lānaʻi	24,654	22,907	25,883	26,129	25,100
Maui County	**732,158**	**580,448**	**648,320**	**691,705**	**668,943**

CONTINUES ON THE NEXT PAGE

7.1.2

CONTINUED

	2019	2020	2021	2022	2023
Average Annual Use, Dec 31 (kWh)					
Residential					
Maui Island	6,513	6,122	6,434	6,404	6,151
Molokaʻi	3,942	4,200	4,241	4,177	4,077
Lānaʻi	5,574	5,659	5,877	5,802	5,628
Other					
Maui Island	70,491	55,359	61,420	65,178	65,968
Molokaʻi	34,955	32,160	31,723	31,644	31,451
Lānaʻi	96,682	90,185	100,324	99,351	94,717
Average Rate (dollars per kWh)					
Residential					
Maui Island	0.33646	0.33318	0.34849	0.43256	0.43311
Molokaʻi	0.40515	0.35430	0.38836	0.53346	0.51740
Lānaʻi	0.42015	0.36410	0.41753	0.54930	0.52484
Other					
Maui Island	0.31500	0.32741	0.33395	0.41236	0.40975
Molokaʻi	0.38856	0.34056	0.37406	0.51682	0.49608
Lānaʻi	0.42115	0.37416	0.41901	0.55180	0.52394
Revenues ($1,000)					
Total					
Maui Island	343,472	296,169	334,111	430,676	411,194
Molokaʻi	11,683	10,051	11,011	14,997	14,256
Lānaʻi	13,879	11,651	14,526	19,151	17,567
Maui County	**369,034**	**317,871**	**359,648**	**464,824**	**443,017**
Residential					
Maui Island	126,573	119,395	132,073	163,333	154,379
Molokaʻi	4,321	4,049	4,485	6,084	5,784
Lānaʻi	3,496	3,080	3,681	4,732	4,416
Maui County	**134,390**	**126,524**	**140,238**	**174,149**	**164,579**
Other					
Maui Island	216,899	176,774	202,038	267,343	256,815
Molokaʻi	7,361	6,002	6,526	8,913	8,472
Lānaʻi	10,383	8,571	10,845	14,418	13,151
Maui County	**234,643**	**191,347**	**219,410**	**290,674**	**278,438**

mW: Megawatts

kWh: Kilowatt hours NA: Not available

1. Peak demand is the maximum amount of energy required from the electrical system. The islands' electrical systems are not interconnected, so no peaks are reported for Maui County as a whole.

SOURCE: MONTHLY FINANCIAL REPORTS ISSUED BY MAUI ELECTRIC COMPANY, CALCULATIONS BY HAWAIʻI STATE DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT AND TOURISM.

7.1.3

GAS UTILITIES
MAUI COUNTY

Excludes bottled gas

	2019	2020	2021	2022	2023
			Island of Maui		
Customers, Dec. 31					
Residential	668	709	713	712	740
Other	100	101	101	105	47
Total	**768**	**810**	**814**	**817**	**787**
Gas Sold (1,000 therms)					
Residential	108	110	129	131	119
Other	831	545	821	893	791
Total	**939**	**655**	**950**	**1,024**	**910**
Average Annual Use (therms)					
Residential	162	155	181	184	161
Other	8,309	5,393	8,129	8,505	16,380
Average Rate (dollar per therm)					
Residential	4.51	4.48	4.60	4.95	4.84
Other	2.40	2.56	2.52	2.91	2.68
Revenues ($1,000)					
Residential	489	494	593	649	576
Other	1,994	1,393	2,071	2,600	2,123
Total	**2,483**	**1,887**	**2,664**	**3,249**	**2,699**
			Islands of Molokaʻi and Lānaʻi[1]		
Customers, Dec. 31					
Molokaʻi	67	69	83	82	76
Lānaʻi	22	22	25	25	25
Gas Sold (1,000 therms)					
Molokaʻi	11	11	11	12	12
Lānaʻi	4	4	5	17	9
Average Annual Use (therms)					
Molokaʻi	169	166	138	146	158
Lānaʻi	167	192	200	680	360
Average Rate (dollar per therm)					
Molokaʻi	4.47	4.43	4.43	4.83	4.92
Lānaʻi	4.50	4.48	4.00	4.53	4.56
Revenues ($1,000)					
Molokaʻi	51	51	51	58	59
Lānaʻi	17	19	20	77	41

1. All Molokaʻi and Lānaʻi customers are residential.

SOURCE: HAWAIʻI GAS THE CLEAN ENERGY COMPANY, HAWAIʻI GAS UTILITY MONTHLY FINANCIAL REPORTS, CALCULATIONS BY HAWAIʻI STATE DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT AND TOURISM.

7.1.4

ENERGY CONSUMPTION ESTIMATES BY SOURCE
HAWAIʻI STATE ENERGY REPORT

In trillion BTU

	2018	2019	2020	2021	2022
Coal	**14.4**	**14.2**	**13.3**	**12.6**	**7.7**
Natural Gas	**0.2**	**0.2**	**0.2**	**0.1**	**0.2**
Petroleum					
Distillate fuel oil	29.7	28.9	27.6	27.0	29.0
Jet fuel	98.9	101.0	51.3	76.4	88.3
Liquefied petroleum gas	3.7	3.7	3.4	4.2	3.9
Motor gasoline	51.4	51.7	40.3	45.7	46.0
Residual fuel oil	62.0	63.5	53.6	58.9	64.0
Other	15.7	15.6	11.8	11.3	11.1
Total Petroleum	**261.5**	**264.4**	**187.9**	**223.0**	**241.9**
Renewable Energy					
Hydroelectric*	0.3	0.3	0.3	0.4	0.4
Biomass	10.7	10.0	8.4	9.0	9.0
Wood and waste	5.4	4.9	4.4	4.6	4.6
Ethanol fuel	3.9	4.0	3.2	3.6	3.7
Geothermal*	0.4	s	s	0.6	0.7
Solar / Photovoltaic*	6.2	6.7	7.8	8.0	8.4
Wind*	2.1	1.8	2.0	2.2	2.1
Total Renewable Energy*	**19.6**	**18.8**	**18.6**	**20.4**	**20.6**
Total Energy Consumption*	**294.9**	**297.1**	**219.7**	**255.9**	**270.3**

Note: Totals may not equal sum of components due to independent rounding.
s: Value less than +0.05 and greater than -0.05 trillion Btu. * Revised data from 2018 to 2021.

SOURCE: U.S. DEPARTMENT OF ENERGY, ENERGY INFORMATION ADMINISTRATION, STATE ENERGY DATA SYSTEM.

7.1.5

WATER SERVICES AND CONSUMPTION
MAUI COUNTY

Years ending June 30

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Number of Services										
Maui County	36,040	36,104	36,211	36,365	36,615	36,719	37,069	37,178	37,342	37,430
Maui	34,373	34,439	34,552	34,692	34,931	35,028	35,374	35,476	35,641	35,728
Molokaʻi	1,667	1,665	1,659	1,673	1,684	1,691	1,695	1,702	1,701	1,702
Consumption (million gallons)										
Maui County	11,851	11,684	11,785	11,624	11,750	11,675	12,114	11,971	12,459	11,850
Maui	11,592	11,427	11,523	11,376	11,509	11,450	11,849	11,703	12,177	11,592
Molokaʻi	259	257	262	248	241	225	265	268	282	258

SOURCE: HAWAIʻI STATE DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT AND TOURISM, DATA COMPILED FROM COUNTY OF MAUI DEPARTMENT OF WATER SUPPLY.

7.1.6

DAILY AVERAGES FOR WATER PRODUCTION BY AREA, MAUI COUNTY, 2023

In thousands of gallons

Area	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Previous 12 Months
Central Maui													
Groundwater-ʻĪao	13,074	11,931	12,905	13,643	13,857	15,712	16,179	16,080	16,108	15,599	13,527	11,416	14,169
Groundwater-Waiheʻe	3,991	3,660	3,859	3,970	4,196	4,729	4,704	5,273	4,812	4,379	5,256	5,521	4,608
Kepaniwai	453	711	713	720	720	716	720	719	720	715	720	720	694
ʻĪao Tunnel	1,684	1,594	1,441	1,612	1,596	1,609	1,612	1,611	1,602	1,612	1,618	1,616	1,601
Maui Lani	995	987	905	969	990	983	1,005	992	986	993	991	991	1,000
Surface water	2,037	1,383	1,922	2,179	2,893	2,612	2,575	2,635	2,258	2,721	2,492	2,721	2,369
Upcountry Maui													
Surface water	5,745	5,330	4,959	5,529	5,830	6,832	6,572	7,467	7,541	7,633	6,437	4,503	6,198
Groundwater	1,525	696	684	555	547	1,338	2,588	2,649	2,645	2,300	2,623	2,238	1,790
West Maui													
Surface water	2,111	2,823	3,241	2,824	2,679	2,557	3,353	2,371	2,423	1,634	1,751	1,400	2,395
Groundwater	2,616	1,516	1,401	1,092	2,366	3,020	2,282	1,643	1,761	1,835	1,789	1,908	1,974
East Maui													
Groundwater	410	365	374	385	386	407	455	446	446	468	456	473	428
Molokaʻi													
Groundwater	685	608	654	744	801	897	896	925	899	871	771	660	800
Total Water Production	**35,326**	**31,604**	**33,058**	**35,222**	**36,861**	**41,417**	**42,941**	**42,811**	**42,201**	**40,760**	**38,431**	**34,167**	**37,900**

SOURCE: COUNTY OF MAUI, DEPARTMENT OF WATER SUPPLY, MONTHLY WATER PRODUCTION.

7.1.7

WATER SYSTEM SERVICE CHARGES AND DEVELOPMENT FEE SCHEDULES

In $ per 1,000 gallons

Water Service Charges (Fiscal Year 2023)

Schedule A		Schedule B (Meter Size)	Per meter/ per month
Family Dwellings, 5/8" meters		5/8 inch	$19.80
0 - 5,000 gal	$2.05	3/4 inch	$32.00
5,001 - 15,000	$3.90	1 inch	$47.50
15,001 - 35,000	$5.85	1 1/2 inch	$91.00
Over 35,000	$6.55	2 inch	$141.00
Rates (All Others)		3 inch	$249.00
0 - 5,000 gal	$2.05	4 inch	$432.00
5,001 - 15,000	$3.90	6 inch	$793.00
Over 15,000	$5.85	8 inch	$1,251.00
Agricultural Rates			
0 - 5,000 gal	$2.05		
5,001 - 15,000	$3.90		
Over 15,000	$1.10		
Non-Potable Agricultural Rates			
All usage	$1.00		

Water System Development Fee Schedule

Meter Size	Fee*
5/8 inch	$12,060
3/4 inch	$18,884
1 inch	$33,356
1 1/2 inch	$71,948
2 inch	$125,012
3 inch	$279,380
4 inch	$496,460
6 inch	$1,113,932
8 inch	$1,977,428
10 inch	$3,089,360
12 inch	$4,447,436

* Plus installation charges.

SOURCE: COUNTY OF MAUI, DEPARTMENT OF WATER SUPPLY.

7.1.8

WATER SERVICE BY METER SIZE
MAUI COUNTY

Fiscal year ending June 30, 2023

District	5/8”	3/4”	1”	1 1/2”	2”	3”	4”	6”	8”	Total
Regular Rates										
Wailuku	17,953	1,770	592	444	427	61	39	6	1	21,293
Makawao	9,134	386	203	105	44	7	1	2	0	9,882
Lahaina	2,669	392	124	124	121	27	13	2	0	3,472
Hāna	496	13	10	7	3	1	0	0	0	530
Molokaʻi	1,570	51	33	14	17	3	0	1	0	1,689
Subtotal	31,822	2,612	962	694	612	99	53	11	1	36,866
Agricultural Meters										
Wailuku	16	13	2	3	1	1	0	0	0	36
Makawao	293	46	58	59	24	1	0	0	0	481
Lahaina	2	1	5	0	1	0	1	0	0	10
Hāna	23	0	1	0	0	0	0	0	0	24
Molokaʻi	9	3	1	0	0	0	0	0	0	13
Subtotal	343	63	67	62	26	2	1	0	0	564
Total	**32,165**	**2,675**	**1,029**	**756**	**638**	**101**	**54**	**11**	**1**	**37,430**

SOURCE: COUNTY OF MAUI, DEPARTMENT OF WATER SUPPLY, ANNUAL REPORT FY 2023.

7.1.9

OUTSIDE WATER DELIVERIES TO DEPARTMENT OF WATER SUPPLY MAUI COUNTY

Fiscal year ending June 30, 2023

	1,000 Gallons	Amount	Cost per 1,000 Gallons
Purchased from			
East Maui Irrigation	2,179,747	$131,439	0.060
Wailuku Water Co.	996,914	$501,745	0.503
Maui Land & Pine	425,568	$136,090	0.320
Hawaiian Home Lands*	7,250	$113,406	15.642
Total	**3,609,478**	**$882,680**	**0.245**
District			
Wailuku	996,914	$501,745	0.503
Kula	191,226	$11,531	0.060
Makawao	1,978,616	$119,311	0.060
Lahaina	425,568	$136,090	0.320
Hāna	9,904	$597	0.060
Molokaʻi	7,250	$113,406	15.642
Total	**3,609,478**	**$882,680**	**0.245**
Other Water			
Wailuku - Wailuku Water Co.	**393,047**		

* Billed bi-monthly.

SOURCE: COUNTY OF MAUI, DEPARTMENT OF WATER SUPPLY, ANNUAL REPORT FY 2023.

7.1.10

WATER SALES TO GENERAL AND AGRICULTURAL CONSUMERS BY DISTRICT, MAUI COUNTY

Fiscal year ending June 30, 2023

District	Services	Change from FY 2022	Consumption (1,000 gal)	Change from FY 2022 (1,000 gal)
Wailuku District				
Wailuku	6,819	10	1,371,299	(134,241)
Waiheʻe	204	2	23,876	(2,079)
Waikapū	974	1	133,526	(11,631)
Wailuku Heights	499	0	69,862	(3,104)
Kahului	5,371	21	1,528,412	1,702
Puʻunēnē	11	0	4,343	837
Kīhei	6,071	8	3,849,498	(157,995)
Māʻalaea	45	0	74,455	(10,867)
Mākena	214	3	263,426	6,619
Pāʻia-Kūʻau	916	2	152,060	(738)
Spreckelsville	205	0	75,517	(6,163)
Subtotal	**21,329**	**47**	**7,546,274**	**(317,660)**
Makawao District				
Kokomo-Kaupakalua	1,171	1	169,132	(7,107)
Kuiaha	306	0	47,302	(3,164)
Haʻikū-Paʻuwela	872	4	119,853	(3,883)
Makawao	2,032	1	277,243	(13,291)
Pukalani	2,150	1	298,939	(22,431)
Hāliʻimaile	201	0	33,827	46
Upper Kula	2,374	11	428,655	(58,424)
Lower Kula	1,137	0	614,622	(18,128)
ʻUlupalakua-Kanaio	81	0	40,815	(12,636)
Kula Ag. Park	39	0	150,203	(7,060)
Subtotal	**10,363**	**18**	**2,180,591**	**(146,078)**
Lahaina District				
Lahaina	2,210	21	814,942	(47,243)
Honokōwai	450	0	488,252	(13,008)
ʻAlaeloa	809	0	497,828	(47,784)
Honokōhau	13	0	1,074	140
Subtotal	**3,482**	**21**	**1,802,096**	**(107,895)**
Molokaʻi District				
Kawela-Kaunakakai	1,184	1	189,557	(11,475)
ʻUalapuʻe	398	0	62,215	(10,886)
Kalaʻe	114	0	7,149	(974)
Hālawa	6	0	0	0
Subtotal	**1,702**	**1**	**258,921**	**23,335**
Hāna District				
Hāna	409	1	51,915	(10,648)
Nāhiku	38	0	3,287	(21)
Keʻanae	86	0	5,654	(2,415)
Kaupō	21	0	2,019	(555)
Subtotal	**554**	**1**	**62,875**	**(13,639)**
Total All Districts	**37,430**	**88**	**11,850,757**	**(608,607)**

SOURCE: COUNTY OF MAUI, DEPARTMENT OF WATER SUPPLY, ANNUAL REPORT FY 2023.

7.1.11

WATER CONSUMPTION BY DISTRICT
MAUI COUNTY

Fiscal year ending June 30, 2023; In 1,000 gallons

Months	Total	Wailuku	Makawao	Kula	Lahaina	Molokaʻi	Hāna
General							
July	1,033,641	696,008	92,932	56,242	178,632	4,031	5,796
August	985,055	654,747	73,244	54,535	146,081	51,427	5,021
September	1,068,221	724,005	90,093	53,054	173,277	23,057	4,735
October	918,971	630,098	75,908	45,823	145,145	17,733	4,264
November	939,242	650,151	76,834	57,620	148,509	3,052	3,076
December	851,346	546,745	65,911	40,982	155,533	37,251	4,924
January	918,815	639,983	71,166	48,418	134,726	18,275	6,247
February	745,276	510,411	64,118	24,809	128,846	14,121	2,971
March	730,860	490,895	56,943	39,057	120,503	18,309	5,153
April	780,009	538,632	77,738	36,010	124,111	375	3,143
May	879,197	566,420	64,629	43,149	159,849	38,610	6,540
June	1,041,817	727,490	79,202	45,161	163,461	22,993	3,510
Total	**10,892,450**	**7,375,586**	**888,718**	**544,860**	**1,778,673**	**249,234**	**55,380**
Agricultural							
July	90,578	7,572	5,887	74,672	2,174	-	273
August	106,195	14,332	4,770	79,735	2,308	3,056	1,994
September	103,573	15,482	7,841	75,372	2,822	1,032	1,024
October	88,320	13,701	5,950	64,093	2,611	1,239	726
November	96,668	19,136	5,578	69,665	2,086	-	203
December	68,674	10,296	4,026	50,084	2,438	658	1,172
January	72,520	23,148	3,577	43,186	1,724	564	321
February	53,927	12,303	3,618	36,187	1,374	316	129
March	75,726	20,463	2,879	49,710	1,599	523	552
April	57,012	13,026	4,969	37,645	1,154	-	218
May	63,148	8,620	3,238	48,374	1,099	1,267	550
June	81,966	12610	5,245	60,712	2,034	1,032	333
Total	**958,307**	**170,689**	**57,578**	**689,435**	**23,423**	**9,687**	**7,495**
Grand Total	**11,850,757**	**7,546,274**	**946,296**	**1,234,295**	**1,802,095**	**258,921**	**62,875**

Source: County of Maui, Department of Water Supply, Annual Report FY 2023.