



Statewide Energy Demand

Overall, statewide electricity consumption in 2014 grew by almost 1 percent over the previous year, totaling 281,916 gigawatt hours (GWh). This modest growth in electricity consumption from 2013 to 2014 was maintained while employment grew more than twice as much, by 2.3 percent, and California’s gross state product grew at about the same pace (2.27 percent).¹ Job growth also outpaced electricity consumption from 2000 to 2014, during which employment grew 8.4 percent and electricity consumption grew 7.5 percent. Between 2000 and 2014, California’s gross state product grew by 27 percent—over three times as fast as electricity consumption during the same period. The gross state product increased from \$1.7 trillion in 2000 (2009 dollars) to \$2.1 trillion in 2014 (2009 dollars). Meanwhile, the state’s population grew from about 34 million in 2000 to 38.8 million in 2014.

In odd-numbered years, the California Energy Commission provides 10-year forecasts for electricity demand in California and for the major utility planning areas within the state as part of the Integrated Energy Policy Report (IEPR) process. These forecasts are used in various proceedings, including the California Public Utility Commission’s Long-Term Procurement Planning process and the California Independent System Operator’s Transmission Planning Process. The IEPR forecast consists of two parts: a baseline forecast, which includes energy efficiency savings from initiatives already in place or approved; and a forecast of energy efficiency savings, referred to as additional achievable energy efficiency savings. Together, these two parts yield a “managed” forecast for resource planning purposes.

Results of the 2015 Electricity Forecast

*California Energy Demand 2016-2026, Revised Electricity Forecast (CED 2015 Revised)*² includes three baseline cases designed to capture a reasonable range of demand outcomes over the next 10 years. The high energy demand case incorporates relatively high economic/demographic growth, relatively low electricity rates, and relatively low self-generation and climate change impacts. The low energy demand case includes lower economic/demographic growth, higher assumed electricity rates, and higher self-generation impacts. The mid case uses input assumptions at levels between the high and low cases.

Table 1 compares the *CED 2015 Revised* baseline forecast for selected years with the *California Energy Demand Updated Forecast, 2015-2025 (CEDU 2014)*³ mid demand case. As the table shows, the consumption forecast for 2014 from *CEDU 2014* was higher than actual historical consumption. (*CEDU 2014* incorporated historical consumption data through 2013.) Consumption in the *CED 2015 Revised* mid demand case grows at a slower rate

¹ Jobs data are from the Employment Development Department and reflect civilian employment growth. The source of gross state product numbers is Moody’s Analytics, April 2016.

² http://doCKETpublic.energy.ca.gov/PublicDocuments/15-IEPR-03/TN207439_20160115T152221_California_Energy_Demand_20162026_Revised_Electricity_Forecast.pdf.

³ <http://www.energy.ca.gov/2014publications/CEC-200-2014-009/CEC-200-2014-009-CMF.pdf>.



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through 2025 compared to the *CEDU 2014* mid case as a result of additional appliance standards and a reassessment of Title 24 energy efficiency standards for existing buildings.

CED 2015 Revised statewide non-coincident peak demand (the sum of planning area peaks, which may occur at different hours), adjusted to account for atypical weather, grows at a slower rate from 2015-2025 in the mid case compared to *CEDU 2014*. This slower growth rate reflects a drop in consumption as well as a higher self-generation forecast, particularly for photovoltaics. All three *CED 2015 Revised* cases are significantly lower than the *CEDU 2014* mid case throughout the forecast period.



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Table 1: Comparison of *CED 2015 Revised* and *CEDU 2014 Mid Case Demand Baseline* Forecasts of Statewide Electricity Demand

Consumption (GWh)				
	<i>CEDU 2014 Mid Energy Demand</i>	<i>CED 2015 Revised High Energy Demand</i>	<i>CED 2015 Revised Mid Energy Demand</i>	<i>CED 2015 Revised Low Energy Demand</i>
1990	227,576	227,606	227,606	227,606
2000	260,399	261,037	261,037	261,037
2014	281,195	280,536	280,536	280,536
2020	301,290	301,884	296,244	289,085
2025	320,862	322,266	311,848	297,618
2026	--	326,491	314,970	299,372
Average Annual Growth Rates				
1990-2000	1.36%	1.38%	1.38%	1.38%
2000-2014	0.55%	0.52%	0.52%	0.52%
2014-2020	1.16%	1.23%	0.91%	0.50%
2014-2025	1.21%	1.27%	0.97%	0.54%
2014-2026	--	1.27%	0.97%	0.54%
Non-coincident Peak				
	<i>CEDU 2014 Mid Energy Demand</i>	<i>CED 2015 Revised High Energy Demand</i>	<i>CED 2015 Revised Mid Energy Demand</i>	<i>CED 2015 Revised Low Energy Demand</i>
1990	47,543	47,123	47,123	47,123
2000	53,702	53,529	53,529	53,529
2015*	63,577	60,968	60,968	60,968
2020	67,373	63,658	62,414	60,560
2025	70,763	67,167	63,848	59,293
2026		67,830	64,007	58,835
Average Annual Growth Rates				
1990-2000	1.23%	1.28%	1.28%	1.28%
2000-2015	1.13%	0.87%	0.87%	0.87%
2015-2020	1.17%	0.87%	0.47%	-0.13%
2015-2025	1.08%	0.97%	0.46%	-0.28%
2015-2026	--	0.97%	0.44%	-0.32%
Actual historical values are shaded.				
*Weather normalized: <i>CED 2015 Revised</i> uses a weather-normalized peak value derived from the actual 2015 peak for calculating growth rates during the forecast period.				

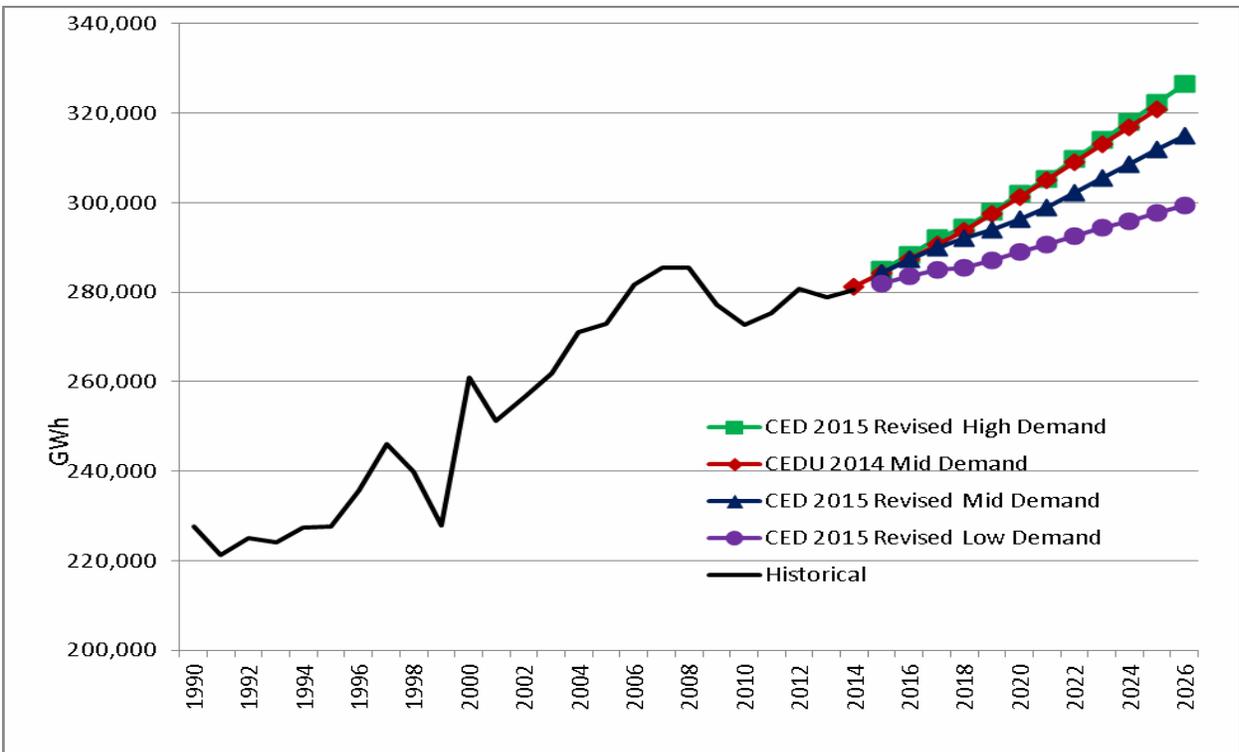
Source: California Energy Commission, Demand Analysis Office, 2015.



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Figure 1 shows projected electricity consumption for the three *CED 2015 Revised* baseline cases and the *CEDU 2014* mid demand forecast. By 2025, consumption in the new mid case is projected to be 2.8 percent lower than the *CEDU 2014* mid case, around 9,000 gigawatt-hours. Annual growth rates from 2014-2025 for *CED 2015 Revised* average 1.27 percent, 0.97 percent, and 0.54 percent in the high, mid, and low cases, respectively, compared to 1.21 percent in the *CEDU 2014* mid case.

Figure 1: Statewide Baseline Annual Electricity Consumption

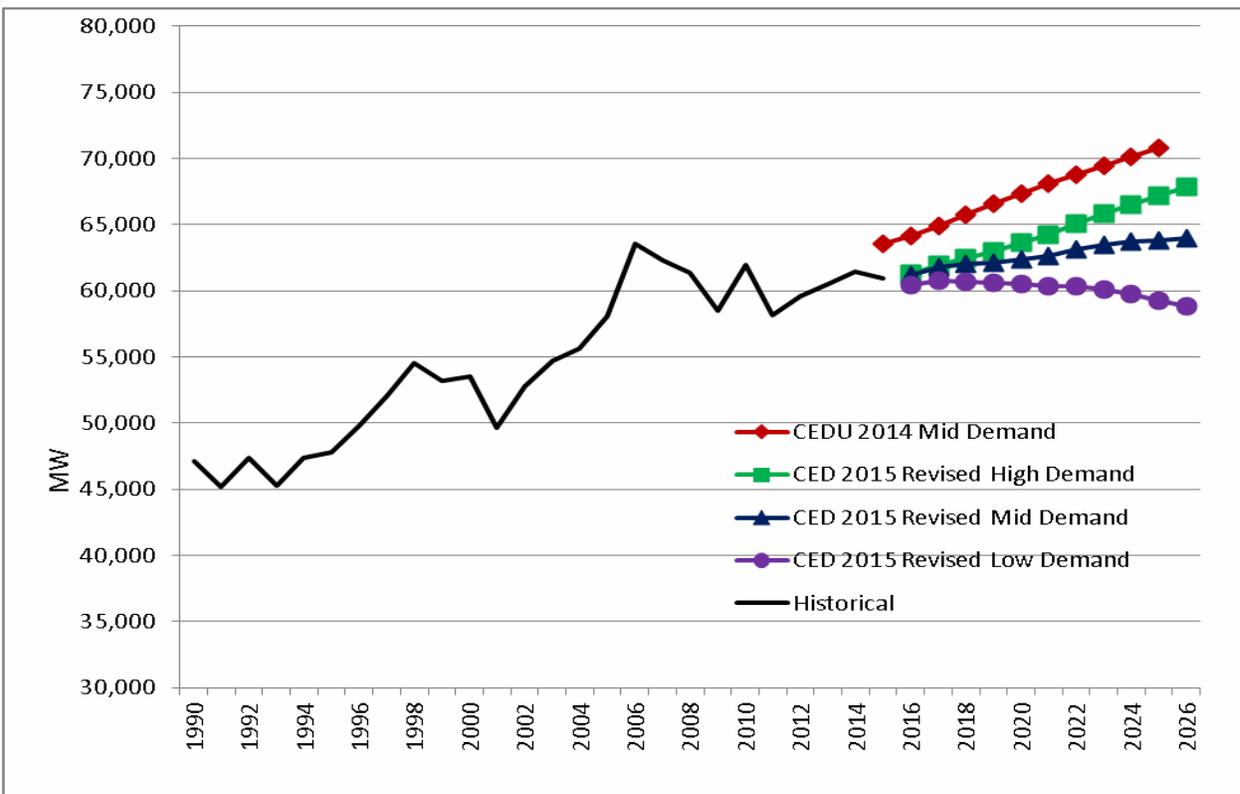


Source: California Energy Commission, Demand Analysis Office, 2015.



Figure 2 shows projected *CED 2015 Revised* baseline non-coincident peak demand, adjusted for atypical weather, for the three baseline cases and the *CEDU 2014* mid demand peak forecast. By 2025, statewide peak demand in the *CED 2015 Revised* mid case is projected to be almost 10 percent lower than in the *CEDU 2014* mid case. Annual growth rates from 2015-2025 for *CED 2015 Revised* average 0.97 percent, 0.46 percent, and -0.28 percent in the high, mid, and low cases, respectively, compared to 1.08 percent in the *CEDU 2014* mid case.

Figure 2: Statewide Baseline Annual Non-coincident Peak Demand

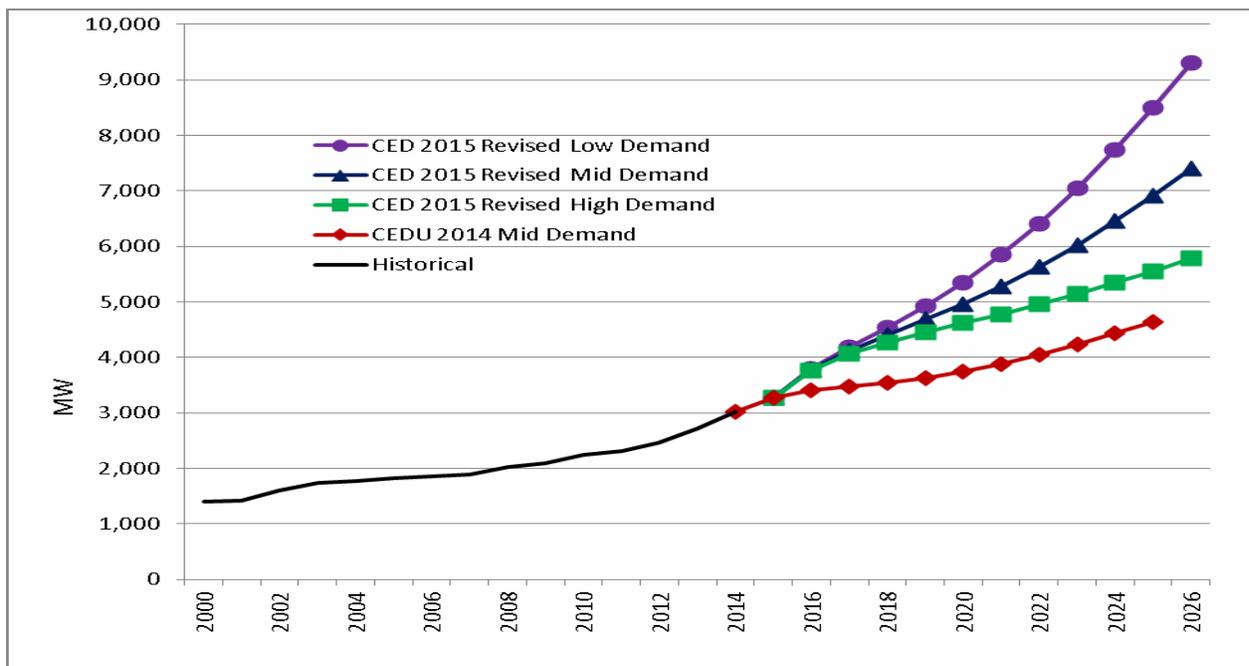


Source: California Energy Commission, Demand Analysis Office, 2015.



Historical and projected peak reduction impacts of self-generation for the three CED 2015 Revised demand cases and the CEDU 2014 mid case are shown in **Figure 3**. Self-generation is projected to reduce peak load by more than 6,900 megawatts in the new mid case by 2025, an increase of more than 2,000 megawatts compared to CEDU 2014. Residential photovoltaic is a key factor in this increase. By 2026, residential photovoltaic peak impacts reach almost 3,000 megawatts in the CED 2015 Revised mid case, corresponding to more than 7,700 megawatts of installed capacity.

Figure 3: Statewide Self-Generation Peak Reduction Impact

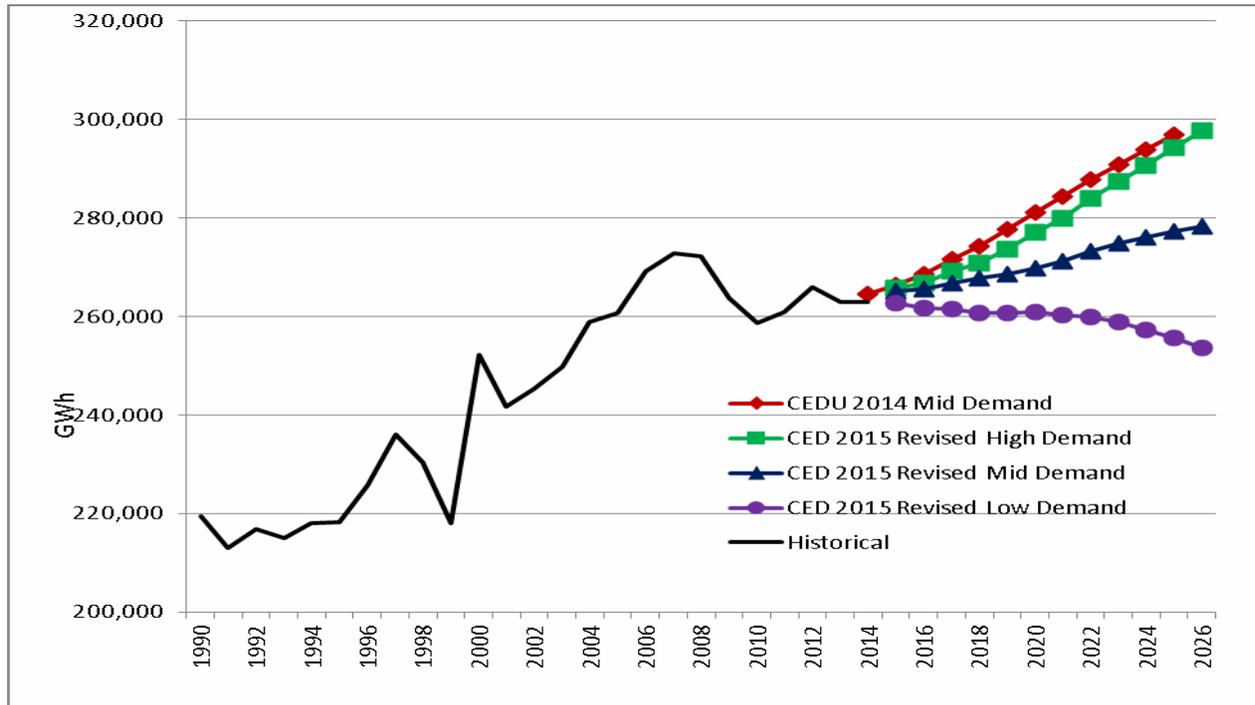


Source: California Energy Commission, Demand Analysis Office, 2015.

The higher forecast for self-generation adoption also has a significant impact on projected baseline statewide retail electricity sales, as shown in **Figure 4**. All three new forecast cases are lower than the *CEDU 2014* mid case throughout the forecast period. By 2025, sales in the *CED 2015 Revised* mid case are projected to be almost 20,000 gigawatt-hours lower than in the *CEDU 2014* mid case, or around 6.6 percent. Annual growth from 2014-2025 for *CED 2015 Revised* averages 1.00 percent, 0.48 percent, and -0.26 percent in the high, mid, and low cases, respectively, compared to 1.05 percent in the *CEDU 2014* mid case.



Figure 4: Statewide Baseline Retail Electricity Sales



Source: California Energy Commission, Demand Analysis Office, 2015.

Table 2 compares projected baseline annual electricity consumption in each *CED 2015 Revised* case for the three major economic sectors—residential, commercial, and industrial (manufacturing, construction, and resource extraction)—to the *CEDU 2014* mid demand case. Residential consumption in the new mid case grows at a slower rate from 2014-2025 compared to *CEDU 2014* due to the most recent residential standards, including the water appliance standards adopted in 2015. Residential consumption grows faster than other sectors because most light-duty electric vehicles are projected to be personal (as opposed to commercial) and because residential plug loads⁴ continue to increase. Commercial sector growth in the *CED 2015 Revised* mid case is below that of *CEDU 2014* because of new appliance standards and an adjustment to the impacts of Title 24 standards for existing buildings. A higher number of electric vehicles and faster economic growth partially offset this decrease. New federal appliance standards, which affect industrial equipment (as well as residential appliances and commercial equipment), result in slightly negative mid case growth for the industrial sector.

⁴ The term *plug load* does not have a strict definition, but in this forecast refers to consumption by various electronic devices (including computers) and smaller appliances and does not include lighting and televisions, which are separate end uses. Residential plug loads, a growing share of total residential consumption, are projected to increase at around 3 percent per year over the forecast period.



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Table 2: Baseline Electricity Consumption by Sector (GWh)

Residential Consumption				
	<i>CEDU 2014 Mid Energy Demand</i>	<i>CED 2015 Revised High Energy Demand</i>	<i>CED 2015 Revised Mid Energy Demand</i>	<i>CED 2015 Revised Low Energy Demand</i>
2014	89,336	89,845	89,845	89,845
2020	97,608	96,255	94,820	93,258
2025	108,807	106,700	103,703	98,558
2026	--	109,142	105,726	99,778
Average Annual Growth, Residential Sector				
2014-2020	1.57%	1.16%	0.90%	0.62%
2014-2025	1.83%	1.58%	1.31%	0.84%
2014-2026	--	1.63%	1.37%	0.88%
Commercial Consumption				
	<i>CEDU 2014 Mid Energy Demand</i>	<i>CED 2015 Revised High Energy Demand</i>	<i>CED 2015 Revised Mid Energy Demand</i>	<i>CED 2015 Revised Low Energy Demand</i>
2014	104,513	106,339	106,339	106,339
2020	113,463	113,982	112,533	110,015
2025	120,252	120,191	117,934	113,829
2026	--	121,262	118,782	114,427
Average Annual Growth, Commercial Sector				
2014-2020	1.38%	1.16%	0.95%	0.57%
2014-2025	1.28%	1.12%	0.95%	0.62%
2014-2026	--	1.10%	0.93%	0.61%
Industrial Consumption				
	<i>CED 2014 Mid Energy Demand</i>	<i>CED 2015 Revised High Energy Demand</i>	<i>CED 2015 Revised Mid Energy Demand</i>	<i>CED 2015 Revised Low Energy Demand</i>
2014	47,932	49,055	49,055	49,055
2020	48,980	51,242	48,735	46,380
2025	48,851	53,504	48,591	45,032
2026	--	53,910	48,574	44,775
Average Annual Growth, Industrial Sector				
2014-2020	0.36%	0.73%	-0.11%	-0.93%
2014-2025	0.20%	0.79%	-0.09%	-0.77%
2014-2026	--	0.79%	-0.08%	-0.76%

Actual historical values are shaded.

Source: California Energy Commission, Demand Analysis Office, 2015.



Historical Electricity Consumption by County

Table 3 shows electricity consumption by county for residential and nonresidential consumers in 2013 and 2014. Residential consumption increased slightly from 90,097 GWh from 189,852 GWh to 191,427 GWh.



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Table 3: Electricity Consumption by County (Millions of GWh)

County	2013			2014		
	Residential	Non-Residential	Total	Residential	Non-Residential	Total
ALAMEDA	2,978	7,638	10,616	2,878	7,422	10,299
ALPINE	13	5	18	12	4	16
AMADOR	139	171	310	134	16	150
BUTTE	729	767	1,497	717	766	1,483
CALAVERAS	199	126	325	192	126	318
COLUSA	65	235	300	64	242	307
CONTRA COSTA	2,762	6,395	9,156	2,721	6,861	9,583
DEL NORTE	127	99	226	11	93	104
EL DORADO	755	486	1,241	718	470	1,188
FRESNO	2,684	4,804	7,488	2,686	4,953	7,638
GLENN	92	258	350	91	292	383
HUMBOLDT	441	449	890	394	445	839
IMPERIAL	537	927	1,464	545	912	1,457
INYO	60	173	233	61	154	215
KERN	2,269	12,750	15,019	2,294	10,896	13,190
KINGS	371	1,414	1,785	376	1,441	1,817
LAKE	302	167	469	284	156	440
LASSEN	104	322	426	94	338	432
LOS ANGELES	20,624	47,792	68,416	20,758	49,240	69,998
MADERA	428	1,148	1,577	423	1,240	1,663
MARIN	682	710	1,392	649	702	1,350
MARIPOSA	72	42	113	68	41	110
MENDOCINO	324	269	593	294	270	563
MERCED	70	2,362	2,432	715	2,306	3,021
MODOC	61	108	169	53	114	168
MONO	99	105	204	88	104	191
MONTEREY	722	1,908	2,631	683	1,933	2,615
NAPA	373	680	1,053	362	684	1,046
NEVADA	422	234	656	406	227	633
ORANGE	6,835	13,398	20,233	7,035	13,689	20,724
PLACER	1,364	1,514	2,877	1,365	1,546	2,911
PLUMAS	101	111	212	98	102	201
RIVERSIDE	6,608	8,516	15,125	6,775	8,747	15,522
SACRAMENTO	4,694	6,131	10,825	4,717	6,262	10,979
SAN BENITO	119	238	357	115	241	355
SAN BERNARDINO	4,671	9,674	14,345	4,751	9,968	14,718
SAN DIEGO	6,788	12,641	19,429	6,847	13,062	19,909
SAN FRANCISCO	1,498	4,374	5,873	1,432	4,401	5,832
SAN JOAQUIN	1,735	3,805	5,540	1,754	3,470	5,224
SAN LUIS OBISPO	658	1,100	1,758	627	1,095	1,722
SAN MATEO	1,567	2,952	4,518	1,495	2,948	4,443
SANTA BARBARA	831	2,532	3,363	803	2,608	3,412
SANTA CLARA	3,908	12,706	16,614	3,831	12,840	16,671
SANTA CRUZ	592	681	1,272	553	681	1,234
SHASTA	747	796	1,544	722	821	1,542
SIERRA	14	10	23	13	10	24
SISKIYOU	231	266	497	214	268	482
SOLANO	1,019	2,202	3,222	1,005	2,208	3,213
SONOMA	1,345	1,626	2,971	1,282	1,661	2,943
STANISLAUS	1,697	2,970	4,667	1,720	3,021	4,740
SUTTER	275	372	647	276	372	648
TEHAMA	237	269	506	230	261	491
TRINITY	11	108	119	10	107	118
TULARE	1,207	3,105	4,312	1,223	3,267	4,490
TUOLUMNE	219	241	460	205	235	439
VENTURA	1,902	3,503	5,405	1,907	3,585	5,493
YOLO	506	1,191	1,697	502	1,230	1,732
YUBA	212	277	489	214	276	489
Total	90,097	189,852	279,948	90,489	191,427	281,916

Source: California Energy Commission, <http://ecdms.energy.ca.gov/>.



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Additional References:

Information regarding California energy consumption is available at <http://www.ecdms.energy.ca.gov>.

Information regarding U.S. energy consumption is available at <http://www.eia.gov/>.

Historical and forecasted statewide annual electricity consumption data are from the *California Energy Demand Forecast, 2016-2026*, published by the California Energy Commission and available at http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR-03/TN207439_20160115T152221_California_Energy_Demand_20162026_Revised_Electricity_Forecast.pdf.

Information on electricity consumption can be found in the California Energy Almanac, available at <http://energyalmanac.ca.gov/electricity/index.html>.

Sources:

Kavalec, Chris, 2016. California Energy Demand 2016-2026. California Energy Commission, Energy Assessments Division. Publication Number: CEC-200-2016-001-V1. http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR-03/TN207439_20160115T152221_California_Energy_Demand_20162026_Revised_Electricity_Forecast.pdf.

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