



California's Installed Electric Power Capacity and Generation

A wide variety of power plants in California and throughout the West provide energy to meet California's electricity needs. The charts and tables below provide information on the total operational capacity and resulting electric generation of power plants within publicly-owned and investor-owned utility service territories in California. The information presented should not be used to determine progress toward California's Renewables Portfolio Standard (RPS). More on the RPS can be found on the tracking progress page on renewable energy. The data here, which is called *total system power*, provides information on California's total fuel mix over several years. Total system power is useful to compare California's use of various fuels, including natural gas, nuclear energy, large hydropower, and renewables—or for making comparisons over several years.

Why Data Reported Here is Not a Proxy for RPS Compliance

The information here is different from what is reported for RPS compliance. Total system power is the annual accounting of electricity generated within California and electricity imported into the state from Canada, Mexico, and other regions in the United States. For power plants located in California, the energy is measured at the generating unit as reported by the power plant owner. Electricity from out-of-state energy is measured as it enters California and is received by a California balancing authority. For most power plants, the reported energy does not account for losses through the transmission and distribution systems. Additionally, unaccounted for energy losses (for example, from short circuits, line failures, and transformer losses) prior to reaching the residential, commercial, or industrial end-user are not accounted for here. In total, both types of losses can exceed 8 percent.

The RPS includes eligibility and accounting requirements that are different from the accounting used to estimate total system power, with highlights described below.

- The Energy Commission certifies if a renewable facility is eligible for the RPS. Some renewable facilities included in the total system power are not eligible for the RPS.
- The RPS is calculated as a percentage of retail sales. Retail sales are typically based on electricity delivered to residential, commercial, industrial, and agricultural customers after line losses.
- For the RPS, electricity retail sellers (including investor-owned utilities, electricity service providers, and community-choice aggregators) and publicly owned electric utilities use renewable energy credits (RECs) to meet their obligation for multi-year compliance periods. The RPS includes various restrictions on the use of RECs that must be factored into evaluating RPS-compliance.

This summary should not be used to estimate the state's progress toward its RPS goals because of the differences between the annual accounting of electric generation in this total system power analysis and the RPS.



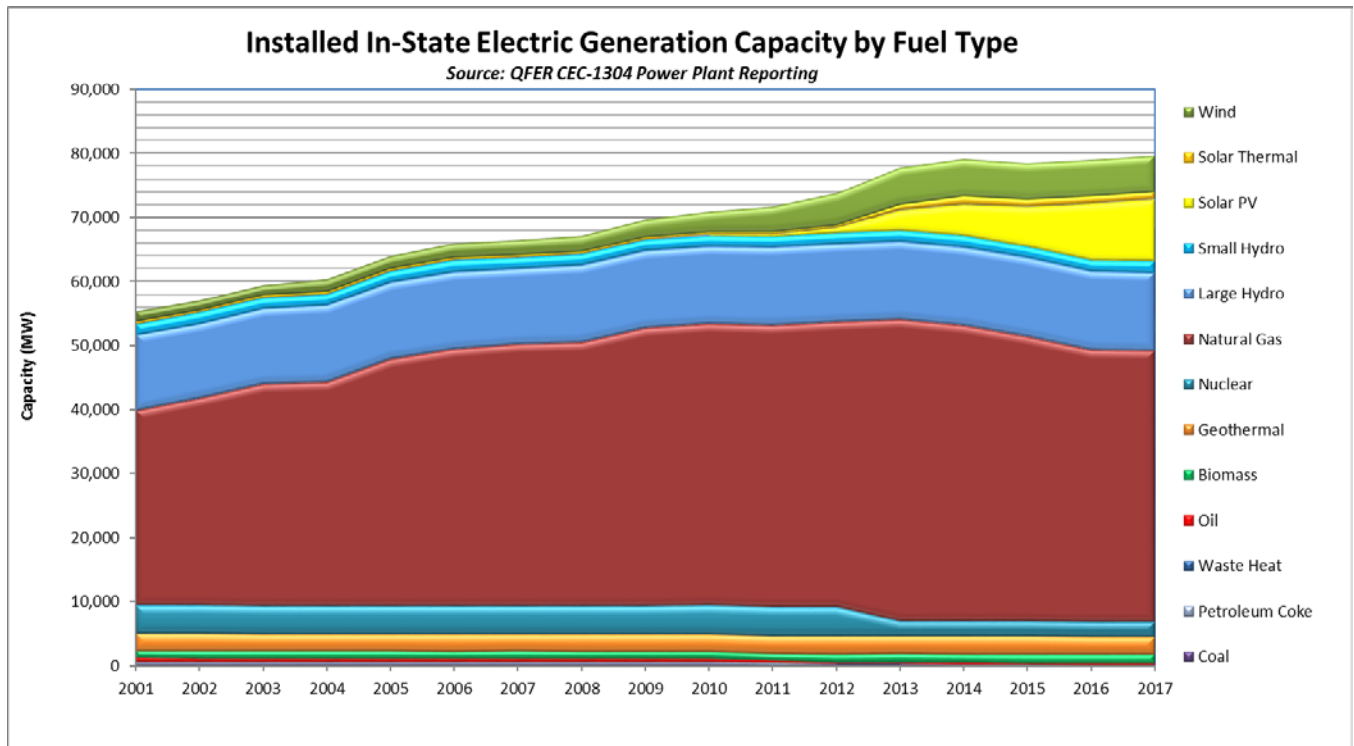
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Installed Capacity

Figure 1 shows on-line capacity by technology for California from 2001 to 2017, as of June 29, 2018. The data are collected under the authority of the California Code of Regulations, Title 20, Division 2, Chapter 3, Section 1304(a)(1)-(2).

Natural gas-powered plants remain the largest portion of the in-state installed capacity. However, in recent years, solar and wind have increased, while natural gas has declined. The values reported in **Figure 1** reflect nameplate capacity, which is the maximum possible output from a generation facility as designated by the manufacturer.

Figure 1: Installed In-State Electric Generation Capacity by Fuel Type



Source: California Energy Commission

* Large hydro are hydroelectric power plants with a nameplate capacity larger than 30 MW.

** Small hydro are power plants 30 MW and smaller, with some exceptions.

*** Waste heat is power from a hydrogen refinery steam methane reforming process.

Note: Behind-the-meter distributed generation including solar photovoltaic residential systems are not included in this data.

Table 1 provides the data used in **Figure 1**. The data shows the nameplate capacity of all power plants 1 megawatt (MW) and larger operating in California as of December 31 of each year. Fuel-type categories have been updated to provide more accurate details. The listings now include petroleum coke, waste heat, and oil. Behind-the-meter or customer-side capacity and generation from facilities smaller than 1 MW are not accounted for in the figures and charts. Examples include distributed electric generation such as rooftop solar photovoltaic (PV)



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installations on residential homes and backup generators used for emergency purposes in larger applications such as hospitals and commercial locations. Facilities with a nameplate capacity less than 1 MW are not required to report to the Energy Commission under the CEC-1304 regulations.

Table 1: Installed In-State Electric Generation Capacity by Fuel Type (MW)

Fuel Type	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coal	422	422	422	422	422	422	422	398	403	408	295	240	240	132	93	55	55
Petroleum Coke	173	173	173	173	173	173	173	173	173	173	149	36	36	36	36	36	36
Biomass	1,143	1,140	1,084	1,076	1,081	1,086	1,094	1,084	1,098	1,086	1,156	1,182	1,214	1,298	1,288	1,309	1,314
Geothermal	2,625	2,623	2,623	2,623	2,623	2,641	2,586	2,598	2,648	2,648	2,648	2,703	2,703	2,703	2,716	2,694	2,694
Nuclear	4,456	4,456	4,456	4,456	4,456	4,456	4,456	4,456	4,456	4,577	4,647	4,647	2,393	2,393	2,393	2,393	2,393
Natural Gas	30,356	32,345	34,702	34,995	38,550	40,192	40,879	41,149	43,371	43,953	43,913	44,528	47,084	46,185	44,521	42,468	42,277
Large Hydro*	11,848	11,713	11,713	11,962	11,951	12,042	11,793	12,074	12,074	12,105	12,145	12,145	12,155	12,244	12,252	12,252	12,254
Small Hydro**	1,751	1,744	1,740	1,739	1,743	1,745	1,747	1,749	1,756	1,745	1,744	1,756	1,750	1,749	1,746	1,743	1,748
Solar PV	2	2	2	2	2	2	2	7	15	117	228	780	3,122	4,798	6,083	8,749	9,769
Solar Thermal	410	378	378	378	378	400	400	400	408	408	408	408	925	1,292	1,249	1,249	1,249
Wind	1,534	1,544	1,571	2,064	2,089	2,310	2,373	2,462	2,728	3,183	3,992	4,967	5,785	5,847	5,680	5,645	5,632
Waste Heat ***	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
Oil	590	567	567	567	567	506	575	575	553	509	349	351	351	352	352	352	352
Grand Total	55,362	57,159	59,483	60,509	64,087	66,027	66,552	67,177	69,735	70,964	71,726	73,795	77,810	79,081	78,461	78,997	79,825

Source: California Energy Commission

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While most of the fuel-type categories remained relatively unchanged over the past year, utility-scale solar PV capacity increased by 1,026 MW to 9,769 MW in 2017. Highlights include:



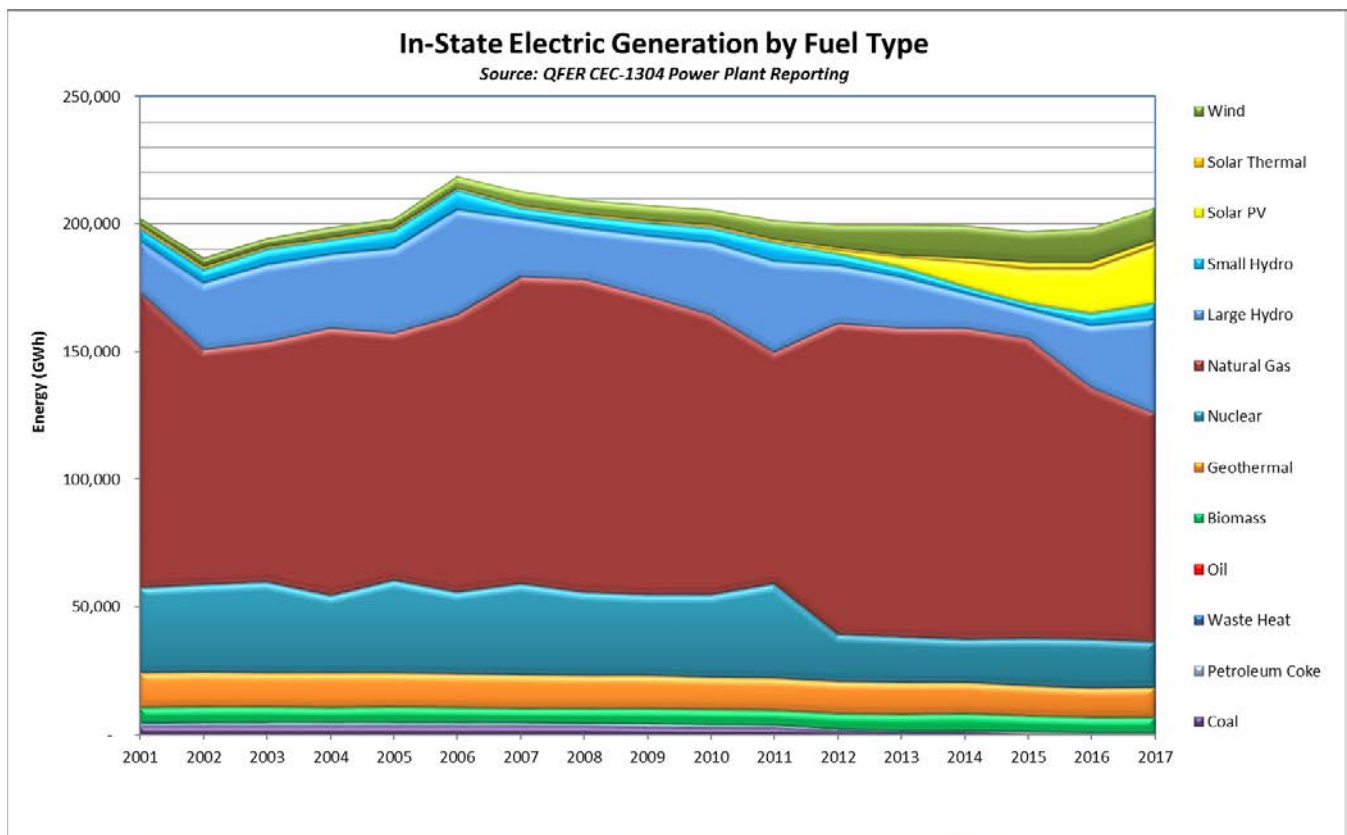
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- San Benito County added the most solar PV in 2017 with the 240-MW Panoche Valley Solar Project.
- Fresno County added 210 MW of solar PV capacity which included 100 MW from Recurrent Energy’s Tranquility 1-8 site near Cantua Creek.
- Monterey County added 130 MW of solar PV at its California Flats North Project.
- Kern County added 103 MW through various solar PV installations including the 56-MW Beacon Solar 1 facility.
- Imperial County added 83 MW with the Midway I and Midway II solar PV projects.
- Los Angeles County added 75 MW from seven solar PV projects which included the 600-MW Bayshore Solar Project.
- San Bernardino added 68 MW of solar PV which included 34 MW from the formerly solar thermal SEGS I and SEGS II projects that were repowered to solar PV systems in 2017.

Electric Generation

Figure 2 shows the generation from in-state power plants 1 MW and larger from 2001 to 2017.

Figure 2: In-State Electric Generation by Fuel Type



Source: California Energy Commission

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In 2017, in-state power generation was 206,336 gigawatt-hours (GWh), up 4 percent from 2016.

Table 2 shows the 17 years of data used in Figure 2.

Table 2: In-State Electric Generation by Fuel Type (GWh)

Fuel Type	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Coal	2,810	3,010	3,032	2,889	3,012	2,920	2,968	2,835	2,562	2,286	2,096	1,262	824	802	309	324	302
Petroleum Coke	1,231	1,265	1,237	1,197	1,271	1,270	1,249	1,142	1,173	1,120	1,024	318	194	208	229	207	246
Biomass	5,762	6,197	6,094	6,082	6,080	5,865	5,766	5,911	6,117	5,989	6,060	6,211	6,559	6,785	6,367	5,876	5,827
Geothermal	13,525	13,396	13,329	13,494	13,292	13,093	13,084	12,907	12,907	12,740	12,685	12,733	12,479	12,186	11,994	11,582	11,745
Nuclear	33,294	34,353	35,594	30,241	36,155	32,036	35,698	32,482	31,509	32,214	36,666	18,491	17,860	17,027	18,525	18,931	17,925
Natural Gas	116,151	92,490	94,194	105,038	96,892	108,952	120,247	122,799	117,099	109,682	91,063	121,776	120,915	121,855	117,565	98,879	89,564
Large* Hydro	20,144	26,003	30,325	28,945	33,334	40,952	22,640	19,887	23,659	28,483	35,682	22,737	20,319	13,739	11,569	24,410	36,920
Small Hydro**	4,844	5,356	5,996	5,545	6,928	7,607	4,466	4,573	4,880	5,706	7,049	4,723	3,778	2,737	2,424	4,567	6,413
Solar PV	3	2	2	2	2	2	2	3	17	90	226	1,018	3,779	9,155	13,064	17,392	21,867
Solar Thermal	834	848	757	739	658	614	666	730	841	879	889	867	686	1,624	2,446	2,548	2,464
Wind	3,242	3,546	3,316	4,258	4,084	4,902	5,570	5,724	6,249	6,172	7,598	9,242	11,964	13,074	12,191	13,499	12,867
Waste Heat***	242	240	294	237	221	259	233	278	233	241	267	217	222	237	177	182	163
Oil	379	87	103	127	148	134	103	92	67	52	36	49	39	45	54	37	33
Grand Total	202,461	186,793	194,273	198,794	202,077	218,606	212,692	209,363	207,313	205,654	201,341	199,644	199,618	199,474	196,914	198,434	206,336

Source: California Energy Commission

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Generation from solar PV systems jumped from 17,392 GWh in 2016 to 21,867 GWh in 2017, a 25.7 percent increase. Hydroelectric generation was above average due to a strong snowpack that helped end California's four-year drought. Snowpack conditions have since changed to below average across the Southern Cascades, the Sierra Nevada Mountains, and the Great



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Basin as of April 1, 2018.¹ Total in-state wind generation decreased to 12,867 GWh in 2017, down 632 GWh from 2016. Overall, renewables in California (biomass, geothermal, small hydro, solar, and wind) accounted for 29.6 percent of the total in-state electric generation in 2017, up 1.6 percent from 2016.

Additional References:

More information on the RPS is at:

- <http://www.energy.ca.gov/portfolio/index.html>.

More about California's total generation is at:

- Total system electric generation
http://www.energy.ca.gov/almanac/electricity_data/total_system_power.html
- Electric generation by resource type
http://www.energy.ca.gov/almanac/electricity_data/electricity_generation.html

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¹ NOAA National Centers for Environmental Information, State of the Climate: National Snow & Ice for April 2018, published online May 2018, retrieved on July 5, 2018, from <https://www.ncdc.noaa.gov/sotc/snow/201804>.