



2020 Total System Electric Generation

Contact

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[2019 Total System Electric Generation and previous years](#)

Depending on browser width, scrolling of table may be necessary. Scroll bar is at bottom of table.

Fuel Type	California In-State Generation (GWh)	Percent of California In-State Generation	Northwest Imports (GWh)	Southwest Imports (GWh)	Total Imports (GWh)	Percent of Imports	Total California Energy Mix (GWh)	Total California Power Mix
Coal	317	0.17%	194	6,963	7,157	8.76%	7,474	2.74%
Natural Gas	92,298	48.35%	70	8,654	8,724	10.68%	101,022	37.06%
Oil	30	0.02%	-	-	0	0.00%	30	0.01%
Other (Waste Heat / Petroleum Coke)	384	0.20%	125	9	134	0.16%	518	0.19%
Nuclear	16,280	8.53%	672	8,481	9,154	11.21%	25,434	9.33%
Large Hydro	17,938	9.40%	14,078	1,259	15,337	18.78%	33,275	12.21%
Unspecified	-	0.00%	12,870	1,745	14,615	17.90%	14,615	5.36%

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Total Non-Renewables and Unspecified Energy	127,248	66.65%	28,009	27,111	55,120	67.50%	182,368	66.91%
Biomass	5,680	2.97%	975	25	1,000	1.22%	6,679	2.45%
Geothermal	11,345	5.94%	166	1,825	1,991	2.44%	13,336	4.89%
Small Hydro	3,476	1.82%	320	2	322	0.39%	3,798	1.39%
Solar	29,456	15.43%	284	6,312	6,596	8.08%	36,052	13.23%
Wind	13,708	7.18%	11,438	5,197	16,635	20.37%	30,343	11.13%
Total Renewables	63,665	33.35%	13,184	13,359	26,543	32.50%	90,208	33.09%
Total System Energy	190,913	100.00%	41,193	40,471	81,663	100.00%	272,576	100.00%

Total System Electric Generation and Methodology

Total system electric generation is the sum of all utility-scale, in-state generation, plus net electricity imports. Items of note for 2020:

- Total generation for California was 272,576 gigawatt-hours (GWh), down 2 percent, or 5,356 GWh, from 2019.
- California's non-CO2 emitting electric generation categories (nuclear, large hydroelectric, and renewables) accounted for 51 percent of its in-state generation, compared to 57 percent in 2019. The change is directly attributable to the significantly reduced hydroelectric generation, some 44 percent lower than 2019 generation levels, as dry conditions returned to the state.
- Net imports increased by about 6 percent (4,435 GWh) in 2020 to 81,663 GWh, partially offsetting the decreased output from California's hydroelectric power plants.
- Total renewable energy reached 33 percent, 90,208 GWh in 2020, up 2.5 percent from 2019 levels.

Overall, California's total grid-served electric generation continues to decline as local, distributed generation systems expanded across the state. Behind-the-meter residential rooftop solar photovoltaic systems directly reduce the measured delivery of power from the state's fleet of utility-scale power plants.^[1]

In 2020, California experienced the third driest year since year since 1895, as drought conditions returned to the state. Similarly, 2020 had the third highest annual average temperature recorded over the past 126-year record. As a result, annual hydroelectric generation fell by 44 percent from 2019 levels to 21,414 GWh. As shown in **Figures 1** and **2**, total monthly hydroelectric generation in 2020 neared the lowest historical monthly levels of the past 19 years of CEC generation data.

As detailed in **Table 1** below, California’s natural gas-fired electric generation increased by 7 percent in 2020 to 92,298 GWh, accounting for 48 percent of in-state generation. In-state renewables (small hydro, geothermal, biomass, solar, and wind) decreased by 1.4 percent compared to 2019, due to decreased generation from biomass (plant retirements) and small hydroelectric generation (drought conditions); combined wind and solar generation were up by 2 percent over 2019 levels while geothermal generation was up 3.4 percent in 2020.

Looking ahead into 2021, hydroelectric generation continues into historically low levels for each of the first five months of the year for which there is available CAISO data, as shown in **Figure 3**. Please note, the CAISO dataset does not include hydroelectric facilities from other balancing areas such as those within LADWP and BANC (SMUD), unlike **Figures 1** and **2**.

Figure 1: Comparison of 2020 Hydroelectric Generation to Historical Highs and Lows

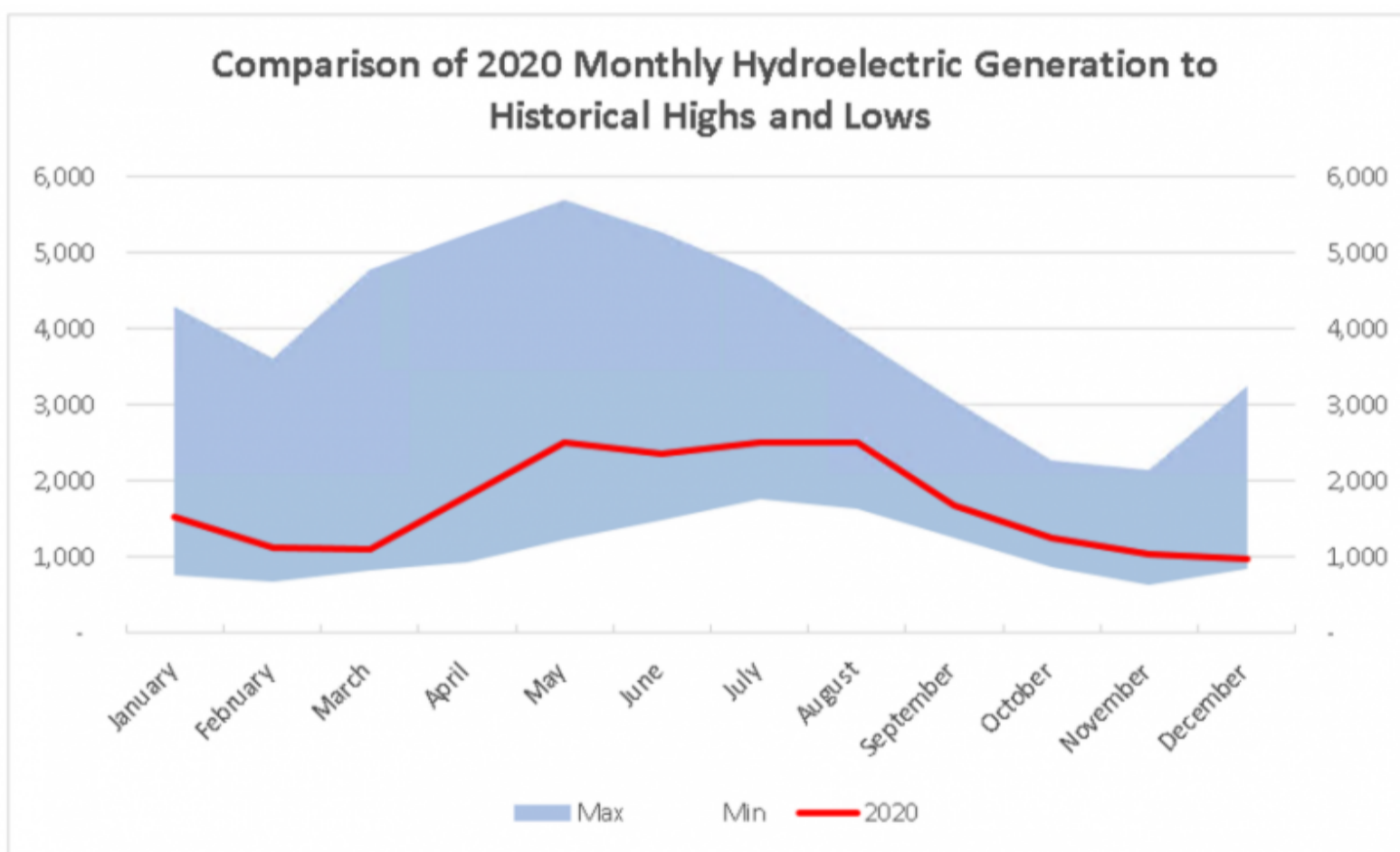


Figure 2: Monthly Hydroelectric Generation, January 2001 – December 2020

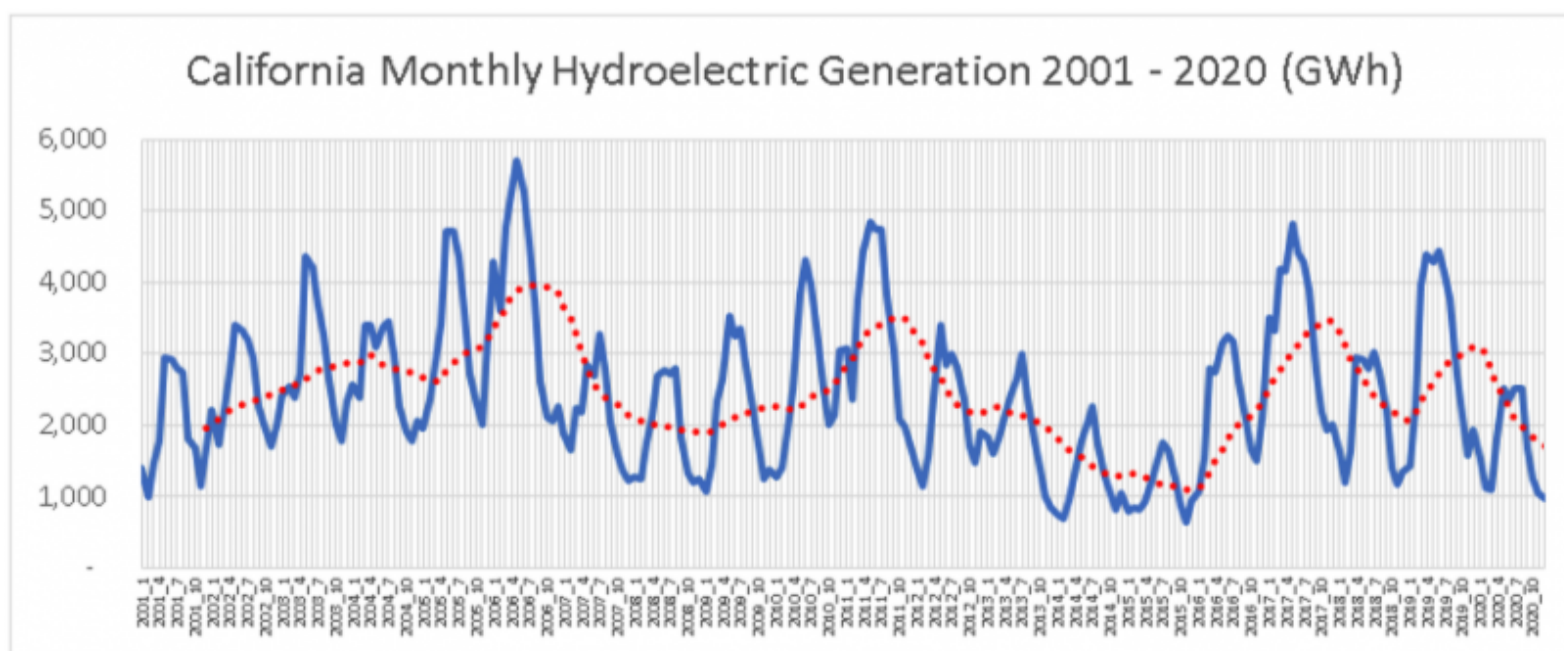
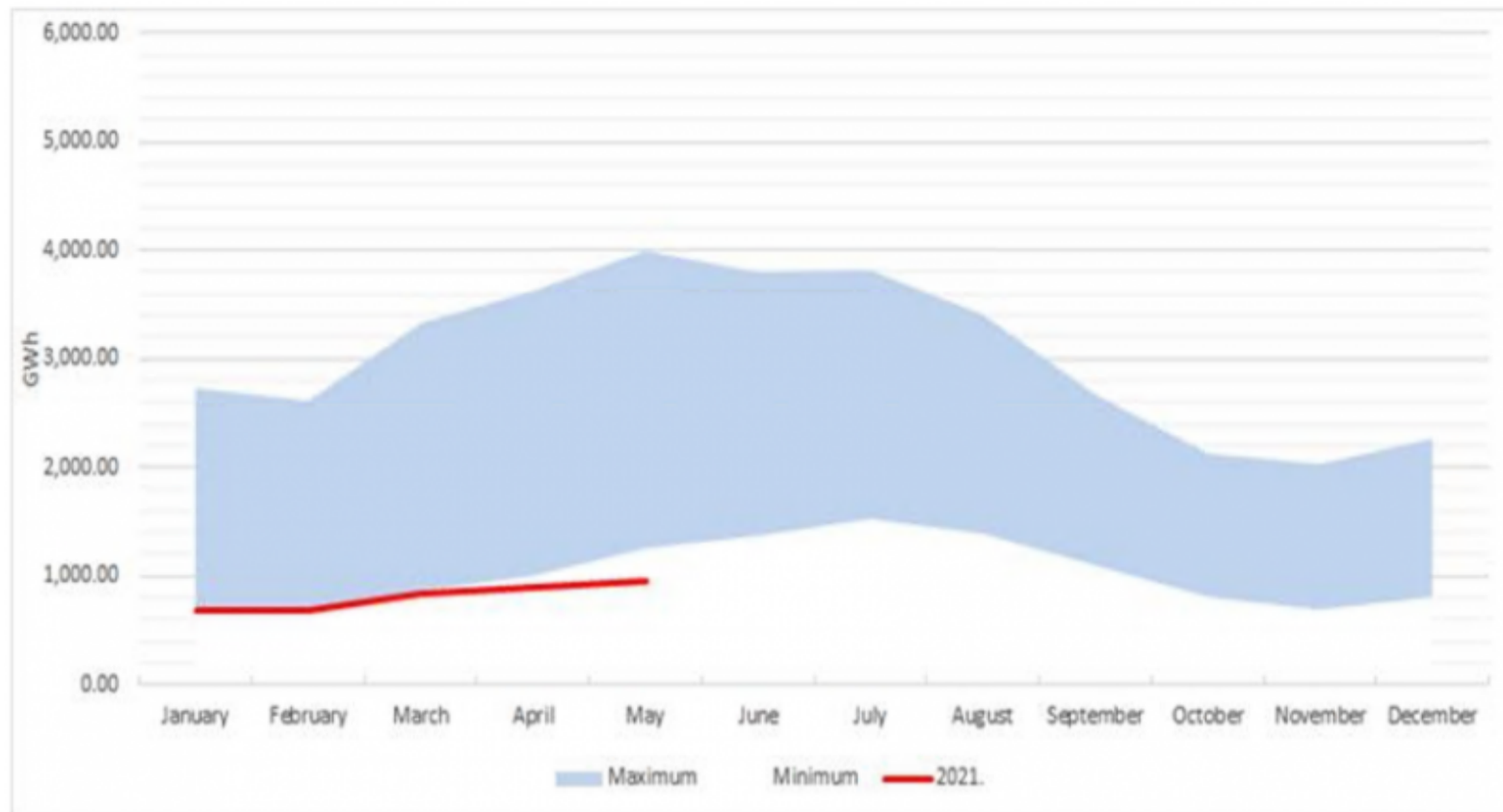


Figure 3: CAISO Monthly Hydroelectric Generation, January 2021 – May 2021**Table 1 – California Electric Generation and Net Imports, 2016-2020**

	2016 GWh	2017 GWh	2018 GWh	2019 GWh	2020 GWh
Total System Electric Generation	290,792	292,083	285,656	277,933	272,576
Total In-State Generation	198,466	206,379	195,008	200,704	190,913
CA Hydroelectric	28,986	43,304	26,344	38,494	21,414
<i>CA Large Hydro</i>	24,410	36,920	22,096	33,145	17,938
<i>CA Small Hydro</i>	4,576	6,384	4,248	5,349	3,476
CA Nuclear	18,931	17,925	18,268	16,163	16,280
CA Coal	324	302	294	250	317
CA Oil	37	33	35	36	30
CA Natural Gas	98,879	89,588	90,691	86,134	92,298
CA Geothermal	11,582	11,745	11,528	10,967	11,345
CA Biomass	5,905	5,847	5,909	5,936	5,680
CA Wind	13,499	12,867	14,244	13,688	13,708
CA Solar PV	17,385	21,895	24,721	26,323	27,179
CA Solar Thermal	2,548	2,464	2,545	2,303	2,277
CA Petroleum Coke	207	246	207	191	197
CA Waste Heat	182	163	223	220	187

	2016 GWh	2017 GWh	2018 GWh	2019 GWh	2020 GWh
Net Imports	92,326	85,704	90,648	77,229	81,663

[California Electrical Energy Generation](#)

The California Code of Regulations (Title 20, Division 2, Chapter 2, Section 1304 (a)(1)-(2)) requires owners of power plants that are 1 MW or larger in California or within a control area with end users inside California to file data on electric generation, fuel use, and environmental attributes. Reports are submitted to the Energy Commission on a quarterly and annual basis. These reports cover all forms of electric generation including renewables, hydroelectric, natural gas, and others. The reporting requirement includes electricity from facilities that generate for onsite usage such as refineries and university campuses. Additionally, loads from hydroelectric facilities that are equipped with reversible turbines (a combined pump and turbine generator) are taken into account. Pumping-generating facilities use electricity to meet water storage, water transfer, and water delivery requirements, while pumped storage facilities use electricity to transfer water from one reservoir to another, usually during off-peak hours at night, so that electricity can be generated during the next day to help peak electricity demand. Energy Commission staff collect and verify these reports to compile a statewide accounting of all electric generation serving California.

Quarterly data reports submitted by balancing authorities for energy imports and exports are used to determine the net energy imports for California. Imports are tracked for two geographical regions: the Northwest and the Southwest. The allocation of fuel types is based on Power Source Disclosure reports from LSEs such as investor-owned utilities, publicly owned utilities, and community-choice aggregators.

What is Unspecified Power?

Unspecified power refers to electricity that is not traceable to a specific generating facility, such as electricity traded through open market transactions. Unspecified sources of power are typically a mix of resource types, and may include renewables. This category can also include spot market purchases, wholesale energy purchases, and purchases from pools of electricity where the original source of fuel can no longer be determined. As mentioned, it can also include renewable energy from a certified renewable facility that has been sold separately from its renewable attributes, or RECs. Renewable energy without its corresponding RECs is sometimes referred to as “null energy.”

Definitions

California Energy Mix: Total in-state electric generation plus Northwest and Southwest energy imports

California Power Mix: Percentage of specified fuel types derived from the California Energy Mix for use on the annual Power Content Label

In-State Generation: Energy from power plants physically located in the state of California

Northwest Imports: Energy imports from Alberta, British Columbia, Idaho, Montana, Oregon, South Dakota, Washington, and Wyoming

Southwest Imports: Energy imports from Arizona, Baja California, Colorado, Mexico, Nevada, New Mexico, Texas, and Utah

Total System Electric Generation: Used interchangeably with California Energy Mix

Total System Power: Original terminology used to describe California’s annual electric generation.

[1] Note, data reporting requirements for total system electric generation are limited to those facilities with a nameplate capacity of 1 MW and larger. As most solar PV systems installed on residential homes and commercial buildings are less than 1 MW, they are typically considered to be distributed generation and not required to report to the CEC.

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