



# California solar energy tripoli

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The state recently hit a milestone: 100 days this year with 100% carbon-free, renewable electricity for at least a part of each day, as tracked by Stanford University engineering Professor Mark Z. Jacobson.

That progress is largely due to the substantial public and private investments in renewable energy -- particularly batteries storing solar power to use when the sun isn't shining, according to energy experts.

"California has made unprecedented investments in our power grid in recent years -- and we're seeing them pay off in real time," Gov. Gavin Newsom said in a statement to CalMatters. "Not only is our grid more reliable and resilient, it's also increasingly running on 100% clean electricity."

The state faces a huge challenge in coming years: A series of mandates will require carbon-free energy while also putting more electric cars on roads and electric appliances in homes. California, under state law, must run on 60% renewable energy by 2030, ramping up to 100% by 2045.

Signs of progress are emerging. From January to mid-July of this year, zero-carbon, renewable energy exceeded demand in California for 945 hours during 146 days -- equivalent to a month-and-a-half of 100% fossil-fuel-free electricity, according to the California Energy Commission, the state agency tasked with carrying out the clean energy mandates.

But California still has a long way to go to stop burning fossil fuels for electricity. Natural gas, which emits greenhouse gases and air pollutants, remains its single largest source of electricity.

Reliability of the power grid is a top concern as the state switches to solar and wind energy. Unpredictable events like wildfires and winter storms also cause outages, while hot summer months, with air conditioners whirring, strain the supply.

In August of 2020 California experienced its first non-wildfire blackouts in nearly 20 years, and in late August and September of 2022, a severe heatwave forced regulators to ask consumers to voluntarily reduce power for 10 days.

Since September 2022 -- when California teetered on the edge of those blackouts and the governor pleaded for conservation -- nearly 11,600 new megawatts of clean energy have been added to the state's grid, said Elliot Mainzer, chief executive of the California Independent System Operator, which manages the grid. (That's enough to power around 9 to 12 million homes although it's not available all at one time.)

California also now has more than 10,000 megawatts of battery capacity, making it the largest supply outside of China. Battery power from large commercial facilities proved its worth during last month's heat wave,



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Mainzer said.

Batteries "were a major difference-maker," Mainzer said. "The batteries charged during the day, when solar energy is abundant, and then they put that energy back onto the grid in the afternoon and evening, when solar production is rolling off the system."

California relies heavily on four-hour duration lithium-ion batteries, which come in large, centralized facilities and hybrid facilities paired with solar energy projects. More homes also are installing batteries with their rooftop solar installations, but they supply a small amount of power.

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