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## Why Californians don't have to worry about their air conditioning conking out

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You can put away the flashlights and candles for now. California is surviving the worst heat wave in 11 years without any major blackouts, and with megawatts to spare.

Billions of dollars in new power plants, and an explosion in solar and wind farms, have made the state's electricity supply network – once a national laughingstock – remarkably robust. Today's market has far more capacity than it did during the energy crisis of 2001. Back then, supply shortages and rampant market manipulation produced three days of rolling blackouts during winter, when electricity demand was well below this week's.

Californians are paying a price for not having to worry about sweltering in the dark. Although their monthly bills are below the U.S. average, the amount Californians pay for each kilowatt hour of electricity is among the highest in the nation. That's partly because of the mega-dollars that utilities have spent since the energy crisis on new plants, sturdier transmission lines and the like.

Some critics say California simply built too much generation capacity in an overreaction to the crisis.

"There's nothing particularly wrong with having too much capacity, except the ratepayer has to pay for it," said Robert McCullough of McCullough Research, an energy consulting firm in Portland. But he added: "Generally, ratepayers are willing to pay for a very reliable system."

This week, with temperatures well in the triple digits, demand is running about one-third higher than last week, peaking each afternoon at around 45,000 megawatts. That still leaves a cushion of about 10,000 megawatts of available power. That's a margin of error of around 20 percent, about twice as much as McCullough said is necessary.

Managers of the state's power grid said they're grateful for the additional electrons, especially when dealing with an energy network as complex as California's.

“We have these pockets, we have these localized transmission areas where congestion (on power lines) can occur,” said spokeswoman Anne Gonzales of the Independent System Operator, which runs the grid. “We also have the risk of wildfires. ... We have to prepare for a perfect storm.” The cushion has shrunk because of the extreme heat in Arizona and the Pacific Northwest, two regions that often sell surplus electricity to California, she said.

The week hasn't been without hiccups. Overheated transformers and other mechanical woes have caused scattered power outages, particularly in the Bay Area. Pacific Gas and Electric Co. said more than 350,000 customers have lost power at various times since last Friday. The Sacramento Municipal Utility District has had fewer problems, but 16,000 customers temporarily lost power Wednesday.

Gonzales said the ISO started preparing a week ago for the run of 100-plus degree days. It ordered power generators to postpone scheduled maintenance. Then it had them turn on their backup plants over the weekend, albeit at minimal levels, so they'd be ready to ramp up quickly when the worst of the heat wave began Monday. It also told generators to stock up on additional natural gas. For good measure, it issued voluntary calls for conservation, known as “flex alerts,” Tuesday and Wednesday.

“I wouldn't say we're breezing through this,” Gonzales said.

An incident May 3 showed how quickly things can turn. The ISO issued a “Stage 1 Emergency” after a midsize power plant conked out in Long Beach and imports from other states didn't materialize as expected. The declaration amounted to another voluntary call for conservation, like a flex alert, but with greater urgency. It was called off after about two hours and blackouts were avoided.

Remarkably, it was the ISO's first such emergency in a decade. In 2001, during the energy crisis, the ISO declared more than 170 emergencies. Three times that year, twice in January and once in March, it had to impose rolling blackouts across the state, affecting hundreds of thousands of homes and businesses even though demand wasn't high.

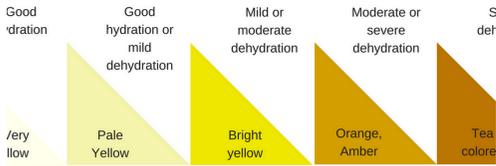
What caused the blackouts? Supplies were genuinely tight to a certain extent. That enabled rogue companies like Enron to exploit loopholes in California's newly deregulated energy market – a system in which most of the electricity was controlled by independent generators and traders, not the hometown utilities like PG&E. To jack up prices, Enron and others periodically withheld electricity from the grid, leading to blackouts.

Today the system is vastly different. Utilities are required to line up at least 15 percent more power than they expect to use. The ISO has safeguards against market manipulation. And the electricity supply has mushroomed. With the state's blessing, scores of power plants have been built since the energy crisis ended. Renewable energy, including solar and wind power, has become a major source. All told, even with some older plants being retired, generating capacity has grown by more than 11,000 megawatts since 2006.

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“The grid of today doesn’t resemble the energy grid of 2001,” Gonzales said.

What’s more, California consumers have become better at conservation. The state’s population grew 14 percent between 2000 and 2014. Its economy grew 27 percent. But its electricity consumption increased by only 7.5 percent during that time, according to the California Energy Commission.

Even this week, consumption hasn’t soared out of sight. Peak daily demand has been around 45,000 megawatts, well below the all-time record of 50,270 on July 24, 2006. The National Weather Service said high temperatures will remain above 100 degrees until Sunday.

Californians’ stinginess with light switches has helped keep bills down. The U.S. Department of Energy says the average residential customer in California paid nearly 17 cents per kilowatt hour in 2015, a third higher than the U.S. average. But Californians used only 557 kilowatt hours a month, almost 40 percent below average. As a result, monthly bills in California averaged \$94.59, about \$20 less than the average American.

Habits are changing in another way: Californians have gotten greener. The state got 27 percent of its power last year from solar, wind and other renewable sources, the state Energy Commission said. That figure doesn’t include the power from large hydroelectric plants, which aren’t considered renewable by state officials.

SMUD, for example, can count on about 300 megawatts of solar power – about half from industrial-solar farms and the rest from its own customers’ rooftops. That amounts to about 9 percent of the utility’s power.

Besides reducing carbon emissions and other pollutants, the infusion of solar has brought SMUD a measure of cushion that didn’t exist during the great heat wave of July 2006, when the utility weathered the largest customer demand in its history.

“Solar was very minimal in 2006,” said Mark Willis, director of grid operations.

Renewables’ share of the energy grid will only grow. State law says utilities must get at least half of their power from renewables by 2030. Legislative Democrats are pushing a bill, SB 100, to require utilities to go all-renewable by 2045. It passed the Senate last month and is pending in the Assembly.





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The control room of the California Independent System Operator in Folsom, where grid managers guard against blackouts and other problems. A surplus of electricity has enabled California to endure this week's heat wave with megawatts to spare. **Randall Benton** - Sacramento Bee file

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