

THE TRANSFORMATION OF THE ENERGY SECTOR

SOLAR ECLIPSE**In Calif., it's like planning for a cloudy day****Debra Kahn, E&E News reporter***Published: Monday, August 21, 2017*

How much of California's solar will go offline during today's eclipse? Matthew WMF/Wikipedia

Today's full solar eclipse will mesmerize the entire U.S., but for power nerds, eyes are trained on sun-thirsty California.

Grid operators in California, the most solar-dependent state, have been thinking about the eclipse for the past year. They say they are fully prepared and not particularly worried, even though the trajectory of celestial bodies will deprive the state of more than half of its solar production — and likely some wind power, as well — in the late morning.

"We really expect it to be very manageable, having the solar ramp down and the other resources ramp up, but we just want to make sure since it is an unusual event for us that everybody's on the same page," said Nancy Traweck, executive director of system operations at the California Independent System Operator.

The last major eclipse to pass over parts of the United States was in 1979, when solar penetration was negligible. Now it comprises about 1 percent of U.S. electricity generation — and about 8 percent in California, which has the most utility-scale and residential solar installations.

On its path from Oregon to South Carolina, the eclipse will obscure all of California's solar panels to varying degrees, ranging from 76 percent in the San Francisco Bay Area to 58 percent in the San Diego area. That will reduce the state's available electricity by a maximum of about 5,500 megawatts at 10:22 a.m. PDT — 4,200 MW from utility-scale projects, and another 1,300 MW from rooftop solar panels.

That's a peak loss of about 65 percent of the state's normal solar capacity and about 14 percent of its peak demand.

"It's a situation where all eyes are on California for this event because it's something that as you increase the buildout of solar throughout the country, this is a threat that a cloudy day can pose if you have 15, 20, 25 gigawatts of solar or have it on every rooftop," said Ross Fessenden, an analyst with Genscape. "This event is going to be closely watched."

The state isn't calling for mandatory conservation, nor is it relying more heavily than usual on imports from other states. Instead, it plans to buy more backup power — about 200 MW of extra capacity — in the form of hydroelectricity and natural gas generation, which can respond quickly if needed.

CAISO is telling transmission owners to hold off on doing routine maintenance today that would otherwise reduce transmission capacity. It is also planning to buy electricity from its energy imbalance market, which delivers out-of-state electricity in five-minute increments, but is not envisioning using it more than usual.

"We're planning on continuing energy transfers during the eclipse hours," Traweck said. "That is not to say we're going to lean on this at all. We actually will have enough generation and regulation within California to manage all of this, but still it helps that we can help each other out as we go through the event."

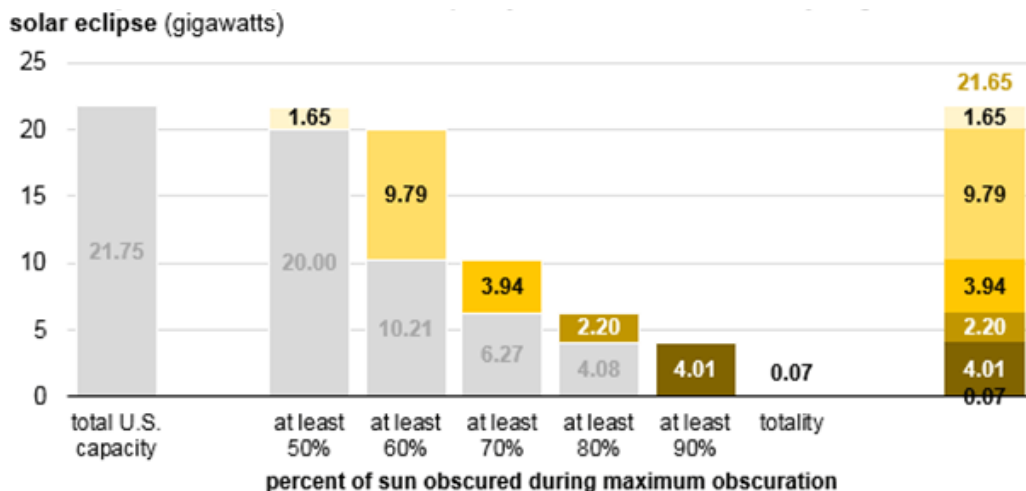
CAISO is most concerned about the back end of the eclipse, which is coming during the sunniest part of the day, when more solar is available. The system could see "ramping" rates of 63 MW per minute on average and a high of 98 MW per minute as the eclipse passes, compared to normal rates of about 30 MW per minute for solar coming online.

Solar operators are ready and waiting for CAISO's instructions, which will come at five-minute intervals as usual. They could be instructed to ramp down ahead of the eclipse to make room for hydro and gas, and they could also have to come back online gradually in order to avoid overwhelming the grid.

"It's sort of like planning for a partly cloudy day, but you know exactly when the clouds are coming," said Aaron Wellendorf, solar design manager with LS Power Development, which has a 125-MW solar plant near Phoenix and a 175-MW plant in the Imperial Valley, 90 miles east of San Diego.

"Because we're getting so much more power from solar now than we're used to, the effect is obviously bigger than it ever has been before, but it's also good practice for the future when we get more solar online and more renewable resources," he said.

Wind power could also see drop-off



This chart shows how today's solar eclipse will affect utility-scale solar in the U.S. U.S. Energy Information Administration

The solar eclipse in Europe on March 20, 2015, was considered a major stress test for its power networks given the large amounts of solar installations there. Grid operators said the test was a success.

European Union's grid oversight organization, the European Network of Transmission System Operators for Electricity, also reported that Great Britain experienced a 10 percent drop in wind power due to the sun's eclipse, but this was anticipated and was not a stability issue.

"What causes the wind power to shift is largely driven by temperature changes," explained DOE Solar Energy Technologies Office Director Charlie Gay. "There will be changes [in predicted wind power output], but they are slow moving on the grid."

Several U.S. experts also said the wind factor in the U.S. eclipse was not expected to be a problem, since planners have been preparing for the effects.

Demand-response companies are stepping up but are not being relied upon to produce major reductions in load. San Francisco-based OhmConnect is planning to ask its users to reduce demand from 10 to 11 a.m. PDT for a reduction of as much as 45 MW. "Given the public awareness and excitement over the eclipse, we approached this event as an opportunity to educate the community," said Chief Marketing Officer Curtis Tongue.

Regulators are also conducting a **public outreach campaign** with the goal of voluntarily saving 3,500 MW from 9 to 11 a.m. PDT — as well as the aim of easing reliance on natural gas plants.

"While our utilities and grid operator have all the tools necessary to manage the grid during the eclipse, what if millions of Californians stepped in to allow our hard working sun to take a break, rather than relying on expensive and inefficient natural gas peaking power plants?" the California Public Utilities Commission is asking on its website. "By plugging into the power of California's citizens and unplugging from the grid, we can have cleaner air, keep our system reliable, and send a message to the rest of the country that we can do all of that without being forced to rely on fossil fuels as the only foundation of our electricity."

"It's a teaching moment, is what it is," said Rory Cox, a senior analyst at the CPUC. "This isn't all that different than a cloudy day in Southern California."

Genscape's Fessenden questioned the decision by CAISO to use just one day — Aug. 22 of last year — as a basis for modeling. He pointed out that last year at this time, the state had a maximum of 9 GW of solar output for any given hour on record. This year, the record is just under 10 GW.

"With that amount of buildout, you can't look at last year as a raw value and say that's a good estimate for this year," he said.

However, expected cooler-than-normal temperatures today will likely bear out the agency's assumptions of peak load, Fessenden said, as demand for air conditioning should be on the lower side.

Reporter Peter Behr contributed.

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