



Theories Abound over California Blackouts Cause

August 30, 2020
By [Hudson Sangree](#) and [Robert Mullin](#)

Observers last week cited dependence on uncontracted imports, underperformance of natural gas and wind, and market manipulation as possible causes of California’s first rolling blackouts in nearly two decades, as a state regulator cautioned against drawing premature conclusions.

“It is not helpful to speculate on the root cause until we have a chance to do a complete analysis on the factors leading to the outages,” Edward Randolph, director of the California Public Utilities Commission’s Energy Division, said Thursday during a commission meeting.



Edward Randolph, CPUC | © RTO Insider

“Within weeks,” the CPUC, [CAISO](#) and the California Energy Commission will release a joint initial report on causes, Randolph said. The report will focus on demand forecasts, the state’s resource adequacy process, what resources were scheduled to meet demand during the emergency and whether those resources were actually available.

A second deeper dive will examine factors that will take more time and data to fully understand, he said.

“At this point, we know some basic facts about why there were outages on [Aug. 14 and 15], and why the grid was too close to the edge on [Aug. 17 and 18] than it ever should be,” Randolph said. “The short of it is there was not enough available supply to meet demand. Based on our planning process, there should have been.”

Randolph called out recent analyses and news reports that attempted to identify root causes of blackouts. Some relied on actual data, while others were based on speculation that could be wrong, he said.

Contracted Imports Vital

A [report](#) from advisory firm ICF International leans heavily on available data. It cited CAISO’s dependence on imported energy as a leading cause of the blackouts and calls on the ISO and state regulators to reduce the state’s reliance on uncontracted imports for RA. CAISO and the commissions offered a similar view in an Aug. 19 letter to Gov. Gavin Newsom. (See [CAISO Provides More Details on Blackouts](#).)

The report lays out discrepancies between CAISO’s RA assessment for this summer and actual system performance Aug. 14-15, when the ISO declared Stage 3 emergencies prompting the blackouts.








The analysis shows that natural gas, wind and imports underperformed sharply both days from 6 to 8 p.m. — just as declining solar output and continuing high demand from air conditioning use during a triple-digit heat wave required sharp ramps to cover rising net load.

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At 6 p.m. on Aug. 15, for example, natural gas generation came in at 4,369 MW — or 15% — short of the RA assessment, while wind lagged 661 MW, or 25%. At the same time, imports fell short of expectations by 5,672 MW, or 56%.

The authors of the ICF report noted that imports account for 10 to 12% of California’s total RA procurement, and they applauded the move last month by the CPUC to require that non-resource-specific imports that count toward a load-serving entity’s RA requirements be reinforced by contracts. The CPUC also required the imports to self-schedule into CAISO’s day-ahead and real-time markets during availability assessment hours — the hours of greatest need on the system.

Time		Market Performance (MW)			CAISO RA Assessment for 2020 (MW)			Delta (MW)				Delta (%)			
Date	Hour	Natural Gas	Wind	Imports	Natural Gas	Wind	Imports	Natural Gas	Wind	Imports	Total	Natural Gas	Wind	Imports	Total
8/14/20	18	24,962	810	5,855	28,689	2,694	10,193	(3,727)	(1,884)	(4,338)	(9,949)	-13%	-70%	-43%	-24%
8/14/20	19	25,278	1,045	6,887	28,689	2,876	10,193	(3,411)	(1,831)	(3,306)	(8,548)	-12%	-64%	-32%	-20%
8/14/20	20	25,220	1,025	7,217	28,689	2,828	10,193	(3,469)	(1,803)	(2,976)	(8,248)	-12%	-64%	-29%	-20%
8/15/20	18	24,320	2,033	4,521	28,689	2,694	10,193	(4,369)	(661)	(5,672)	(10,701)	-15%	-25%	-56%	-26%
8/15/20	19	25,781	1,436	5,480	28,689	2,876	10,193	(2,908)	(1,440)	(4,714)	(9,062)	-10%	-50%	-46%	-22%
8/15/20	20	25,880	2,114	5,751	28,689	2,828	10,193	(2,809)	(714)	(4,442)	(7,964)	-10%	-25%	-44%	-19%

This chart shows the wide discrepancy between CAISO’s RA assessment for August and the actual performance during key periods of the system emergency. | ICF

However, ICF said there is a mismatch between the CPUC’s mandates and the figures used in reliability planning. The state continues “to include import resources that are not backed up by RA contracts (in addition to RA contracted imports) to meet its peak demand in its resource adequacy planning assessment,” the report said.

“According to statistics released by CPUC, jurisdictional LSEs only have around 5.8 GW of contracted import RA capacity, [yet] ... CAISO’s 2020 summer assessment assumes availability of imports up to 9.5 GW during constrained hours,” it said.

The ICF report pointed out that CAISO’s August RA assessment assumed 4.9 GW of uncontracted imports alone would be available during peak hours, but instead just 5 GW of total imports were delivered to CAISO during the 6 p.m. interval on Aug. 16, suggesting that most of the uncontracted supply didn’t materialize. “The reliance on uncommitted import resources brings additional uncertainties to a grid with a large amount of intermittent internal resources and brings challenges to system operation under extreme events,” the report said.

It also encouraged California to step up preparations for supply-driven system fluctuations as it brings on increasing volumes of variable renewable resources while retiring thermal units, a development that will reduce the margin for error in RA as demand also becomes more variable.

“California’s RA procurement process should consider potential hourly variations in resource deliverability and prepare for stressful scenarios,” ICF said.

It said it was encouraged by the latest revised straw [proposal](#) in CAISO’s RA enhancements initiative, which proposed adopting an RA construct based on unforced capacity — the percentage of resource capacity available after outages are considered. The proposal also considers increasing LSE planning reserve margins from the current level of 15% to 20% or higher.

“The proposal, if implemented, will be helpful in pushing the LSEs to secure additional resources to prepare for emergency conditions,” ICF contended.

Contrary Take

Energy economist Robert McCullough offered a contrarian view on the blackouts. He raised the possibility that CAISO’s flawed market design or even market manipulation caused the outages.

A longtime observer of California’s electricity sector, McCullough pointed to CAISO’s highly complex convergence bidding market, a mechanism that allows market participants to hedge their physical positions and limit exposure to day-ahead and real-time price differentials.



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The bid is a purely financial one, implying no obligation to take or deliver electricity. Instead, a market participant buys or sells “virtual” energy in the day-ahead market, a position required to be automatically liquidated in the opposite direction in real time. The objective is to make day-ahead and real-time prices converge as much as possible.

As California’s recent emergency episode unfolded, CAISO announced it would temporarily suspend day-ahead convergence bidding beginning Aug. 17 because the practice was “detrimentally affecting the ISO’s ability to maintain reliable grid operations.” CAISO later pointed to the difficulty of distinguishing how much actual supply was available on the system with physical and virtual bids mingling.

McCullough suggested there might have been a connection between convergence bidding and generation outages during the system emergencies. The ISO had initially explained the crisis as a demand-driven outcome of the heat wave, he said.

“As we now know, the wave of [resource] outages was probably a more important factor. This does suggest market manipulation.”

California’s 2000/01 energy crisis “ended abruptly” when [FERC](#) finally imposed price controls, he noted.

“On the day the controls went in place, forced outages ended and prices never reached the price cap,” McCullough said.

“The nature of convergence bidding rewards a similar exploit,” he said. “If you own a unit at a sensitive location, you can schedule an outage and create a price spike. Of course, revenues from that plant would be zero. However, convergence bids are purely financial. This means that the plant owner could both reduce output and make a profit in the convergence market.”

McCullough has previously told *RTO Insider* that convergence bidding doesn’t even require manipulation to enrich some market participants at the expense of other participants, “just a willingness to gamble on the ISO’s computer systems.”

“Past experience has tended to make this less of a gamble than you might think, since critical information is often learned by specific market participants and then used to advantage,” he said. (See [CAISO Blames Blackouts on Inadequate Resources, CPUC](#).)

Oregon utility Portland General Electric has yet to disclose the precise cause of its staggering trading losses related to recent market volatility in California, but McCullough speculates that convergence bidding could have played a role by creating a “black swan” trading event that left PGE heavily exposed. (See related story, [PGE Traders Burned by California Heat Wave](#).)

McCullough said he hopes Gov. Newsom or Attorney General Xavier Becerra will investigate alternative possibilities behind the blackouts before moving to increase the state’s 15% reserve margin, as ICF and others have urged.

“Collecting ratepayer dollars to offset possible mismanagement and market manipulation is a bad idea, especially since these dollars are needed for system hardening,” he said.

Convergence Breakdown

A question about CAISO’s decision to suspend convergence bidding arose during a biweekly market update call Thursday.

Seth Cochran, manager of market affairs and origination at trading firm DC Energy, said it was still unclear why the ISO suspended bidding when it could have used its day-ahead residual unit commitment (RUC) process to count available units, examine their schedules and make curtailments.

CAISO’s RUC process is designed to procure additional generation needed when the day-ahead market fails to clear enough resources to meet forecasts.

“I wasn’t sure why that process couldn’t be used, and why you had to resort to suspending convergence bidding,” Cochran said. “I would note that the markets didn’t look well converged, and that seems to be a market dysfunction, not something that should impede reliability necessarily.”

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CAISO Director of Market Analysis and Forecasting Guillermo Bautista Alderete responded that when the system has sufficient available supply, operators can dip into the RUC market to cover load and back up convergence bids with physical supply.

“The problem is when you don’t have enough physical supply to cover the demand,” Bautista Alderete said. “In this case, the convergence bids are going to be backing up potential exports and load that later on we know won’t be supported and then we have to start curtailing those in the real-time.

“This is a problem. We have to have physical supply enough to cover physical demand and the exports,” he said.

During the same call, Rahul Kalaskar, the ISO’s manager of market validation and analysis, provided an operational rundown of the emergency events.

High demand during the heat wave created congestion on the transmission lines comprising the SP-26 path between Northern and Southern California, creating price separation between the two regions, Kalaskar said. Higher demand in Southern California drove up prices, a situation exacerbated by a shortage of imports because of correspondingly higher demand in neighboring states, he said.

The heat wave also created a scarcity of ancillary services, particularly non-spinning reserves, Kalaskar said. A CAISO [market notice](#) issued Friday showed consistently high levels of ancillary service scarcity during the 7 and 8 p.m. delivery periods over Aug. 14-18, with non-spinning reserve shortages peaking around 1,000 MW — or 75% of requirements — on Aug. 18.

“The non-spin reserves scarcity was essentially because of the fact that some of the resources that received a non-spin award in the day-ahead market were committed in real time to provide energy,” Kalaskar explained.

Kalaskar noted the calm after the storm.

“For the period of Aug. 17 and 18, we were facing higher loads in the real-time, or somewhere around 50,000 MW, but the loads came in much lower on these days, so that’s why the real-time events were much milder [compared] to what we saw on Aug. 14 and 15,” Kalaskar said.

During Thursday’s CPUC meeting, Director Randolph said CAISO came close to calling for more outages over Aug. 17-18 but didn’t have to thanks to conservation encouragement and efforts by the governor’s office, state agencies, utilities, community choice aggregators, large and small customers, and customers using backup batteries and generation to support the grid.

“Thanks to massive efforts ... California was able to dramatically reduce overall demand and bring more generation into the mix to avoid more outages,” he said.



Additional news on this topic:



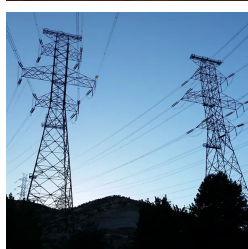
CAISO Provides More Details on Blackouts

CAISO and the California PUC and Energy Commission explained to Gov. Gavin Newsom why the state had two days of rolling blackouts recently. | U.S. Navy



Newsom Reappoints 2 CAISO Governors

Gov. Gavin Newsom reappointed Ashutosh Bhagwat and Angelina Galiteva to their fourth three-year terms on the CAISO Board of Governors. | © RTO Insider



CAISO Blames Blackouts on Inadequate Resources, CPUC

CAISO said millions of residents could be blacked out this week because it does not have enough power to meet demand during the Western heat wave.