

RIVERSIDE PUBLIC UTILITIES

Board Memorandum

BOARD OF PUBLIC UTILITIES

DATE: JANUARY 11, 2021

SUBJECT: UPDATE ON THE ROOT CAUSES OF THE AUGUST 2020 CALIFORNIA INDEPENDENT SYSTEM OPERATOR LOAD SHEDDING EVENTS

ISSUE:

Receive an update on the causes of the August 14 and August 15, 2020 California Independent System Operator ordered load shedding events that impacted multiple California utilities.

RECOMMENDATION:

That the Board of Public Utilities receive and file this update on the root causes for the August 14 and August 15, 2020 California Independent System Operator ordered load shedding events.

BACKGROUND:

From August 14 - 19, 2020, the Western United States experienced an extreme heat storm, with temperatures 10-20 degrees above normal. This heat storm was particularly severe in California and compromised an already constrained bulk electric transmission system that was being concurrently threatened by numerous wildfires and the loss of critical generation units. Due to these events, on August 14 and 15, 2020, the California Independent System Operator (CAISO) was forced to declare Stage 3 emergencies and institute rotating electricity outages (i.e., "load shedding") across its Balancing Area (BA).

As a participating Load Serving Entity (LSE) within the CAISO BA, Riverside Public Utilities (RPU) is mandated by law to follow all CAISO dispatch instructions, including the shedding of load under any emergency conditions. In response to a Stage 3 emergency declared at 6:38 p.m. on August 14, the CAISO ordered all participating LSE's to shed a total of 1,000 megawatt (MW) across the BA, in proportion to their respective load shares. RPU was specifically ordered to shed 12.7 MW of electrical load at 7:00 p.m. on August 14 for approximately 50 minutes. The CAISO also declared a Stage 3 emergency at 6:28 p.m. on August 15 and subsequently ordered the three largest LSE's to shed a total of 500 MW across the BA. Fortunately, RPU was not instructed to shed any load on August 15.

Immediately after these two load shedding events, Governor Newsom declared a State of Emergency due to the ongoing significant heat storm in California. Additionally, on August 17, 2020 the Governor ordered the CAISO, California Public Utilities Commission (CPUC), and California Energy Commission (CEC) to jointly perform a root cause analysis of the factors

contributing to the need for these rotating outages. On October 6, 2020, these three agencies released their preliminary Root Cause Analysis document (Attachment 2). This staff report presents a high-level summary of the findings presented in that document.

DISCUSSION:

The joint agency Root Cause Analysis (Attachment 2) presents a detailed and technical analysis of the conditions and events that contributed to the rotating electricity outages on August 14 and 15. This document includes a review of Resource Adequacy (RA) and how RA obligations are assigned to jurisdictional LSEs, an overview of the mid-August heat storm event, a comprehensive discussion on the various factors contributing to the outages, an overview of the steps taken to mitigate further supply shortfalls (during August 16 through 19), and a number of preliminary recommendations for how California can avoid such outages in the future. A useful synopsis of all these topics is presented in the document's Executive Summary.

The joint agencies identified three primary factors that contributed to the Stage 3 emergencies:

Point 1 - The extreme heat storm across the western United States resulted in the demand for electricity exceeding the existing electricity resource planning targets.

Point 2 - As California has continued to transition to a grid based on more variable renewable resources, resource planning targets have not kept pace to ensure that there are still enough dispatchable resources that can be relied upon to meet demand in the early evening hours.

Point 3 - Some practices in the day-ahead energy market exacerbated the supply challenges under highly stressed conditions.

Figure 1 shows the daily average composite August temperatures for each year from 1985 to 2020. The middle 90% of temperatures are contained in the shaded gray region and the 2020 August temperatures (including the six-day heat storm event) are shown in orange font. CEC staff have concluded that the August 2020 heat storm represented a 1-in-35-year event, which was outside the bounds of existing electricity resource planning targets.

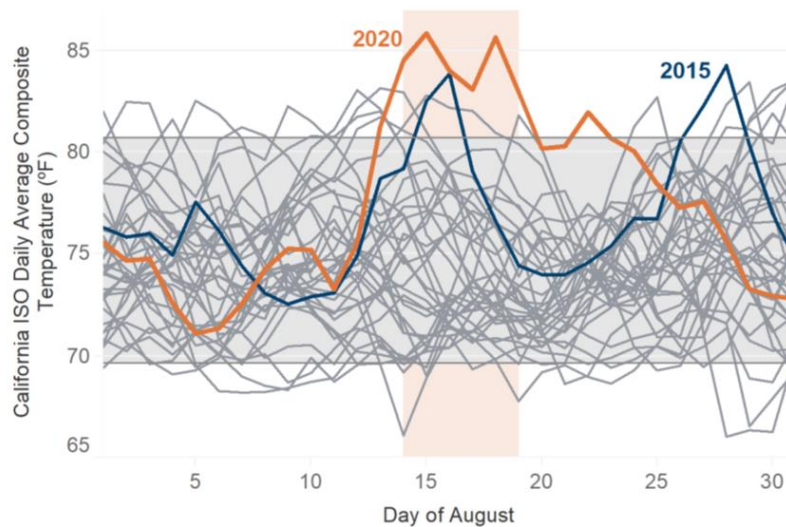


Figure 1. August daily average composite temperatures: 1985 - 2020.

Point 2 - The continued reduction in dispatchable generation resources in the CAISO BA has been well documented. For example, nearly 7,000 MW of natural gas fired generation has retired over the last three years, and to date only a small percentage of this capacity has been replaced by large scale battery energy storage systems. The CAISO has been emphasizing the importance of this issue by focusing significant attention on when the system experiences its “net peak demand”, which is defined as the peak demand net of all solar and wind generation. Note that this is different from the more traditional gross peak demand, which instead represents the time of highest actual load demand. Figure 2 shows both the actual and net demand curves for the CAISO system over the two-day period from 12:01 AM August 14 through 11:59 PM August 15, 2020. Figure 2 also shows the timing and durations of the two Stage 3 emergencies, each of which occurred at almost the same time as the net peak demand. This figure illustrates the challenges that the CAISO experienced when trying to meet the net peak demand on August 14 and 15.

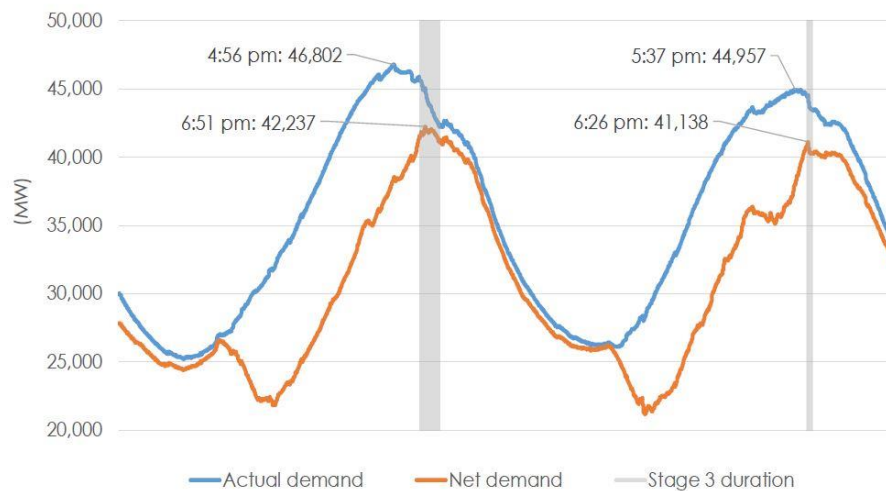


Figure 1. Actual and net CAISO load demand, August 14-15, 2020.

Factor 3 - The CAISO identified several issues and practices in the day-ahead energy market that further contributed to supply challenges. These issues and/or practices included: (a) approximately 1,500 MW of forced outages or de-rates to the natural gas fleet due to the extreme heat; (b) import constraints caused by the heat storm extending across the broader area of the western United States; (c) Demand Response (DR) resources apparently providing less energy savings than anticipated; (d) load under-scheduling in the day-ahead market by some (still to be identified) LSEs; and (e) convergence bidding and residual unit commitment algorithms that partially masked this load under-scheduling issue. Out of all these issues, the load under-scheduling will probably be the most heavily investigated, since this practice directly compromises the CAISO’s ability to properly manage the grid. However, it should also be noted that RPU did not materially under-schedule its load on either August 14 or 15.

The joint agency report also presents several preliminary recommendations for improvements to resource planning, procurement and market practices. At a high level, these recommendations for the CAISO, CEC and CPUC can be summarized as follows:

1. Update future RA targets to better account for heat storms and extreme events, as well as the transitioning generation resource mix in the CAISO BA.
2. Ensure that the generation and storage projects that are currently under construction in California are completed on time.

3. Expedite the regulatory and procurement processes to develop additional resources (primarily Demand Response resources) that can come online by the summer of 2021.
4. Coordinate additional procurement of flexible resources by non-CPUC jurisdictional entities.
5. Enhance CAISO market practices to ensure that they accurately reflect the actual balance of supply and demand during high stressed operating conditions.

With respect to these five recommendations, staff expect that recommendations 1 and 4 are the most likely to impose additional costs on RPU. Recommendation 1 essentially calls for revising the rules for how much RA each participating LSE should be responsible for. While this might be accomplished in multiple ways, nearly all the hypothetical approaches will most likely impose additional RA costs on market participants. Likewise, while recommendation 4 primarily focuses on load shifting and Demand Response resources, certain California legislators have already called for imposing new resource procurement mandates across all California LSEs.

Staff intends to continue to closely follow all future hearings and proceedings associated with this ongoing investigation. The joint agencies are continuing to conduct additional data analyses in order to draft a final, in-depth Root Cause Analysis document; this report is expected to be completed by the end of 2020. Additional information will be presented to the Board of Public Utilities once these investigations are completed.

FISCAL IMPACT:

There is no fiscal impact associated with this report.

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Attachments:

1. Preliminary Root Cause Analysis – Joint Agency Report
2. Presentation