The Public ADVOCATES OFFICE

PRELIMINARY ANALYSIS OF CALIFORNIA'S RESILIENCY DURING THE SEPTEMBER 2022 HEAT WAVE

Date: 9/22/2022

EXECUTIVE SUMMARY

The all-time record heat wave that swept California and much of the western United States at the beginning of September 2022 (August 31-September 9, 2022) was unlike any heat wave we have seen in regard to its duration, record-setting temperatures, and the unprecedented demand on the electricity grid. Power demand reached a record high, breaking a longstanding 2006 record. Unfortunately, it will not be the last as intense heat waves become more frequent with climate change and drive-up electricity demands.

In short, California avoided rolling blackouts, albeit narrowly, due to the following:

- ***Robust planning.*** Planners applied in earnest the lessons of the 2020 heat event and prepared for the worst. This included delaying retirements of dispatchable power and issuing voluntary demand response emergency alerts. September 6 saw the highest demand during the heat wave at approximately 16:55 reaching 51,426 MW. On top of ongoing demand response and flex alert programs, CAISO saw a 2,000 MW decrease in the subsequent 20-30 minutes following the first-time use of an emergency text alert asking Californians to reduce power demand. Additionally, natural gas facilities dispatched 25,822 MW at that time, and renewables supplied 12,836 MW.
- ***Aggressive resource acquisition.*** Despite numerous supply chain issues, California was still able to install over 3,111 MW of new battery storage between July 2020 and April 2022. Energy storage dispatch peaked on September 5 and contributed to 3,059 MW in supply at 18:30.
- ***Good luck***. While wildfires had the potential to threaten key facilities and solar production, it did not cause significant challenges. We only saw an approximate 30% decrease in solar production on September 8, which may have been the result of wildfire smoke or impacts from Tropical Storm Kay in Southern California. In addition to wildfires, there were no large unplanned outages at power plants, significant transmission line failures or import disruptions.

Given largely unforeseen challenges, California successfully protected its California families and business from power outages with its strategic grid reliability planning. A marked increase in energy storage coming online between 2020 and 2022 also significantly contributed to the avoidance of system outages.

One area that needs further study is the role that utility demand response programs and voluntary load reduction actions played in averting blackouts. Early indications suggest it was important, especially the September 6 Office of Emergency Services use of the Emergency

Alert system that pushed out alerts to mobile phones across the state urging residents to “turn off or reduce nonessential power if health allows” during peak demand hours. Shortly after, CAISO saw a 2,000 MW drop in energy demand in the 20-30 minutes after the alert was issued. This is the equivalent of shutting off over 500,000 air conditioners operating at max capacity. In addition, new emergency demand response products were deployed, and Flex Alerts were issued daily throughout the heatwave encouraging residents to limit energy use between the hours of 4-9pm.

As Californians face more heat waves and increased energy demands, it is important to note that energy prices have been higher in 2022 than in previous years. This is partially due to the fact that natural gas prices are two to three times higher this summer than in recent years. Natural gas continues to play an important role in maintaining California’s grid.

In the end, it appears that we needed every available resource on both the supply and demand sides to avert system rolling blackouts. While localized outages occurred due to heatwave impacts on distribution-level infrastructure and an isolated incident of operator error in Northern California, the worst system-level impacts were avoided. The recent and significant expansion of the battery fleet played a critical role in avoiding evening blackouts. Renewable production was generally robust, though solar production decreased by approximately 30% on the afternoon of September 8. The impact of decreased solar production was offset by increased generation from mostly natural gas generation, and to a lesser extent, energy storage and hydropower. Once-through-cooling natural gas plants experienced their typical, relatively high outages rates compared to national averages.

We endeavor to contribute to identifying lessons learned from the state’s response and handling of the September heatwave so that California will be that much more prepared for future events.