



Preliminary Observations on the August 2020 California Heat Storm

December 2020

Slides posted on www.ferc.gov



12/17/2020

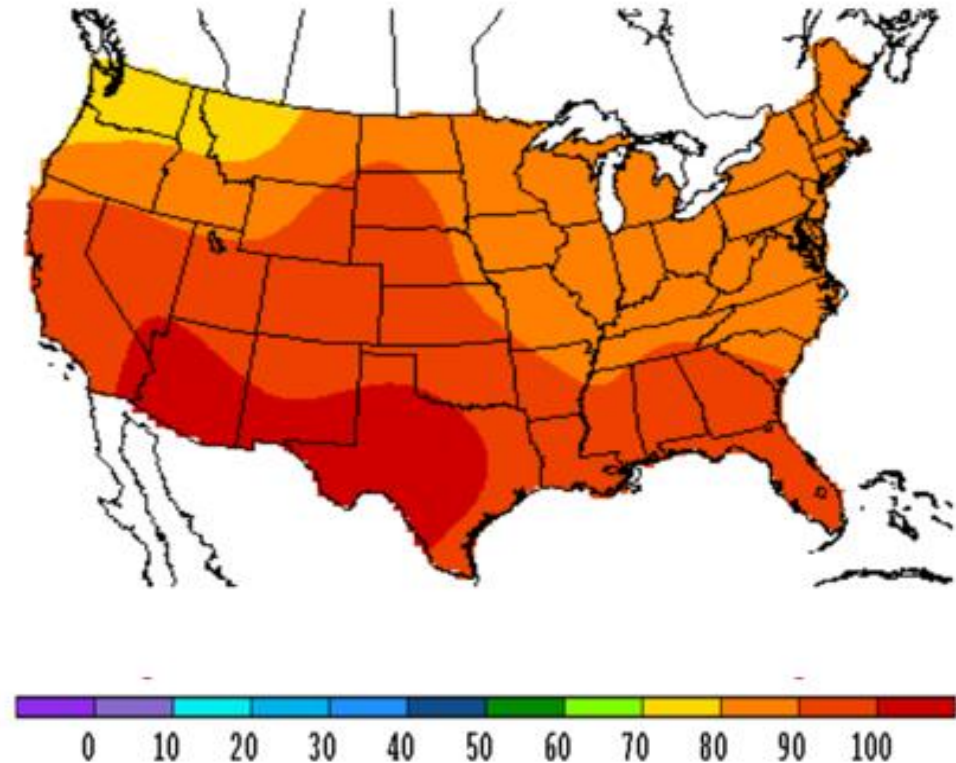
Highlights

- **Mid-August temperatures reached record highs in California and throughout the West.**
- **Generation resource planning focuses on Peak Load Hours, not Net Peak Load hours, which, on August 14 and 15, were when system conditions were tightest and load was shed.**
- **CAISO invoked demand response throughout the event.**
- **California faced similar conditions in September: high temperatures and tight system conditions.**

Weather Forecast for August 14 - 19, 2020

August 14, 2020

- Temperatures 10-20 degrees above normal highs in California.
- Excessive heat warnings throughout much of the Western Interconnection.
- Elevated fire risks threatened transmission lines.
- Low levels of hydro power.
- Lower than forecasted wind output at key times.
- Reduced solar generation due to cloud cover at key times.



https://www.wpc.ncep.noaa.gov/dailywxmap/index_20200814.html

Highlights of Significant Events on August 14

Fri Aug 14



Sat Aug 15



Sun Aug 16



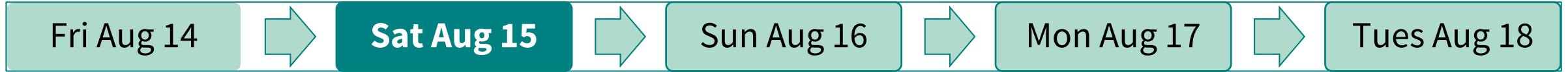
Mon Aug 17



Tues Aug 18

- **Forecasted potential reserve shortage - 5 PM through 9 PM**
- **Around 3 PM - a 475 MW Natural Gas generator tripped offline.**
- **3:25 PM - Stage 2 Emergency declared.**
- **4:56 PM - System peak load occurred. Solar generation declining and demand remaining high.**
- **6:38-8:38 PM - Stage 3 Emergency declared.**
 - **CAISO was deficient in meeting its reserve requirement.**
 - **Ordered two phases of controlled load shed of 500 MW each.**

Highlights of Significant Events on August 15



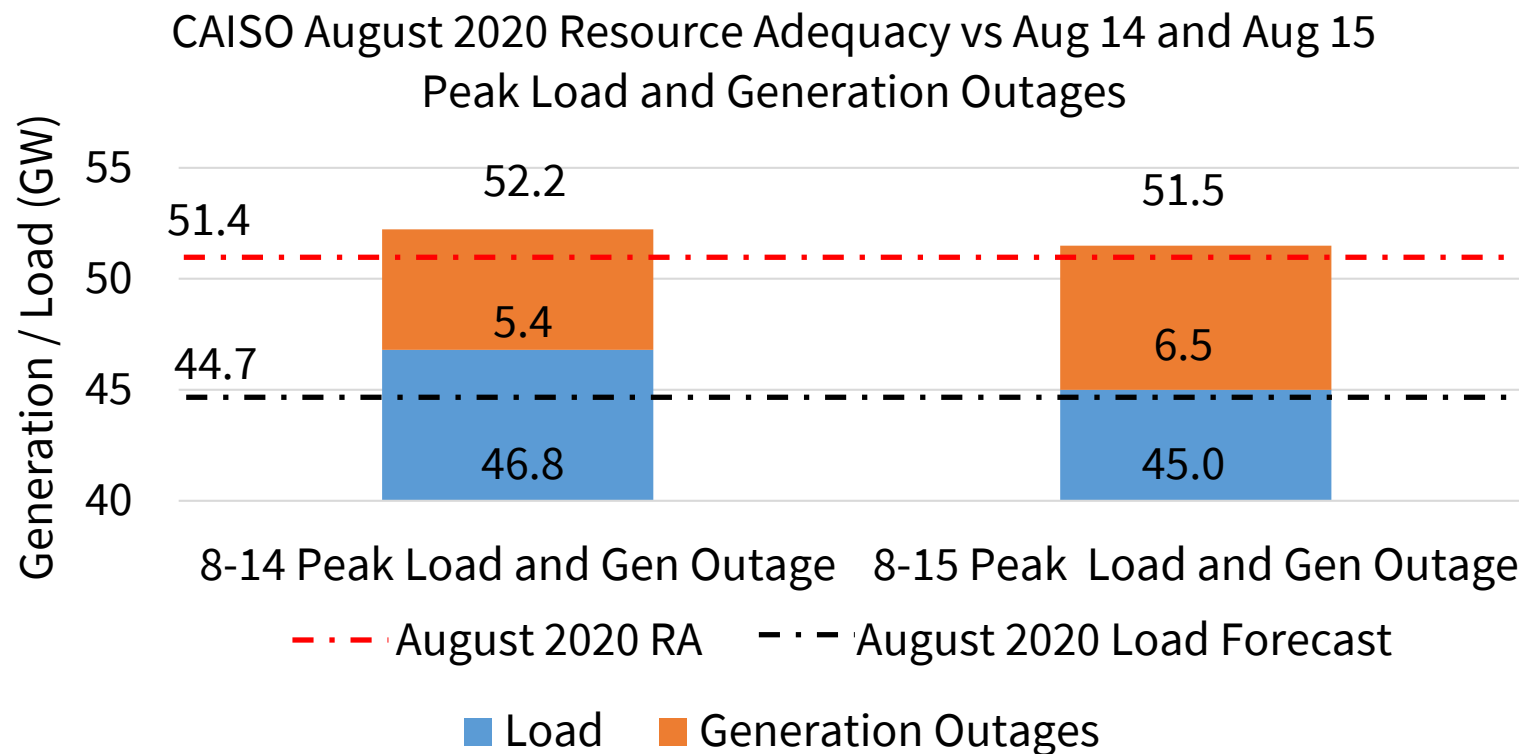
- **Similar conditions to Friday.**
- **2 - 3 PM - Solar generation declined by 1,900 MW. Immediate dispatch of emergency Demand Response (891 MW).**
- **5 - 6 PM - Unexpected decline of 1,200 MW wind generation. Peak occurs at 6 PM. Loss of 248 MW. Stage 2 Emergency declared.**
- **6:28 PM - Stage 3 Emergency declared. All generation was online and solar generation declining. 500 MW of controlled load shed.**
 - **Canceled 20 minutes later when wind increased by over 500 MW.**

Highlights of Significant Events on August 16-18



- **Heat storm continued. Storms and wildfires throughout region.**
- **Sunday – Governor declared State of Emergency, freeing up resources.**
- **Monday – Governor’s Executive Order further extended resource availability.**
 - **3:30 PM – 6:30 PM - Stage 2 Emergency in effect.**
- **Tuesday –**
 - **2 PM – 7:45 PM - Stage 2 Emergency in effect.**

The Peak Loads and Generation Outages on August 14-15 Were Higher Than Planned



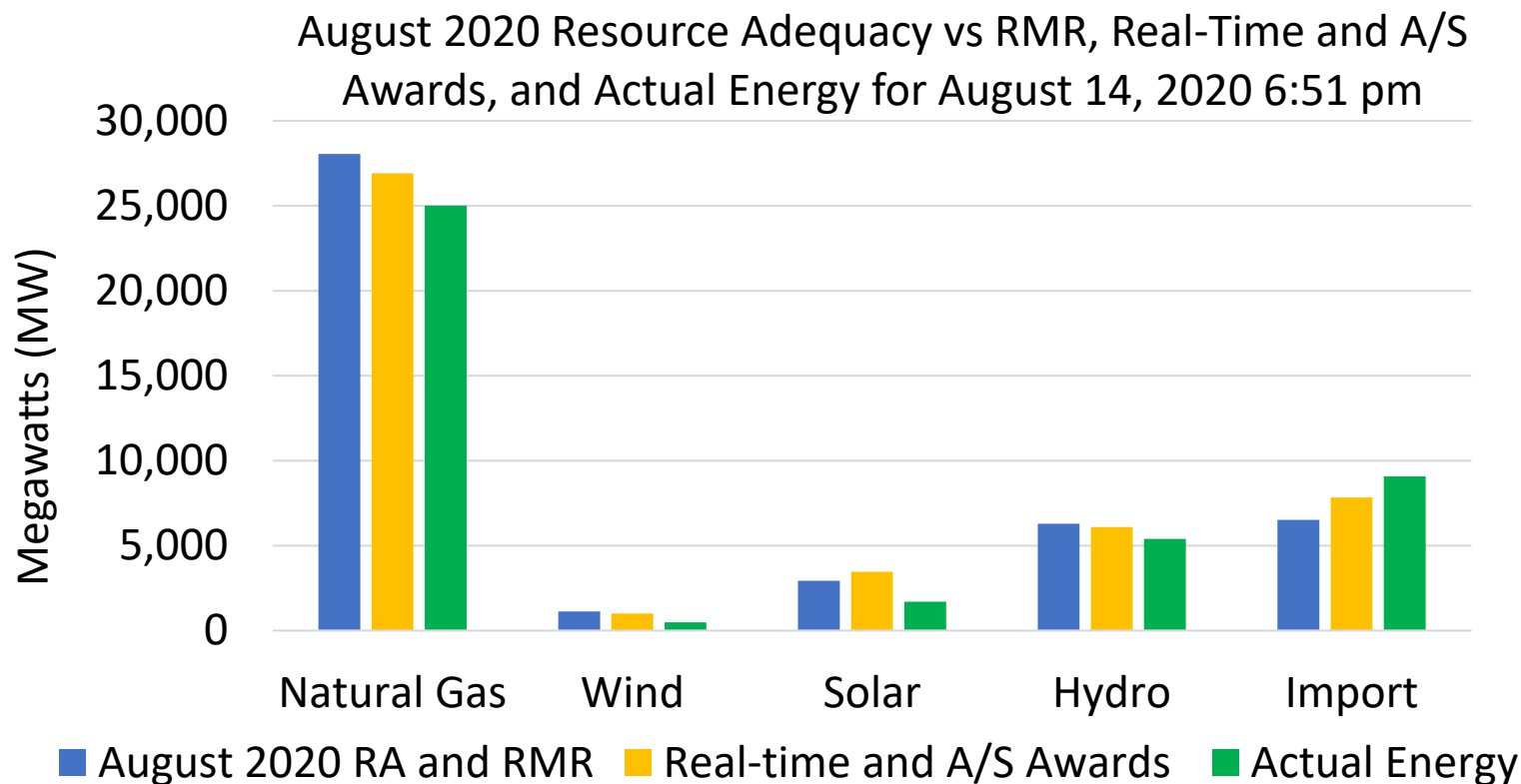
Source: CAISO and Preliminary Root Cause Analysis Mid-August 2020 Heat Storm report, October 6, 2020

Note: Bar elements not plotted to scale.



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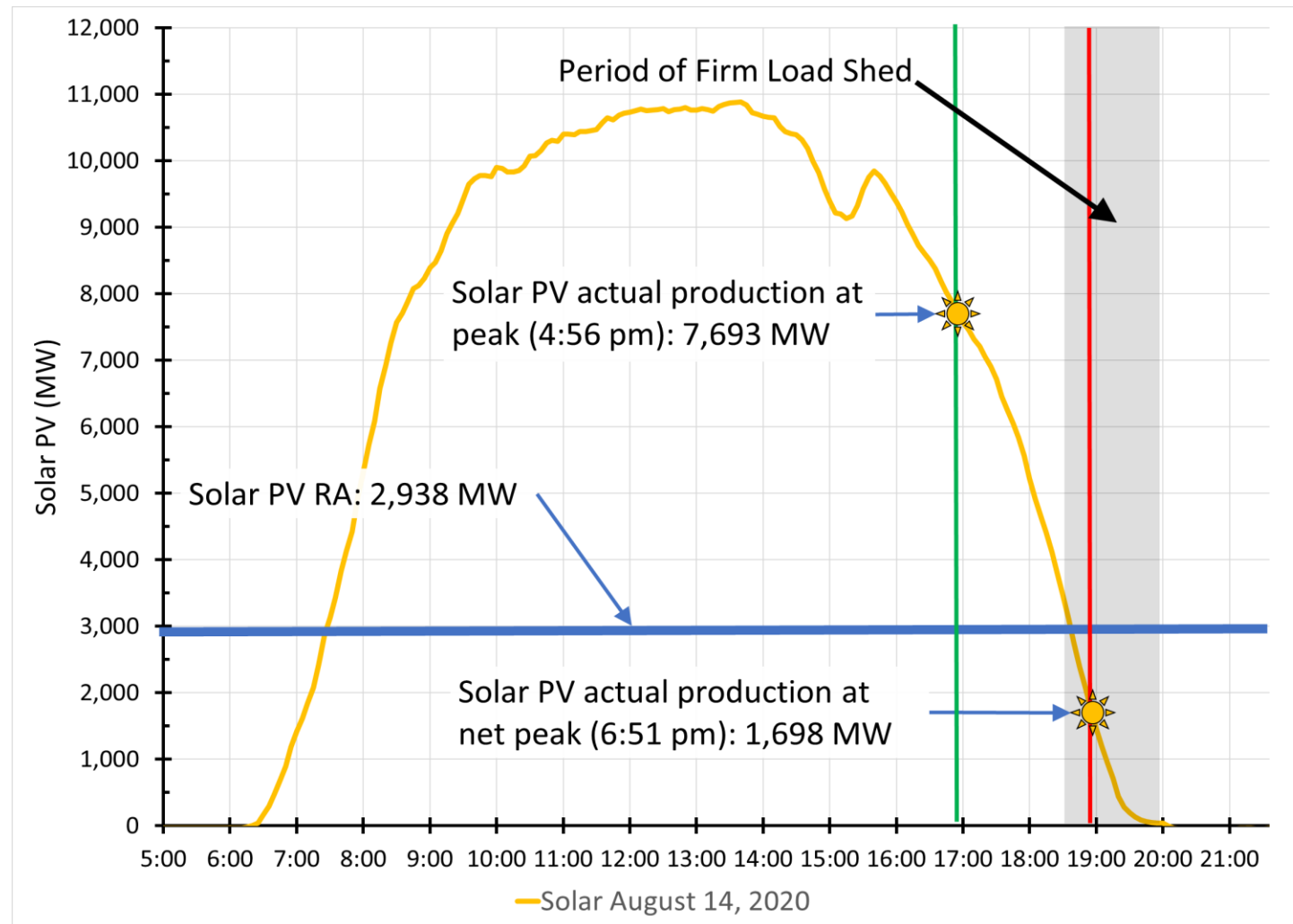
Generation Did Not Reach Expected Resource Adequacy Levels From Most Resource Types



Source: CAISO and Preliminary Root Cause Analysis Mid-August 2020 Heat Storm report, October 6, 2020
Note: Actual Energy from Natural Gas, Hydro and Imports do not reflect capacity reserved for Ancillary Services. Solar and wind do not provide Ancillary Services.



Significant Variations in Solar PV Generation Occurred during the Peak and Net Peak Load Periods

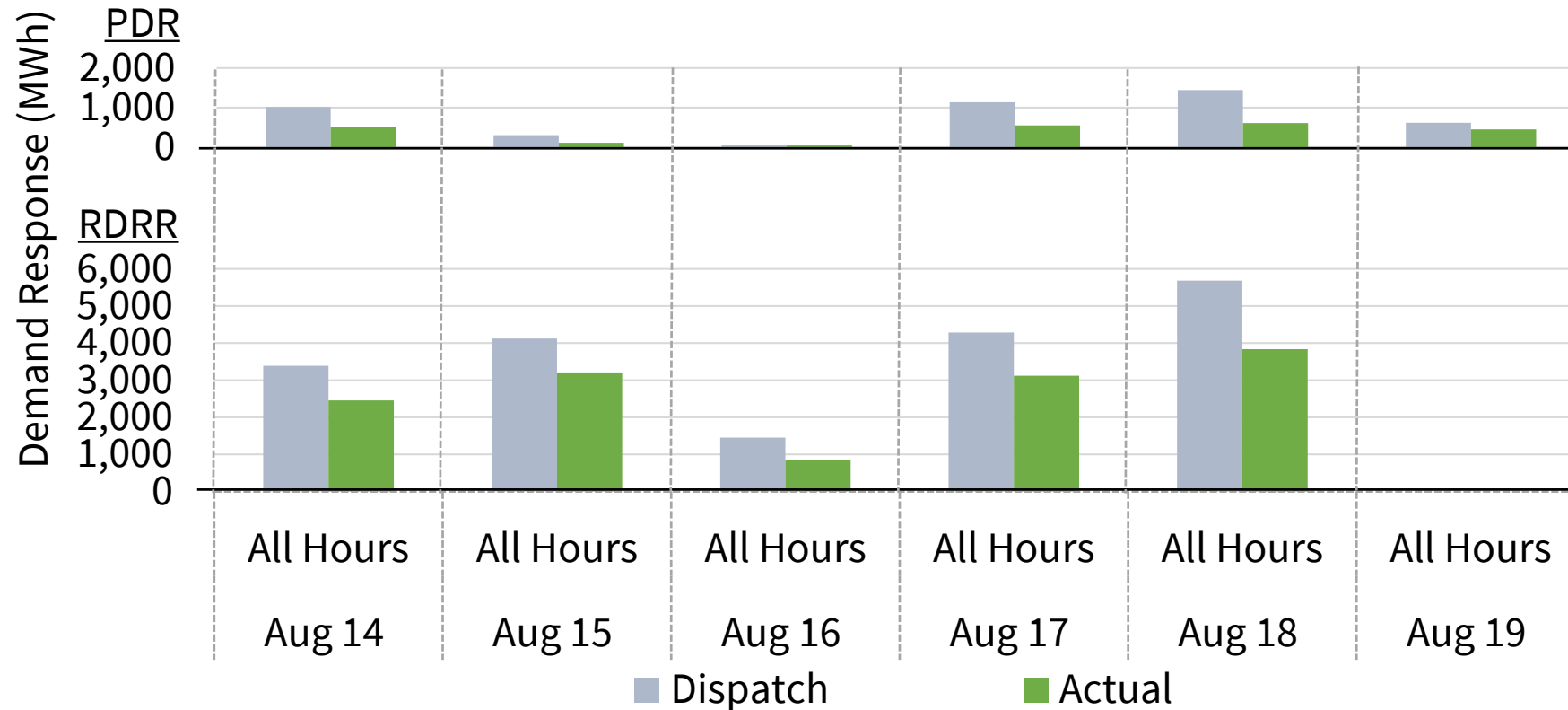


Source: CAISO and Preliminary Root Cause Analysis Mid-August 2020 Heat Storm report, October 6, 2020



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Demand Response Fell Below Dispatch Levels



Source: CAISO

Note: PDR refers to Proxy Demand Response, which is bid into the CAISO markets. RDRR refers to Reliability Demand Response Resources, which are also bid into the CAISO markets but only dispatched after a warning notice or during system emergencies.





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