Redwood Coast Energy Authority: 2023 Summer Assessment

CAISO Grid Conditions Summary

Compared to previous years, the California Independent System Operator's (CAISO's) 2023 Summer Loads and Resources Assessment indicates significant improvements in summer readiness driven by accelerated resource development and high hydro conditions. The addition of new resources and improved hydro conditions have resulted in a reduction of overall risk, with a particular focus on addressing the decline in solar output during the early evening hours. The assessment highlights a more consistent risk across the hours ending between 19:00 and 21:00, while also demonstrating significantly lower risk leading up to the hour ending at 19:00. This improvement can be attributed in part to the larger fleet of storage resources available to manage the rapid decline of solar output.

To enhance grid resilience, the ISO has also implemented emergency resource programs, such as the State Power Augmentation Project (SPAP) and the Electricity Supply Strategic Reliability Reserve Program (ESSRRP). These programs add emergency capacity and reserve resources to support the grid during extreme events. Additionally, demand-side programs like the Demand Side Grid Support Program (DSGS) and the Distributed Electricity Backup Assets (DEBA) program focus on load reduction as a means of ensuring grid reliability. The California Energy Commission (CEC) has launched the DSGS program, enrolling over 315 MW of load reduction in 2022, and intends to expand it further in 2023. The DEBA program aims to procure clean and efficient distributed energy assets that can serve as emergency supply or load reduction during extreme events. These initiatives collectively contribute to improving grid conditions and enhancing overall system preparedness for the summer of 2023.

CAISO Grid Conditions – Deeper Dive

New Power Plants

The California Public Utilities Commission (CPUC) developed a Power Supply Plan and adopted it in February 2022. The CAISO Summer Assessment conducted analysis of the CPUC's preferred portfolio comparing it to the anticipated online portfolio in both June and September 2023. It is notable that there were large misses in the June portfolio by solar (4,069 MW), battery storage (1,250 MW) and a small mismatch in the preferred installed capacity of wind (216 MW). That said, by September, this 5,535 MW miss is expected to reduce by 3,305 MW to 2,230. By September, installed battery storage capacity is expected to exceed the CPUC's preferred 2023 portfolio target by 759 MW while solar and wind will lag by 2,989 MW combined. From a resource adequacy standpoint, the overage in installed battery storage capacity is preferable given the ability to reliably contribute to peak load service after sunset. In analysis of Qualifying Capacity (QC) the results indicate a more modest 1,551 MW miss compared to the preferred portfolio in June with a 543 MW overage by September 2023.

The programs described in the Grid Conditions summary are also expected to favorably impact CAISO summer operations. SPAP has been established and contracted for the installation of 120 MW of emergency capacity. This includes two General Electric TM2500 gas turbine generator units rated at 30 MW each located at the Roseville Energy Park and the Greenleaf 1 site. These resources are designated

for dispatch during ISO-declared emergency conditions. The Electricity Supply Strategic Reliability Reserve Program (ESSRRP) includes contracting for reserve resources available during extreme events. The program has contracted for 171 MW of emergency capacity that can be utilized by any California Balancing Area Authority declaring an emergency event.

Hydro Generation

The 2023 hydro conditions have approached or exceeded historical maxes in most areas of the state with snow-water content at 239% of average statewide as of April 1st, 2023. For planning purposes, the CAISO does not automatically assume high hydro conditions will persist throughout the summer period; however, they repeatedly note that if conditions do persist, a 1-in-10 planning margin will be exceeded by about 200 MW in June and 2,300 MW in September. The CAISO notes that most of the the footprint's generation capacity is located in the northern part of the state, which is lagging other regions but still at 196% of average. The default study assumes average historical hydro generation which results in a 1,100 MW shortfall of the 1-in-10 planning margin in June and a 960 MW surplus in September.

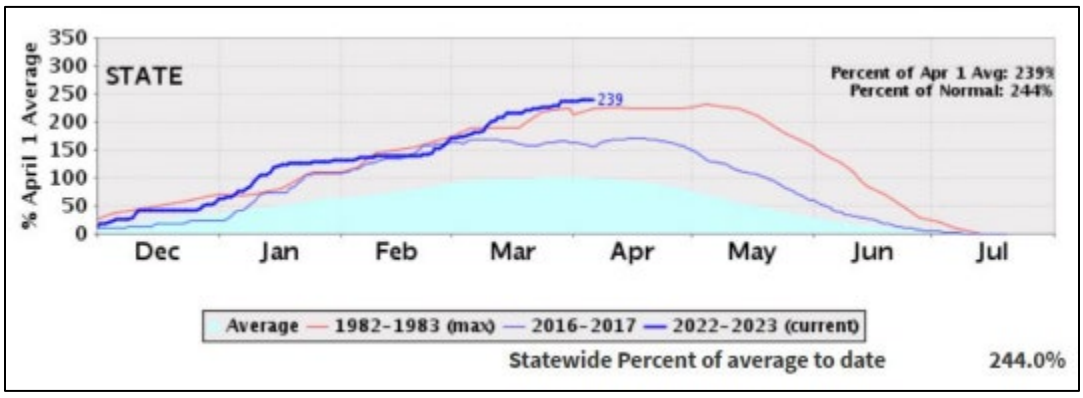

Figure 1: Snow Water Content as of April 1, 2023

At the time of this summary's publication in July, the statewide snow water content is near zero; however, the melt has translated into robust reservoir levels which suggests CAISO's 1 in 10 planning margin is likely to be exceeded.

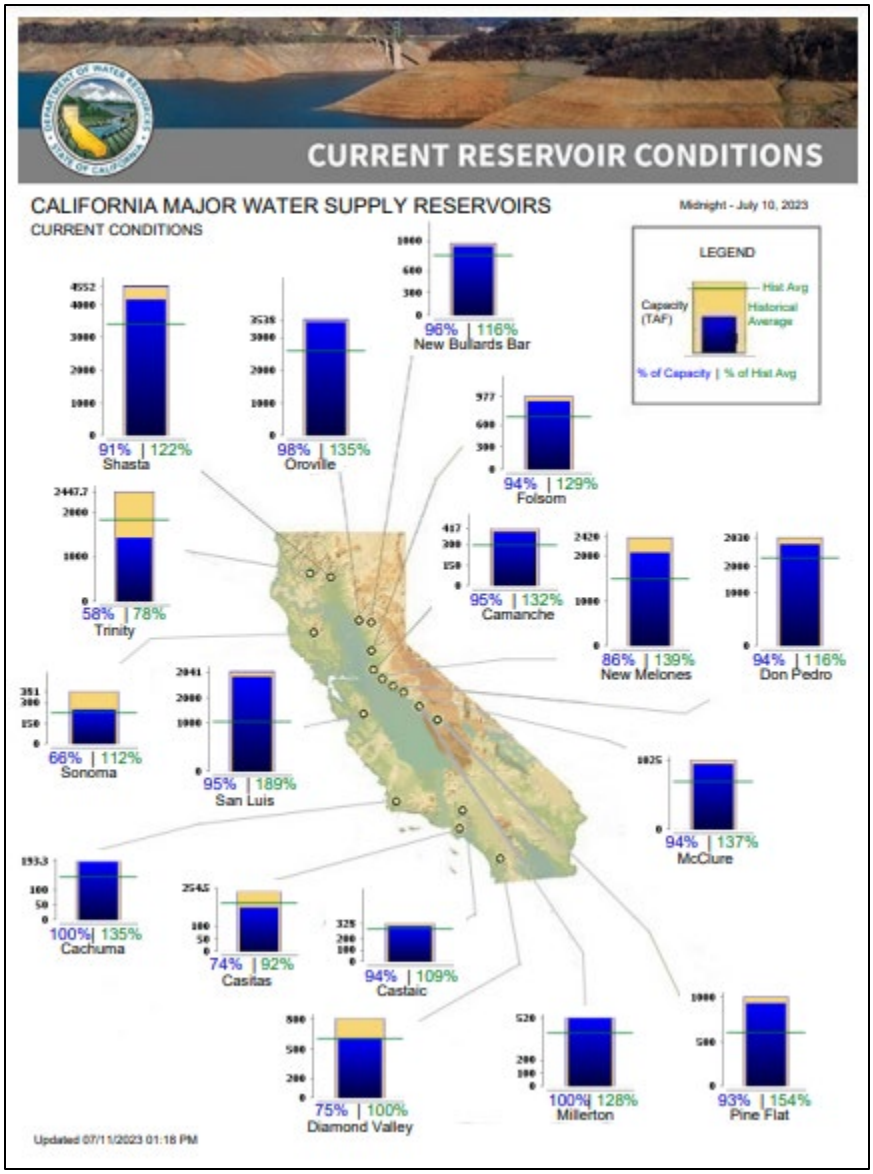

Figure 2: CA Reservoir Conditions as of 7/11/2023

Stack Analysis of Available CAISO Resources

The ISO's deterministic stack analysis is used to evaluate resource procurement targets and minimum resource needs under the CPUC Resource Adequacy program. It provides an additional perspective on the expected capacity available for summer 2023 and the level of reliability under different load levels and import conditions. In this analysis, reserve margins are interpreted differently from the loss of load expectation (LOLE) approach and focus specifically on resources available during peak load times. The ISO considered various parameters including North American Electric Reliability Corporation (NERC) requirements, unloaded capacity, forced outage rates, and load forecast levels. Accordingly, for 2023, the CPUC set a planning reserve margin (PRM) of 16%, with an effective PRM range of up to 22.5%. The analysis also compared the expected resource stack to the CPUC's PRM for 2023 and the effective PRM range. This assessment helps ensure resource sufficiency and reliable service during real-time

operations in the face of peak load conditions. The figure below illustrates the relatively better overall position CAISO portrays in their analysis for summer 2023 compared to summer 2022.

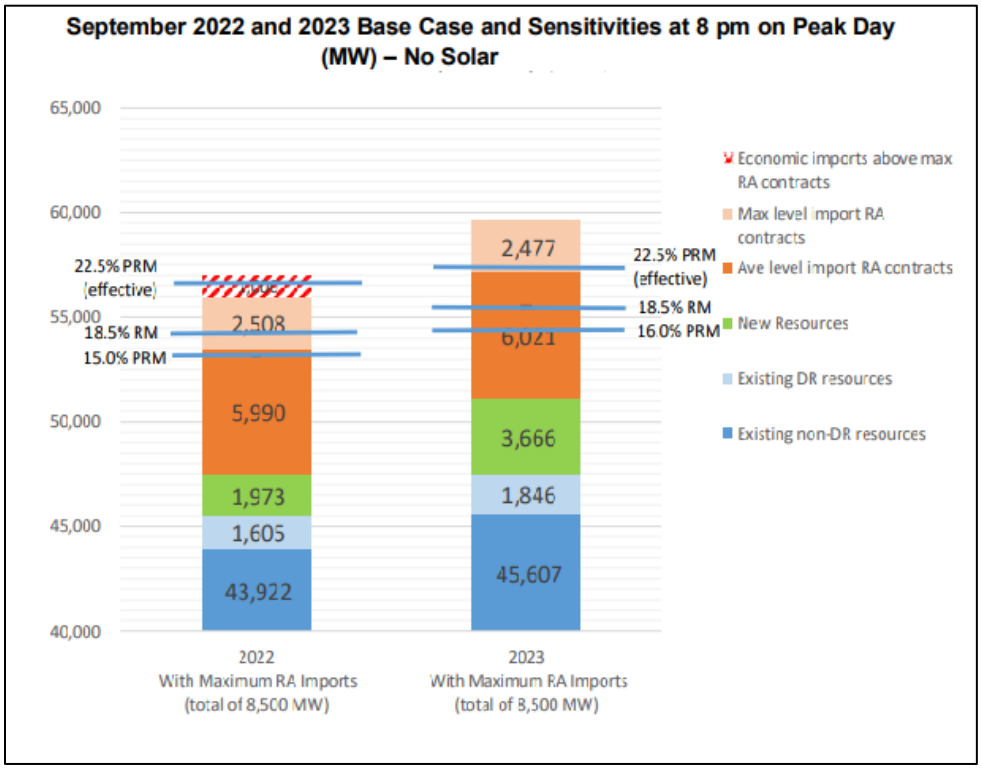

Figure 3: CAISO Summer Assessment Stack Analysis

Redwood Coast Energy Authority Summer 2023 Readiness

A short summary of RCEA's work in ensuring local and statewide grid reliability is described below.

Energy Hedging

RCEA utilizes a programmatic approach to hedging that incrementally fills energy deficits after bilateral procurement from market counterparties. The program is designed to ensure the utility is fully hedged for summer periods. This approach means that RCEA's exposure to volatile energy prices that may occur during summer heat events is significantly mitigated. Care is taken to ensure load variation is accounted for when determining the appropriate hedge volumes.

Resource Adequacy

RCEA actively monitors its resource adequacy position (RA) and pursues forward procurement of RA-only products or generation resources through Power Purchase Agreements (PPAs) to meet its assigned RA obligations. Like many similarly situated entities, RCEA has been impacted by delays in the online date of resources that has resulted in deficiencies in the summer months. Further complicating this matter has been the extreme illiquidity in RA markets, which are opaque and require a combination of both formal and informal solicitation approaches to secure this product. RCEA will be unable to fully meet its RA procurement requirements for summer 2023 because of project delays and unavailability in the RA market. This tight RA market is reportedly causing many load-serving entities across the state to experience RA shortfalls for summer 2023.

New Resources

RCEA continues to pursue new clean capacity resources and has over 100 MW of new capacity resources in development that it has contracted for. While different types of new resources provide different degrees of carrying capacity on the grid, RCEA's goals for resource procurement will provide it with a substantial amount of clean peaking energy in the years to come. RCEA did not bring any new resources online this year due to development delays outside of its control. Nevertheless, RCEA plans on expanding its renewable energy portfolio in the coming years with further procurement of renewable resources that can be paired with storage assets to provide clean dispatchable peaking energy when needed. This will not only provide support to the power grid, but will also reduce costs to RCEA ratepayers.

Existing Resources

RCEA's existing fleet of resources all provide summer capacity. Largest among them is Humboldt Sawmill Company's biomass plant, which has provided reliable capacity during peak hours and has a steady generation shape that allows it to have a relatively high load carrying capacity when compared to other types of renewables. Furthermore, Snow Mountain Hydro's Cove Hydro plant, like other California run-of-river hydropower resources, has been providing meaningful early summer energy and capacity thanks to an extremely robust water year. Lastly, RCEA's Redwood Coast Airport Microgrid not only reduces RCEA's draw on the power grid during the summer but also serves as a source of local emergency power within the microgrid footprint during a potential blackout condition.

Public Safety Power Shutoffs

RCEA staff has developed protocols regarding communication with its scheduling coordinator, The Energy Authority, as well as with PG&E in anticipation of PSPS events that may impact Humboldt County. In the case of a PSPS event and other transmission outages, PG&E may island the Humboldt County Local Capacity Area using its Humboldt Bay Generating Station, reducing the risk of significant blackout events for Humboldt residents compared to previous years.