



California ISO

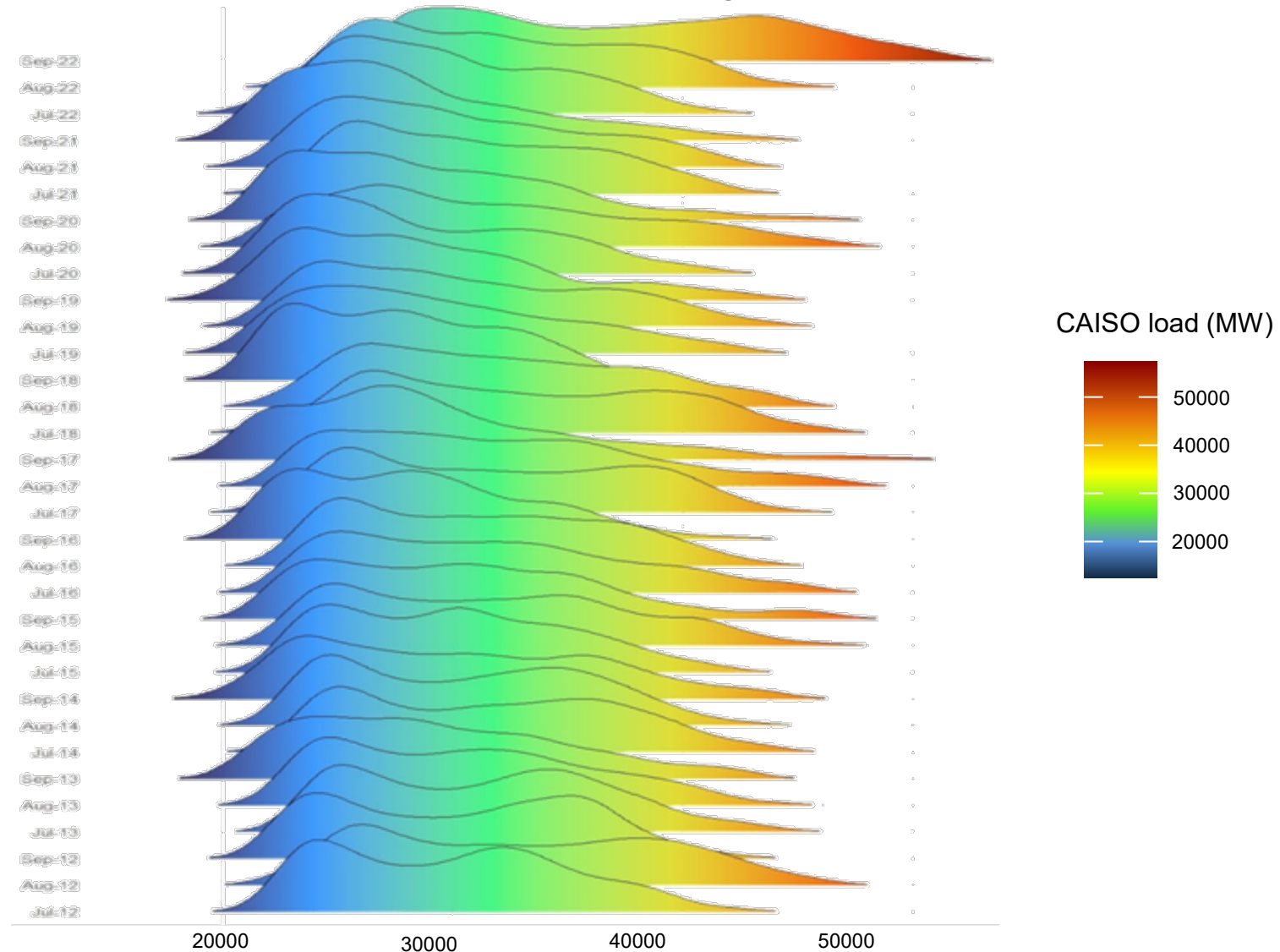
CAISO Outlooks

Mark Rothleder
SVP & Chief Operating Officer

SMUD – Energy Resources & Customer Services Committee Meeting
May 9, 2023

The September heat wave was extraordinary in duration and intensity

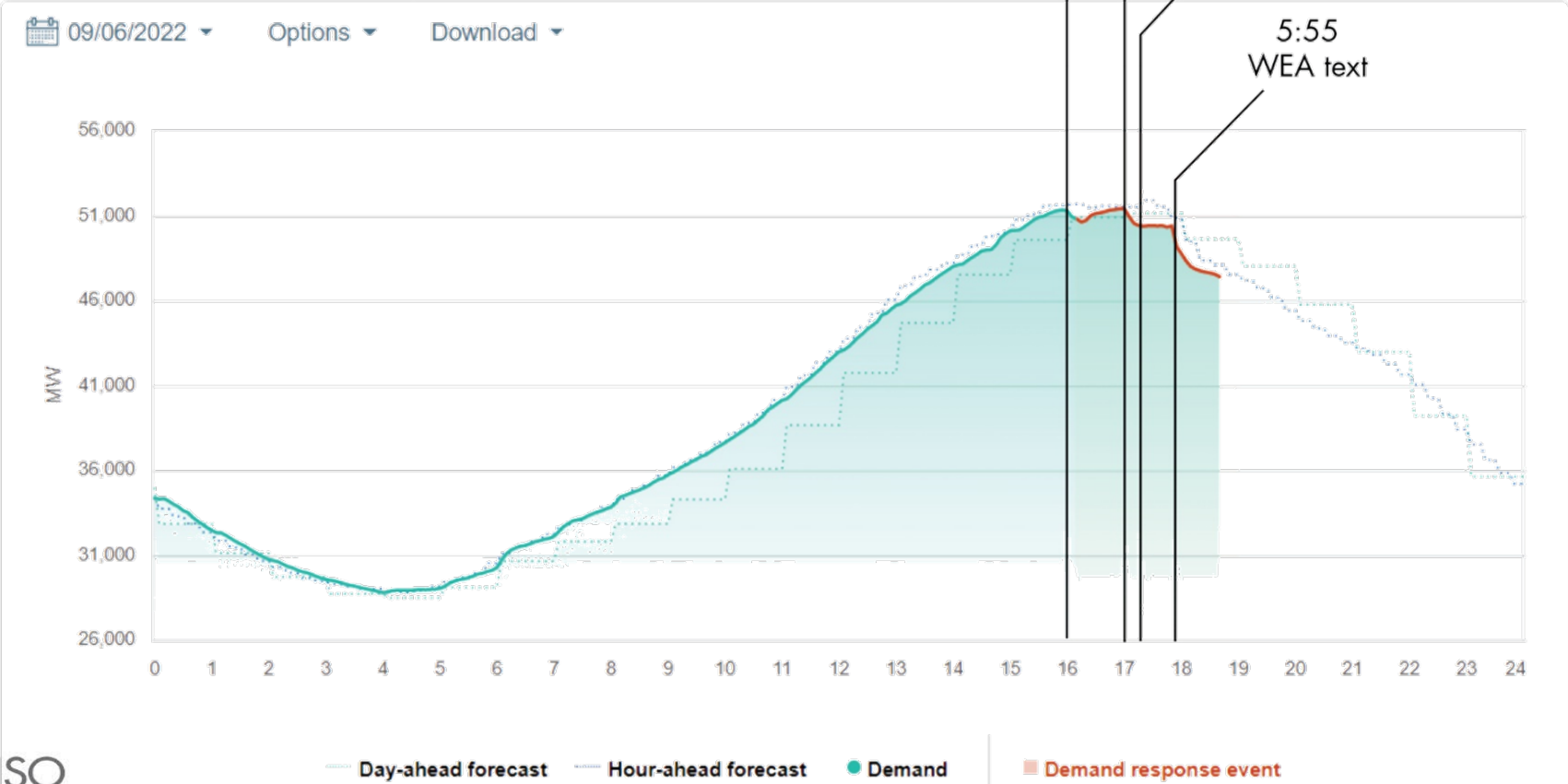
*Historical Loads
for CAISO area*



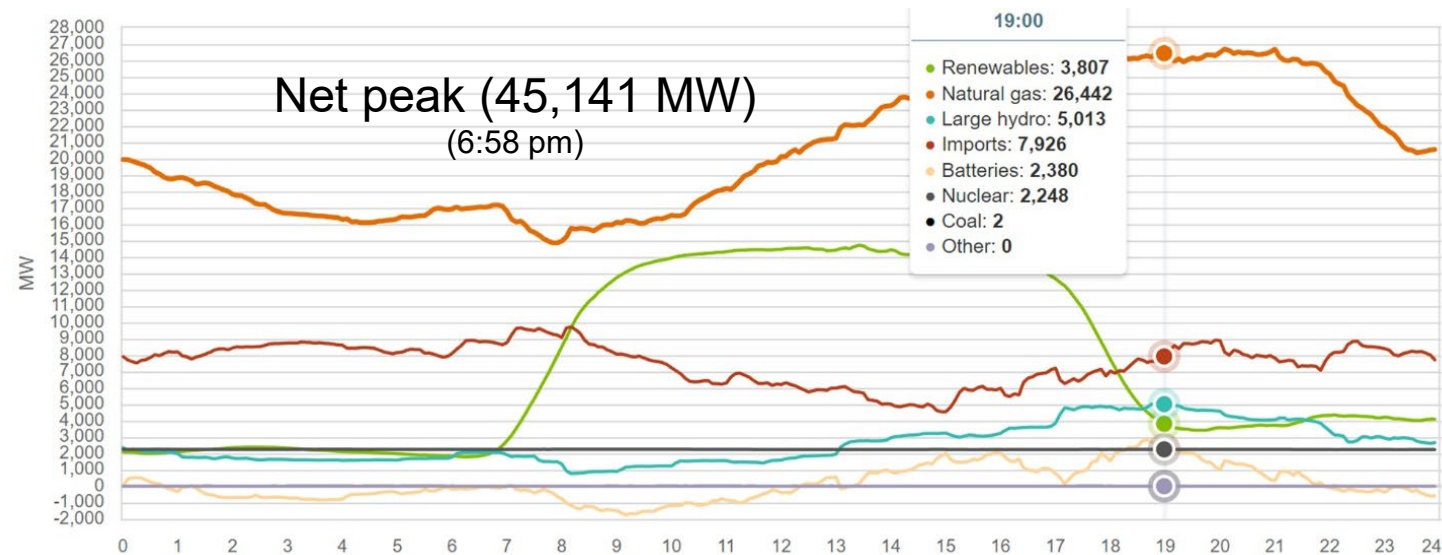
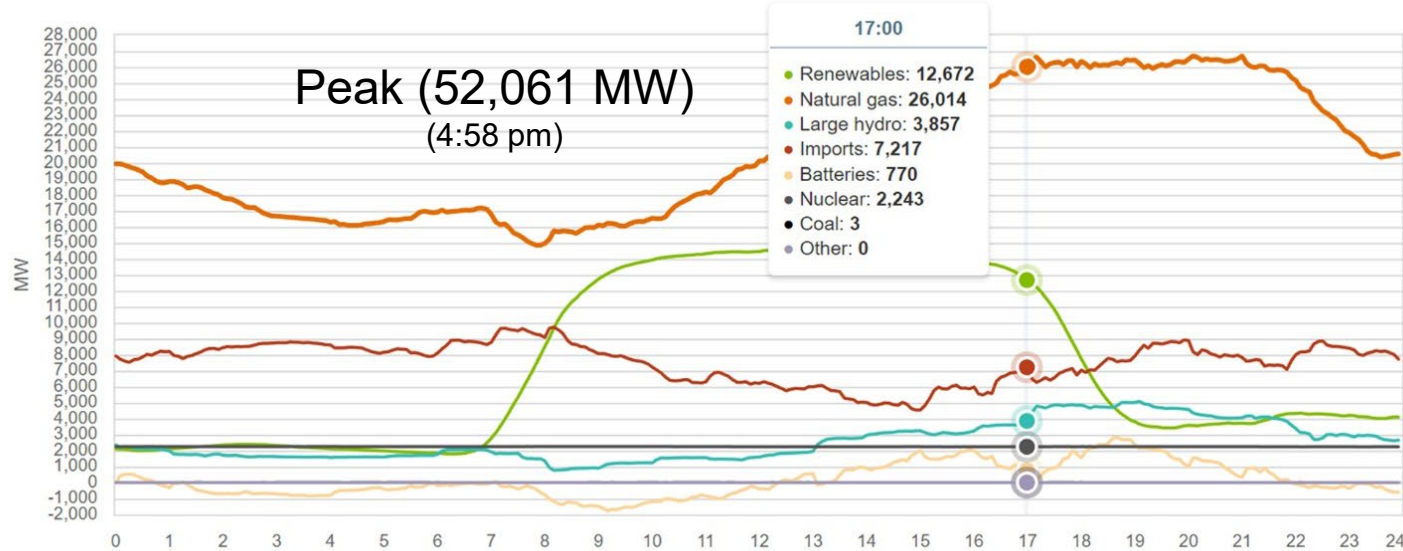
Sep. 6 demand response and emergency resources

Demand trend

System demand, in megawatts, compared to the forecasted demand in 5-minute increments.



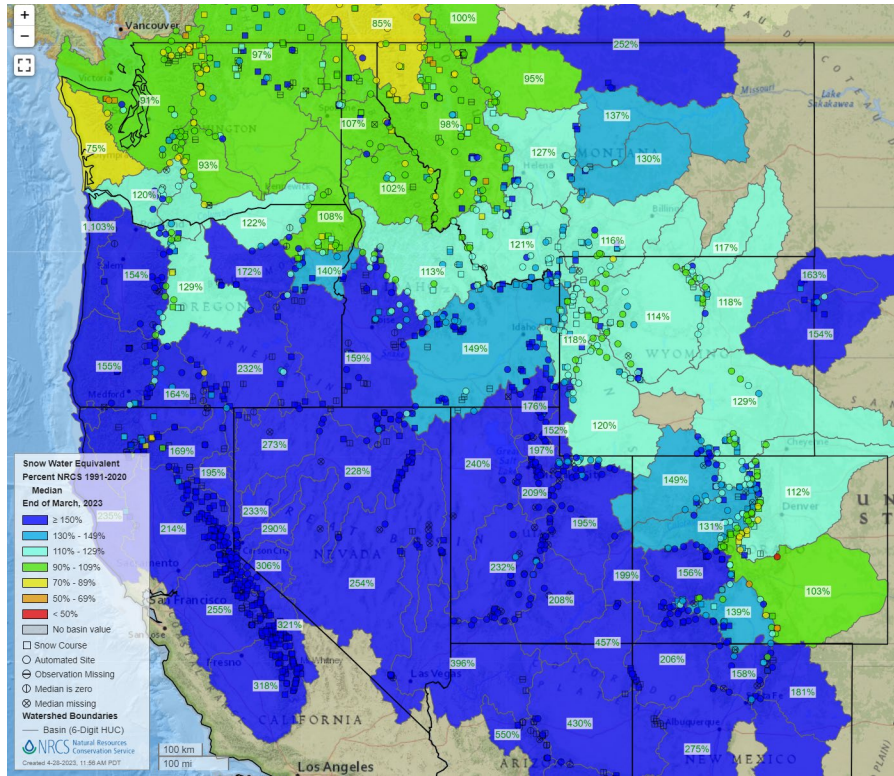
Sept 6th peak and net peak resource stack



Above normal snow pack to help improve reservoir conditions

Snow Water Equivalent Percent

As of end of March 2023



Source: <https://www.nrcs.usda.gov/wps/portal/wcc/home/snowClimateMonitoring/snowpack/snowpackMaps>

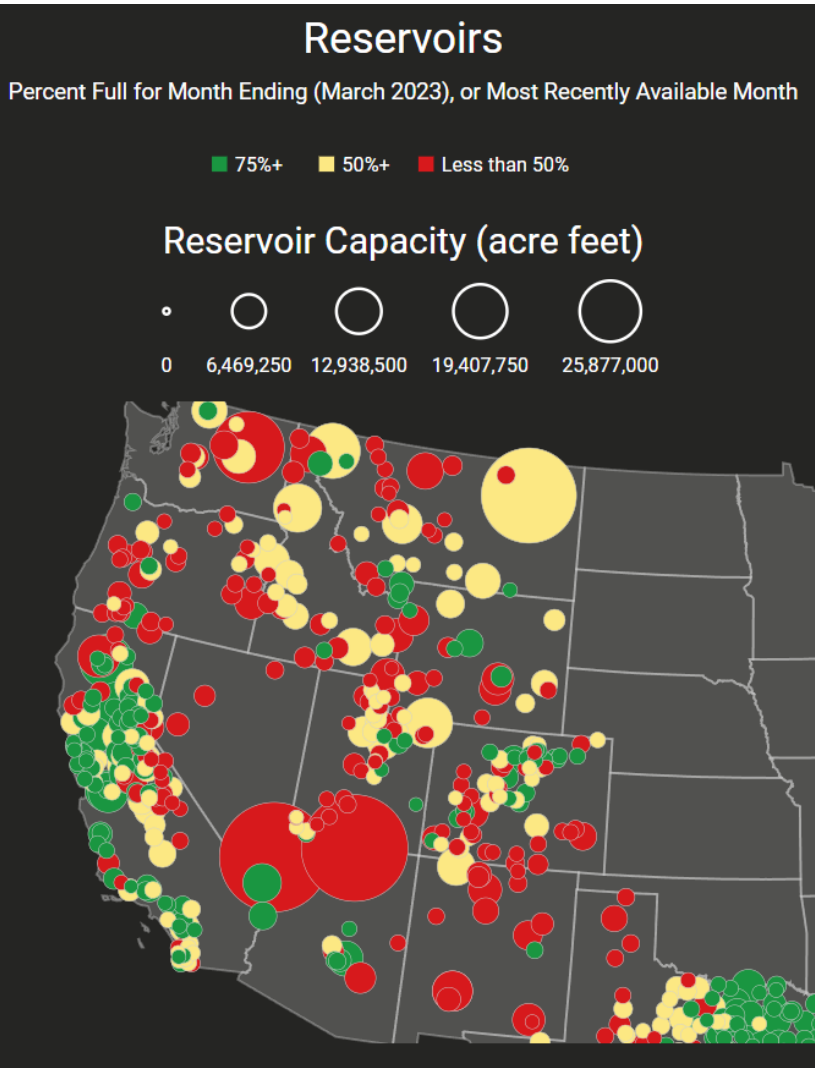
Reservoirs

Percent Full for Month Ending (March 2023), or Most Recently Available Month

75%+ 50%+ Less than 50%

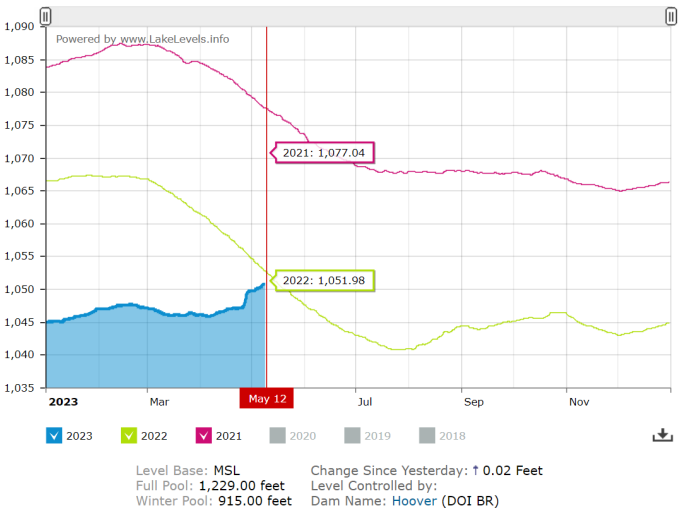
Reservoir Capacity (acre feet)

0 6,469,250 12,938,500 19,407,750 25,877,000



Source: https://www.deanfarr.com/western_water/

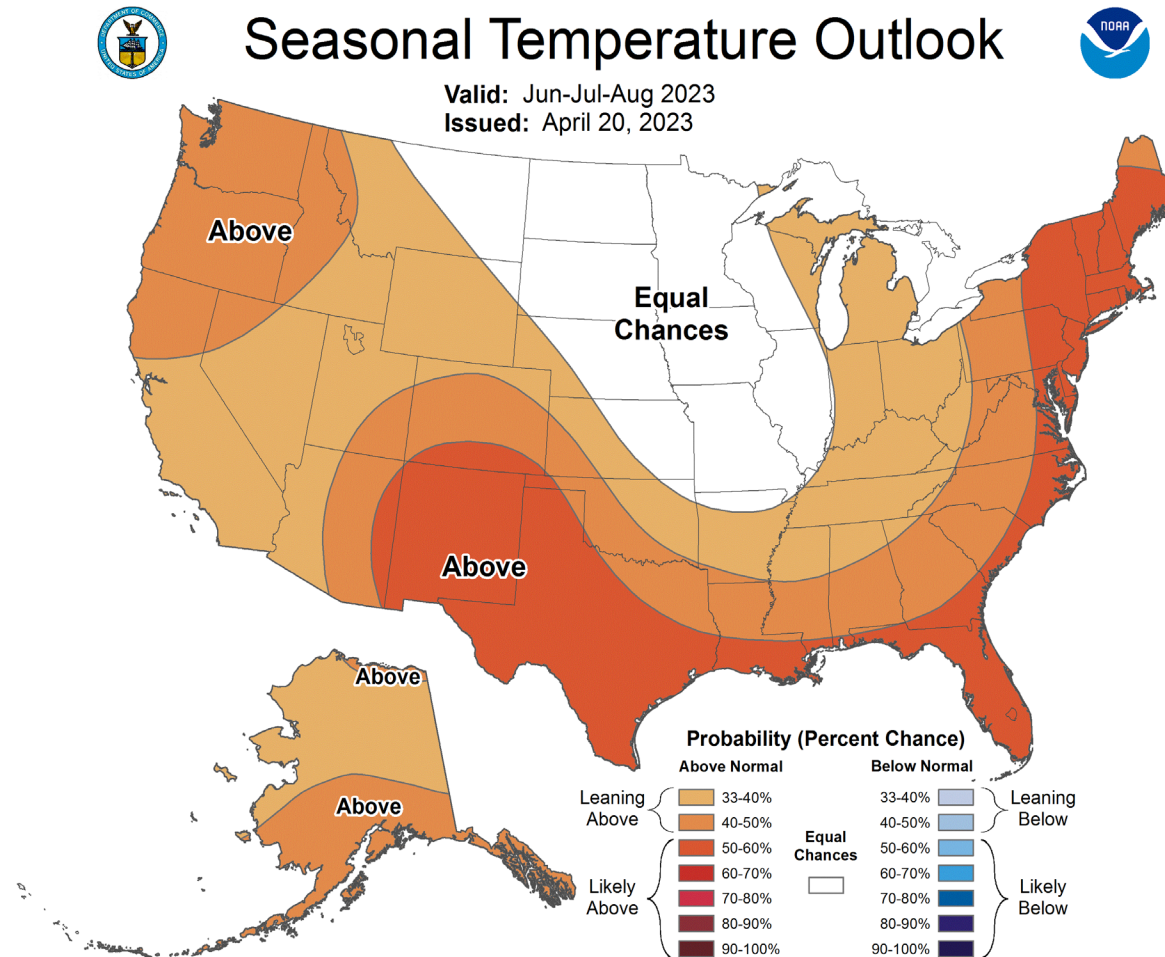
Lake Mead Level



Source: <https://mead.uslakes.info/level.asp>

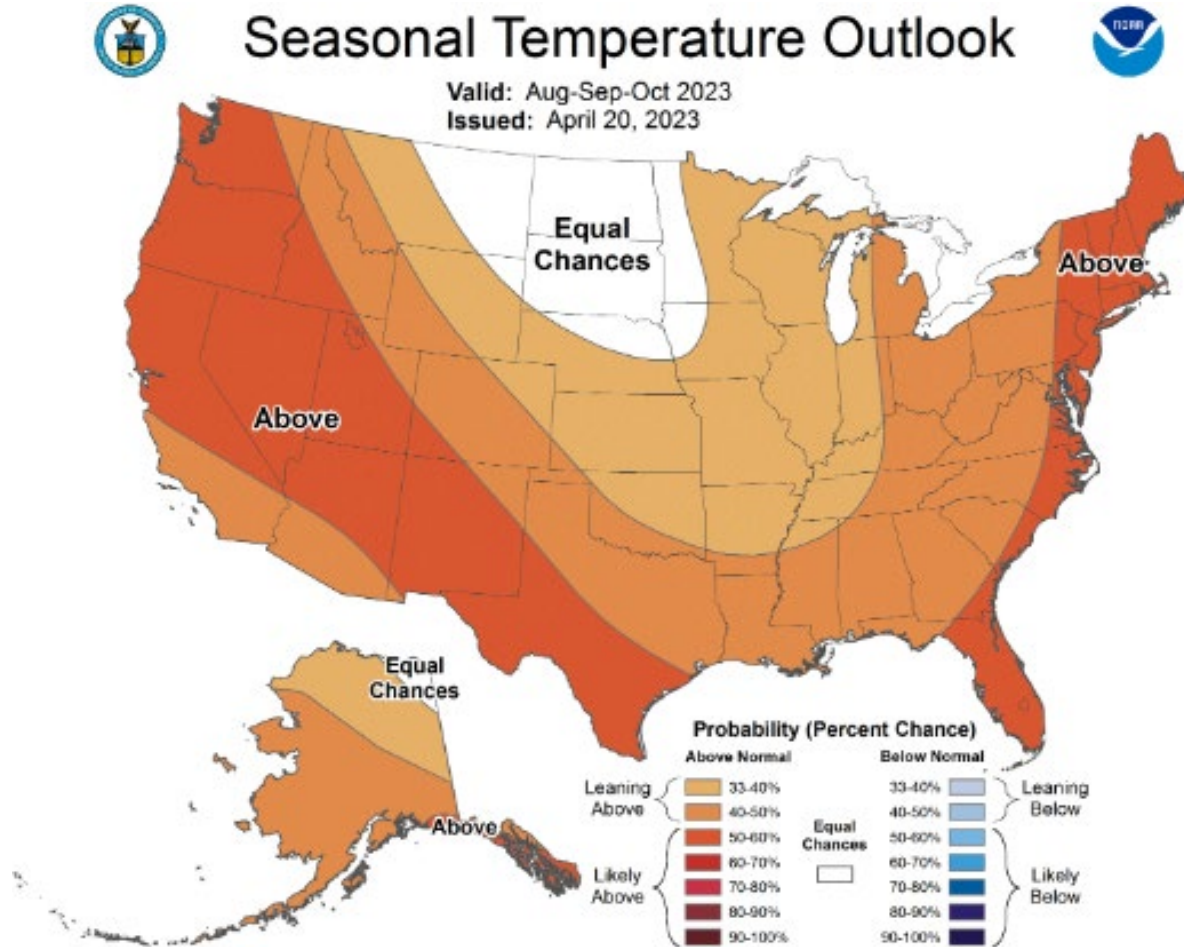
Western Weather Outlook – Temperature June 2023 – August 2023

- Warmer than normal average temperatures are forecast for California and the Pacific Northwest
- Expecting milder conditions along the coastal regions in June and July due to cool Sea Surface Temperatures off the coast



Western Weather Outlook – Temperatures: September 2023 – October 2023

- The chances of above normal temperatures for far western United States increases in August or September due to warming sea surface temperatures

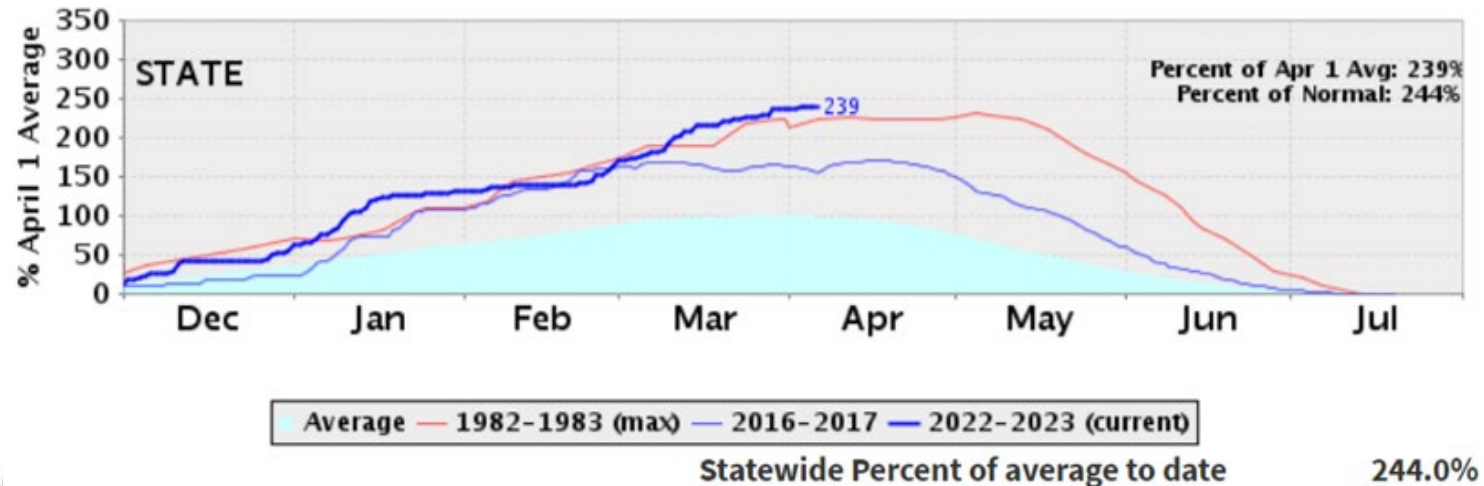


The ISO is showing considerable improvement in the resource situation driven off of new resources and high hydro conditions

- New resource development is continuing through the summer:

Resource Type	Incremental Installed Capacity Between Sept 1 2022 and <u>June 1, 2023</u>	Incremental Installed Capacity Between Sept 1 2022 and <u>Sept 1, 2023</u>
Wind	518	518
Solar	2,478	3,774
Battery Storage	2,293	4,302

- Hydro conditions are tracking to record highs:



The improved resource situation more than offset modest increases in CEC load forecasts

CEDU 2022 Planning Forecast for ISO Balancing Authority Area

	Forecast for 2023	Last year's forecast for 2022
1-in-2 forecast	46.8 GW	46.3 GW
1-in-5 forecast	48.8 GW	48.3 GW
1-in-10 forecast	49.9 GW	49.4 GW

In 2022, while the actual peak demand reached 52,061 MW in 2022 – a 1-25 year event (weighted 3-day temperature using 28 years of weather data).

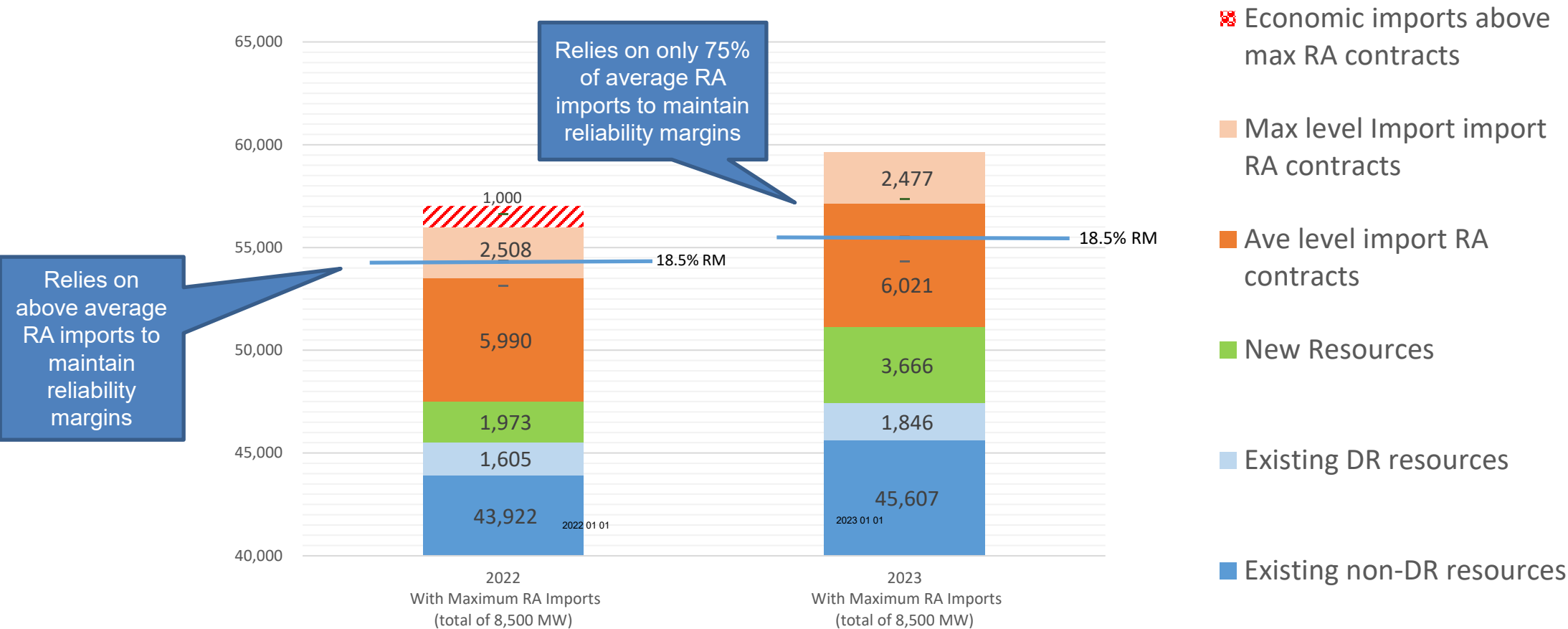
Overall, the ISO balancing authority area is expected to achieve the reliability planning target of 1-in-10 LOLE

Progress to achieving a 1-in-10 reliability planning target	Resources scheduled online by June 1	Resources scheduled online by September 1
With current high hydro conditions	~ 200 MW Surplus	~ 2300 MW Surplus
With average hydro conditions	~ 1100 MW Shortfall	~ 960 MW Surplus

There was an estimated **1,700 MW capacity shortfall** in 2022 to meet the planning target

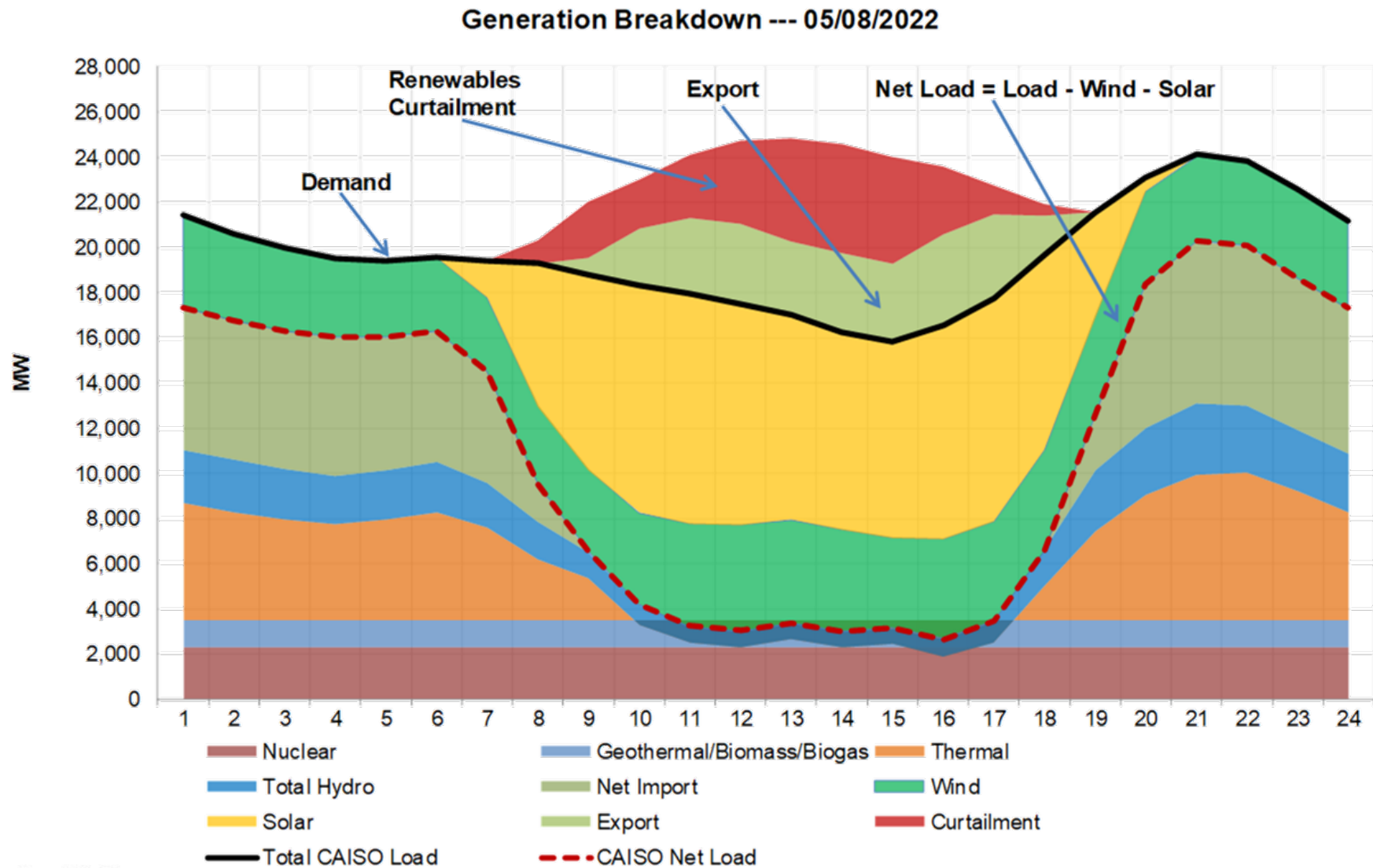
Peak load analysis also shows a significant improvement over 2022 in meeting operating reserves at peak load

September 2022 and 2023 base case and sensitivities at 8 pm on peak day (MW) – No Solar

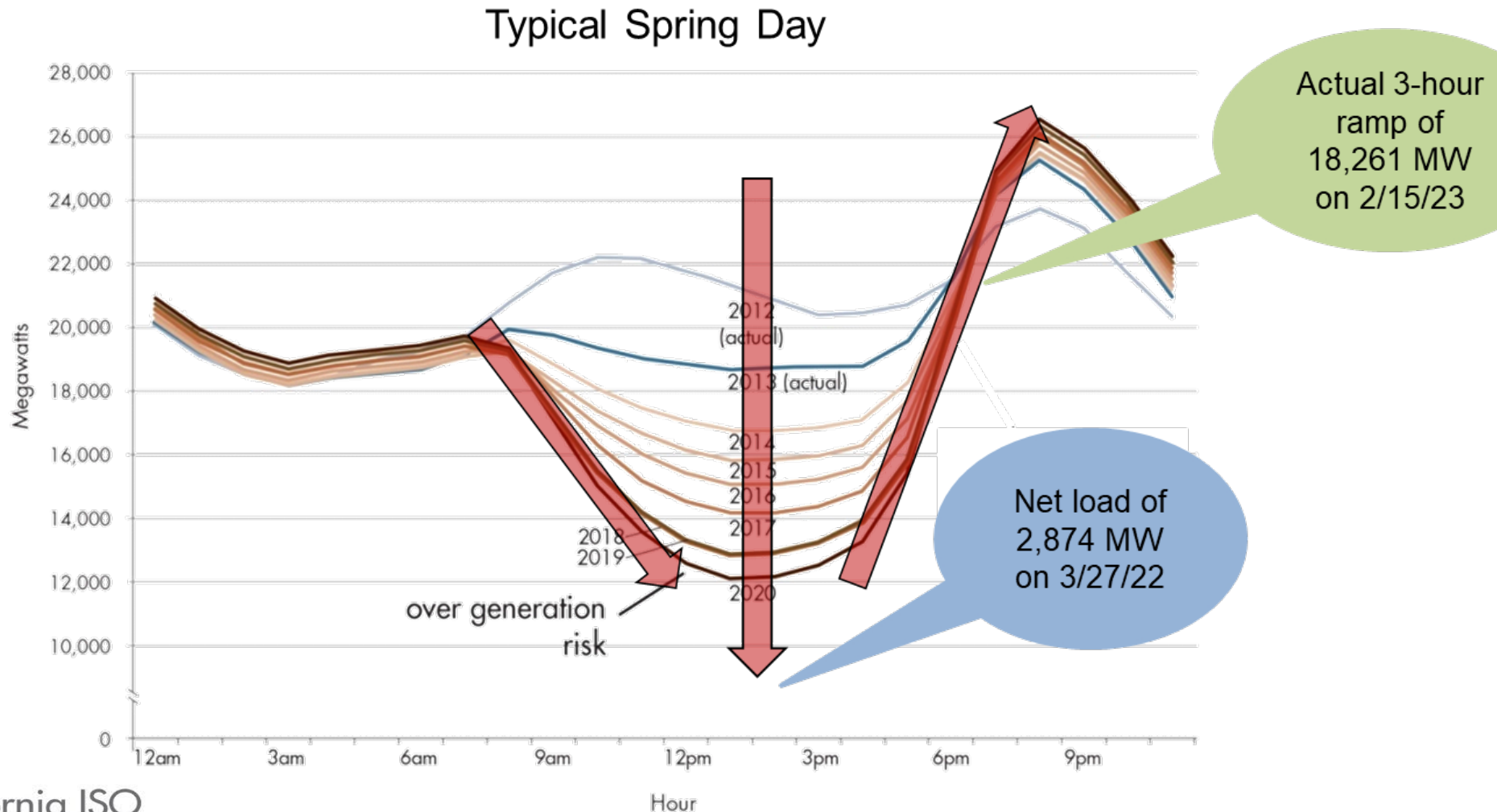


An 18.5% reserve margin is needed to meet reserve requirements and allowances for forced outages and to accommodate a 1-in-5 load level.

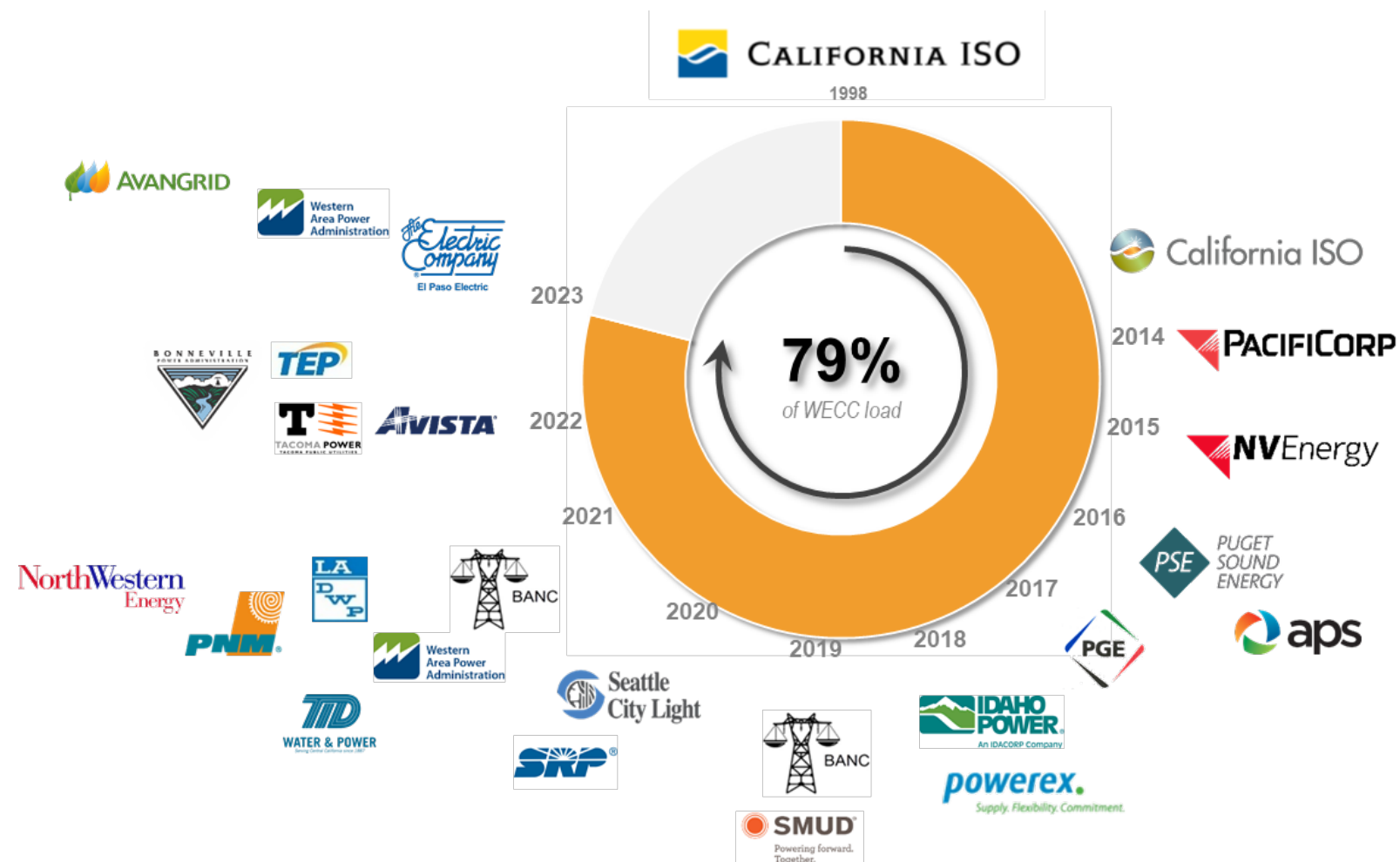
Non-carbon resources grow to meet 119.6 percent of load plus exports



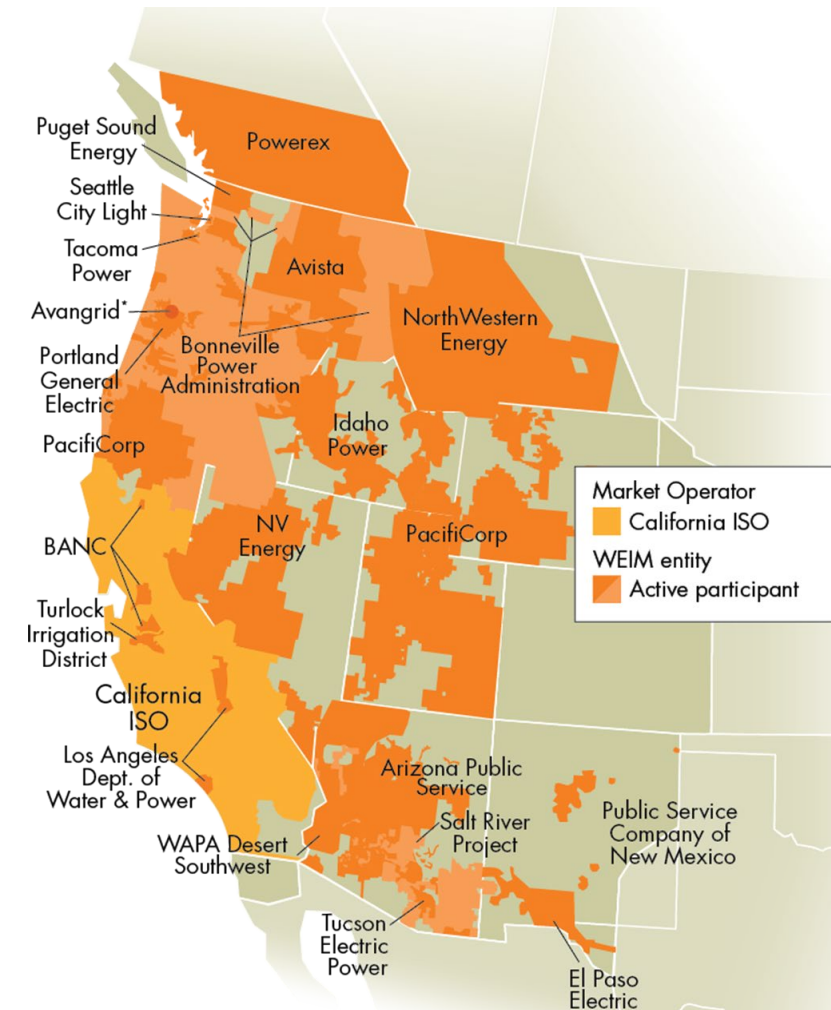
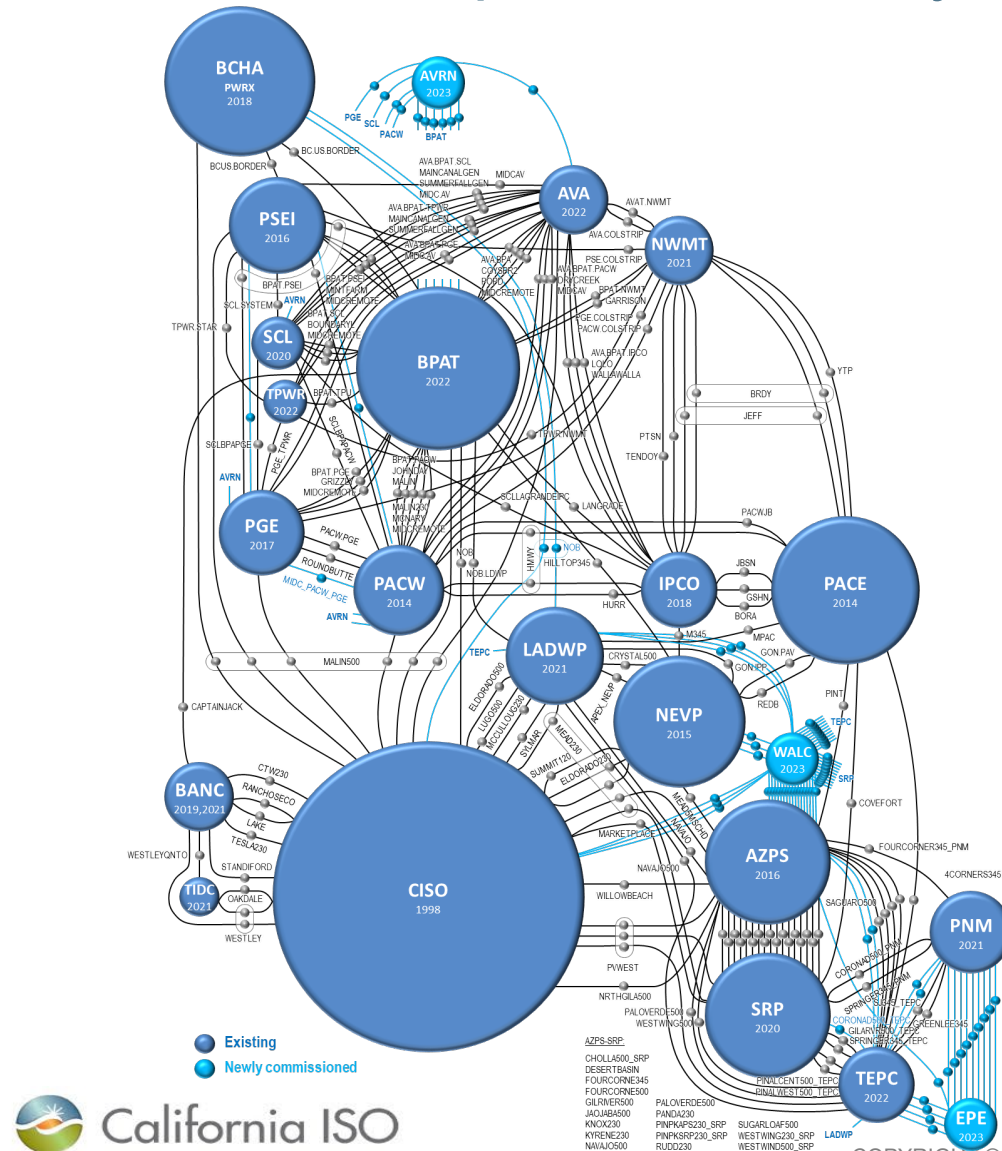
The actual net load and 3-hour ramps are years ahead of the ISO's original estimate primarily due to under forecasting rooftop solar PV installation



WEIM Implementation Status



WEIM transfer paths and entity map 2023



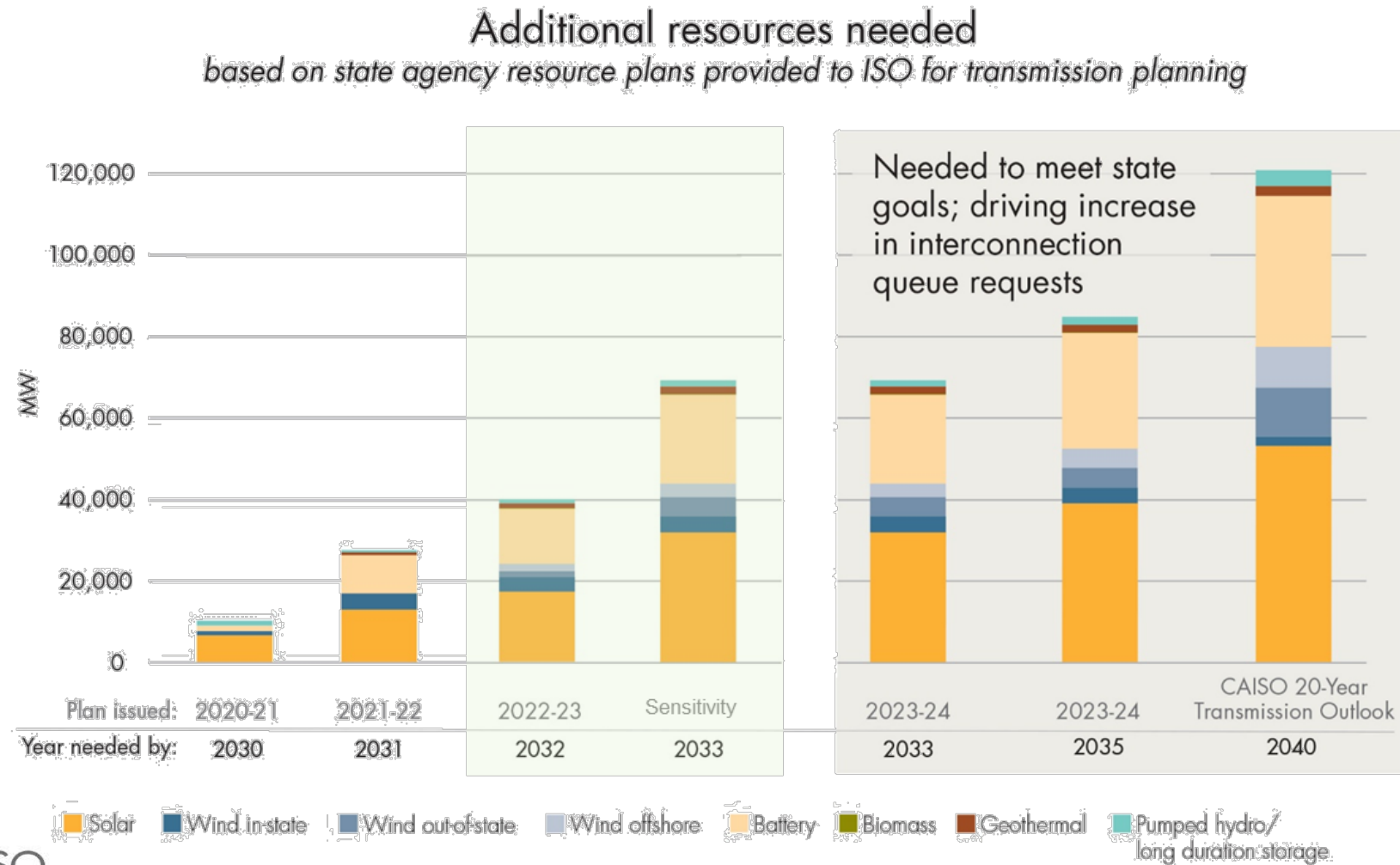
*Avangrid office; generation-only BAA with distribution across multiple states.
Map boundaries are approximate and for illustrative purposes only.

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Page 15

California's climate change goals and escalating load forecasts lead to unprecedented resource needs



2022-2023 draft transmission plan uses a zonal approach which enables clear direction and prioritization

