California State Assembly

UTILITIES AND ENERGY

COTTIE PETRIE-NORRIS
CHAIR

Wednesday, May 8th, 2024
1:30 p.m. – Swing Space, Room 1100

OVERSIGHT HEARING

Reliability in the Near- and Mid-Term

California's energy system runs reliably without issue most days. The state also has adequate backup assets to provide energy during extreme events, which now includes resources directly owned or contracted for by the state. However, during a small number of hours, during increasingly historic heat events – when demand for electricity soars and available supply may be impacted – electric reliability may be compromised. These reliability concerns prove especially challenging if multiple extreme events coincide, such as a heat event occurring alongside a drought or wildfire.

In 2020, two extreme heatwaves impacted the western United States and strained electric system operations in California.[1] One of the heatwaves resulted in two days (August 14-15) of rotating outages in the California Independent System Operator (CAISO) territory in the hours of 6-9 p.m. The outages were the result of a roughly 500 megawatt (MW) shortfall, and marked the first time in nearly 20 years that such rotating outages occurred in California.[2] In 2021, in the midst of a western heat wave,[3] the Bootleg fire in Southern Oregon compromised a transmission line coming into California, reducing the amount of imported electricity by about 3,000 MW. As California relies on imports to meet anywhere between 20-30% of power needs, the loss of this asset on top of the forecasted heatwave led to very tight grid conditions from July 9-11, 2021. Fortunately, no rotating outages were called. In 2022, the state experienced record high temperatures between August 31 and September 9.[4] On September 6, 2022, CAISO's system demand exceeded 52,000 MW, setting an all-time

[1] Berardelli, Jeff, "Another record-breaking heat wave is building in the West," CBS News, September 3, 2020; https://www.cbsnews.com/news/labor-day-weekend-heat-wave-forcast-western-united-states/
[2] Pg. 3, CAISO, CPUC, and CEC; "Preliminary Root Cause Analysis: Mid-August 2020 Heat Storm"; October 6, 2020; http://www.caiso.com/Documents/Preliminary-Root-Cause-Analysis-Rotating-Outages-August-2020.pdf
[3] White, R., et al.; "The unprecedented Pacific Northwest heatwave of June 2021;" *Nature Communications*, **14**, 727 (2023).
[4] Powell, M. and Hubler, S., "California swelters through a Labor Day heat wave, stretching its electricity resources." *New York Times*, September 5, 2022; https://www.nytimes.com/2022/09/05/us/california-heat-wave-record-labor-day.html

record.[5] This demand was nearly 2,000 MW higher than the previous record, despite significant efforts to conserve during this peak period.[6] Many cite a statewide emergency alert sent to 27 million Californians at 5:48 p.m. by the Governor's Office of Emergency Services as the final tool that prevented rotating outages from being called that day.[7] The text alert was unexpected and unprecedented, but did seemingly result in almost 1,200 MW of demand reduction in five minutes.[8]

Last year, during a period of promising hydroelectric conditions and adequate reserve margins, the state experienced two grid constraint conditions: an Energy Emergency Alert 1 (EEA) on July 20 in the CAISO, and two EEA Watches on July 25 and July 26 in the CAISO and Imperial Irrigation District balancing areas, respectively.[9] In both circumstances heat events and higher than expected demand resulted in grid conditions where all supply resources were in use and energy deficiencies were anticipated.[10] The EEA1 lasted approximately an hour, with no further concern arising. However, after these last four summers of tight grid events, conditions once considered *extreme* have begun to be routine. California's energy planners maintain the grid with enough reserves to approximately cover an event so extreme it impacts conditions once every 10 years.[11] Yet these events have become an annual expectation every summer, raising the need to reassess the state's emergency planning.

Throughout this time the Legislature, in collaboration with the Newsom Administration, adopted several measures to buttress California's electricity supply against extreme events. These measures included the creation of the Electricity Supply Strategic Reliability Reserve Program (ESSRRP) at the Department of Water Resources (DWR), the Demand Side Grid Support (DSGS) Program and the Distributed Electricity Backup Assets (DEBA) Program at the CEC, and the authorized extension of the operating life of Diablo Canyon Power Plant (DCPP) through 2030.[12] The Legislature also tasked the CEC to develop a $1 billion Clean Energy Reliability Investment Plan (CERIP) to support investments that address near- and

[5] Jenna Cohen, "California's electricity demand breaks all-time record during severe heat wave," *PBS News Hour*, September 9, 2022; https://www.pbs.org/newshour/nation/californias-electricity-demand-breaks-all-time-record-during-severe-heat-wave#:~:text=Tuesday's%20peak%20demand%20set%20an,Graphic%20by%20Jenna%20Cohen.

[6] For context the peak in 2020 was 47,121 MW; for 2021 it was 43,982 MW -- CPUC Press Release, "CPUC Ensures Electricity Reliability During Extreme Weather for Summers 2022 and 2023," December 2, 2021. https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-ensures-electricity-reliability-during-extreme-weather-for-summers-2022-and-2023

[7] Justine Calma, 'Why a text alert might have helped California keep the lights on," *The Verge*, September 7, 2022; https://www.theverge.com/2022/9/7/23340821/california-electricity-grid-power-outage-text-phone-alert.

[8] Murtaugh, D. and Eckhouse, B., "A Text Alert May Have Saved California From Power Blackouts," *Bloomberg*, September 6, 2022, https://www.bloomberg.com/news/articles/2022-09-07/a-text-alert-may-have-saved-california-from-power-blackouts?leadSource=uverify%20wall

[9] CAISO News Release, "Energy Emergency Alert (EEA) 1 declared and ended." July 20, 2023; http://www.caiso.com/Documents/energy-emergency-alert-eea-1-declared-and-ended.pdf

[10] https://www.caiso.com/Documents/Emergency-Notifications-Fact-Sheet.pdf

[11] A 1 event in 10 year loss of load expectation, or "0.1 LOLE."

[12] ESSRRP, DSGS, and DEBA were created under AB 205 (Committee on Budget, Chapter 61, Statutes of 2022), AB 178 (Ting, Budget Act of 2022, Chapter 45, Statutes of 2022), and AB 180 (Ting, Budget Act of 2021, Chapter 44, Statutes of 2022); Diablo Canyon was authorized under SB 846 (Dodd, Chapter 239, Statutes of 2022).

mid-term reliability,[13] and authorized DWR to act as a Central Procurement Entity to purchase long lead-time resources.[14]

The California Public Utilities Commission (CPUC), beginning in 2019, also took extraordinary action, issuing procurement orders on top of their integrated resource planning (IRP) process, due to the urgent nature of the procurement need. In total, the CPUC has called for 3.3 gigawatts (GWs) to incrementally come online from 2021-2023[15] and 11.5 GWs to come online from 2023-2026.[16] Recently the CPUC called for an additional 4 GW to come online from 2026-2027.[17] However these measures are emergency efforts, and establish either temporary programs or procurement processes outside the norm. To the committee's knowledge, a holistic assessment of statewide reliability planning has yet to be completed.

Looking ahead to summer 2024, many of the analyses of grid conditions are forthcoming, with the CAISO Summer Loads and Resource Assessment soon-to-be published. Even without these assessments, the outlook seems promising. The above average water conditions this winter have led to promising hydroelectric conditions.[18] The state also has over 10 GWs of battery storage today, a 1,250% increase since 2019.[19] New resources are anticipated to come online prior to the summer, increasing the energy capacity in excess of demand and reserve requirements.

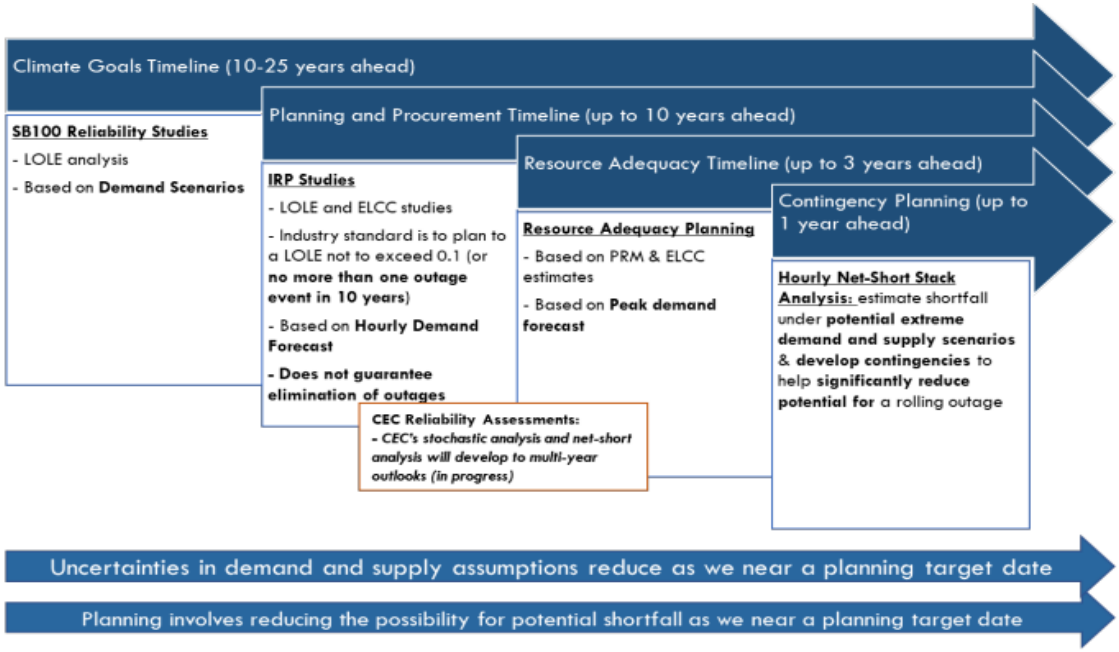
The purpose of this hearing is to receive an update from the state's energy entities prior to summer 2024 on the anticipated grid conditions and the state's readiness to meet those conditions. However, its focus will not be limited to this summer alone. Rather, energy entities will also report on efforts to address reliability in the mid-years – approximately 2-5 years out – to ensure we're adequately planning today for unanticipated events tomorrow. This hearing will also provide an opportunity, alongside efforts in the Assembly Committee on Budget, to receive updates on program implementation for many of the energy actions adopted during past legislative session.

Current Statewide Resource Planning – the Integrated Resource Plans (IRP), SB 100, the Integrated Energy Policy Report (IEPR), and the Resource Adequacy (RA) Program. California has a complicated but robust electric planning and procurement regime spread across the CPUC, CEC, and CAISO. This regime guides the current procurement the load-serving entities (LSEs) conduct, and informs short-, mid-, and long-term procurement strategies. The regime is intended to be complementary, where one resource may count toward meeting many facets of an LSE's procurement requirements and planning goals. This is reflected in how these resources are served up in the market for LSEs to meet their

[13] SB 846 (Dodd, Chapter 239, Statutes of 2022)
[14] AB 1373 (E. Garcia, Chapter 367, Statutes of 2023)
[15] D. 19-11-016, CPUC, *Decision Requiring Electric System Reliability Procurement for 2021-2023*, R. 16-02-007, November 7, 2019.
[16] D. 21-06-035, CPUC, *Decision Requiring Procurement to Address Mid-term Reliability (2023-2026)*, R. 20-05-003, June 24, 2021.
[17] D. 23-02-040, CPUC, *Decision Ordering Supplemental Mid-term Reliability Procurement (2026-2027) and Transmitting Electric Resource Portfolios to California Independent System Operator for 2023-2024 Transmission Planning Process*, R. 20-05-003, February 23, 2023.
[18] California Water Watch. Reservoir levels 119% of average; statewide snowpack 66% of average peak; assess on May 6, 2024. https://cww.water.ca.gov/
[19] Governor Newsom's Press Release; "California Achieves Major Clean Energy Victory: 10,0000 Megawatts of Battery Storage," April 25, 2024.

practical and legal requirements, and the manner in which each power producing resource can provide multiple services (e.g., units of energy, units of capacity, units of clean, etc.) As shown in Figure 1 below, the main pieces of the regime are the IRP, the related SB 100 Report, the IEPR, and RA.

Figure 1: Resource planning across the energy agencies with associated timelines. Source: CEC.[20]



The IRP (mid- to long-term procurement) – Since 2015, with the passage of SB 350 (De León, Chapter 547, Statutes of 2015), California regulators have worked to identify a diverse mix of resources to achieve our clean energy goals. SB 350 requires the CPUC to adopt a process for each LSE to file an IRP starting in 2017 and for each publicly-owned utility (POU) to file an IRP by January 1, 2019. The goal of the IRP is to reduce the cost of achieving greenhouse gas (GHG) emission reductions by looking broadly at system needs, rather than at individual LSEs or resource types, in order to identify generation that reduces GHGs, improves reliability, avoids shuffling resources around, and reduces overall cost. Compliance with the Renewables Portfolio Standard (RPS) program occurs separately, but in concert with, the resource mixes selected by LSEs' IRP filings. The renewables procurement that the RPS requires occurs on three-year compliance periods, ratcheting up to the 60% RPS requirement in 2030. Beyond 2030, LSEs must continue increasing the remaining balance of their portfolios that is zero-carbon to meet the final, 2045 100% zero-carbon electricity requirement.

The IRP operates on a 2-year planning cycle, and forecasts system need over a decade into the future. The most recent IRP analysis identified almost 56 GW of new resources needed by 2035,[21] arising from a mix of geothermal, biomass, land-based wind, offshore wind, solar,

[20] Pg. 3, Hannah Craig, CEC, "Summer Stack Analysis for 2022-2026" CEC Staff Paper, July 2022; file:///C:/Users/shybutla/Downloads/TN244116_20220719T115430_Staff%20Paper%20-%20Revised%20Summer%20Stack%20Analysis%20for%202022-2026%20(1).pdf

[21]25 MMT scenario resource stack; CPUC, *Decision Adopting 2023 Preferred System Plan and Related Matters, and Addressing Two Petitions for Modification,* D. 24-02-047; https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M525/K918/525918033.PDF

battery storage, pumped storage, and long duration storage.[22] This portfolio represents a more than 66% increase in 10 years of the current nameplate capacity on the system; an enormous goal.

SB 100 Report (long-term procurement planning) – While the IRP focuses on what energy mix is best suited to meet our GHG and reliability goals over a decade into the future, the Joint Agency SB 100 Report looks at a planning horizon two decades out to determine how best to implement the 100%-clean-electricity-by-2045 policy enacted under SB 100 (De León, Chapter 312, Statutes of 2018).[23] The first SB 100 report was finalized in March 2021, and included analyses of many pathways to achieve the state's 2045 clean energy goal.[24] The SB 100 Report will be updated every four years, with future work focused on system reliability,[25] among other considerations.

The IEPR (demand forecast) – Alongside the IRP and SB 100 Report, which focus on potential mid- and long-term procurement needs for the electricity system, the CEC conducts an IEPR to forecast all aspects of energy industry supply, production, transportation, delivery, distribution, demand, and pricing. The CEC is then required to use these assessments and forecasts to develop energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety. The CEC adopts an IEPR every two years with updates every other year. The information generated from the IEPR's demand forecast informs the IRP and RA processes at the CPUC. The most recent IEPR focuses on a 15-year planning horizon.

RA (short-term procurement) – Running concurrently with these planning streams is the RA compliance process at the CPUC and CAISO. While the IRP and SB 100 Report focus on potential future needs, RA is designed to identify resources needed to ensure reliability *today*. Following the California energy crisis of 2000-01, the Legislature enacted AB 380 (Nunez, Chapter 367, Statutes of 2005) to prevent future incidents of widespread blackouts and rolling brownouts due to lack of electricity, as well as to meet federal requirements for reliability planning. This statute established the RA program at the CPUC. The CPUC must work in consultation with the CAISO to establish RA requirements for all LSEs. The current RA program consists of three categories of requirements – system, local, and flexible capacity – for each month of a given year. System requirements are determined for each LSE based on the CEC's IEPR electricity forecast plus a 15% planning reserve margin (PRM).[26] Local requirements are determined based on an annual CAISO study using a 1-10 (once in ten years) weather year and an N-1-1 contingency.[27] The 1-10 standard is a common standard in electricity planning and is used by the Western Electricity Coordinating Council (WECC) as its reserve margin baseline, although California uses it more selectively in its reliability programs. Flexible requirements are based on an annual CAISO study that currently looks at

[22] Table 4, pg. 68; CPUC, D. 24-02-047; *Ibid.*
[23] CEC, CPUC, & CARB; *2021 SB 100 Joint Agency Report: Achieving 100 Percent Clean Electricity in California: An Initial Assessment*;" March 2021.
[24] Pg. 12, *2021 SB 100 Report.*
[25] Pg. 1, *2021 SB 100 Report.*
[26] The CPUC has recently adopted changes to RA, including increasing the planning reserve margin from 15% to 16% for 2023 and 17% for 2024, with the IOUs procuring between 21-22.5% for summers 2022 and 2023.
[27] N-1-1 Contingency: A sequence of events consisting of the initial loss of a single generator or transmission component (Primary Contingency), followed by system adjustments, followed by another loss of a single generator, or transmission component (Secondary Contingency).

the largest three-hour ramp for each month needed to run the system reliably. In October, LSEs must demonstrate that they have procured 90% of their system RA obligations for the five summer months (May-September) of the following year, as well as 100% of their local requirements, and 90% of their flexible requirements for each month of the coming compliance year. There is an additional monthly reporting requirement for RA, where LSEs must demonstrate they have procured 100% of their monthly system and flexible RA obligation.

The Safety Nets: CAISO backstop procurement and DWR's Strategic Reliability Reserve. Under Federal Energy Regulatory Commission (FERC) rules, the CAISO, like all other balancing authorities, must ensure system reliability or face penalties from FERC. When there is a failure to provide sufficient resources on the system, the CAISO is compelled to utilize centralized backstop procurement mechanisms in order to maintain electric system reliability. Centralized backstop procurement occurs when the CAISO contracts with a generator to address the observed shortfall. The CAISO has two mechanisms to do this: Reliability Must Run (RMR) and the Capacity Procurement Mechanism (CPM). A RMR asset is contracted one to two years in advance; while a CPM may be as soon as the month ahead. A resource receiving RMR designation must continue to operate and is compensated at a rate set by the CAISO, per FERC approved tariffs. RMR contracts can be expensive relative to procurement through the CPUC process, especially considering the limited operating parameters of the contracted resources. The use of RMR contracts declined after implementation of the CPUC's local RA program. For 2023, three powerplants made up the CAISO RMR resource portfolio. However, as of September 2023, the contracts for one of the 2023 facilities had been released with the remaining two pending.[28]

CPM can be used for resources that may be needed in the following year and where the resource is at risk of retirement. The CAISO did not utilize any CPM resources in 2023; the committee is unaware of the status of these resources for 2024. The CAISO did use the CPM tool during the summer of 2021, at the written request of the CPUC. Eight rounds of CPM designations were issued and more than 1,300 MWs of capacity were included. The procurement costs of both mechanisms are shouldered by ratepayers in the insufficient Local Capacity Area or by all ratepayers of the LSE(s) lacking the adequate RA.

In June 2022, AB 205 (Committee on Budget, Chapter 61, Statutes of 2022), AB 178 (Ting, Budget Act of 2022, Chapter 45, Statutes of 2022), and AB 180 (Ting, Budget Act of 2021, Chapter 44, Statutes of 2022) were signed into law. These three pieces of legislation collectively established the Strategic Reliability Reserve, which includes the ESSRRP at DWR, and DSGS and DEBA at the CEC. The ESSRRP set forth new responsibilities and activities for DWR, separate from the State Water Project, to procure – or even outright own and operate – energy resources to provide backstop reliability for the CAISO balancing area. These resources are meant to operate "outside" of CAISO's market, meaning they do not regularly schedule into the market, and only operate during grid emergency events, as specified. As of December 2023, DWR procured approximately 3.15 GW of generation

[28] Millar, Neil; "Decision on conditional approval to extend existing reliability must-run contracts for 2024," September 13, 2023;
http://www.caiso.com/Documents/DecisiononConditionalApprovaltoApproveReliabilityMust-RunContractsfor2024-Memo-Sep2023.pdf

facilities – either power generators or once-through cooling (OTC) powerplants – and 3.3 GW of imported firm energy,[29] with a combined budget of roughly $1.8 billion committed funds, of which $1.2 billion was for extending the operations of the OTC plants.[30] The imported firm energy procured by DWR were one-off resources for the summers of 2022 and 2023. The OTC plants procured by DWR are intended for use in 2024 through 2026. DWR also has purchased peaker units with 120 MW of capacity and fixed generator units with more than 140 MW of capacity, installed in various locations in the Sacramento and Central valleys.

Interestingly, some resources previously designated as CAISO RMR are now part of the ESSRRP.[31] Procurement of resources in the ESSRRP is currently paid by General Fund appropriations, and has run into the billions.[32] However, the longevity of such appropriation, and the longevity of the ESSRRP itself, remains a topic of ongoing discussion. Due to AB 1373 (E. Garcia, Chapter 367, Statutes of 2023), the CPUC and CEC are authorized to collect capacity payments from LSEs and POUs, respectively, who are deficient in their reliability procurement during the same month as the ESSRRP is utilized. These additional payments are meant to act as an incentive to utilities to be current on their reliability procurement, but also provide a financial boost to the ESSRRP, as the current budget outlook makes any future disbursement of state dollars unlikely.

Actions Taken to Address Reliability – Inside the Current Procurement Process. The regulatory framework of the IEPR, IRP (or long-term procurement planning, as it was previously known), and RA has been in place since the early 2000s, operating with relative stability. However, since that time, market fundamentals have changed to the point that it may be prudent for the energy agencies to re-evaluate the planning regime governing the market and the standards it uses. Some of these trends include increased market participants, increasing GHG goals, and increased capacity (RA) market tightness.

Following the 2020 rotating outages, the state energy entities issued a Joint Reliability Contingency Plan to address immediate actions that could be taken to ensure a reliable electric supply moving into summer 2021 and beyond.[33] These efforts included increased funding for the statewide Flex Alert, which is a media campaign to alert Californians to conserve electricity during net peak hours; establishing an Emergency Load Reduction Program (ELRP) at the CPUC to compensate customers for load reduction during an energy emergency; and squeezing extra power from existing thermal power plants or increasing imports, where possible, from California's POU balancing authorities. The contingency plan also outlined basic communication protocols between the various energy entities, their jurisdictional utilities and generators, and the public up to seven days prior to an emergency event.

[29] 202 MW represents total from both the 82MW from the ">5 MW" generator bucket and the 120MW from the State Power Augmentation Program.
[30] DWR, *Progress Report: Electricity Supply Reliability Reserve Fund*, December 2023.
[31] The 27.5 MW Channel Islands power was released in December 2022 from the RMR obligations, and now is listed as a 2023 resource in the SRR.
[32] Cornett, Sarah; LAO, *The 2023-24 Budget: Proposed Energy Policy Changes*, March 2023; https://lao.ca.gov/reports/2023/4735/Proposed-Energy-Policy-Changes-031023.pdf
[33] CEC, CPUC, and CAISO, "2021 Joint Agencies CAISO Balancing Authority Area Electric Reliability Contingency Plan," August 2021;

Aside from this contingency plan, the CPUC also took action to direct their jurisdictional entities (LSEs) to procure as much power, as quickly as possible. This included directed procurement orders in the IRP to address potential mid-term reliability shortfalls, but also increases to the LSE RA requirements to address short-term reliability challenges. In December 2021, the CPUC ordered Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E) to "meet a revised targeted procurement range of 2,000-3,000 MW for summers 2022 and 2023" resulting in "an effective PRM [for these 3 IOUs] of 20%-22.5%."[34] The remaining LSEs were held to the 15% PRM in 2021 and 2022. Any costs the IOUs incurred from exceeding their 15% PRM was socialized amongst all LSE ratepayers. According to the May 2024 RA Report, the CPUC-jurisdictional LSEs collectively met their system and local RA obligations for 2022.[35] The CPUC has previously reported to this committee that individual LSEs, however, were deficient in meeting their individual RA requirements by over 1,000 MW in 2022. Rather, it was the effective PRM of the IOUs that pushed this deficit to a surplus, exceeding the 15% PRM in aggregate.

In other words, the CPUC's ad hoc adjustment to the effective PRM eliminated the deficit. However it is unclear whether the resources the IOUs maintained or procured to meet their effective PRM were in excess, or if they prevented other LSEs from achieving their PRMs for that time.

In June 2022, the CPUC ordered the minimum PRM of all its jurisdictional LSEs to increase to 16% for 2023 and 17% for 2024.[36] This increased PRM across all LSEs does not change the higher "effective PRM" requirements of the IOUs; rather, "IOUs will continue to target the same MW totals for contingency resources, despite the change in LSE RA requirements."[37] It is unclear how LSEs unable (or unwilling) to meet their 2022 15% PRM will meet these higher targets for 2023 and 2024. It is also important to note that, in the balancing act between costs and uncertainty that is reliability planning, ratepayers pay all of the costs of capacity secured to meet the higher effective PRM.

These changes, alongside resource tightening western-wide given the extreme weather events, have led to a massive constriction in the RA market. LSEs have rushed, practically at any cost, to buy resources needed to meet RA obligations for the next few summers; and energy sellers have seemingly taken note. As shown in Figures 2 and 3 below, both system and local RA prices have been increasing significantly over the last few years, and are projected to be even higher for the coming summers.

[34] Pg. 161, Order Paragraph #3, D. 21-12-015, *Phase 2 Decision Directing PG&E, SCE, and SDG&E to Take Actions to Prepare for Potential Extreme Weather in the Summers of 2022 and 2023."* R. 20-11-003, December 6, 2021.
[35] Pg. 3; CPUC, *2022 Resource Adequacy Report*, May 2024; https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/resource-adequacy-homepage/2022-ra-report_05022024.pdf
[36] Pg. 125, Order Paragraphs #7 & #8, D. 22-06-050, *Decision Adopting Local Capacity Obligations for 2023-2025, Flexible Capacity Obligations for 2023, and Reform Track Framework,* R. 21-10-002, June 24, 2022.
[37] Pg. 22, D. 22-06-050, *Ibid.*

***Figure 2*:** Weighted Average Price of System RA ($/kW-month).[38]

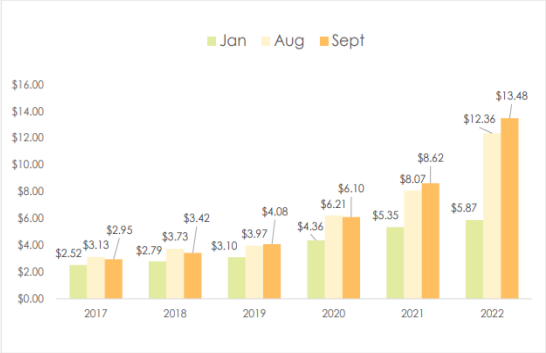
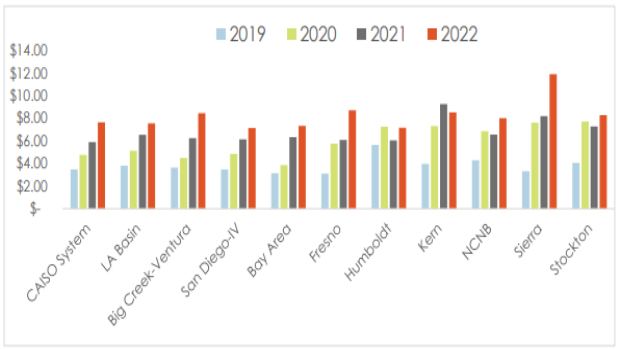


***Figure 3*:** Weighted Average Prices for Local RA ($/kW-month).[39]



These changes to the RA market are not isolated to the LSEs. The POUs have likewise raised concerns over their ability to procure RA. In a recent letter to the CEC, the California Municipal Utilities Association noted examples of POUs attempting to procure resources for the upcoming summer but receive no bids or only a single bid at an exorbitant price.[40]

Non-CPUC-jurisdictional LSEs do not necessarily tie their load forecasts to the CEC's IEPR load forecast, do not all have a 15% PRM, and do not file their RA plans with the CPUC. Without this information, it is unclear how the rest of these entities (which make up ~10% of the remaining load in CAISO) are performing.[41] As a result, AB 209 (Committee on Budget, Chapter 251, Statutes of 2022) established a process where POUs within CAISO collaborate with the CEC to "develop recommendations about approaches" to determine an appropriate minimum PRM for POUs. The CEC hosted a workshop in November 2023 to discuss RA, POU approaches to RA, and proposed options for setting PRM. No recommendations have been formalized to date, despite statute directing the recommendations be developed by December 31, 2023. In March 2024, the CEC opened a rulemaking related to the POU PRMs to establish the regulations for assessing and collecting capacity payments.

AB 1373 (E. Garcia, Chapter 367, Statutes of 2023) also required the CEC to issue a report by January 31, 2024 assessing whether each POU met its minimum PRM for 2023, and how that minimum PRM compared to the system RA requirements for LSEs. This report was issued in April 2024, and found that approximately half of the POUs within CAISO were short in their RA showings – relative to a 15% PRM – for July, August, and September 2023.[42] However, these net deficiencies made up only 0.64%, 0.66%, and 0.75% of total CAISO need for those months; the same months CPUC-jurisdictional LSEs procured up to 1% beyond their RA needs.[43] Similar to the impact of the effective PRMs of the IOUs on other LSE procurement, it is unclear whether the additional resources the CPUC-jurisdictional LSEs procured beyond their PRMs were necessary and helpful, or whether they prevented other LSEs from achieving their PRMs for that time.

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[38] Figure 4, pg. 30, CPUC, *2022 Resource Adequacy Report*, *Ibid.*
[39] Figure 5, pg. 31, *2022 Resource Adequacy Report*, *Ibid.*
[40] CMUA Letter to Siva Gunda, "AB 209 (2022) Planning Reserve Margin Process and Reliability," March 22, 2023.
[41] There are also POUs that act as their own balancing authority (e.g. Los Angeles Department of Water & Power) or are a member of a joint authority (e.g. Roseville Electric)
[42] CEC, *Assessment of Publicly Owned Utilities' Resource Adequacy: Assembly Bill 1373 Report*; April 2024; CEC-200-2024-004.
[43] Pg. 7, POU RA Assessment, *Ibid.*

For mid-term reliability, as updates to IEPR demand forecasting and IRP modeling assumptions evolved, the CPUC utilized the IRP proceeding to order new near- and mid-term resources, requiring all LSEs to bear some responsibility for their costs. Beginning in 2019, these procurement orders were issued outside the IRP cadence due to the urgent nature of the procurement need, and resulted in the CPUC calling for 3.3 GWs to incrementally come online from 2021-2023[44] and 11.5 GWs to come online from 2023-2026.[45] Recently the CPUC called for an additional 4 GW to come online from 2026-2027.[46] These orders call for the new resources to be classified as net qualifying capacity (NQC), so the IRP procurement will ensure RA eligibility for these new resource additions. Importantly, the 2021 mid-term order for 11.5 GWs specified certain resource attributes that must be procured, specifically calling for 1 GW of long-duration storage and 1 GW of firm resources, referred to as "long-lead time" resources.[47] However, in its 2023 IRP decision, the CPUC extended the delivery timeline for these long-lead time resources to 2028, citing potential delays for these projects.[48]

While these decisions mark an unprecedented level of procurement ordered by the CPUC, at 18.8 GWs over six years, they represent little more than half of the additional resources needed by 2030 to meet the adopted IRP system portfolio, which calls for approximately 37.7 GWs by the end of the decade.[49] Procurement is needed, urgently. But the procurement orders have raised concerns that the just-in-time, order-by-order approach leads to uncertainty for the LSEs, and presents the potential for the broader market to constrain further or increase costs, as LSEs rush to procure anything and everything to meet the targets. According to the CPUC, resources called for the meet the 2021-2022 requirements were online in time and in excess. As shown in Table 1 below, resources to meet the 2023 mid-term reliability obligations also show an excess of roughly 1 GW above the 2 GW obligation.[50] The vast majority of the resources procured to meet mid-term reliability obligations in each year showing have been hybrid (solar + battery) or standalone batteries.

[44] D. 19-11-016, CPUC, *Decision Requiring Electric System Reliability Procurement for 2021-2023*, R. 16-02-007, November 7, 2019.
[45] D. 21-06-035, CPUC, *Decision Requiring Procurement to Address Mid-term Reliability (2023-2026),* R. 20-05-003, June 24, 2021.
[46] D. 23-02-040, CPUC, *Decision Ordering Supplemental Mid-term Reliability Procurement (2026-2027) and Transmitting Electric Resource Portfolios to California Independent System Operator for 2023-2024 Transmission Planning Process*, R. 20-05-003, February 23, 2023.
[47] Not defined as such, but rather resources that must have no on-site emissions (or are RPS eligible), have at least an 80% capacity factor, and be available continuously during the evening peak and all weathers.
[48] D. 23-02-040, *Ibid.*
[49] Pg. 67, D. 24-02-047, *Ibid.*
[50] August 2023 Data Filings; CPUC ED Slide deck; "Summary of Compliance with IRP Order D.19-11-016 and Mid Term Reliability D. 21-06-035 Procurement."

Table 1: Mid-Term Reliability Procurement by LSE Type and Online Date. Numbers shown in red show a deficit relative to the LSE obligation.[51]

LSE Type	2023 Obligation	Claimed	2024 Ob.	Cl.	2025 Ob.	Cl.	2026 Ob.	Cl.	2027 Ob.	Cl.	Obligation 2028 (LLT resource)	Long-duration claimed	Firm zero-carbon claimed
CCA	621	936	2,476	2,914	2,939	3,952	3,610	4,365	4,282	4,486	620	361	270
ESP	193	440	773	627	919	639	1,104	706	1,289	706	126	0	0
IOU	1,188	1,602	4,750	4,322	5,642	5,722	6,785	5,859	7,929	5,859	1,087	0	0

This progress is positive and demonstrates a level of urgency for procurement not seen in decades, from both the CPUC and LSEs. Yet it is unclear how much these procurement orders will operate as a bridge – until the LSE IRPs can "catch up" to the identified system need – or the norm. Rather, the orders might indicate that the historic planning efforts of the energy agencies may be inadequate to meet our current needs.

Extraordinary Actions Taken to Address Reliability – Outside the Current Procurement Process. The 2022-23 budget package planned for $9.6 billion over five years for clean energy programs and reliability efforts, with the reliability efforts accounting for approximately $4.5 billion of that package.[52] Many programs in this package were scaled back in 2023, with some subject to cuts in the 2024 budget. A large share of this funding – $3.3 billion across five years – was for three programs intended to increase statewide electricity reliability. Together, the administration refers to these three programs as the "Strategic Reliability Reserve," (SRR) and they include the ESSRRP, DSGS, and DEBA. As described above, the SRR operates as the backstop for the backstop, with the LSEs' RA obligations providing the first line of defense against grid shortages.

As of December 2023, DWR had procured approximately 3.15 GW of generation facilities – either power generators or once-through cooling (OTC) powerplants – and 3.3 GW of imported firm energy for the ESSRRP.[53] The DSGS program, administered by the CEC, provides customer incentives to reduce net electricity load during extreme events. In the summer of 2022, utilities began enrolling participants in the program. The Administration reported in March 2023 that approximately 300 MW had been enrolled over the summer into the program.[54] Currently the program is undergoing proposed modifications at the CEC, to ensure scalability and bring cleaner resources into the SRR.[55] The DEBA program, also administered by the CEC, provides incentives for certain distributed energy resources that

[51] August 2023 Data Filings; CPUC ED Slide deck; *Ibid.*
[52] As reported by the Legislative Analyst's Office, based on numbers from October 19, 2022.
[53] 202 MW represents total from both the 82MW from the ">5 MW" generator bucket and the 120MW from the State Power Augmentation Program.
[54] Table 2, BCP DF-46 for Clean Energy Reliability Investment Plan, May 12, 2023.
[55] CEC Staff presentation, "DSGS Program Staff Workshop," April 26, 2023; file:///C:/Users/shybutla/Downloads/TN249895_20230427T122244_Presentation%20-%20April%2026,%202023%20DSGS%20Program%20Staff%20Workshop%20.pdf

can be used to support the state's electrical grid during extreme events. As of January 2024, the DEBA program had over $500 million in unspent, previously appropriated funds.[56] In April 2024, the CEC announced investment of $122 million in DEBA funds.

In addition to these budget actions, SB 846 (Dodd, Chapter 239, Statutes of 2022) authorized the extension of the Diablo Canyon Power Plant (DCPP) – which was scheduled to retire by 2025 – through 2030. Diablo Canyon is California's last remaining operational nuclear power plant, and the state has identified it as a valuable near-term source of zero-carbon energy during the transition to greater renewable resources. While the legislation authorized an extension, DCPP still has to receive required permits at the local, state, and federal levels in order to continue operations. Statute also directed the CEC to issue two analyses on the benefits of a DCPP extension: one comparing costs of keeping DCPP online relative to a portfolio of other resources;[57] and one identifying the need for DCPP to support reliability.[58] The reliability analysis was issued in March 2023 and concluded that it was "prudent for the state to pursue extension of DCPP through 2030 to mitigate the risks imposed by the dependence on an unprecedented speed and scale of development and of increased frequency and intensity of climate-driven extreme events."[59]

The second report was meant to "present a cost comparison of whether extended operations at the DCPP compared to a portfolio of other feasible resources available for calendar years 2024 to 2035,"[60] is consistent with energy sector GHG emission reduction goals. The analysis issued in May 2024, however, only looked at resources that could be online by 2025 – bizarre to evaluate resource additions that are given only a year to be procured – and that were not competitive with resources LSEs were procuring. The report ultimately found 725 MW of demand resources available by 2025, and concluded those would be insufficient to replace DCPP. It is unclear to committee why the CEC analysis ignored statute, and provided a cost comparison to procurement that bears no resemblance to the actual procurement ordered by the CPUC to replace DCPP.[61]

Finally, AB 1373 (E. Garcia, Chapter 367, Statutes of 2023) authorized the CPUC to request that DWR act as a central procurement entity (CPE) to conduct procurement of certain eligible long lead-time resources until January 1, 2035. Per statute, the CPUC is required to make an initial need determination for procurement by DWR by September 1, 2024. If a need is identified, the CPUC must make a request to DWR to exercise its CPE mechanism within six months. The CPUC must allocate the costs and benefits of any procurement conducted by DWR. The CPUC is in the early stages of the CPE evaluation, issuing a Ruling in late April.[62]

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[56] Budget Subcommittee #4 agenda, March 13th, 2024.
[57] Erne, David and Chie Hong Yee Yang. May 2024. *SB 846 Diablo Canyon Power Plant Extension Cost Comparison.* CEC. Pub #: CEC-200-2023-013-SF.
[58] Erne, David, Mark Kootstra. 2023. *Draft Diablo Canyon Nuclear Power Plant Extension – CEC Analysis of Need to Support Reliability.* CEC Pub #: CEC-200-2023-004.
[59] Pg. 3, CEC DCPP Reliability Analysis; *Ibid.*
[60] Public Resources Code Section 25233.2
[61] Per D. 21-06-035, pg. 44: "at least 2500 MW of resources procured by LSEs collectively, between 2023 and 2025, be from zero-emission resources that generate electricity, or generation resources paired with storage to replace DCPP." Resources "are expected to be largely incremental renewables paired with storage that can deliver continuous power at a minimum during 5 hours (5pm-10pm) everyday."
[62] CPUC, *ALJ Ruling Seeking Comments on Need and Process for Centralized Procurement of Specified Long Lead-time Resources*, R. 20-05-003; April 26, 2024.

Outlook for Summer 2024 and Beyond. Since the 2020 rotating outages the state energy entities, the Governor's office, and the Legislature have invested an enormous amount of funding and adopted numerous policy changes in an effort to ensure the electricity grid is able to withstand future extreme events. These efforts have occurred within a western electricity market that was already tightening due to reduced supply and increasing demand. *The outstanding questions for the Legislature to consider moving forward into summer 2024 are 1) whether these initiatives are adequate to ensure reliability, 2) how effective each reliability initiative was in 2023 as the Administration discusses its plan for 2024 and beyond, 3) how these efforts are impacting the electric utilities' ability to engage in the energy market, and 4) whether these efforts and expenditures reveal issues with existing state and federal reliability programs.*

Such direct state investment and procurement orders provide clear market signals that there is additional, long-term demand for electrical capacity in California, making additional resource build-out – especially for those resources qualifying for RA – almost a risk-free investment for developers. But such action may also create market contraction in the short-term, as new projects hit supply-chain or regulatory delays, granting the remaining available resources outsized market power and the leverage to offer exorbitant prices as has already been observed.

Ensuring California's electricity grid is reliable in the face of extreme weather events while also undergoing a clean energy transition will require the full effort and coordination among the state's energy entities. How these various initiatives interact to ensure reliability and stabilize the market remains for the energy entities to sort out. In the short-term, the early signals for the 2024 summer reliability outlook look positive. Even if summer 2024 proves to be well-resourced – given the enormous contingency efforts, accelerated procurement, heightened reserve requirements, and the positive hydro outlook – it will be important for the energy entities to review the broader impact of the reliability efforts and consider potential adjustments needed in the resource procurement regime to prevent a rushed process for resource procurement in future cycles and avoid inefficient and fiscally unsustainable uses of limited General Fund resources.

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