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Joint Agency Reliability Planning Assessment

SB 846 Combined Second and Third Quarterly Report 2024

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ABSTRACT

The *Joint Agency Reliability Planning Assessment* addresses requirements for electric system reliability reporting in Senate Bill 846 (Dodd, Chapter 239, Statutes of 2022). This report provides the 2024 combined second and third quarterly review of the supply forecast and risks to reliability in the California Independent System Operator territory for 2024 and includes an updated analysis for summer 2024.

Keywords: Reliability, Reliability Planning Assessment, Diablo Canyon, SB 846, California ISO, CEC, CPUC, California, electricity, supply and demand, extreme weather, electricity system planning, stack analysis, summer reliability, resource procurement

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EXECUTIVE SUMMARY

Senate Bill 846 (Dodd, Chapter 239, Statutes of 2022) mandated the California Energy Commission (CEC) and California Public Utilities Commission (CPUC) to develop and provide to the Legislature quarterly joint agency reliability planning assessments beginning on or before December 15, 2022. These assessments include updates on electric system demand and supply for the next 5- and 10-year period, as well as an assessment of electric system reliability under different risk scenarios. The report is also required to provide information on the status of new resources and any delays or barriers to the resources being available to support reliability.

This assessment is the second and third combined quarterly report of 2024 and provides an update to the May 2024 first quarterly *Joint Agency Reliability Planning Assessment* on the status of demand and electricity supply for summer 2024 for the California Independent System Operator (California ISO) balancing area. This report does not update the 5- and 10-year-forward projections of system reliability or provide any recommendations to the Legislature because the assumptions are not updated until the end of calendar year.

Projected system conditions for this summer have improved from the first to the third quarter as new resource projects continue to come online. For August and September, the analysis shows surplus capacity under average and extreme weather conditions, such as those witnessed in the 2020 heat wave (2020 equivalent event) and the 2022 heat wave (2022 equivalent event).

For September, improvements in supply build and system conditions led to an increase in the surplus of resources expected under average conditions, up to 4,700 megawatts (MW). Under a 2020 equivalent event, the September surplus is 2,200 MW. In a 2022 equivalent event, the September projected shortfall turns into a surplus of 655 MW. Under similar extreme conditions, this summer could likely be managed with contingency resources and additional real-time market procurements projected for July through September. However, if there is a coincident fire that impacts transmission assets and results in reduced electricity imported to the California ISO balancing area, the state could face up to a 4,000 MW loss of resources. Such an event could lead to the dispatch of contingency resources and calls for energy conservation measures across the state.

CHAPTER 1: Combined Second and Third Quarterly Report

Introduction

This report provides an update to reliability-related activities and developments since the May 2024 first quarterly *Joint Agency Reliability Planning Assessment*¹ was published. This report provides updates for topics required by Senate Bill 846 (Dodd, Chapter 239, Statutes of 2022) (SB 846).

Supply Forecast

New Megawatts Online Through May 2024

Throughout the state, over 20,000 MW of new nameplate capacity have come online from January 2020 to May 2024. In this year alone, as shown by Table 1, California continues to experience rapid growth in renewable resources, particularly solar photovoltaics (PV) and energy storage. In 2023 alone, over 5,000 MW of solar PV and energy storage nameplate capacity were added to the electric grid. The CPUC staff estimate that new generation and storage investments represent approximately \$7 billion in new infrastructure investment in California in 2022 and 2023.

This growth took place despite challenges outlined in previous reports including permitting, construction, and the interconnection processes. Increased transmission development, approved by the California ISO, should increase the amount of both in-state and out-of-state project development in the coming years.

1 CEC and CPUC May 2024 first quarterly [Joint Agency Reliability Planning Assessment](https://www.energy.ca.gov/publications/2024/joint-agency-reliability-planning-assessment-covering-requirements-sb-846-first) available at <https://www.energy.ca.gov/publications/2024/joint-agency-reliability-planning-assessment-covering-requirements-sb-846-first>

Table 1: New Resource Additions Since January 1, 2024

Technology Type	Nameplate Capacity (MW)	Estimated Sept. Net Qualifying Capacity (NQC) MW²	Number of Projects
	January 1, 2024-May 28, 2024	January 1, 2024-May 28, 2024	January 1, 2024-May 28, 2024
Storage	1,345	1,255	21
Solar	921	29	18
Hybrid (storage/solar)	153	95	2
Wind	230	0	1
Geothermal	0	0	0
Biomass, Biogas, Hydro	0.6	0	1
Subtotal Total New SB100 Resources, In-California ISO	2,650	1,379	43
Natural Gas, including Alamitos and Huntington Beach	0	0	0
Total New Resources, In-California ISO	2,650	1,379	43
New Imports, Pseudo-Tie or Dynamically Scheduled	0	0	0
Total New Resources, including Imports	2,650	1,379	43

Source: CPUC staff, California ISO data through May 2024

Note: Data shown here includes new resources added to the California ISO grid since the May 2024 first quarterly *Joint Agency Reliability Planning Assessment* that have been verified online in the California ISO Generator Interconnection Resource ID Report as of May 28, 2024. CEC resource stack assumptions include additional resources with 2024 Commercial Operations Dates that are not included in the California ISO Generator Interconnection Resource ID Report at this time.

Compliance with CPUC’s Procurement Orders

In April 2024, California Public Utilities Commission (CPUC) staff released the Summary of Compliance with Integrated Resource Planning (IRP) Order D.19-11-016 and Mid-Term Reliability (MTR) D.21-06-035 Procurement using the August 2023 data filing. All of the data released shows claimed procurement by load serving entities (LSEs) towards the MTR. A supplemental MTR Decision (D.23-02-040) was issued in March 2023, and procurement efforts by the LSEs are ongoing.

² New projects have not yet made it onto the CPUC’s monthly NQC list and have not yet been assigned NQC. Future quarterly SB 846 reports will include updated NQC amounts for these resources.

CPUC staff are monitoring LSE Procurement Progress with IRP Procurement orders. As of the August 1, 2023, CPUC IRP Compliance Filings, LSEs are reporting:

- 3,466 MW net qualifying capacity³ (NQC) of total new procurement (validated by CPUC staff as online by August 1, 2023), collectively exceeding the D.19-11-016 3,300 MW procurement obligation.
- 2,978 MW NQC eligible for IRP procurement orders (validated by CPUC staff as online by August 1, 2023), collectively exceeding the 2,000 MW of MTR Tranche 1 Obligation.
- 11,052 MW NQC of procurement as under contract and forecasted to be online by June 1, 2027, as progress towards the 13,500 MW NQC MTR and supplemental MTR procurement order.

More comprehensive information about compliance with IRP procurement orders can be found in the CPUC's report.⁴

Estimates of Planned Resources

This section updates the estimated new capacity under contract to CPUC-jurisdictional LSEs through 2027. Tables 2 through 5 include resources being developed for compliance with IRP procurement orders as well as procurement for LSE compliance with Renewables Portfolio Standard and procurement the CPUC approved in the Emergency Reliability proceeding.

All totals provided below represent the cumulative LSE-reported September NQC under contract to CPUC-jurisdictional LSEs. The data underlying the expected projects can be challenging to track due to:

- Changes in project names throughout the lifecycle of project development.
- Frequent on-line date changes that can be reported on differently in different data sets
- Multiple load-serving entities can contract as off-takers for each project.
- Different on-line dates for different phases of a project.
- Projects with multiple technologies at the same site in various configurations.
- Projects with changes to project sizing, or initial phases that are subsets of the total project size.
- Projects with a single interconnection queue position can result in multiple project resource identification numbers, once they come on-line with interconnection at the California ISO (i.e., each California ISO queue position can have multiple California ISO resources IDs).
- Projects can be developed and interconnected via either wholesale interconnection tariffs governed by California ISO interconnection tariffs (known as Large Generator

3 NQC values listed for compliance with IRP procurement orders are based on IRP's effective load carrying capabilities (ELCCs). More information about ELCCs for use in IRP's Procurement Track are available here: <https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/more-information-on-authorizing-procurement/irp-procurement-track>

4 [Summary of Compliance with Integrated Resource Planning \(IRP\) Order D.19-11-016 and Mid Term Reliability \(MTR\) D.21-06-035 Procurement](https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/publicirpcomplianceport080123.pdf), available at <https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/publicirpcomplianceport080123.pdf>

Interconnection Agreements) or wholesale interconnection tariffs governed by distribution utility tariffs (known as Wholesale Distribution Access Tariffs)

LSE procurement is ongoing to meet CPUC IRP procurement orders; some of the existing contracts will be delayed, and other contracts will be added, which is consistent with the cycle of energy project development. The CPUC staff emphasizes that Tables 2 through 5 represent resources known to be under contract to CPUC-jurisdictional LSEs between 2023 and 2027, as of March 2024. Tables 2 through 5 do not comprehensively track all new MW already on-line and, instead, track CPUC Jurisdictional LSEs' reporting of their contracts that came online in 2023 and are forecasted to come online through 2027, inclusive of procurement beyond the scope of IRP. Since the May 2024 first quarterly *Joint Agency Reliability Planning Assessment* was released, the CPUC is reporting more expected MW as its jurisdictional LSEs continue to sign additional contracts to meet IRP procurement orders. These totals are subject to change as the CPUC receives new data from LSEs, conducts field calls with developers and investor-owned utility (IOU) interconnection departments, and continues to evaluate the data.

Table 2: Estimated September NQC⁵ (MW) by Transmission Access Charge (TAC) Area 2024 through 2025

TAC Area	2024 Q1	2024 Q2	2024 Q3	2024 Q4	2025 Q1	2025 Q2	2025 Q3	2025 Q4
East-Central	1,917	3,706	4,294	4,687	5,129	5,322	5,340	5,340
North	1,070	1,836	1,933	1,967	2,377	2,870	3,035	3,035
South	120	224	275	275	689	806	920	920
Other	411	815	815	853	853	1,738	1,903	1,952
Total	3,518	6,580	7,317	7,782	9,048	10,736	11,198	11,247

Source: CPUC Staff Aggregation of March 2024 LSEs' Procurement Status Reports

Table 3: Estimated September NQC (MW) by TAC Area 2026 through 2027

TAC Area	2026 Q1	2026 Q2	2026 Q3	2026 Q4	2027 Q1	2027 Q2	2027 Q3	2027 Q4
East Central	5,601	6,762	6,762	6,762	6,762	7,255	7,255	7,255
North	3,186	3,597	3,600	3,667	3,667	4,007	4,007	4,007
South	920	970	970	1,029	1,029	1,029	1,029	1,029
Other	2,038	2,547	2,575	2,834	2,834	2,884	3,334	3,340

5 Values here also represent NQC per IRP's Procurement Track ELCCs. More information is available here: <https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/more-information-on-authorizing-procurement/irp-procurement-track>.

TAC Area	2026 Q1	2026 Q2	2026 Q3	2026 Q4	2027 Q1	2027 Q2	2027 Q3	2027 Q4
Total	11,745	13,876	13,907	14,291	14,291	15,175	15,625	15,630

Source: CPUC Staff Aggregation of March 2024 LSEs' Procurement Status Reports

Table 4: Estimated September NQC (MW) by Resource Type 2024 through 2025

Resource Type	2024 Q1	2024 Q2	2024 Q3	2024 Q4	2025 Q1	2025 Q2	2025 Q3	2025 Q4
Solar	214	299	304	323	326	361	361	361
Battery	2,089	4,371	5,082	5,239	6,260	7,622	7,787	7,787
Paired/hybrid	1,123	1,812	1,820	2,103	2,345	2,624	2,899	2,927
Wind	64	64	64	64	64	64	64	64
Geothermal	21	28	28	28	28	38	57	87
Biomass/biogas	21	28	28	28	28	38	57	78
Total	3,518	6,580	7,317	7,782	9,048	10,736	11,198	11,247

Source: CPUC Staff Aggregation of March 2024 LSEs' Procurement Status Reports

Table 5. Estimated September NQC (MW) by Resource Type 2026 through 2027

Resource Type	2026 Q1	2026 Q2	2026 Q3	2026 Q4	2027 Q1	2027 Q2	2027 Q3	2027 Q4
Solar	363	363	363	363	363	363	363	363
Battery	7,981	9,871	9,871	9,938	9,938	10,640	11,090	11,090
Paired/hybrid	3,143	3,243	3,245	3,304	3,304	3,334	3,334	3,334
Wind	64	157	186	374	374	424	424	424
Geothermal	163	212	212	282	282	382	382	388
Biomass/biogas	31	31	31	31	31	31	31	31
Total	11,745	13,876	13,907	14,291	14,291	15,175	15,625	15,630

Source: CPUC Staff Aggregation of March 2024 LSEs' Procurement Status Reports

CPUC Rulemaking (R.23-01-007) Related to the Diablo Canyon Power Plant Extension

On January 12, 2023, the CPUC adopted Order Instituting Rulemaking (R.) 23-01-007 to implement the provisions of SB 846. In August 2023, the CPUC approved Decision D.23-08-004 for Phase 1, Track 1 of R.23-01-007, addressing funding issues for the Diablo Canyon Independent Safety Committee (DCISC). Ongoing SB 846-related items in the rulemaking include the following:

- In February 2024, Phase 2 of R.23-01-007 commenced during which the CPUC will consider whether Pacific Gas and Electric (PG&E) should:
 - provide upfront reasonable manager showings for CPUC review and approval.⁶
 - determine the process for Diablo Canyon Power Plant (DCPP) cost review and true-up to actual costs and market revenues for the prior year.
 - establish the process for submittal and review of an annual compensation report and spending plan.
- On February 21 and 22, 2024, the DCISC held its first meeting of the year at which it reviewed DCPP safety, seismic, and operational issues, and presented on their fact-finding efforts. The Fact-Finding Report and informational presentations can be downloaded from the DCISC webpage.⁷ Some of the key conclusions from the report are:
 - DCPP's Refueling Outage 1R24 was successfully performed. All planned scope of work was completed, and all performance goals were met except for radiation dose and post-outage reliability. The DCISC should follow up on reviewing the causes and corrective actions for Maintenance Outage 1X25 (Pressurizer Safety Valve repair) which occurred about one month after the end of the Refueling Outage.
 - The DCPP team successfully completed a total of approximately 182 Aging Management Program inspections during Refueling Outage 1R24 in support of license renewal. Overall, there were no findings of aging-related challenges to any structure, system or component's ability to perform its intended functions. The DCISC considered these results to be an indicator of excellent performance and a strong assurance of continued safety during a period of extended operations.

PG&E provided information on past Unit 1 Reactor Vessel weld inspection results along with answers to questions related to vessel embrittlement. The DCPP team was unable to withdraw the Capsule B weld material specimen from the Unit 1 Reactor Vessel during Refueling Outage 1R24 due to tool fitment problems. The DCPP team will retry this procedure and other approaches in Refueling Outage 1R25 with the Reactor Vessel core barrel removed, which should enable better access. The DCISC's evaluations of Unit 1's Reactor Pressure Vessel embrittlement is ongoing and will be completed at a future Public Meeting. The DCISC has

⁶ Upfront reasonable manager showings mean the utility's procurement expenses are found to be reasonable before incurring the costs rather than after. Typically this looks like establishing regulatory (balancing accounts) that have a revenue requirement approved through a proceeding on a forecast basis.

⁷ [Past Public Meetings](https://www.dcisc.org/event-public-meeting_43.htm). Available here: https://www.dcisc.org/event-public-meeting_43.htm

published two embrittlement reports and presented the information in two public meetings while accepting and addressing public comments. The DCISC has indicated it will likely vote on whether to endorse the report's conclusions at their October 2024 public meeting. Additionally, the NRC Atomic Safety and Licensing Board considered a petition for hearing on the topic of embrittlement from San Luis Obispo Mothers for Peace, Friends of the Earth, and Environmental Working Group. On July 3, 2024, the NRC Administrative Judges concluded that embrittlement testing was in line with NRC regulations, denying the request for hearing and terminating the proceeding. On March 29, 2024, PG&E filed Application (A.)24-03-018⁸, its first DCPD Extended Operations Cost Forecast application with the CPUC, as ordered in D.23-12-036.

- The Nuclear Regulatory Commission continues its review of PG&E’s license renewal application for DCPD.
- On May 30, 2024, the Diablo Canyon Independent Peer Review Panel met to discuss the findings of geological studies done on the faults around Diablo Canyon.

Tracking Project Development

The Tracking Energy Development (TED) Task Force, comprised of the CEC, CPUC, Governor’s Office of Business Development (GO-Biz) and California ISO, continues to track energy projects under development and help to navigate challenges and barriers where appropriate. Table 6 lists the TED Task Force tracking efforts and its frequency.

Table 6: TED Task Force Tracking Efforts and Frequencies

Frequency	Action
Ongoing	TED Task Force conducts outreach to developers with many projects under development to review status of projects and issues, if any.
Ongoing	Ad-hoc meeting with developers and others about specific project challenges.
Weekly	TED Task Force meets weekly to review issues, developer requests for assistance and provide updates.
Monthly	CPUC receives and compiles submitted data from LSEs on resources under contract for the near-term.
Monthly	CPUC compiles data on new MW online.
Monthly	CPUC hold calls with investor-owned utility interconnection teams to review projects, pinpoint discrepancies, and identify operational areas for improvement.
Quarterly	TED Task Force provides updates to Joint Agency Reliability Planning Assessments.
Biannual	California ISO, in conjunction with CPUC, hosts the Transmission Development Forum to provide status updates and discuss delays to transmission projects, including network upgrades.

Source: GO-Biz

⁸ [Application of Pacific Gas and Electric Company to Recover in Customer Rates the Costs to Support Extended Operations of Diablo Canyon Power Plant From September 1, 2023, Through December 31, 2025, and for Approval of Planned Expenditure of 2025 Volumetric Performance Fees.](https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M528/K454/528454317.PDF) Available at <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M528/K454/528454317.PDF>

In the first quarter of 2024, 19 renewable energy projects totaling 1,188 MW were added to the California grid. The TED Task Force is working to assist more projects to come online timely to support the state’s energy reliability needs. With improved coordination amongst member agencies, the TED Task Force has increased engagement with renewable energy project developers as well as other stakeholders including utility companies and permitting agencies. This has allowed the TED Task Force to monitor and understand the successes and challenges experienced throughout project development. The major barriers to energy project deployment remain the same as previously reported: supply chain challenges, interconnection issues (including network upgrades), and permitting challenges. These issues are complex, interrelated, and cannot be resolved with a single solution. Recent activities that members of the TED Task Force have taken, individually or collectively, to help address some of these issues are outlined below.

Leveraging Federal Funding to Accelerate Energy Project Development

The passage of the federal Inflation Reduction Act of 2022 and the Infrastructure Investment and Jobs Act provided billions of dollars for clean energy projects and climate initiatives over the next 10 years, including projects to modernize the grid, improve energy efficiency, speed up the interconnection process and increase transmission capacity.

Most of these funds are available through a competitive application process. In January 2022, CPUC President Alice Reynolds sent a letter to the utilities in California encouraging them to apply for suitable federal funding opportunities that will advance innovative approaches to reduce the cost of energy.⁹

Further, GO-Biz assisted many businesses and organizations into securing federal funds by providing support letters. When appropriate, members of the TED Task Force partnered with private entities to directly apply for funding of critical projects that will assist with improvements and address the issues that regularly plague deployment of utility-scale energy projects.

In April 2024, TED Task Force members worked with utility partners to apply for funds from the U.S. Department of Energy's Grid Resilience and Innovation Partnerships (GRIP) Program Round 2 Funding Opportunity.¹⁰ The proposal would implement projects that will address two challenges – transmission capacity and interconnection system upgrade needs. The “California Harnessing Advanced Reliable Grid Enhancing Technologies for Transmission” (CHARGE 2T) proposal would utilize advanced conductors and grid enhancing technologies which would help to increase the capacity of current transmission lines. Additionally, by streamlining the interconnection process through bridging critical data gaps and increasing transparency for developers and utilities, this proposal will greatly assist in the state’s effort to connect more clean energy projects to the California grid. CHARGE 2T projects would aid in the state’s efforts to reach its energy and carbon neutrality goals set out in Senate Bill 100 (de León,

9 Letter available here: https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/office-of-governmental-affairs-division/documents/federal-funding/january-2022-letter-from-cpuc-president-reynolds-to-electric-and-gas-ious.pdf?sc_lang=en&hash=1776D6C63D6310697A34CDA849700EE7

10 PG&E Press Release related to grant application. [PG&E Corporation - Statewide Partnership Aims to Deliver More Clean Energy Faster to Californians and Support State Climate Goals \(pgecorp.com\)](#)

Chapter 312, Statutes of 2018) and the 2022 California Air Resources Board Scoping Plan. The TED Task Force members will remain in partnership with project sponsors to ensure successful project implementation if funded.

Additionally, the CEC partnered with an energy developer to apply for GRIP funding for the “California Enabling Grid Reliability with Energy Storage Technology” project, which aims to deploy new multiday energy storage assets in California’s Central Valley. If funded, these assets will promote higher levels of renewable energy projects and help the state decarbonize the grid.

Continued Stakeholder Engagement on Battery Energy Storage Safety

Battery energy storage systems (BESS) play an enormous role in providing reliable power and helping California reach its energy decarbonization goals. In April 2024, California reached a milestone of deploying 10,000 MW of battery energy storage, including over 8,000 MW of wholesale energy storage. In the coming years, more than half of the capacity expected to come online to serve the wholesale electricity market are BESS systems.

While the state has deployed many BESS projects, the technology is fairly new compared to other resources. There are public concerns around the impacts on the communities near and around where the projects are built, including safety risks and in particular, fire risks. In the first quarter of 2024, the CEC, in conjunction with other members of the TED Task Force, hosted a staff workshop on BESS safety, siting and permitting best practices. The workshop highlighted the importance for stakeholders to work collaboratively to develop a common understanding of how BESS can be designed and installed to operate safely and reliably. Following the workshop, GO-Biz engaged with stakeholders to partner and develop a forum to exchange information needed as cities and counties revise planning documents and determine how BESS best fits within their communities. Considering the nascency of BESS, forums such as this, as well as education and training will be critical to develop best practices.

Reliability Assessment

The reliability assessment approach used for this report is consistent with the Summer Resource Stack Analysis for 2024–2034 published by the CEC in the May 2024 first quarterly *Joint Agency Reliability Planning Assessment*. A change worth noting is the addition of new logic, shown in Table 7, built into the analysis to better track the development of new projects and account for uncertainty. The assessment compares an hourly projection of anticipated supply, against the projected hourly demand plus the reserve margin, for the peak day of each month (July through September). A 17 percent planning reserve margin (current resource adequacy planning standard) is equivalent to average conditions, while 22.5 and 26 percent planning reserve margins are comparable to 2020 and 2022 equivalent events, respectively.

Generally, the Summer Resource Stack Analysis conservatively identifies the maximum hourly need for contingencies in summer 2024 for each equivalent event. There is no projected need for contingency resources in July and August and as such, this section will report on September, which is typically the most challenging summer month for reliability.

Comparison Matrix

As part of an ongoing effort to align inputs and assumptions for various energy entities, CEC staff collaborated with California ISO and CPUC staff to develop a comparison matrix that shows the similarities and differences. As shown in Table 7, the CEC and California ISO inputs for stack analyses are generally aligned with few minor differences in solar and wind profiles methodologies.

Table 7: CEC and California ISO Comparison of Inputs and Assumptions

Input	CEC stack	California ISO Stack ¹¹
Horizon	Near term, year ahead, 2024	Near term, year ahead, 2024
Planning reserve margin (PRM)/ Reserve margin	17%, 22.5%, 26% PRM	18.5% Reserve margin
Base demand	2023 IEPR California Energy Demand Forecast (CED) - Planning	2023 IEPR CED - Planning ¹²
Existing supply	<ul style="list-style-type: none"> California ISO NQC list - monthly update CPUC NQC list 	California ISO NQC list - monthly update
New supply	<ul style="list-style-type: none"> California ISO queue data CPUC Procurement Orders <p>Apply logic for projects with online dates in the past:</p> <ul style="list-style-type: none"> If the project is ACTIVE then add 3 months to the online date If the project is SYNC OK then add 2 months to the online date If the project is COMX then add 1 months to the online date 	<p>California ISO queue data. Criteria for revised commercial operations dates to reflect potential project delays:</p> <ul style="list-style-type: none"> If the project is not active in Resource Interconnection Management System (RIMS) then add 6 months If the project is active in RIMS without a resource ID then add 4 months If the project is active in RIMS and has a resource ID then add 3 months If the project is SYNC OK in RIMS and has a resource ID then add 2 months

¹¹ [2024 Summer Loads and Resources Assessment](https://www.caiso.com/Documents/2024-Summer-Loads-and-Resources-Assessment.pdf). Available at: <https://www.caiso.com/Documents/2024-Summer-Loads-and-Resources-Assessment.pdf>

¹² [2023 Integrated Energy Policy Report \(IEPR\) California Energy Demand Forecast \(CED\) - Planning](https://efiling.energy.ca.gov/GetDocument.aspx?tn=254234&DocumentContentId=89587) available at <https://efiling.energy.ca.gov/GetDocument.aspx?tn=254234&DocumentContentId=89587>

Input	CEC stack	California ISO Stack ¹¹
		<ul style="list-style-type: none"> If the project is COMX in RIMS and has a resource ID then add 1 month Additional information ¹³
Imports (resource adequacy)	Average of 2015-2022 Import RA ¹⁴	Average of past 8 years import resource adequacy (2016-2023) ¹⁵
Hybrids	<ul style="list-style-type: none"> NQC value; When no NQC, ignore variable energy resource (VER) component. Battery nameplate and assume a discharge profile (4 hours across peak) 	<ul style="list-style-type: none"> Apply solar and wind profile factors to the VER component, and Apply standalone assumptions for battery component; the sum of these two is constrained by net MW at point of interconnection
Solar	Nameplate capacity using solar shapes ¹⁶	<ul style="list-style-type: none"> CPUC exceedance value approach using 8 years of rolling data (2016-2023) Net dependable capacity multiplying solar profiles¹⁷
Wind	Nameplate capacity using wind shapes	<ul style="list-style-type: none"> Exceedance value approach using 8 years of rolling data (2016-2023): Net dependable capacity using wind profiles¹⁸

13 Expected new resources are those that are not on the California ISO NQC list, but are expected to be online by June 30, 2024; If the new resource has an NQC then use NQC; If no NQC - use technology factors (e.g., effective load carrying capability) to discount maximum operating level; Solar profile based on 70% exceedance value; Wind profile based on 80% exceedance value for summer months (June to October) and 65% for non-summer months; batteries are at 90% of maximum operating level. New resources are units in California ISO systems in the New Resource Implementation process and are selected based on the following methodology: Push out online dates for delayed projects, include all SYNC OK and COMX in NRI, Include Active status NRI projects that are on the California ISO NQC list.

14 Non-resource specific plus tie generator, no liquidated damages credits for month of September

15 Non-resource specific plus pseudo-tied import resources; liquidated damages credits are included separately.

16 Profiles based on high load days and weighting 2014-2023 load data (OASIS); generation data from meter data

17 Profiles based on 70% exceedance, California ISO historical demand meter data for the top 5 load days, and generation meter data

18 Profiles based on 80% exceedance for summer months (June to October) and 65 percent for non-summer months, California ISO historical demand meter data for the top 5 load days, and generation meter data

Input	CEC stack	California ISO Stack ¹¹
Projected demand response	Demand Response CPUC load impact protocol 2024	NQC plus demand response resource adequacy credits
Hydro	NQC value	NQC value, or technology factor to discount net dependable capacity if no NQC
Cogen/Biomass/Bio gas/Geothermal	NQC value	NQC value, or technology factor to discount net dependable capacity if no NQC
Once Through Cooling (OTC)	Not included in 2024 and beyond, as OTCs will be in the Strategic Reliability Reserve (SRR)	Not included in 2024 and beyond, as OTCs will be in the SRR
Diablo Canyon Power Plant	<ul style="list-style-type: none"> Included in 2024 and beyond stack Retired beginning 2031. 	Included in 2024 stack

Source: CEC staff with input from California ISO staff

California ISO Area: Updated Resource Stack Analysis Results for Summer 2024

As shown in Table 8, there were various changes to the resource stack since the release of the May 2024 first quarterly *Joint Agency Reliability Planning Assessment*. Notably, over 2,000 MW of NQC were added that will now be available to support summer net peak demand. The new NQC consists of standalone battery, geothermal, hybrid, and solar resources. The effect of adding 2000 MW of NQC can be seen in the need for contingencies, in Table 8, where surpluses continue to improve. Other changes to note, in Table 8, include changes to demand response resources and expected new battery capacity for September. CEC staff removed a 6 percent demand response PRM adder to align with CPUC demand response program changes.¹⁹ The decrease, in the New Batteries Nameplate, is due to the net impact of battery projects coming online, moving to the Existing Resources category, and projects delayed.

In the May 2024 first quarterly *Joint Agency Reliability Planning Assessment*, surpluses of 4,000 MW and 1,500 MW were reported under average conditions and 2020 equivalent event conditions, respectively. However, there was a 90 MW need if the state were to experience a 2022 equivalent event. As shown in Table 8, the resource stack analysis identified improvements from the average conditions through all extreme events.

While improvements can be seen in all conditions, it is important to note that improvements are forecasted results based on the assumed full build out of resources planned for the year. More specifically, the resource stack analysis in this report assumes that 2,102 MW of batteries

¹⁹ [2022 Filing Guide for System, Local and Flexible Resource Adequacy Compliance Filings](https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/resource-adequacy-homepage/resource-adequacy-compliance-materials/final-2022-ra-guide-clean-101821.pdf). Available at <https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/resource-adequacy-homepage/resource-adequacy-compliance-materials/final-2022-ra-guide-clean-101821.pdf>

will fully be online before August 31, 2024, to support reliability in the month of September 2024. Any delays to the battery storage build out could create challenges under extreme events.

Table 8: Comparison of Summer Assessment Results for September 2024

	2024 1 st Quarterly Report	2024 2 nd and 3 rd Quarterly Reports	Change Since Last Update
Supply			
Demand Response	1,115	1,052	▼ 63
Existing Resources*	43,556	45,643	▲ 2087
New Batteries Nameplate**	3,327	2,102	▼ 1225
Wind	1,382	1,325	▼ 57
Solar	1,643	1,745	▲ 102
Resource Adequacy Imports	6,000	6,000	— 0
Total (MW)	57,022	57,867	▲ 844
Demand			
2023 CEC Demand Forecast – 2024 Sept. Peak Demand	45,972	45,972	— 0
Surplus/Shortfalls			
Planning Standard	4,000	4,765	▲ 765
2020 Equivalent Event	1,500	2,253	▲ 753
2022 Equivalent Event	-90	655	▲ 745

Source: CEC staff with California ISO data

*Increase in this category is due to all types of resources coming online. Values are in RA NQC MW.

**Decrease in this category means that resources have come online or have an updated online date but generally means they are no longer considered new and have been moved to Existing Resources.

Table 9 shows the impact of 20 percent and 40 percent resource delays to the need for contingencies. The delay percentage is applied across all resources but solar and wind contributions to reliability at net peak are minor. Therefore, the biggest new resource supporting reliability is BESS. As shown in

Table 9, a 40 percent delay to new BESS resources could swing a 2022 equivalent event system condition from a 655 MW surplus to a 318 MW need for contingency.

Table 9: Impact of Delay on Reliability

Delay	Battery capacity online by 8/31/2024	System conditions	Surplus/Shortfalls
20 percent	1,680 MW	2020 equivalent event	168 MW
40 percent	1,260 MW	2022 equivalent event	-318 MW

Source: CEC staff

Contingency Resources

The agencies and the California ISO are continuing to track contingency resources to provide support during an extreme event. The updated contingency list for 2024 includes the addition of 2,859 MW of OTC resources to the Electricity Supply Strategic Reliability Reserve Program. Contingency resources, identified in **Table 10**, are expected to provide up to 4,200 MW during extreme events and may be called upon to cover contingency needs identified in real time grid operations.

Table 10: Contingency Resources for Summer 2024

Type	Contingency Resource	Available MW July	Available MW August	Available MW September
SRR ²⁰	DWR Electricity Supply Strategic Reliability Reserve Program	3,130	3,150	3,150
SRR	Demand Side Grid Support	393	444	450
SRR	Distributed Electricity Backup Assets (under development)	0	0	0
CPUC	Ratepayer Programs (Emergency Load Reduction Program, Smart Thermostats, etc.)	217	209	202
CPUC	Imports Beyond Stack*	25	25	25
CPUC	Capacity at Co-gen or Gas Units Above Resource Adequacy *	159	186	93
Non-Program	Balancing Authority Emergency Transfers	300	300	300
Non-Program	Thermal Resources Beyond Limits: Gen Limits	40	40	40
Non-Program	Thermal Resources Beyond Limits: Gen Limits Needing 202c ²¹	25	25	25
	Total	4,289	4,379	4,285

*Estimates based on IOU excess procurement reports from 2024.
Source: CEC staff with California ISO, DWR, and CPUC data

²⁰ Strategic Reliability Reserve

²¹ Federal Power Act Section 202(c) - emergency order authorizing specific electric generating units located within a service territory to operate at their maximum generation output levels in order to preserve the reliability of the bulk electric power system due to ongoing wildfires, extreme heat, and droughts causing a diminished ability to generate hydropower resulting in higher than usual electricity demand.

Additional recent activities related to the SRR include the following:

- On May 8, 2024, the CEC adopted the Third Edition of the guidelines for its Demand Side Grid Support (DSGS) program in time for the 2024 summer season, continuing to streamline participation and incorporating bi-directional electric vehicle chargers as an eligible resource providers can include in the virtual power plant option in the DSGS program.
- The CEC released a Notice of Proposed Awards on April 22, 2024, for 9 projects selected among the applications submitted in response to the first solicitation issued under the Distributed Electricity Backup Assets program (referred to as Bulk Grid Assets Enhancements for Grid Reliability Grant Funding Opportunity). The selected projects requested \$123 million funding to add ~297 MW of new capacity by 2027 to increase California's grid reliability. The CEC is expected to approve executed project agreements in the second half of 2024.
- The CEC released a draft concept proposal for the second grant funding opportunity focused on distributed energy resources in February 2024 under its Distributed Electricity Backup Assets program.

Summer 2024 Outlook

The CEC hosted a Summer Reliability Workshop on May 29, 2024. The following were the key takeaways for the Summer 2024 Outlook:

- The weather forecast indicated cooler temperatures in June and July, with a significant increase expected from August onward, particularly in interior areas of the Western U.S. The Desert Southwest and Rockies regions have the highest probability of above-average temperatures, while coastal California is expected to remain cooler. There is a need to monitor weather patterns closely as shifts could lead to widespread heatwaves.
- The fire outlook suggested that California remains at risk, particularly due to the robust herbaceous growth from the past two years, which provides ample fuel for potential fires.
- The resource adequacy outlook for the Western Interconnection was generally positive, with sufficient resources under expected conditions. However, extreme weather events, ongoing droughts, and wildfires could elevate reliability risks. Efforts to expedite resource builds and delay retirements have been beneficial, but challenges such as supply chain issues could impact these improvements.
- The Sacramento Municipal Utility District reported a cautiously optimistic outlook for summer 2024, with no significant planned transmission or generation outages and sufficient operating margins to meet a 1-in-10 year load forecast. The Los Angeles Department of Water and Power expects stable loads compared to previous years, with a forecasted peak load of 5,727 MW for 2024 and plans to add 200 MW of solar and 150 MW of battery storage by the end of summer. The Imperial Irrigation District emphasized enhanced grid resilience using mobile generators for emergency responses in rural areas, and the critical role of energy storage in maintaining grid stability. Collaborative planning with the California ISO and other balancing authorities, as well as reconductoring transmission lines with advanced conductors to withstand higher temperatures, were also highlighted as essential strategies for ensuring summer reliability.

- California's new energy resource build out has seen significant developments, including a record addition of clean energy capacity, primarily from solar and battery projects. These advancements are crucial for meeting energy demands during peak periods. The state's hydro resources are managed with improved flexibility, thanks to favorable water and reservoir conditions. Demand-side programs, such as the Emergency Load Reduction Program and the Distributed Electricity Backup Assets Program, are expanding participation and providing additional support for reliability. Additionally, the Stack Analysis indicated a surplus of 4,000 MW under average conditions, though contingencies may be necessary in extreme scenarios. Overall, the workshop emphasized the importance of continued monitoring and proactive measures to ensure grid reliability throughout the summer.

Recent and Upcoming Activities

The following activities occurred recently or are projected for the next quarter:

- The CEC is targeting to release the final version of the grant funding opportunity focused on distributed energy resources under its Distributed Energy Backup Assets program pending the final budget adopted for fiscal year 2024-2025 and review of stakeholder comments.
- DSGS Program staff plan to continue the stakeholder process this summer to explore changes to the DSGS program guidelines that would be implemented in 2025, such as a potential incentive option for market-aware demand response and real-time emergency triggers for virtual power plants.
- In quarters three and four of 2024, the CPUC's Resource Adequacy Proceeding (R.23-10-011) will consider modifications to the PRM for compliance years 2026 and 2027, including the results of Energy Division's annual Loss of Load Expectation study to be published in July 2024.²²
- In April 2024, the IRP Proceeding (R.20-05-003) issued an amended Scoping Memo, which established timelines for key items in the proceeding. Among those items was CPUC's work toward implementing Assembly Bill 1373 (Garcia, Chapter 367, Statutes of 2023) and, in support of that implementation, the CPUC issued an Administrative Law Judge Ruling Seeking Comments on Need and Process for Centralized Procurement of Specified Long Lead-Time Resources, including some supporting material, and held a workshop on the Ruling.

22 Available here: <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M534/K332/534332050.PDF>

APPENDIX A:

Acronyms and Abbreviations

BESS – Battery energy storage system

California ISO – California Independent System Operator

CEC – California Energy Commission

CED – California Energy Demand Forecast

CHARGE 2T - California Harnessing Advanced Reliable Grid Enhancing Technologies for Transmission

CPUC – California Public Utilities Commission

DCISC - Diablo Canyon Independent Safety Committee

DCPP – Diablo Canyon Power Plant

DSGS – Demand Side Grid Support

DWR – Department of Water Resources

ELCC - Effective load carrying capability

GO-Biz – Governor’s Office of Business and Development

GRIP - Grid Resilience and Innovation Partnerships Program

IRP – Integrated Resource Planning

LSE – Load-serving entity

MTR – Mid-term reliability

MW - Megawatts

NQC – Net qualifying capacity

OTC – Once through cooling

PG&E – Pacific Gas and Electric

PV - Photovoltaics

RIMS – Resource Interconnection Management System

SRR – Strategic Reliability Reserve

TED – Tracking Energy Development

TED Task Force – Tracking Energy Development Task Force

VER – Variable energy resource

APPENDIX B:

Glossary

For additional information on commonly used energy terminology, see the following industry glossary links:

- California Air Resources Board Glossary, available at <https://ww2.arb.ca.gov/about/glossary>
- California Energy Commission Energy Glossary, available at <https://www.energy.ca.gov/resources/energy-glossary>
- California Independent System Operator Glossary of Terms and Acronyms, available at <http://www.caiso.com/Pages/glossary.aspx>
- California Public Utilities Commission Glossary of Acronyms and Other Frequently Used Terms, available at <https://www.cpuc.ca.gov/glossary/>
- Federal Energy Regulatory Commission Glossary, available at <https://www.ferc.gov/about/what-ferc/about/glossary>
- North American Electric Reliability Corporation Glossary of Terms Used in NERC Reliability Standards, available at: https://www.nerc.com/pa/Stand/Glossary%20of%20Terms/Glossary_of_Terms.pdf
- US Energy Information Administration Glossary, available at <https://www.eia.gov/tools/glossary/>

Integrated Energy Policy Report (IEPR)

Senate Bill 1389 (Bowen, Chapter 568, Statutes of 2002) requires the California Energy Commission to prepare a biennial integrated energy report. The report, which is crafted in collaboration with a range of stakeholders, contains an integrated assessment of major energy trends and issues facing California's electricity, natural gas, and transportation fuel sectors. The report provides policy recommendations to conserve resources, protect the environment, ensure reliable, secure, and diverse energy supplies, enhance the state's economy, and protect public health and safety. For more information, see the [CEC Integrated Energy Policy Report Web page](#).

Investor-owned utility (IOU)

Investor-owned utilities (IOUs) provide transmission and distribution services to all electric customers in their service territory. The utilities also provide generation service for "bundled" customers, while "unbundled" customers receive electric generation service from an alternate provider, such as a community choice aggregator. California has three large IOUs offering electricity service: Pacific Gas and Electric, Southern California Edison, and San Diego Gas & Electric.

Load-serving entity (LSE)

A load-serving entity is defined by the California Independent System Operator as an entity that has been “granted authority by state or local law, regulation or franchise to serve [their] own load directly through wholesale energy purchases.”

Nameplate capacity

The maximum amount of electricity that a generating station (also known as a power plant) can produce under specific conditions designated by the manufacture.

Net qualifying capacity (NQC)

The amount of capacity that can be counted towards meeting resource adequacy requirements in the CPUC’s RA program. It is a combination of the CPUC’s qualifying capacity counting rules and the methodologies for implementing them for each resource type, and the deliverability of power from that resource to the California ISO system. CPUC IRP procurement orders (D.19-11-016, D.21-06-035, D.23-02-040) also require counting of resources for compliance using the associated NQCs, which can be different to those used in the RA program, depending on the resource type and order.

Planning reserve margin

Planning reserve margin (PRM) is used in resource planning to estimate the generation capacity needed to maintain reliability given uncertainty in demand and unexpected capacity outages. A typical PRM is 15 percent above the forecasted 1-in-2 weather year peak load, although it can vary by planning area.

Power plant

A centralized facility that generates and stores electricity to meet the energy demands of a specific area or grid. It includes generating units and storage resources to produce and supply electrical energy effectively.

Real-Time Market

The competitive generation market controlled and coordinated by the ISO for arranging real-time imbalance energy.

Renewables Portfolio Standard (RPS)

The Renewables Portfolio Standard, also referred to as RPS, is a program that sets continuously escalating renewable energy procurement requirements for California’s load-serving entities. The generation must be procured from RPS-certified facilities (which include solar, wind, geothermal, biomass, biomethane derived from landfill and/or digester, small hydroelectric, and fuel cells using renewable fuel or qualifying hydrogen gas). More information can be found at the [CEC Renewables Portfolio Standard web page](#) and the [CPUC RPS Web page](#).

Reserve margin

The differences between the dependable capacity of a utility's system and the anticipated peak load for a specified period.

Resource adequacy

Resource adequacy ensures there is enough capacity and reserves for the grid operator to maintain a balanced supply and demand across the electric system.

Transmission Planning Process (TPP)

The California Independent System Operator's annual transmission plan, which serves as the formal roadmap for infrastructure requirements. This process includes stakeholder and public input and uses the best analysis possible (including the CEC's annual demand forecast) to assess short- and long-term transmission infrastructure needs. For more information, see the [California ISO Transmission Planning Web page](#).