2025 Summer Grid Reliability

Senate Energy, Utilities and Communications Committee - Oversight Hearing

August 19, 2025

CALIFORNIA ENERGY ENTITIES

California Energy Commission (CEC)

California Public Utilities Commission (CPUC)

California Independent System Operator (CAISO)

California Air Resources Board (CARB)

California Department of Water Resources (DWR)

Primary Roles in Energy Supply Planning and Services

CARB

- Scoping Plan
- Air Regulations
- Carbon Market/Cap-and-Trade

CEC

- California Electric Demand Forecast
- Municipal Utility Renewable Portfolio Standard (RPS) Oversight

CPUC

- Integrated Resource Planning (IRP)
- Resource Adequacy (RA)
- Load serving entity RPS Oversight

CAISO

- Market Operation
- Transmission Operation and Generator Dispatch
- Transmission Planning

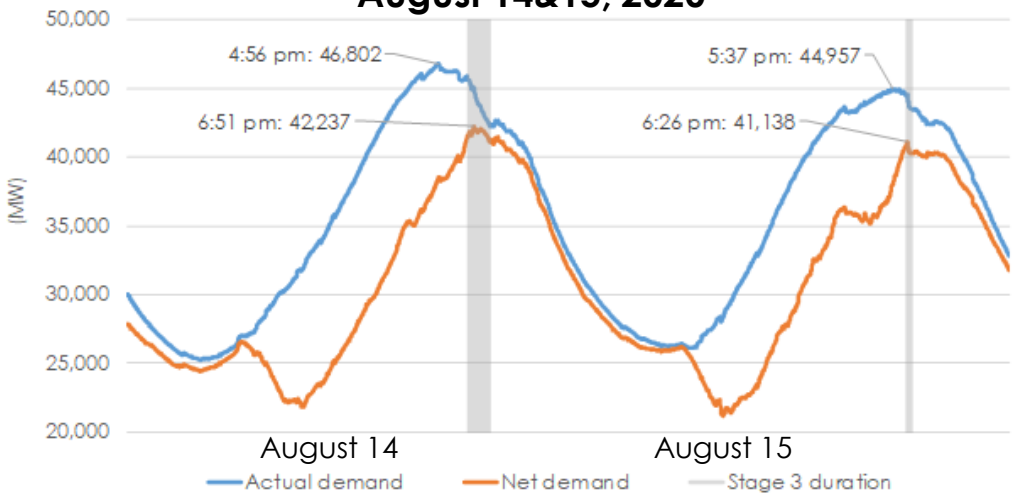
DWR

- Electricity backstop responsibilities such as the Electricity Supply Strategic Reliability Reserve Program and administering the Diablo Canyon Extension Fund

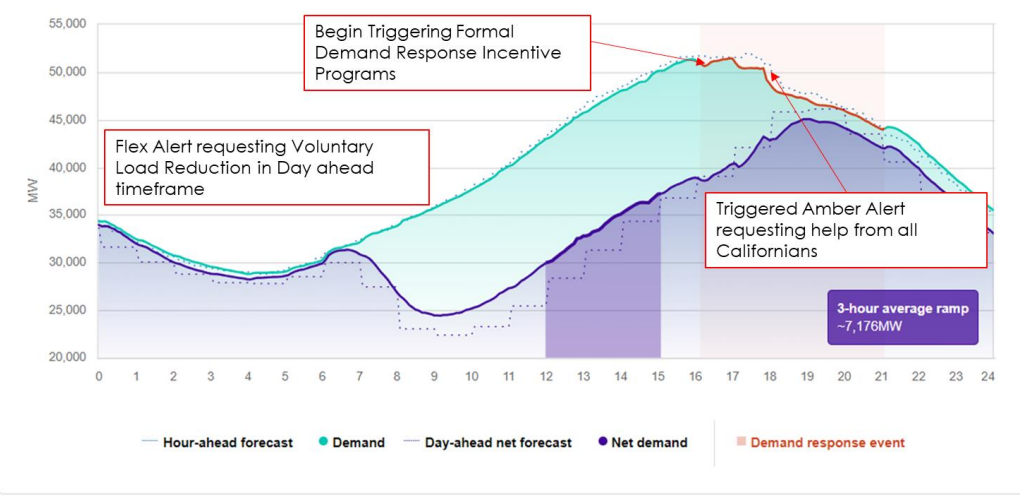
2020 & 2022 Grid Reliability Events

	2020 Rotating Outages	2022 Sept 6 Record Peak
Peak Demand	~47,000 MW	~52,000 MW
Outcome	Rotating outages (800k+ customers affected)	No outages despite historic heat and demand
Response	Late-stage emergency; limited demand response activation	Early Flex Alerts, 2,000 MW drop after text alert
Key Lesson	Insufficient resource adequacy; market issue; coordination gaps	Demand flexibility and fast public response work

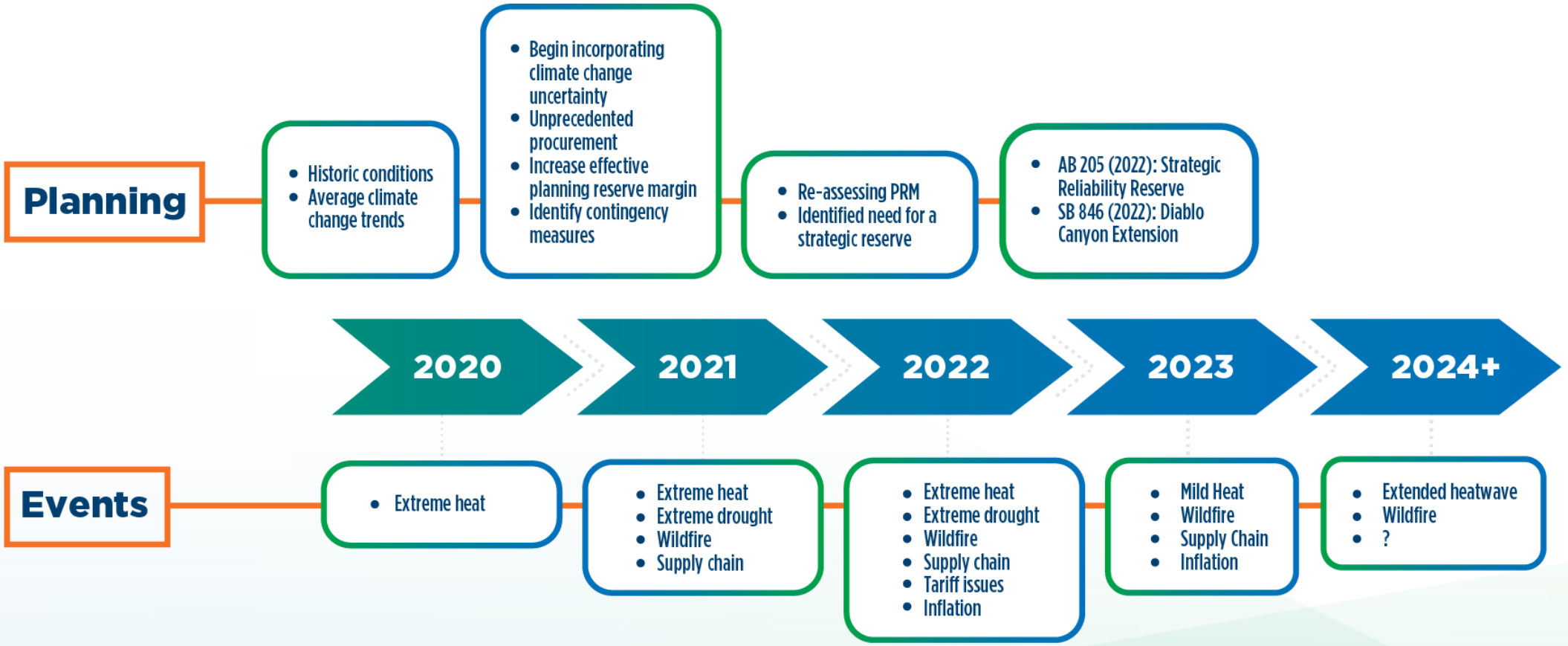
August 14&15, 2020



Sept 6, 2022



Changing Grid Conditions



Actions - Grid Reliability & Clean Energy Transition

- **Improving Grid Planning Processes**
  - Improvements to forecasting for climate change-induced weather variability and electrification
  - Ordering sufficient and diverse energy resource procurement
  - Improvements to Resource Adequacy process and requirements

- **Scaling Supply & Demand-Side Clean Energy Resources**
  - Lauch an Energy Development Task Force to track new energy projects and provide development support
  - Improve interconnection & permitting process
  - Implement SB 846 (2022) - continue to assess and plan for clean energy resources and storage and demand flex resources

- **Preparing for Extreme Events (Contingency Measures)**
  - Retain existing and construct new assets & procure energy imports to backstop uncertainties
  - Expand emergency demand flex opportunities as part of strategic reliability reserves

HIGHLIGHT: Diablo Canyon Power Plant (DCPP)

- **SB 846 (2022) provided a pathway to extend DCPP to 2030 to keep 2,200 MW of clean energy capacity online for grid reliability purposes, while clean energy capacity ramps up.**
- SB 846 directed the CEC to:
  - Determine the need to extend the operation of the Diablo Canyon Power Plant for 2024–2030 to support reliability.
  - Determine whether extended operations of the DCPP, compared to a portfolio of other feasible resources, is consistent with the greenhouse gases emissions reduction goals.
- In 2023, the CEC found:
  - DCPP extension was prudent given the potential delays in resource build out to meet ordered procurement and increasing risk for climate-related threats to grid reliability.
  - There were no supply resources that could be brought on-line before the planned 2025 retirement of DCPP to meet the like-for-like energy generation.

2020-25 Grid Conditions Summary

Alerts	2020	2021	2022	2023	2024	2025
Flex Alerts	10	8	11	0	0	0
Restricted Maintenance Operations	20	24	16	6	18	2
Transmission Emergencies	2	0	10	2	23	1
Energy Emergency Alerts						
Energy Emergency Alert Watch	16	4	9	2	1	0
Energy Emergency Alert 1	0	0	6	1	0	0
Energy Emergency Alert 2	6	1	5	0	0	0
Energy Emergency Alert 3	2	0	1	0	0	0
Total Emergency Alerts in CAISO Area	**24**	**5**	**22**	**3**	**1**	**0**
Total Emergency Alerts across RC West	**47**	**17**	**42**	**29**	**57**	**15**

2025 Summer Grid Readiness

2025 Summer - Grid Readiness & Outlook

- **The current 2025 demand/supply forecast shows a further improved outlook compared to recent years.**
  - No supply shortfalls expected under traditional grid planning conditions
  - No supply shortfalls expected even under extreme conditions like those experienced in 2022 and 2020
  - Battery storage capacity on the grid continues to scale significantly
  - Market and supply chain uncertainties remain elevated due to trade tariff risks and uncertainties

- **Long-lasting west-wide extreme heat conditions, if combined with sudden events like a fire affecting key electric transmission equipment, could still create tight conditions on the grid.**

- **Total "contingencies" reach up to 4,000 MWs, with the State Reliability Reserve's Once-Through Cooling (OTCs) generators contributing the largest share at 2,859 MWs.**

2022-2025 Summer Forecast Comparison

- Long lasting west-wide extreme conditions, coincidental or sudden onset events (e.g., wildfires) that impact key electric transmission equipment - as seen with the 2021 Bootleg Fire cutting 4,000 MW of imports - could still cause severe grid strain, with potential **shortfalls of up to 2,700 MW** during conditions similar to a 2022 extreme event.

September Forecast	Summer 2022	Summer 2023	Summer 2024	Summer 2025	Summer 2025
	May 2022 Analysis	Aug 2023 Report	Jan 2024 Report	2025 Q1/2 Report	2025 Q3 Report
Demand (MW)					
Total Demand	**46,319**	**47,327**	**45,972**	**46,152**	**46,152**
Resources (NQC MW)					
Total Resources	**53,080**	**55,533**	**56,439**	**63,765**	**63,995**
Potential Surplus/Shortfall Before Contingencies Are Need (Resources – Demand) (MW)					
Standard Planning Event	40	2100	4020	5,512	5,480
2020 Equivalent Extreme Event	-3,000	-400	1500	2,980	2,955
2022 Equivalent Extreme Event	-7,000	-2,000	-90	1,368	1,348

2025 Summer - Contingencies

Type	Contingency Resource	MW Available			Note
		July	August	September	
Strategic Reliability Reserve	DWR Electricity Supply Strategic Reliability Reserve Program and State Power Augmentation Program	3079	3079	3079	
	CEC Demand Side Grid Support (DSGS)[1]	589	630	650	See Note
	CEC Distributed Electricity Backup Assets (DEBA)[2]	0	0	0	See Note
CPUC	Ratepayer Programs (Emergency Load Reduction Program, Power Saver Rewards etc.)[3]	143	238*	233*	See Note
	Imports Beyond Stack	0	25*	25*	See Note
	Capacity at Co-gen or Gas Units Above Resource Adequacy	599	374*	484*	See Note
Non-Program	Balancing Authorities Emergency Transfers	300	300	300	
	Thermal Resources Beyond Limits: Gen Limits Needing 202c	25	25	25	
	Total	**4735**	**4671**	**4796**	

[1] Estimates based on current enrollment and projected growth
[2] Nine projects were recommended for DEBA funding for a total of 297 MW. Includes 9.5 MW anticipated to be online in 2026 and ~287 MW online in 2027.
[3] Based on enrollment numbers and average per customer ex ante load reduction from filing year 2025 Load Impact Protocols
**estimates from previous year reports*
Contingencies as of 6.13.25

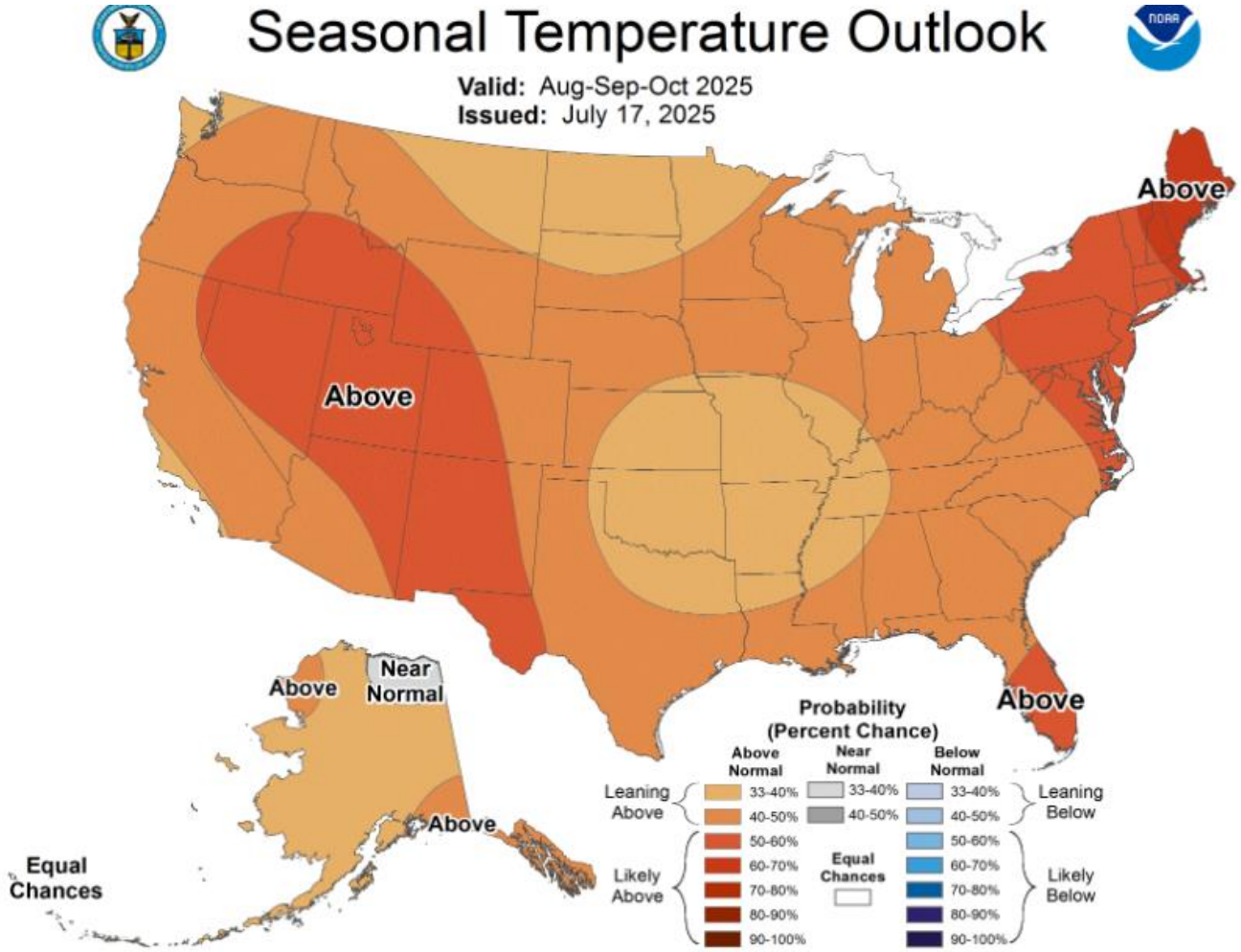
2025 Summer – Grid Operations Update

- Overall moderate statewide weather and electric demands
  - 28 out of 31 days in July were below normal
  - August is trending 1 degree below normal so far
- Active wildfire season
  - Over 5,300 wildfires*
    - Number of wildfires ahead of last year and 5-year average
    - However, close coordination with the utilities and fire agencies helped the CAISO respond quickly to wildfire threats
- No Flex Alerts, no Energy Emergency Alerts (EEAs)
  - High-levels of coordination with partners across the CAISO footprint has kept the grid stable

*Source: CalFire, as of 8/11/25

2025 Summer - California Favors Near and Above Normal Temperatures for Rest of Summer

- Northern CA: Near and above normal Inland and seasonal temperatures at the Coast
- Southern CA: Slightly above normal temperatures with better chances of heat Inland

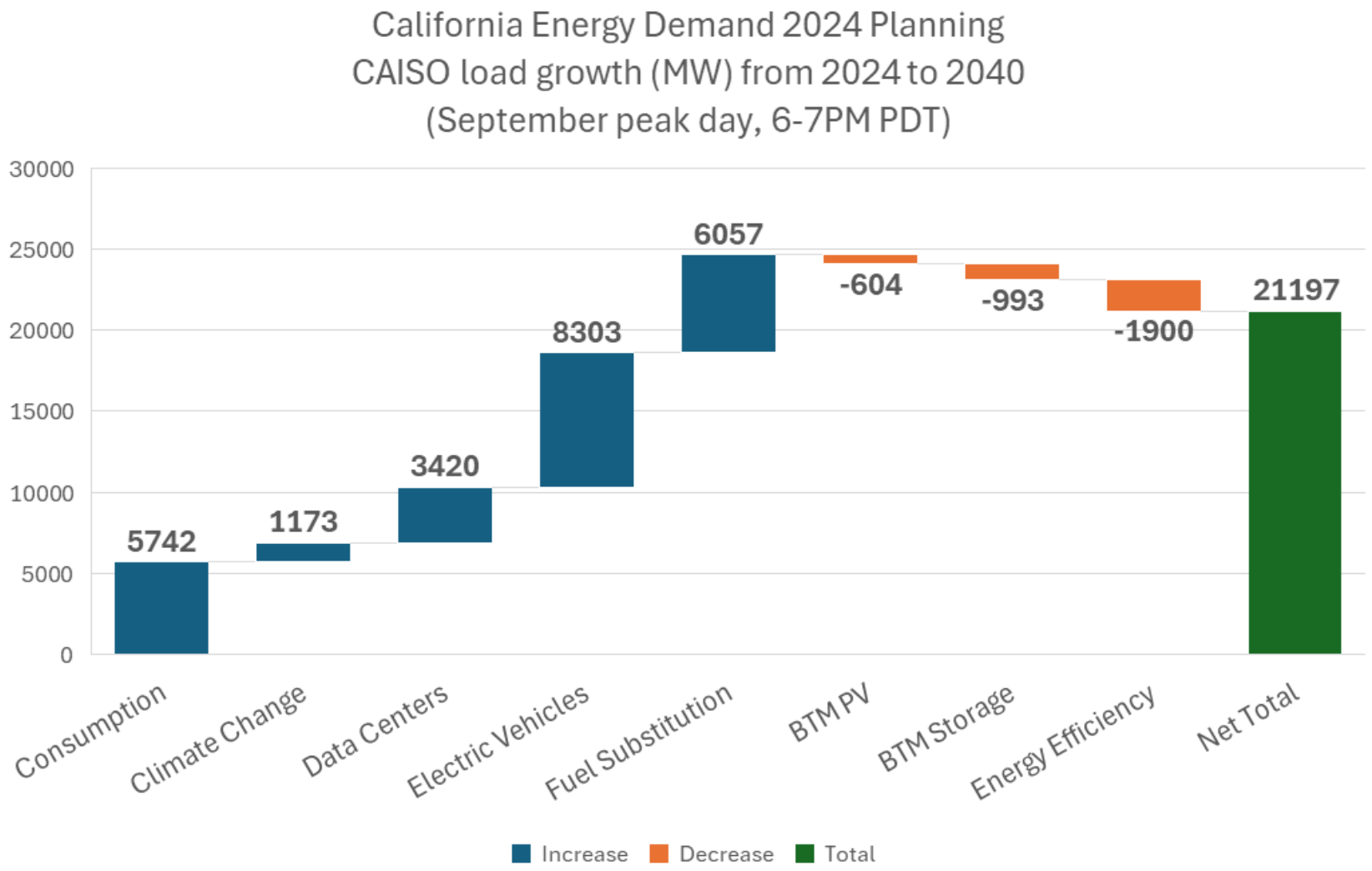


2025 Summer – Grid Operations Continues to be Well Positioned

- New all-time solar peak of 21,774 MW at the end of July
- Over 13,350 MW of battery storage connected to the CAISO grid, which continues to perform well in evening hours when demand is still high and solar energy ramps off the system
- Geographic diversity of weather and resources across the West enables the Western Energy Imbalance Market (WEIM) and Reliability Coordinator (RC) West continue to play a critical role in maintaining grid reliability
- New resources on the grid, enhanced communication and coordination across the CAISO footprint and strong electricity market keep outlook for the rest of the summer positive

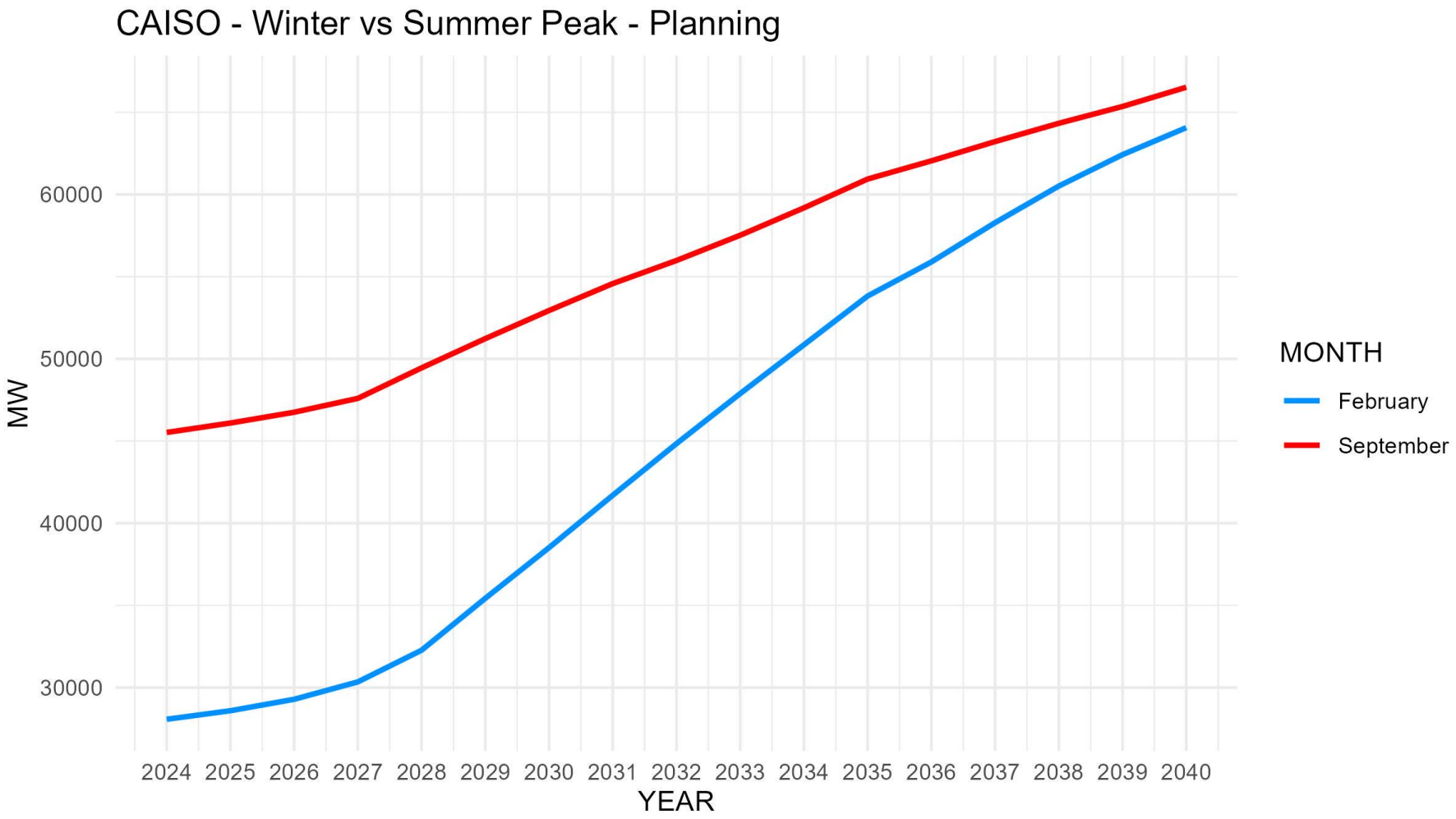
Future Grid Outlook

Forecast - Growth of Peak Demand



- Growth in the demand forecast is primarily driven by data centers and building and transportation electrification
- Growth in installed behind-the-meter solar PV and battery storage capacity is significant, but impacts are small during the system peak hour

Forecast - Winter Peak Demand



- Replacement of gas appliances with electric is forecast to add more than 23,000 MW by February 2040 causing winter peak loads to approach summer peak levels.
- Electric space and water heating puts the winter peak in the morning (7-8AM PST)

CPUC Procurement Orders

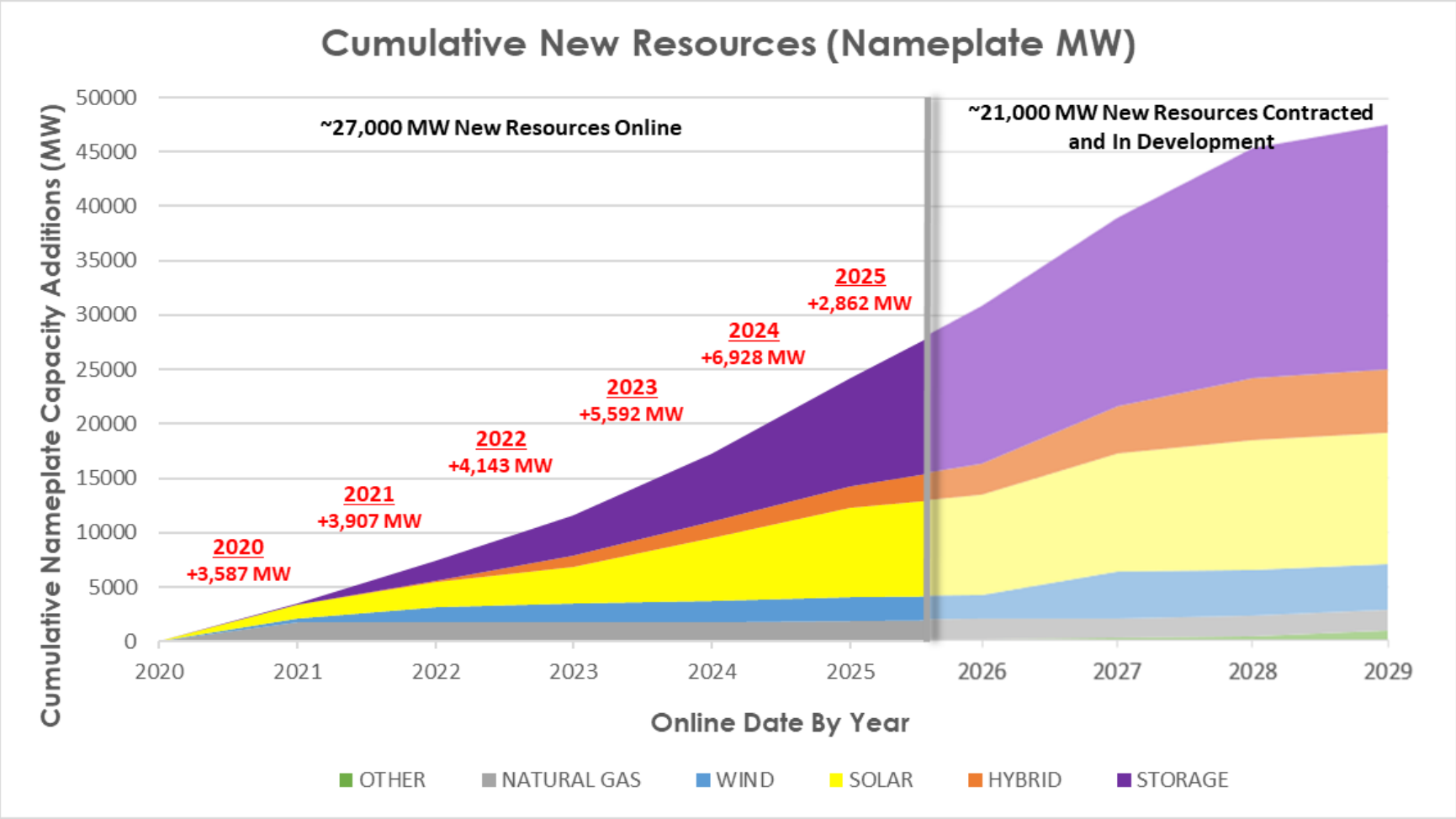
In Megawatts* (MW) By Year

CPUC Orders	Amount	2021	2022	2023	2024	2025	2026	2027	2028
Near-Term Reliability Ordered in 2019	**3,300 MW**	1,650	825	825	-	-	-	-	-
Mid-Term Reliability (MTR) Ordered in 2021	**11,500 MW**	-	-	2,000	6,000	1,500	-	-	2,000**
Supplemental MTR Ordered in 2023	**4,000 MW**	-	-	-	-	-	2,000	2,000	-
Total Recently Ordered Procurement	**18,800 MW**								

**Megawatts (MW) reflect Net Qualifying Capacity (NQC)*

*** The order requires LSEs to procure 2,000 MW of long-lead time (LLT) resources by 2028. Per D.24-02-047, LSEs may request extensions for their required LLT procurement for CODs no later than June 1, 2031.*

Energy Resource Growth – New & Expected



Note: Data shown here includes new resources added to CAISO grid, including imports. "Other" resources includes geothermal, biomass, biogas, and hydropower. Prior versions of this chart indicated 7,054 MW came online in 2024; however subsequent data corrections to CAISO COD records now indicate the 2024 total was 6,928 MW.

Diablo Canyon Power Plant (DCPP) Extension

- Provided pathway to assess the need for DCPP extension and manage the extension if necessary.
- Requires exclusion of DCPP's co ntinued operations from resource procurement planning.
- Establishes funding mechanisms and oversight for continued DCPP operations and eventual decommissioning

Agency Roles

Agency	Key Responsibilities
CEC	• Assess reliability need for DCPP • Evaluate if clean energy alternatives can replace DCPP before retirement • Develop a load flex goal
CPUC	• Undertake planning for clean energy and storage procurement without DCPP • Oversee utility compliance and cost recovery • Implement direction to set new DCPP retirement dates
DWR	• Oversees the Diablo Canyon Extension Fund • Manages loan agreement with DCPP operator to extend operations

HIGHLIGHT: SB 846 Requirements & Actions

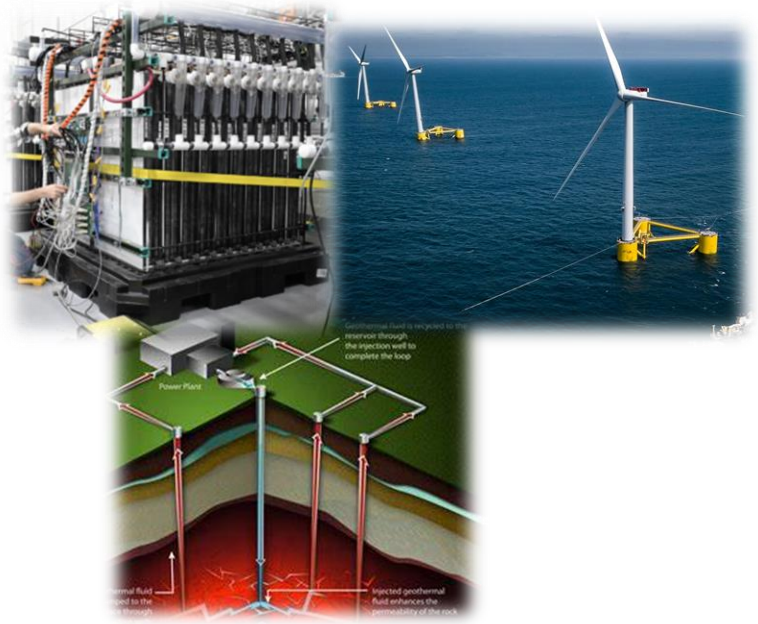
Requirements	Action Taken
CPUC and CEC submit quarterly joint reliability report to Legislature	First report submitted Feb. 9, 2023; latest submitted this week
CEC to adopt load shifting goal by Sep. 1, 2023	7,000 MW goal adopted in May 2023
CPUC to authorize PG&E to take all actions necessary to operate DCPP beyond original retirement dates	Adopted in D.22-12-005
CPUC to authorize extension of operations by Dec. 31, 2023, pursuant to certain conditions	Adopted in D.23-12-036
CPUC to authorize recovery of reasonable operation costs beyond original expiration dates, with annual true-up	Adopted in D.23-12-036. PG&E must submit an annual application for forecast costs. Two applications submitted so far: A.23-04-018 and A.25-03-015.
CPUC to authorize volumetric rate in lieu of rate-based return on investment	Adopted in D.23-12-036
Each year, PG&E to submit plan for use of compensation in lieu of rate-based return	Adopted in D.23-12-036. Additional guidelines for use of funds adopted in D.25-06-002.

HIGHLIGHT: Central Procurement Function

- AB 1373 (2023) established this function at the Dept. Of Water Resources (DWR) to serve as an optional procurement mechanism to procure large, clean, diverse, long-lead time energy resources in furtherance of our 100% clean electricity by 2045 goal.

- In August 2024, the CPUC triggered this mechanism after reviewing LSE procurement plans relative to our clean electricity goals and identified a "need" for several resources to be procured through DWR managed competitive solicitations on behalf of all LSEs.

"Needed" Energy Resource Type	Quantity	Online by
Geothermal	1 GW	2031-2037
Long Duration Energy Storage (LDES): 12-hour + duration	1 GW	2031-2037
LDES: Multi-day	1 GW	2031-2037
Offshore Wind	7.6 GW	By 2037



- In February 2025, the CPUC released a Procurement Request confirming that DWR should move forward.

- Since then, the CPUC and DWR have been jointly preparing for the launch of the competitive solicitation

HIGHLIGHT: Resource Adequacy Reforms

- **Overview -**
  - Shorter-term (1-3 years) reliability planning program established in the early 2000s.
  - LSEs contract for capacity from generators, imports, and demand response, which then must bid into wholesale power markets (i.e., day-ahead and real-time).
  - Traditionally, each LSE had one system capacity requirement for each month, based on the CAISO-area peak load forecast for that month.
- **2025 Slice of Day Framework -**
  - Each LSE has 24 requirements in each month, based on each hour of the CAISO-area peak day that month.
  - More granular; helps ensure all hours are covered by appropriate energy resources.
  - LSEs are collectively meeting their requirements.

HIGHLIGHT: Electric Transmission Infrastructure Enhancements

General Order (GO) 131-E -

- Sets forth rules for permitting electric transmission facilities, including the lines, substations, and switching stations.
- Implements several bills passed over last several years (e.g., AB 2292 (2024), AB 1373 (2023) and SB 529 (2022))
- Updates expected to accelerate transmission permitting by modernizing rules, shifting environmental review earlier in the process, and reducing permitting requirements for smaller projects (including upgrades and expansions of existing infrastructure)

Other Activities -

- Developing an Electric Transmission Developer Guidebook, exploring alternative financing and advancing cost-effective Grid Enhancing Technologies

HIGHLIGHT: Grid Interconnection Reform

- The CAISO has implemented transformational changes to its energy resource grid interconnection process
- The CAISO received record-breaking volumes of grid interconnection requests in 2022-2023, and worked with stakeholders to design major reforms to unclog the queue and move viable projects forward
- FERC approved these reforms in September 2024
- Progress to date:
  - Number of interconnection requests moving through the Cluster 15 application window to the interconnection study process was reduced by 73%
    - 68 GW in Cluster 15's study process
  - Currently 230 MW of new capacity in the interconnection queue
    - 60 GW of new capacity to provide resource adequacy

Thank You!

Senate Energy, Utilities and Communications Committee - Oversight Hearing

August 19, 2025