DOCKETED	
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Filer:	Mikayla Roberts
Organization:	California Energy Commission
Submitter Role:	Commission Staff
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Docketed Date:	5/2/2025

Summer Energy Reliability Workshop

California Energy Commission

Date: May 2, 2025

Housekeeping

- Administrative questions: Zoom Chat function
- Public comments due May 16, 2025
- CEC Docket 21-ESR-01

Comments from the Dais

Introduction – Workshop Overview

- Anticipated Summer Conditions
- California Resources
- Summer Reliability Assessments
  - Electricity
  - Fossil Gas
  - Publicly Owned Utilities

Panel: Anticipated Summer Conditions

Moderator: David Erne

A. Westwide Weather, Amber Motley, California ISO

B. Westwide Fire Outlook, Jeff Fuentes, CALFIRE

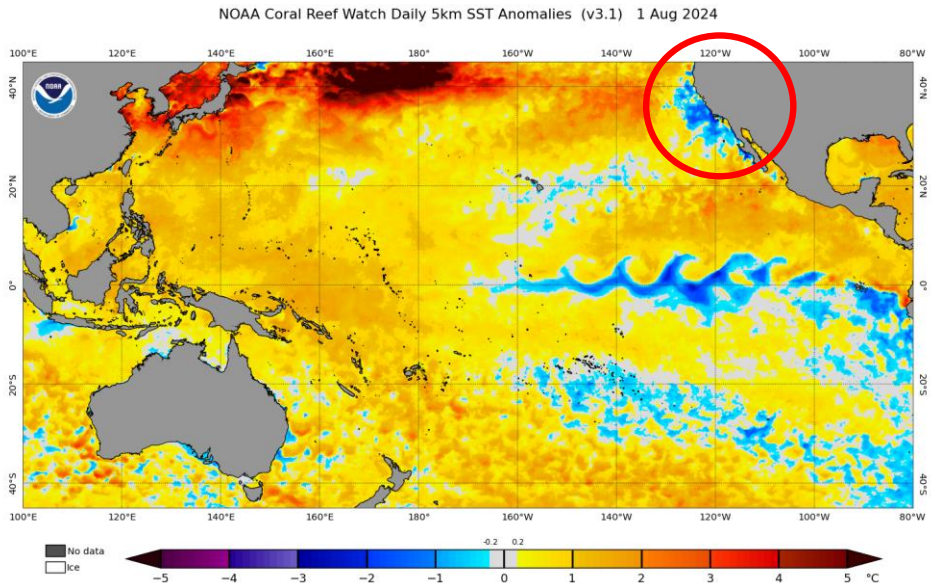
C. Westwide Reliability, Branden Sudduth, WECC

2025 Summer Meteorological Outlook

Amber Motley
Director, Short Term Forecasting

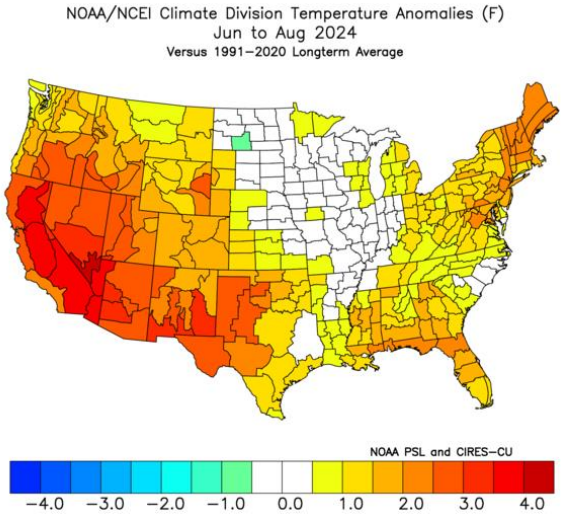
2024 Summer: Observations

- Above normal temperatures throughout the entire west, strongest for CA and Desert SW
  - Hottest in June and July, near normal August
- Near normal precipitation across the west

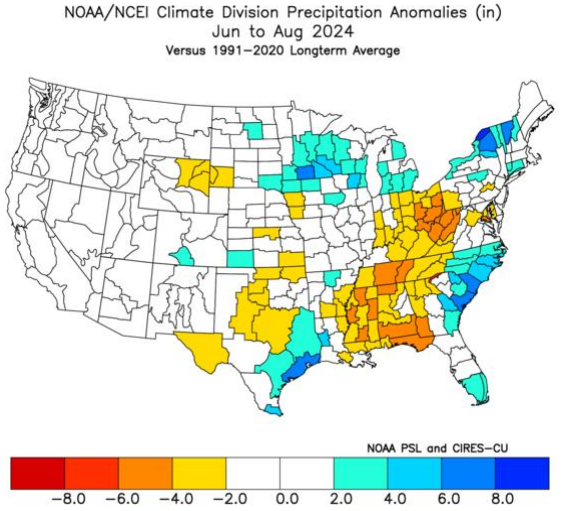


Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2023	-0.7	-0.4	-0.1	0.2	0.5	0.8	1.1	1.3	1.6	1.8	1.9	2.0
2024	1.8	1.5	1.1	0.7	0.4	0.2	0.0	-0.1	-0.2	-0.3	-0.4	-0.5
2025	-0.6	-0.4										

Temperature

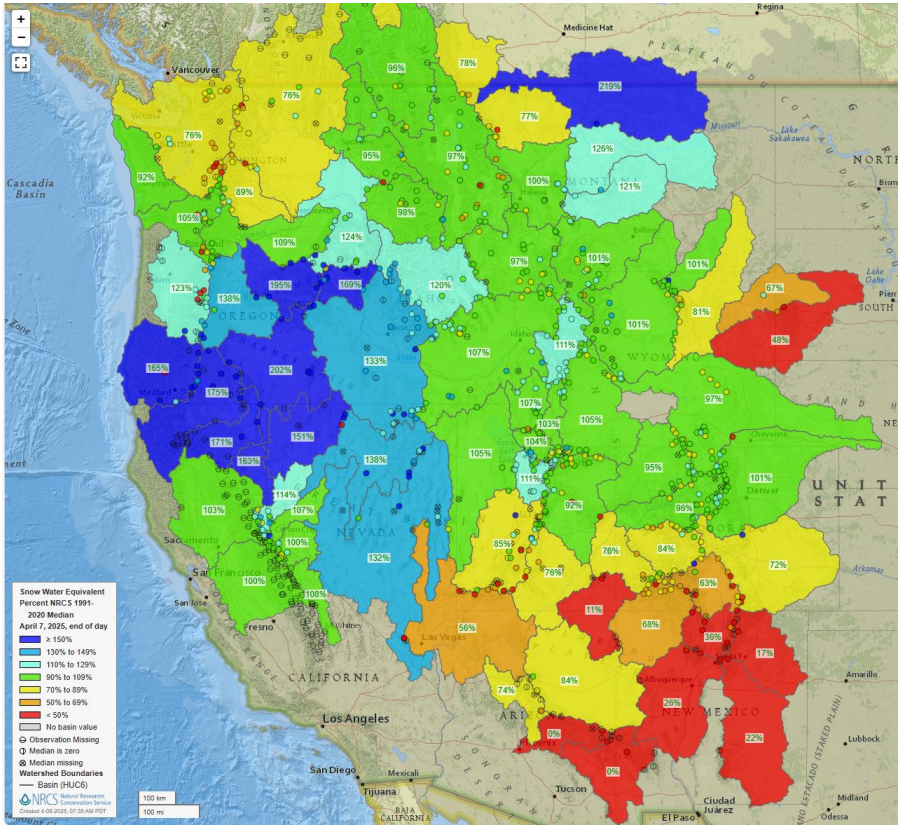


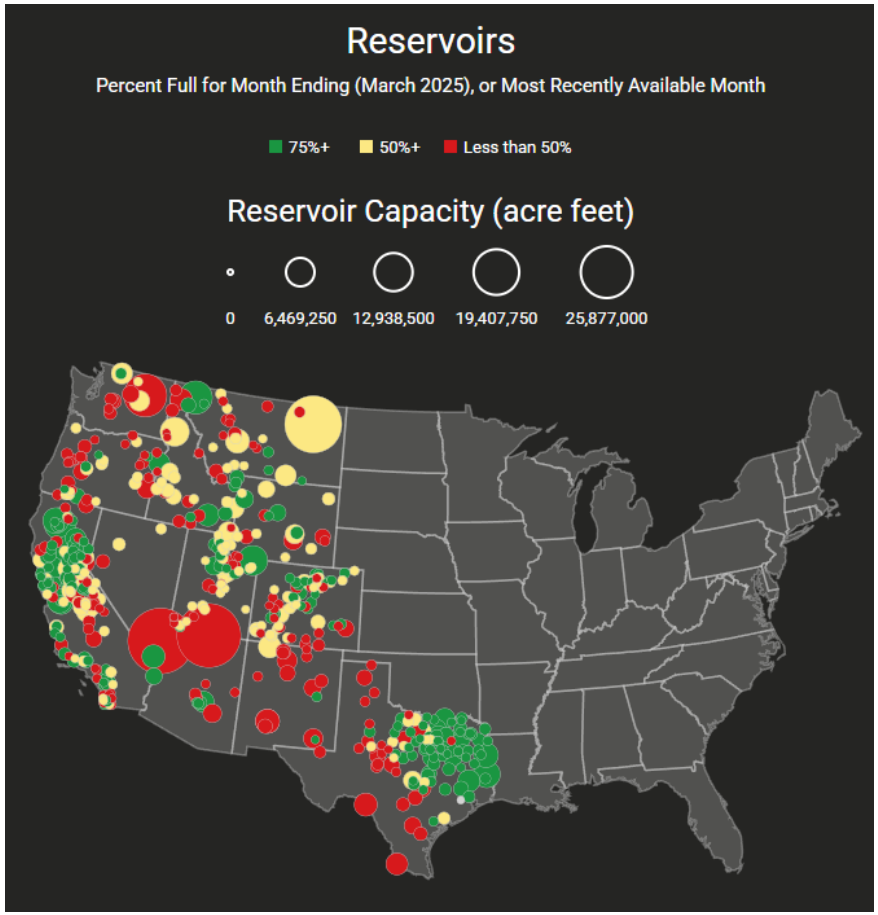
Precipitation



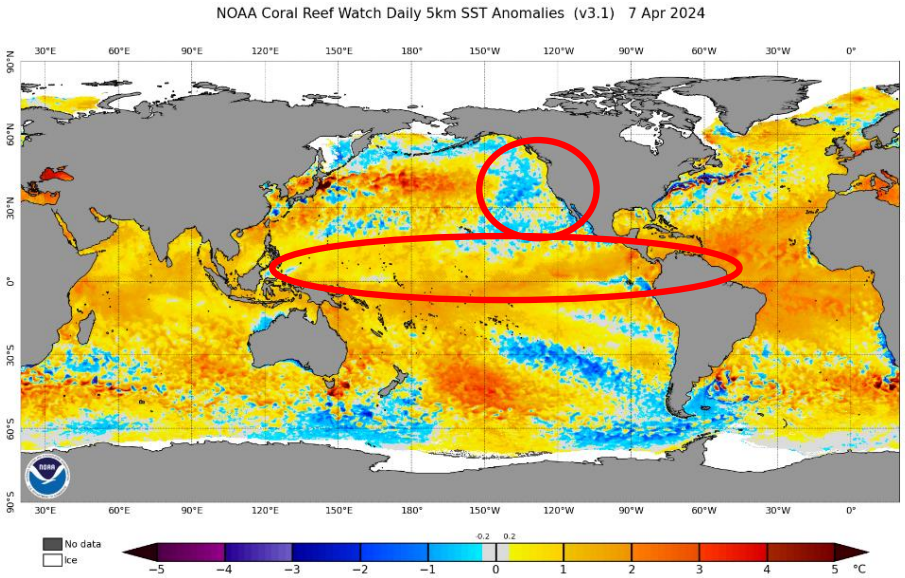
Above normal snow water equivalent across the mountains, but many reservoirs still below 50% capacity

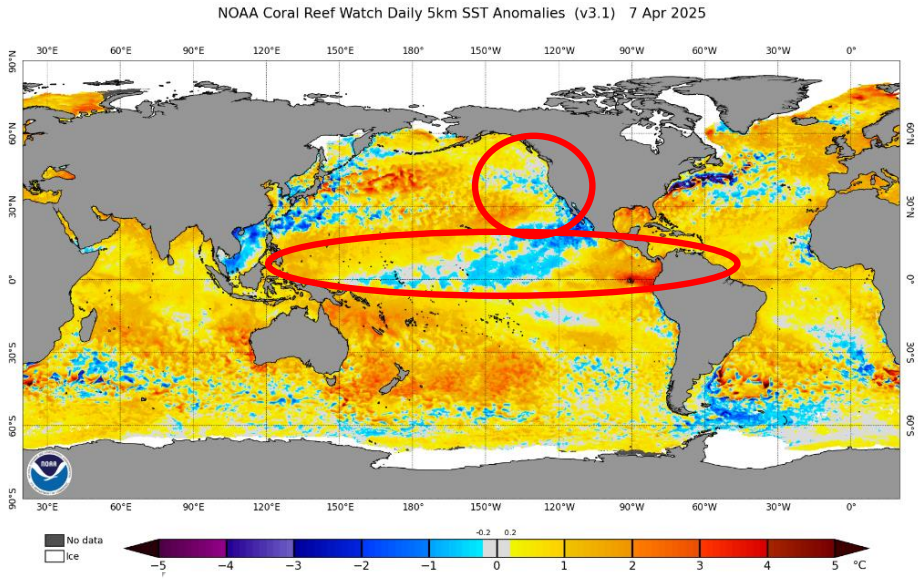
Snow Water Equivalent



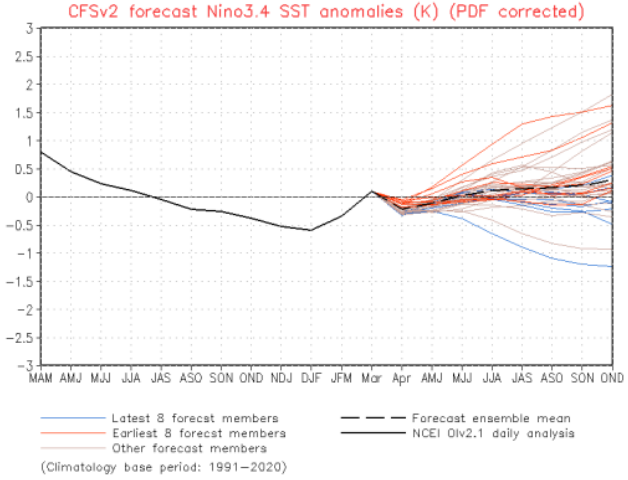


Comparing spring sea surface temperature anomalies: Spring 2024 vs 2025





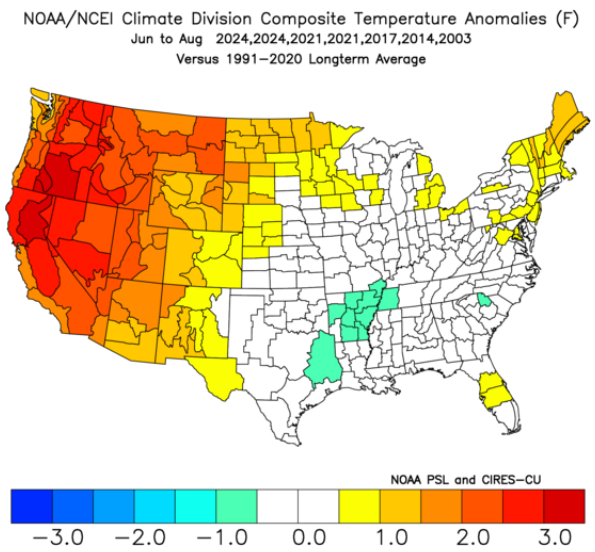
Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
2020	0.5	0.5	0.4	0.2	-0.1	-0.3	-0.4	-0.6	-0.9	-1.2	-1.3	-1.2
2021	-1.0	-0.9	-0.8	-0.7	-0.5	-0.4	-0.4	-0.5	-0.7	-0.8	-1.0	-1.0
2022	-1.0	-0.9	-1.0	-1.1	-1.0	-0.9	-0.8	-0.9	-1.0	-1.0	-0.9	-0.8
2023	-0.7	-0.4	-0.1	0.2	0.5	0.8	1.1	1.3	1.6	1.8	1.9	2.0
2024	1.8	1.5	1.1	0.7	0.4	0.2	0.0	-0.1	-0.2	-0.3	-0.4	-0.5
2025	-0.6	-0.4										



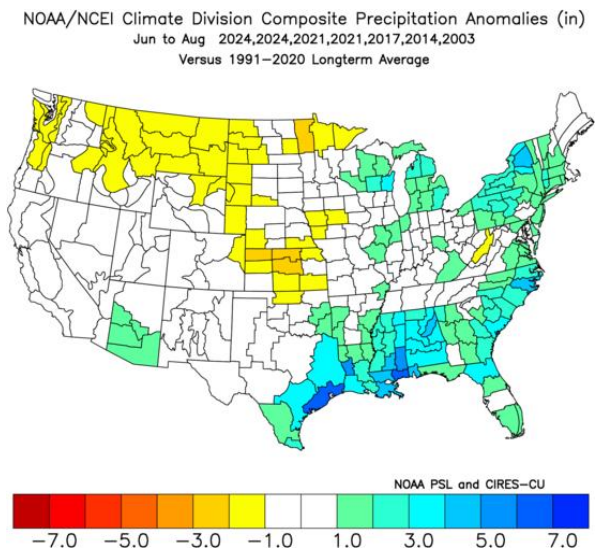
Similar years: 2024, 2021, 2017, 2014, 2003

- Focusing on years with similar SST and El Niño patterns and trends
- Watching positioning of ridge
  - Shifting of the ridge of heat further north can allow for hotter temperatures further north

Temperature

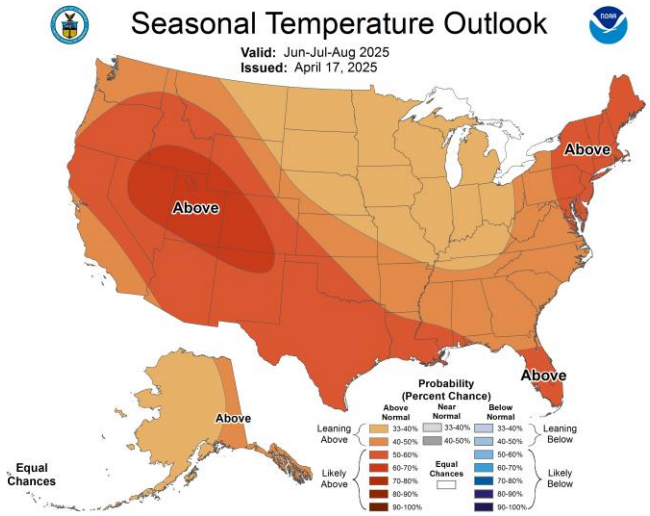


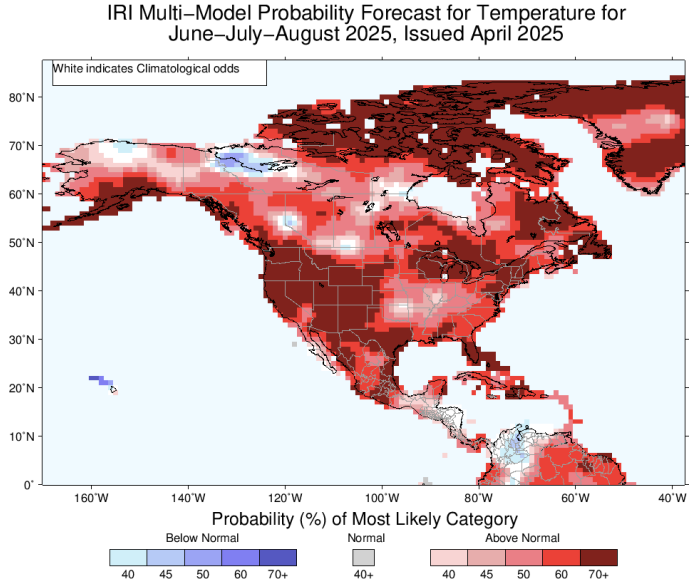
Precipitation



Temperature Outlook
June – August 2025

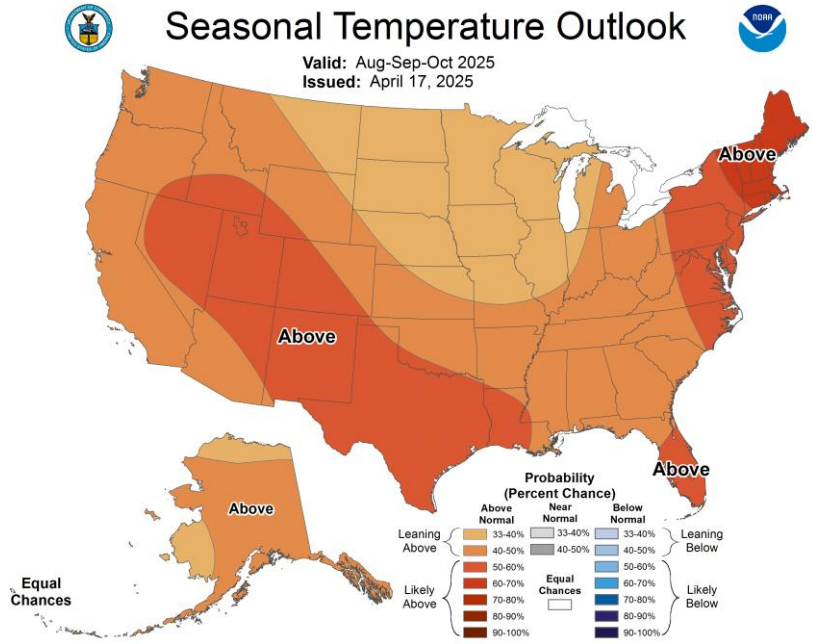
- First half of summer could have higher magnitude of above normal temperatures.
- Above normal temperatures are most likely to occur across the Northern and Central western US.
- A slightly lower chance of above normal temperatures in coastal locations.

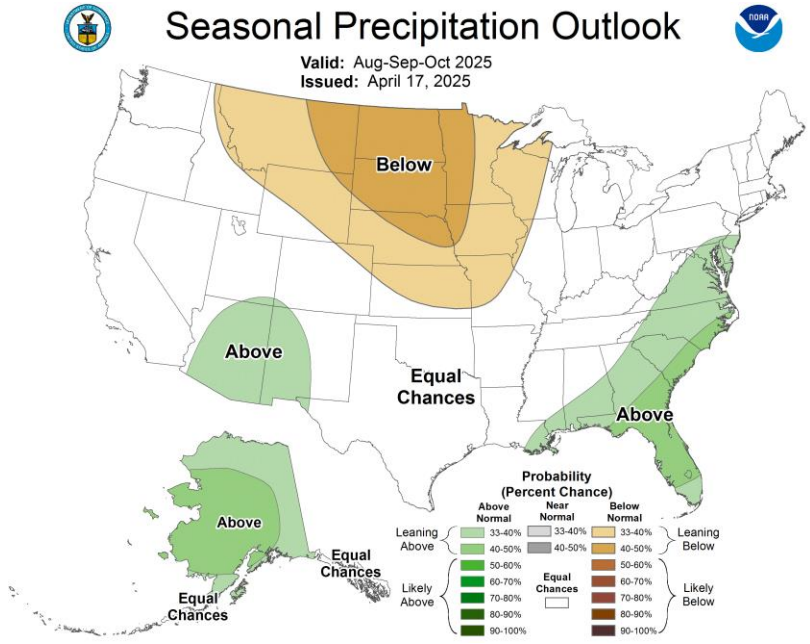




Weather Outlook
August – October 2025

- Potential for above normal temperatures in August and September, primarily for the western interior
- Continued risk for below normal rainfall for Pacific NW and above normal rainfall for the Desert SW



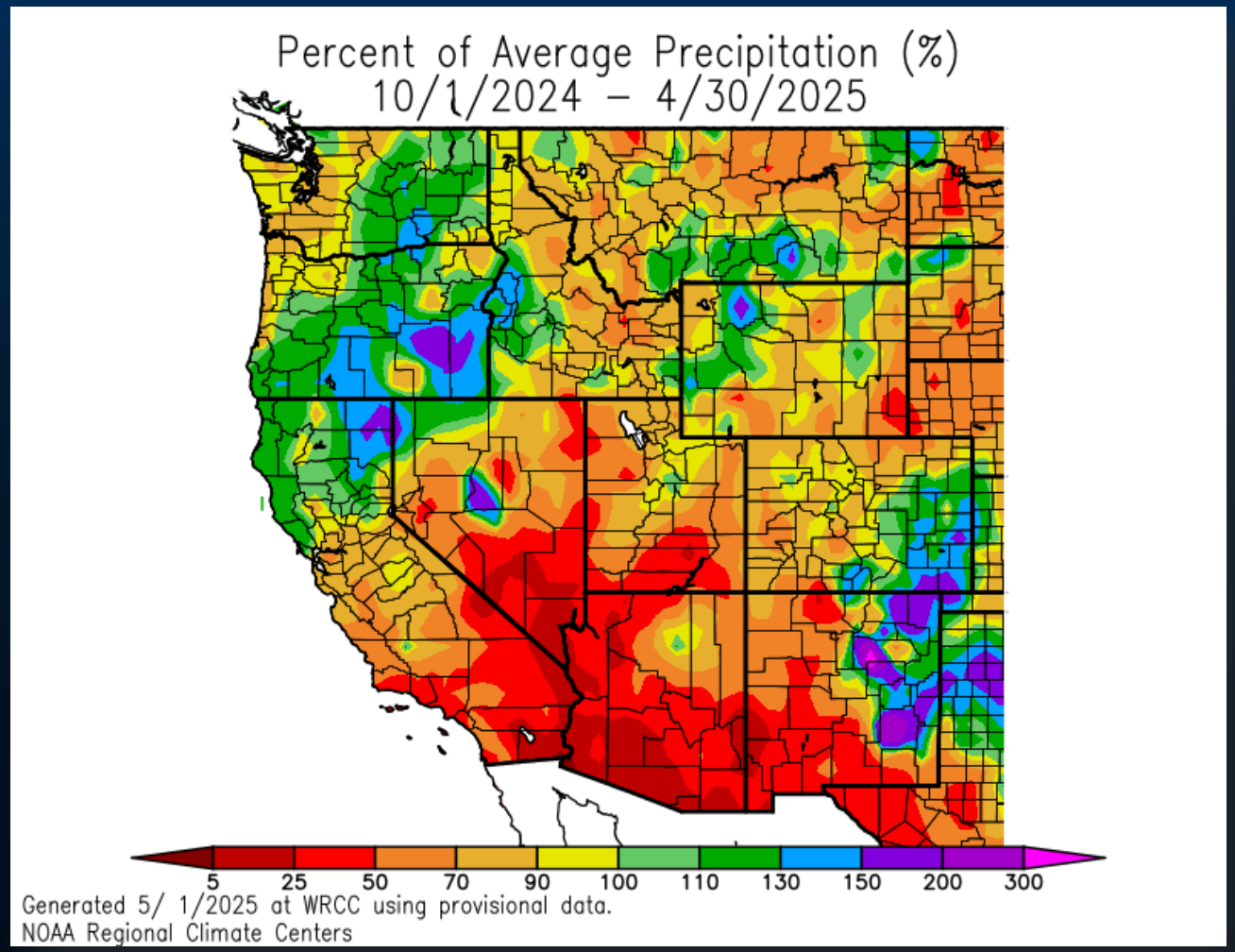


California Seasonal Outlook

May – August, 2025

Summer Energy Reliability Workshop

Water Year: Percent of Average Precipitation

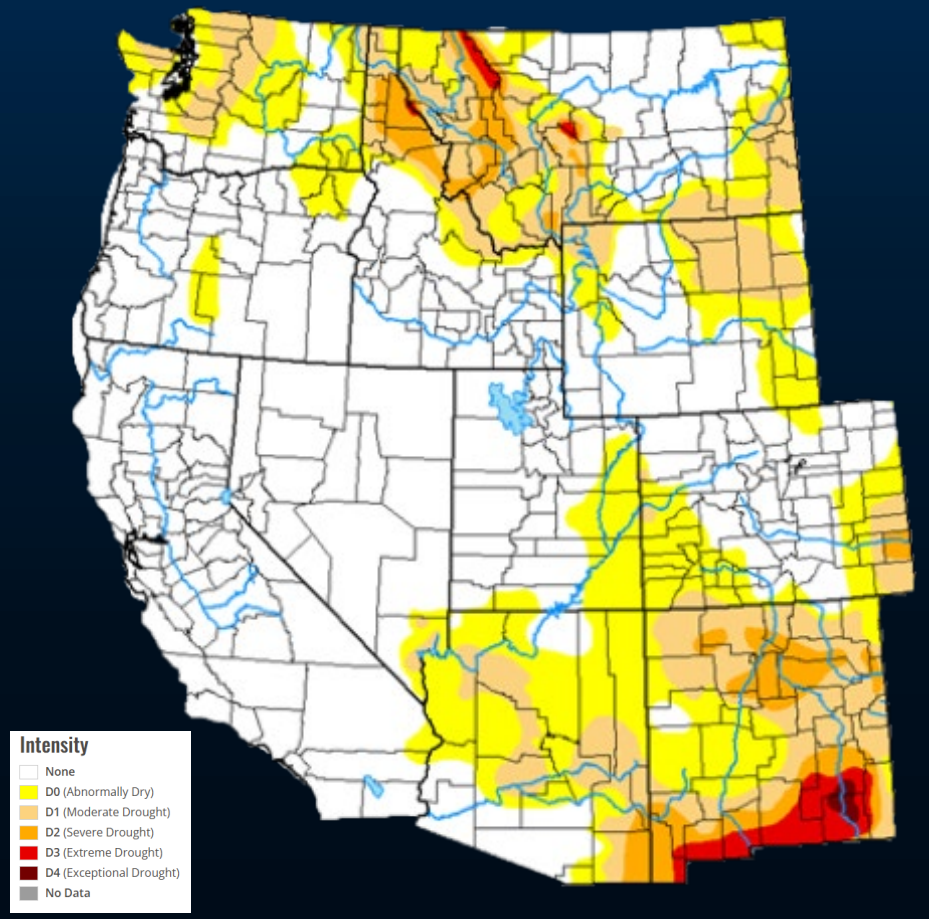


- Near normal to above normal precipitation totals in the Pacific Northwest.
- Below normal precipitation across most of Southern California during the current water year.
- NOAA Regional Climate Center data indicates that all areas South of Bakersfield is anywhere from less than 25% to 70% percent of average precipitation.

Recent Climate Anomaly Maps and Tables

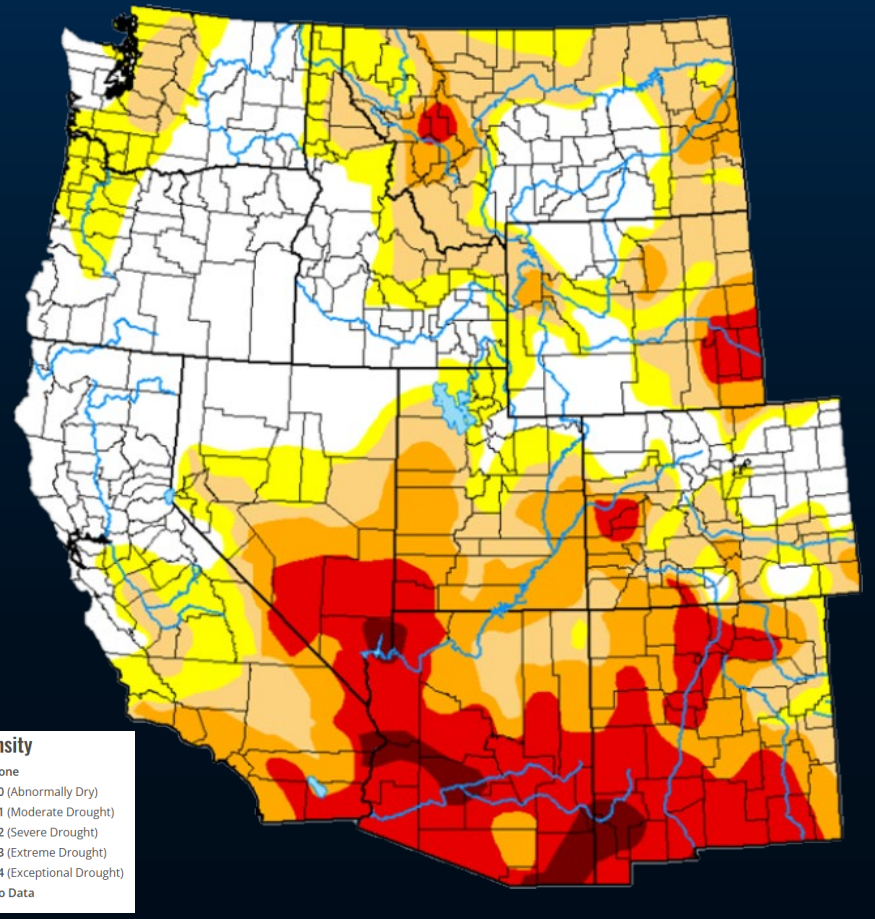
US Drought Monitor: Western Region

Drought Status April 30, 2024



- Moisture deficits led to the expansion of Moderate to Exceptional Drought in Southern California.
- Abnormal dryness into southwestern Washington and much of northwestern Oregon.

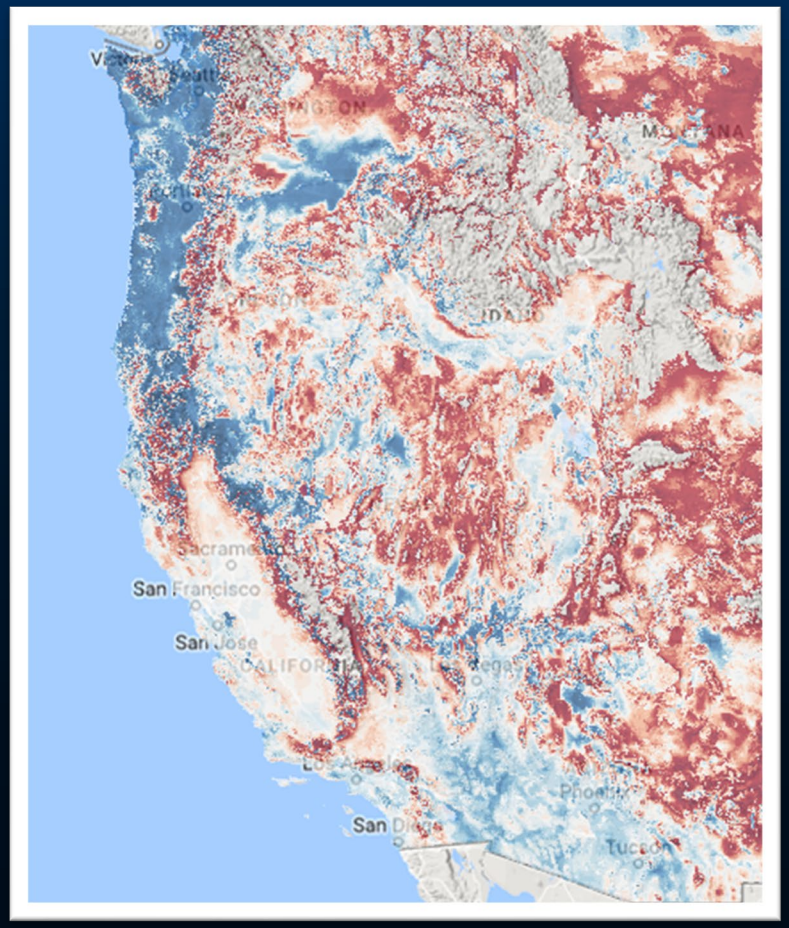
Drought Status April 29, 2025



[Comparison Slider | U.S. Drought Monitor]

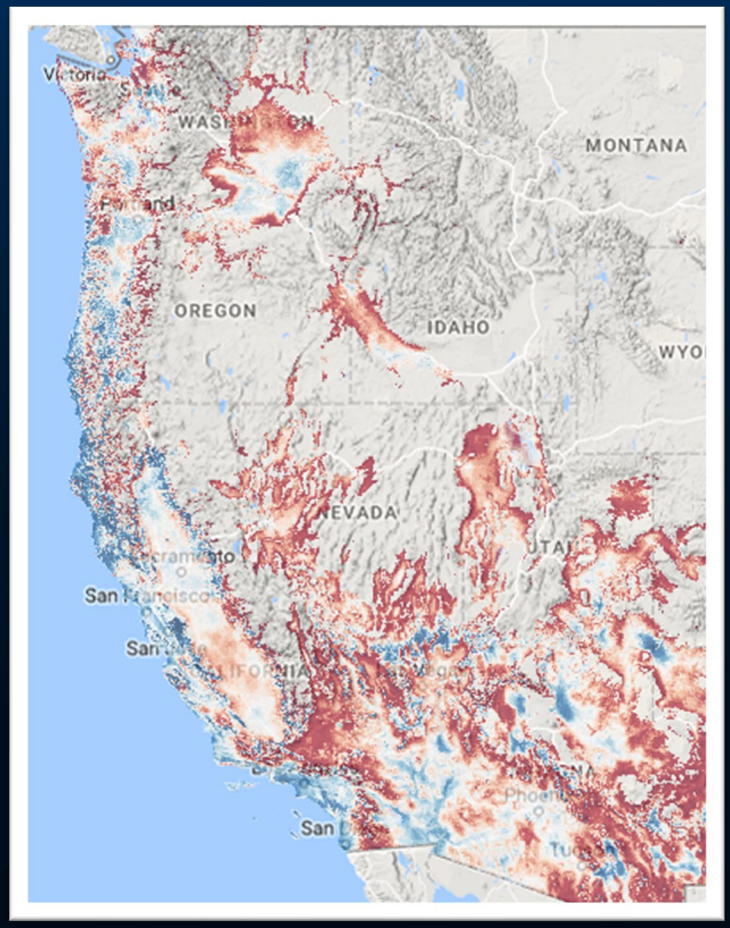
Spring Status 2025

Spring Leaf Index



How does this spring compare to normal?

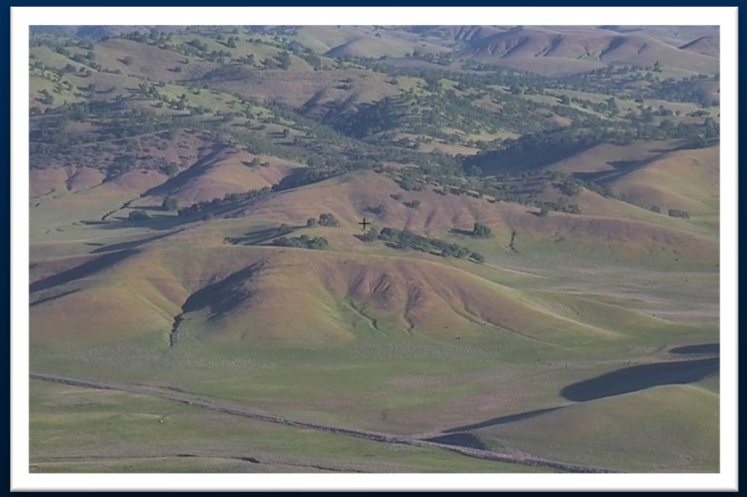
Spring Bloom Index



[Status of Spring | USA National Phenology Network]

Fuels Discussion: Herbaceous Live Fuels

April 1, 2025



May 1, 2025

Northern California

- The green-up process in live fuels continued to progress further up the slopes during April, with various stages of woody fuel green-up as high as 5,000 feet by the end of the month.

- Herbaceous fuels found in the fully exposed and/or thin soil areas started to show signs of curing during the latter half of the month below 1,000 feet.

Southern California

- Several pulses of moisture in February and March coupled with the recent rain this week is allowing green-up to continue. This has also resulted in an increased yield of the grass crop and fine fuels.

- Drier conditions become more likely as we transition into the summer months. The long-term drying trends allow for less moisture in the larger live fuel types such as timber.

California: Four Month Significant Fire Potential

May – August 2025 California Highlights

Northern California

- Atmospheric patterns in May are likely to be similar to April. Near to above normal precipitation east of the Cascade-Sierra crest and likely below normal precipitation west of the crest.

- From June through August, expect a shift towards warmer and drier than normal conditions. Significant Fire potential is projected to be normal for May, then trending near to above normal during June and July favoring the interior or away from coastal influences.

Southern California

- Near normal fire potential for May , slightly tilting towards above normal fire potential for the Sierra Foothills, Central Coast Interior, Western and Southern Mountains for June.

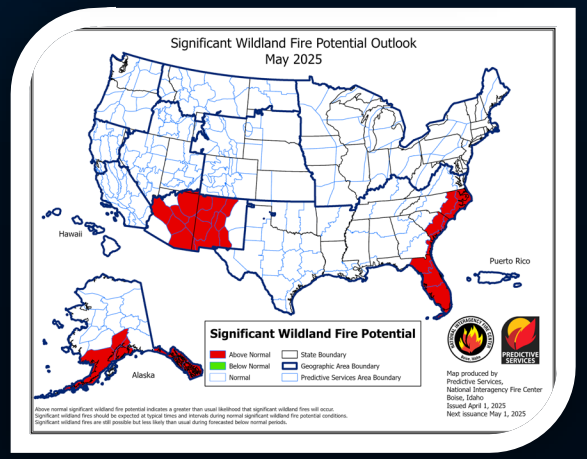
- For July and August odds of large fire potential extending into Southern Sierras, and South Coasts as well.

Pacific Northwest

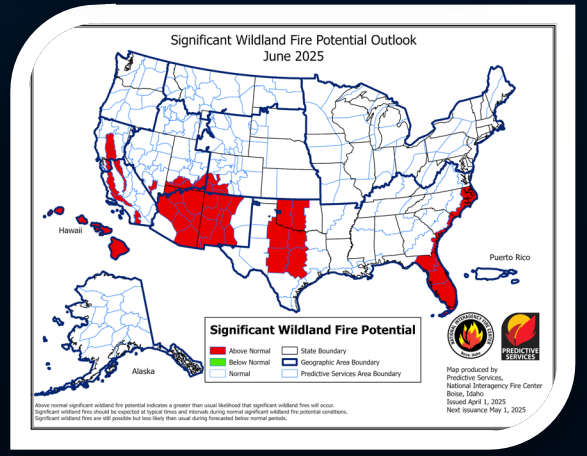
- May predicted to be near normal large fire potential, with slightly higher risk in in drought-prone eastern areas of WA. July and August much of the Pacific Northwest will rise to above normal Large Fire Potential.

California: Four Month Significant Fire Potential

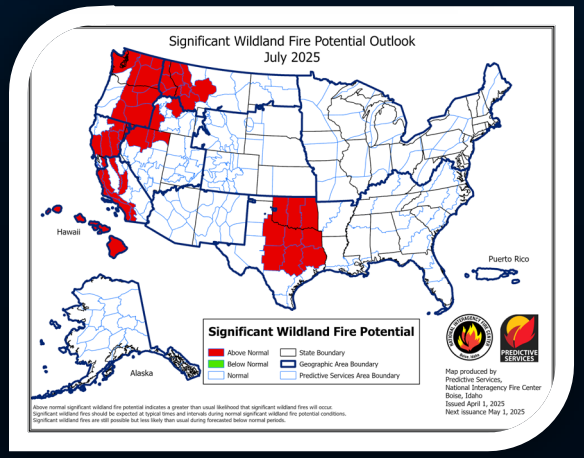
May



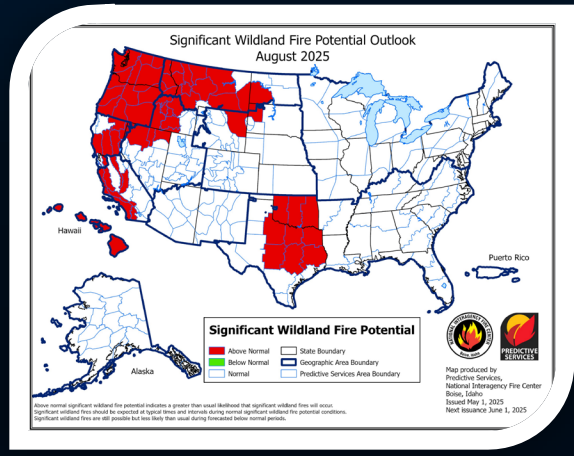
June



July

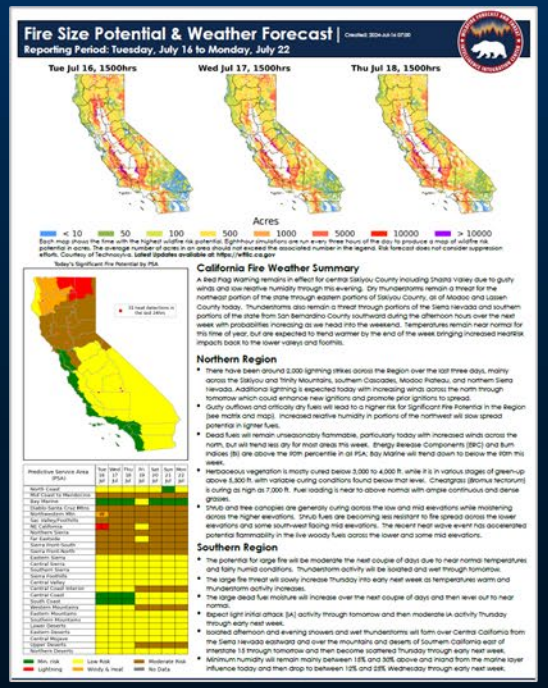


August



Outlooks | National Interagency Coordination Center

WFTIIC Products

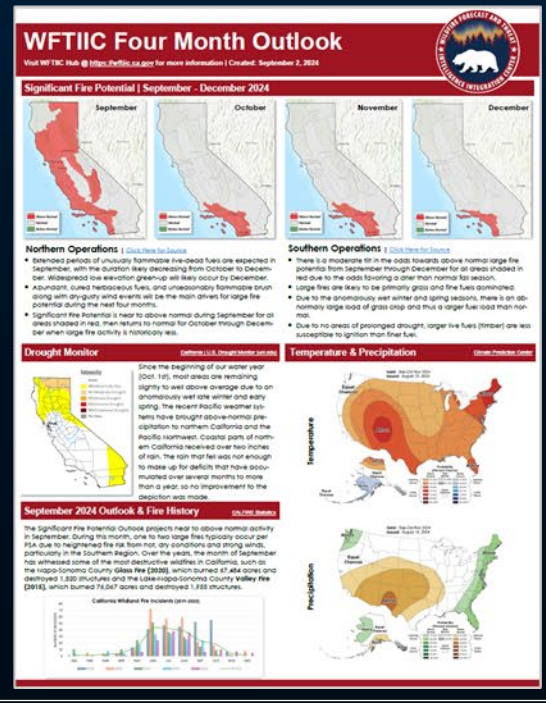


WFTIIC Daily

- 3-day Fire Size Potential Forecast for the entire state of California.
- 2024 version includes California Fire Weather Summary provided by WFTIIC's NWS liaison.
- Statewide 7-day Significant Fire Potential Map with FireGuard detections and daily fire potential rating by Predictive Service area with CAL FIRE Unit boundaries.

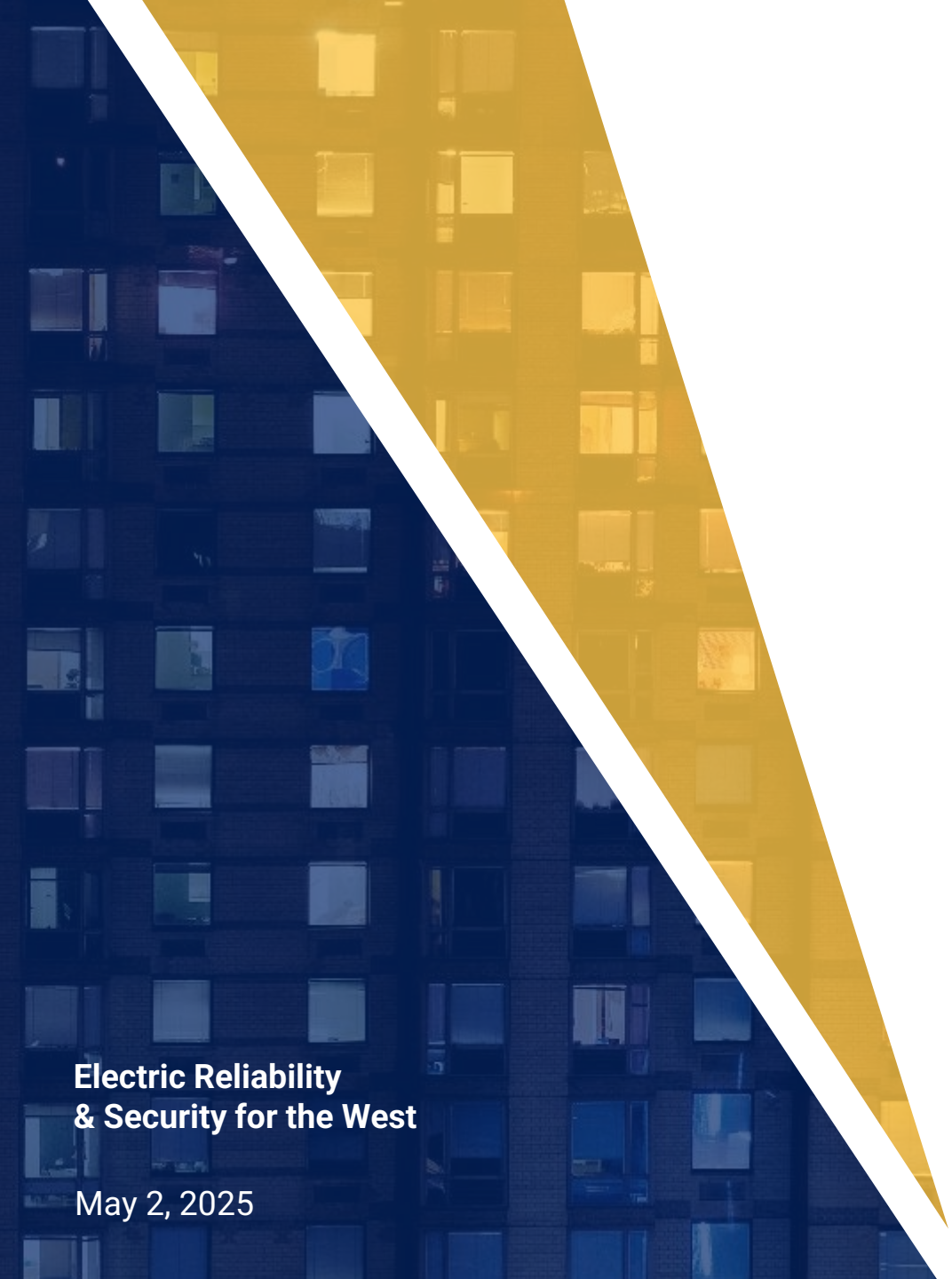
WFTIIC Monthly One-page

- Lower right portion reflects the immediate concern of the outlook.
- Rainfall to date, snowpack status, reservoir capacity, grassland fuel loading, dead fuel moisture, lightning outlook, fall fire history, Santa Ana wind trends, Pacific Ocean current oscillations.



Wildfire Forecast & Threat Intelligence Integration Center (WFTIIC)

Jeff Fuentes
CAL FIRE
Deputy Chief WFTIIC
Jeff.Fuentes@fire.ca.gov



WECC

2025 Summer Reliability Outlook

Prepared for the California Energy Commission

Branden Sudduth

Vice President of Reliability Planning & Performance Analysis

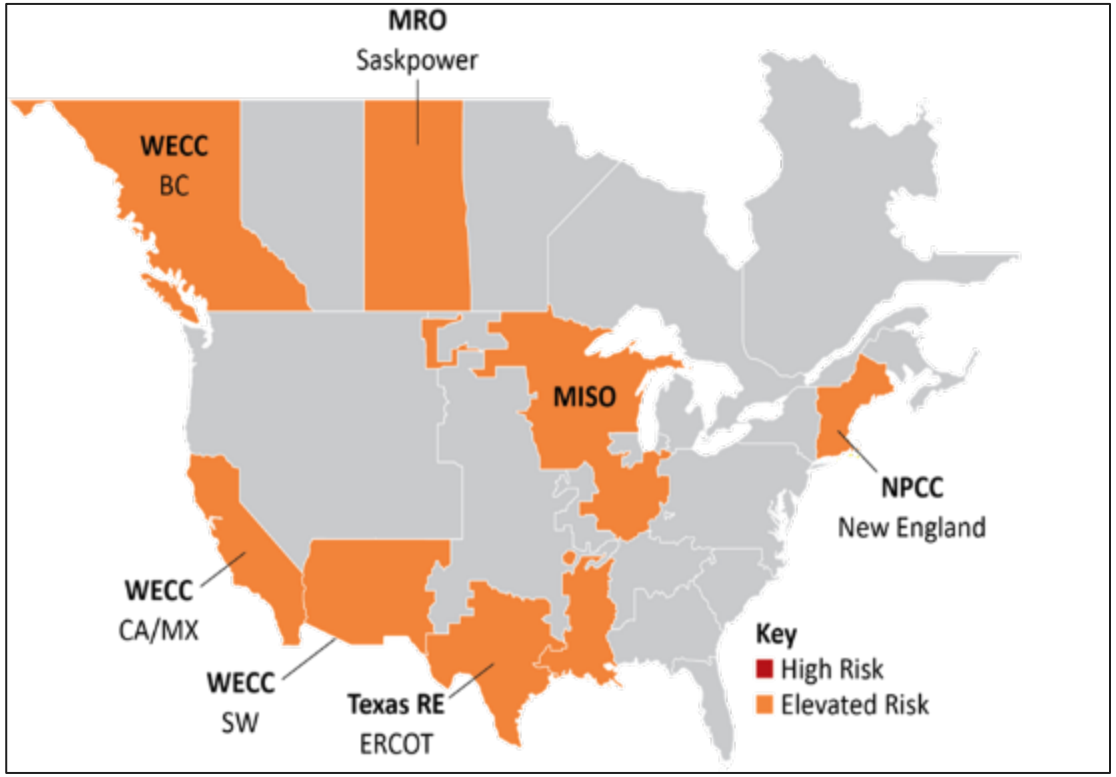
Electric Reliability & Security for the West

May 2, 2025

Summer Reliability Assessment (SRA)

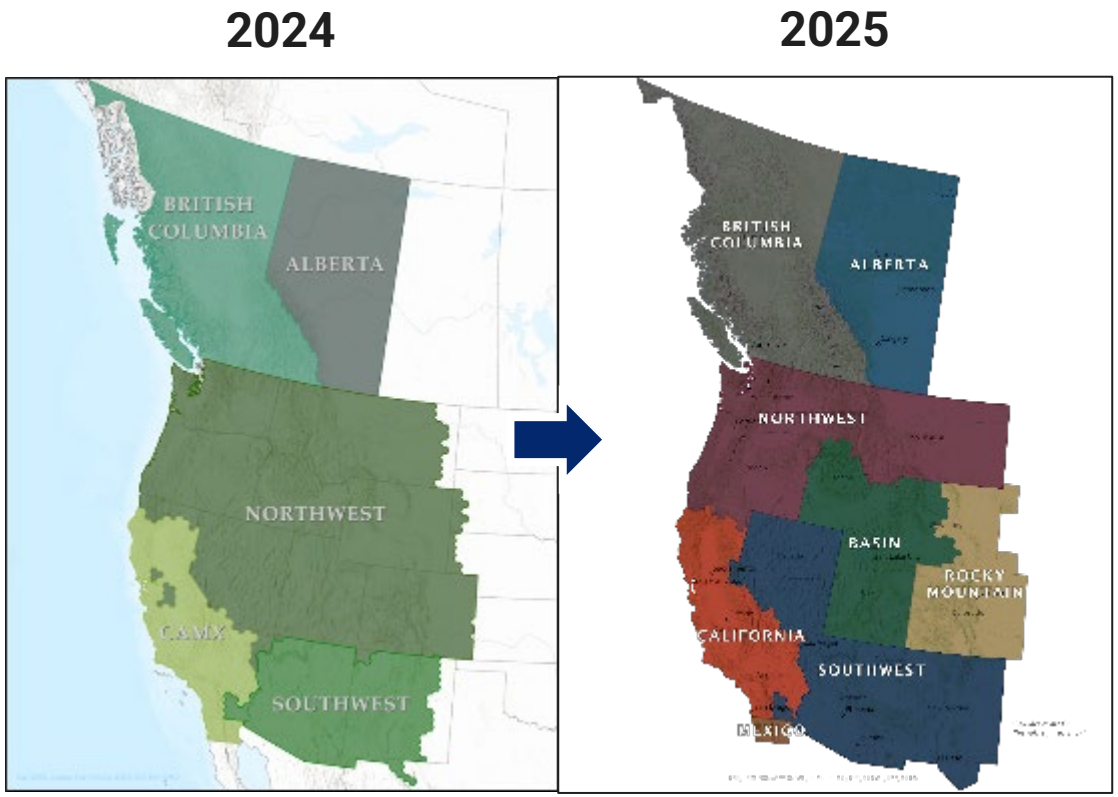
- **Risk identification June–September**
- **Extreme Conditions:**
  - At or above 90/10 demand forecast
  - Abnormally high generator outages
  - Low renewable availability
- **Normal Conditions:**
  - Average (50/50) demand conditions
  - Typical outages & renewable availability

2024 SRA



Seasonal Risk Assessment Summary	
High	Potential for insufficient operating reserves in normal peak conditions
Elevated	Potential for insufficient operating reserves in extreme conditions
Normal	Sufficient operating reserves expected

Regional Boundaries

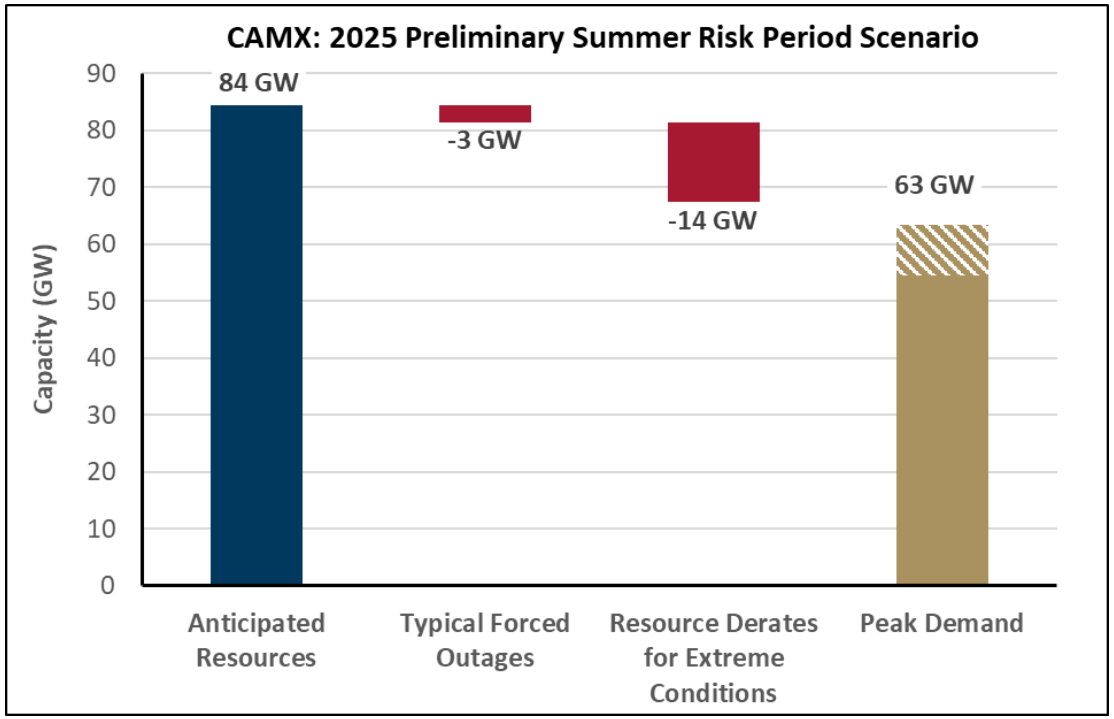


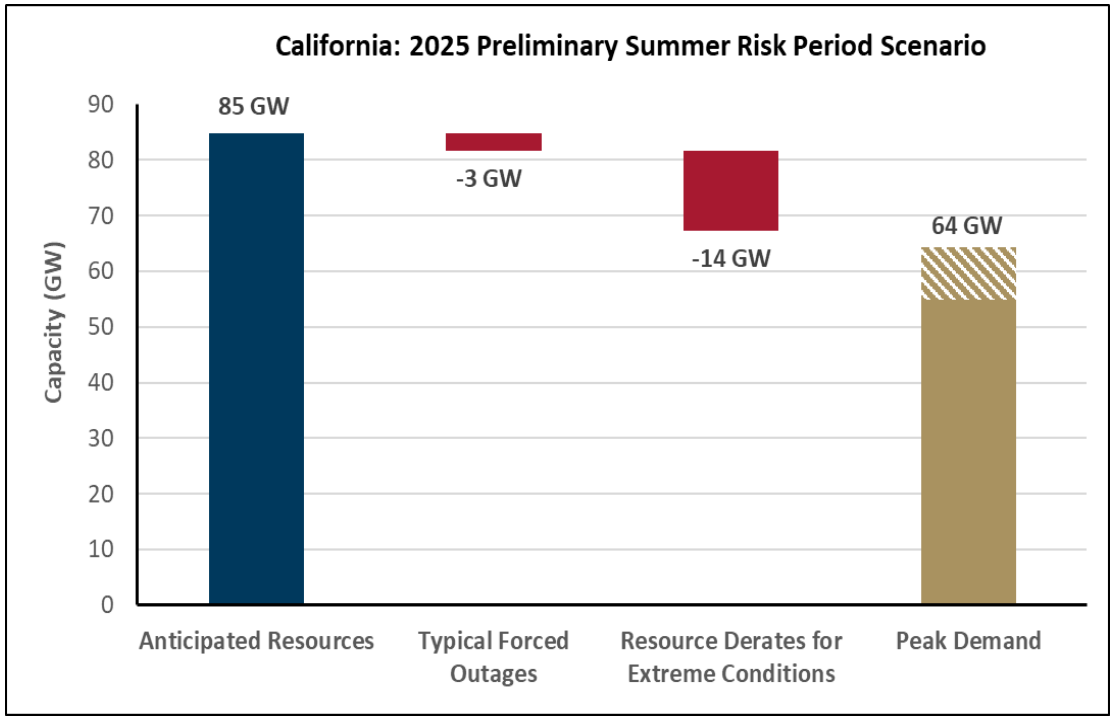
- **NERC transmission planning region guidance:**
  - Separate Canadian Provinces & Mexico
  - Avoid large interregional transmission within a region
  - One or two states per region
- **More granularity for the Northwest**
- **Generally separated by known constraints in transfer capability**
- **Consistent with WECC PCM regions**
- **Regional similarities in climate**

2025 *Preliminary* SRA Results

- **CAMX/California prediction: Normal Risk**
  - Peak hour at HE 17 in early September

Summary	LOLH		EUE	
Submission Yr	2025		2025	
Resource Type	T1+Existing	Existing	T1+Existing	Existing
CAMX	-	-	-	-
Submission Yr	2025		2025	
Resource Type	T1+Existing	Existing	T1+Existing	Existing
California	-	-	-	-





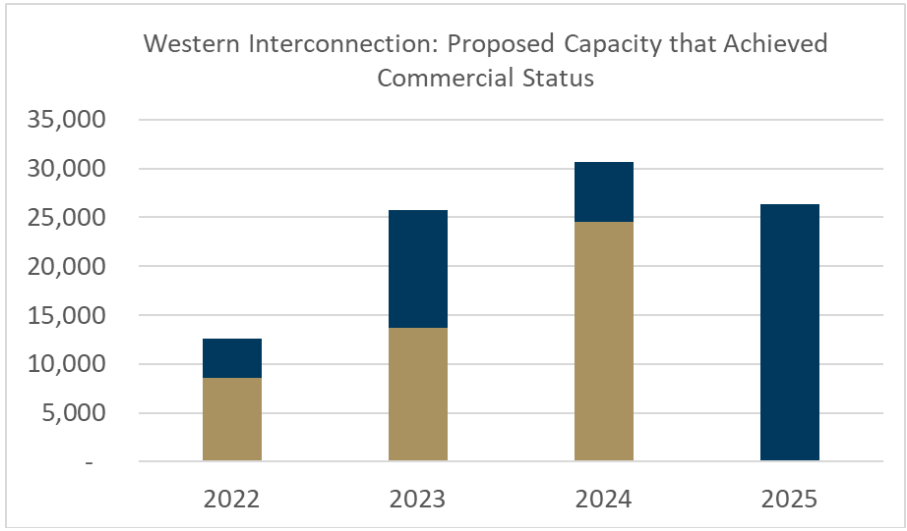
Supply Chain Issues

- **Transformers (2–4 years)**
  +1 year, +100% cost
- **Circuit Breakers (2–4 years)**
  +0.5 years, ↑ cost
- **Switchgears (1.5–2 years)**
  +0.5 years, +10% cost
- **Insulators (1 year)**
- **Substation Switches (1–2 years)**
  +10 weeks
- **Transmission Poles (0.5 years)**
  -0.5 years, ↑ cost

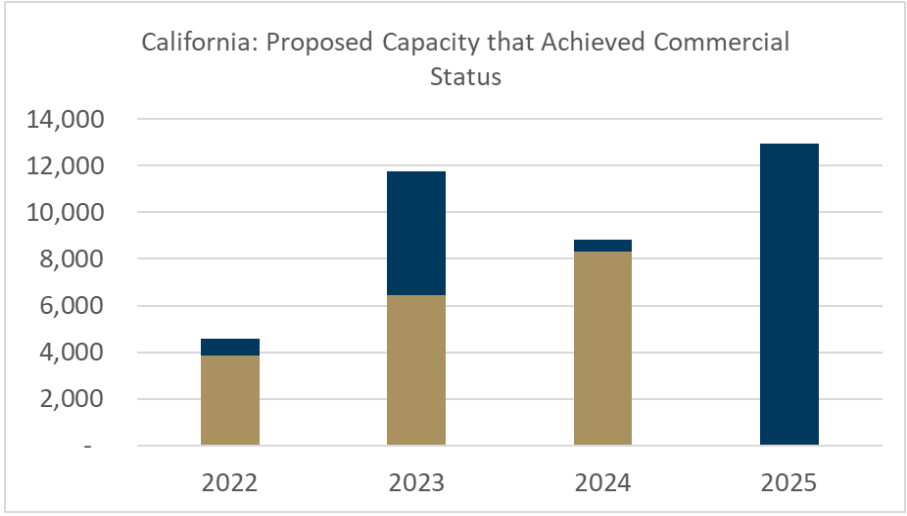
Rank	Equipment	Percentage of WECC BAs Citing Procurement Concerns
1	Transformers	59%
2	Circuit Breakers	52%
3	Switchgears	31%
4	Insulators	28%
Tied-5	Substation Switches	24%
Tied-5	Transmission Poles	24%

Proposed vs. Completed

- **Vastly improved resource completion percentage in 2024 in comparison to 2023**
- **Delayed resources in 2022 & 2023 becoming operational**
- **Mitigation strategies for supply chain issues making an impact**



Year	Western Interconnection	California
2022	69%	84%
2023	53%	55%
2024	80%	94%
3-Year Avg.	67%	78%



WECC

WWW.WECC.ORG | (801) 582-0353

155 N 400 W, Salt Lake City, UT 84103, USA

Q&A

Ten Minute Break

Panel: California Resources

Moderator: Elise Ersoy

A. State of the Energy Market, Derrick Flakoll, Bloomberg
B. Demand Forecast, Nick Fugate, CEC
C. CPUC New Resources, Christina Pelliccio, CPUC
D. Hydro Conditions, Jorge Quintero, DWR
E. Emerging Trends, Rohimah Moly, Governor's Office of Business Development
F. Energy Situational Awareness Dashboards, Stephen Lai, CEC

US and California Energy Overview

From Trends to Tariffs

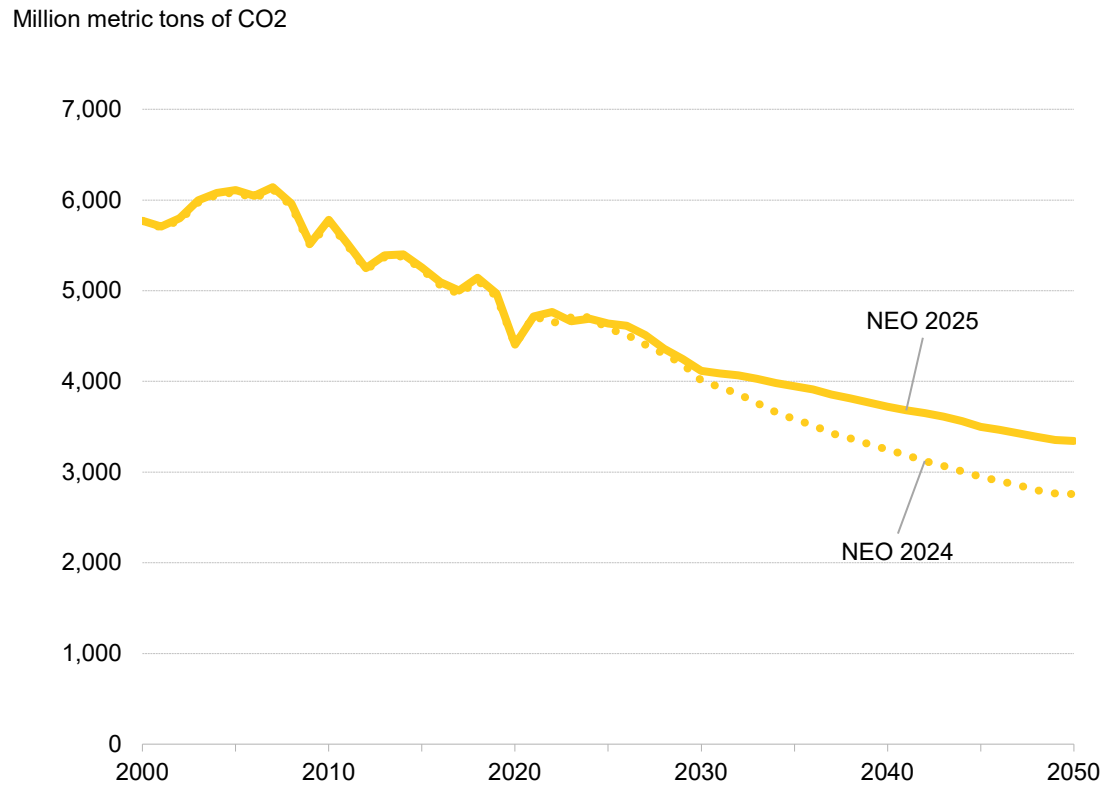
Derrick Flakoll

May 2, 2025

BloombergNEF

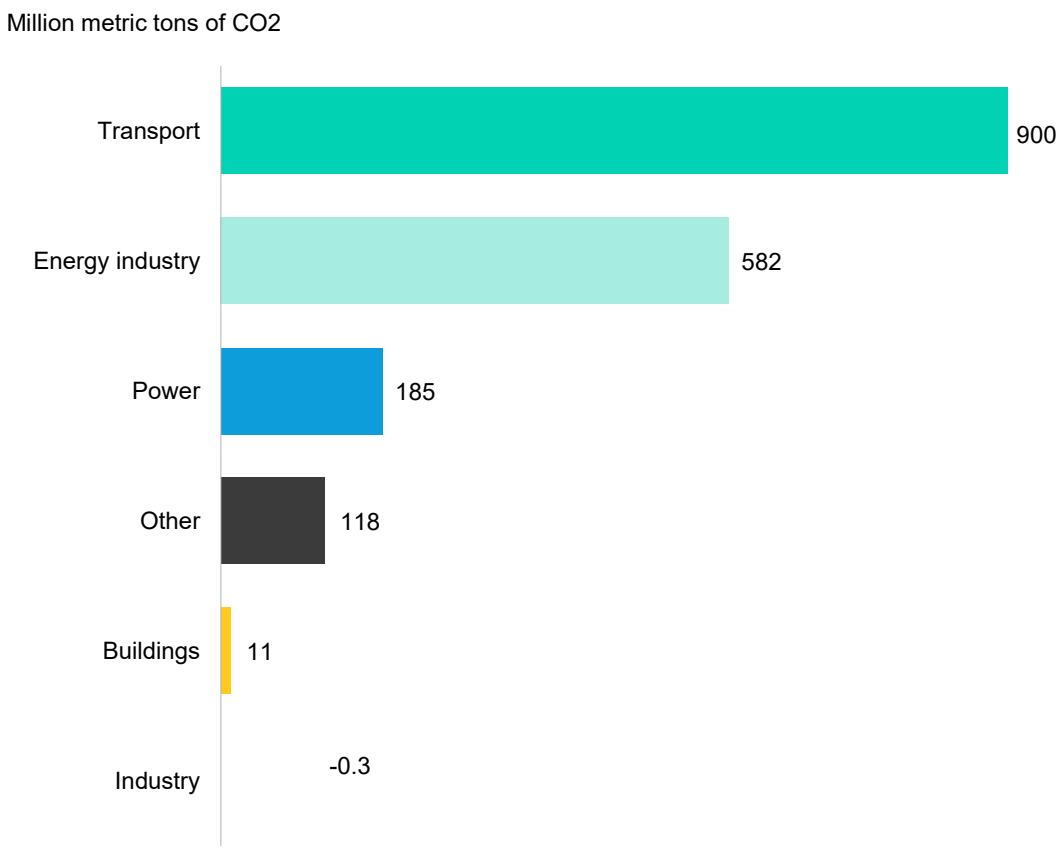
US energy-related emissions under Economic Transition Scenario, NEO 2024 versus NEO 2025

Annual energy-related CO2 emissions



Source: BloombergNEF

Change from previous case by sector, 2025-2035

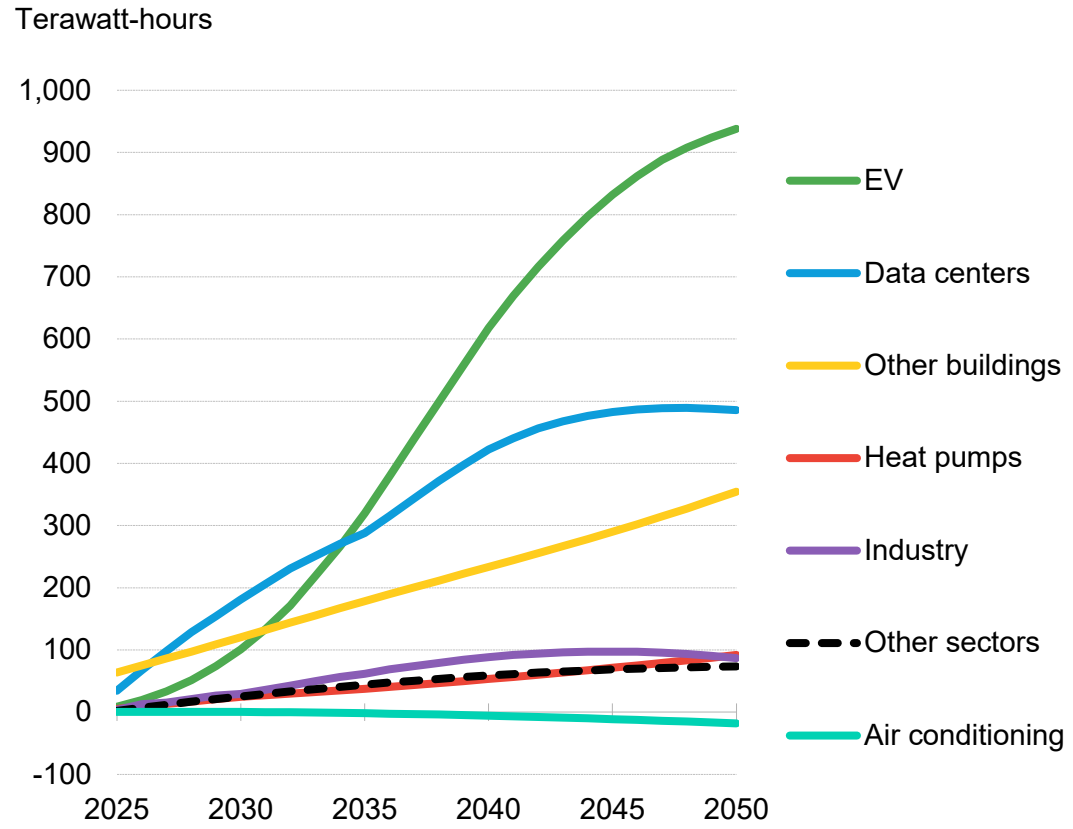


Source: BloombergNEF

BloombergNEF

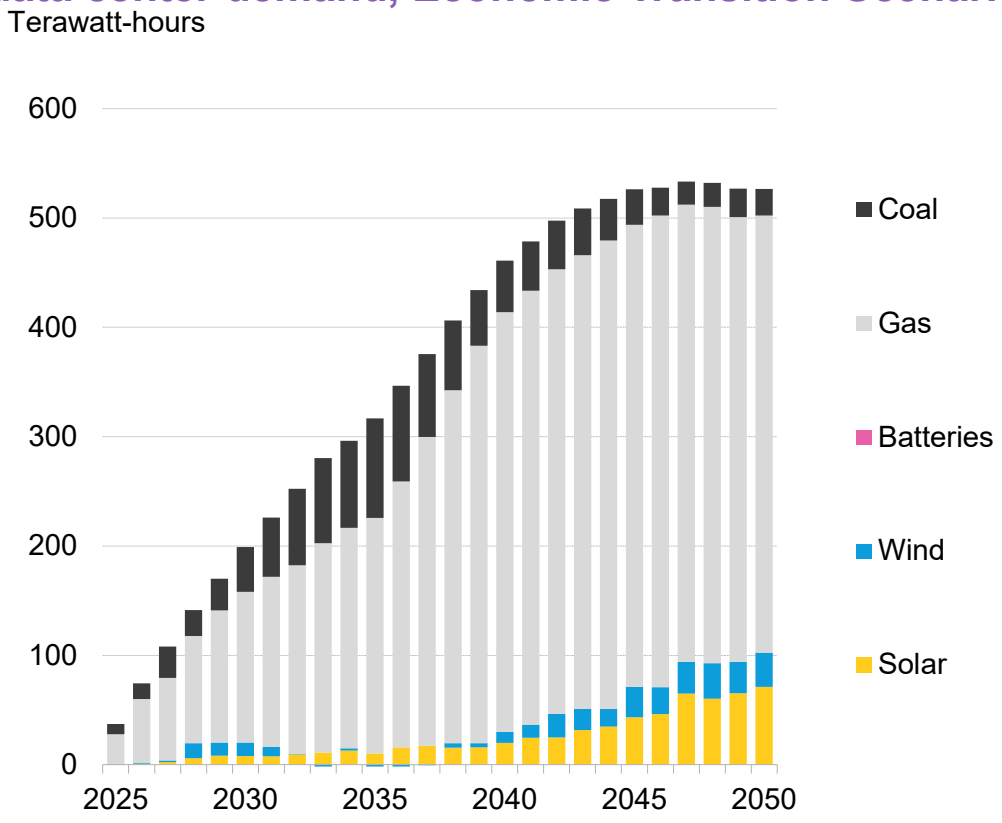
Data centers drive US electricity demand growth in the near term

Drivers of future US electricity demand, Economic Transition Scenario



Source: BloombergNEF

Net impact on US power generation from additional data center demand, Economic Transition Scenario

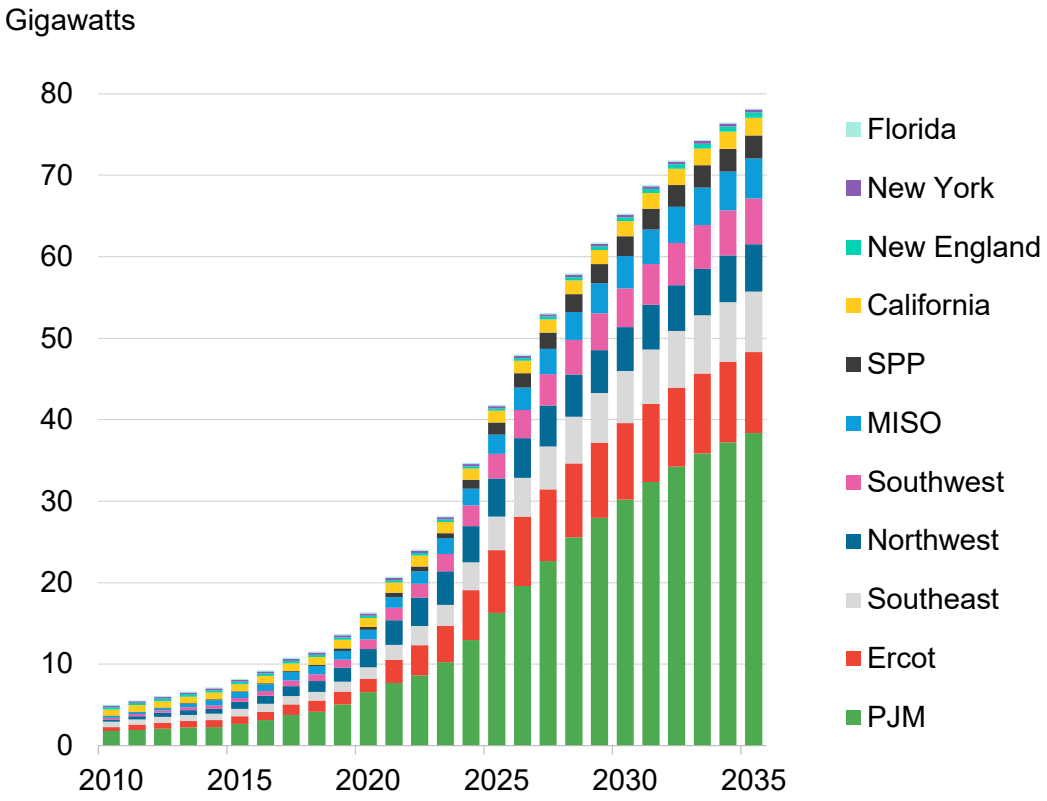


Source: BloombergNEF

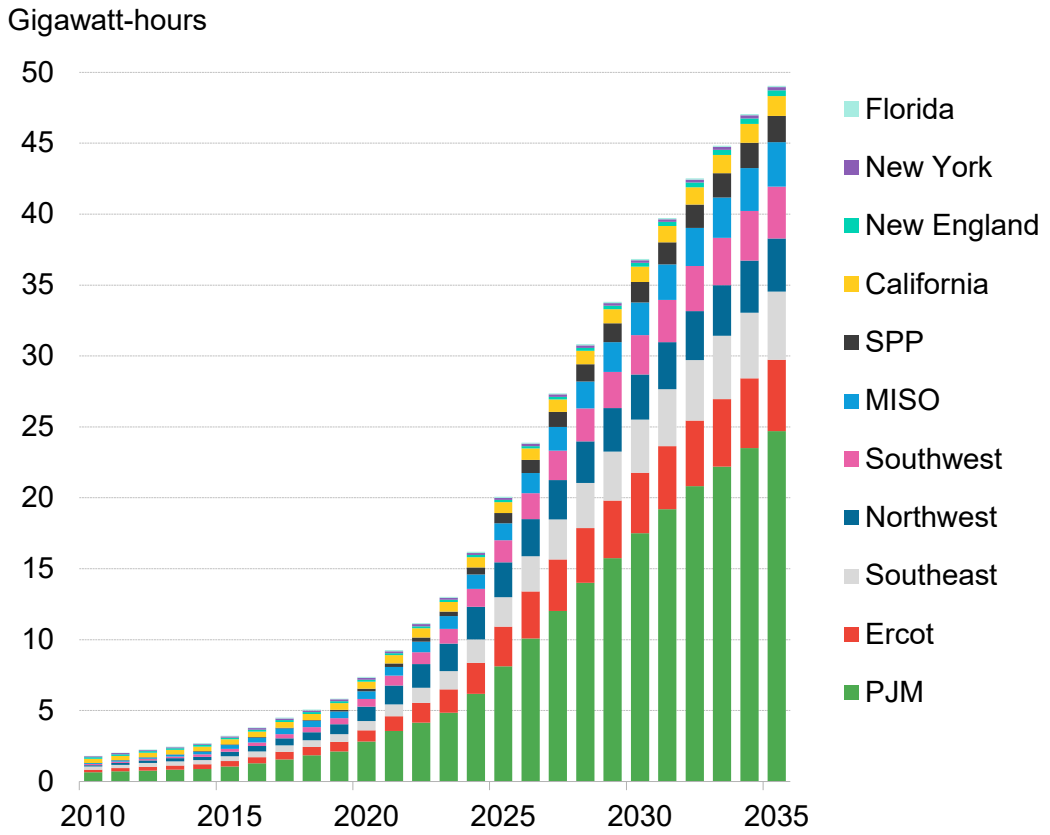
BloombergNEF

Forecast US data center power load and electricity demand

US data-center power load



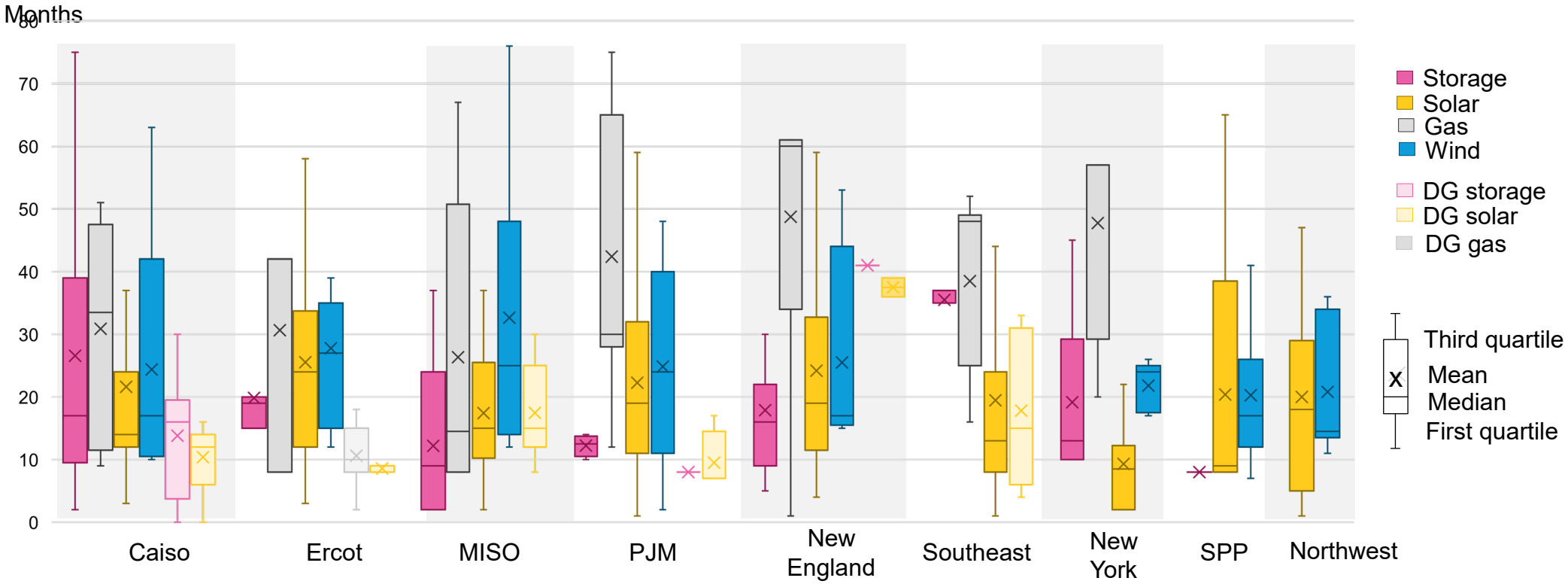
Average hourly US data-center electricity demand



Source: BloombergNEF, DC Byte. Note: Power load and electricity demand refers to total power load and total electricity demand.

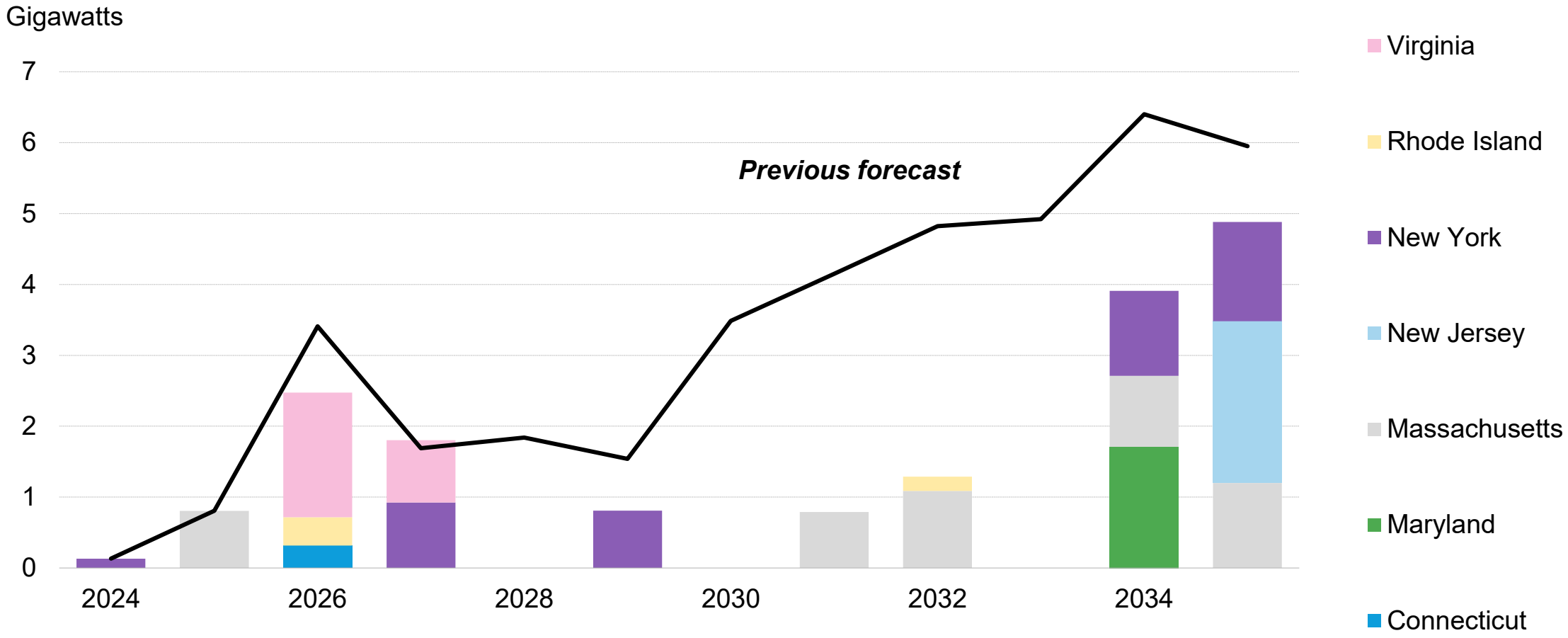
BloombergNEF

Lead times for technologies by US power region based on project development data from 2018 to 2024



Source: BloombergNEF, US Energy Information Administration (EIA). Note: Caiso is California Independent System Operator, SPP is Southwest Power Pool, Ercot is Electric Reliability Council of Texas, MISO is Midcontinent Independent System Operator, PJM is PJM Interconnection, NYISO is New York Independent System Operator, ISO-NE is ISO New England. DG is distributed generation and is defined as grid-connected generators that are smaller than 0.5MW large.

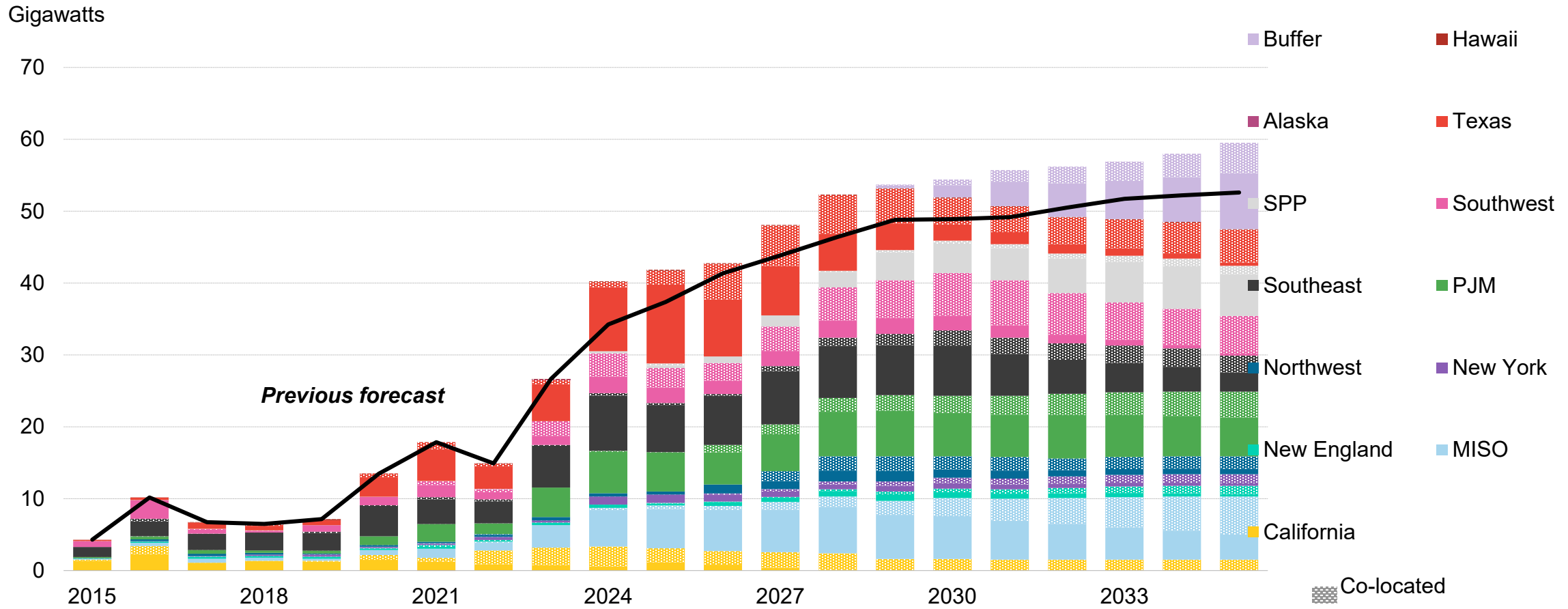
Annual US offshore wind capacity additions



Source: BloombergNEF. Note: Installations by commissioning year.

BloombergNEF

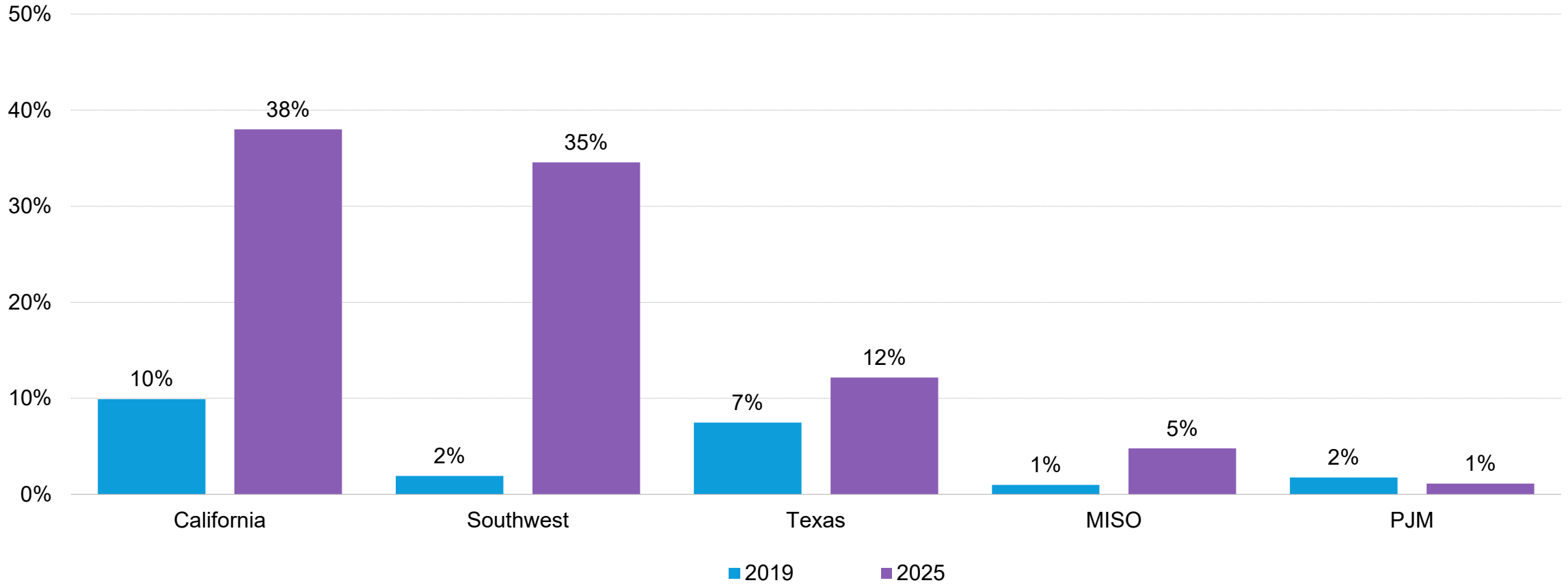
Annual US utility-scale PV capacity additions



Source: BloombergNEF. Note: Buffer refers to capacity that we expect to get built but cannot allocate to a region. Gigawatts in direct current (DC) terms. Co-located only considers solar capacity not storage. PV refers to photovoltaic. MISO is Midcontinent ISO. SPP is Southwest Power Pool.

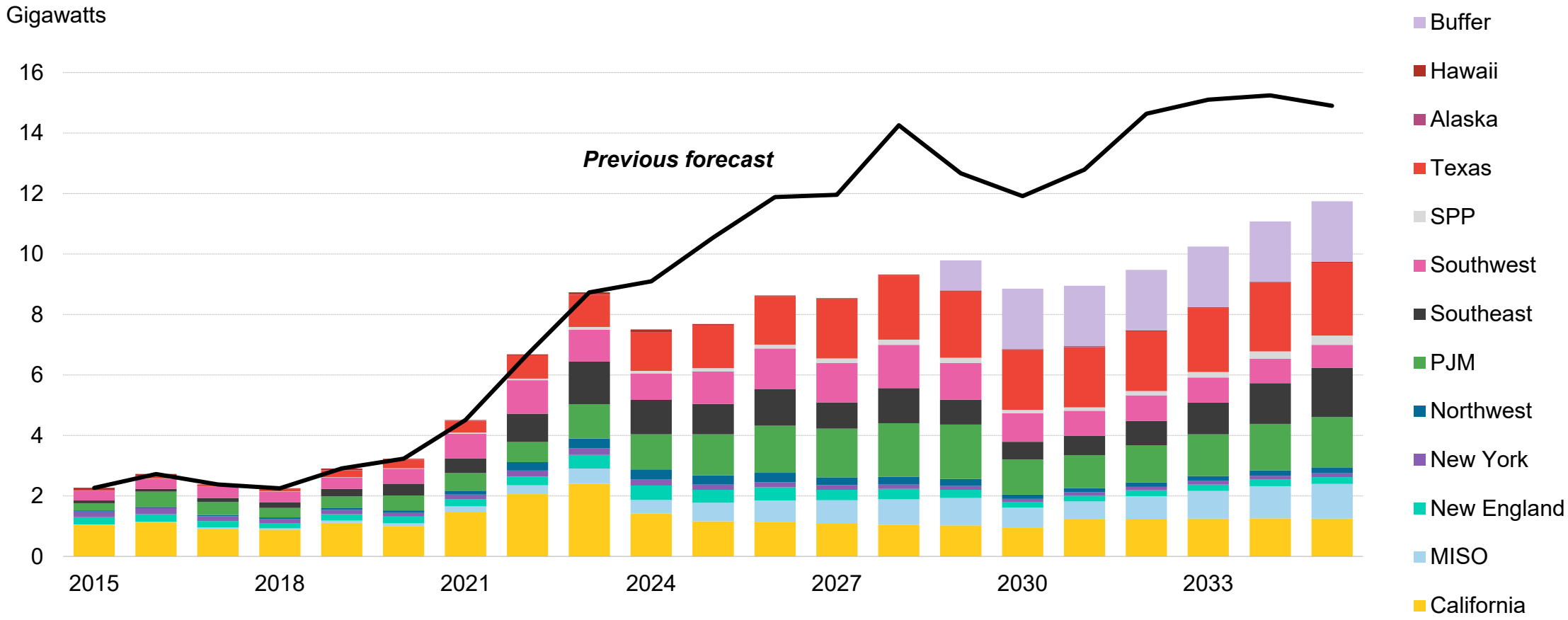
BloombergNEF

Share of cumulative utility-scale PV capacity paired with a battery, by year



Source: BloombergNEF, US Energy Information Administration. Note: Gigawatts in direct current (DC) terms. PV refers to photovoltaic. Only considers solar capacity not storage. MISO is Midcontinent ISO.

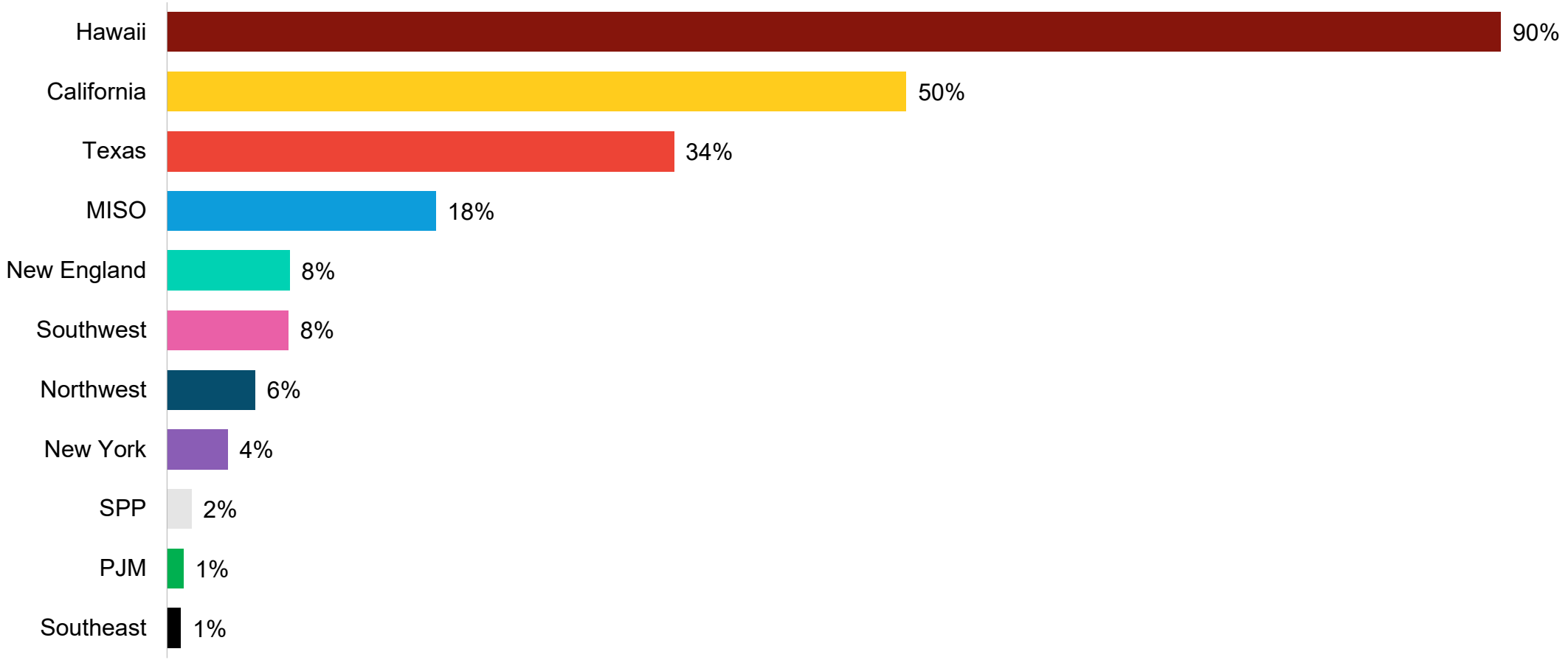
Annual US residential PV capacity additions



Source: BloombergNEF. Note: Buffer refers to build we expect to get built but cannot allocate to a region. GW in direct current (DC) terms. PV refers to photovoltaic. MISO is Midcontinent ISO. SPP is Southwest Power Pool.

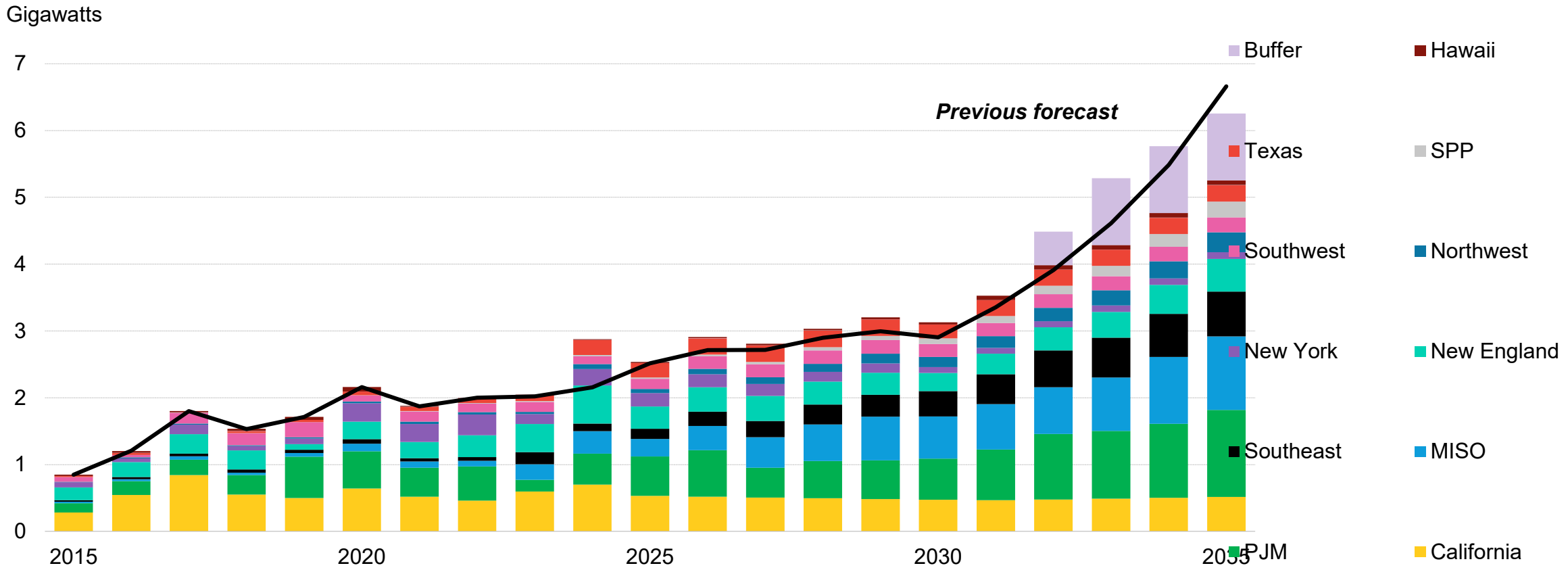
BloombergNEF

Battery attachment rates to new residential solar installations in 2024 by US region



Source: BloombergNEF, US Energy Information Administration (EIA). Note: Hawaii attachment rates are self-derived from BNEF conversations with installers. MISO is Midcontinent ISO. SPP is Southwest Power Pool.

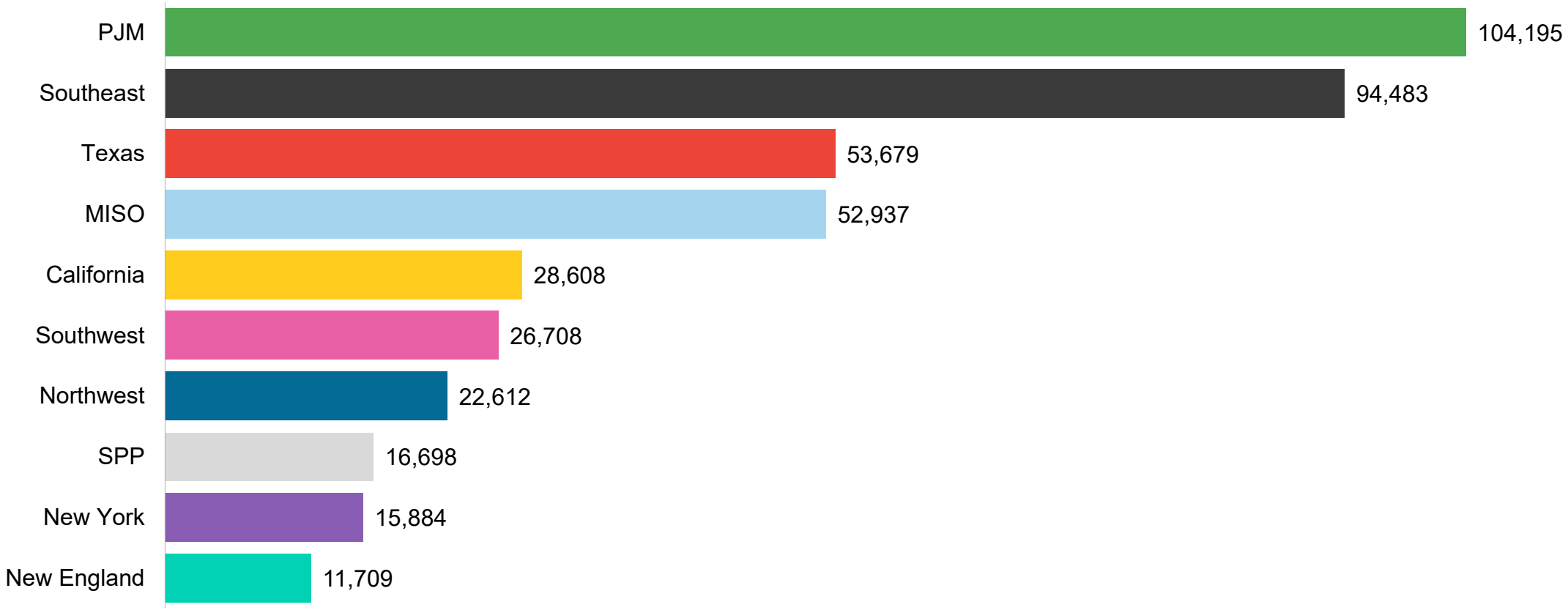
Annual US commercial PV capacity additions



Source: BloombergNEF. Note: Buffer refers to expected capacity that we cannot allocate to a region. GW in direct current (DC) terms. PV refers to photovoltaic. MISO is Midcontinent ISO. SPP is Southwest Power Pool.

Average 2019-2024 yearly commercial and industrial electricity consumption

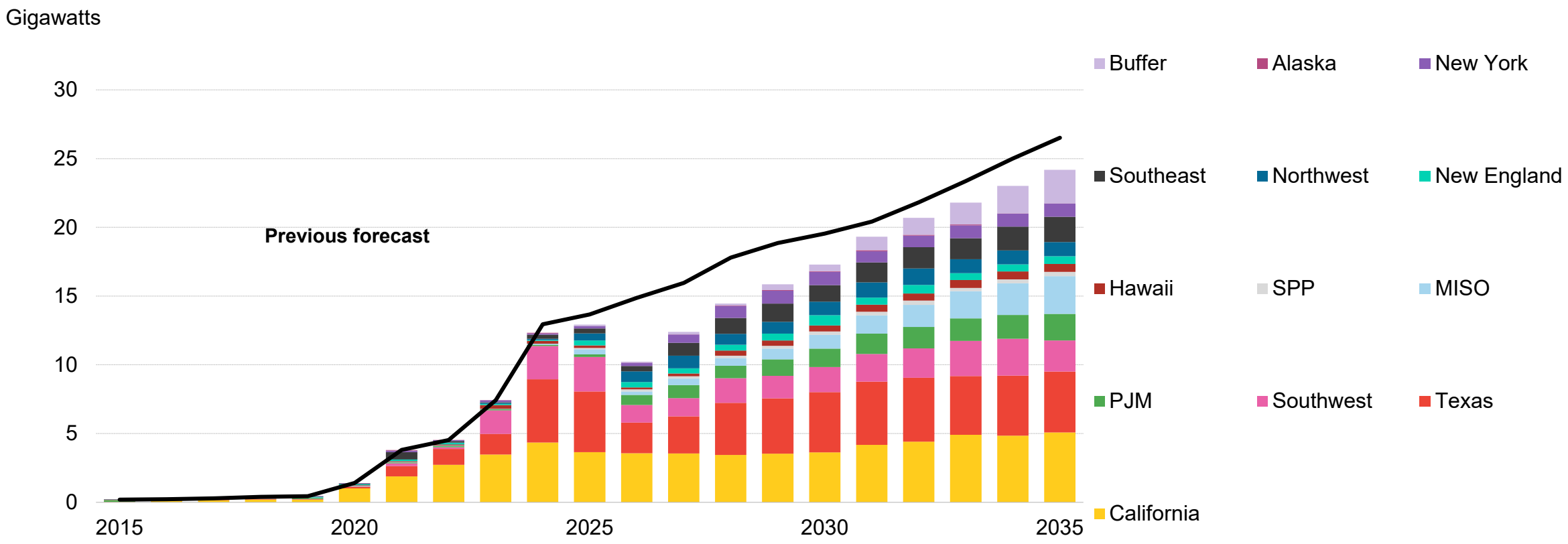
Terwatt-hours (TWh)



Source: BloombergNEF, US Energy Information Administration (EIA). Note: MISO is Midcontinent ISO. SPP is Southwest Power Pool.

Storage is the energy technology most affected by tariffs

Annual US energy storage capacity additions by region, assuming 54% import tariff on China

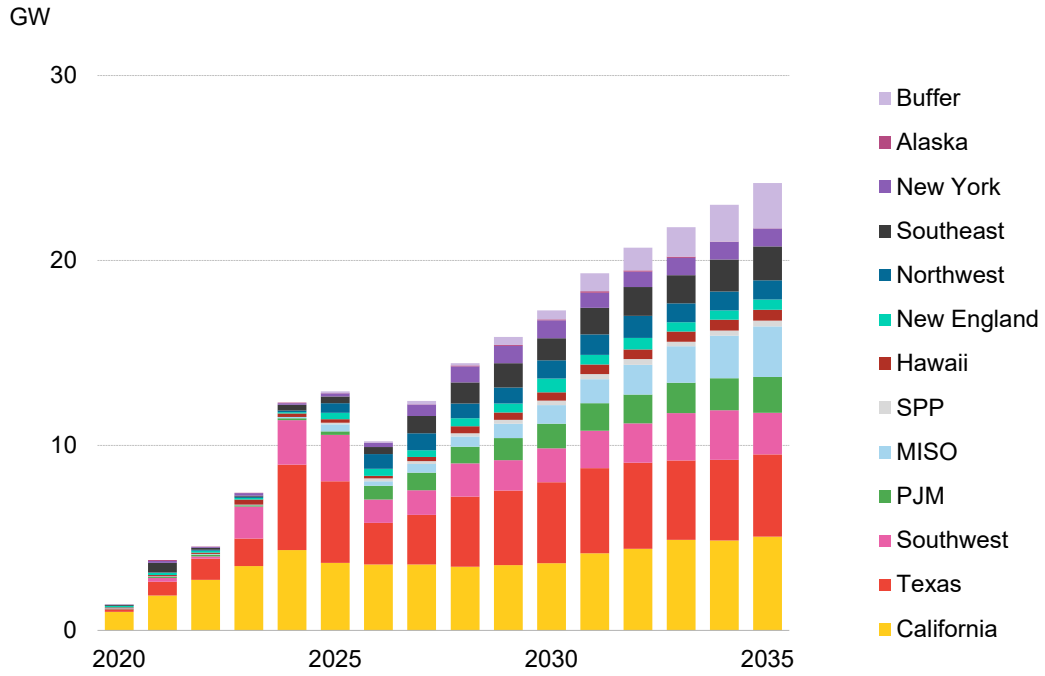


Source: BloombergNEF. Note: Buffer refers to capacity that we expect to get built but cannot allocate to a region. Forecast is based on a 54% tariff on Chinese imports. MISO is Midcontinent Independent System Operator, SPP is Southwest Power Pool, and PJM is PJM Interconnection.

BloombergNEF

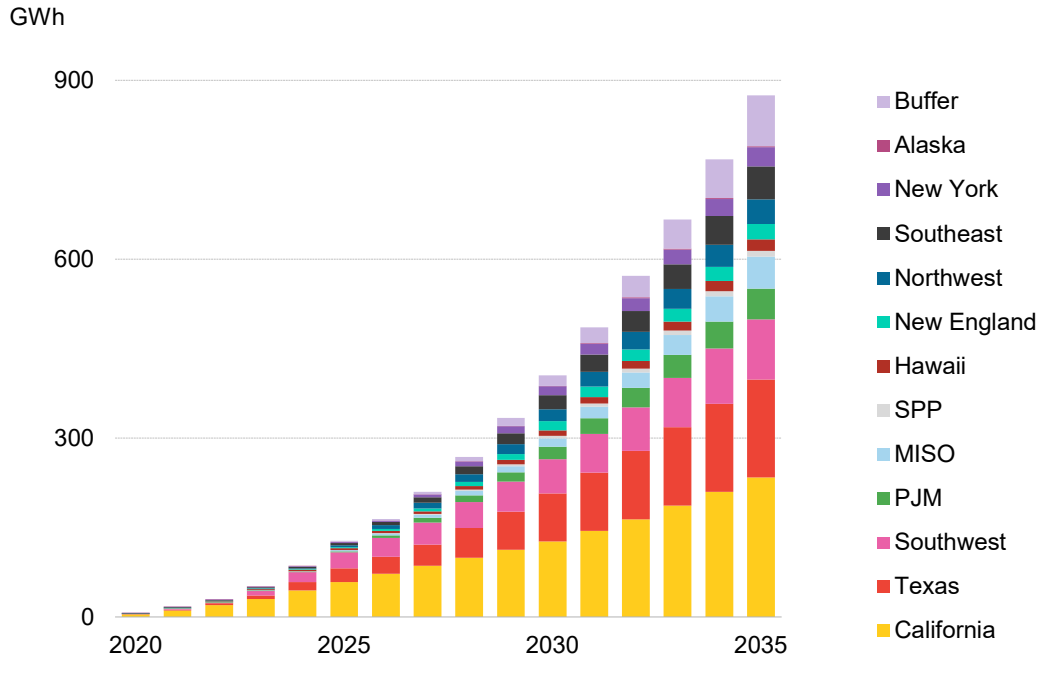
US energy storage outlook

US annual new energy storage build by region, assuming 54% import tariff on China, by region



Source: BloombergNEF

US cumulative energy storage capacity by region, assuming 54% import tariff on China, by region

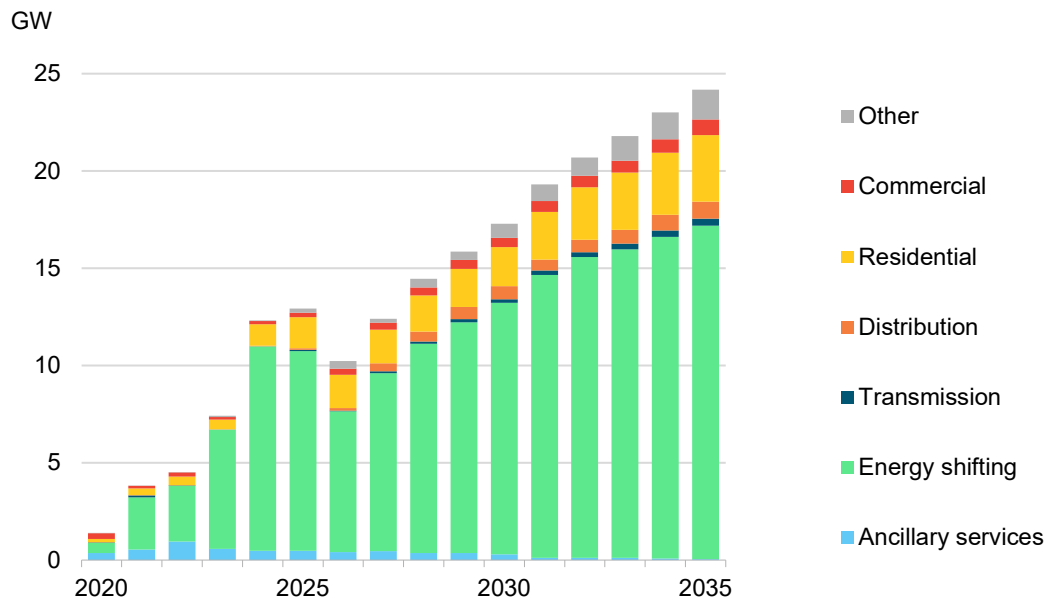


Source: BloombergNEF

BloombergNEF

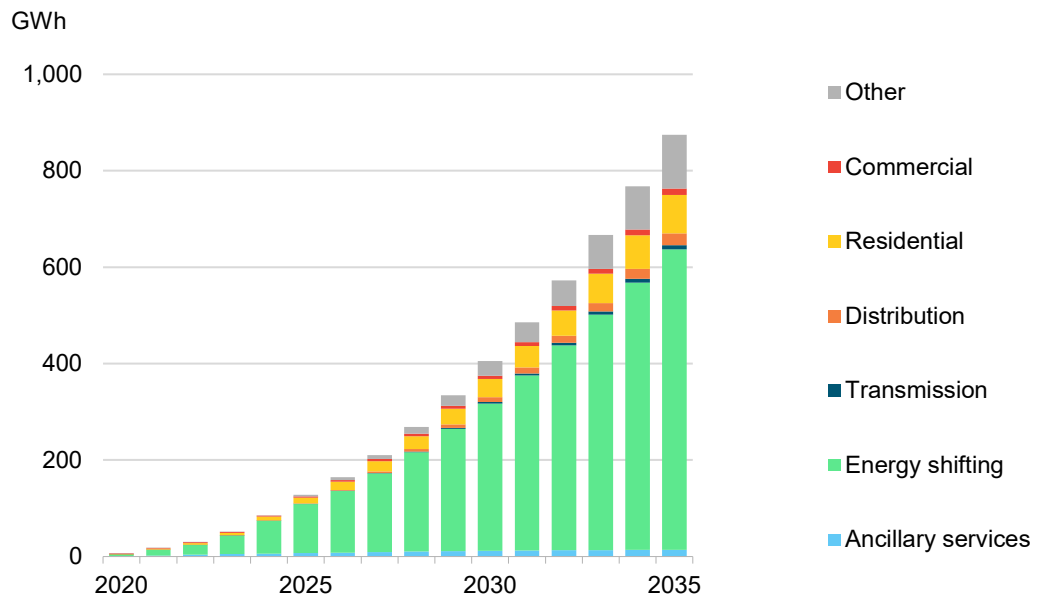
US energy storage outlook

US annual new energy storage build, assuming 54% import tariff on China, by application



Source: BloombergNEF

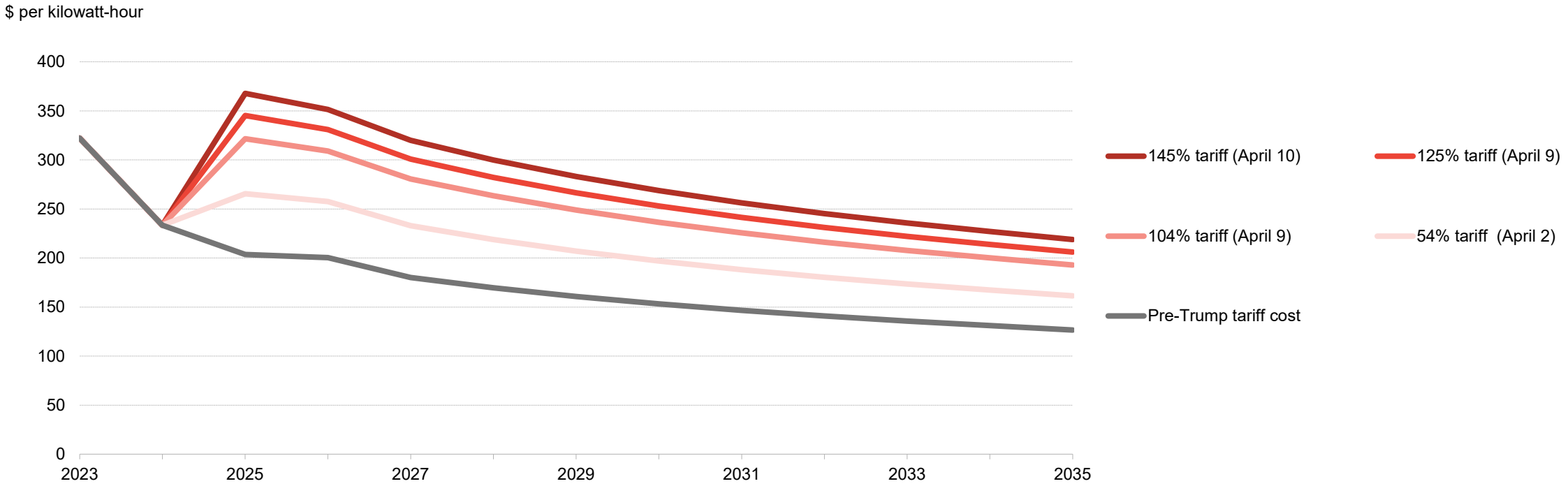
US cumulative energy storage capacity, assuming 54% import tariff on China, by application



Source: BloombergNEF

BloombergNEF

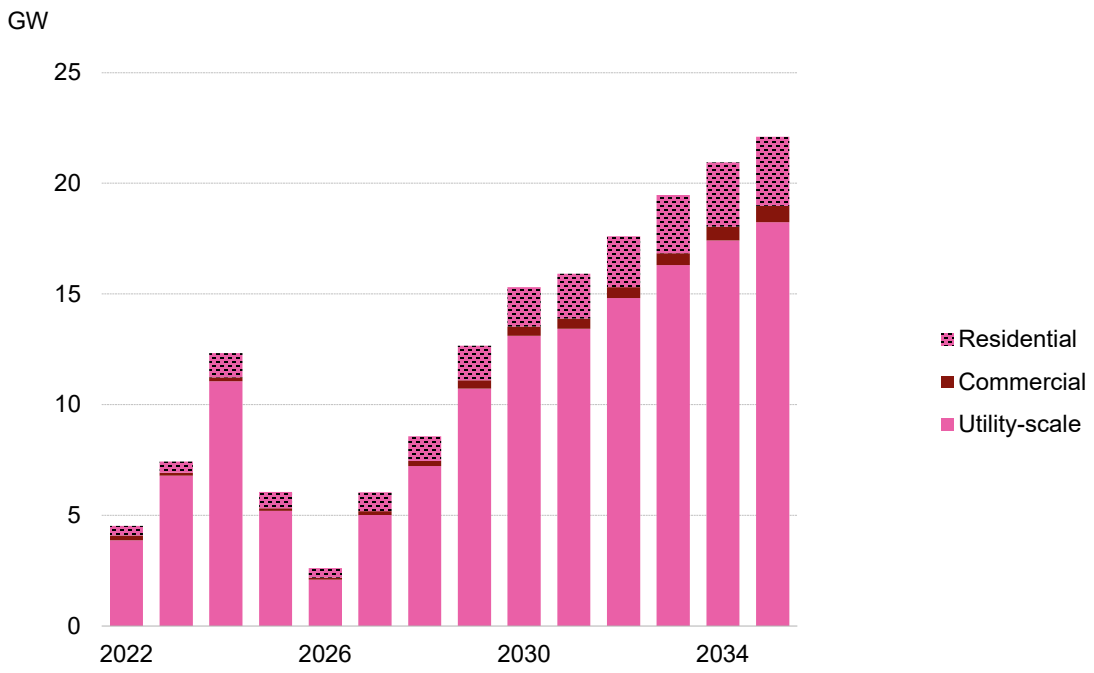
Cost outlook for US four-hour turnkey battery energy storage systems by tariff on Chinese imports



Source: BloombergNEF. Note: Charts show costs of four-hour turnkey systems, which include all project equipment (DC-side battery system, power conversion system and related installation) excluding engineering, procurement, and construction (EPC) and grid connection. Applies sweeping tariffs to battery rack and inverters from China and 25% tariffs to transformers from Canada and Mexico. Includes Section 301 tariffs of 7.5% for 2023-2025, 25% after 2025 and a general import tariff for lithium-ion batteries. Pricing based on usable capacity. Dates for reciprocal tariffs indicate announcement dates.

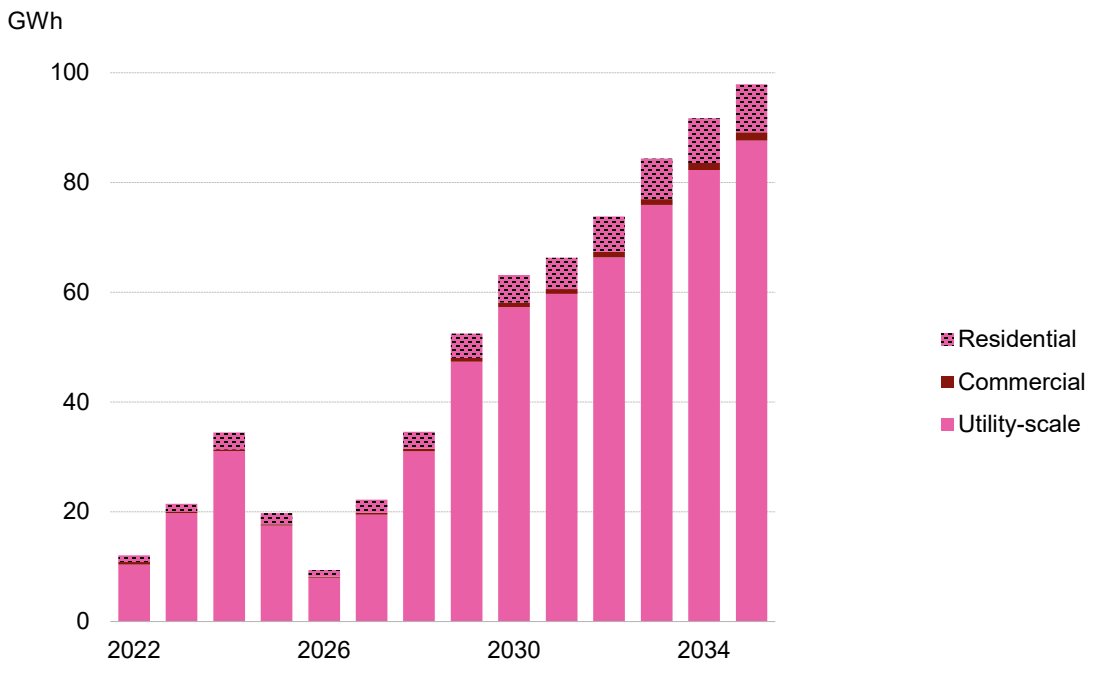
US energy storage outlook

Annual US energy storage additions based on power output, assuming 145% import tariff on China



Source: BloombergNEF

Annual US energy storage additions based on energy capacity, assuming 145% import tariffs on China



Source: BloombergNEF

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Our expert coverage assesses pathways for the power, transport, industry, buildings and agriculture sectors to adapt to the energy transition.

We help commodity trading, corporate strategy, finance and policy professionals navigate change and generate opportunities.

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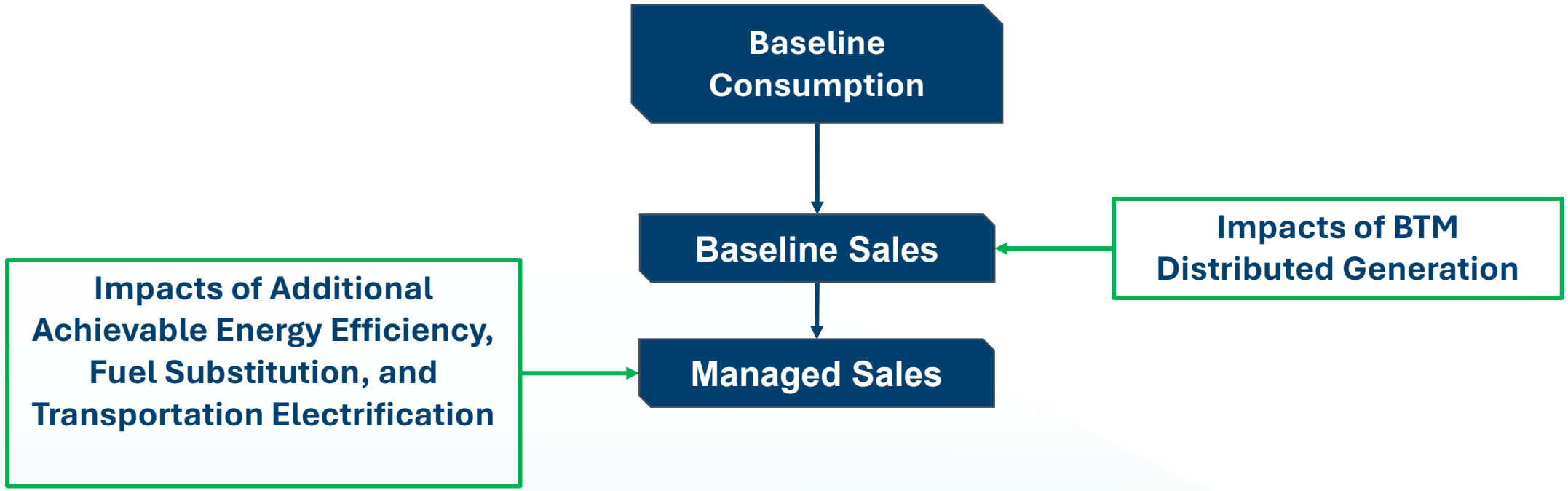
Demand Forecast

Summer Energy Reliability Workshop

Nick Fugate, CEC

Forecast Terminology



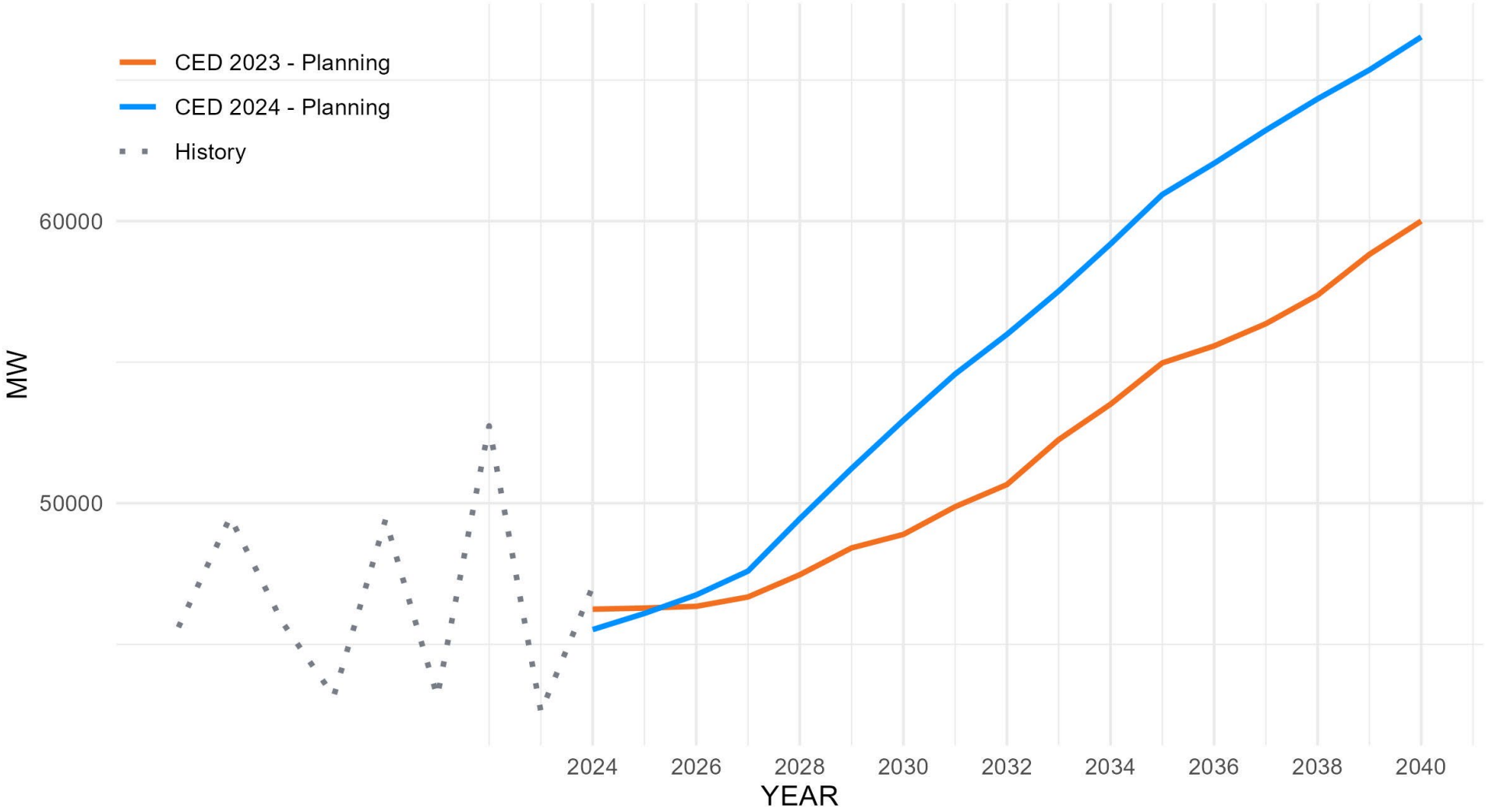
CED 2024 Forecast Updates

- Historical peak/sales data update (↓)
- Self-gen changes
  - PV capacity factors (↑↓)
- Econ-Demo update
  - Demographics (↑)
  - Economics (↓)

- "Additional Achievable" modifier updates (↑)
  - AAEE (=)
  - AAFS (↑↓)
  - AATE (↑)
- Re-estimated consumption profiles (↑↓)
- **New data and model for data centers (↑)**

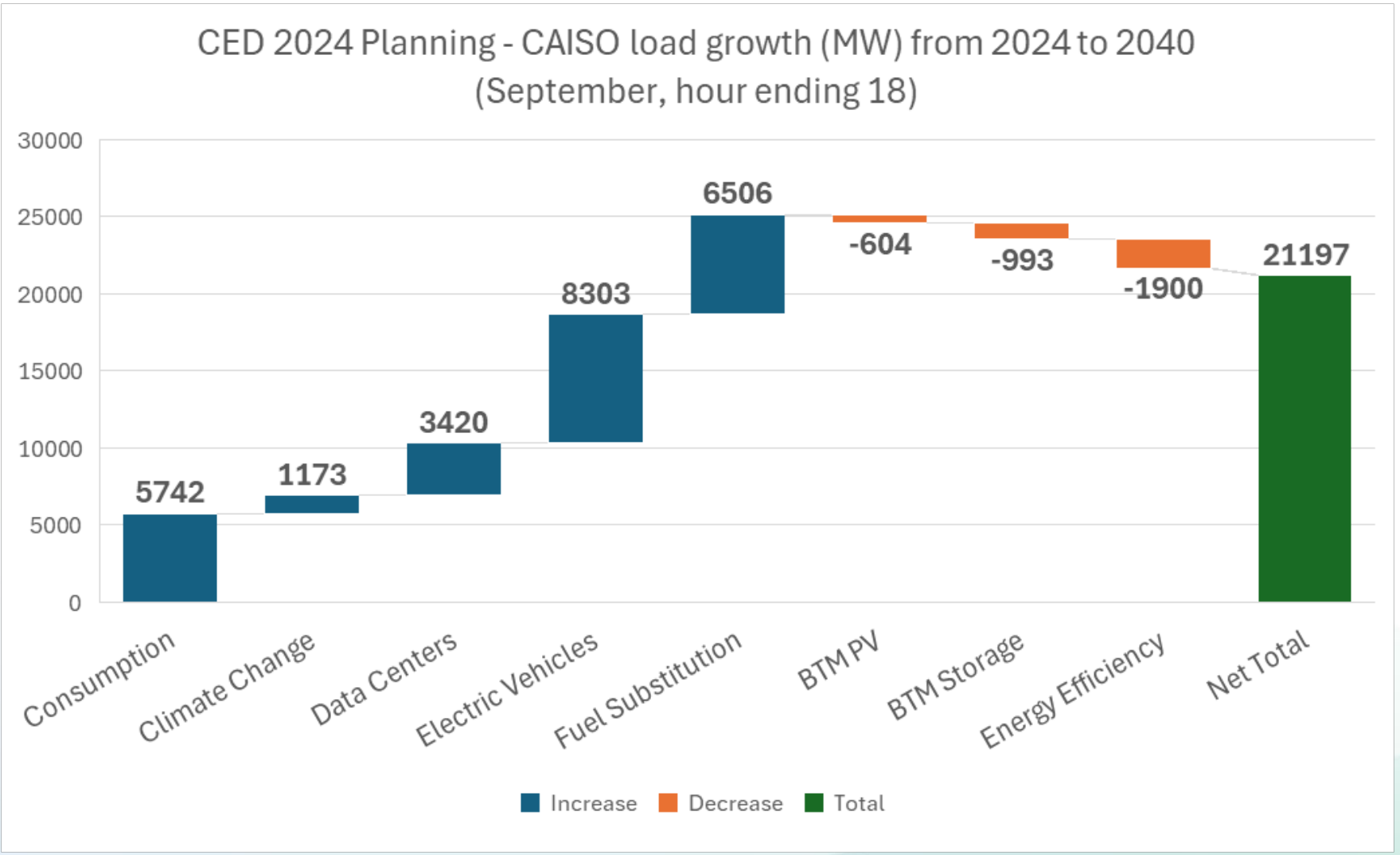
Arrows indicate that an update exerted generally increasing (↑), decreasing (↓), mixed (↑↓), or no (=) pressure on energy demand.

Annual Peak Forecast - CAISO



Year	Month	Hour	Peak (MW)
2016	7	17	45,603
2017	9	16	49,508
2018	7	17	45,806
2019	8	17	43,158
2020	8	17	49,421
2021	9	17	43,145
2022	9	17	52,745
2023	8	17	42,610
2024	9	17	47,049
2024	9	17	45,522
2025	9	17	46,094
2026	9	17	46,751
2027	9	18	47,595
2028	9	18	49,451
2029	9	18	51,231
2030	9	18	52,940
2031	9	18	54,579
2032	9	18	55,984
2033	9	18	57,521
2034	9	18	59,188
2035	9	18	60,941
2036	9	18	62,047
2037	9	18	63,220
2038	9	18	64,333
2039	9	18	65,358
2040	9	18	66,526

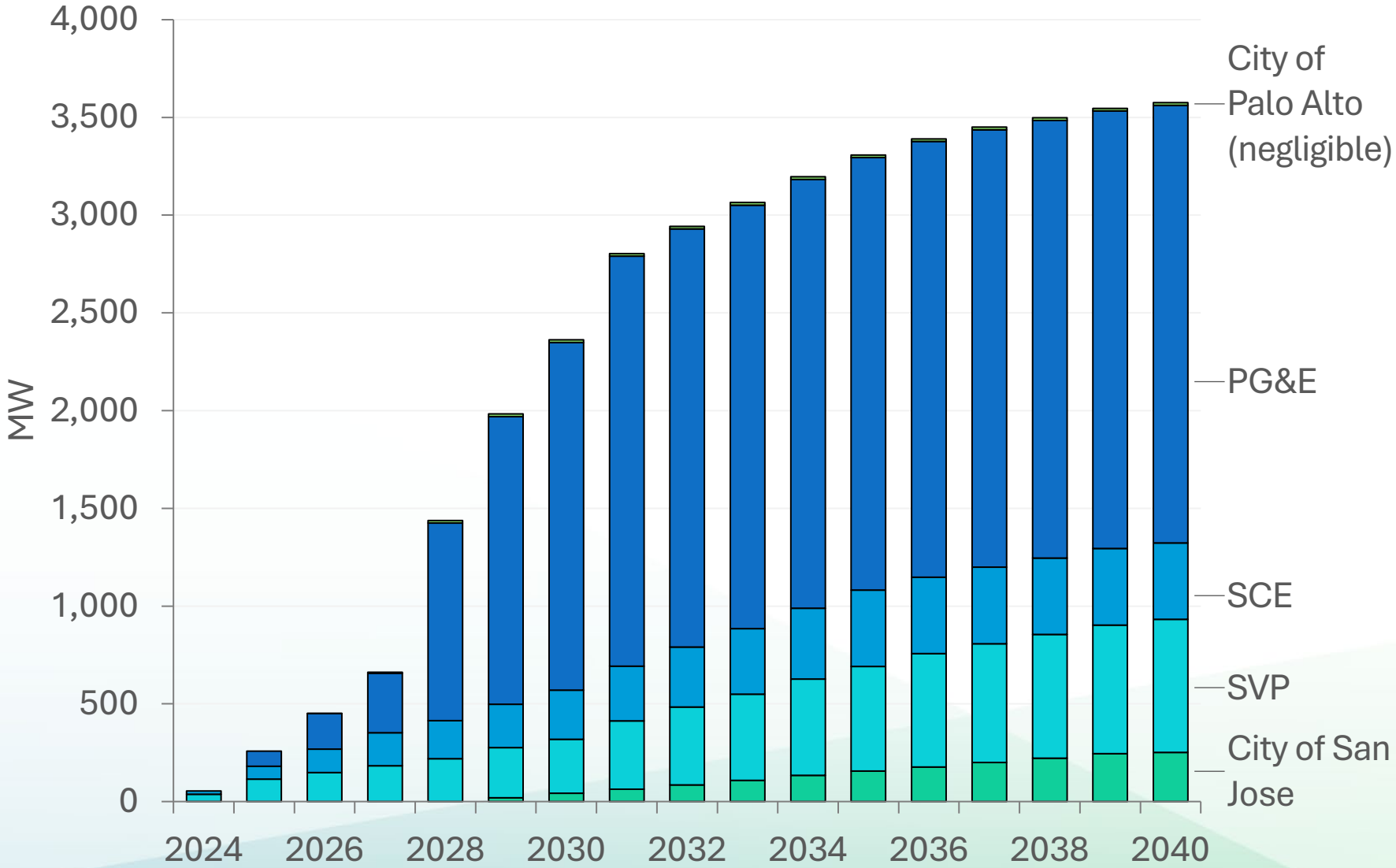
Components of Peak Growth



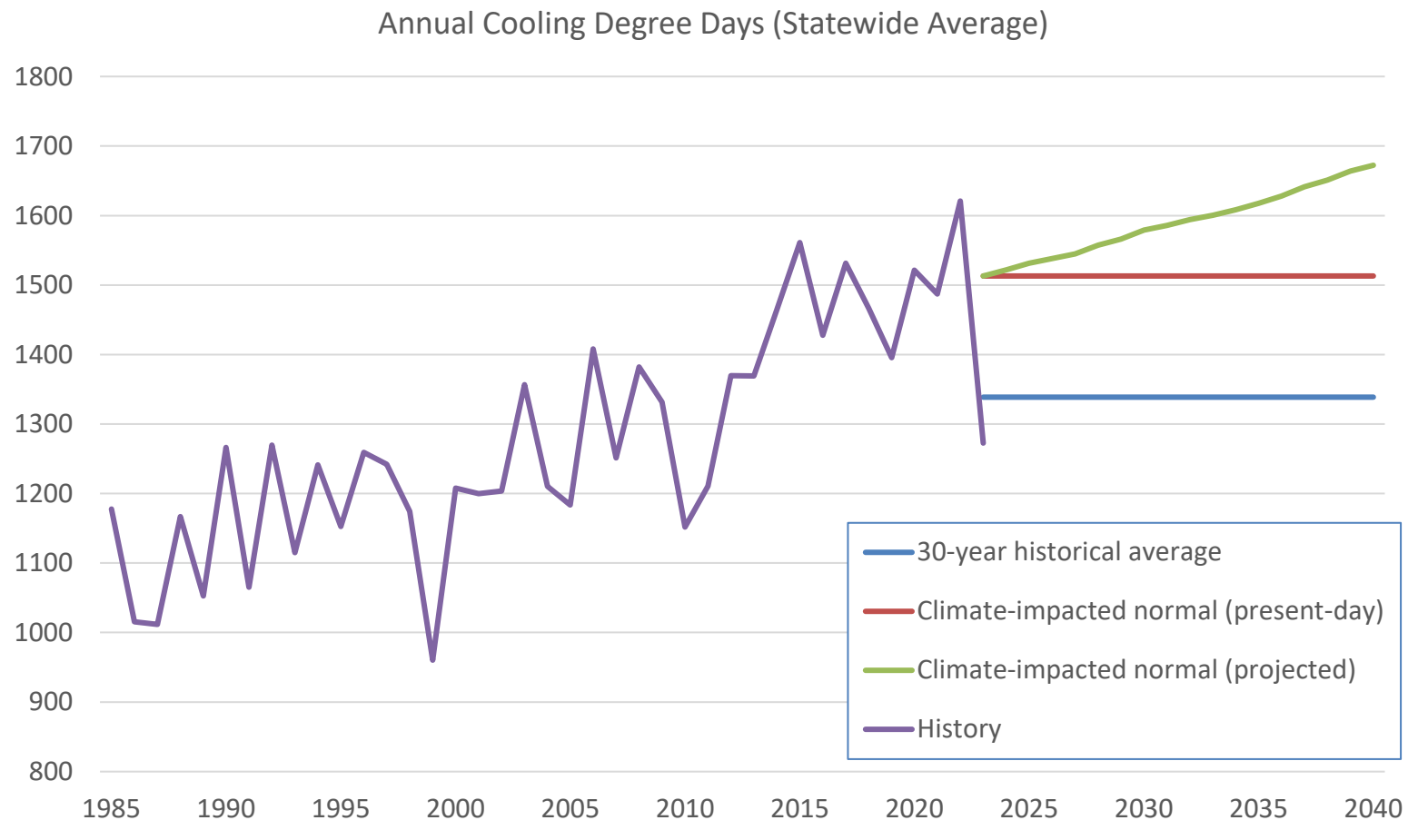
- Growth in the forecast is primarily driven by data centers and building and transportation electrification
- Growth in installed behind-the-meter PV and storage capacity is significant, but impacts are small during the system peak hour

Data Center Load Growth

- Data from five utilities
  - Load forecasts (SVP, Palo Alto)
  - Application data (PG&E, San Jose, SCE)
    - Ramping schedules
    - Geographic data
- Planning Forecast projects ~3.5 GW growth in data center load by 2040

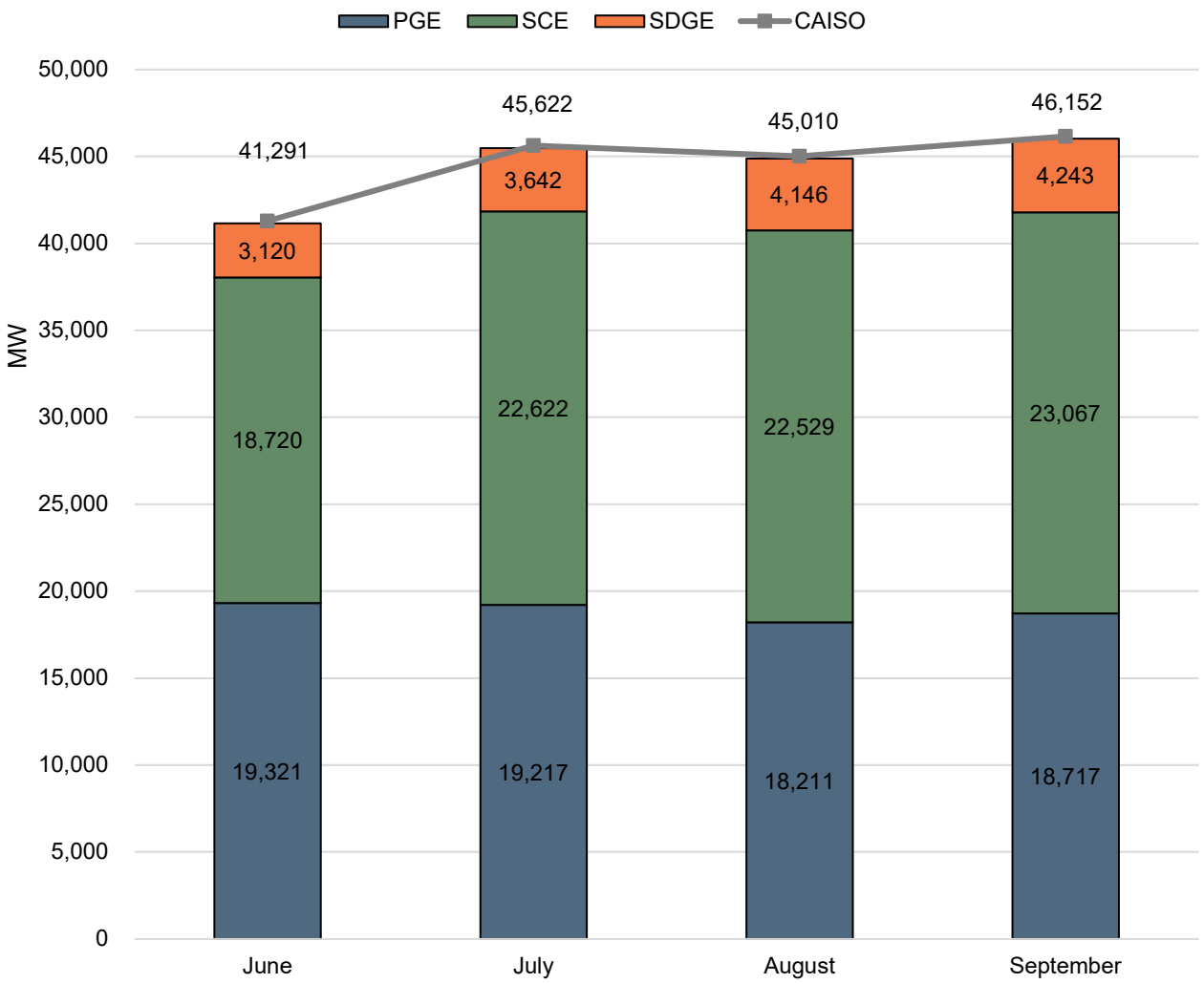


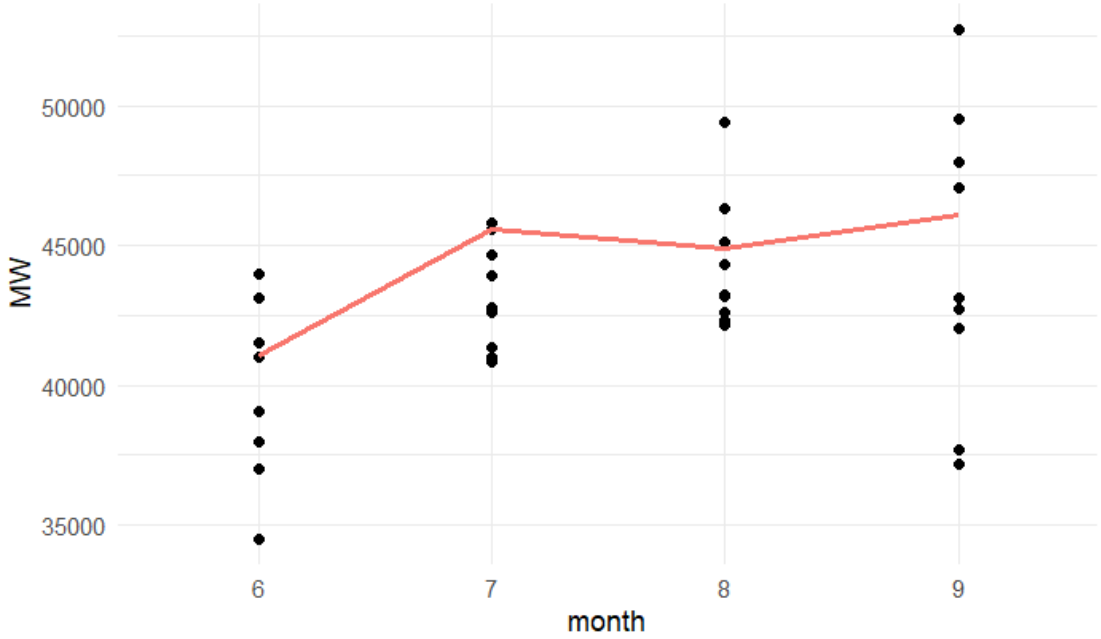
Climate Considerations



- Staff leverage downscaled, localized climate projections to establish “normal” levels of daily peak temperature as well as heating- and cooling-degree-days for each forecast year
- Forecast accounts for average temperature increases over a 50-year rolling window

Summer 2025 – Monthly Peaks





Above: Comparison of CAISO-coincident monthly peaks for forecast year 2025 to historical observations (reconstructed)

Left: Contribution of each IOU TAC area toward the CAISO-coincident monthly peaks

Thank You!

CPUC New Energy Resources

Christina Pelliccio

Analyst, Integrated Resource Planning Procurement Oversight

CPUC Energy Division

May 2, 2025

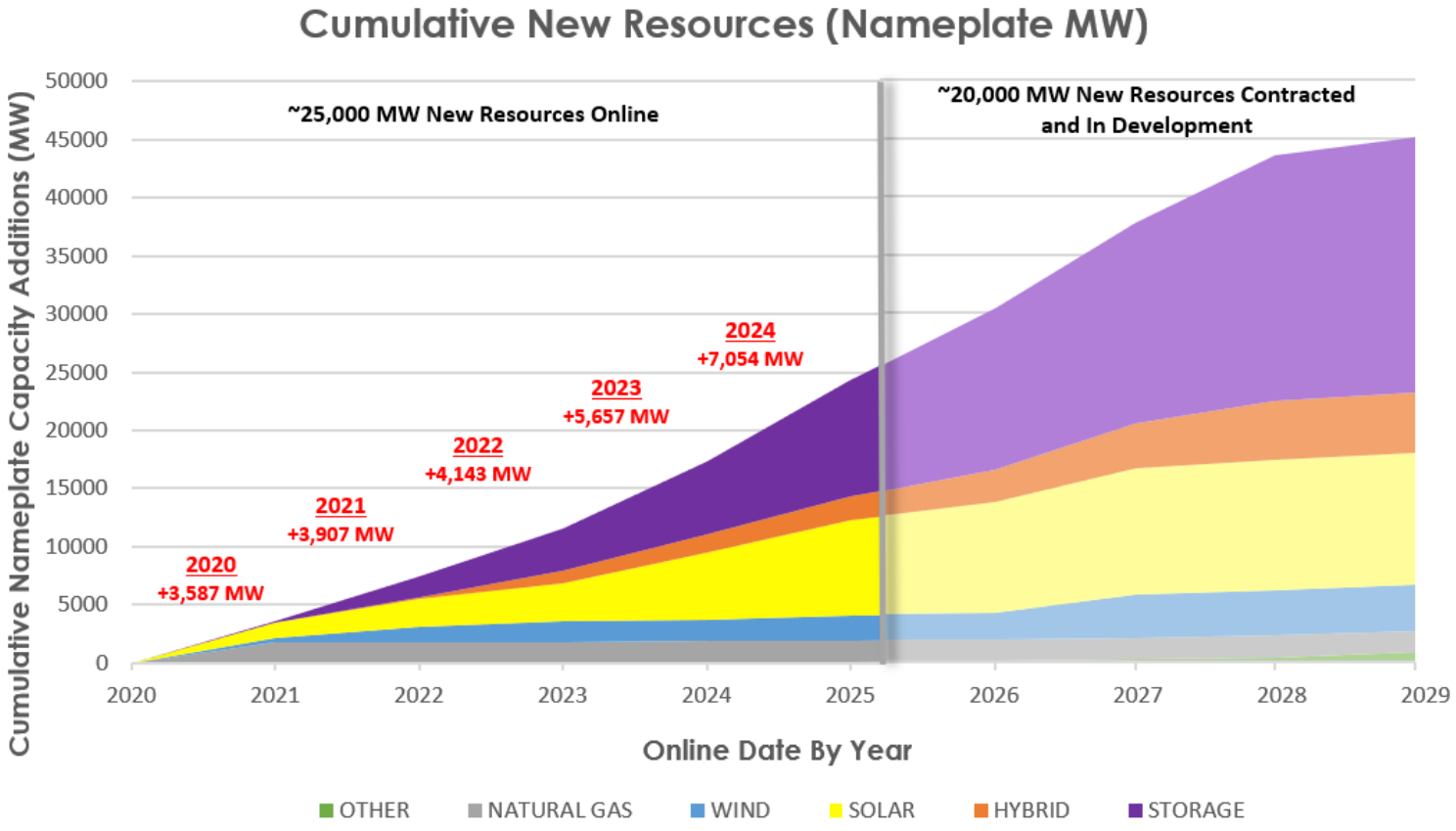
New MWs Online - Nameplate

By Year and Resource Type

Data includes projects online as of April 9, 2025

Technology Type	*2024 MW*	*2025 MW (to date)*	2020-2025 Cumulative MW
SOLAR	2,227	70	**8,039**
STORAGE	3,678	802	**10,719**
HYBRID (SOLAR + STORAGE)	503	68	**1,841**
WIND	260	27	**1,145**
GEOTHERMAL	41	0	**41**
HYDRO, BIOMASS, BIOGAS	0.5	0	**39**
Subtotal Total New SB100 Resources, IN-CAISO	**6,709**	**966**	**21,825**
NATURAL GAS, incl. Alamitos & Huntington Beach	63	0	1,539
Total New Resources, IN-CAISO	**6,772**	**966**	**23,364**
New Imports, Pseudo-Tie or Dynamically Scheduled	280	0	1,883
Total New Resources, including Imports	**7,054**	**966**	**25,247**

New Online & Expected Resources in CAISO

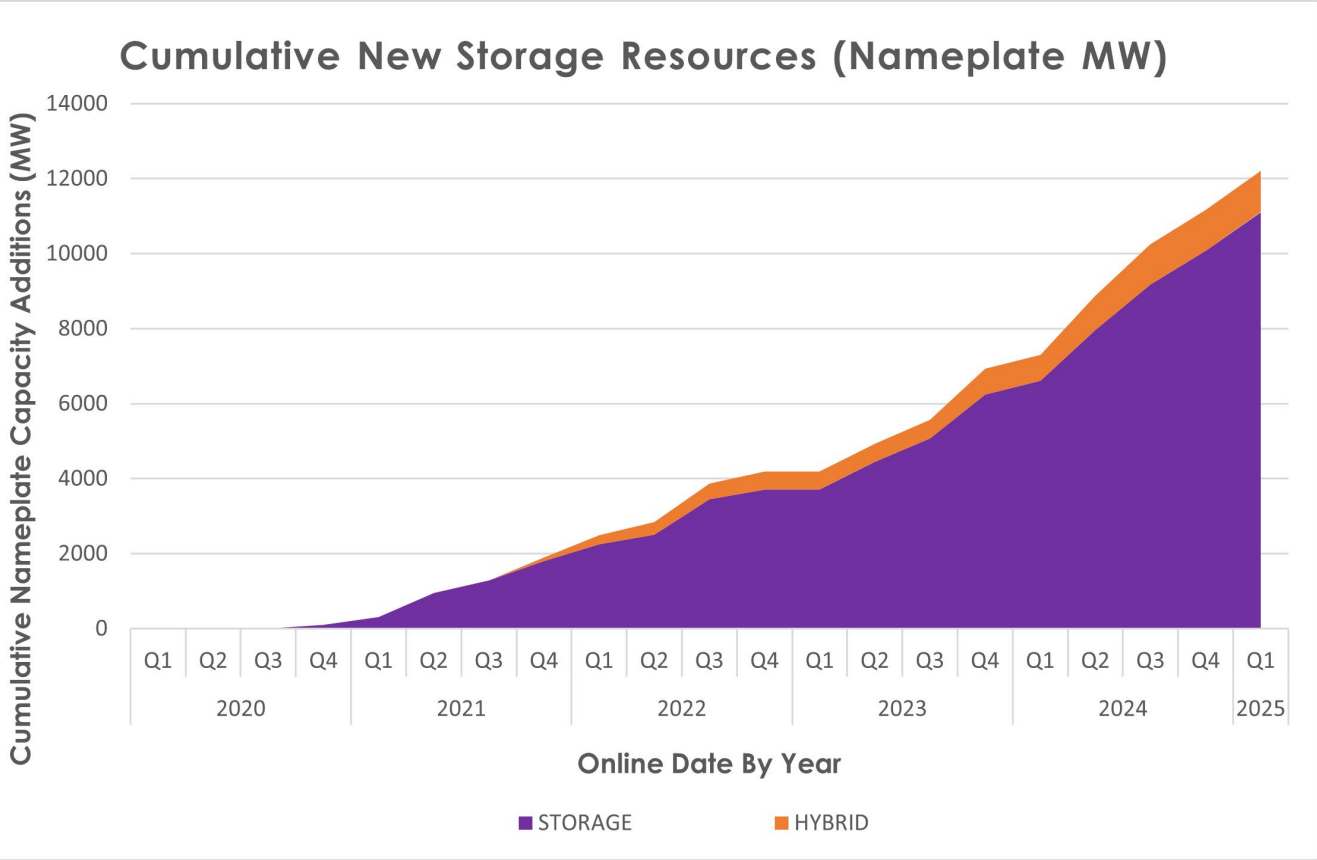


- **Online –** Over 25,000 MW of new resources were added between 2020 and 2025 to date
- **2024 –** Over 7,000 MW of new resources came online in 2024, the highest clean energy year on record
- **Future –** Over 20,000 MW of additional resources are currently under contract and in development; Additional contracting will be done to fully meet the CPUC IRP orders by 2028.
- **Technology -** Most of the new resources installed and expected are battery storage, solar, or hybrids (usually solar+storage).

Note: Data shown here includes new resources added to CAISO grid, including imports. "Other" resources includes geothermal, biomass, biogas, and hydropower.

Total Storage Online
By Year

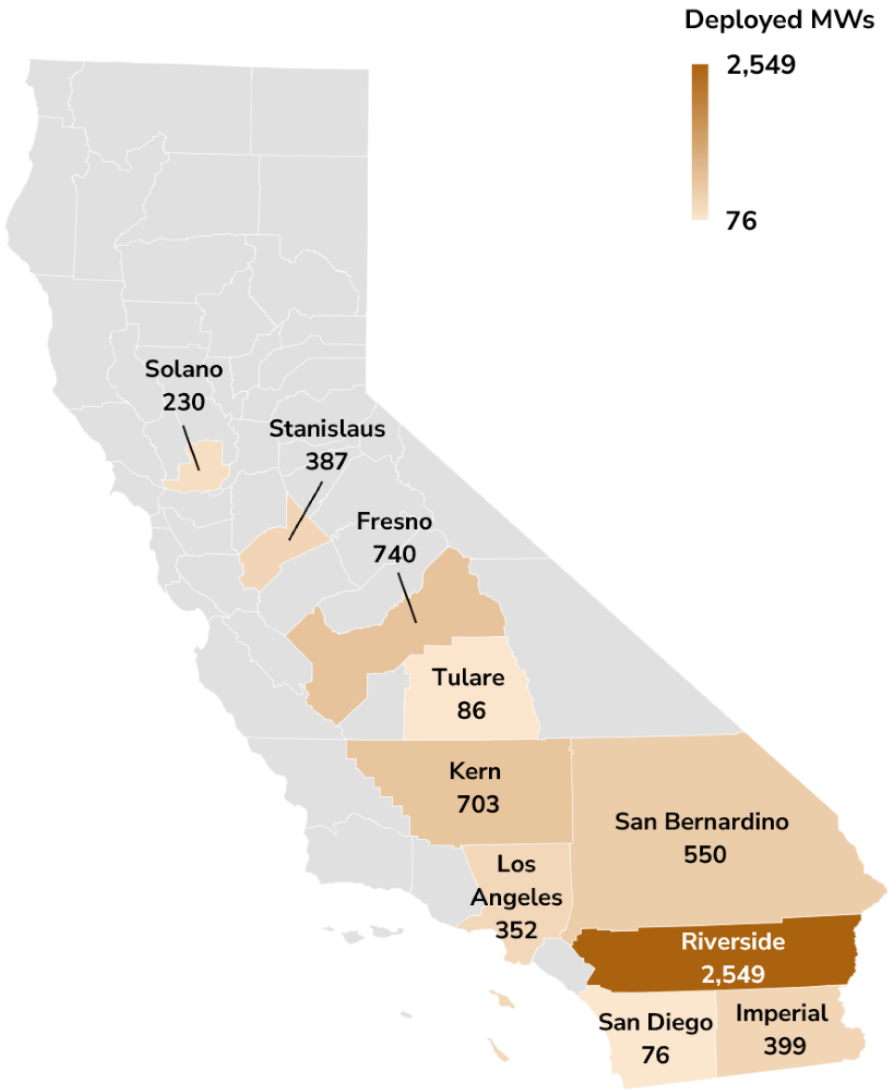
Data includes projects online as of April 9, 2025



Note: Data shown here shows a snapshot of new resources added to the CAISO grid Q12020 – Q12025, including specified CAISO imports. Hybrids include some storage, and some other (usually solar) technology. MW shown here only include the storage portion of hybrids.

- **Installed to date:** Over 12,000 MW of storage nameplate capacity is online serving the grid as of April 2025, including imports.
  - Includes ~150 MW of storage added prior to 2020
  - Includes standalone battery storage and the storage component of hybrid resources
- **Expected future installs:** ~15,000 MW nameplate capacity of additional storage resources are under contract and expected to come online by 2028.

2024 New Resource Development

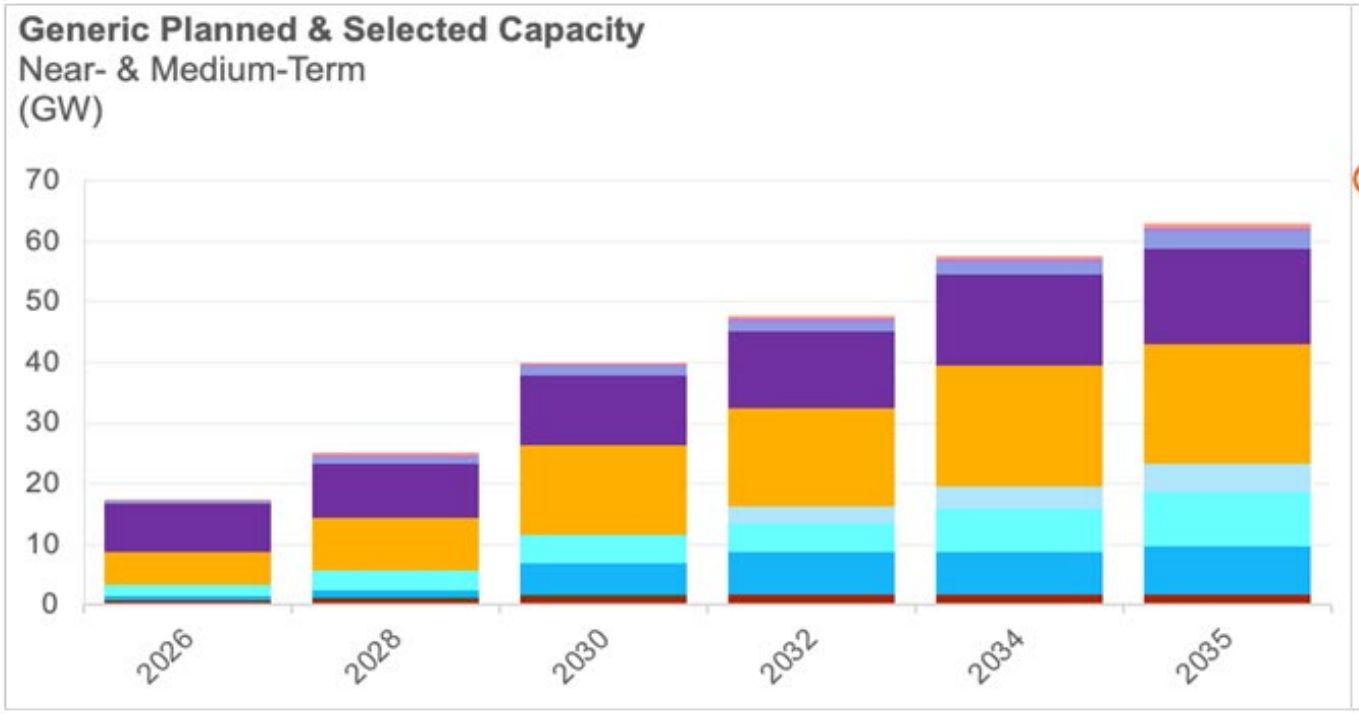


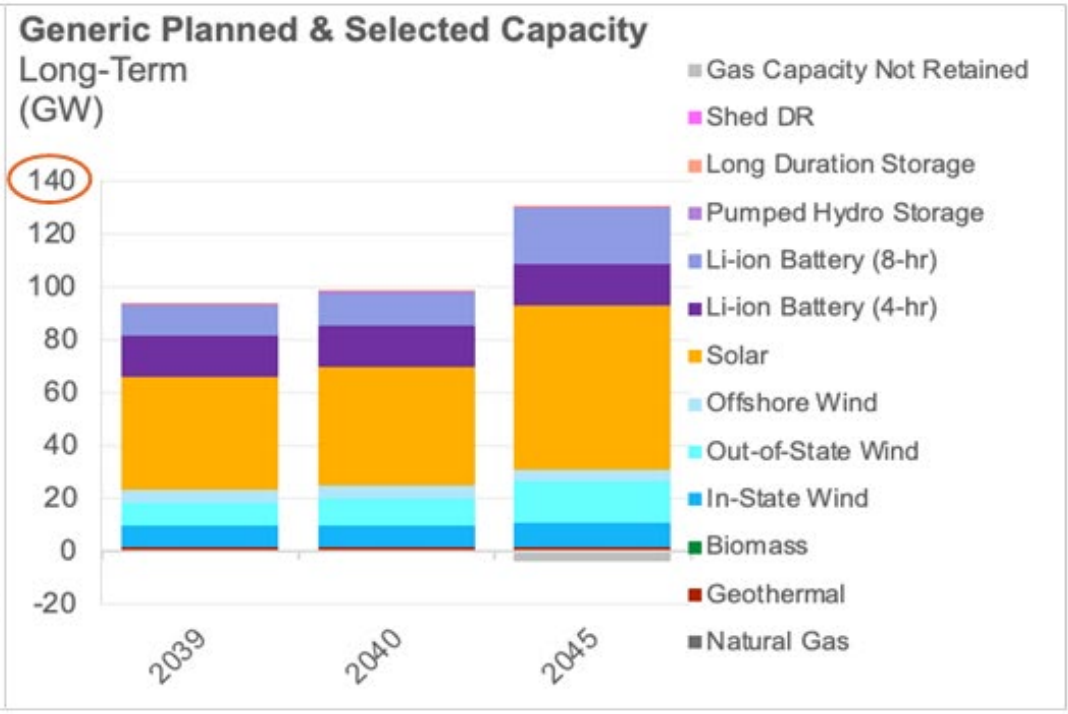
2024 | Top Counties

County	Deployed MWs	Deployed Projects
Riverside	2,549	21
Fresno	740	11
Kern	703	13
San Bernardino	550	9
Imperial	399	3
Stanislaus	387	7
Los Angeles	352	12
Solano	230	1
Tulare	86	3
San Diego	76	10

New Resource Buildout in 25-26 Transmission Planning Process Portfolio (TPP)

- In Feb 2025, CPUC adopted a Transmission Planning Process Portfolio which expects 63 GW of new clean energy resources will be built by 2035 and 127 GW by 2045.



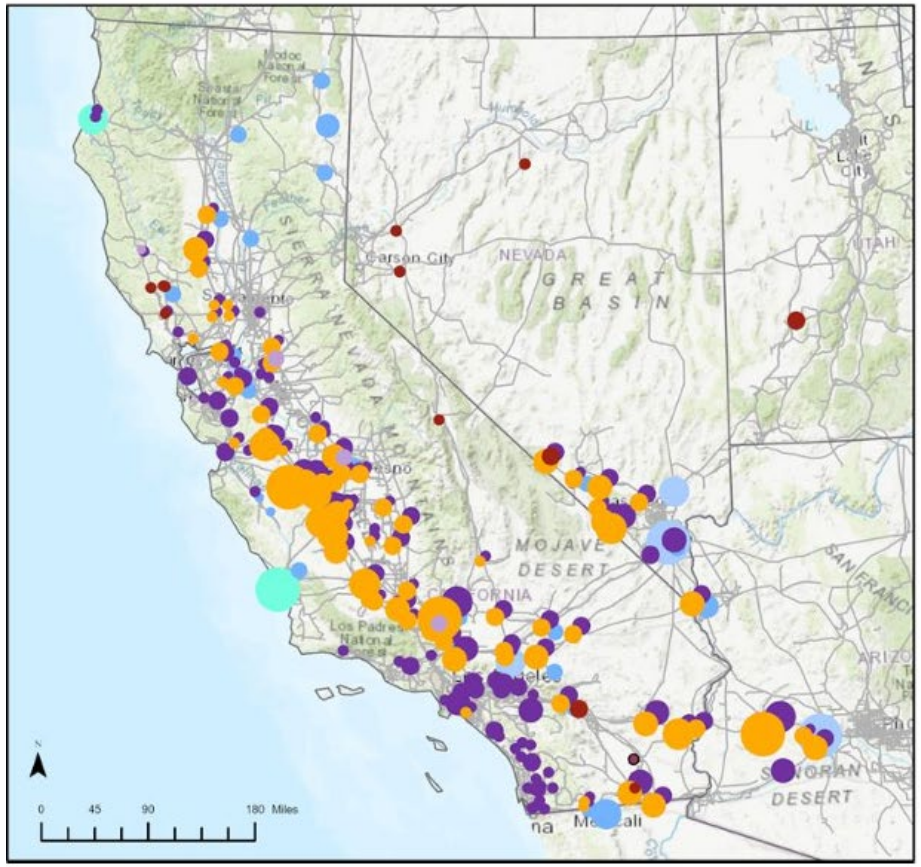


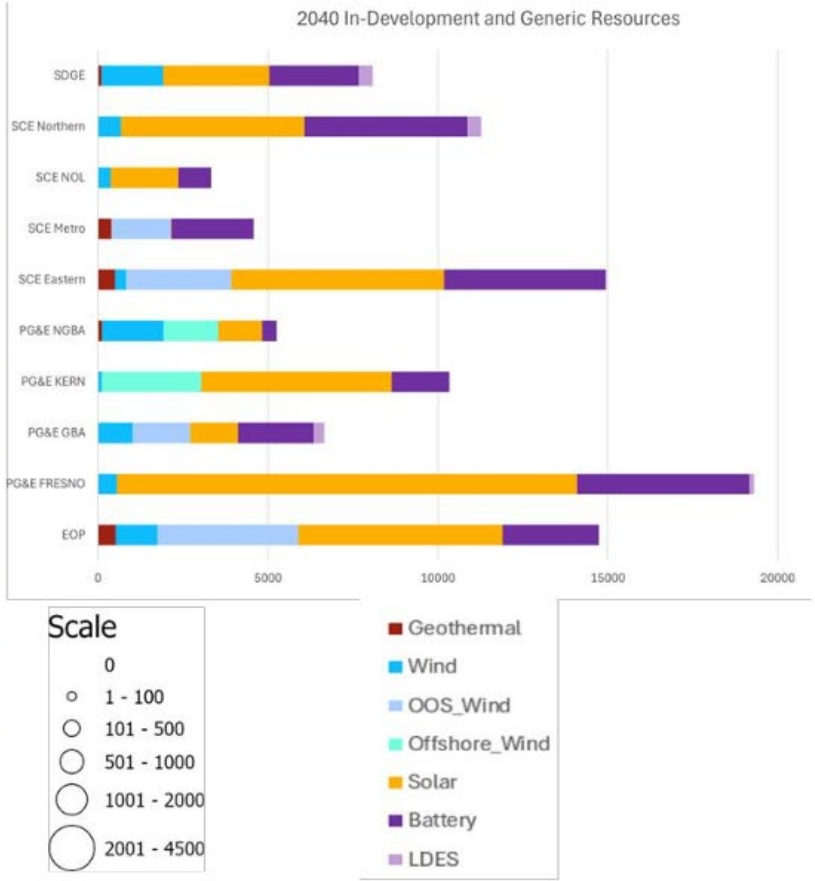
Source: https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/integrated-resource-plan-and-long-term-procurement-plan-irp-ltpp/2024-2026-irp-cycle-events-and-materials/assumptions-for-the-2025-2026-tpp/25-26-tpp-pd-resolve-and-servm-analysis-slide-deck.pdf

Modeled Potential Locations for Future Clean Energy Resources for Transmission Planning

CPUC transmits IRP resource portfolios to the CAISO for use in its annual Transmission Planning Process (TPP) to identify future transmission needs.

2025-26 TPP Base Case Portfolio (2040) Busbar Mapping Results





Source: Modelling Assumption and Busbar Mapping Report for the 2025-2026 TPP

APPENDIX

New MWs Expected - Nameplate

By Year and Resource Type, including imports

Data includes projects expected/under contract as of February 13, 2025

Resource Type	2025	2026	2027	2028	Total
Solar	1,057	1,345	322	150	**2,874**
Battery Storage	3,468	3,399	3,789	890	**11,546**
Paired/Hybrid	765	1,085	1,209	70	**3,129**
Wind	71	1,435	250	0	**1,756**
Geothermal	10	126	163	435	**734**
Biomass/Biogas	10	0	0	0	**10**
Totals	**5,381**	**7,389**	**5,732**	**1,545**	**20,048**

- Over 20,000 MW nameplate of future contracts are expected to meet CPUC's procurement order obligations.
- Majority of new resource MWs are expected to be battery storage.
- Other types of resources are eligible to meet orders and may be contracted in the future.

CAISO Resource Development By Location

Data includes projects online
as of April 9, 2025

County/State	2020	2021	2022	2023	2024	2025	Total Nameplate MW	Number of Projects
Riverside	625	1,109	1,802	883	2,549	27	6,996	66
Kern	208	402	781	901	703	126	3,121	60
San Bernardino	0	150	0	1,183	550	-	1,883	34
Kings	274	386	263	780	1	3	1,706	21
Los Angeles	775	20	252	115	352	-	1,514	31
Fresno	160	16	72	287	740	97	1,372	20
All Other CA Counties	1,195	883	716	952	1,409	328	5,483	111
Subtotal New Resources, In State Generation	**3,236**	**2,966**	**3,886**	**5,102**	**6,302**	**581**	**22,073**	**343**
Out of State Generation	350	941	256	490	752	385	3,173	24
Total New Resources, IN-CAISO	**3,586**	**3,907**	**4,142**	**5,592**	**7,054**	**966**	**25,247**	**367**

CALIFORNIA DEPARTMENT OF WATER RESOURCES

State Water Project's Summer 2025 Operations Outlook

May 2, 2025

CDWR-SWP-O&M-POM

Jorge Luis Quintero, P.E.

SWP Facilities

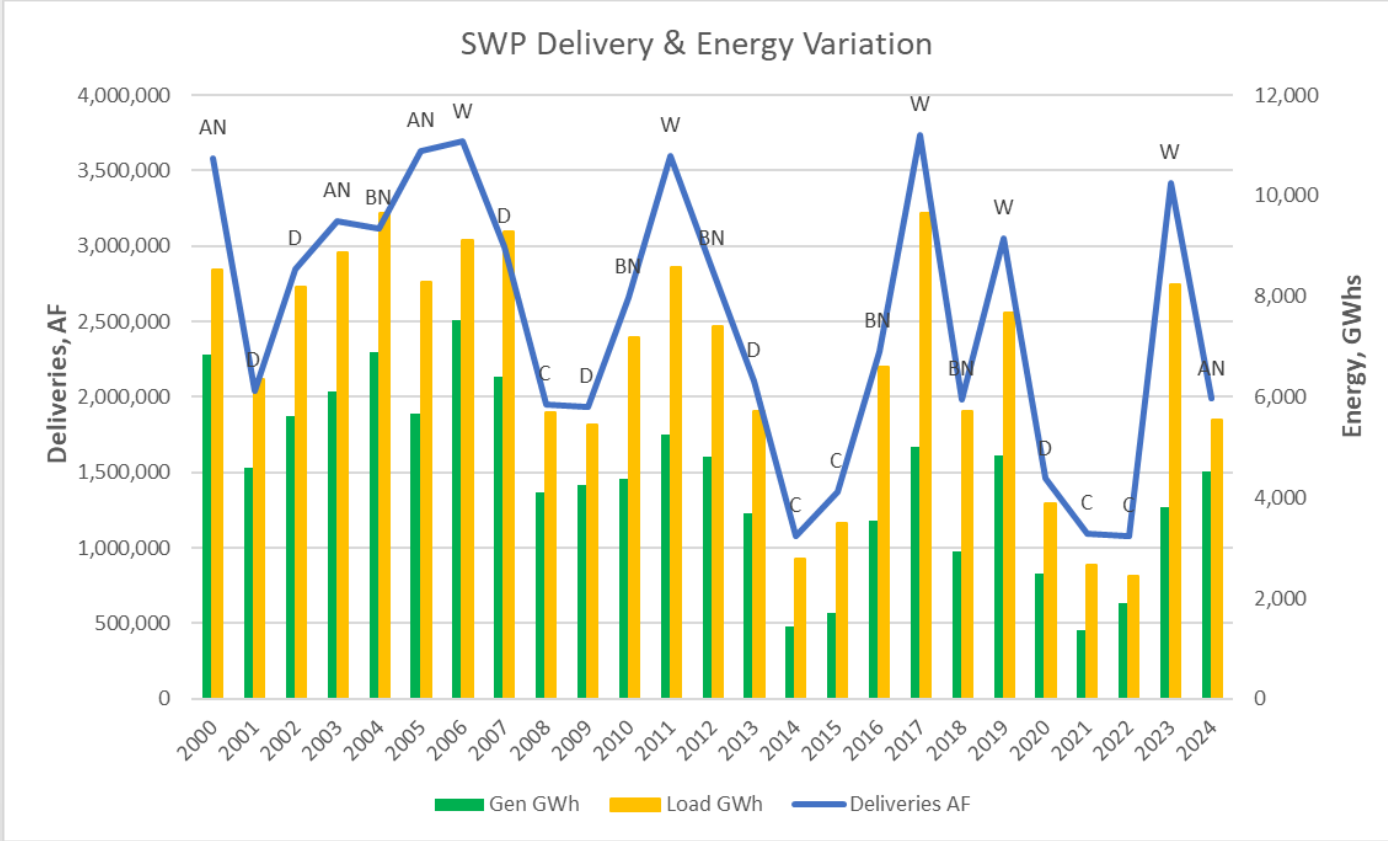
- 36 Storage Facilities
- 21 Pumping Plants
- 5 Hydro Power Plants
- 4 Pump-Gen Plants
- 700 Miles of Canals & Pipelines

CALIFORNIA DEPARTMENT OF WATER RESOURCES

SWP Historical Variability of Operations

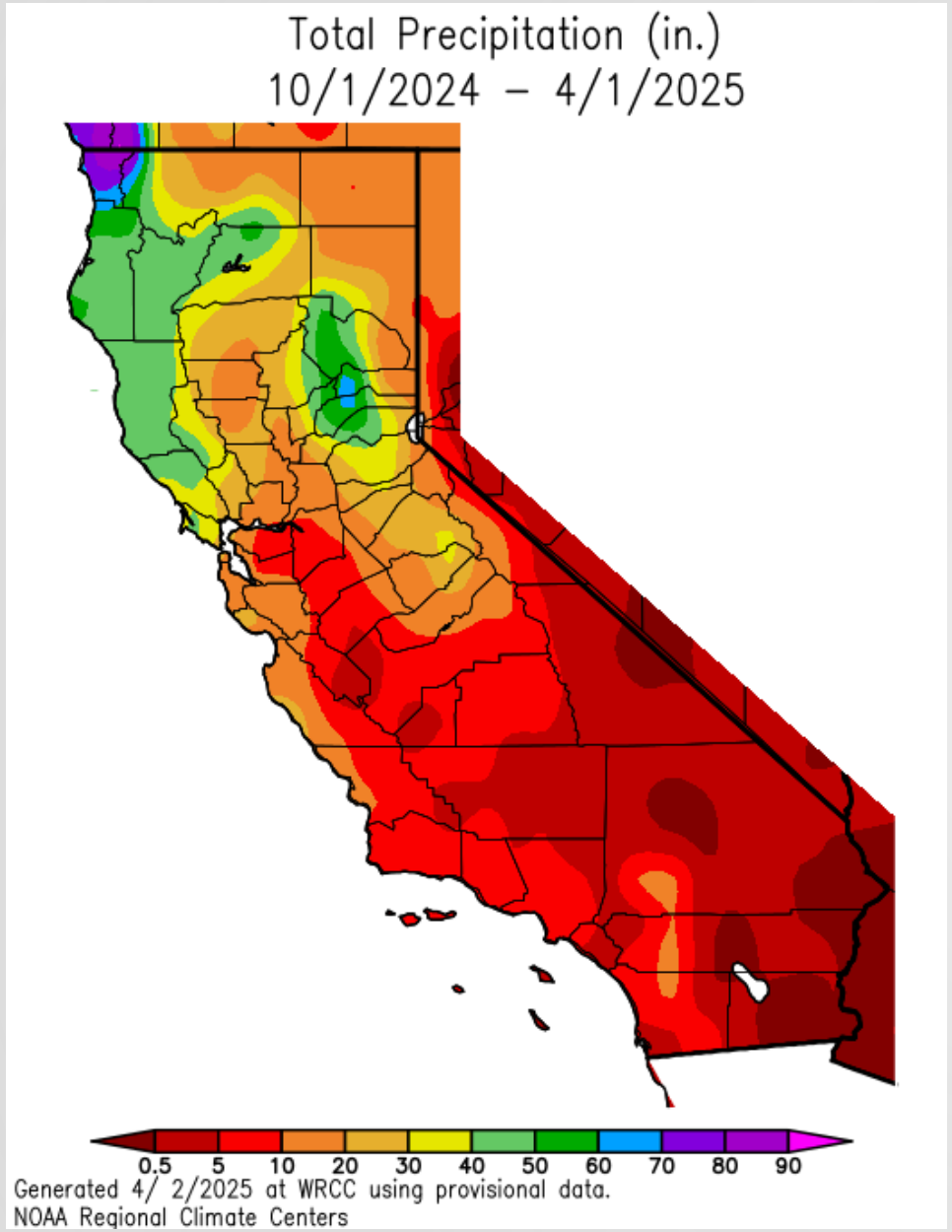
- Hydrology drives supply
- Reflects operational constraints and water contractor demands
- SWP hydro plants only (other non-hydro power resources not included)

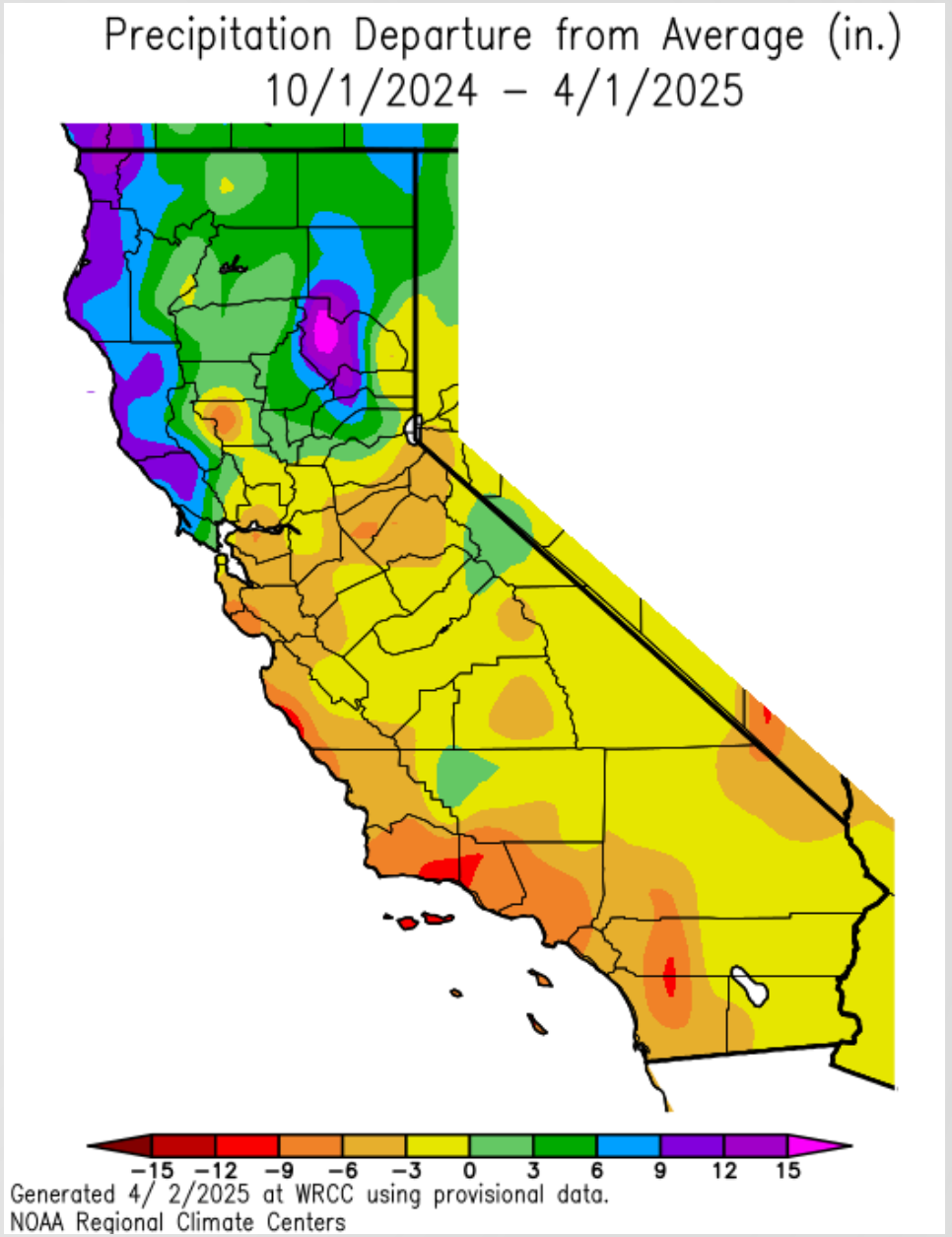
Water Year Type	Deliveries AF	Gen GWh	Load GWh	# of Years	Alloc %
W	3,497,122	5,287	8,646	5	88%
AN	3,091,718	5,784	7,802	4	78%
BN	2,582,604	4,507	7,314	5	55%
D	2,231,295	4,508	6,477	6	44%
C	1,315,692	2,096	3,411	5	14%



CALIFORNIA DEPARTMENT OF WATER RESOURCES

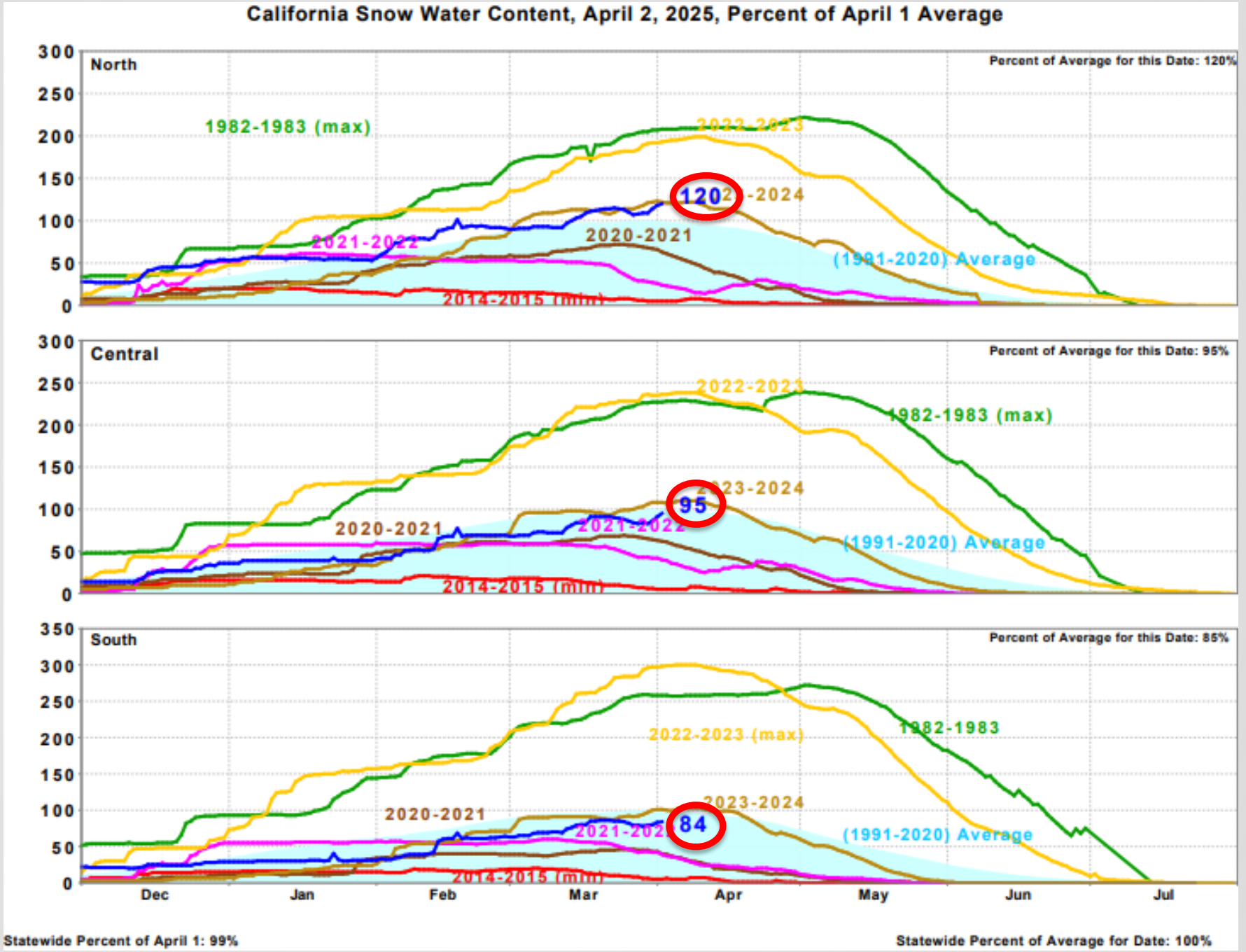
2025 Hydrology





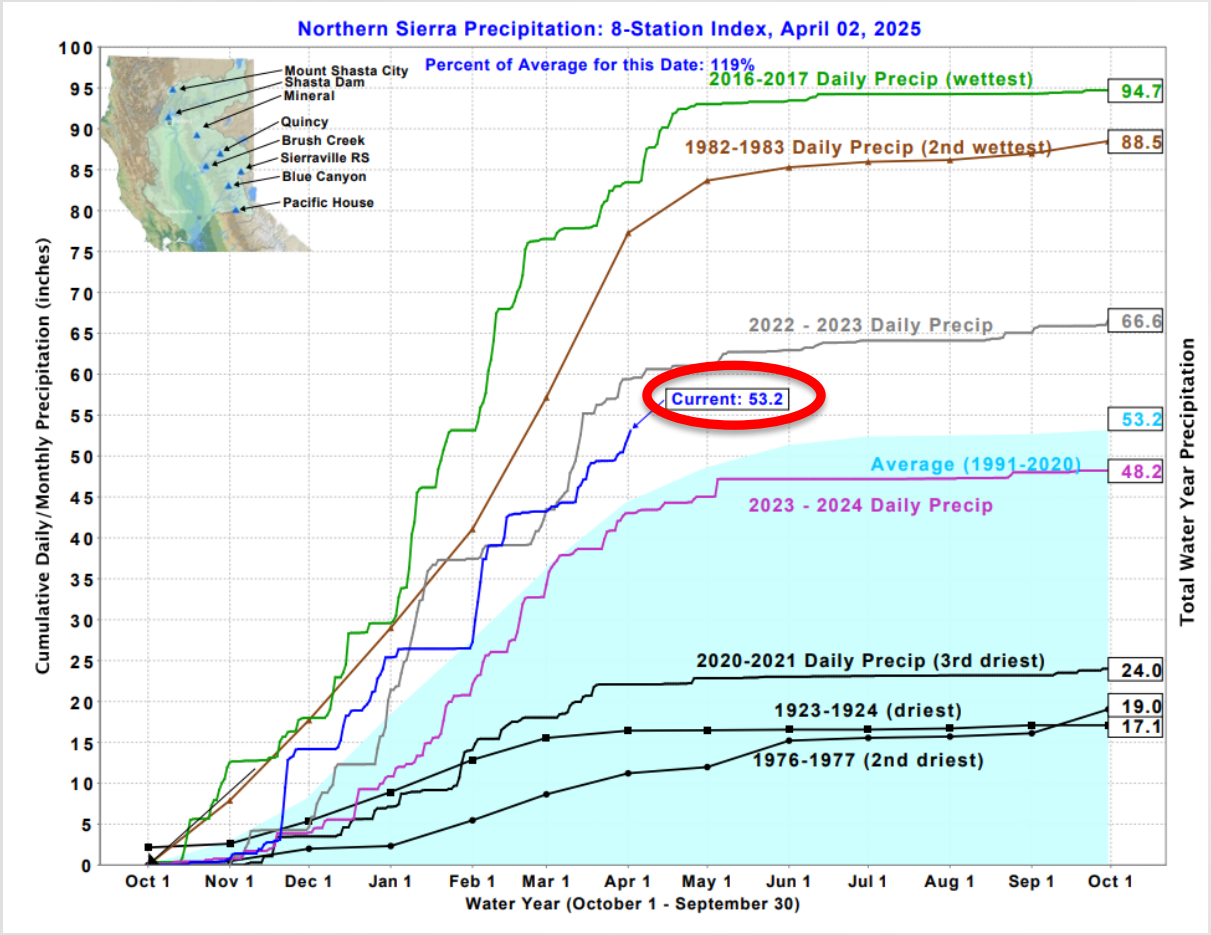
CALIFORNIA DEPARTMENT OF
WATER RESOURCES

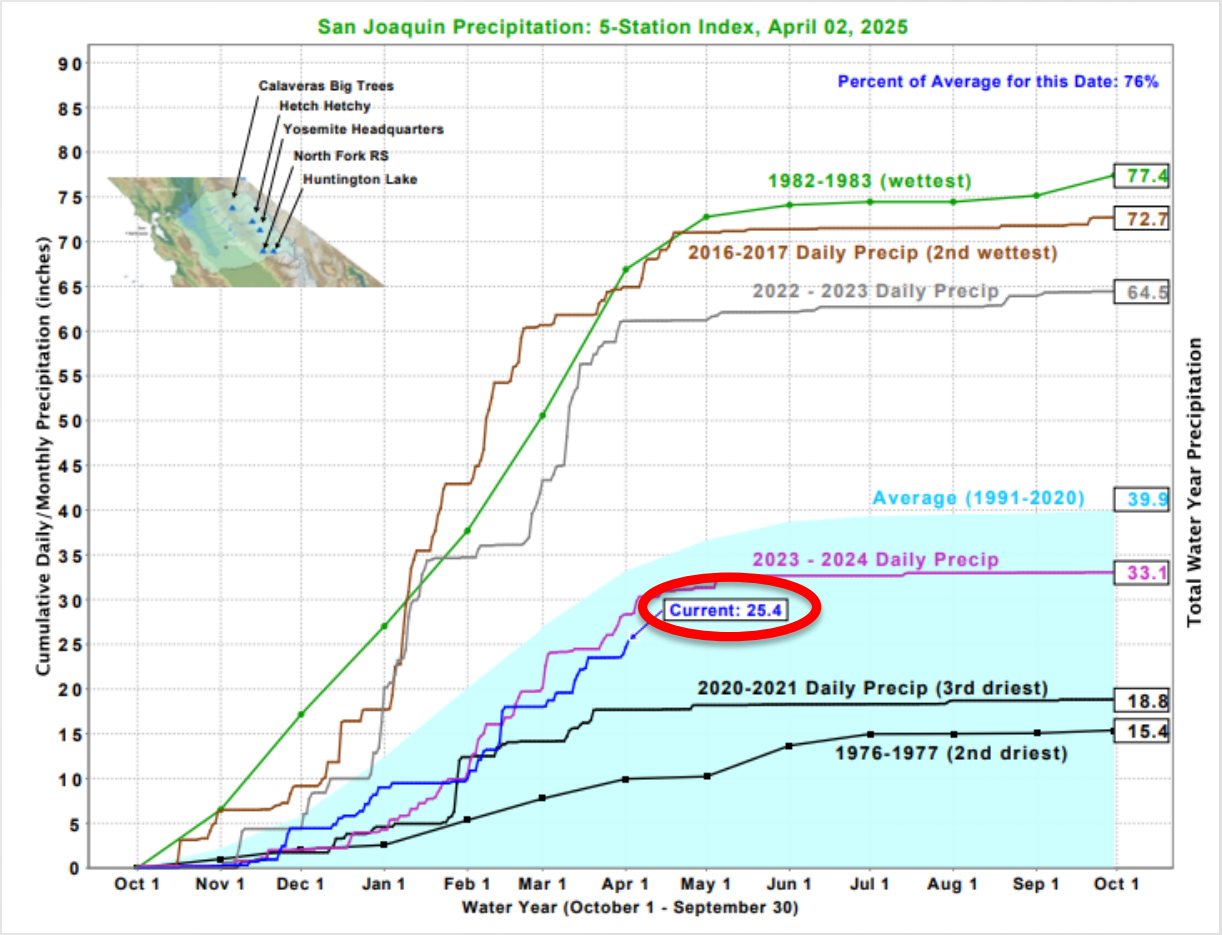
2025 Hydrology



CALIFORNIA DEPARTMENT OF WATER RESOURCES

SWP Operations – 2025 Hydrology Outlook





CALIFORNIA DEPARTMENT OF WATER RESOURCES

SWP Operations – 2025 System Outlook

SWP Generation

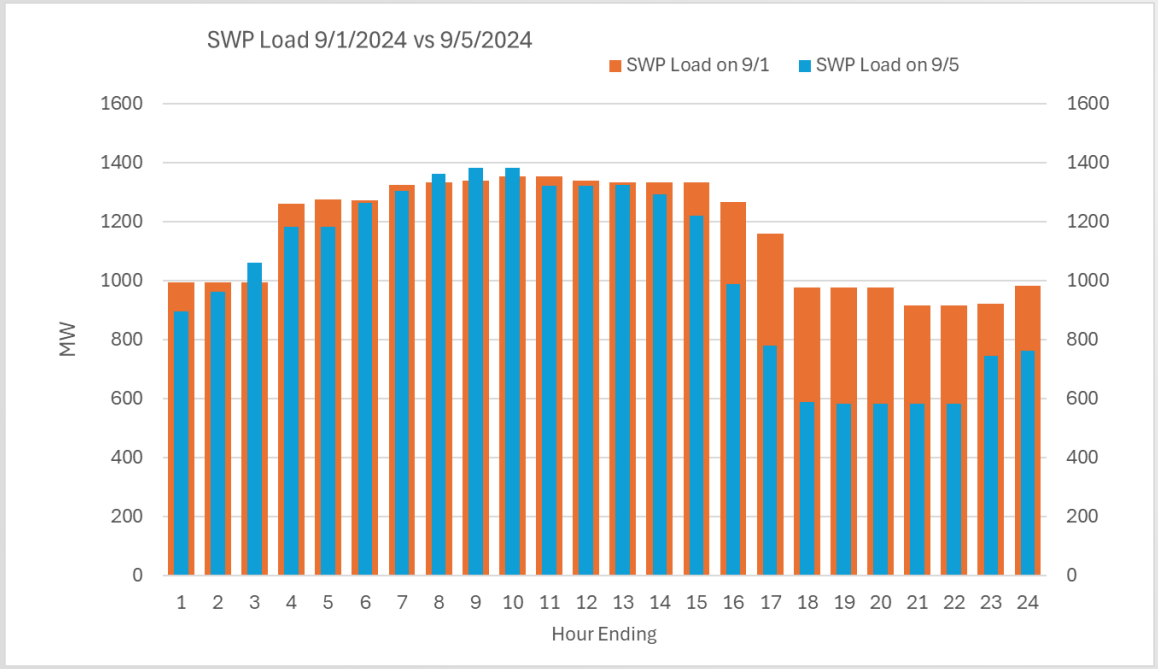
- Oroville Complex, San Luis Gen, Devil Canyon, Warne, Alamo, Mojave

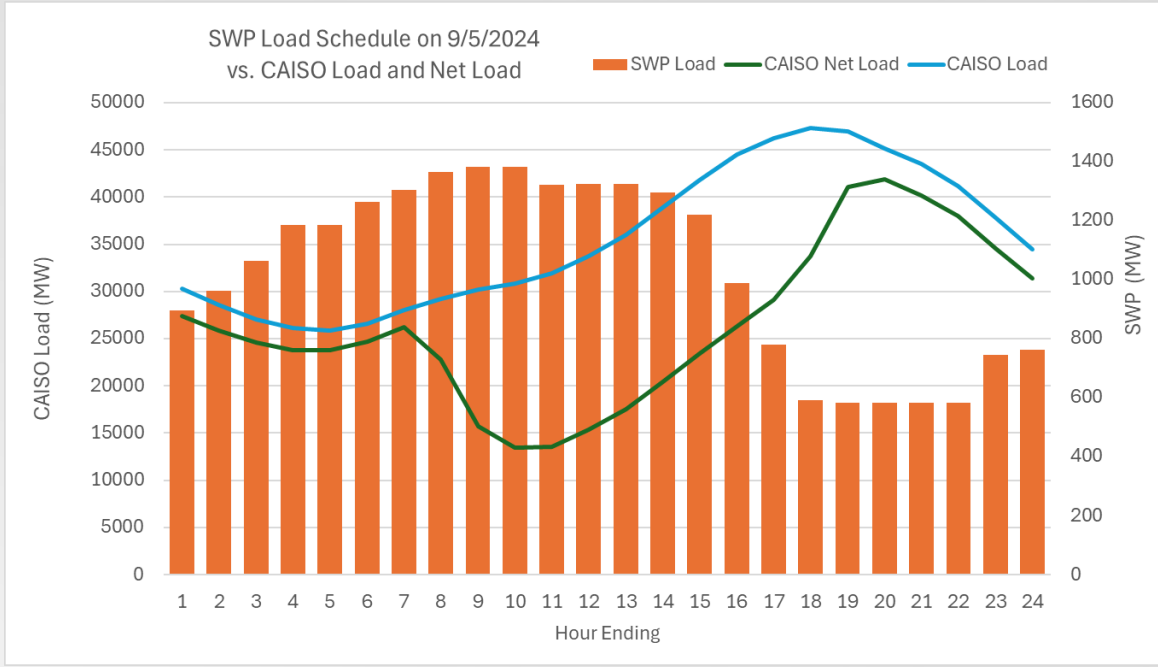
SWP Pump Load

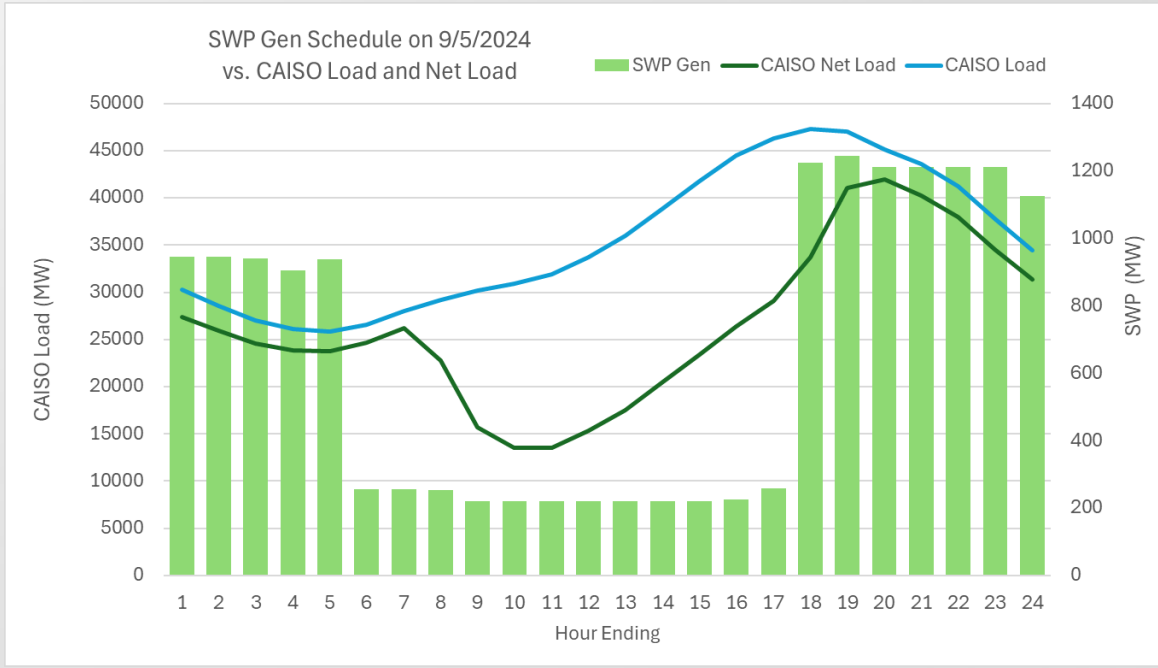
- Banks, San Luis Pump, Dos Amigos, Valley String, Pearblossom, Oso

SWP Net System Gen & Pump							2025 Forecast			
Ave HE17-21	2022 Meter		2023 Meter		2024 Meter		Low		High	
Month	Gen	Pump	Gen	Pump	Gen	Pump	Gen	Pump	Gen	Pump
July	379	65	624	1113	917	676	727	535	906	801
August	346	40	678	1052	846	839	657	485	852	796
September	272	48	799	1038	786	666	563	523	789	810

2024 Flexibility based on 3-7 Day Communication







CALIFORNIA DEPARTMENT OF
WATER RESOURCES

CALIFORNIA
BUSINESS AND ECONOMIC DEVELOPMENT

Renewable Resources Deployment Emerging Trends

CEC | Summer Energy Reliability Workshop
05.02.2025

Tracking Energy Development (TED)Task Force

- Joint inter-agency working group to provide project development support for new energy projects
- Tracks project under development and those expecting to come online in the near-term
- Collect and synthesize information on project issues and challenges that may impact timely deployment
- Coordinate actions to address barriers, where applicable

Tracking Project Issues and Challenges

- GO-Biz Energy Unit tracking began in late 2022
- Set up a system for tracking engagement with developers and projects issues
- Synthesize data
- Work with TED Task Force member agencies to improve data collection

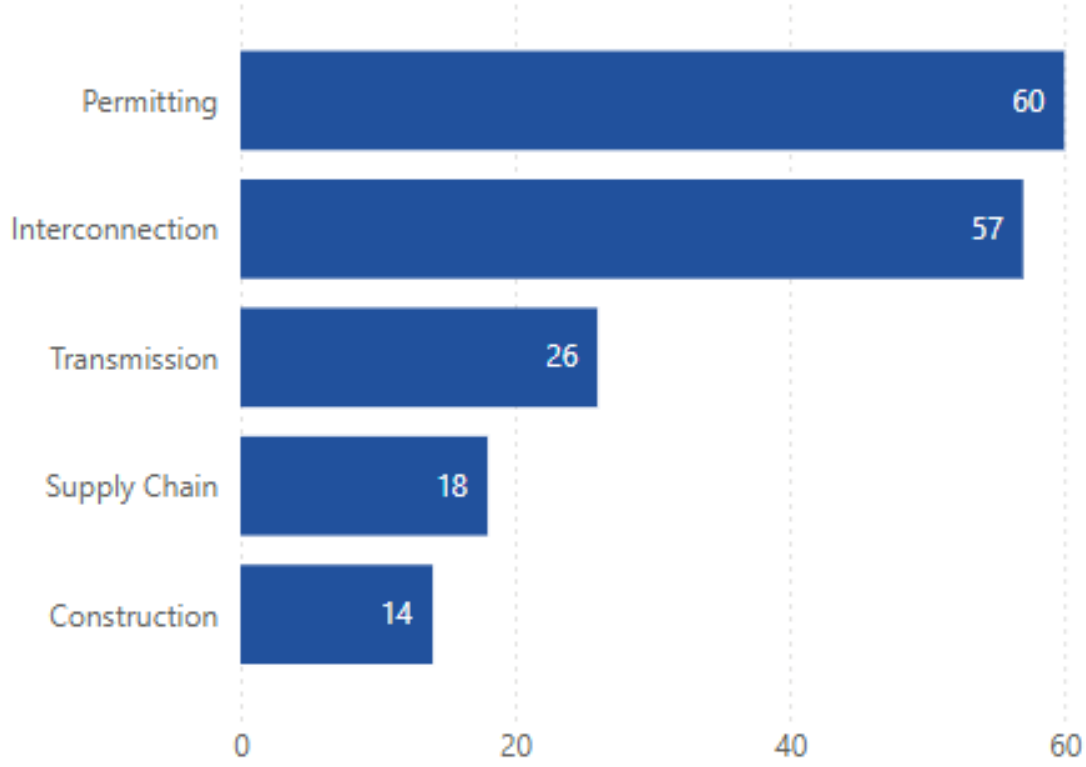
Tracking Project Issues and Challenges

Currently Tracking

123 Total Active Projects

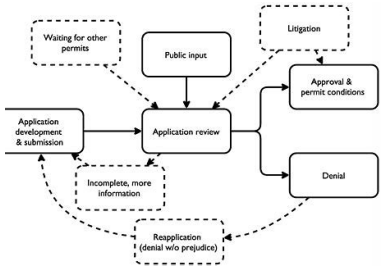
- → 52,000 MW
- → 53 with COD delays
- → 26-month avg. delay/project
- → 175 reasons cited for delay

Summary of Top Reasons for Delay



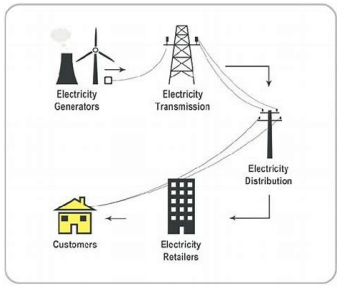
Challenges to Energy Project Deployment

Main Reasons for Delay



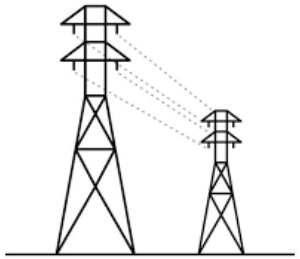
PERMITTING

- Local, state and/or federal
- Environmental reviews
- Staffing capacity/turnover
- Community opposition



INTERCONNECTION

- Documentation delays
- Easement issues
- Studies



TRANSMISSION

- Network upgrades
- Circuit breaker procurement
- Deliverability (queue management)
- Study issues

SUPPLY CHAIN

- UFLPA
- Global competition
- Very long lead time for circuit breakers and transformers

Battery Storage Safety Concerns & Challenges

Concerns/Challenges

- Fire safety risks
- Environmental concerns
- Evolving technology
- Lack of permitting know-how
- Moratoriums

Fifth Standard Project in Fresno County

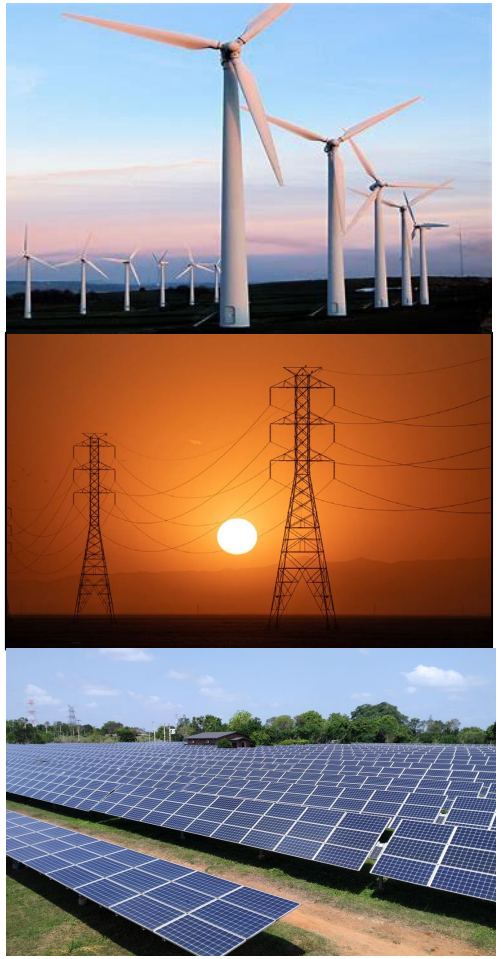
State Activities to Date

- Convening of the Battery Storage Collaborative
- CPUC General Order 167-C
- CPUC Data Request & Inspection
- CEC Roundtable with Stakeholders
- CEC Inspection (of it's jurisdictional plants)
- GO-Biz BESS Webinar & Upcoming Permitting Playbook
- Upcoming OSFM Battery Safety Symposium in July

Addressing Barriers & Challenges

Additional State Actions

- CEC Opt-In Program
- SB 149 | Judicial Streamlining
- CPUC GO 131 E | Transmission Permitting Process Streamlining
- CAISO Interconnection Process Enhancement (IPE) Process
- Energy Infrastructure Strike Team
- CERIP | GO-Biz Renewable Energy Project Permitting Playbook



GO-Biz Renewable Energy Permitting Initiative

OBJECTIVE | Renewable Energy Project Permitting Playbook

- Produce documentation to increase transparency and alignment of local jurisdiction permitting processes to reduce barriers for deployment of energy projects

KEY RESULTS | Assessment Report and Toolkit

- Report on the barriers to deployment for large renewable energy generation projects
- Develop resources toolkit that would include:
  - smart practices
  - approaches to undertake to improve processes
  - strategies that enhances connectivity b/w responsible entities

Approach to Developing Report & Toolkit

Dec 2024 - Now

Discovery & Data Collection

- Surveys, interviews and workshops with local permitting agencies, developers, and community-based organizations
- Assess local jurisdictions permitting processes for large-scale renewable projects
- Synthesize information and findings

Apr to Jul 2025

Report and Toolkit Development

- Develop report on findings
- Develop resources toolkit that will include:
  - ✓ best practices
  - ✓ resources to support permitting process
  - ✓ strategies that enhances connectivity b/w responsible entities

July to Nov 2025

Report and Toolkit Publication

- Seek feedback on a draft of toolkit
- Launch toolkit
- Publicize and share through selected events and forums

CONTACT INFO

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Governor’s Office of Business & Economic Development
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Energy Situational Awareness Dashboards

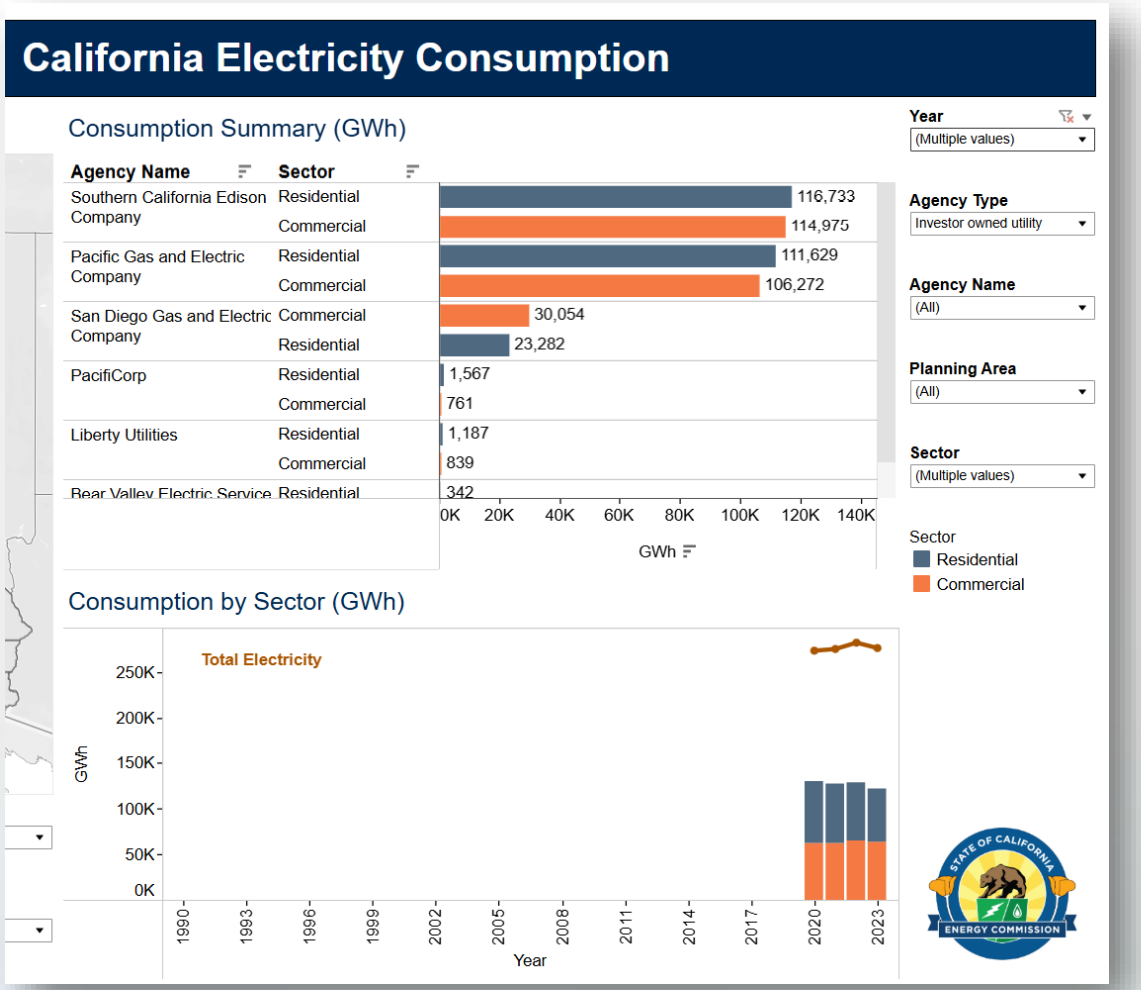
Summer Energy Reliability Workshop

Stephen Lai, CEC

Overview

- Data is collected through regulations, legislation, rule-makings.
  - Quarterly Fuel and Energy Reporting (QFER), California Code of Regulations, Title 20, Ch.3, Article 1.
  - Power Source Disclosure (PSD) program, established by Senate Bill (SB) 1305 (Stats. 1997, ch. 796).
- External data leveraged from authoritative sources.
  - California Independent System Operator (CAISO).
  - U.S. Energy Information Administration (EIA).
- Dashboards convey key metrics in a user-friendly tool.
- Data is updated on specified intervals.

Dashboard Design

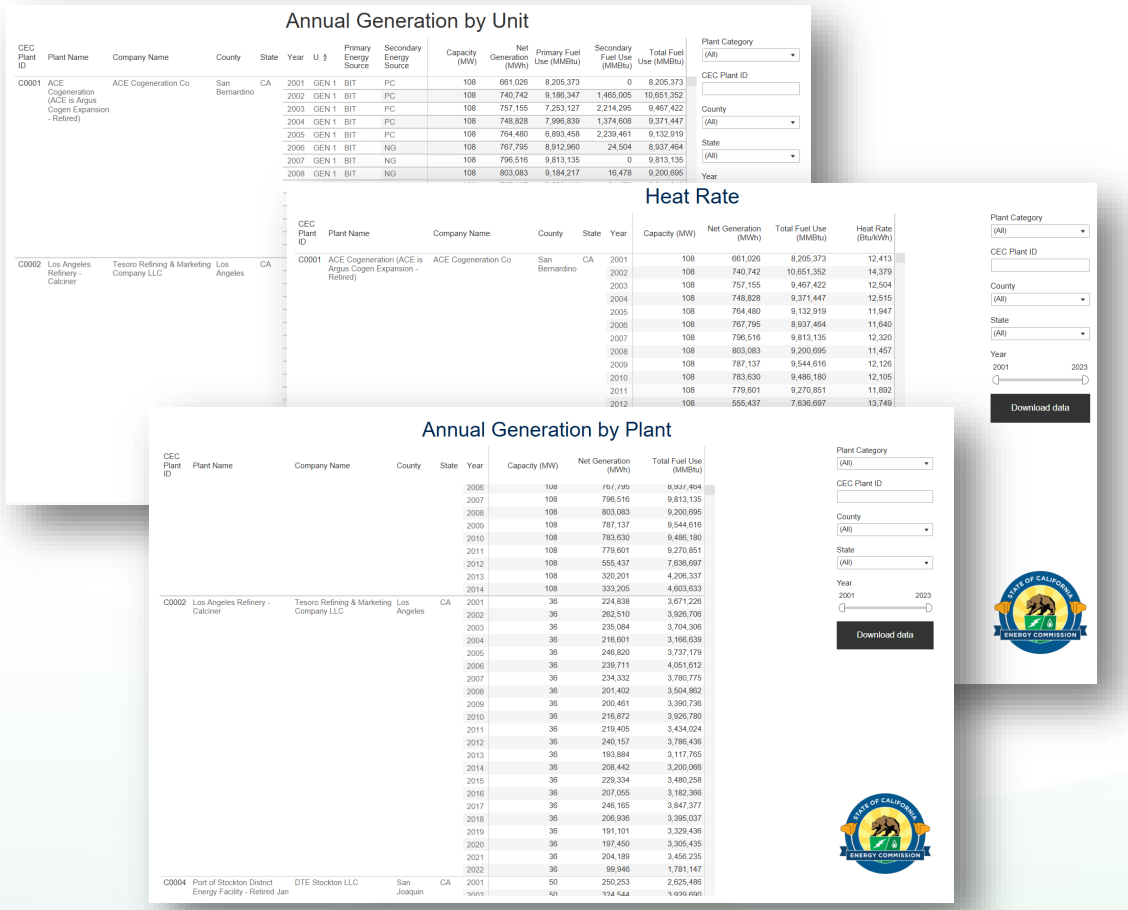


- User friendly graphs and charts.
- Dynamic interaction.
- Data filters.
  - Year
  - Location
  - Type
  - Name/ID
- Empowering the end user to create custom views.

Quarterly Fuel and Energy Report

- The regulations under QFER provide for the collection of energy data relating to electric generation, control area exchanges, and natural gas processing and deliveries.
- The dashboards display information that includes gross generation, net generation, fuel use by fuel type for each generator, and total electricity consumed on site.

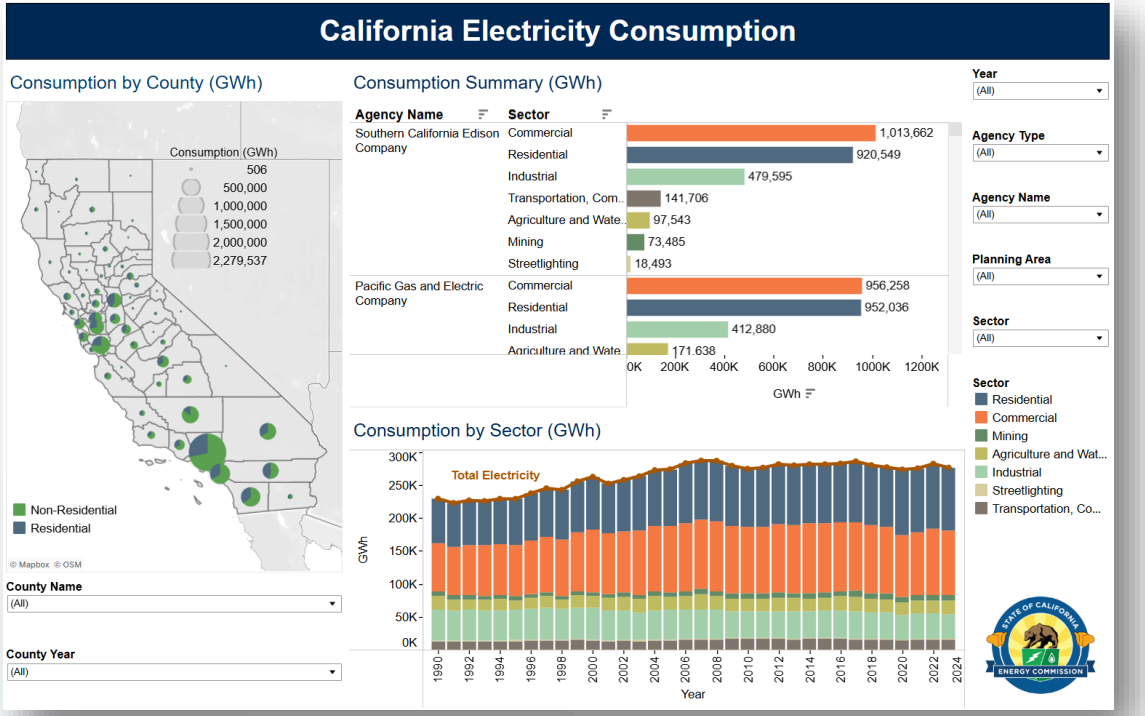
[Quarterly Fuel and Energy Report (QFER) Data Tables](https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/quarterly-fuel-and-energy-report-qfer-data) (https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/quarterly-fuel-and-energy-report-qfer-data)



The statistics presented here are derived from the QFER CEC-1304 Power Plant Owner Reporting Form

Electricity Consumption

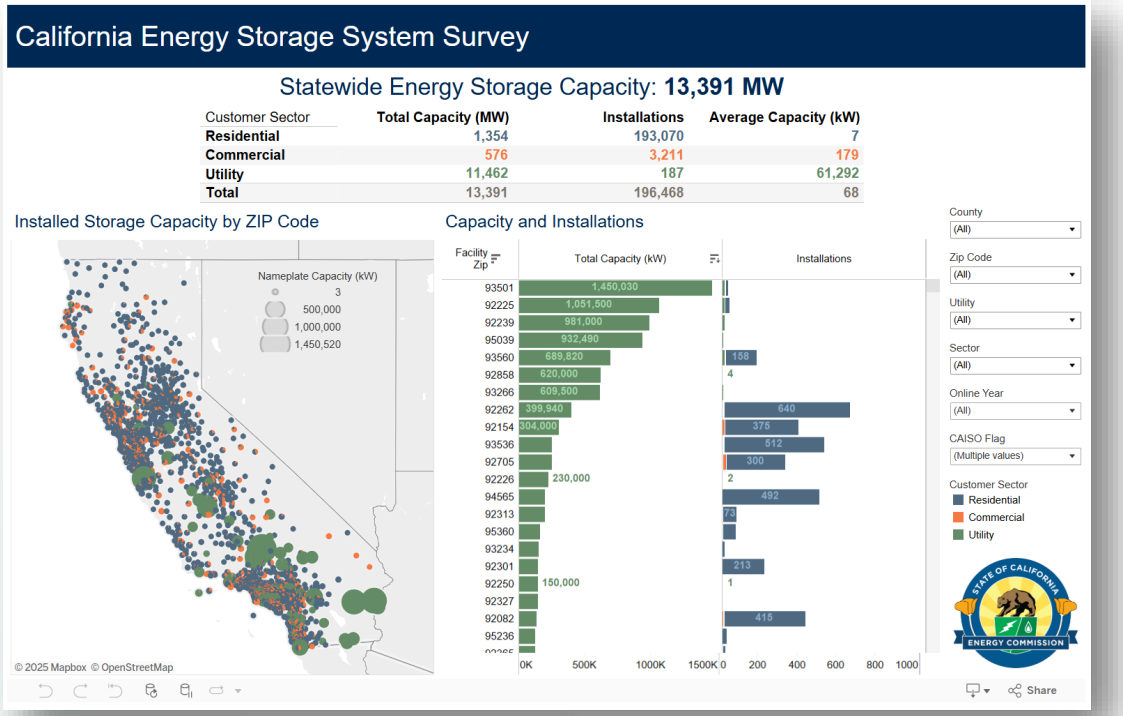
- The California Electricity Consumption dashboard illustrates the state's historical electricity consumption by agency, sector, and county level.
- Data is sourced from Quarterly Fuel and Energy Reports (QFER) Form 1306A, Schedule 1.
- Annual statewide electricity consumption is available to explore by sector, agency, and county



Electricity Consumption (https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/california-energy-consumption-dashboards-0)

Energy Storage

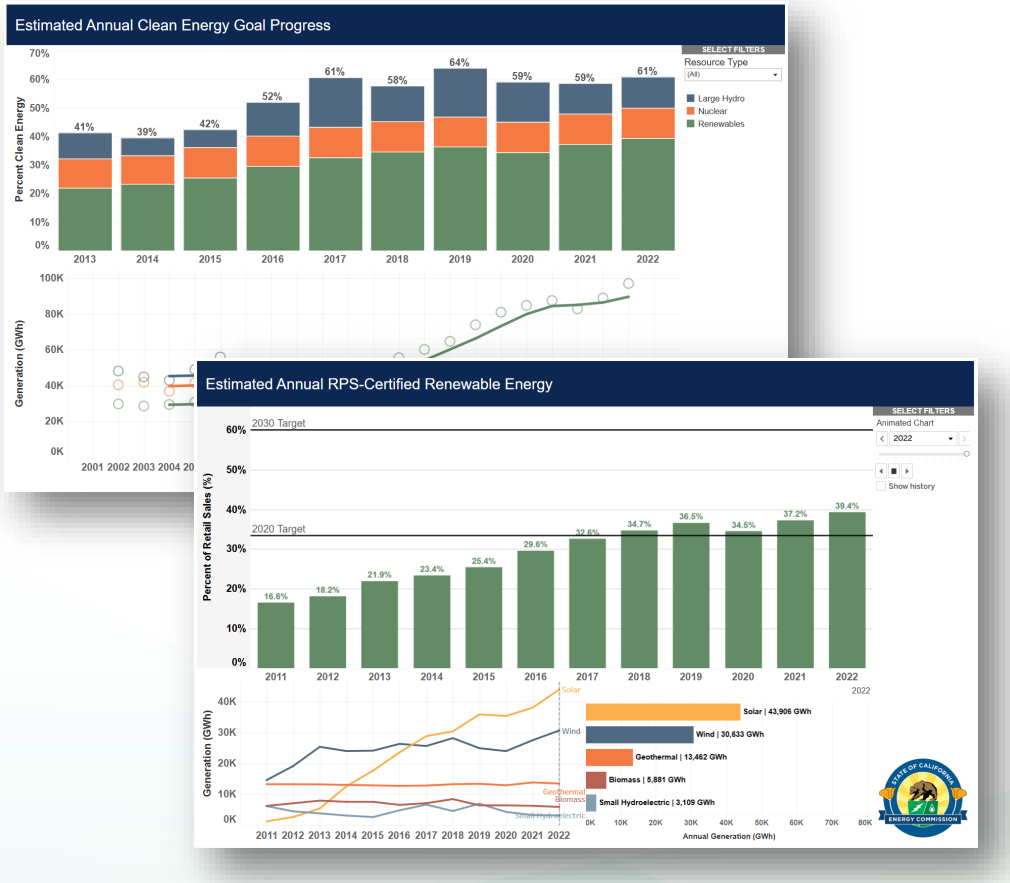
- The California Energy Storage System Survey dashboard illustrates California's progress toward the 2045 goal of 52,000 MW for battery storage.
- Information is categorized by customer sector focused on capacity and installations.
- Data is sourced from QFER, CAISO, and EIA.



California Energy Storage System Survey (https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/california-energy-storage-system-survey)

Clean Energy

- The Estimated Annual Clean Energy Goal Progress dashboard illustrates California's progress toward serving 100 percent of California's retail sales and state loads with Renewables Portfolio Standard (RPS) certified renewable and zero carbon energy by 2045.
- The Estimated Annual RPS-Certified Renewable Energy dashboard illustrates California's load-serving entities (LSEs) progress to increase their procurement of eligible renewable energy resources to 60 percent of retail sales by 2030.
- Data is sourced from Power Source Disclosure (PSD), QFER, RPS.



[Estimated Annual Clean Energy](https://www.energy.ca.gov/programs-and-topics/topics/renewable-energy/clean-energy-serving-california/estimated-annual-clean)
(https://www.energy.ca.gov/programs-and-topics/topics/renewable-energy/clean-energy-serving-california/estimated-annual-clean)

[Estimated Annual RPS-Certified Renewable Energy](https://www.energy.ca.gov/programs-and-topics/topics/renewable-energy/clean-energy-serving-california/estimated-annual-rps)
(https://www.energy.ca.gov/programs-and-topics/topics/renewable-energy/clean-energy-serving-california/estimated-annual-rps)

Thank You!

Q&A

Lunch Break

Panel: Summer Reliability Assessments – Electricity

Moderator: Liz Gill

A. CEC Stack Analysis, Chie Hong Yee Yang, CEC
B. Stack Analysis for CPUC Resource Adequacy Proceeding, Elijah Cohen, CPUC
C. Summer Loads and Resources Assessment, Aditya Jayam Prabhakar, California ISO
D. 2026 CPUC Resource Adequacy Planning Reserve Margin Study, Behdad Kiani, CPUC
E. Long-Term Loss of Load Expectation Analysis, Hannah Craig, CEC

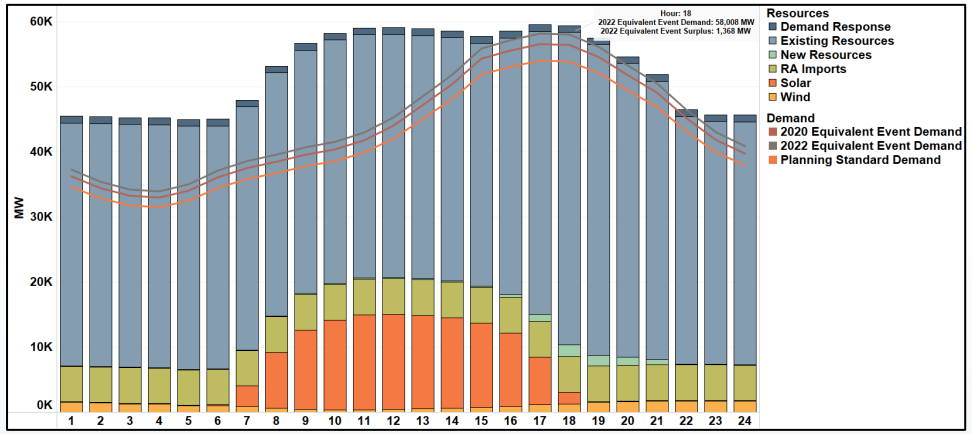
2025 Summer Stack Analysis

Summer Energy Reliability Workshop

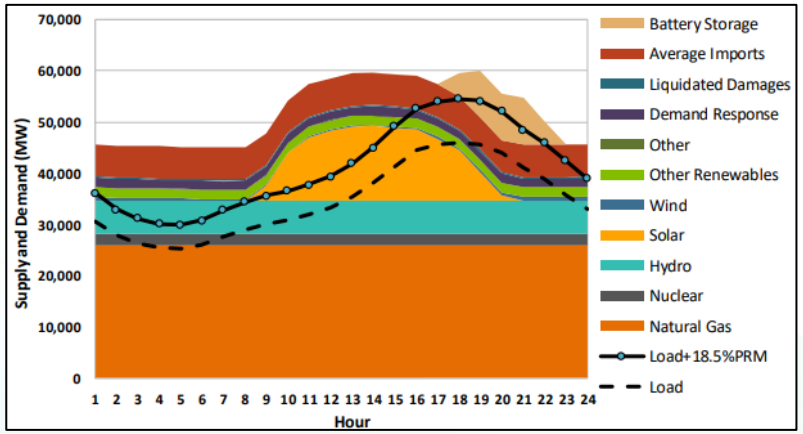
Chie Hong Yee Yang, CEC

What is a stack analysis?

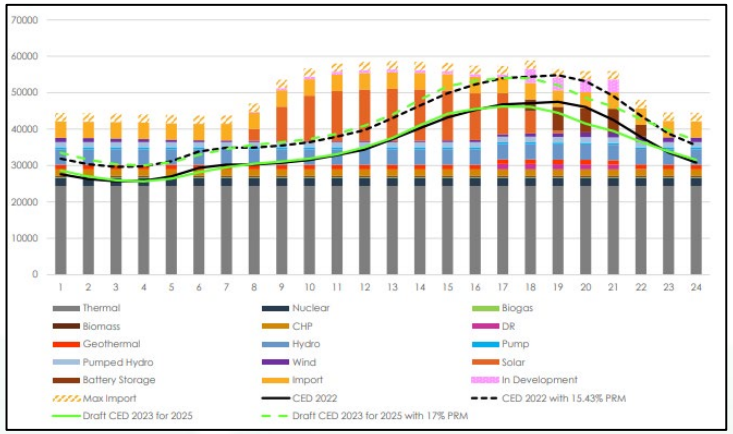
- Visual and analytical tool that compares available generation capacity with forecasted electrical demand
- Identifies potential reliability gaps when demand exceeds supply
- Critical for reliability planning, resource adequacy, and contingency resource planning



Source: CEC



Source: California ISO



Source: CPUC

CEC Summer Stack Analysis

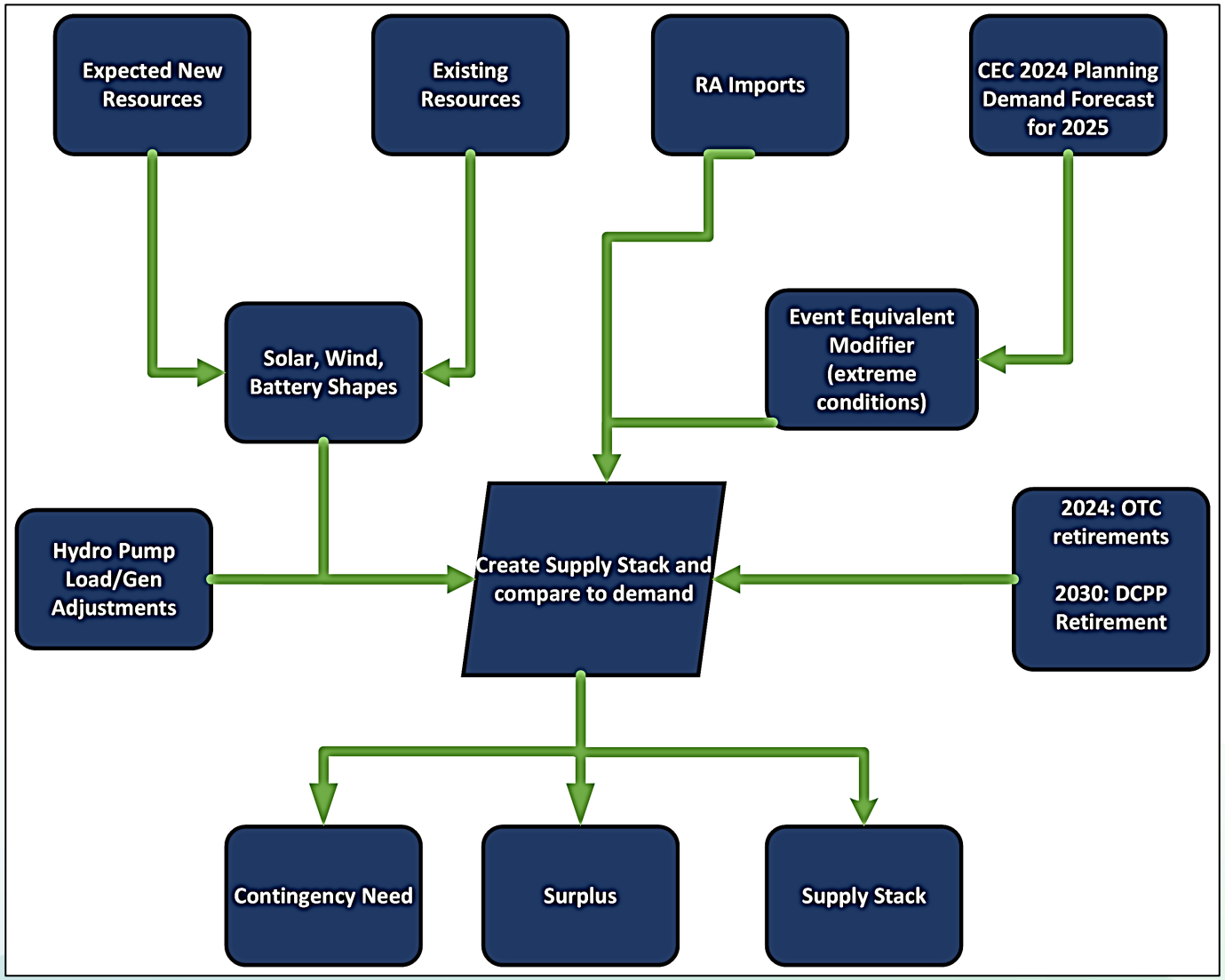
Purpose:

- Deterministic approach
- Assess average and extreme conditions
- Inform need for contingencies

Considers extreme conditions:

- High demand days like summer 2020 and 2022
- Increased levels of unplanned outages
- Coincident Fire Risk

Stack analysis is updated throughout the summer and as new information becomes available



Source: CEC

System Planning Conditions

Condition Relative to 1-in-2 Forecast	Operating Reserves	Outages	Demand Variability	Coincidental Fire Risk	Notes
Average Conditions: Current RA Planning Standard – 17%	6%	5%	6%	4,000 MW	17% beginning 2024
2020 Equivalent Event: Additional capacity needed to ride-through heat event like 2020	6%	7.5%	9%	4,000 MW	9% higher demand over median, and 2.5% higher levels of outages
2022 Equivalent Event: Additional capacity needed to ride-through heat event like 2022	6%	7.5%	12.5%	4,000 MW	12.5% higher demand over median, and 2.5% higher levels of outages

Source: CEC

Supply Modifications

- Wind and Solar
  - Hourly profiles based on generation on high-load days from 2014-2024
- Batteries
  - Discharge limited to 4 hours across peak hours
  - Charging load is not considered – batteries assumed to be fully available

Time (PDT)	Jul - Wind	Aug – Wind	Sep - Wind	Jul - Solar	Aug - Solar	Sep - Solar	Jul - Battery	Aug - Battery	Sep - Battery
4PM-5PM	0.46	0.35	0.18	0.56	0.55	0.41	0.39	0.48	0.35
5PM-6PM	0.49	0.40	0.21	0.32	0.25	0.10	0.42	0.51	0.66
6PM-7PM	0.51	0.42	0.25	0.07	0.03	0.00	0.77	0.85	1.00
7PM-8PM	0.54	0.47	0.27	0.00	0.00	0.00	1.00	0.98	1.00
8PM-9PM	0.55	0.49	0.28	0.00	0.00	0.00	0.84	0.71	0.64
9PM-10PM	0.56	0.50	0.28	0.00	0.00	0.00	0.58	0.48	0.35

Source: California Energy Commission staff with California ISO data

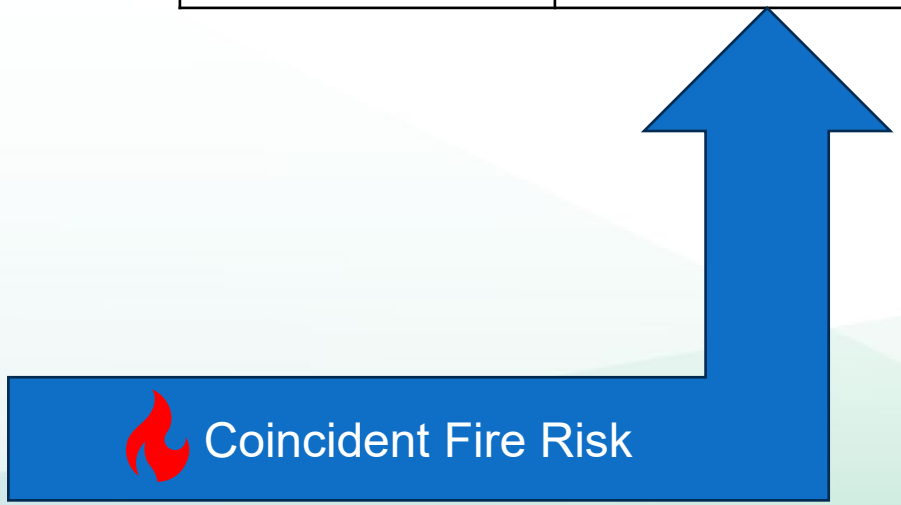
Resource Stack Comparison

Results

- No shortfalls expected under average conditions and extreme events, Tight conditions may occur if there is a coincident fire impacting transmission assets
- Cautiously optimistic summer outlook

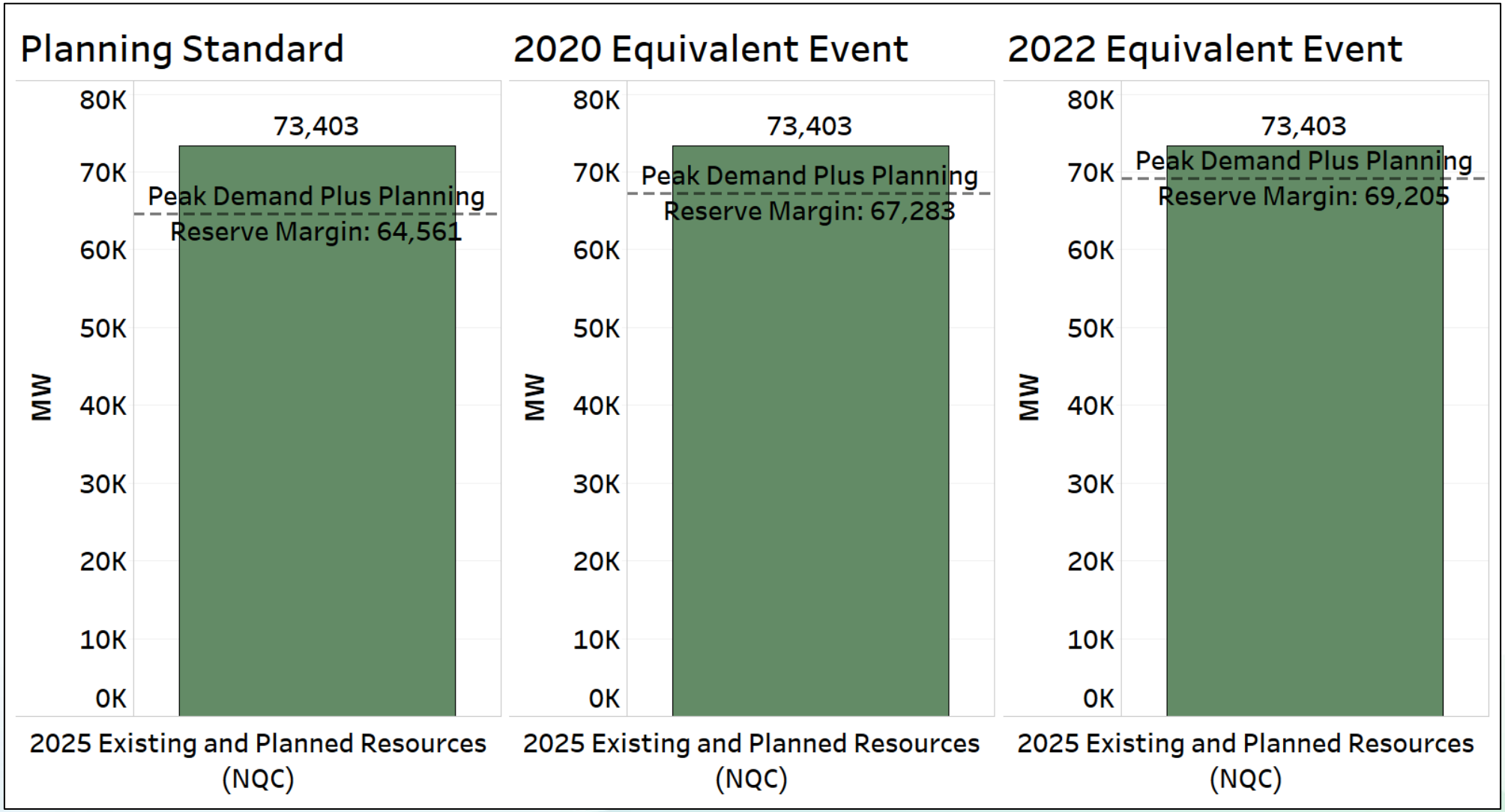
	2025 1st & 2nd Quarterly Report
Supply	
Demand Response	1,033
Existing Resources	48,032
New Batteries Nameplate	1,722
Wind	1,305
Solar	1,765
RA Imports	5,500
Total (MW)	**59,357**
Demand (MW)	
Sept. Peak Demand	**46,152**
Surplus/Shortfalls (MW)	
Average Conditions	5,512
2020 Equivalent Event	2,980
2022 Equivalent Event	1,368

System conditions	Surplus/Shortfalls
Planning Standard	**1,512 MW**
2020 Equivalent Event	**-1,020 MW**
2022 Equivalent Event	**-2,632 MW**



Results are for CAISO for September 2025, hour 18. All new resources are projected to be online by 9/1/25.

Statewide Reliability Snapshot



Source: CAISO data and CEC 2024 electric resource plans

2025 Contingencies (as of 4/21/2025)

		MW Available		
Type	**Contingency Resource**	**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[1]	530	540	545
	CEC Distributed Electricity Backup Assets[2]	0	0	0
CPUC*	Ratepayer Programs (Emergency Load Reduction Program, Power Saver Rewards etc.)[3]	106	104	103
	Imports Beyond Stack	25	25	25
	As Available Energy from Installed Resources	794	364	474
Non-Program	Balancing Authorities Emergency Transfers	300	300	300
	Thermal Resources Beyond Limits: Gen Limits Needing 202c	25	25	25
	Total	**4859**	**4437**	**4551**

[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

** Numbers are from 2024 IOU Excess Reports. Numbers will be updated for summer 2025 when IOUs submit their June 2025 Month-Ahead Showings to CPUC*

Thank You!

2025 CPUC Stack Analysis

July, August, and September

Elijah Cohen

Analyst, Electric Market Design

CPUC Energy Division

May 2, 2025

California Public
Utilities Commission

CPUC Slice Of Day (SOD) RA Compliance

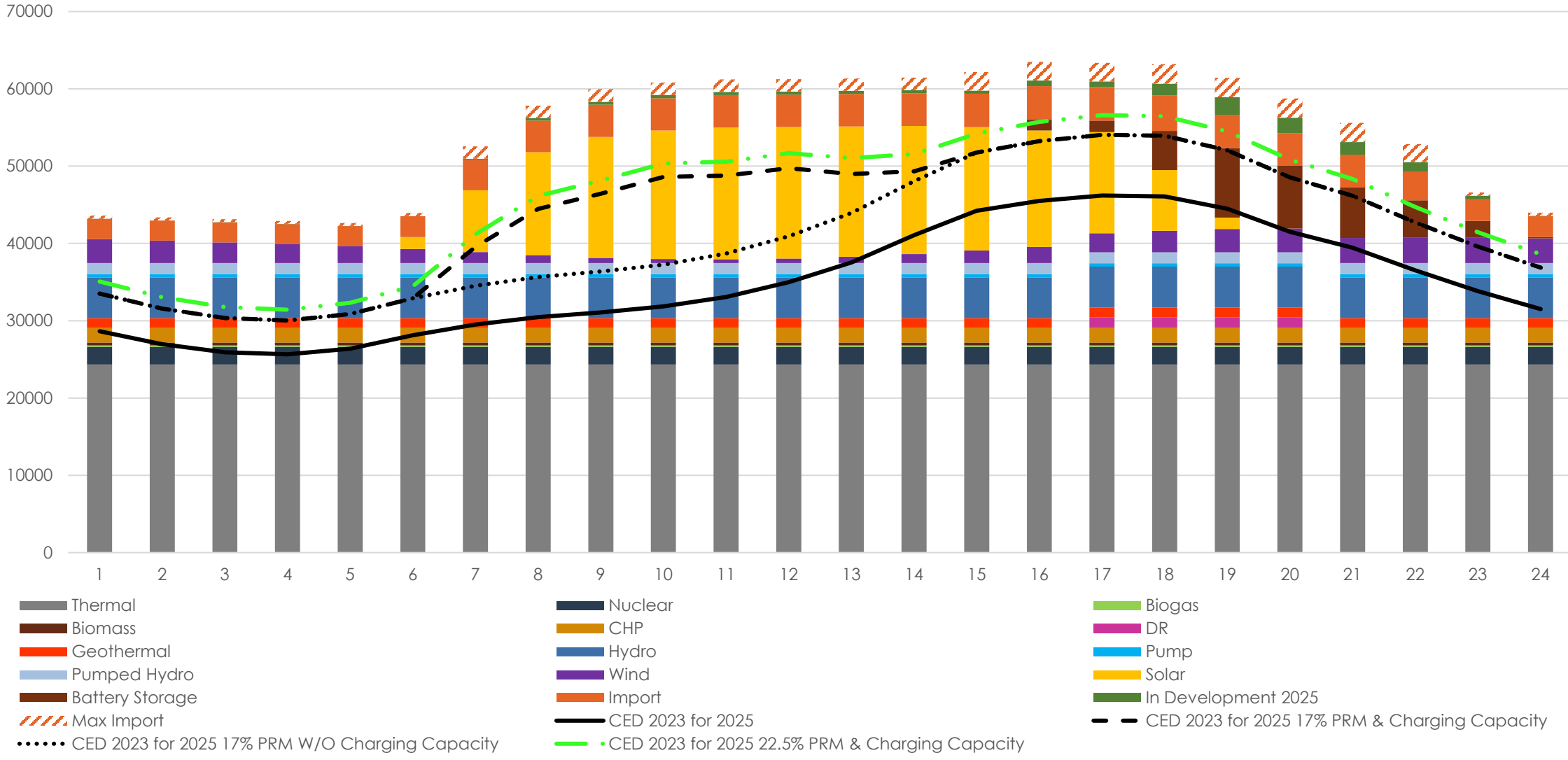
- CPUC's Slice of Day RA Framework became binding for compliance year 2025 pursuant to D.24-06-004.
- LSEs are required to make Year-ahead and Month-Ahead RA showing that demonstrate they meet a 24-hour worst day need obligation, as opposed to a single net peak value. They must also demonstrate that they have enough charging capacity to charge their storage resources. The 24-hour monthly need is based on individual adjusted LSE load forecast benchmarked to the 2023 hourly CED IEPR vintage (for load forecast year 2025) plus a 17% planning reserve margin.
- Implementation of SOD:
  - Master Resource Database ((MRD) - Used for validating resource supply across 24 hour.
  - SOD Template - Tool used by LSEs to show compliance to CPUC.
  - SOD Validation Tool - Tool used by ED to validate LSEs showings. Pulls from MRD and CAISO supply plan data.
- SOD Filings to-date
  - Year Ahead- filings submitted October 31, 2024
  - Month Ahead- filings have been submitted for compliance months January - June 2025. July MA filings due on 5/17
  - Non-binding Summer RA Filings- LSEs have also filed non-binding RA SOD filings for July-September that CPUC is currently analyzing

Background and Assumptions

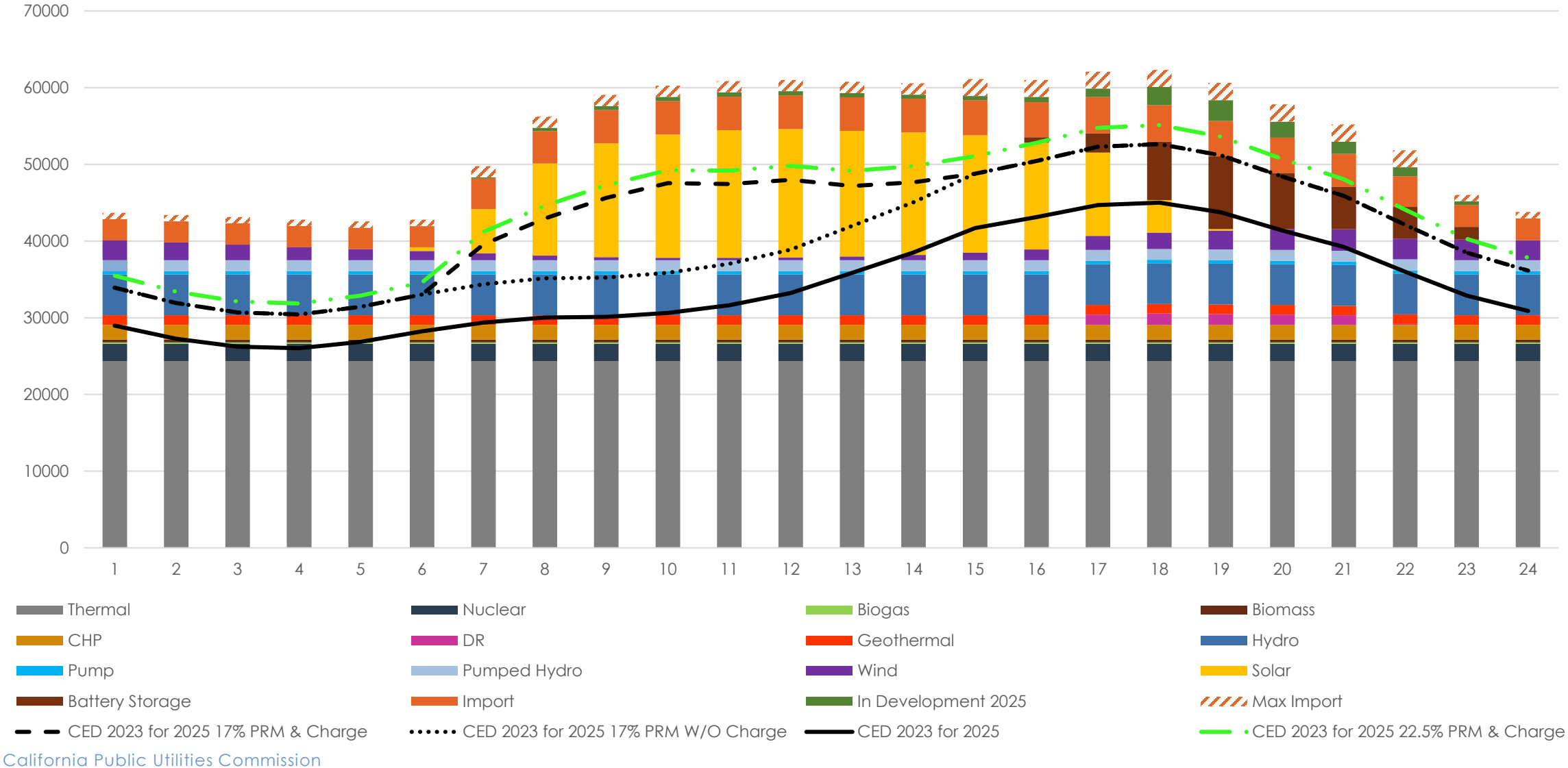
Supply	Key Assumptions
Imports	Includes a conservative value representing minimum historical imports ("Import"- represented in solid orange) and a more optimistic value representing maximum historical imports ("Max Import"- represented in dashed orange). Sources are CAISO Supply Plans and CPUC Month Ahead filings.
Under Construction	Data sourced from IRP filings gathered in October 2024. Staff applied a 40% reduction to the Under Construction (UC) resources to represent potential construction delays. These resources are represented in dark green in the supply stack.
Existing Physical Resource	Data sourced from the CPUC Master Resource Database (vintage October 2024) represent physical resource supply in CAISO BAA. This MRD utilizes resource specific exceedance profiles and technology factors. Note: No SRR OTC plants were included in supply stack.
Batteries	Profiles from the CPUC PRM LOLE study were used to create battery shapes. Additional analysis adjusted batteries to achieve equal supply margins over evening hours (HE17-24).
Demand	**Key Assumptions**
Load Forecast	2023 CEC IEPR managed demand forecast (system planning scenario) for RA year 2025 (July, August, and September). Demand forecast is represented by the black line which reflects the peak day (worst day) hourly shape. This includes both CPUC-jurisdictional and non-jurisdictional LRAs.
Planning Reserve Margin	17%, which is the CPUC jurisdictional PRM. The dotted black line reflects hourly RA capacity needs (hourly load + 17% PRM). The dashed black line represents the hourly RA capacity needs plus the excess capacity required to charge the storage resources. There is also a dashed green line representing a 22.5% PRM, which a more extreme scenario that the CEC uses that matches a 2020 weather event.

2025 Summer Stacks

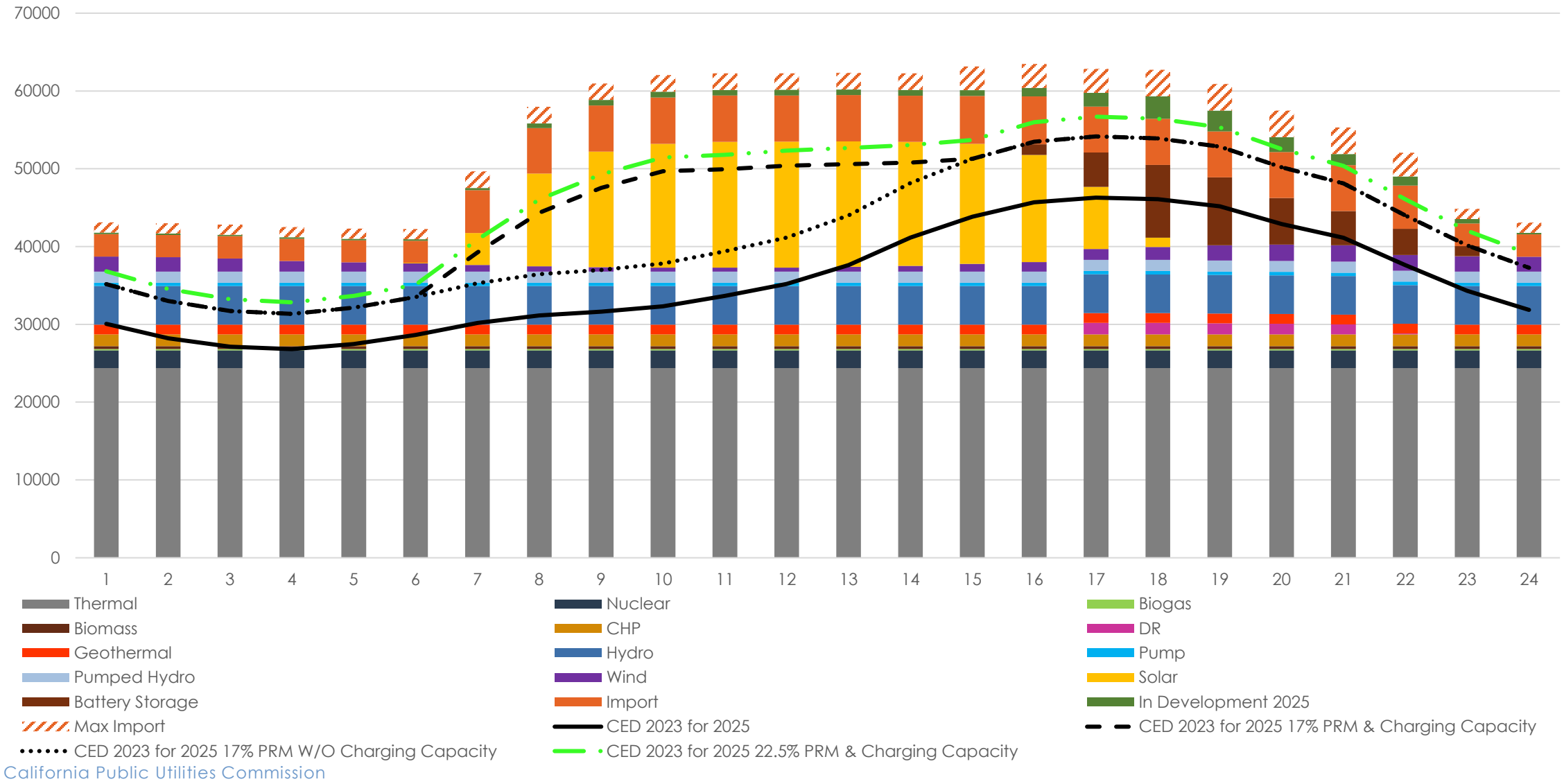
Slice of Day July 2025 Stack



Slice of Day August 2025 Stack



Slice of Day September 2025 Stack



Supply Margin Summary by Month

HE 23 (10-11 PM)	July	August	September
17% PRM with Conservative Imports	6,586 MW	6,723 MW	3,381 MW
17% PRM with Max Imports	6,993 MW	7,541 MW	4,696 MW
22.5% PRM with Conservative Imports	4,725 MW	4,914 MW	1,493 MW
22.5% PRM with Max Imports	5,132 MW	5,733 MW	2,808 MW

- Under a range of assumptions, all 2025 summer months show installed capacity length relative to RA program obligations

Staff Observations on 2025 Supply Margin Analysis

- **Imports**: HE 23-24 historically has fewer planned imports than other evening hours (Max Imports in September are only 4200 MW for those hours, in July/August: 3100/3600), due to most imports being MCC bucket 3 (7 AM – 10 PM, 6 days per week). This is does not reflect actual import flows, but firm capacity contracts.
- **Late Evening Hours**: Stacks often assume battery profiles that fully discharge by 10 PM. Using this assumption, HE23-HE24 becoming more constrained, requiring batteries to spread discharge until then, rather than discharging at Pmax over four hours. Other hours are more constrained without batteries.
- **Batteries**: If battery profiles are adjusted to make supply margins equal across hours, then the equalized supply margin with a conservative import assumption across evening hours would be 4783 MW (Sep), 7313 MW (Aug), and 7120 (Jul). As evenings get hotter, batteries should retain charge up until later hours.

For more information:

https://www.cpuc.ca.gov/ra/

California Public Utilities Commission

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2025 Summer Loads and Resources Assessment

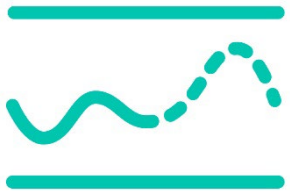
Aditya Jayam Prabhakar
Director, Resource Assessment and Planning

May 5, 2025

2025 Summer Outlook: resources, loads, and weather

Resource Additions

- Capacity added from September 1st through December 31st, 2024: **2,478 MW**
- Capacity added from January 1st through April 1st, 2025: **894 MW**
- Capacity expected from April 1st through June 30th, 2025: **2,163 MW**



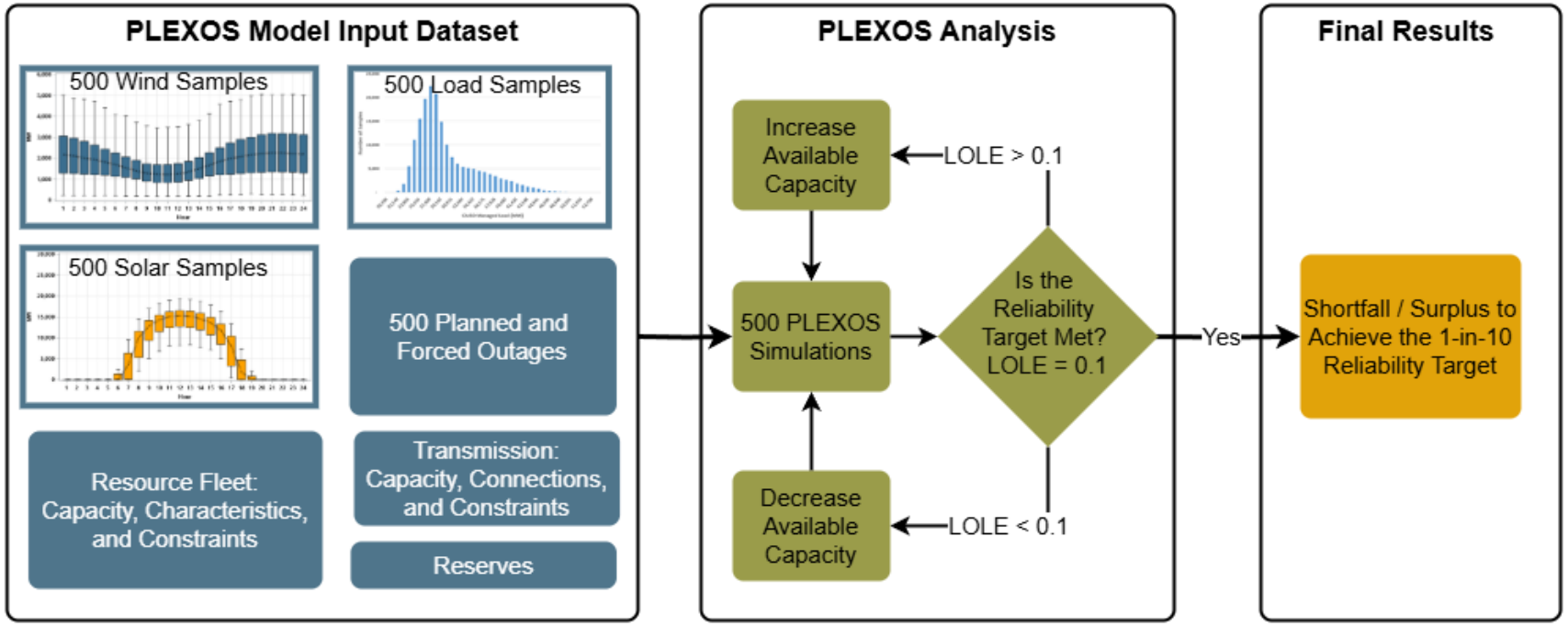
Load Forecast

- September peak load forecast: **46,094 MW**, HE 18 (from 2024 California Energy Commission's Integrated Energy Policy Report)

Weather Outlook

- **Above normal temperatures are likely** June through August
- Increased chance of heat events in June and July across the West
- **Average hydro** conditions

The CAISO conducted a probabilistic assessment to evaluate the sufficiency of the anticipated 2025 summer fleet to meet the 1-in-10 LOLE planning target

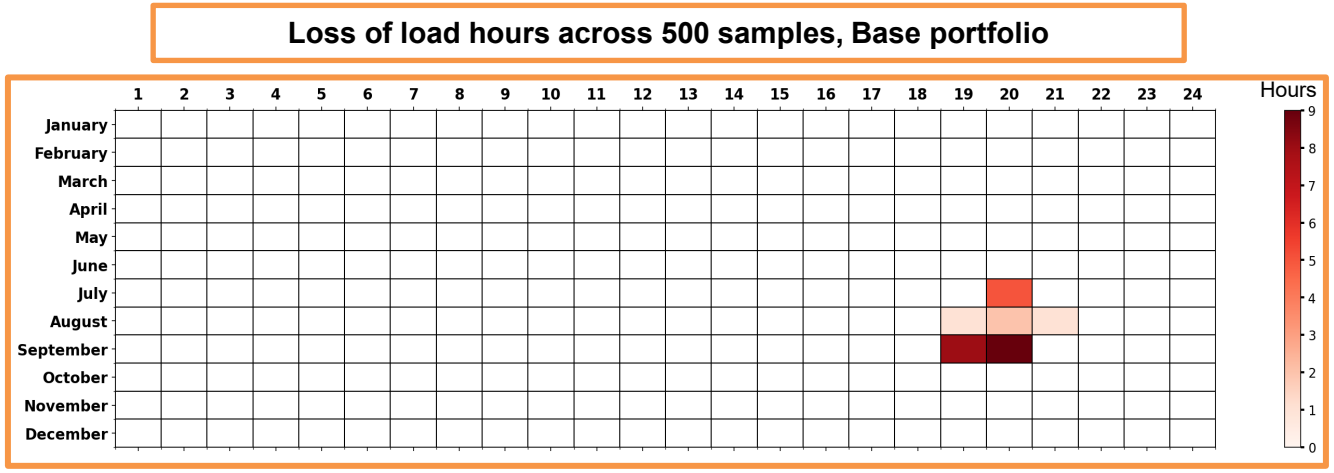


Loss of load expectation (LOLE) is a measure of the number of days per year for which the available generation capacity is insufficient to serve the demand at least once during that day. 0.1 LOLE or 1-day-in-10 LOLE equates to "1 day with an event in 10 years".

PLEXOS is an energy market simulation engine.

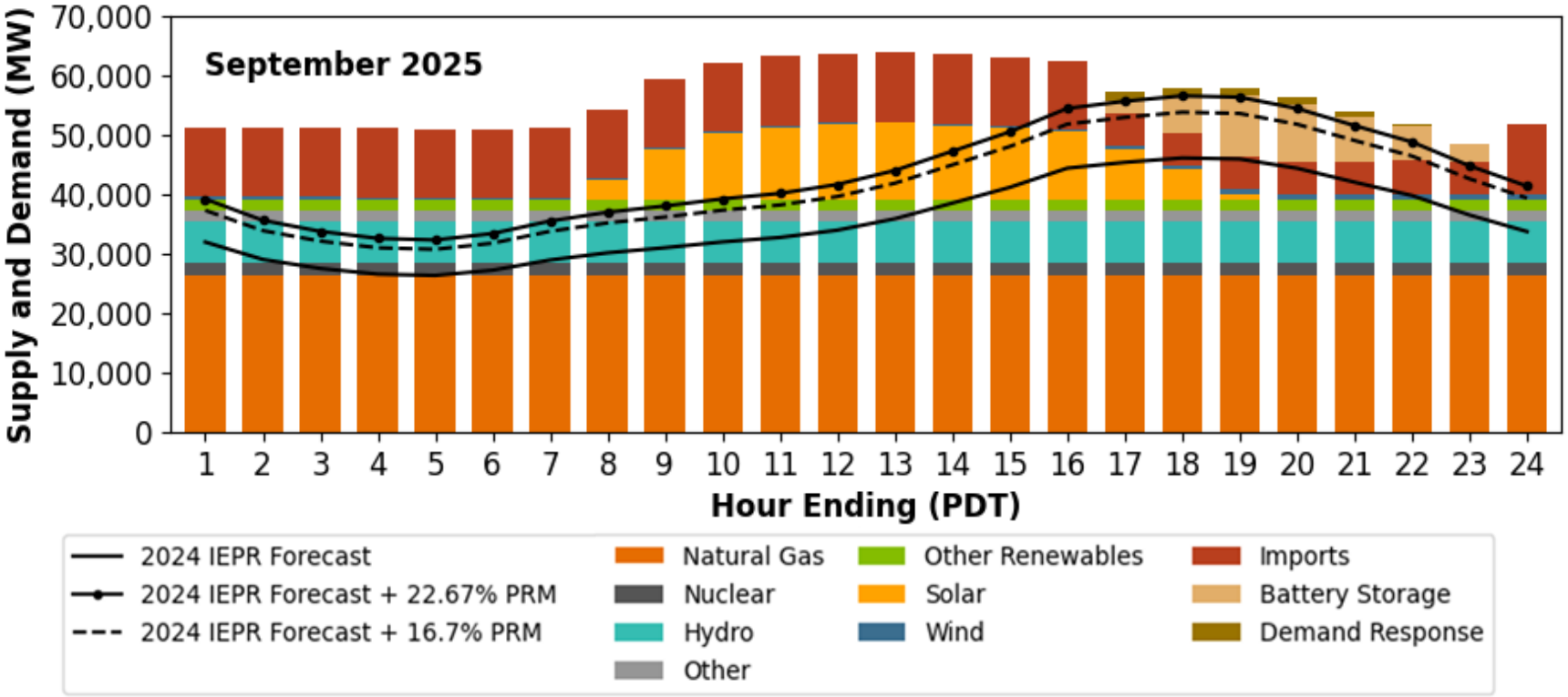
The CAISO's probabilistic assessment concludes that the portfolio meets planning performance targets, yielding a surplus of 1,451 MW

This assessment evaluates the likelihood of needing emergency measures to balance supply and demand.



This assessment takes into account reasonable historical trends and data, but does not consider extreme or emergency events.

The CAISO's multi-hour stack analysis also indicates a reasonable margin above the PRM required to achieve a 0.1 LOLE

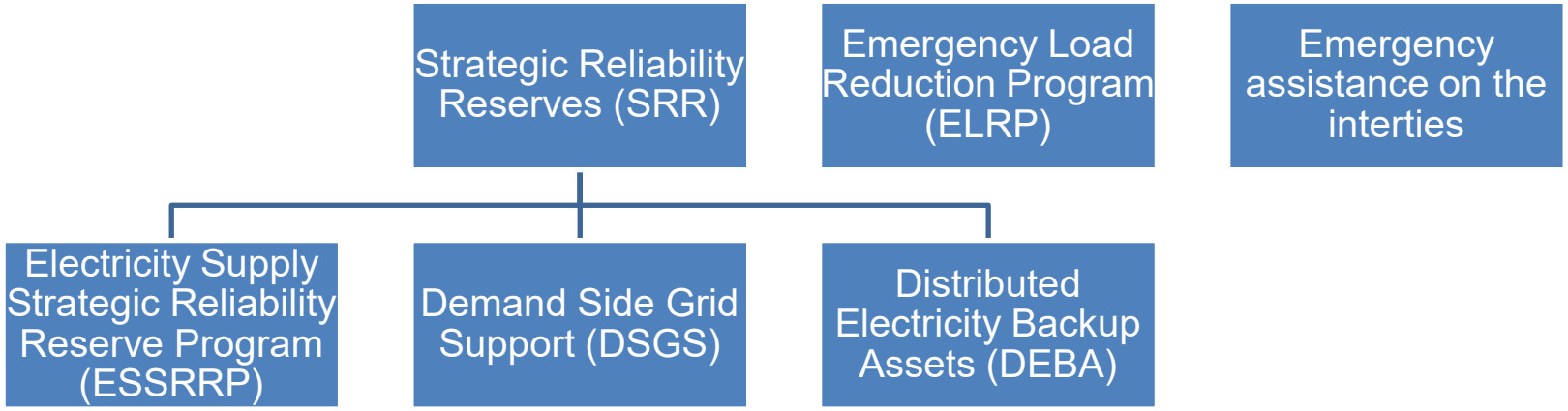


A Planning Reserve Margin (PRM) of **22.67 percent is required to meet a 0.1 LOLE**, calculated by first subtracting the surplus capacity of 1,451 MW (as determined in the probabilistic study) from all available resources.

The **load-weighted average PRM** across all LSEs for the 2025 RA year, which reflects LRA-established requirements, is **16.7 percent**.

State reliability reserves and coordination with neighbors support reliability during extreme events

- Extreme drought, wildfires, and the potential for widespread heat events continue to pose risks to the CAISO grid
- To safeguard against these extremes, strategic reserves and state emergency programs have been mobilized and remain available in 2025



2026 CPUC Resource Adequacy Planning Reserve Margin Study

Behdad Kiani, PhD
Senior Analyst, Energy Resource Modeling
CPUC Energy Division
May 2, 2025

California Public
Utilities Commission

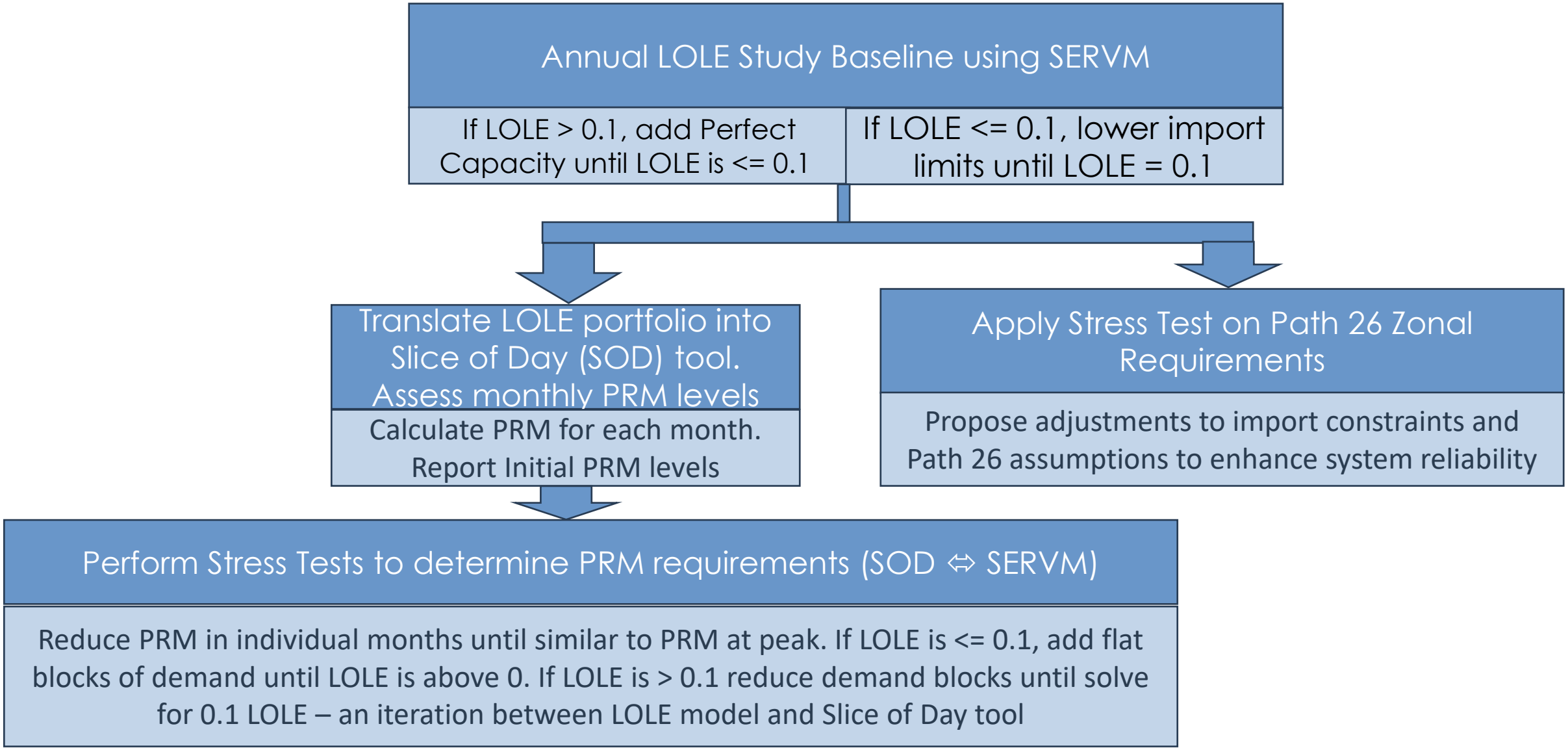
Summary/Outline of Presentation

- Loss of Load Expectation (LOLE) Study Methodology and Key Assumptions and Stress Test
- LOLE Study Results
- Planning Reserve Margin (PRM) Calibration Results

CEC – CPUC – SOD Framework and Challenges

- IEPR Single Forecast Set (SFS) 1-in-2 consumption specifies forecast year magnitude (peak and mean)
- CPUC consumption weather years tuned distribution of weather years so median matches IEPR 1 in 2 managed forecast
- SERVM used to determine Total Reliability Need (TRN) portfolio which satisfies 0.1 LOLE
- Slice of Day tool (SOD) Inputs:
  - TRN portfolio
  - IEPR SFS 1-in-2 sales strip
- Ideally IEPR SFS and CPUC 1-in-2 consumption and sales forecasts should align
  - All demand modifiers are nominally identical
  - However, disparities between IEPR SFS and CPUC stochastic approach can lead to inconsistencies
    - May not be possible to tune to both consumption and sales

Review of Overall Study Methodology



Modeling Approach and Key Assumption

- Energy Division issued an Inputs and Assumptions document in March 2024 documenting process for performing LOLE study and translating to the SOD PRM Calibration Tool. Parties were given opportunity to comment on the assumptions and methods.
- Staff Modeled Existing Resource Fleet Plus Known Planned Resources (Resource under development expected to be online June 1, 2026). Import constraint was initially set at 4,000 MW. No LOLE surfaced

Modeling Criteria	Description
Import Assumption	To surface LOLE Staff used the import constraint as a lever
Stress Test	Added to ensure reliability criteria is being met across all months
PRM Calibration	LOLE study results converted to Slice of Day (SOD) accounting using a calibration SOD tool to produce monthly PRM levels
Planned Outages	Removed from portfolio to reflect current planned outage framework used for RA

Note: This approach was previewed in the IRP Inputs and Assumptions doc published in March 2024

Updated Baseline: Existing and In-Development Resources

- Existing (online) units refreshed from CAISO Master Generating Capability List January 2024
- In-development resources drawn from contracted projects reported by LSEs in their December 1, 2023, IRP Filings
- CAISO will be able to rely on, for reliability purposes, the large amounts of storage, solar, and hybrid projects that are under development as of January 2024 and projected to be online by August 2026
  - In-development projects total about 80 units, with total nameplate about 9.4 GW, comprising about 9.8% of the total Baseline nameplate MW - and the majority of these projects are online or close to being online

Summary of Revised LOLE 2026 RA Study Results (Released Jan. 2025)

- Staff found that the baseline resource fleet was over reliable. In order to surface Loss of Load, staff reduced imports assumption to just 1,700MW. This avoided the need to retire individual power plants in the model to surface LOLE.

- When performing the monthly SOD stress tests, overall PRM levels of 20% for the months of October through March and 21% for June through October allow for reliable operation of the CAISO system by raising the import constraint back up to 2,500 MW.

- Staff are comfortable combining April and May with the off-peak months and maintaining PRM of 20% in these off-peak months as it is expected CAISO can manage these off-peak months with dispatch and operational actions.

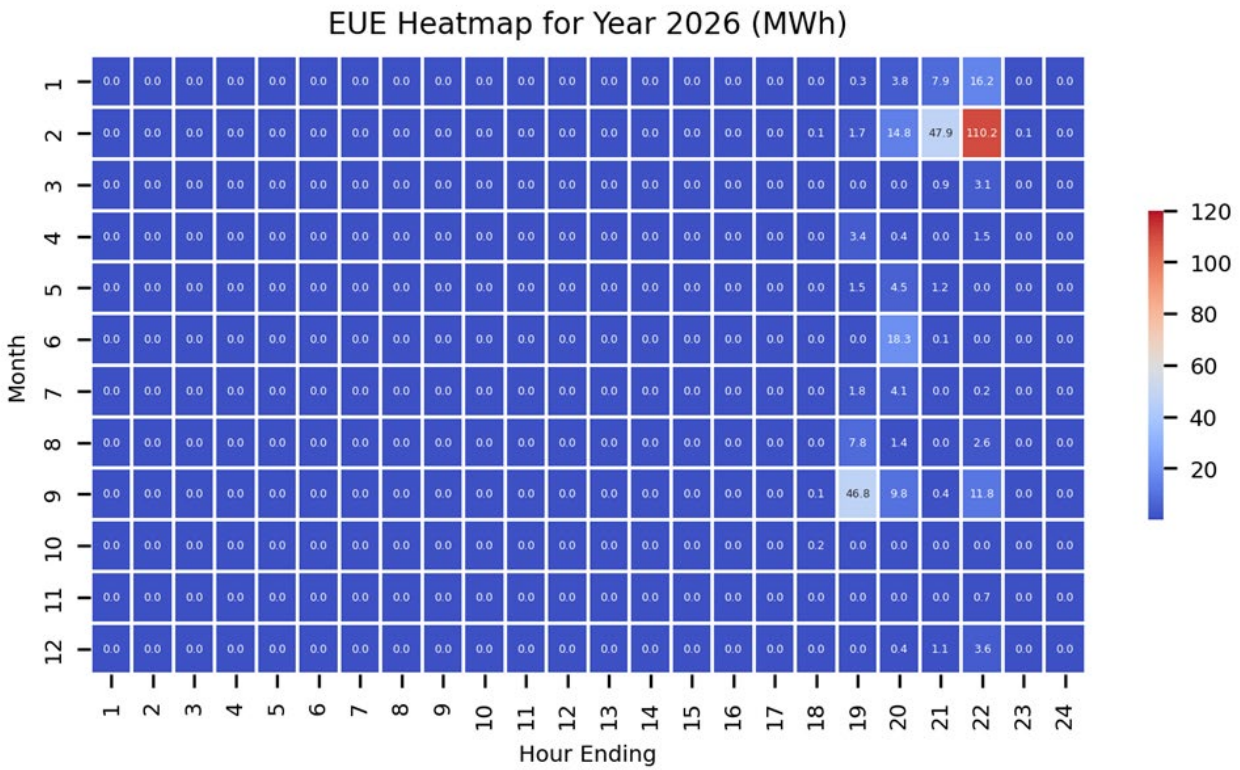
Initial Monthly Modeled SOD PRM for the most constraint hour in Sep. resulting from Annual LOLE Portfolio

- September Hour Ending 18 is the month+hour the model shows has the most constrained PRM
- Initial model focuses only on summer months achieving 0.1 LOLE and other months showing 0 LOLE due to extra resources resulting in higher PRM numbers

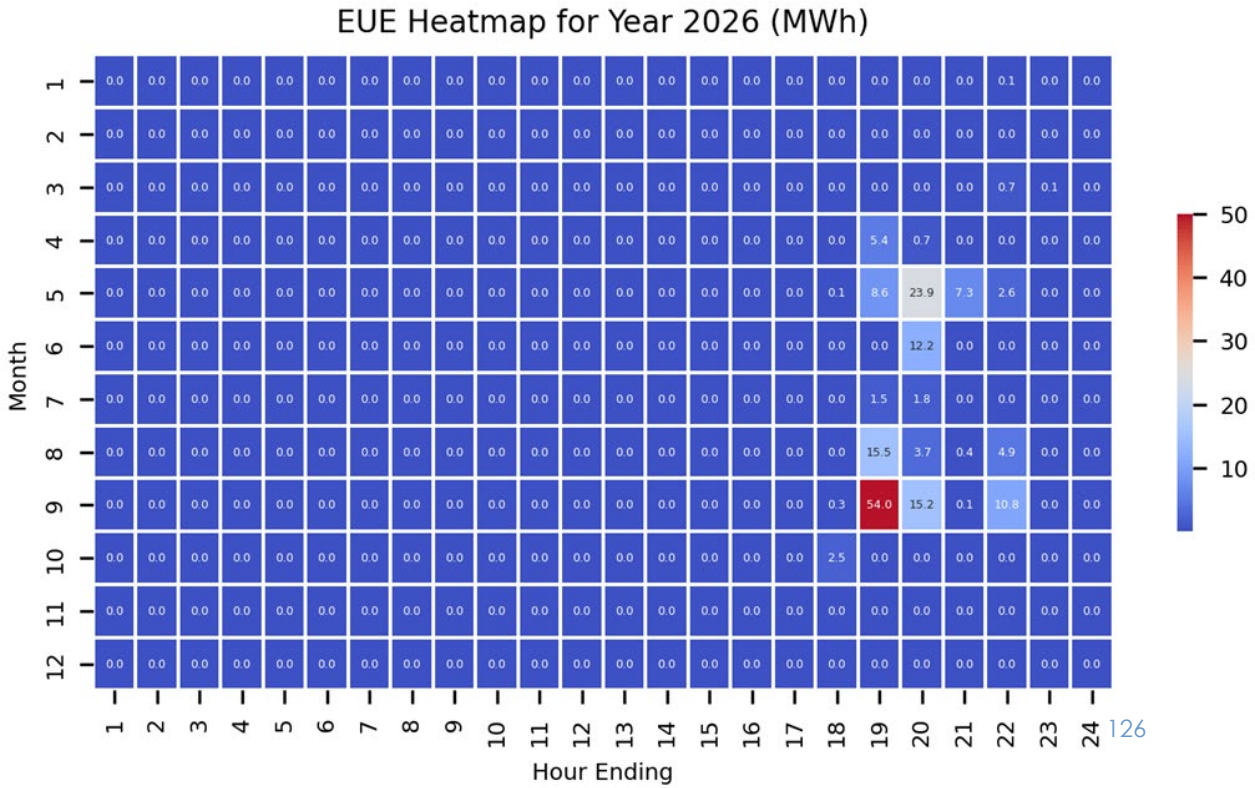
Month	PRM	Most Constrained Hour Ending	Managed Load (MW)	Available Supply (MW)
1	**59.98%**	19	30,003	47,998
2	**67.13%**	19	29,419	49,169
3	**71.17%**	20	29,412	50,345
4	**71.68%**	19	31,688	54,402
5	**63.91%**	19	34,546	56,625
6	**39.62%**	19	41,906	58,511
7	**29.02%**	19	45,588	58,820
8	**30.18%**	19	44,125	57,442
9	**23.12%**	18	46,395	57,122
10	**42.97%**	18	37,720	53,927
11	**58.54%**	18	31,645	50,170
12	**57.57%**	19	30,392	47,888

Comparison of EUE Heatmaps with and without maintenance scheduled – EUE more focused in summer

EUE MWh Original Appendix A Maintenance Forcing EUE in Winter



EUE MWh by hour of day and by month – SOD Revised Monthly Stress Test in Appendix B



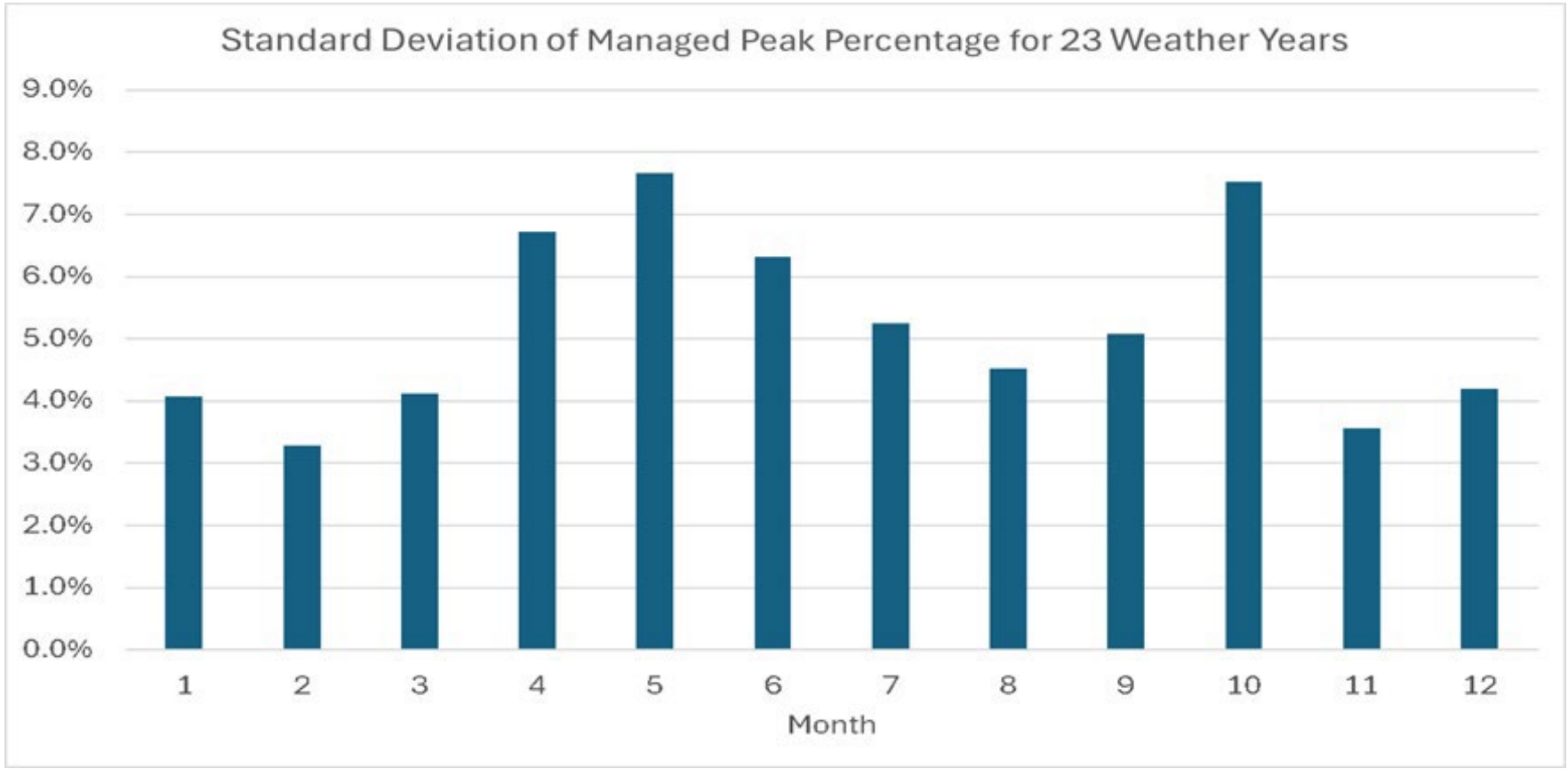
PRM LOLE Studies Using Updated CPUC Demand Model

- LOLE study results are shown utilizing updated EMS data and CPUC Demand Model (v2025a)
- Months 5 and 10 show higher LOLE due to higher variability
- Summer months only reliability total to 0.1162, and non-summer months show some surfaced amounts of LOLE

	Month	LOLE Results
	1	0.0000
	2	0.0001
	3	0.0025
	4	0.0137
	5	0.0474
	6	0.0159
	7	0.0047
	8	0.0401
	9	0.0555
	10	0.0247
	11	0.0000
	12	0.0001
Sums	***1 - 12***	***0.2047***
	6 - 9	***0.1162***
	5, 10	***0.0721***

Standard Percentage Deviation of ratio of monthly peak to annual peak demand within 23 weather years

- High Variations in months April, May, June and October resulting in higher LOLE during these four months



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Slice Of Day Tool Detail: Updated Demand Profiles, recalibrated LOLE

- This table reflects SOD tool output using results of LOLE study with updated, corrected EMS data and electric demand profiles (v2025a)
- PRM for months 6 – 10 are set to 21% after updating LOLE results. October now added to summer.
- Minimum demand blocks of 1,400 MW reflects manually adjusted PRM of 21%

Month	Charging Energy (MWh)	Charging Requirement (MWh)	Excess Energy Check (MWh)	Daily Energy Check (MWh)	Minimum SOC Check	Maximum Capacity Check (MW)	Planning Reserve Margin	Constraining Hour Ending	Managed Load (MW)	Demand Blocks (MW)	Supply (MW)
1	59,547	59,556	-9	810	21.70%	6,087	**20.00%**	19	30,003	9,854	47,829
2	96,504	60,523	35,981	-11	23.24%	5,578	**20.01%**	19	29,419	11,127	48,658
3	96,136	60,533	35,603	-20	18.09%	4,874	**20.01%**	20	29,412	11,964	49,654
4	131,190	60,531	70,660	-13	8.52%	3,335	**24.50%**	19	31,688	11,270	53,484
5	121,846	60,558	61,288	-2	4.04%	2,686	**24.50%**	20	33,897	10,442	55,202
6	122,190	61,132	61,058	3	0.01%	1,434	**21.00%**	19	41,906	6,509	58,582
7	114,331	61,444	52,887	3	0.01%	969	**21.00%**	19	45,588	3,468	59,358
8	117,522	60,803	56,719	4	0.01%	349	**21.00%**	19	44,125	3,775	57,959
9	137,362	61,083	76,279	0	0.00%	548	**21.00%**	18	46,395	1,400	57,832
10	106,476	60,515	45,961	-4	-0.01%	1,584	**21.00%**	18	37,720	6,742	53,799
11	85,380	60,510	24,870	0	7.63%	4,518	**20.00%**	18	31,645	9,744	49,667
12	54,562	54,565	-3	5,053	30.12%	7,308	**20.00%**	22	28,855	9,138	45,592

Appendix (extra slides)

Recalculating PRM using the ‘old’ methodology for 2026 RA LOLE Study

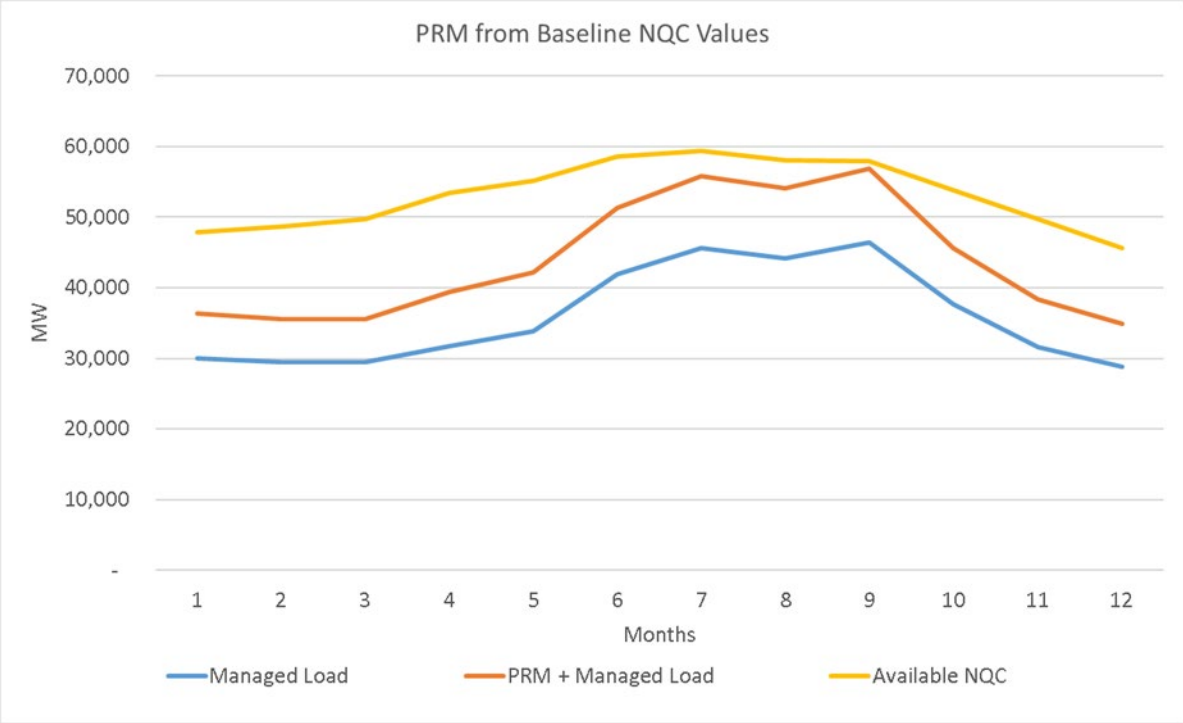
California Public Utilities Commission

Overview of analysis – recreating PRM from managed peak and ELCC/NQC

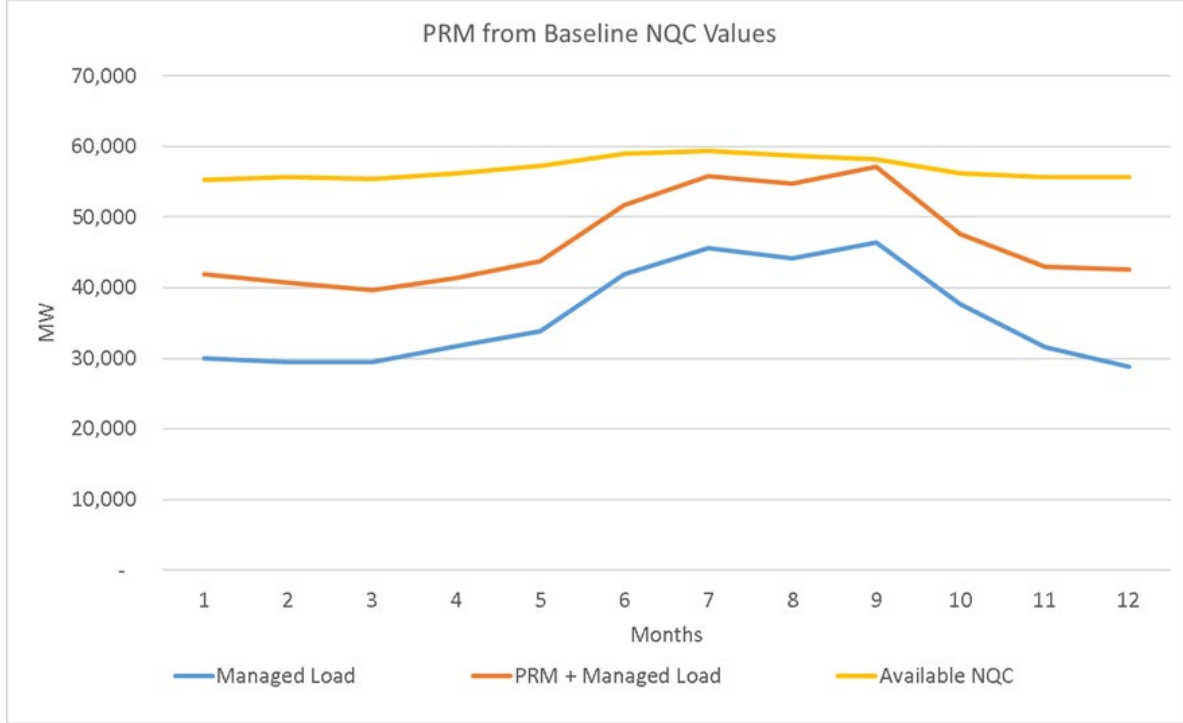
- The monthly PRM were calculated by using ELCC (Effective Load Carrying Capability) instead of exceedance for solar and wind resources.
- This is compared to the monthly peak demand, rather than the most constrained monthly hour that is used in SOD tool
- Monthly NQC values of total resources were divided to managed load to calculate the monthly PRM
- staff observe that the modeled PRM requirement percentages mostly match between methods through summer months.
- However, higher modeled PRM requirement levels are seen during the winter months since ELCC values are higher than exceedance capacity values in winter months.

Comparison of Revised SOD results with the "old method" stress test from SERVM – increase in NQC in offpeak months

PRM calculated from SOD PRM-setting tool using exceedance



PRM calculated from non-SOD ELCC Stress Tests



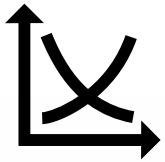
CEC 2025-40 Probabilistic Reliability Analysis

Summer Energy Reliability Workshop

Hannah Craig, CEC

Probabilistic Reliability Analysis

- **Industry standard:** Used to set and measure against resource adequacy metrics



- **Probabilistic:** Hundreds to thousands of production cost model simulations drawing weather years and outages

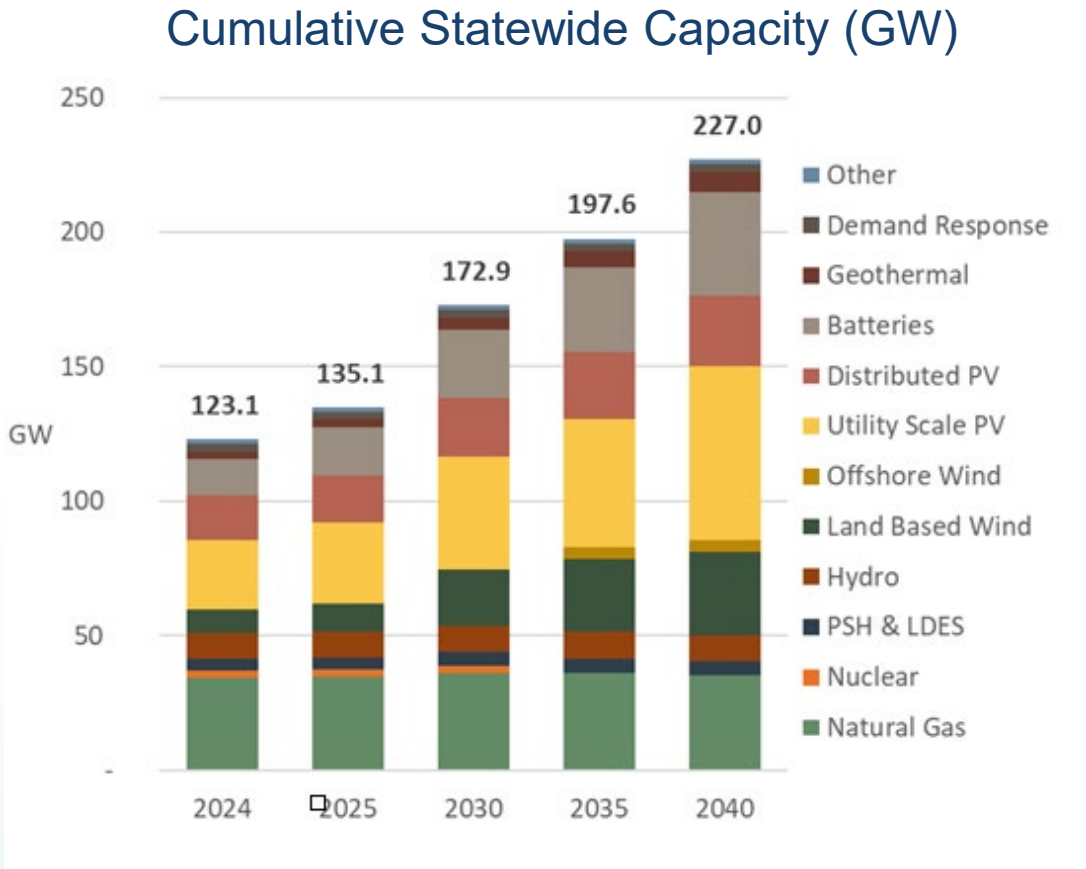
- **Primary metric:** No more than one day with loss of load in 10 years

CEC Reliability Model Basics

- **Model:** Stochastic model in PLEXOS 9.2
- **Sampling: 408** samples
  - 17 weather years from 2007-2023.
    - NREL solar and wind profiles calibrated to CAISO generation data.
    - Load profiles based on the 2024 IEPR California Energy Demand Forecast
  - 24 outage samples, using forced outage data from GADS.
- **Metric:** 1 day of loss of load for every 10 years sampled.
- **Interval**: Results reported 2025-2040 for every five years.

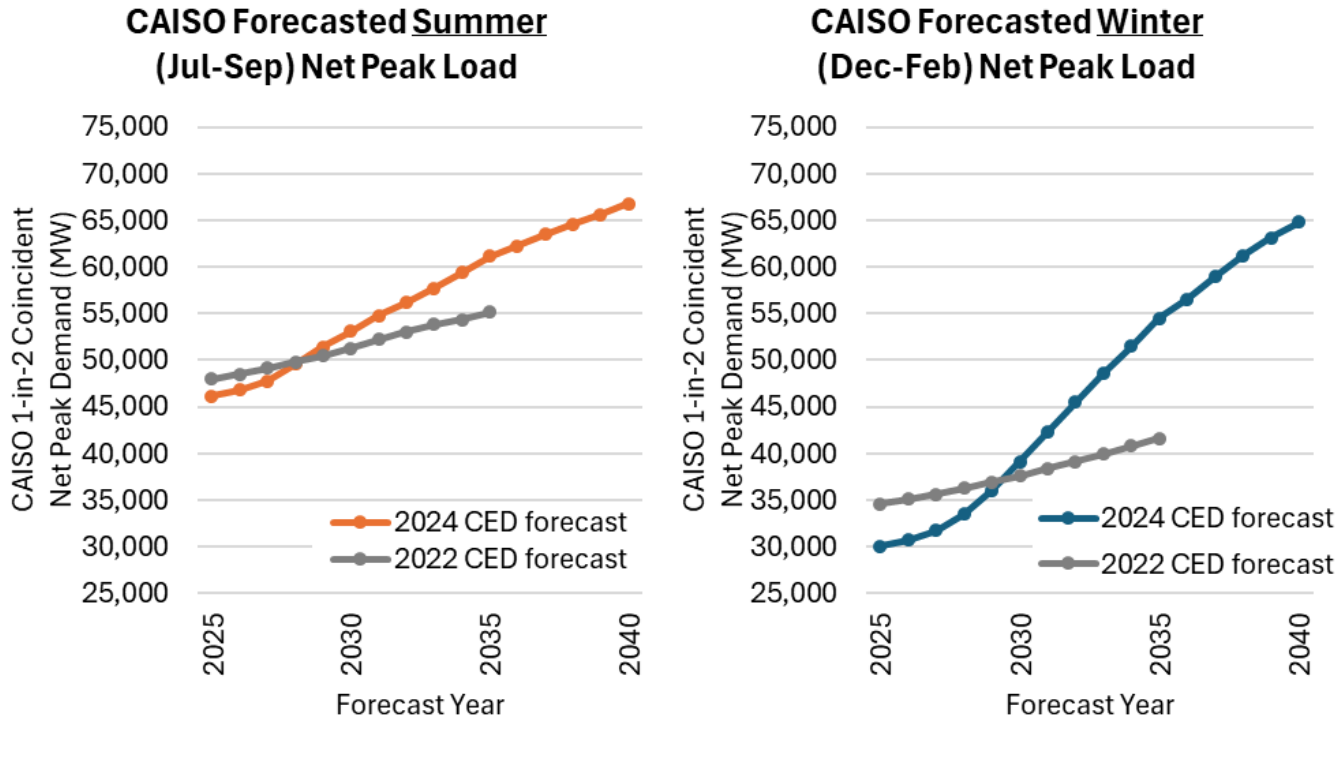
Statewide Model

- **California Centric Model:** CA power plants but does not model WECC.
- **New Resource Portfolio:**
  - CPUC Preferred System Plan adopted in February 2023.
  - Non-CAISO expansion based on utility plans.
- **Results reported statewide**



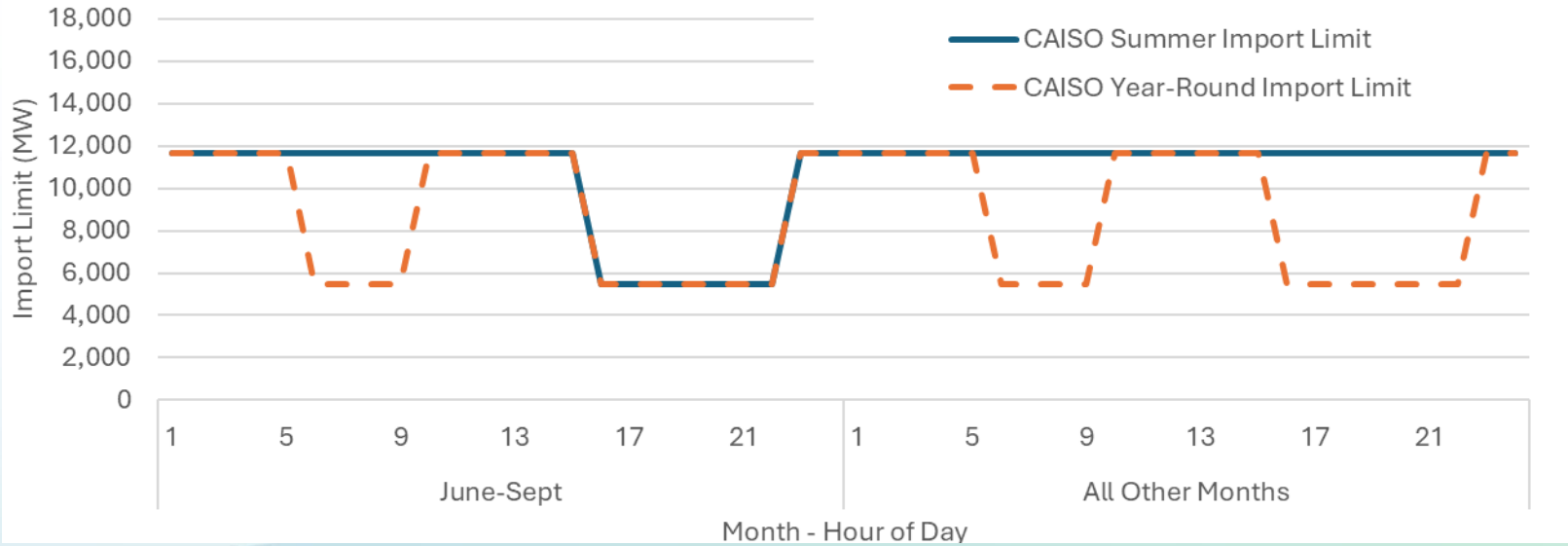
Stochastic Demand Shapes

- Forecast vintage: 2024 IEPR CED
- Stochastic profiles developed through regression weather year analysis
- Load modifiers from the 2024 CED added and do not vary by weather



Imports

- CAISO Import Limit: 5,500 MW
- Statewide Import Limit: 12,450 MW in all hours
- Three Import Scenarios:
  - Base case limits flows into CAISO during summer evening peak
  - Year-Round Peak scenario limits imports during morning and evening peaks year round
  - No imports scenario allows no imports into CA, CAISO still limited at peak.

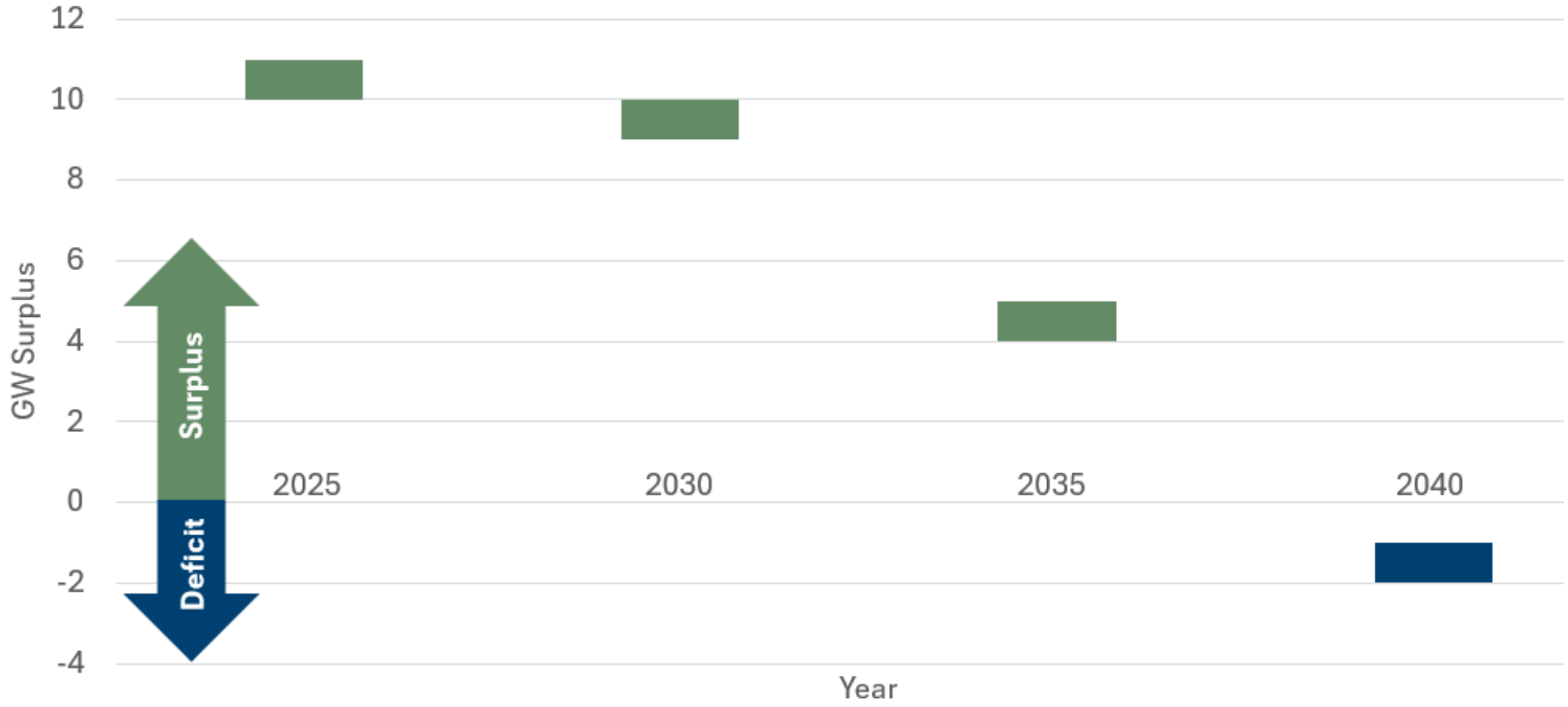


Scenarios

- **Base Case**: Determine whether planned resources are sufficient to meet reliability target under normal conditions.
- **Stress Cases:** Evaluate reliability under more conservative resource and import assumptions to determine vulnerability to risk factors.

Scenario	PSP	California Imports	CAISO Import Limit	Results
Base Case	Full PSP	Yes	Summer Only	Surplus and LOLE
Stress Case	40% Reductions in PSP	Yes	Summer Only	LOLE
Stress Case	40% Reductions in PSP	Yes	Year-Round	LOLE
Stress Case	40% Reductions in PSP	No	Summer Only	LOLE
Stress Case	Full PSP	Yes	Year-Round	LOLE (Report Only)
Stress Case	Full PSP	No	Summer Only	LOLE (Report Only)

Base Case Results



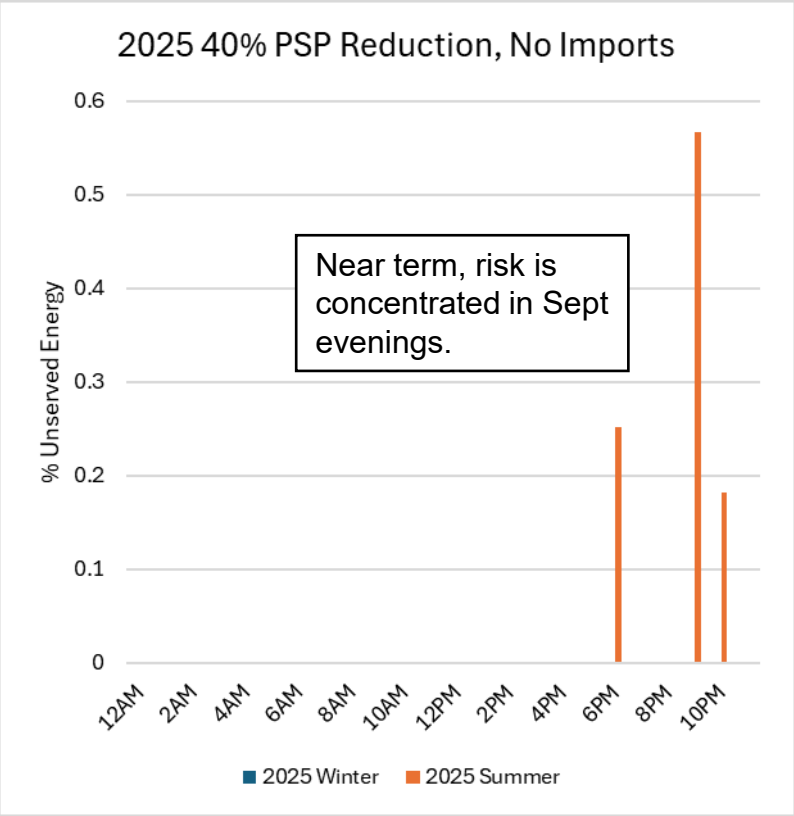
Full PSP buildout results surplus in the near-term assuming normal transmission conditions.

Stress Case Results

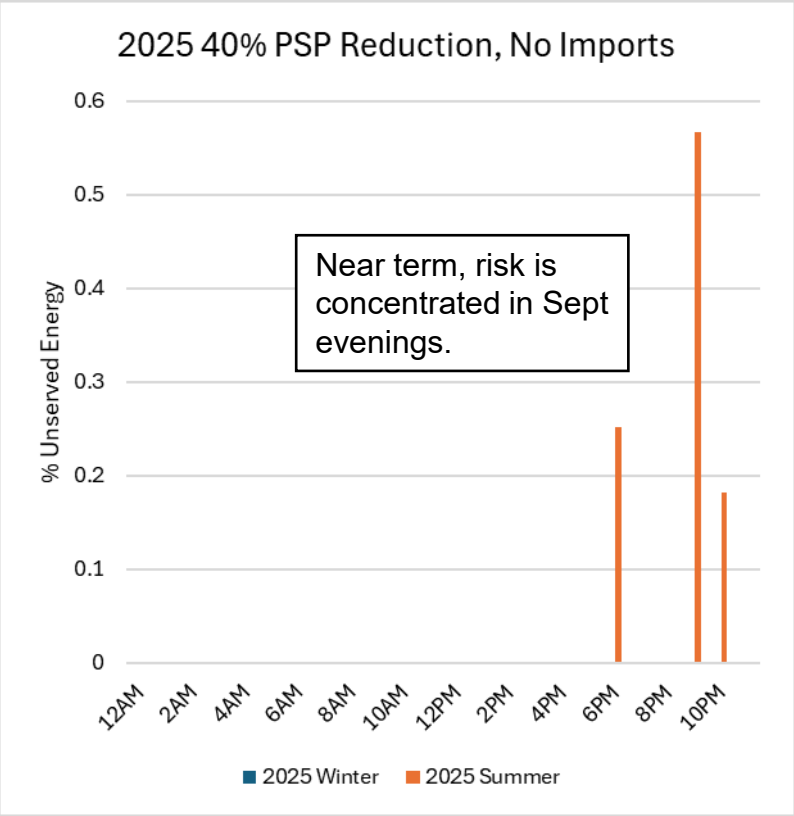
- Base case reliability analysis assumes full PSP comes online.
- System still reliable out to 2030 with 40% reduction in PSP resources.
- 2035 and 2040 show high levels of unserved energy with 40% reduction cases.

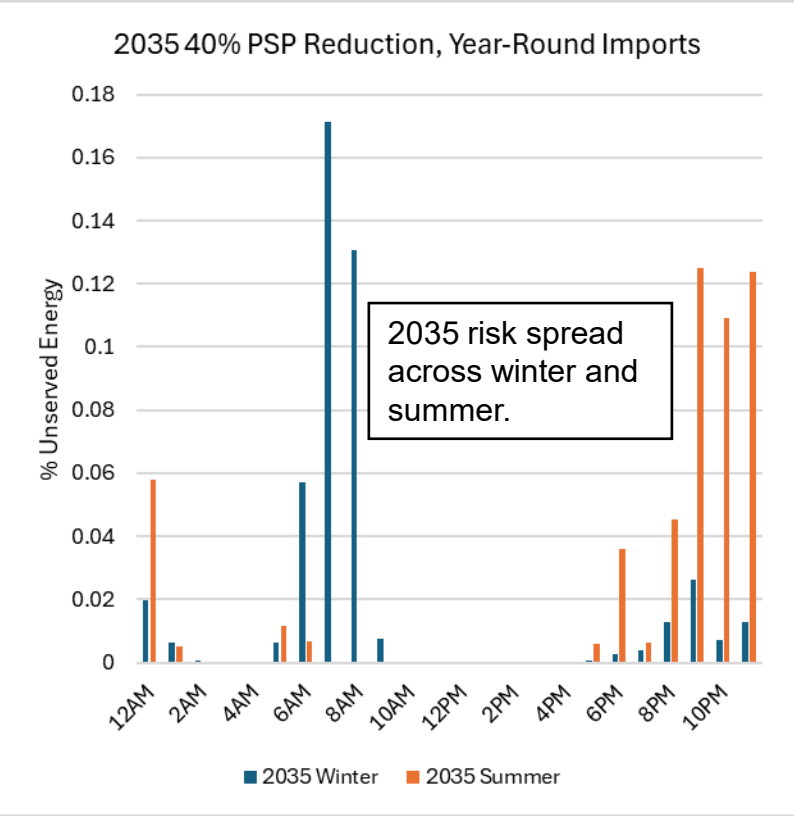
PSP	California Imports	CAISO Import Limit	2025 LOLE (days/year)	2030 LOLE (days/year)	2035 LOLE (days/year)	2040 LOLE (days/year)
Full PSP (Base Case)	Yes	Summer Only	0	0	0	**0.9**
40% Reductions in PSP	Yes	Summer Only	0	0	**0.79**	**10+**
40% Reductions in PSP	Yes	Year-Round	0	0	**2.64**	**10+**
40% Reductions in PSP	No	Summer Only	0.003	**0.17**		

Shifting Nature of Risk (1/3)

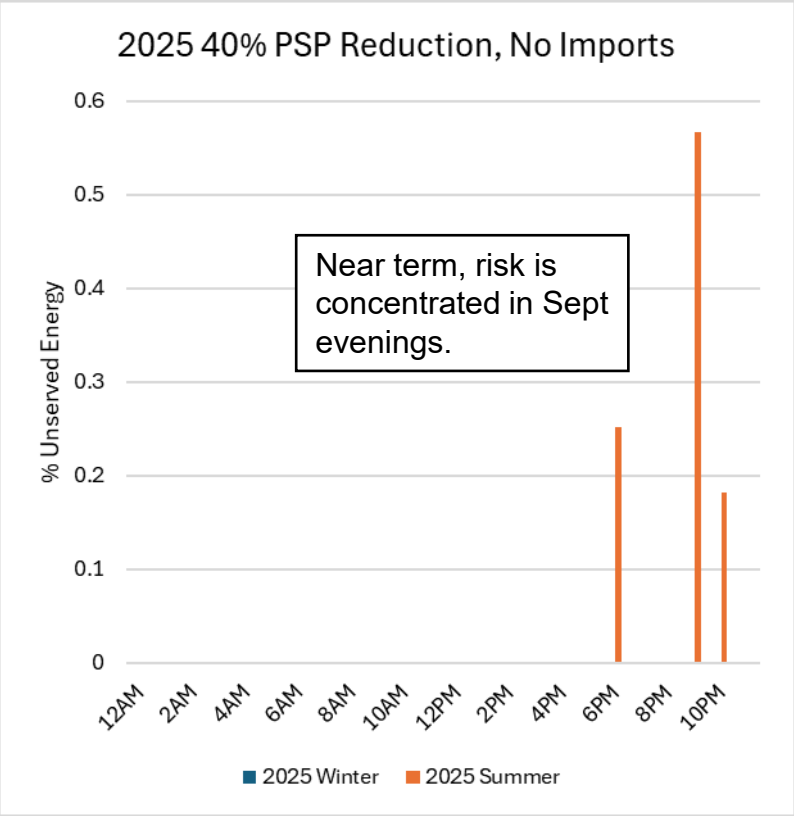


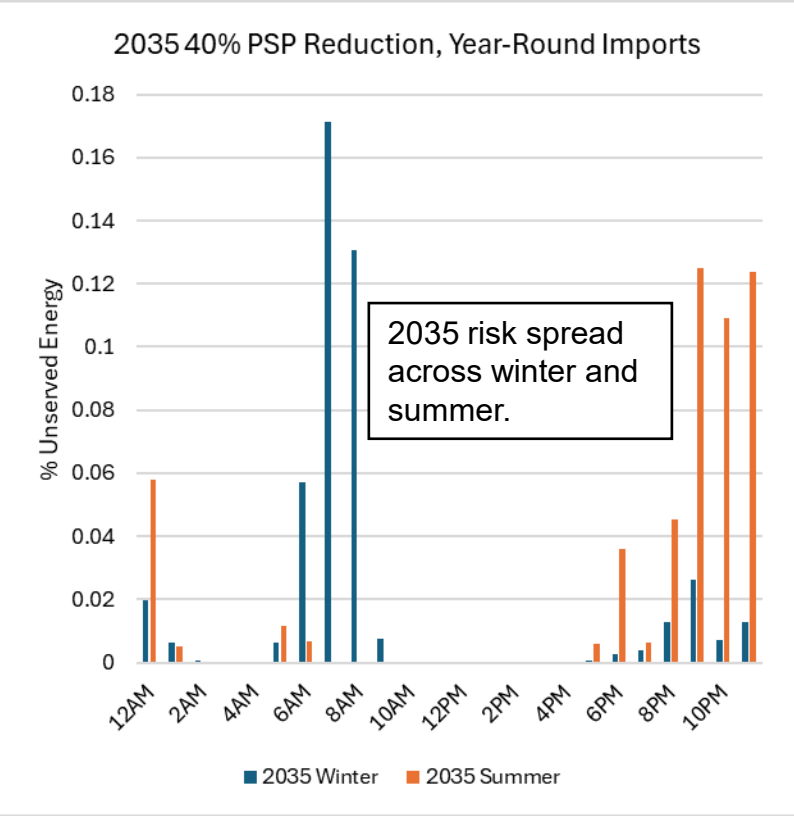
Shifting Nature of Risk (2/3)

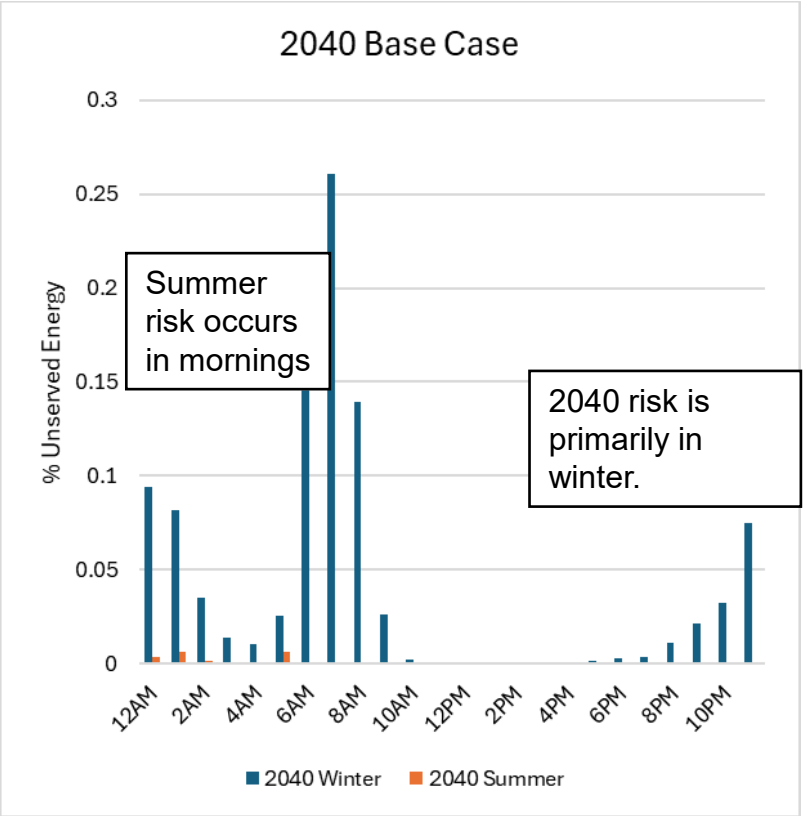




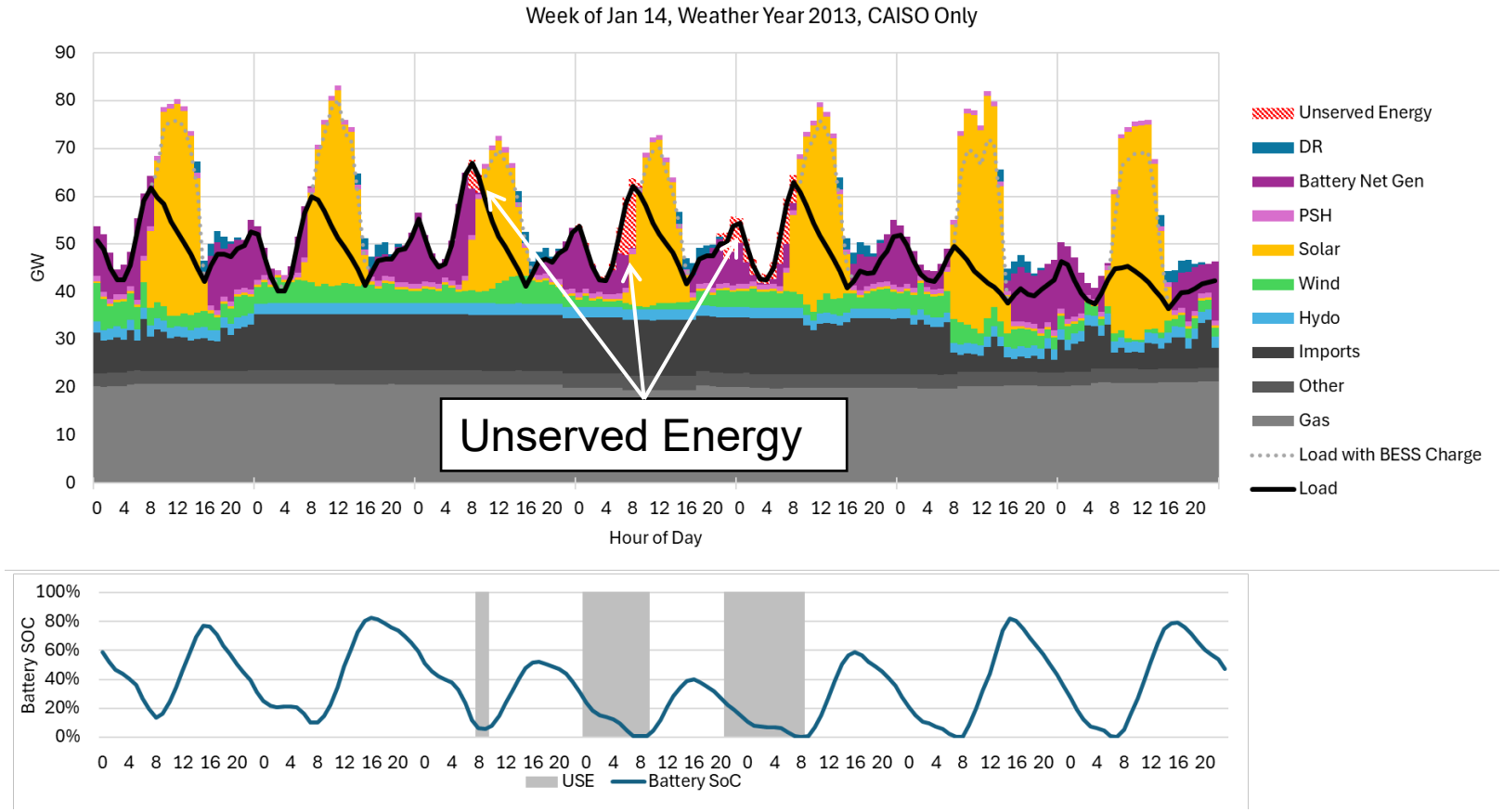
Shifting Nature of Risk (3/3)







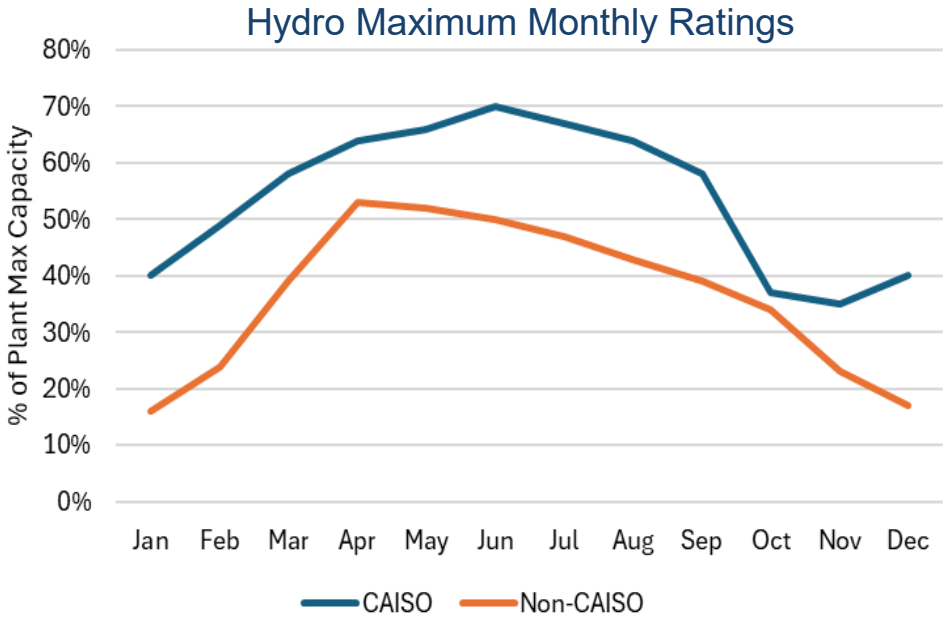
Winter Reliability Stressed Conditions

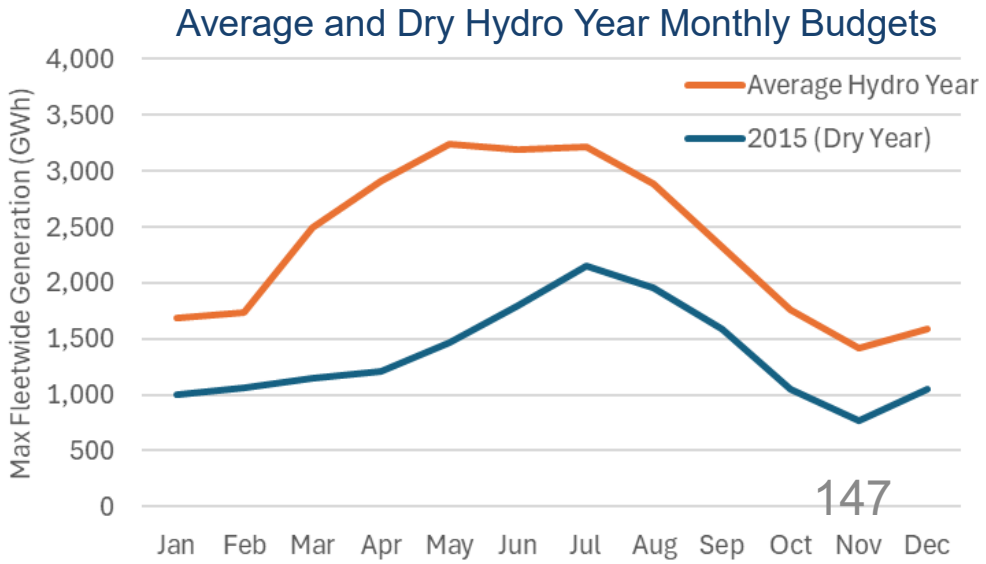


- Winter reliability risk in 2040 could look like:
  - Heavy rain reduces solar output.
  - Cold snap raises morning loads.
  - Batteries struggle to maintain charge.
  - Multiday risk due to cascading low battery charge.

Stochastic Hydro Sensitivity

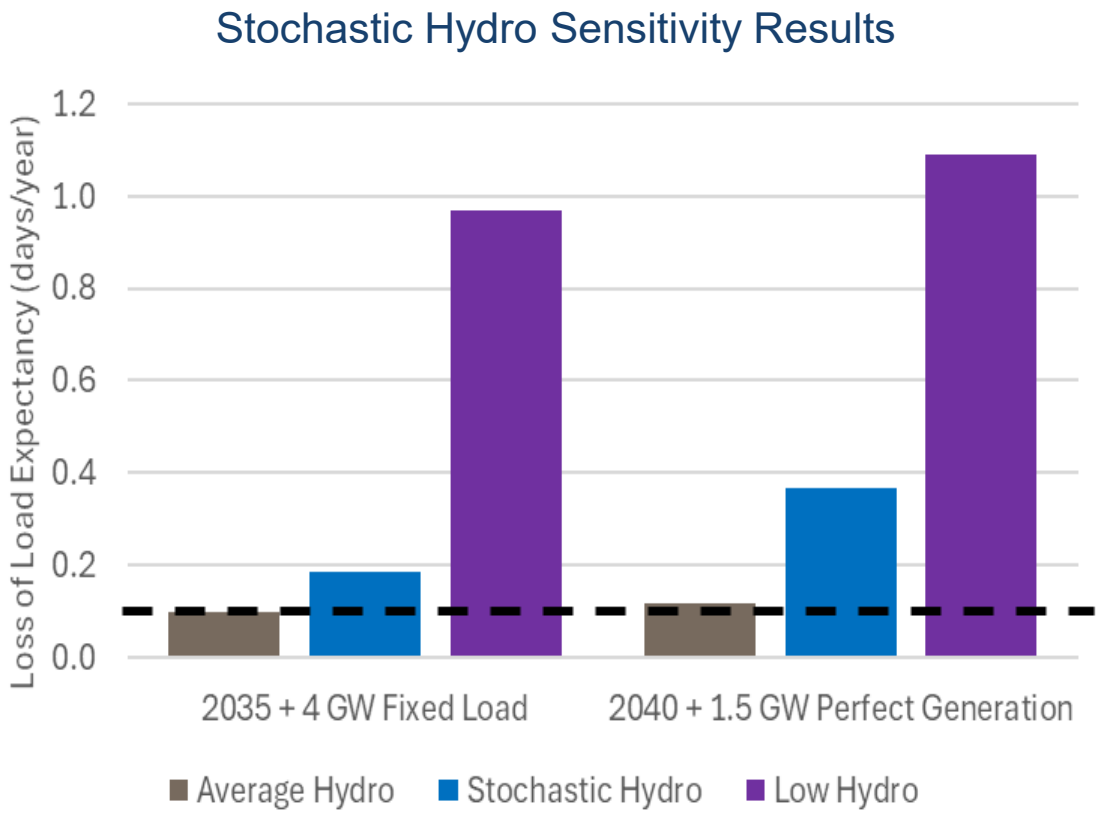
- **Question:** Is using an average year hydro budget a valid approach given recent swings in hydro availability?
- **Base Case:** Average monthly budget for all samples.
- **Stochastic Case:** Varies hydro budget by sample
- **Dry Hydro Case:** 2015 hydro budget for all samples
- Max and Min ratings do not change.





Stochastic Hydro Results

- Calibrated to a .1 LOLE to explore whether the current hydro modeling approach continues to be valid.
- The stochastic hydro year does show higher LOLE and the dry hydro year has a much bigger impact.
- Monthly maximum ratings are not affected, showing that the calibrated systems are energy-limited throughout the month.
- Historic monthly budgets and ratings may not be representative of a winter-peaking system.



Conclusion

- The system may have reliability surpluses in the near term if full PSP is built out, assuming normal transmission conditions.
- The increase in electrification forecast in 2035 and 2040 will shift reliability risk into winter mornings.
- Modeling assumptions based on historic data like imports and hydroelectric generation may no longer be predictive in a system with winter risk periods.

Thank You!

Q&A

Panel: Summer Reliability Assessments – Fossil Gas

Moderator: David Erne

A. Gas System Reliability, Jason Orta, CEC

B. CPUC Gas System Reliability Assessments, Khaled Abdelaziz, CPUC

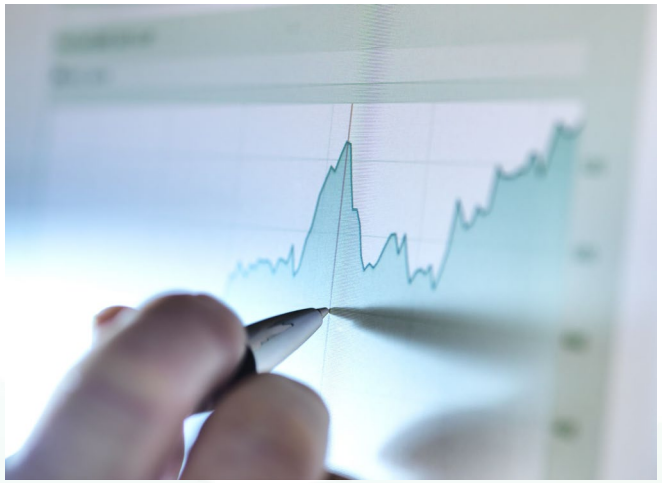
Gas System Reliability

Summer Energy Reliability Workshop

Jason Orta, CEC

Overview

- Assess ability of PG&E and Southern California Gas (SoCalGas) to:
  - Meet Summer 2025 forecasted gas demand
  - Refill underground gas storage to meet winter 2025-26 demand
- Qualitative analysis of natural gas prices



Sources: California Energy Commission, Santa Clarita Valley Signal, Microsoft Power Point

CEC Gas System Reliability Modeling

CEC Demand Forecasts
- Monthly average temperature
- Monthly hot temperature/dry hydro
- Summer peak day

CEC Supply Estimates
- Pipeline capacities
- April 1st storage inventory

Modeling Tools
- Gas balances - Tables comparing supply and demand
- Hydraulic models - Calculating system pressures and flows
- Stochastic model - Hourly gas balance (SoCalGas Only)

Modeling Results
- Storage injections/withdrawals
- April 30 - October 31 storage inventories
- Peak day hourly supply and demand (SoCalGas only)

- **Ability to meet Summer 2025 gas demand without curtailment**
- **Adequate gas storage field inventory for winter**

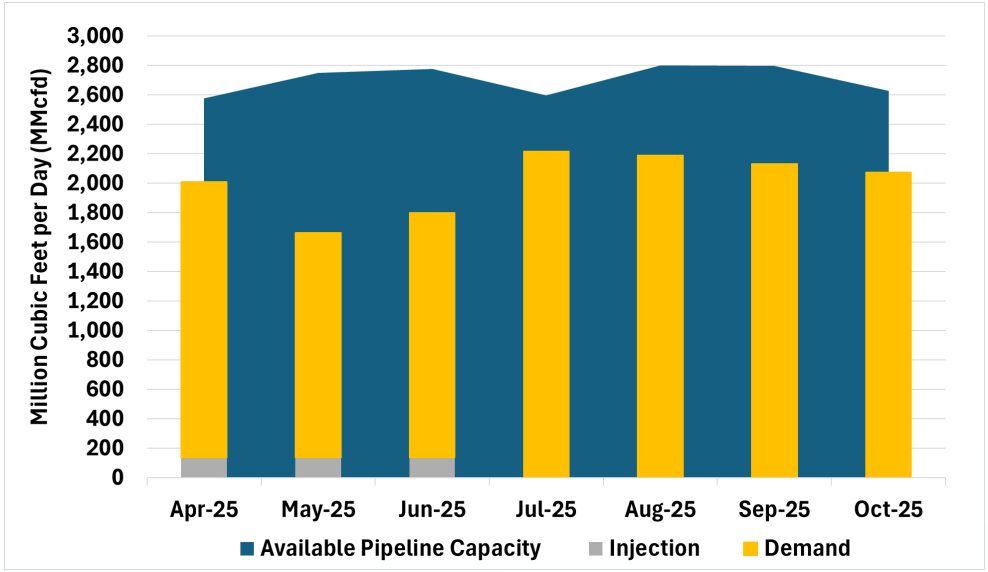
Summer Scenarios Analyzed

- Normal Temperature Year
- Hot Temperature/Dry Hydro Year
- Peak Day

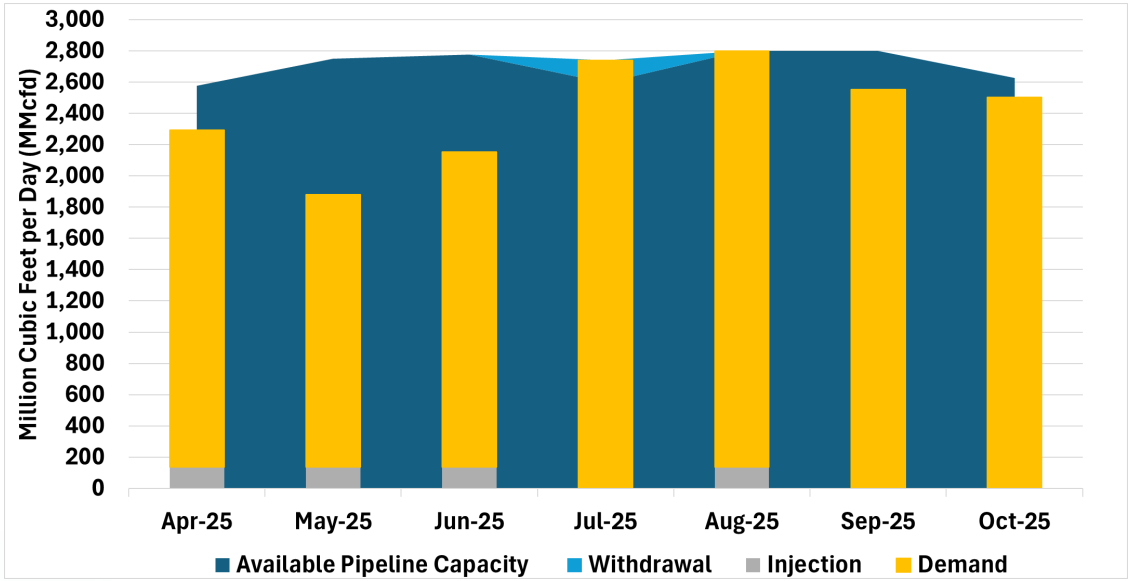
Source: California Energy Commission

PG&E – Normal & Hot Temp Scenarios
Monthly Gas Balances/Storage Inventories

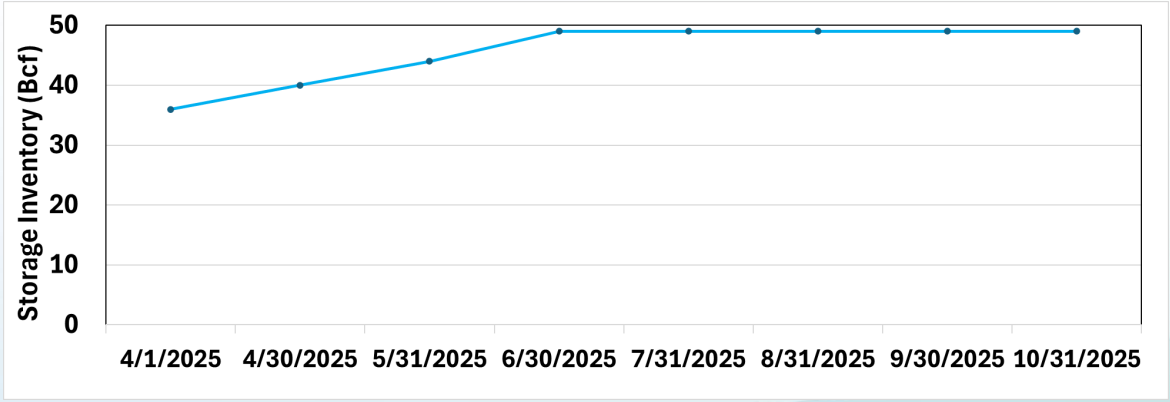
Normal Temperature Supply and Demand



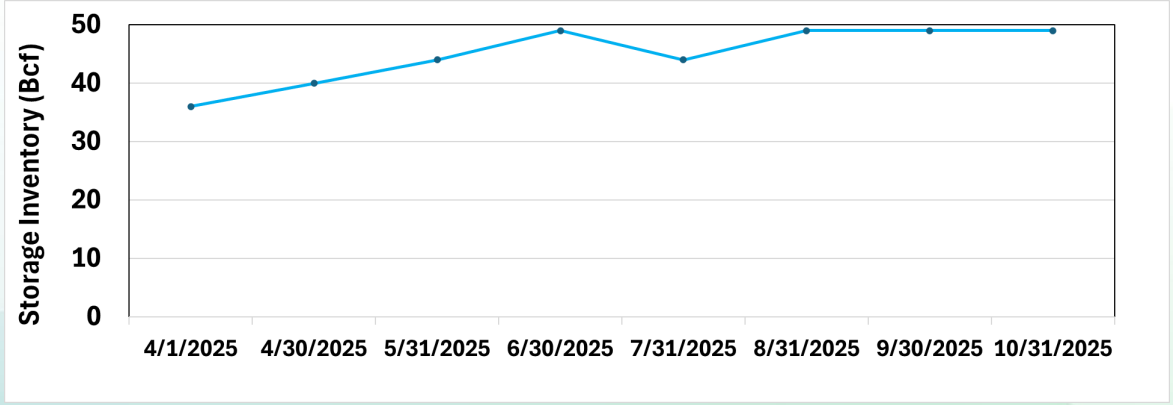
Hot Temperature/Dry Hydro Supply and Demand



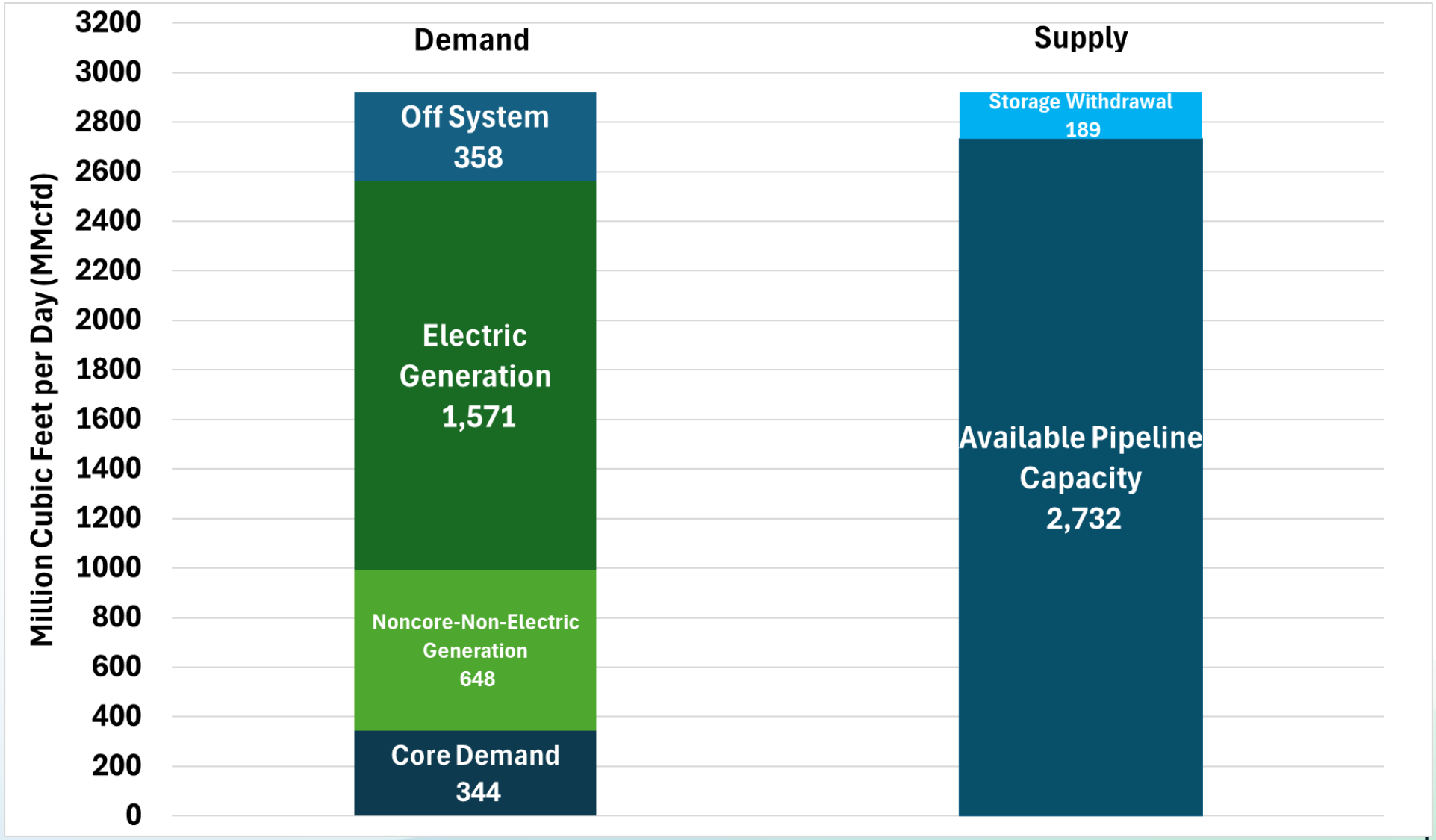
Normal Temperature Storage Inventory



Hot Temperature/Dry Hydro Storage Inventory



PG&E - Peak Day Scenario
Daily Gas Balance



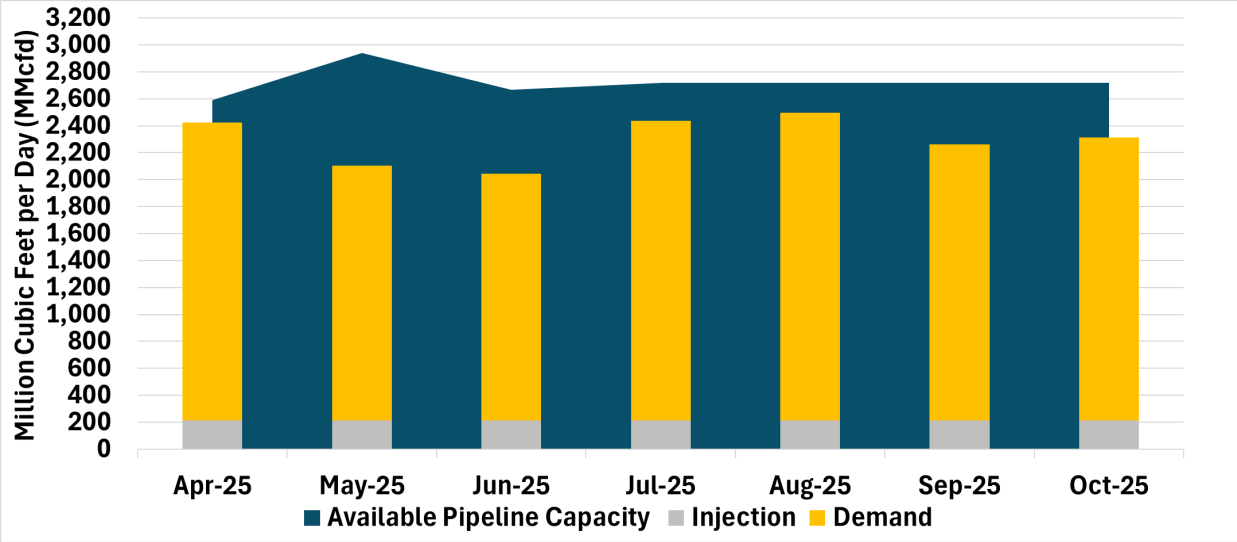
PG&E Conclusions

- Meets demand under the three scenarios.
- Can limit off-system deliveries to 80 MMcfd.
- Gas storage facilities at capacity by November 1.
- Low risk to gas system reliability.

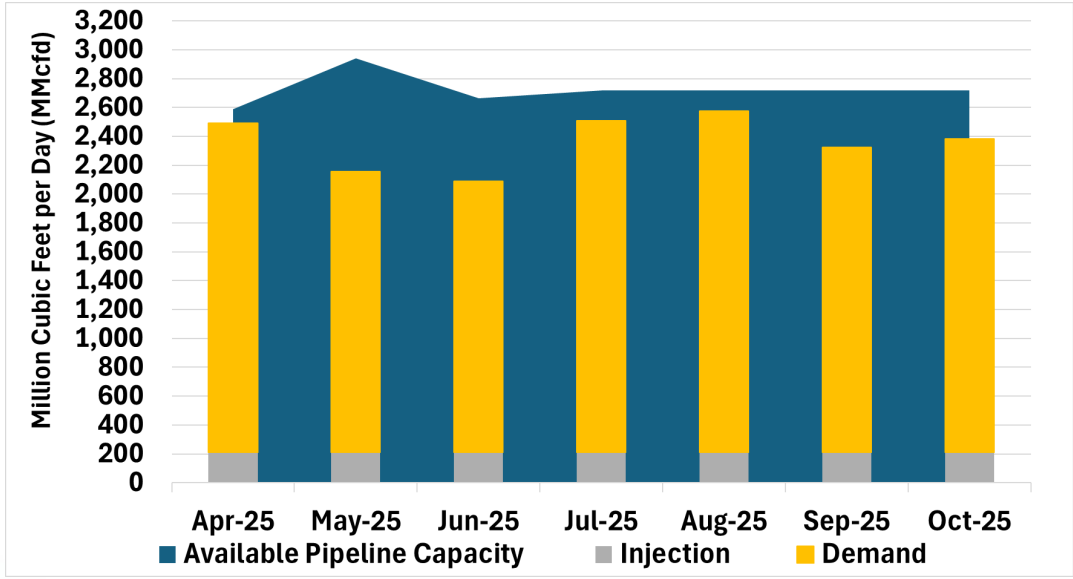
Source: Bank of Hawaii.

SoCalGas – Normal & Hot Temp Scenarios
Monthly Gas Balances/Storage Inventories

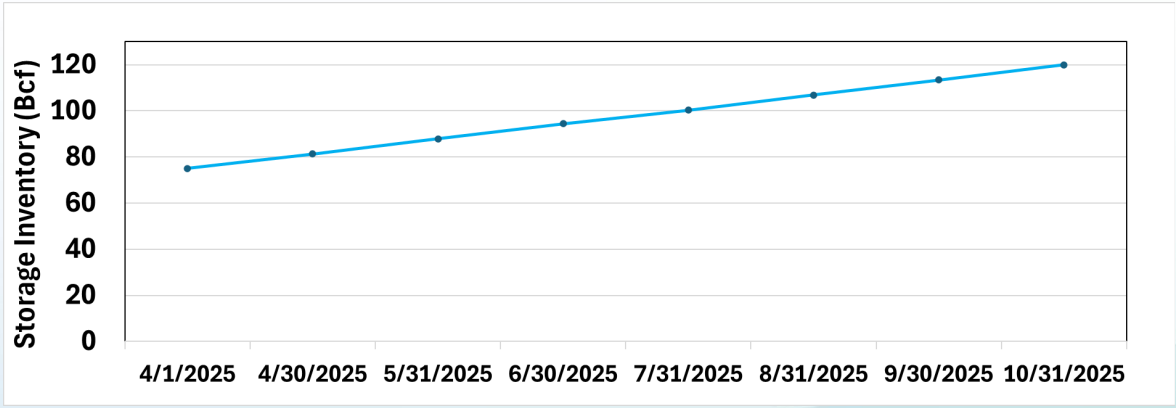
Normal Temperature Supply and Demand



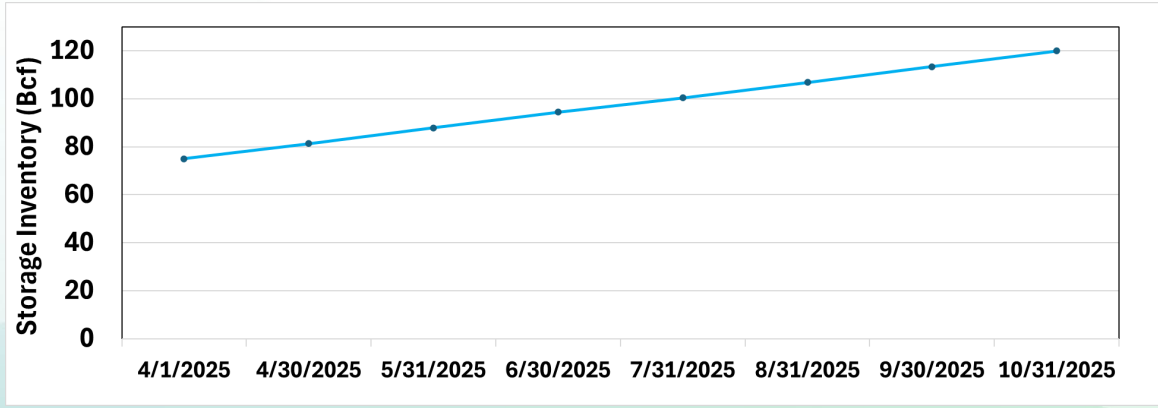
Hot Temperature/Dry Hydro Supply and Demand



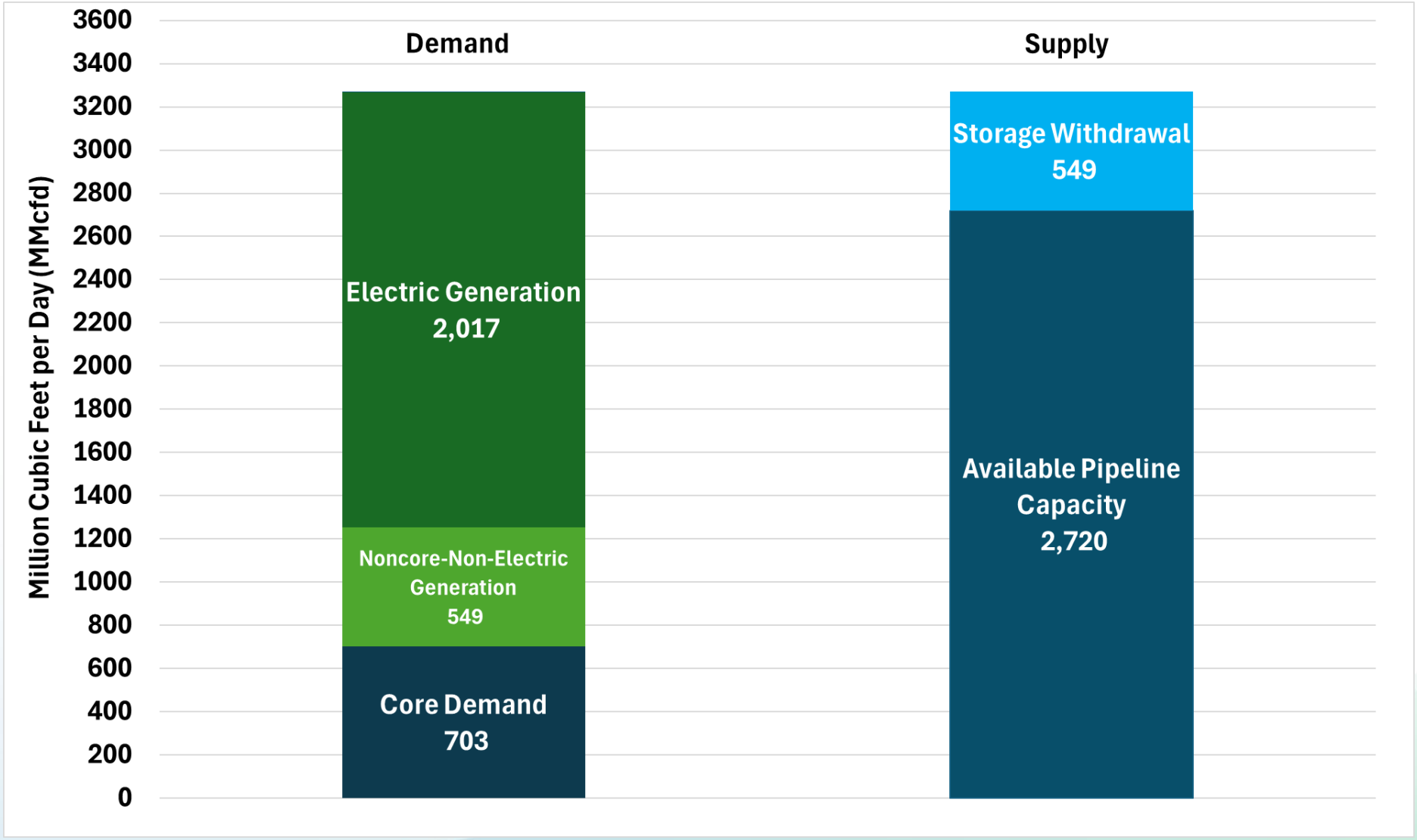
Normal Temperature Storage Inventory



Hot Temperature/Dry Hydro Storage Inventory

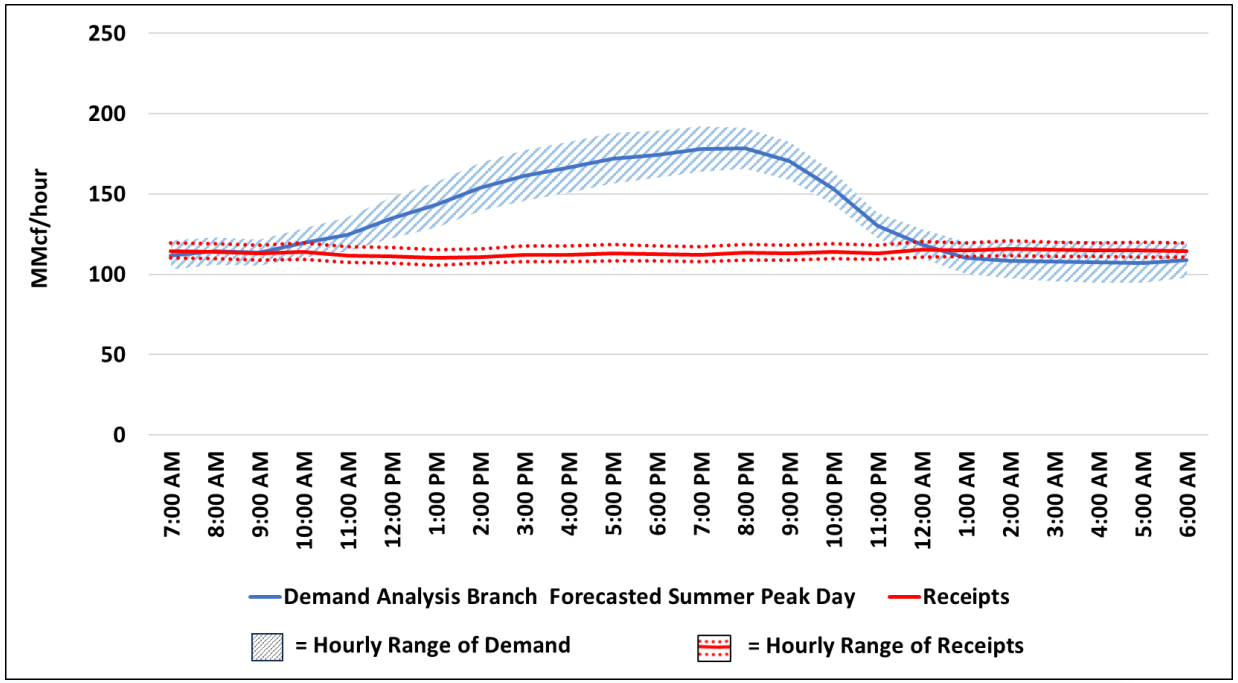


SoCalGas - Peak Day Scenario
Daily Gas Balance



SoCalGas Stochastic Analysis

Summer Peak-Day Demand Hourly Load Profile by Hour (MMcf/hour)



- An estimated 537 MMcf of storage withdrawals needed
- Storage withdrawals needed from 10 AM to 11 PM
- Hourly peak storage withdrawal- (62 MMcf from 7PM-8PM)

SoCalGas Conclusions

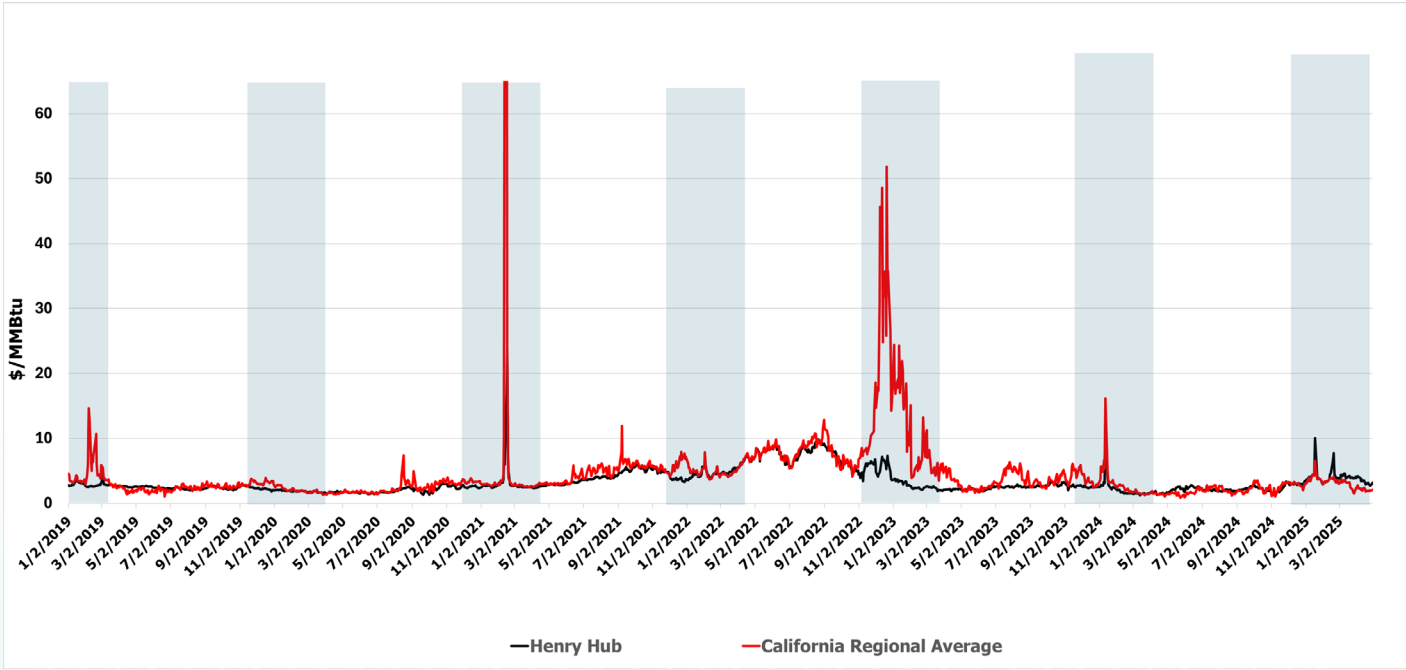
- Meets demand under the three scenarios.
- Gas storage facilities at capacity by November 1.
- Low risk to gas system reliability.

Source: Crescenta Valley Town Council.

Qualitative Price Analysis

- EIA forecasts Henry Hub price to average ~$2.90/MMBtu in 2025
  - $2.19/MMBtu in 2024
  - Increased US LNG demand
- Summer prices stable in recent years
  - Unexpected events can impact prices

Henry Hub and Average California Regional Prices, 2020–2025



Thank You!

Natural Gas Reliability Modeling Tools

Stochastic Daily Mass Balance

Khaled Abdelaziz, PhD, PE

Natural Gas Modeling Lead

CPUC Energy Division

May 2, 2025

California Public
Utilities Commission

Presentation Outline

- Overview of Natural Gas Models Used by Energy Division
- Stochastic Daily Mass Balance Model
- Previous Use Cases
  - Summer 2024 Southern California Gas Reliability Assessment
  - The possibility of minimizing the use of Aliso Canyon
- Upcoming Use Case
  - 2025 Biennial Assessment of Aliso Canyon
- Model Strengths and Weaknesses
- Discussion

Overview of Natural Gas Models
Modeling Tools Used by Energy Division

- Monthly Mass Balance
  - Simplest model (excel spreadsheet)
  - Conserves mass only on a monthly basis (using known monthly means)
  - Used widely to calculate seasonal storage needs
- Stochastic Daily Mass Balance Model
  - Conserves mass only on a daily basis (using random sampling)
  - Can model daily inventory, withdrawal, and injection capacities available
  - Can predict the number and size of imbalances during the winter season
  - Developed from scratch by Energy Division staff using R
- Synergi Gas (sub-hourly):
  - Conserves mass and momentum at each time step
  - Most detailed model, most computationally expensive, and laborious
  - Simulates the transmission network of the IOU (or more if desired)
  - Multi-state models do not exist

Stochastic Daily Mass Balance Model Summary of Methodology

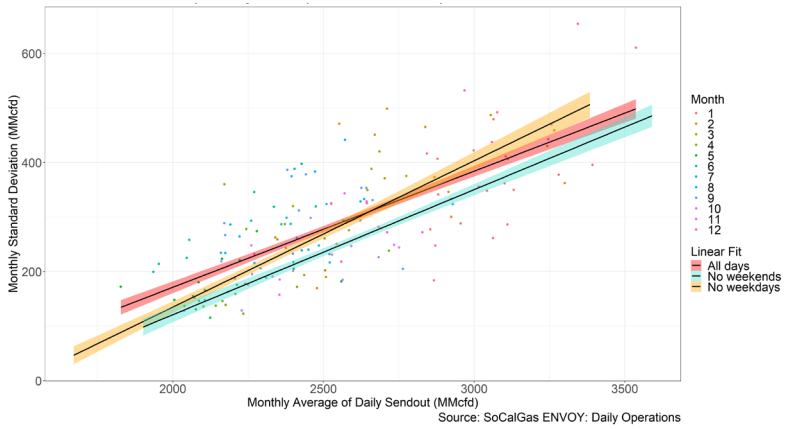
1. Calculate the standard deviation (σ) from historical data and obtain the daily mean (*X*) from CGR forecasts.

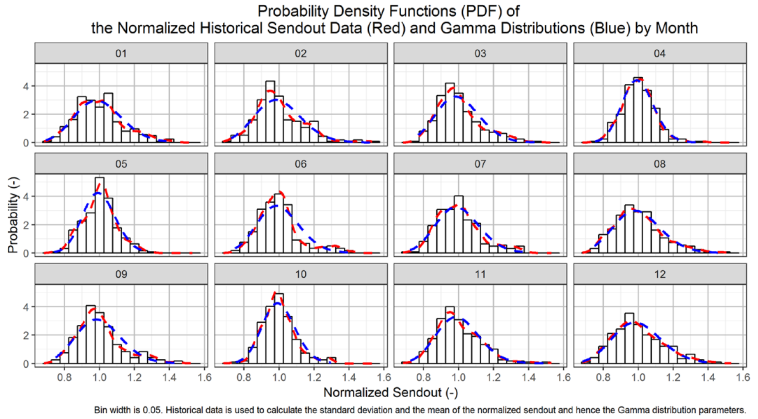
2. Forecast daily demand for the study year using a known statistical distribution.

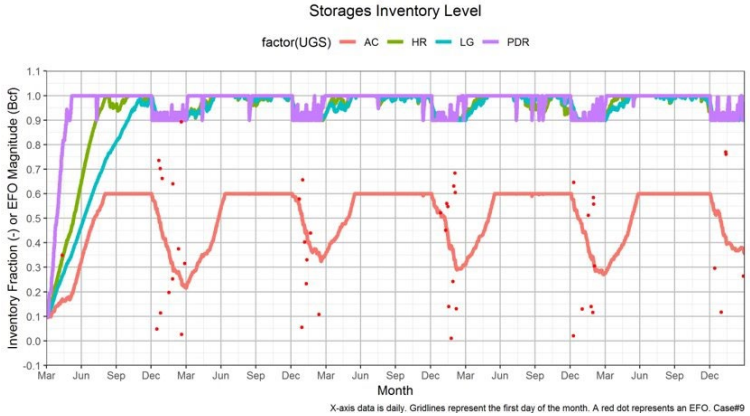
3. Determine gas supply assumptions.

4. Calculate daily excess or deficit, withdrawing or injecting as needed.

5. Track inventory levels over the whole study period.

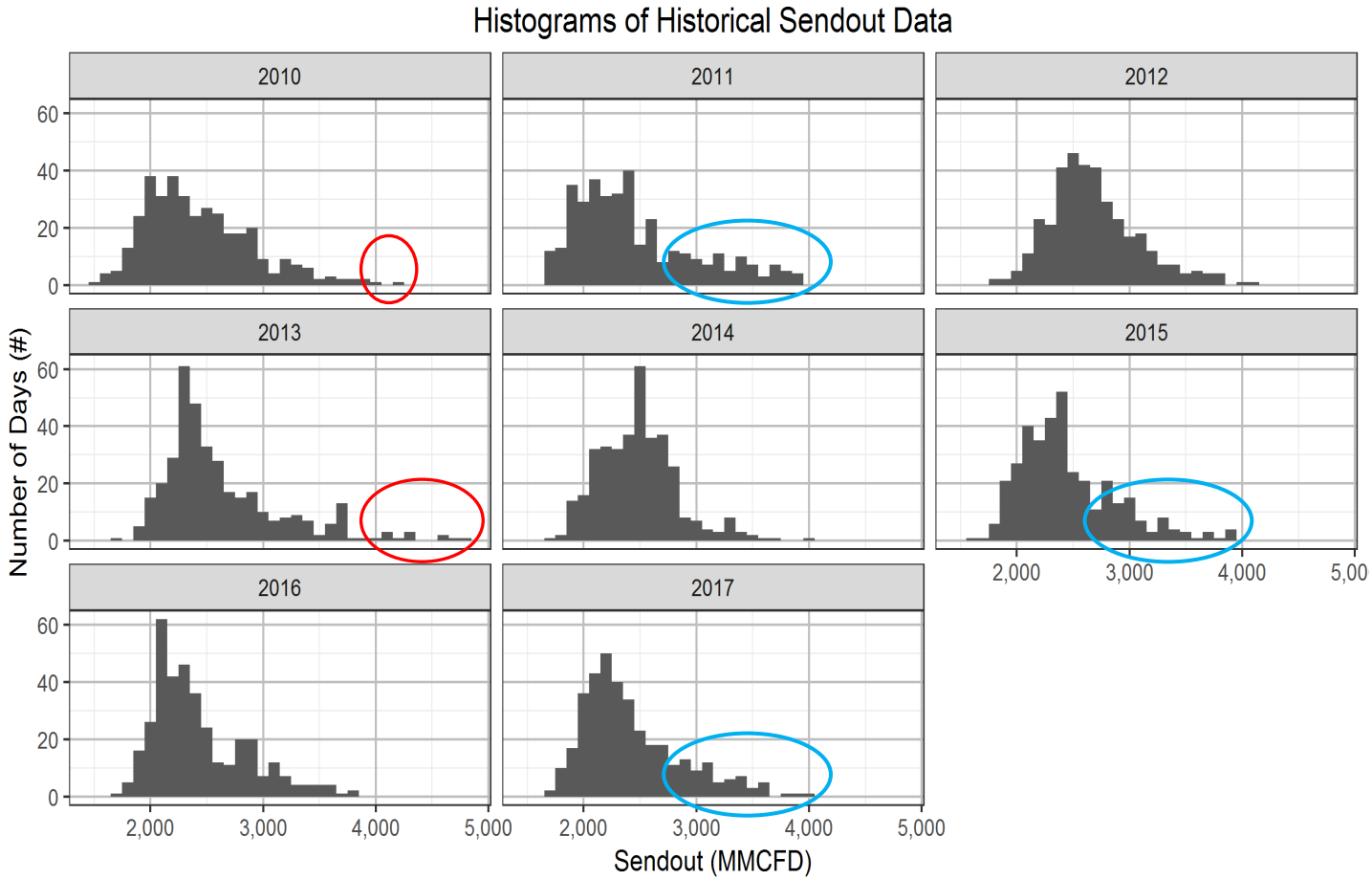






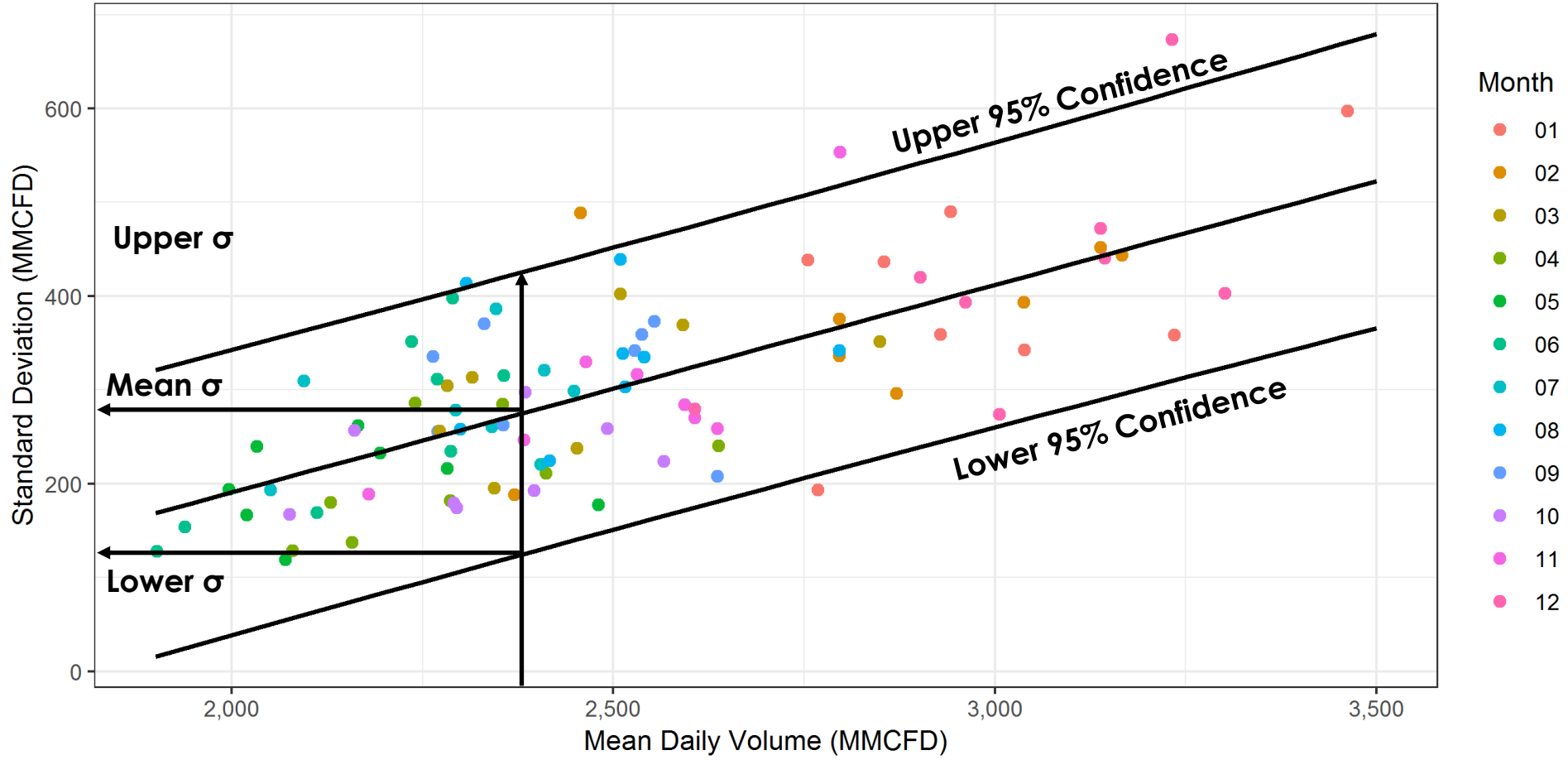
Historical Sendout by Year (2010-2017) Yearly Histograms are Right Skewed

Monthly Histograms employ similar distribution, i.e., right skewed (Gamma Distribution) based on forecasts of mean and historical variability.
Red outlines highlight high Sendout days.



Bin width is 100MMCFD

Standard Deviation vs. Mean Daily Volume Variability is Proportional to Monthly Means



Source: Data Request #6

Use Case

Summer 2024 Southern California Gas Reliability Assessment

Summer 2024 Southern California Gas Reliability Assessment: Supply Assumptions

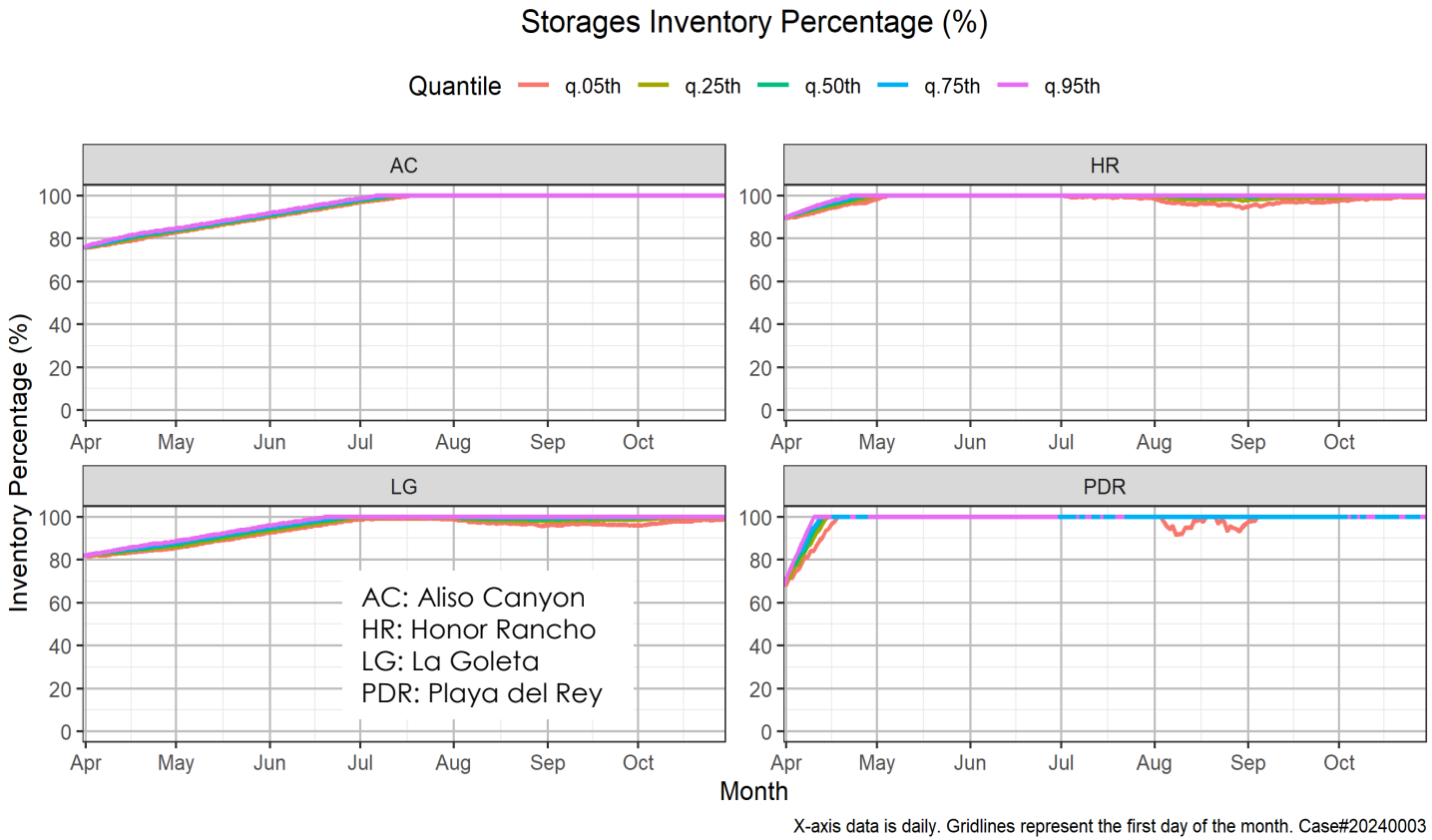
- Assumed supplies are higher than the forecasted demand for all months and all scenarios.

	Supply Scenario			Demand	
	1	2	3	CGR 2022	CGR 2020
Month					
April	2,355	2,707	2,707	2,385	2,245
May	3,000	2,707	2,707	2,090	1,915
June	3,005	2,707	2,707	2,021	1,864
July	3,625	2,707	2,707	2,058	2,270
August	3,625	2,707	2,707	2,102	2,508
September	3,625	2,707	2,707	2,100	2,399
October	3,625	2,707	2,707	2,086	2,259
Average Daily	**3,266**	**2,707**	**2,707**	**2,120**	**2,209**
Total (Bcf)	**699.68**	**579.30**	**579.30**	**453.59**	**472.75**

L-4000 Hydrotest and L-3000 Remediation . 90% RPU

Summer 2024 Reliability Assessment Inventory Tracking for Scenario 3

- Summer 2024 is reliable as indicated by near-full inventory levels throughout the season.
- Seasonal assessment reports are published on the Aliso Canyon OII Webpage around May and September.[+]



[+] https://www.cpuc.ca.gov/regulatory-services/safety/gas-safety-and-reliability-branch/aliso-canyon-well-failure/aliso-canyon-summer-and-winter-reliability-assessments

Use Case

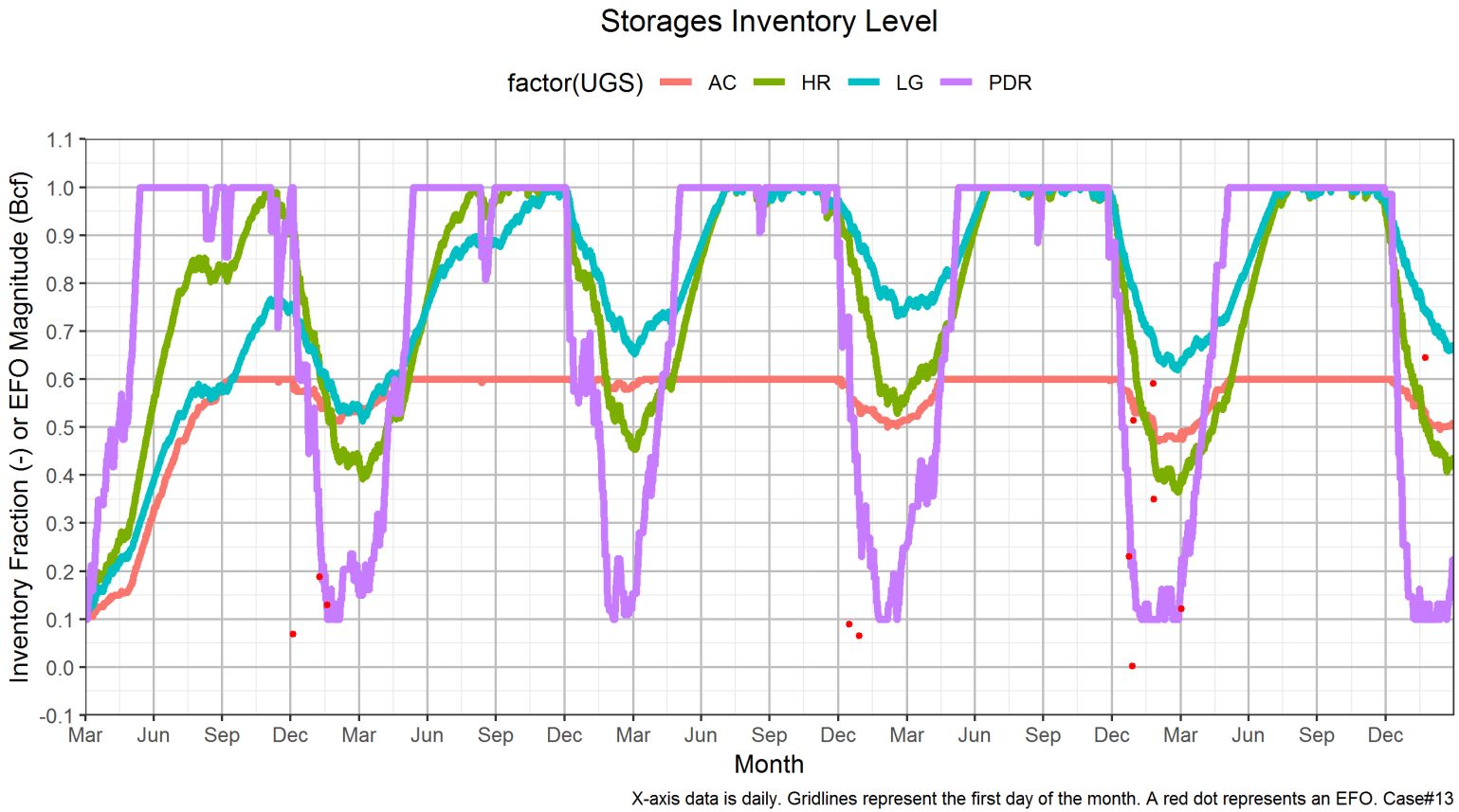
Aliso Canyon Proceeding OII-17-02-002

The Possibility of Eliminating or Minimizing the Use of Aliso Canyon

First Biennial Assessment for 2025-2026 and 2030-2031

Case 13: Aliso Allowed to 60%

- Reducing Aliso Canyon allowed maximum to 60% increases the risk of curtailment.
- Red dots indicate days where demand could not be met.
- The first biennial assessment will be published on the Aliso Canyon Webpage and is expected in June 2025.+



Cold year (1,594 HDD). Daily capacity of 3,000 MMscfd. Upper monthly standard deviation. 80% of wells are available year around. 10% minimum level for non-Aliso storage fields. 100% maximum level for non-Aliso fields. 60% maximum level for Aliso

+ https://www.cpuc.ca.gov/aliso

Stochastic Daily Mass Balance Model Weaknesses and Strengths

1. High gas prices could cause gas customers to use withdrawals from storage to manage costs as well as reliability, leading to higher withdrawals than forecasted.
2. A successful run of this model is **necessary** to meet the reliability standards but is **not sufficient** since the model does not conserve energy or model sub-daily events (i.e. peak hourly demand).
3. The daily mass balance introduces some stochasticity in natural gas modeling, which is much needed and reflects many uncertainties present in the natural gas system (outages, scheduling, customers' decisions, etc.)
4. This model also provides insight to the minimum storage inventory levels during the winter season.

Thank you

Q&A

Fifteen Minute Break

Panel: Summer Reliability Assessments – Publicly Owned Utilities

Moderator: Liz Gill

A. Balancing Authority of Northern California, Jim Shetler
B. Imperial Irrigation District, Kyle Bryant
C. Los Angeles Department of Water and Power, Tony Skourtas

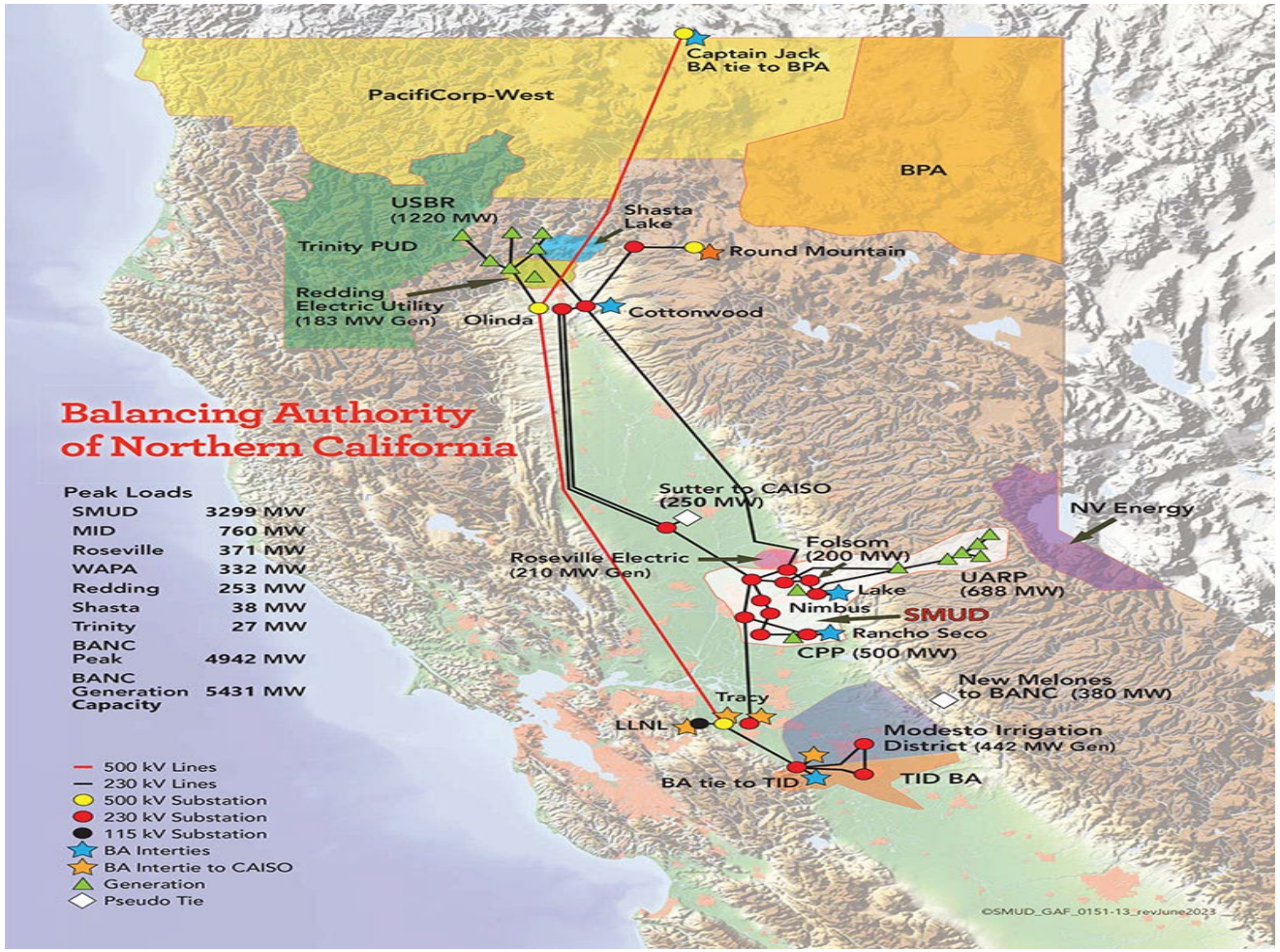
2025 BANC Summer Readiness Update

CEC Summer Readiness Workshop

Jim Shetler
General Manager

May 2, 2025

BANC Footprint



2024 Summer Operations Review

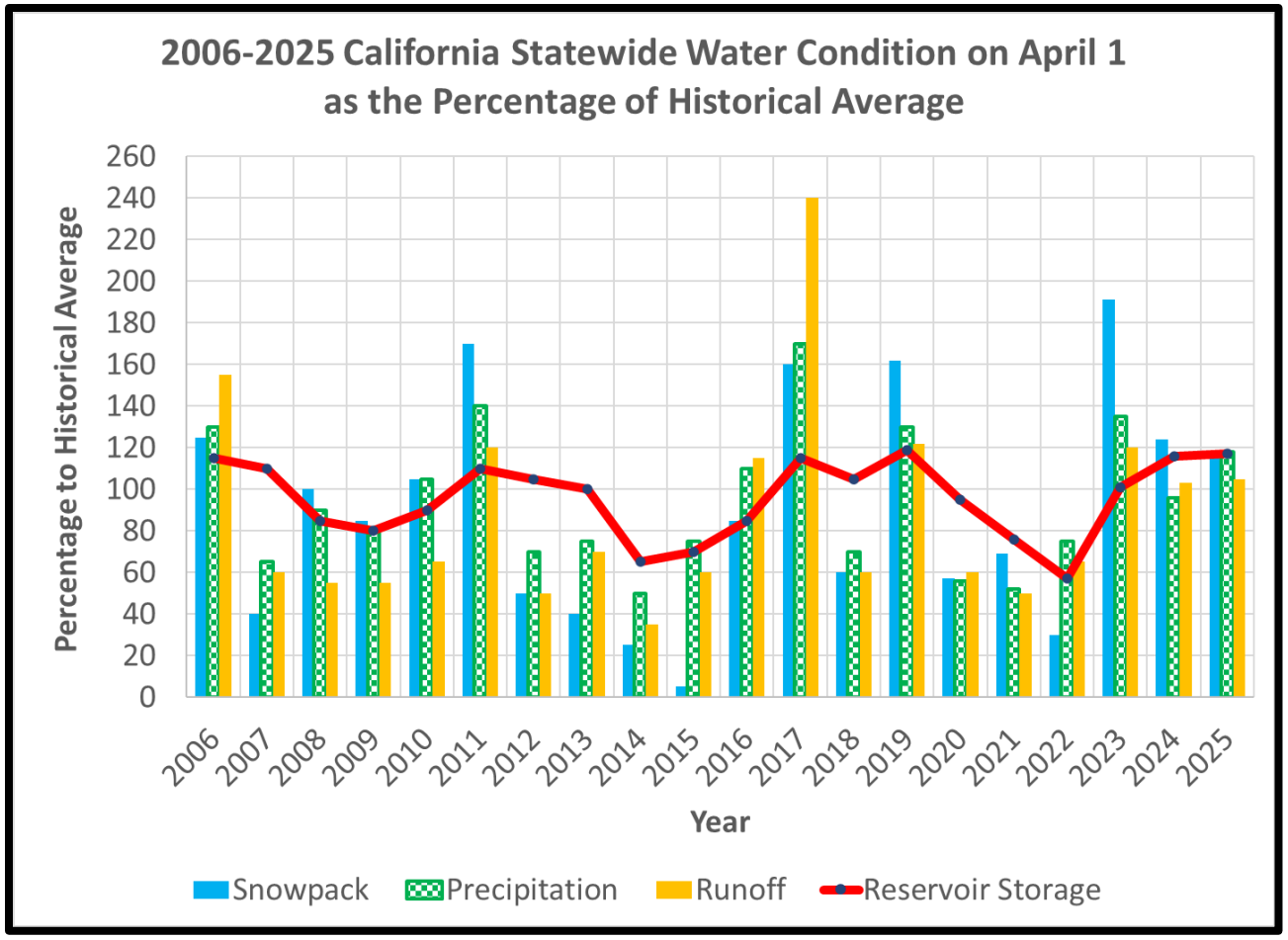
- BANC reached peak demand of **4777 MW** on July 11, 2024, at 16:53 – 166 MW lower than the all-time peak demand of 4943 MW recorded in 2022.

Entity	SMUD	MID	RE	REU	Shasta Lake	Trinity PUD	WAPA footprint	BANC BA
Non-Simultaneous Peak Load (MW)	3168	713	362	241	38	29	1635	4777

2025 Summer Load Forecasts

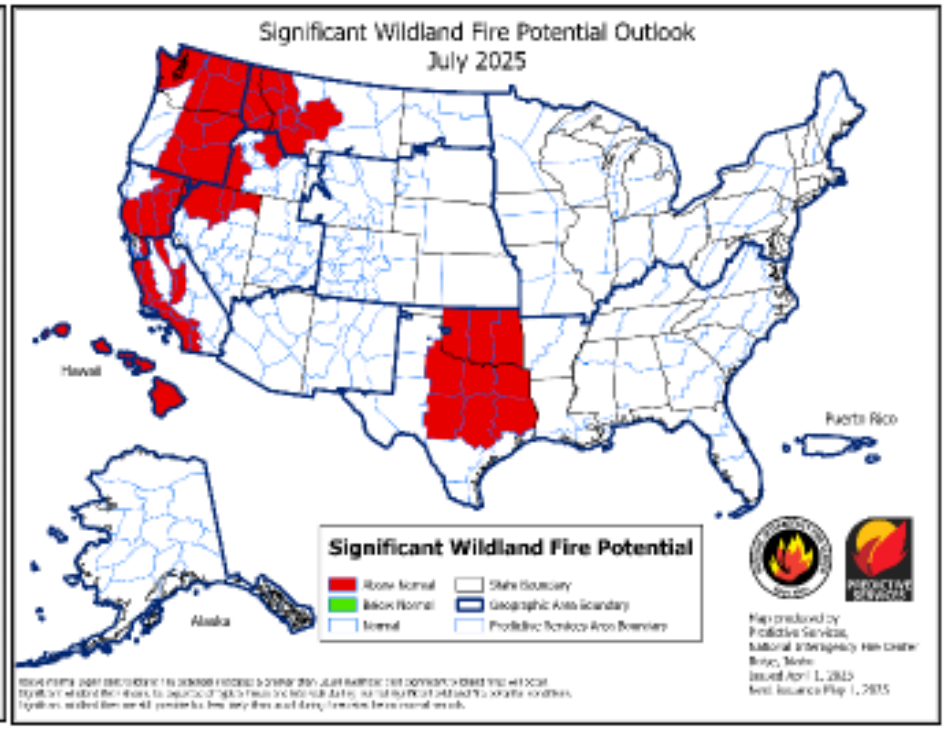
	1-in-2 Gross Peak Load Forecast (MW)	1-in-2 Net Peak Load Forecast (MW)	1-in-10 Gross Peak Load Forecast (MW)	1-in-10 Net Peak Load Forecast (MW)
SMUD	3060	2796	3305	3041
WAPA Footprint	1626	1612	1699	1686
MID	705	687	750	732
Roseville Electric	363	363	384	384
REU	235	235	237	237
Shasta Lake	34	34	38	38
Trinity PUD	27	27	28	28
BANC Total	4686	4408	5004	4727

2025 Water Conditions

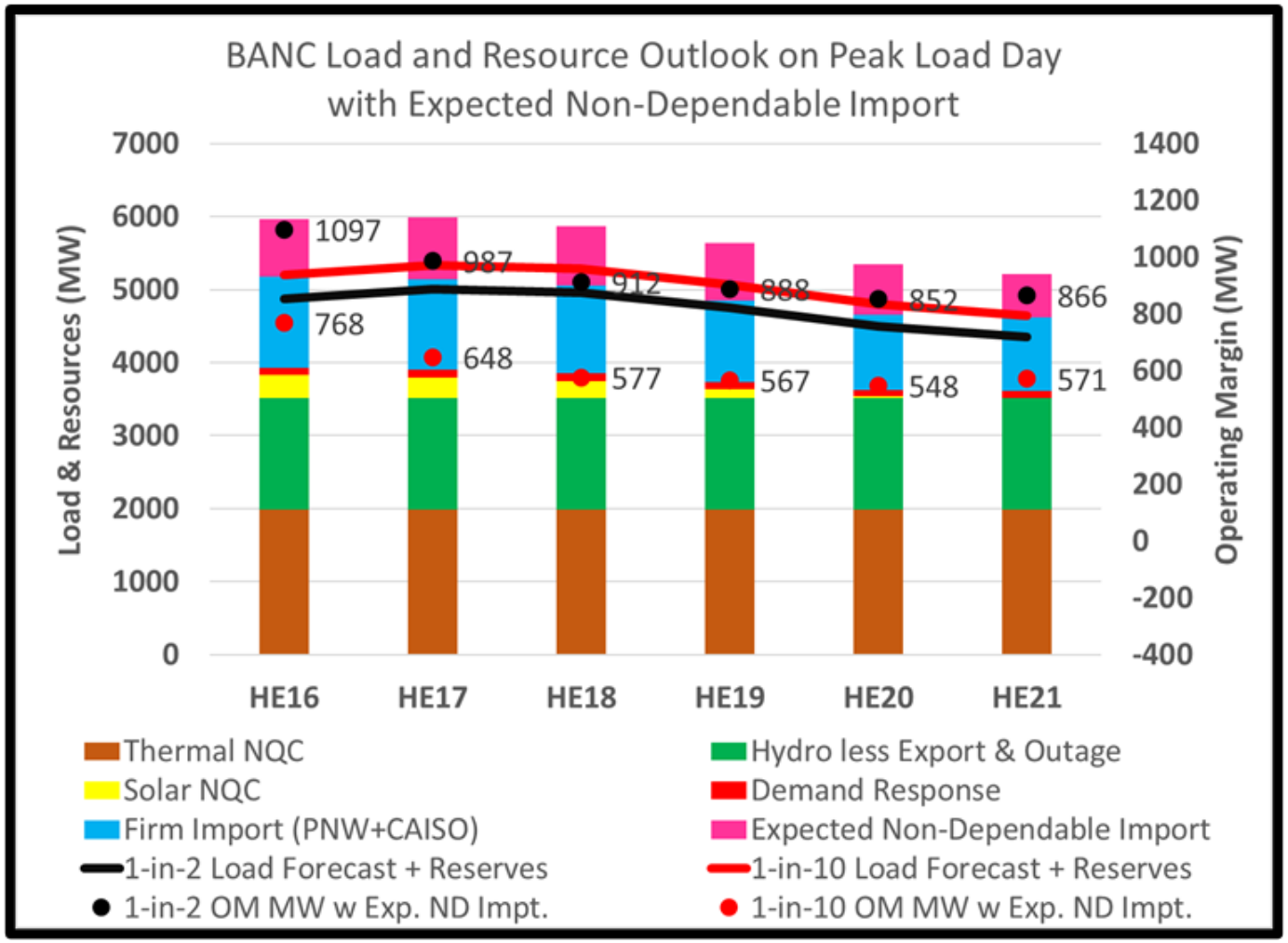


- Northern Sierra Snowpack – 118%
- Northern Sierra Precipitation – 118%
- Major Northern California Reservoir Levels – 118%
- Snow runoff – 105%
- Water year classification – "Above Normal"

2025 Summer Wildfire Outlook



2025 BANC Load & Resource Outlook



Special Operating Scenarios

- California Oregon Intertie (COI) derate due to the loss of two 500 kV lines under wildfire condition
  - ⚠ Under 1-in-2 load condition, BANC would be in EEA 3 with potential risk of firm load shedding (This condition occurred in the past on 7/9/2021 with the Bootleg Fire.)
  - ⚠ under 1-in-10 load condition, BANC would face significant risk of firm load shedding
- West-wide heatwave causing 1-in-20 load
  - ⚠ BANC would be in EEA 3 with potential risk of firm load shedding under 1-in-20 load condition
- Solar reduction due to wildfire smoke
  - ✓ Smoke reduces BANC load more than Solar
- CAISO BA in Energy Emergency Alert 3 (EEA 3)
  - ✓ Minimal import reduction (1~4%)

Summary

- Slightly higher 1-in-2 and 1-in-10 load forecasts
- “Above Normal” water conditions
- 286 MW generation outages throughout the summer
- Sufficient Operating Margins for both 1-in-2 and 1-in-10 load conditions under base case analysis
- Slightly higher risk of load shedding compared with 2024 due to increased load forecast and extended generation outages.
  - Increased load shedding risk during conditions of COI outages, energy shortages and west-wide heatwave.
- BANC Power System Operators and the Operators from other BANC entities are having Summer Readiness Training to prepare for the summer operations.

Questions

Jim Shetler – BANC General Manager
E-mail: jimshetler@thebanc.org
Phone: (916) 870-3774

IID
A century of service.

Imperial Irrigation District

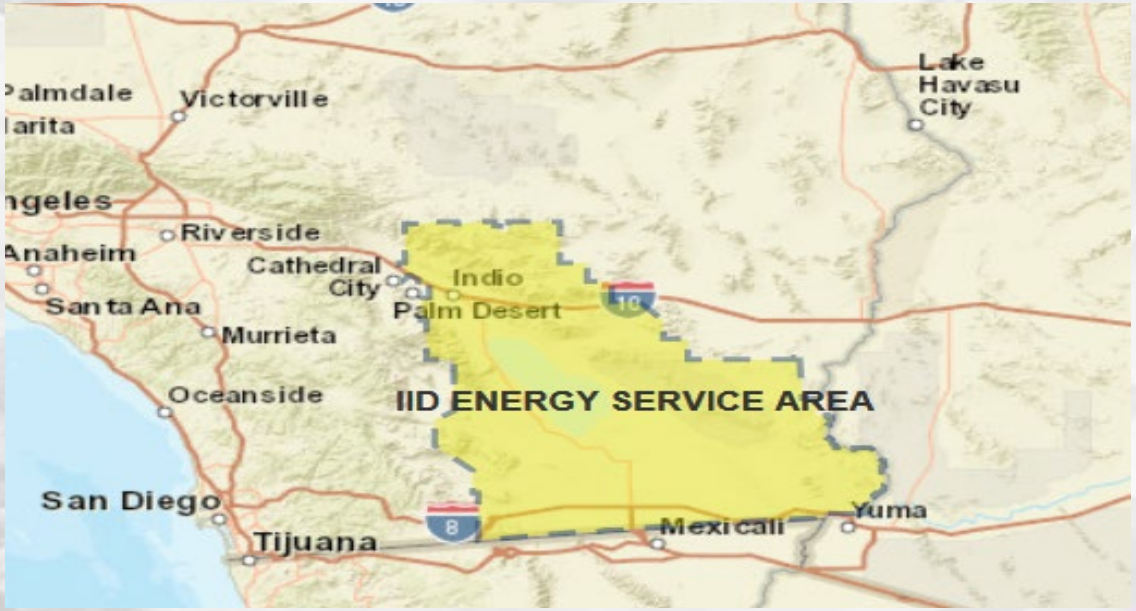
2025 Summer Reliability Workshop

Kyle Bryant,
Manager Power Dept, Assistant

May 2, 2025

Background

- The Imperial Irrigation District (IID) was established in 1911 and entered the power business in 1936. Proudly serving Imperial and Coachella Valleys and a portion of San Diego County, IID has a service area of **6,471 square miles with over 165,000** residential and commercial customers.



Service Territory

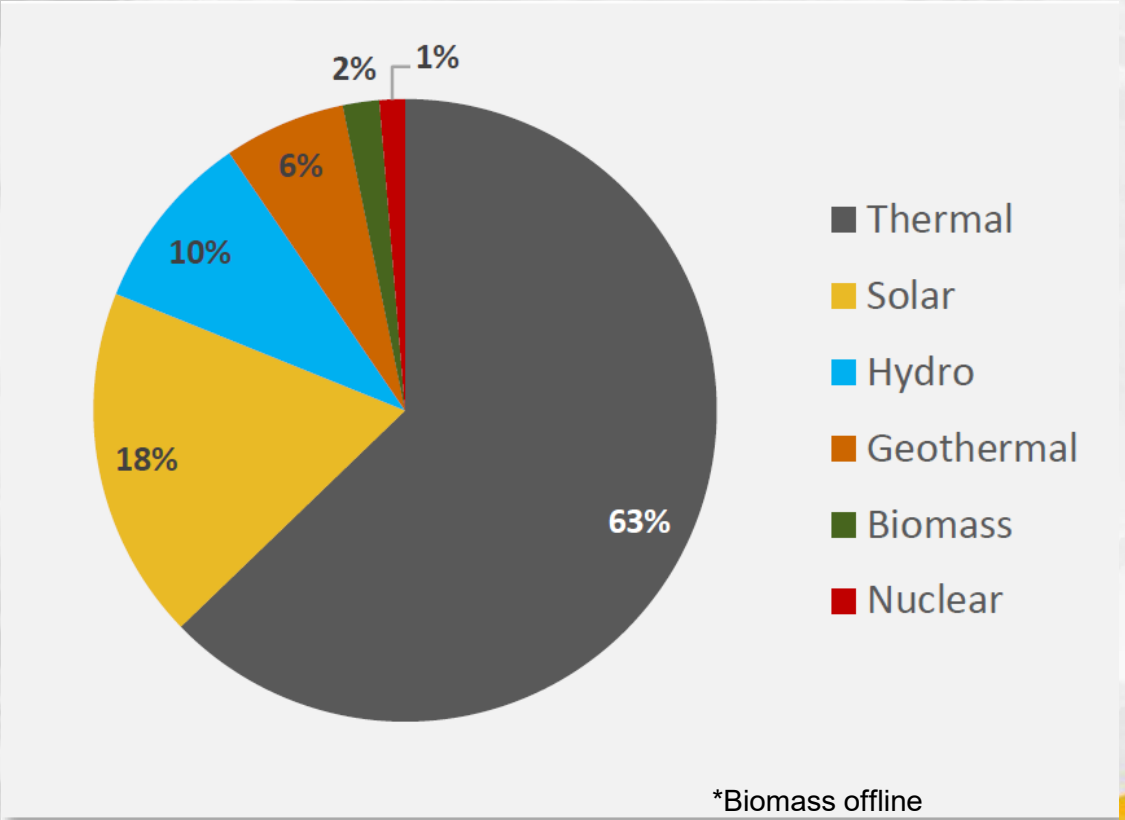
- Balancing Authority historic peak of **1,177MW** in September 2024. That was a 2.2% increase over 2023.
- 1,780-miles of transmission network and 5,004-mile distribution lines.
- Connected Generation Capacity is over 2,200MW
- Diverse resource portfolio including: geothermal, solar, hydro, and emergency diesel resources
- Battery Storage
  - *30MW/20MWh El Centro*
  - *30MW/120MWh Holtville*

This Summer

- 2025 summer load is projected to be slightly higher than last year's with peak forecast expected later in the summer
- New IPP contract 42MW in IID BA
- New 230kV Cap Bank in the Coachella Valley

Generation Portfolio for 2025

- Over 165MW of distributed solar (roof top).
- Nameplate capacity of IID generation portfolio for 2025:



*Biomass offline

Current Energy Storage

- 30MW/20MWh used for reliability:
  - *Spinning Reserves*
  - *Automatic Generation Control*
  - *Voltage support*
  - *Frequency Response*

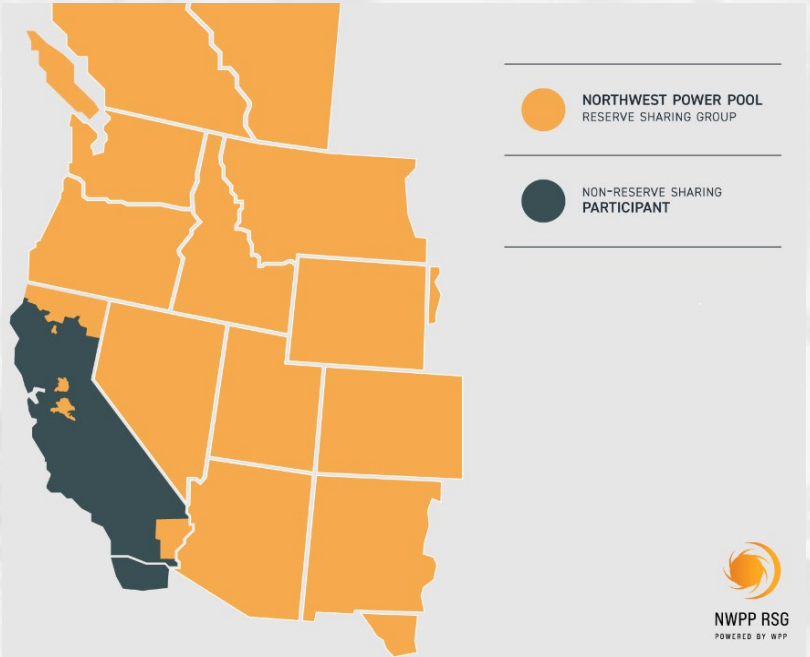
- 30MW/120MWh used for reliability:
  - *Market Optimization*
    - Negative Pricing
    - Solar Ramp Hours

Emergency Turbines

- Three 20MW (60MW) of emergency diesel turbines at three distribution substations.
- 5 hour Max run time air permit.

Reserve Sharing Group

- Increase in potential MW assistance based on WPP's methodology.
- More qualifying events under WPP's reserve sharing program.
- Allows for assistance request during EEA3 events.

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WWW.IID.COM

Los Angeles Department of Water & Power

Summer Reliability Workshop

LADWP

Tony Skourtas
Manager of Energy Control Operations
Energy Control and Grid Reliability Division

May 2, 2025

Los Angeles Department of Water & Power

Load Forecast

All-time Peak

- 6278-MW August 31, 2017

  (6502MW includes non-conforming)

- 2023 5226-MW August 29, 2023

- 2024 6266-MW September 6, 2024

Los Angeles Department of Water & Power

Load Forecast

	2017	2024
NPL	6278	6266
CC	102	110
LAX	93	105
Northridge	110	114

2025 Load Forecast

Base 5575-MW

1 in 5 5974-MW

1 in 10 6183-MW

1 in 40 6505-MW

Los Angeles Department of Water & Power

Generation

- OTC plants continue operation through 2029
  - Scattergood Unit 2
  - boiler re-tube completed, expect greater reliability
- Haynes Unit 1 & 2
  - Unit 1 due back mid-late July
  - Unit 2 due back in June (blades replaced)

Los Angeles Department of Water & Power

Generation

Intermountain Power Project

- IPP Units 1 & 2 (Coal)
  - end of service ~ July/Aug (-1124 MW)
- IPP Units 3 & 4 (CC) "*IPP Renewed*"
  - Commissioning underway ~ Aug/Sept (+529 MW)

Approx 600-MW Net decrease at IPP

Los Angeles Department of Water & Power

Renewables

- Wind Generation (no change from 2024)
  - Approximately 425-MW (excluding PPA's)
- Solar Generation
  - Adding 400-MW of PV
  - includes 300-MW BESS
- Total solar approximately 1520-MW

Los Angeles Department of Water & Power

Net Generation

Intermountain Power	-600MW
Eland 1 & 2 BESS	+300MW
Net Change at peak	-300MW

Los Angeles Department of Water & Power

Transmission

- ✓ Barren Ridge Renewable Transmission Project
  - BAR-HSK 1 conductor upgrade complete – Feb '25
- ✓ Rinaldi-Tarzana 1 upgrade complete – Apr '25
- Sylmar Bank E (Path 41)
  - Out since Nov '22
  - Target date is July '26
  - 600-MVA ➡ 1290-MVA

Los Angeles Department of Water & Power

Resource Adequacy

Adequate Capacity, but...

dependent on

1. Actual Load/Temperatures
2. Successful commissioning of IPP and Solar/BESS
3. Procurement of additional imports if needed

Los Angeles Department of Water & Power

Concerns

- Reliability of older generating units
- Reliability of new generating units
  - ➢ Wildfires

Q&A

Public Comment

Zoom:

- Use the “raise hand” feature to make verbal comments

Telephone:

- Dial *9 to raise your hand
- *6 to mute/unmute your phone line. You may also use the mute feature on your phone.

When called upon:

- Your microphone will be opened
- Unmute your line
- Spell your name for the record, then start your comment.

Limited to 3 minutes per person and 1 representative per organization.

3-MINUTE TIMER