

Energy Reliability and Affordability Media Briefing

May 6, 2022

CA State of Play

California faced backed to back years of energy reliability challenges driven by climate change in 2020 and 2021

In summer of 2020, multi day extreme heat across the west led to outages across the state. CAISO/CPUC/CEC were directed to conduct a root cause analysis of the outages which showed:

- demand/supply estimates did not adequately account for accelerated impacts on the grid from climate change
- extreme weather including drought and wildfire both reduce our ability to generate as well as increase demand.

In 2021, California experienced another hot and dry summer -

- Hydropower at Oroville's Hyatt Powerplant was shut down for the first time ever due to lack of water supply representing a loss of more than 600MWs
- Oregon Bootleg fire took out interstate transmission lines cutting off 4,000 MW of energy imports into California - 3,000 into CAISO

In addition, there are planned retirements of facilities accounting for 6,000 MWs by 2025.

COVID-19 pandemic, supply chain challenges and tariff issues have delayed California's ability to bring the projects we need to maintain energy reliability online.

California's Actions to Date

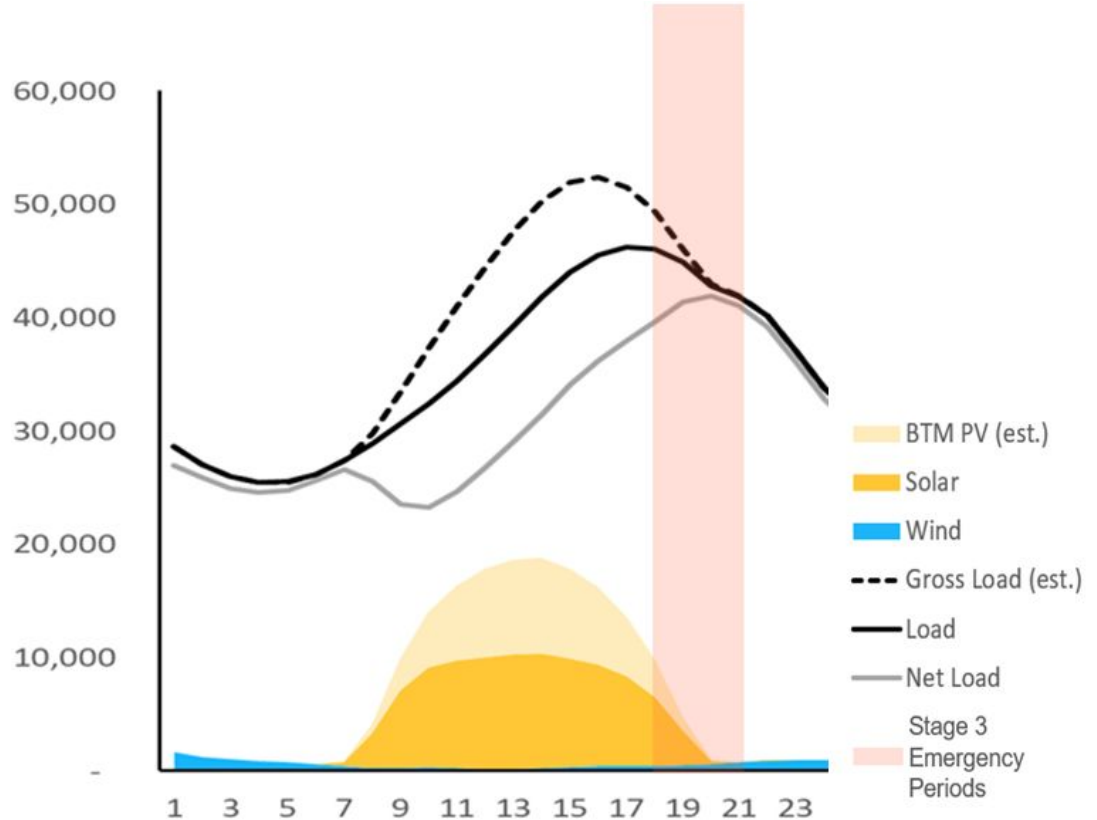
To address these challenges California has:

- Revised forecasts to better reflect climate impacts
- Mandated an unprecedented amount of energy procurement - 11,500 MW in 2021
- Accelerated projects including rapid deployment of energy storage
 - Went from 200 MW to nearly 4,000 MW battery storage in just 2.5 years
- Maximized demand response
 - Launched new Flex alert campaign, introduced customer payment program and auto enrolled low-income Californians.
 - Established Emergency load reduction program
 - Increased demand response programs by energy providers
 - New smart thermostat incentive program
- Installed emergency DWR generators
- Delayed planned retirement dates for existing power plants

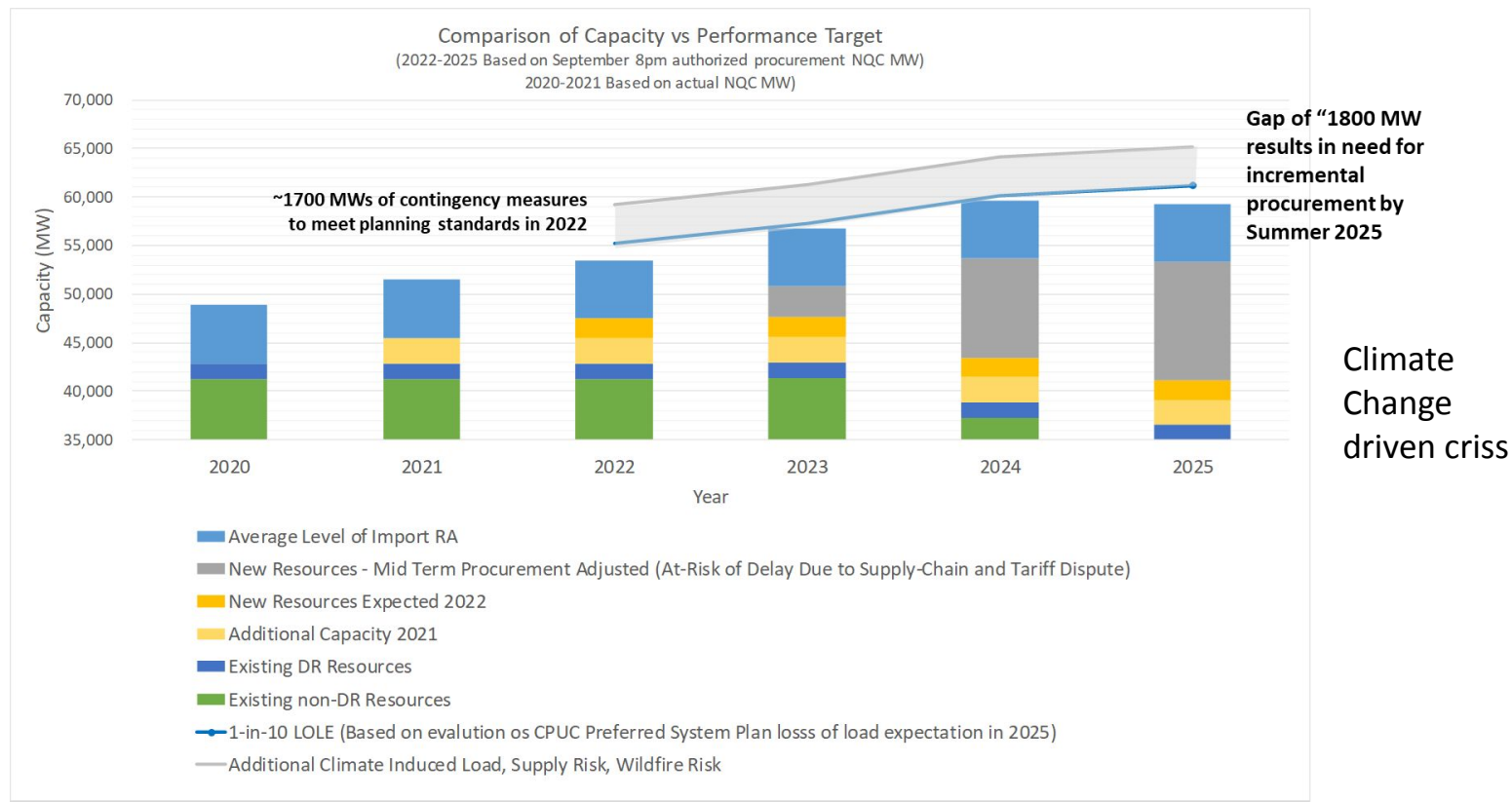
Even with these actions, climate change continues to cause unprecedented stress on California's energy system - it continues to threaten reliability and put Californians at risk of additional outages.

Net Peak vs. Gross Peak

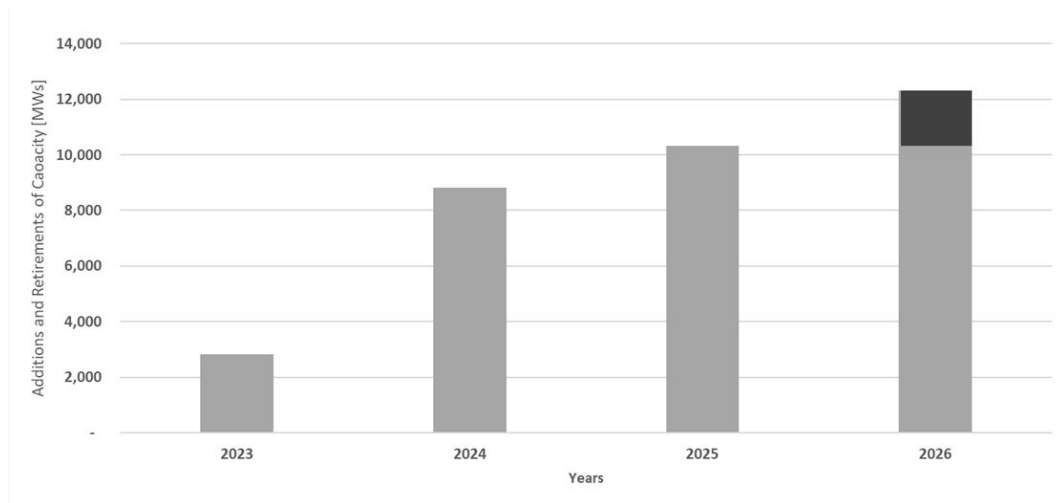
- The net peak period is now when the grid experiences the greatest challenge, especially in summer and early fall.
- While the load at the time of the net peak is only slightly lower than that gross peak, the solar production drops by thousands of megawatts between gross and net peak.
- As a result, planning and operation require a focus on additional resource capacity that can reliably produce during and immediately after sunset.



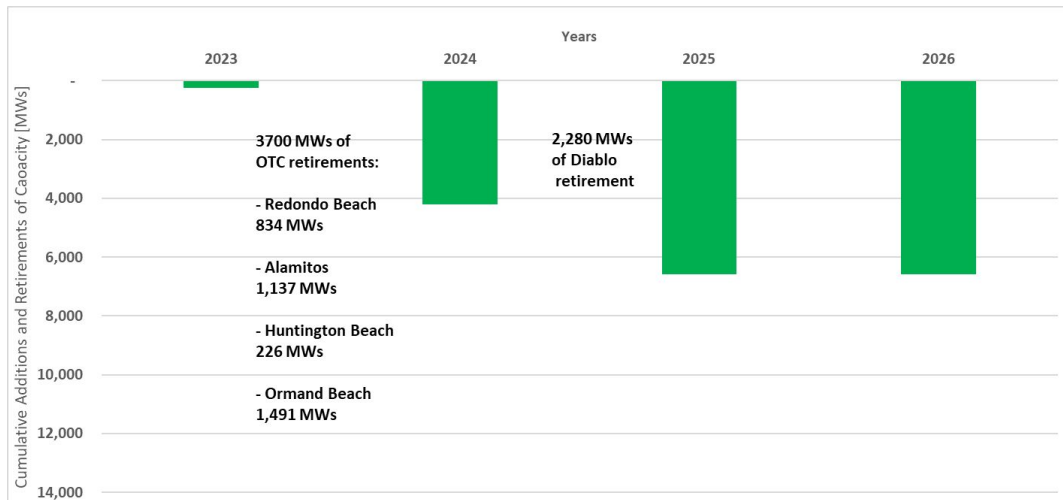
September peak day conditions: 2022-2025



Expected Additions



Planned Retirements



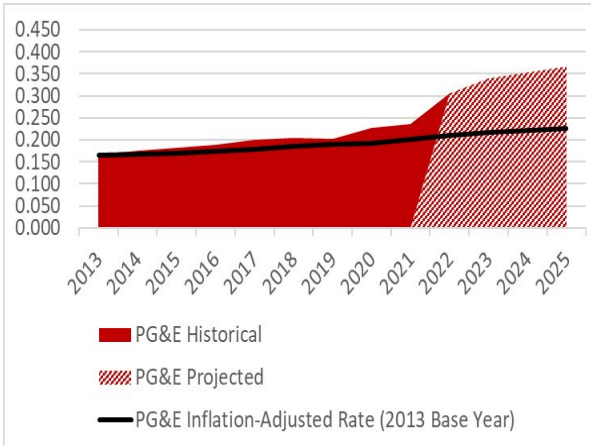
- Authorized Procurement of Long Lead Time Resources
- Authorized Procurement
- Planned Retirements

Estimated Impact on Energy Reliability

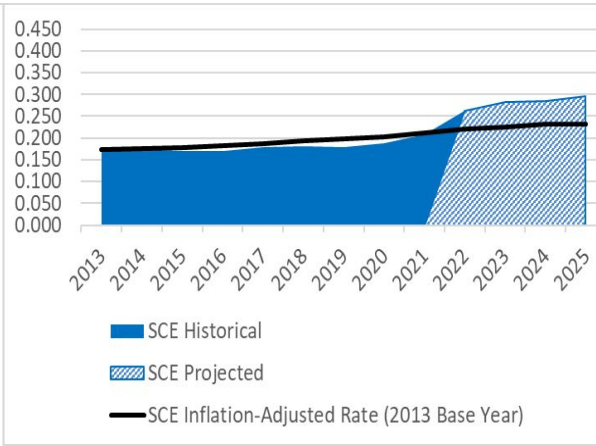
	2022	2025
Lag in incorporation of updated demand forecasts and policy goals in procurement targeting 1-in-10 traditional planning metric	1,700 MWs	1,800 MWs
Extreme weather and fire risks to energy assets not completely captured in a 1-in-10 traditional planning efforts	4,000 - 5,000 MWs	
Project Development Delay Scenarios (estimated)	600 MWs	1,600 - 3800 MWs

Projected Residential Rate Growth Expected for California IOUs (\$/kWh)

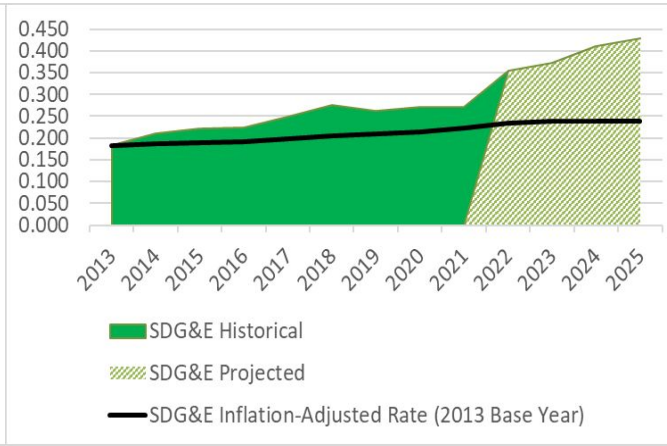
PG&E



SCE



SDG&E



By 2030, bundled residential rates are forecasted to be approximately **40% (PG&E), 20% (SCE), and 70% (SDG&E) higher** than they would have been if 2013 rates for each IOU had grown at the rate of inflation.

Recent Electric Bill Trends and Mid-term (2025) Projections

Bundled Residential Monthly Electric Bill Impact Estimates*

Utility	Actual				Projection		
	2019 Bill	Annual Growth Rate**	Total Bill Increase from 2019	Current Bill (2022 YTD)	Annual Growth Rate**	Total Bill Increase from Current Bill	Projected 2025 Bill
PG&E	\$121	12%	\$44	\$165	9%	\$46	\$211
SDG&E	\$128	11%	\$43	\$171	8%	\$42	\$213
SCE	\$100	16%	\$50	\$150	4%	\$18	\$168

* For Non-CARE customers. Based on PG&E & SCE residential average consumption = 500 kWh/mo.; SDG&E = 425 kWh/mo.

** Growth rate accounts for partial year of 2022 YTD

2022 Cost Drivers

Residential Average Bill Impacts of Principal Cost Drivers that Went into 2022 Rates*

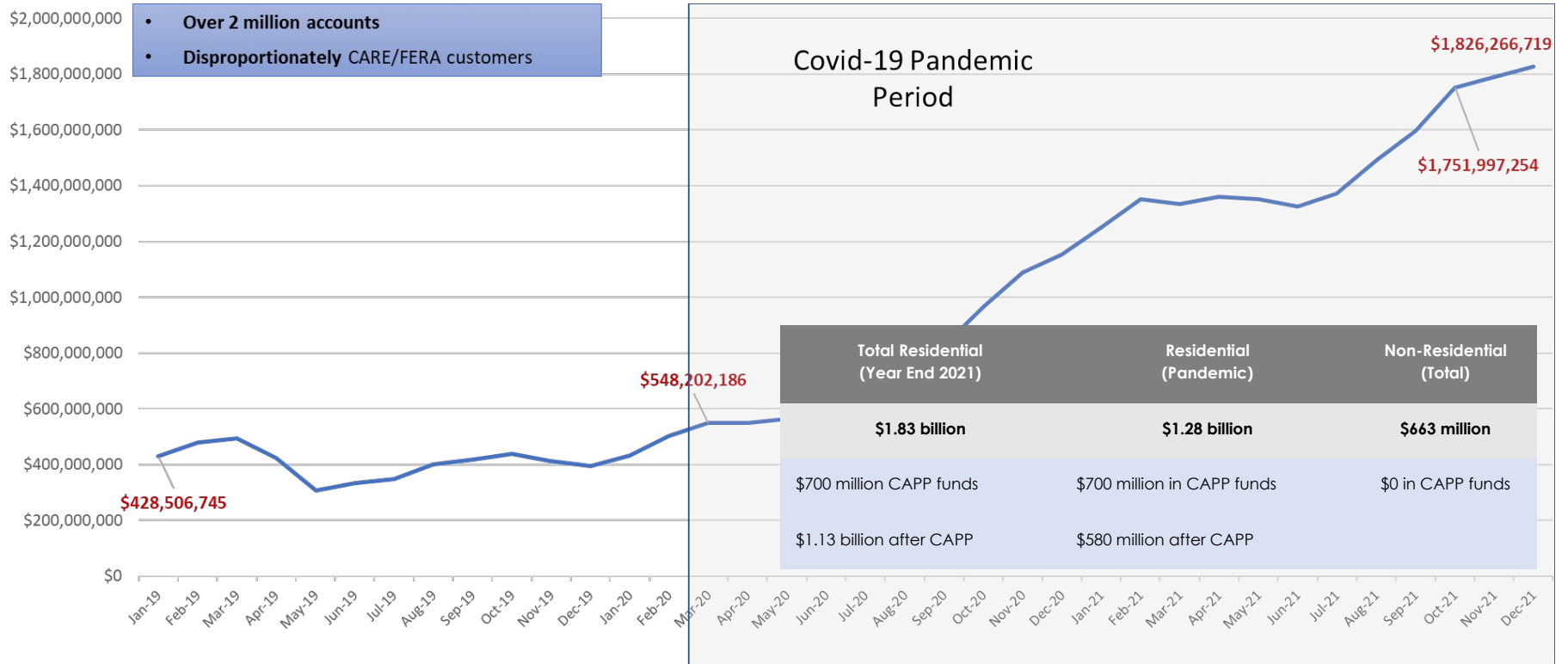
Driver	PG&E	SCE	SDG&E
Fuel & Purchased Power (Gas Prices)	11.6% increase	5.8% increase	5.7% increase
Transmission Costs (Approved at FERC)	5.7% increase	1.3% increase	2.5% increase
Distribution & Wildfire Costs	3% increase	4% increase	2.6% increase
Arrearages (Pre-pandemic)	0.8% increase	0.1% increase	N/A

*Examples of other costs include: Summer Reliability, AB 841, and SB 350 TE Programs. Data based on rates that went into effect Jan 1 and/or Mar 1, depending on utility.

Unquantified Costs not included in Rate Projections

- Additional wildfire mitigation
- The most aggressive alternatives being considered in 2022 scoping plan including 2035 carbon neutrality
 - Most accelerated timelines for electrification and zero carbon targets
 - Distribution grid upgrades for high electrification (CARB ACC2 for LDV and ACF for MDV/LDV)
- Transmission costs beyond 10-Year IRP assumptions
 - CAISO 20-year conceptual transmission outlook estimates \$30 billion system costs in addition to other network and local upgrade costs.

Total Residential Arrearages Among 4 largest IOUs



What's Next?

- Continue incorporating our experiences with climate change into how we maintain reliability as traditional forecasting consistently underestimates the scale of the challenge as evidenced by 2020 and 2021.
- Factor in new challenges to bringing the projects we need online
- Further diversification of our clean energy with resources that can produce during the critical net peak period including: battery storage, wind, geothermal and pumped storage
- Develop additional actions to maintain reliability during our transition to clean energy and to support affordability

California will continue leading the fight against climate change and take necessary actions to ensure energy reliability during the clean energy transition.