



Energy Storage Evolution in California

**Thermal-Mechanical-Chemical Energy
Storage Workshop**

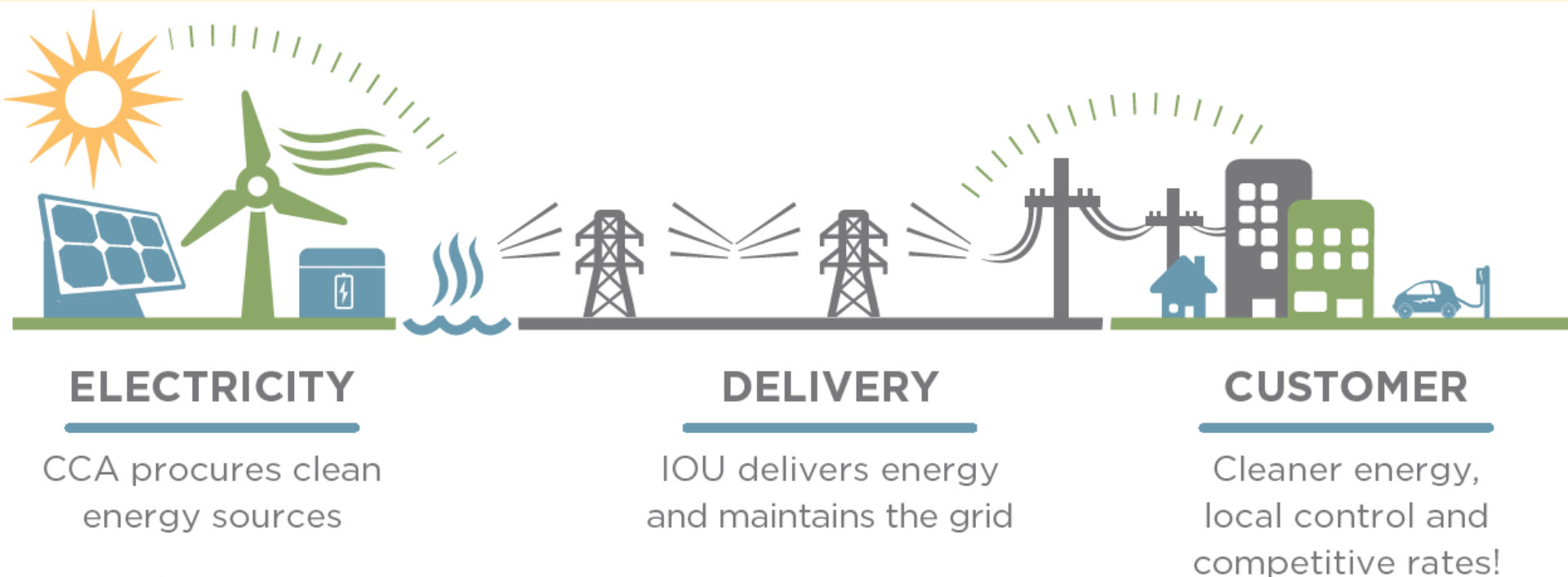
August 11, 2021 8:50am – 9:20pm

Agenda

- About California Community Choice Aggregators and Clean Power Alliance
- California Energy Storage Leadership
- Long-Duration Storage in California
- CPA's Storage Procurement and Upcoming Long-Duration Storage Activities

What is a Community Choice Aggregator?

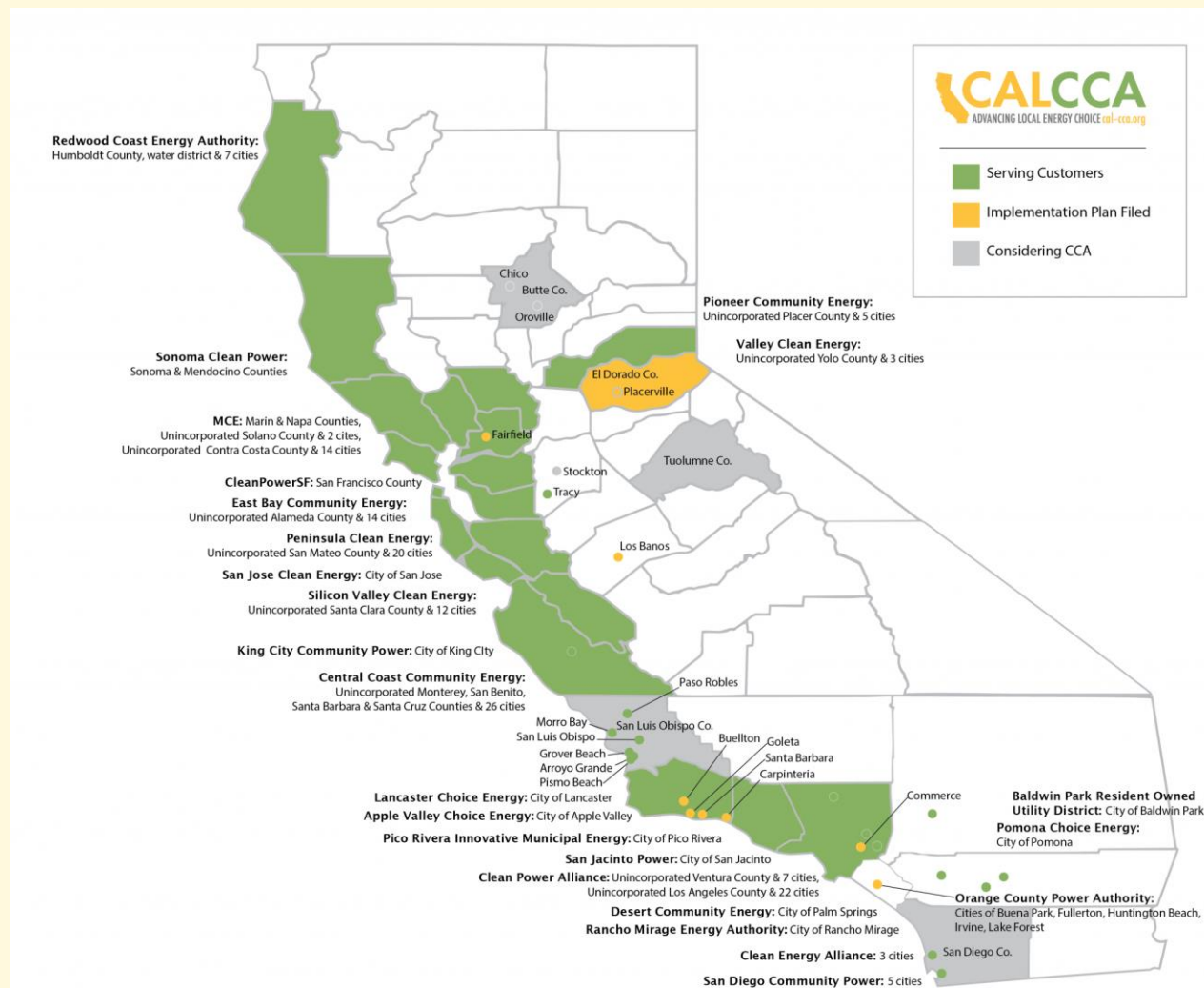
- A Community Choice Aggregator (CCA) is a local government program to procure power on behalf of residents and businesses while still receiving transmission and distribution service from the existing utility producer



Source: CalCCA

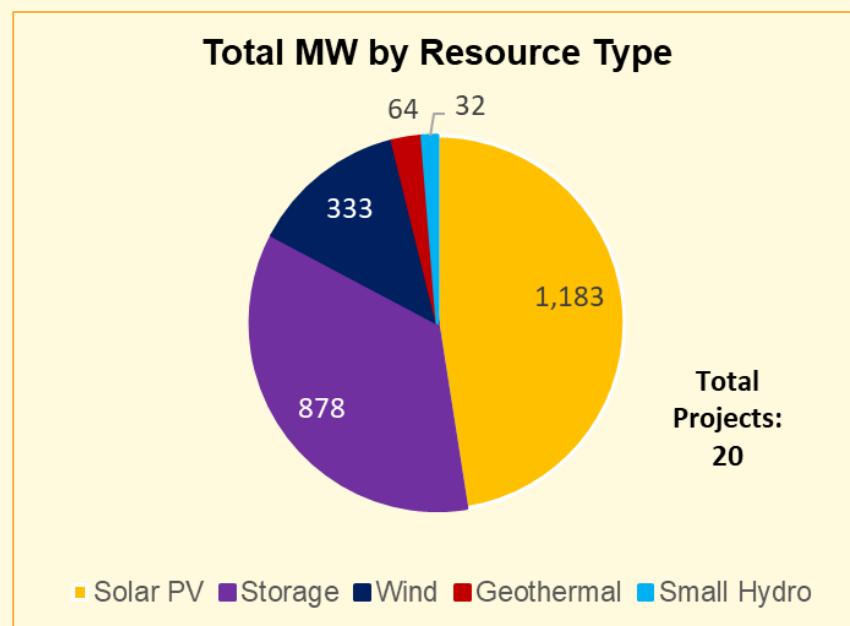
CCAs in California

- CCAs are now serving ~20% of California's total load
- CCAs have contracted for more than 6,000 MW of new clean generation capacity through long-term power purchase agreements



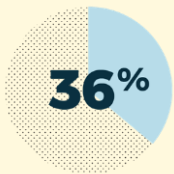
About Clean Power Alliance

- Clean Power Alliance (CPA) is a CCA formed through a Joint Powers Authority made up of 32 public agencies across Southern California
- CPA is CA's 5th largest Load Serving Entity and 3rd largest buyer of storage
 - 715 MW lithium-ion storage (3 and 4-hour) contracted to date
 - 150 MW lithium-ion storage online (4-hour) by September 2021
 - Residential & commercial behind the meter storage programs

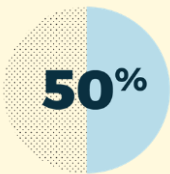


CPA Member Agencies

Rate Options



Lean Power



Clean Power

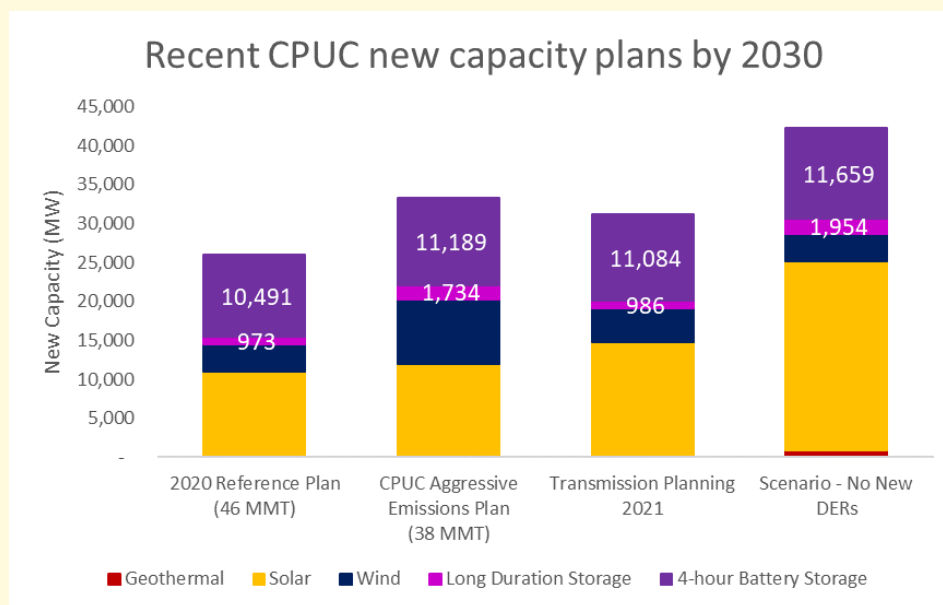


100% Green Power



California Energy Storage Leadership

- CAISO had 200 MW storage end-2020; 500 MW now; expecting 2,000 MW by 8/1/2021
- California SB100 – 60% renewable by 2030 and 100% clean energy by 2045
 - 10-14 GW storage need by 2030
 - 25-56 GW by 2045
 - 1-2 GW long-duration storage represent 12-hour needs
 - Recent procurement complying with 3,300 MW reliability order by 2023



Long-Duration Storage Roles

- Discharging supports reliability in peak net load hours (hours ending 18-21)
- Charging reduces renewable curtailment
- Discharging prevents carbon emission from natural gas ramping and evening generation
- Discharging supports climate change resiliency (longer reliability events related to extreme heat/wildfires)

California Long Duration Storage Updates

1. New regulation reduced storage reliability contributions

(May 2021)

- California Public Utilities Commission (CPUC) limited the amount of standalone 4-hour storage and 8-hour storage that can be counted for Resource Adequacy

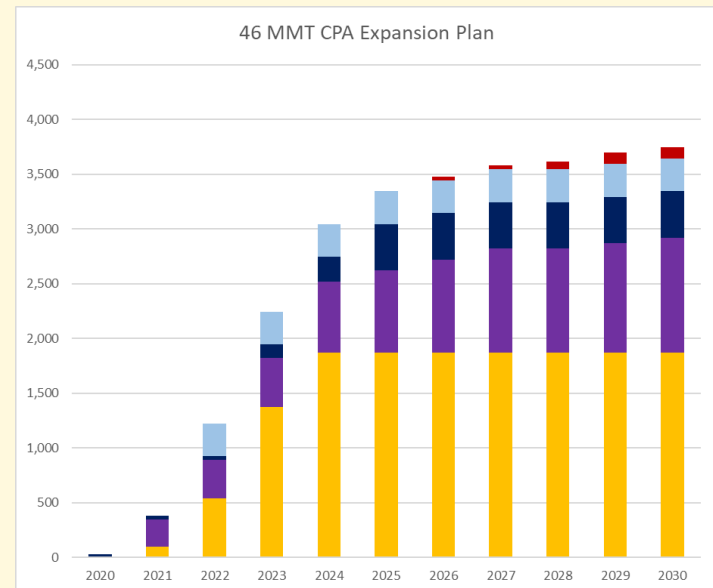
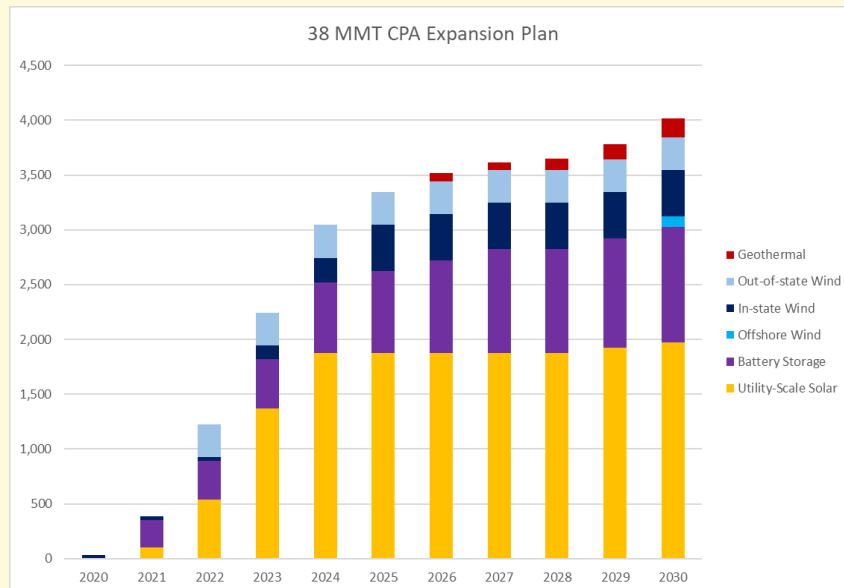
2. Integrated Resource Plan resulted in Diablo Canyon procurement order

(June 2021)

- 1,000 MW long-duration storage by 2026 (out of 11,500 MW total)
- Long-duration storage categorized as “long-lead time” (LLT) resource; eligible for compliance extension to 2028

CPA's 2020 Integrated Resource Plan

- CPA's 2020 Integrated Resource Plan (IRP) recommended two resource portfolios that maintain reliability and achieve environmental goals
 - CPUC's CAISO-wide environmental goal: 46 million metric tons (MMT) CO₂
 - CPA's preferred, aggressive emission goal: 38 million metric tons (MMT) CO₂
- Expansion plans created using an iterative AURORA modeling process
- CPA will require ~1000 MW 4-hour storage by 2030 to integrate renewables and support reliability during the net load peak hours



CPA Storage Procurement

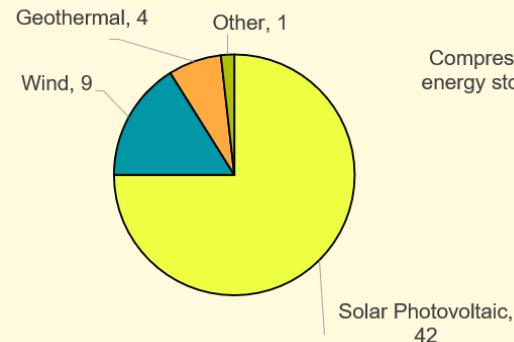
- CPA procures long term contracts to ensure affordable, reliable, clean power that supports load-resource balance, and to meet compliance obligations
- Four long-term Request for Offers (RFOs) to date (2018, 2019, 2020):
 - RPS Generation
 - RPS + Storage
 - Standalone Storage
 - Long Duration Storage (2020 only)

CPA's 2020 Clean Energy RFO

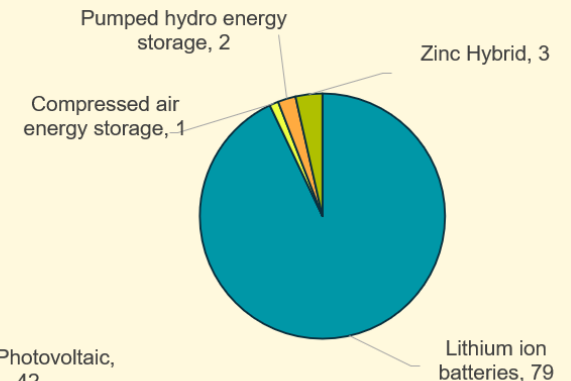
13 long-duration storage offers

- Lithium-ion
- Compressed air
- Zinc Hybrid

Generation Offers

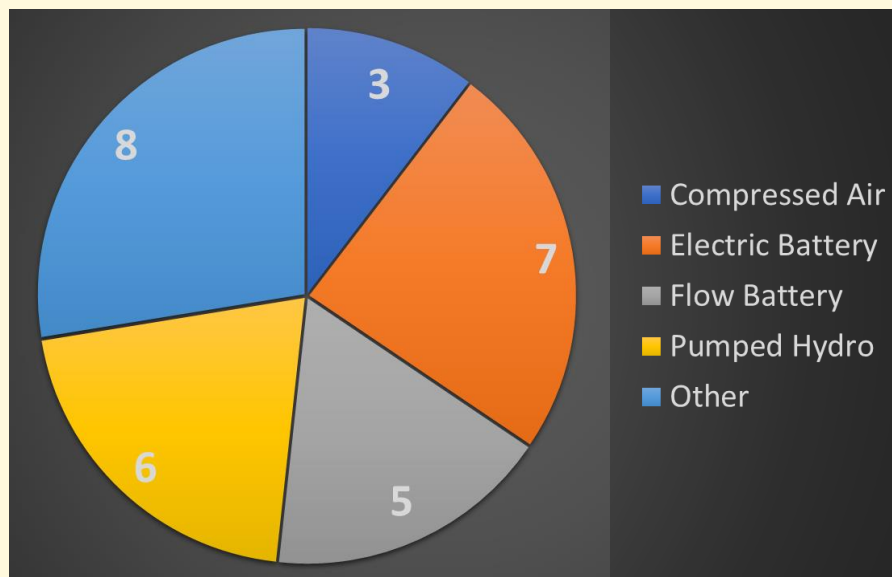


Storage Offers



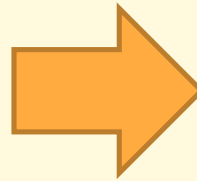
CA CCA Joint Long-Duration Storage Procurement

- CPA partnered with 10 other CA CCAs in creating a joint RFI for long-duration storage proposals
 - ≥ 8 hours discharge
 - Front of meter
 - Qualifies for Resource Adequacy
- “Other” types included:
 - Hydrogen (electrolytic)
 - Molten Salt Thermal Storage
 - Gravity Energy Storage
 - Liquid Salt Combined Cycle
 - Renewable Natural Gas



CPA Planned Procurement

- CPA is issuing 2021 Mid-Term Reliability RFO for Diablo Canyon Compliance
- 118 MW long-lead time resources by 2026
 - 59 MW of long-duration storage (8-hour or longer)
 - 59 MW of new firm zero-emitting resources (e.g., baseload renewables)



Resources and Links

- CPA Procurement and Contracting Page:
<https://cleanpoweralliance.org/get-involved/job-contracting-opportunities/>
- CPA Procurement Contact (to register for RFO announcements):
Procurement@cleanpoweralliance.org
- Joint CCAs Long Duration Storage RFI:
https://www.peninsulacleanenergy.com/wp-content/uploads/2020/06/Joint-CCAs_2020-Request-for-Information-on-Long-Duration-Storage_6-3-2020.pdf
- CPA's Integrated Resource Plan (2020):
https://cleanpoweralliance.org/wp-content/uploads/2020/09/cpasc_v1-PUBLIC.pdf
- CPUC's Diablo Canyon Procurement Decision (2021):
<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M389/K603/389603637.PDF>