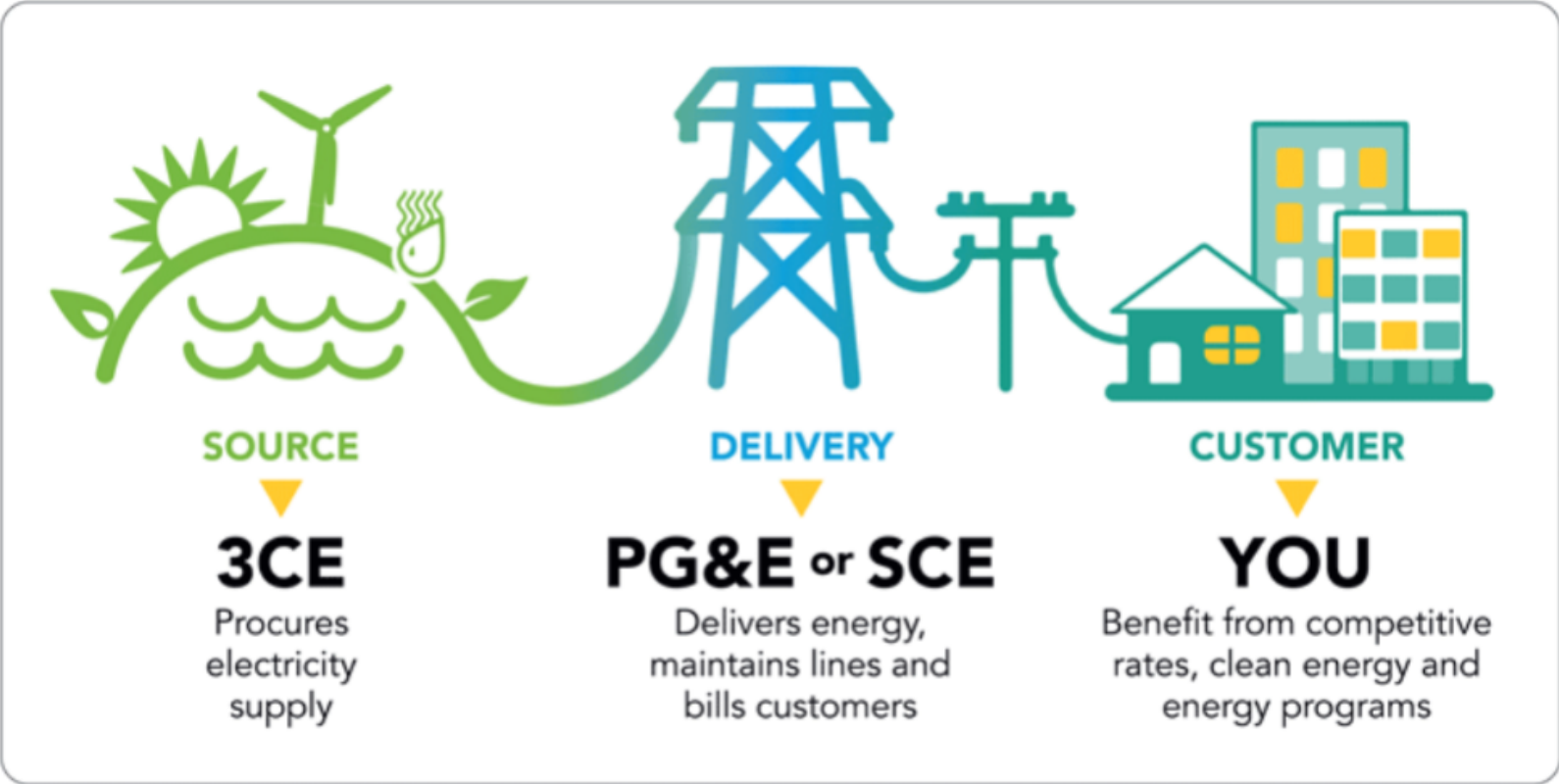




# Battery Energy Storage Systems: Role in the Energy Transition



# Introduction to 3CE





## VISION

A world free from the need to burn fossil fuels to generate energy.

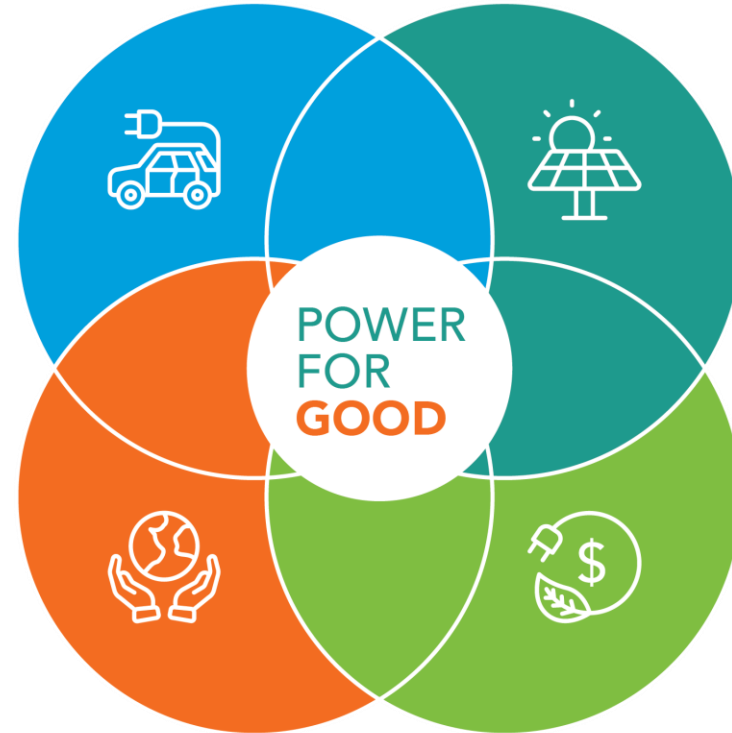


## MISSION

We serve our central coast community by providing reliable, affordable, clean electricity, and electrification programs to reduce greenhouse gas emissions and strengthen our local economies.

# Benefits of 3CE

1. Fair cost-based rates
2. Community investment
3. Local control
4. Clean energy



# 3CE and Santa Cruz County

1. Savings across customer class to incumbent IOUs with no shareholder profits
2. Over \$5 million invested in Santa Cruz County
3. Direct engagement with Boardmembers and agency staff
4. Over 70% of total retail demand contracted through renewable resources

# California's Renewable Goal

Established in 2002, California's RPS requires electricity providers to ensure that renewable energy constitutes a specified minimum portion of their electric load.

The state Legislature has accelerated the RPS several times, resulting in one of the most ambitious standards in the country:

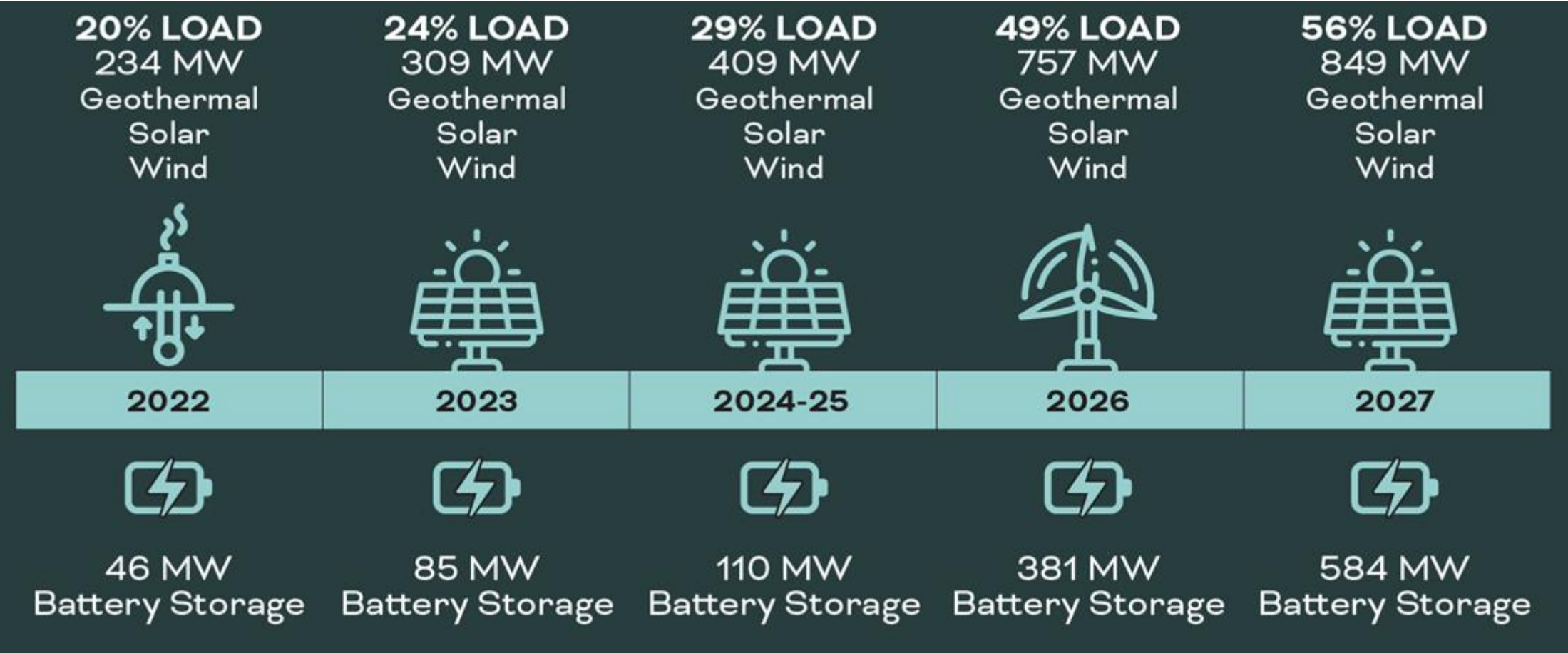
Renewable Energy must serve:

**60%** OF ELECTRIC LOAD BY **2030**

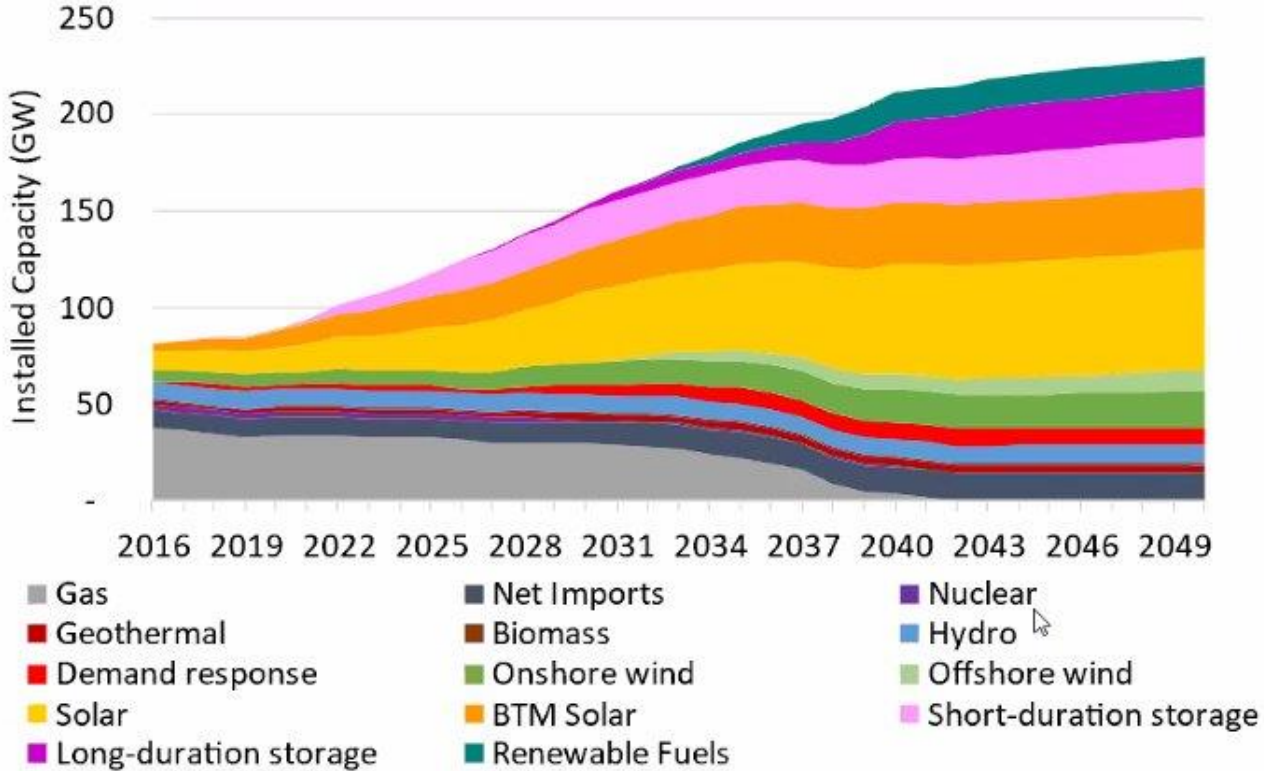
**100%** OF ELECTRIC LOAD BY **2045**



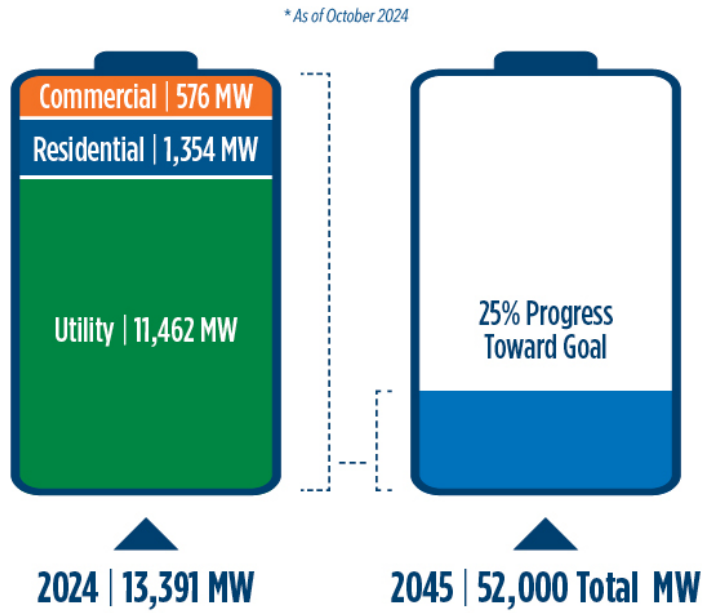
# Progress Toward 100% Renewable Energy



# Decarbonization is a Storage Challenge



## Energy Storage in California by Type

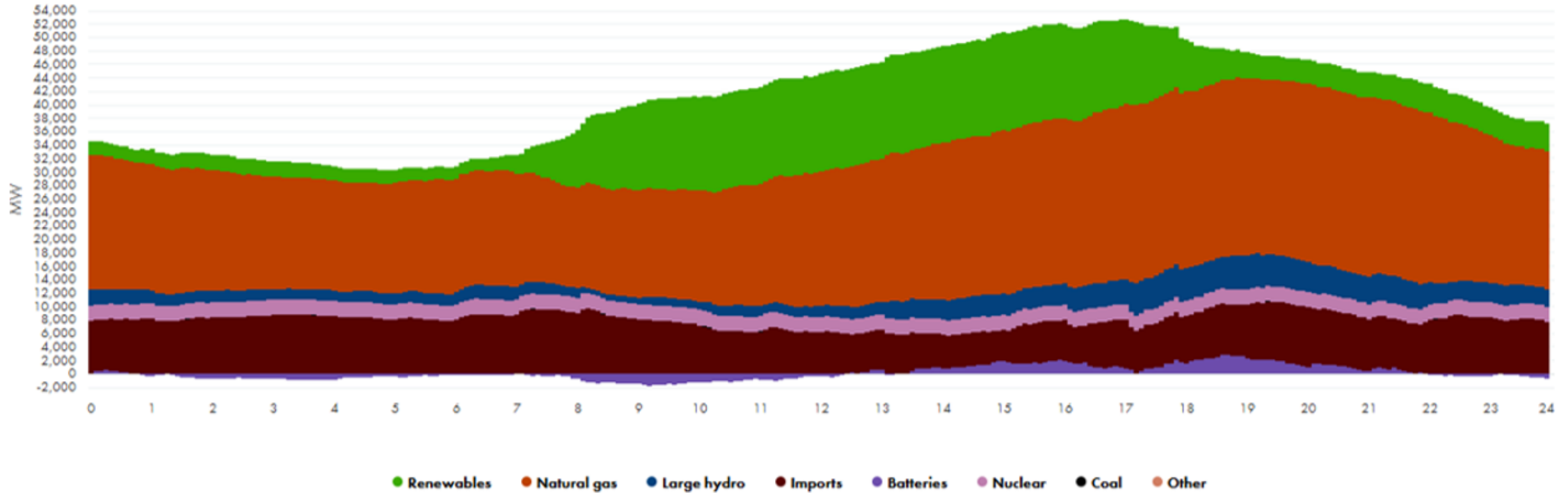




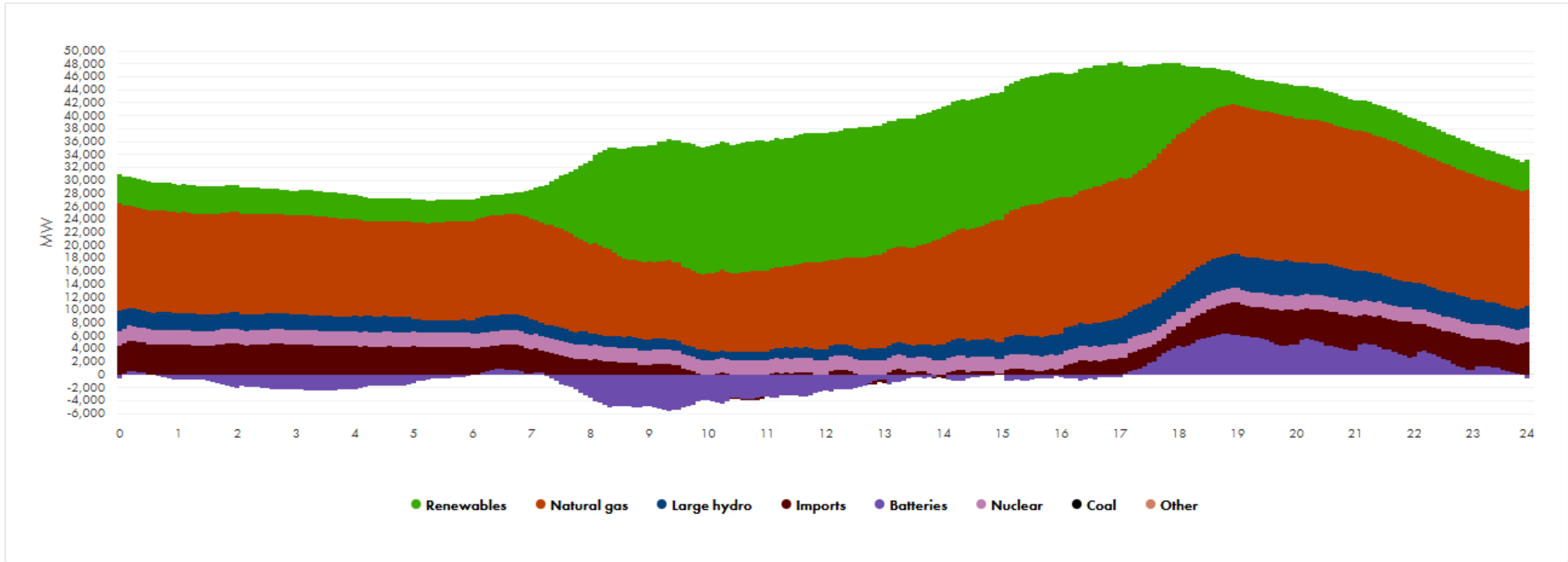
# Batteries Support the Renewable Transition

- Balancing intermittent renewables
- Adding grid services and stability
- Reducing reliance on combustion generation
- Driving affordability
- Empowering customers

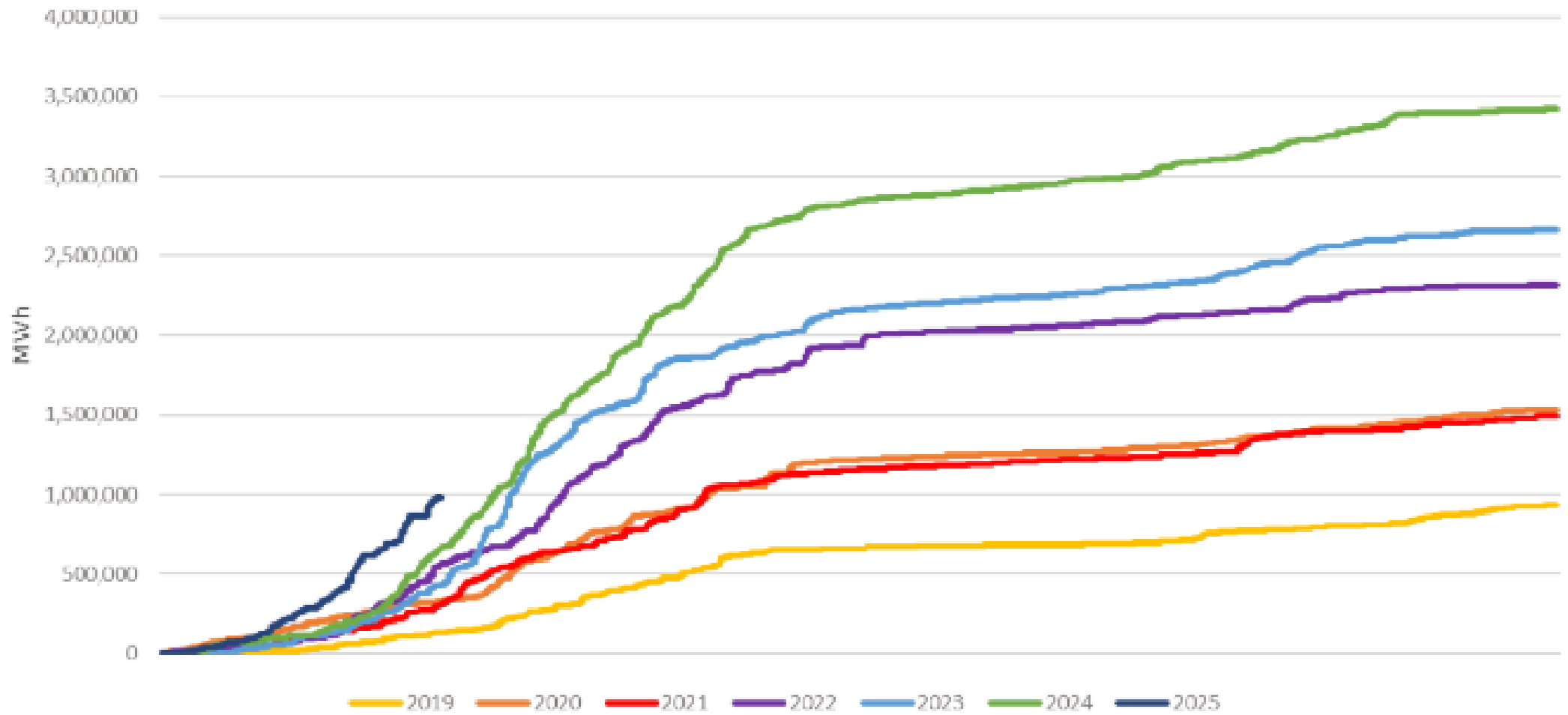
# September 2022



# September 2024



# CAISO Renewable Curtailment



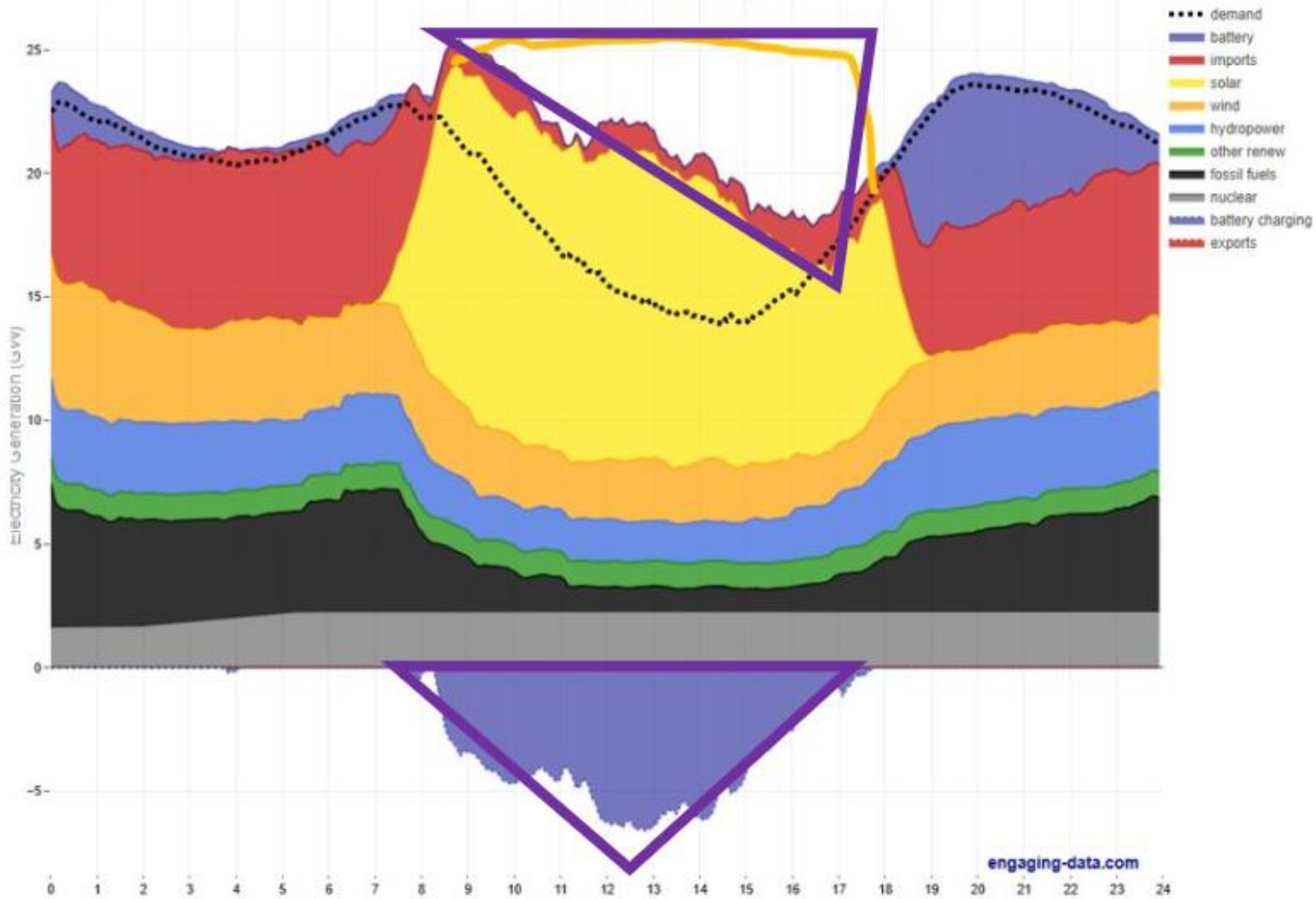
# Electricity Generation in California

Simplified Day 03/15/2025

Daily Sum (GWh)



Hourly Generation (GW)



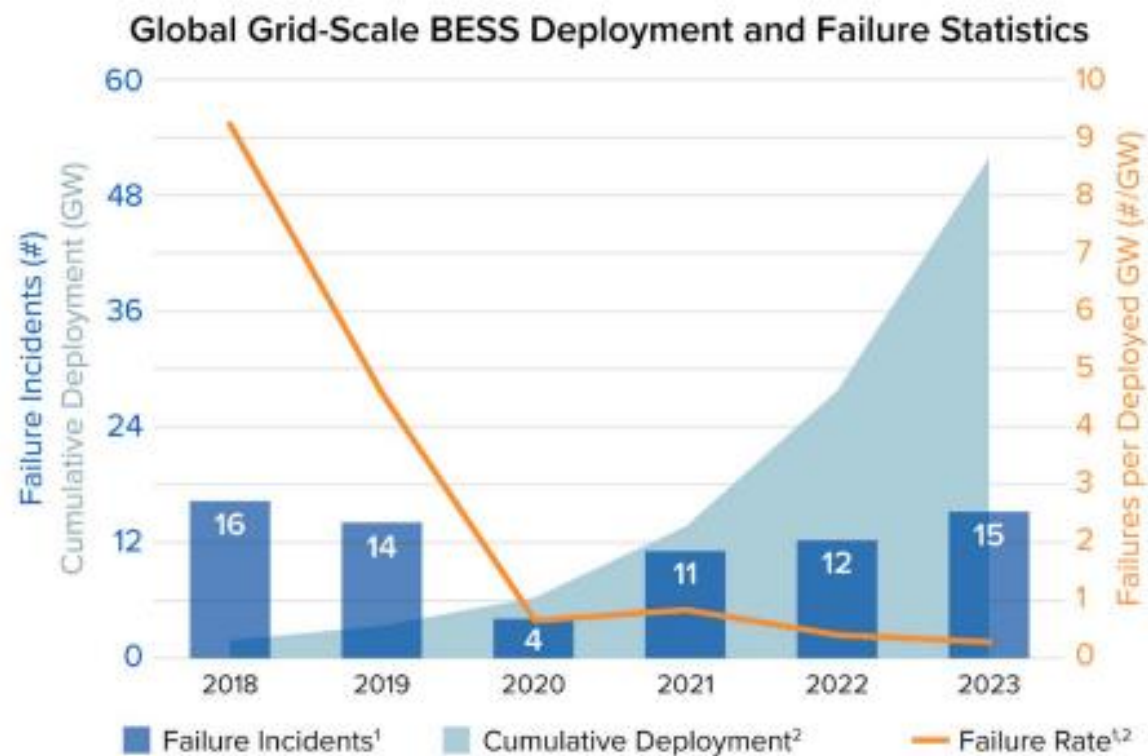
# 3CE Battery Portfolio

- 110 MW Operating
  - Including first Solar Plus Storage in California
- 728 MW Contracted for
  - Including 200 MW of largest Advanced Compressed Air Storage
  - Hybrid battery projects to reduce existing emissions
- Actively negotiating over 500 MW of additional storage
  - Including seasonal, long duration, and 4-hour
- Seeking an additional 300 – 500 MW of storage
- Launched a residential battery program
  - Paired with telemetry data to scale and aggregate storage value to all customers

# Battery Impact on Historically Burdened Communities

- Contracted two 1-hour batteries at separate peaker facilities (Midway / Panoche)
  - Will reduce runtime by nearly 70%
- Contracted for an 8-hour battery at a CCGT facility (Tracy)
  - Will reduce runtime by nearly 12%
- Significant health impacts for residents
  - Tracy, for example was identified by CEJA as having a Pollution Burden of 53% driven by high Nox emissions

# Battery Impact on Historically Burdened Communities



Sources: (1) EPRI Failure Incident Database, (2) Wood Mackenzie. Data as of 12/31/23.



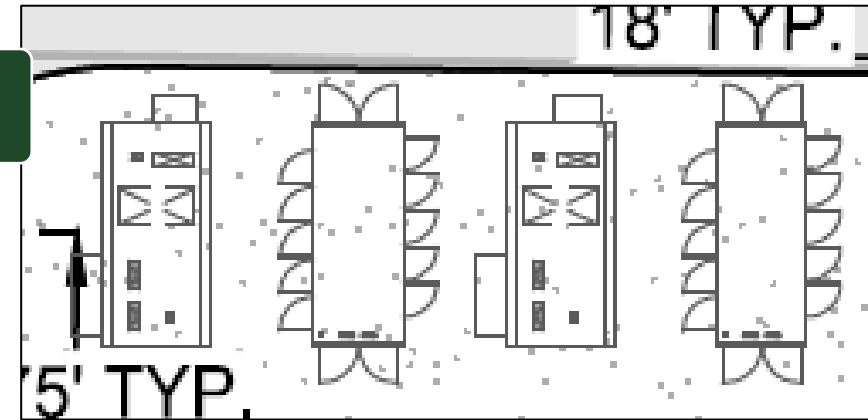
# Improvements in Design Mitigates Fire Risk

**Point #1:** Liquid-cooled configurations have significantly improved heat transfer ability, keeping cells cool during charge/discharge. Includes safety mechanism automatically derating BESS, and in certain cases, completely shutting down the container. <sup>1</sup>

- Containers include internal fire-suppression aerosol coupled with fire water available to deluge the adjacent containers to avoid propagation.

**Point #2:** Outdoor installations with significant separation for more convenient and safer firefighting access. <sup>2</sup>

- NFPA 855 standards & 6.5 feet requirement, isolating a single container from the rest should an unlikely event occur. <sup>2</sup>



**Point #3:** Use of lithium iron phosphate (“LFP”) technology reduces the risk of thermal runaway due to less energy-dense cells, resulting in lower temperatures during charging/discharging, and has greater stability as temperatures rise. <sup>3</sup>

- LFP technology is the new standard in utility-scale storage with a chemistry least likely to release flammable gases in the event of overheating.

Source #1: “How Liquid-Cooled Technology Unlocks the Potential of Energy Storage.” *Wood Mackenzie*, 23 Jan. 2023.

Source #2: *Lithium-Ion Battery Fires and Fire Protection.* National Fire Sprinkler Association, 30 Oct. 2024.

Source #3: “Research on the Thermal Runaway Behavior and Flammability Limits of Sodium-Ion and Lithium-Ion Batteries,” MDPI, 12 Jan. 2025, [www.mdpi.com/2313-0105/11/1/24](http://www.mdpi.com/2313-0105/11/1/24).

# GO 167 (C) Compliance Requirements

## **March 13, 2025, California Public Utilities Commission approved GO 167 (C)**

- Maintenance and Operations Plans
- Comprehensive Audit
- Outage Inspections
- Incident investigations
- Operator control log with a chronological history of facility (retain entries for 5 years)
- Must comply with SB 1383 and SB 38

**Thank You!**

