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CAISO Resource Adequacy Overview

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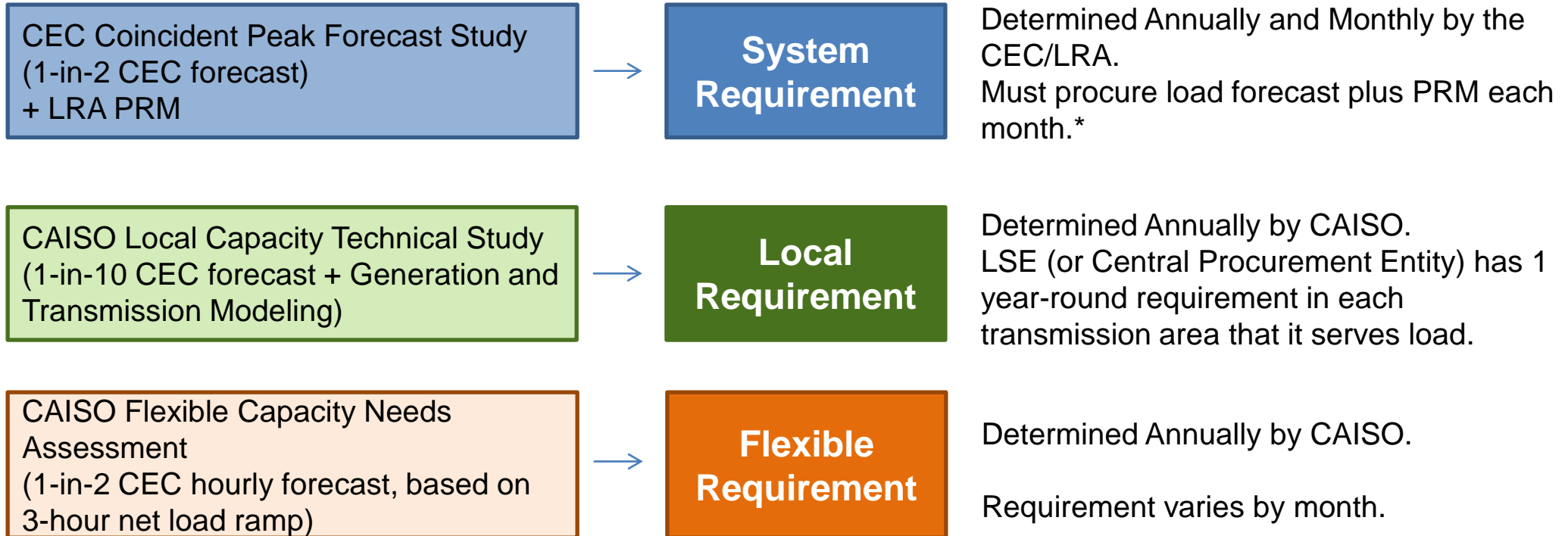
California resource adequacy shared responsibilities



RA program is a shared responsibility with Local Regulatory Authorities

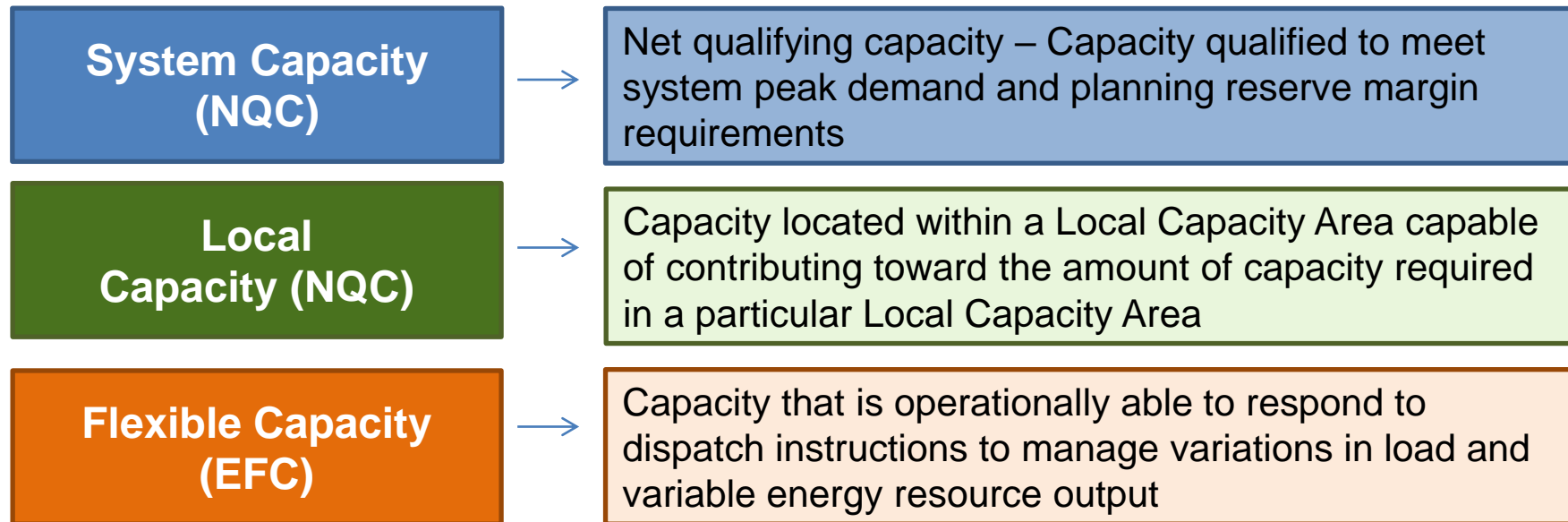
- CAISO partners with Local Regulatory Authorities (LRAs) including the CPUC and Publicly Owned Utility jurisdictions to establish and execute the RA program
 - CPUC-jurisdictional load serving entities (LSEs) represent ~90% of load in the CAISO Balancing Area
- Under the CAISO tariff, LRAs have the authority to set resource Qualifying Capacity (QC) values and LRA Planning Reserve Margins (PRM)
 - QC = capacity accreditation/resource counting rules
- The CAISO tariff includes default resource adequacy values (counting rules and PRM) for LRAs that have not established their own

Three types of RA requirements



* PRM can vary based on LRA

Three types of RA capacity



CAISO establishes the “N” in the NQC by reducing, if necessary, the QC values provided by the LRAs for different reasons (deliverability, Pmax test, interconnection agreement, *etc.*)

Procurement & demonstration (showing) of RA

1. LRA mandates procurement of target system capacity for the next year and month peak load forecast. CAISO allocates local and flex requirements.

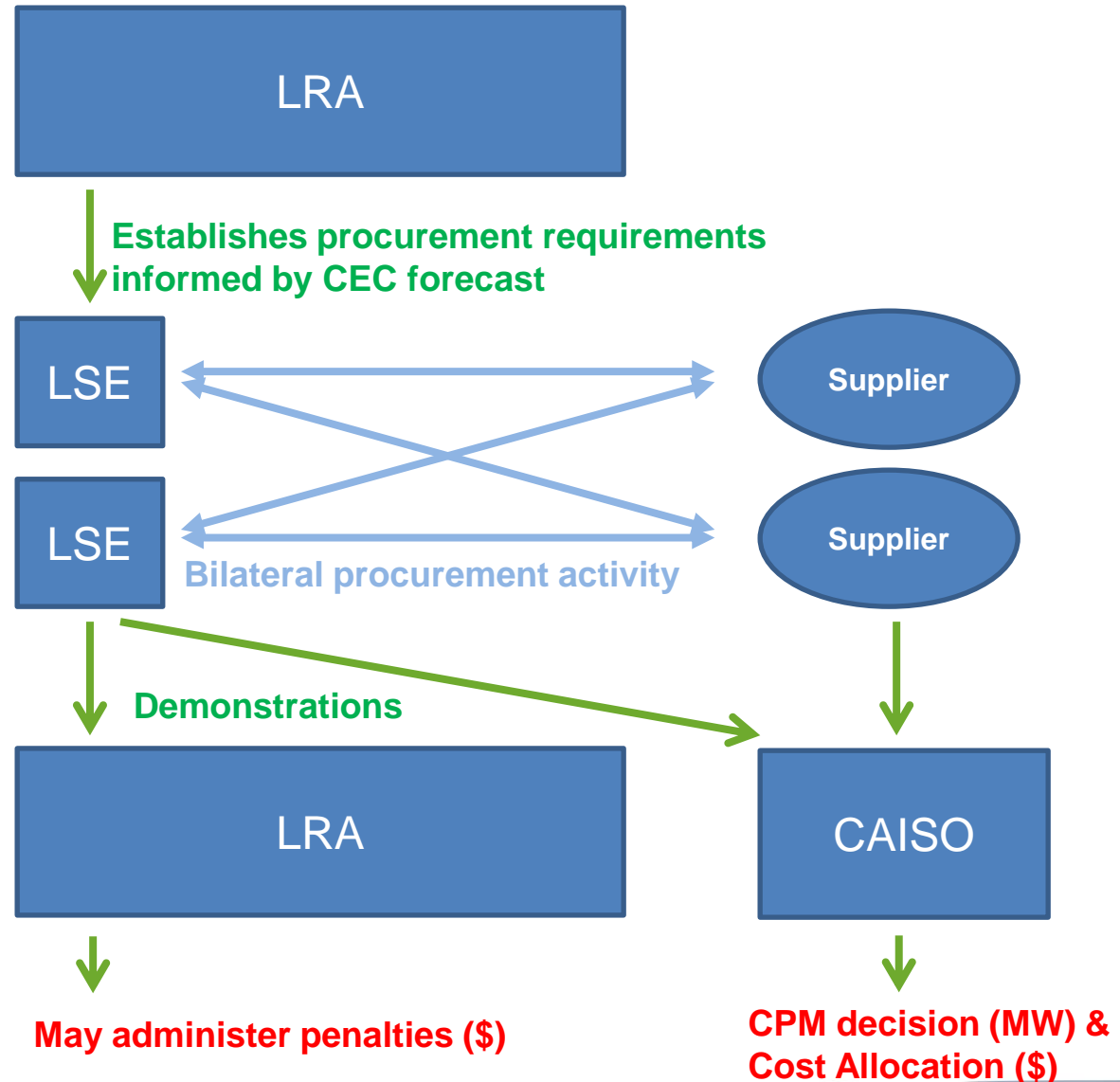
2. LSEs engage in bilateral capacity procurement to meet requirements.

3. LSEs demonstrate procurement to LRA and CAISO

4. Suppliers demonstrate RA showings to CAISO

5. LRA ensures LSE compliance

6. CAISO receives supplier and LSE showings and assesses aggregate showings

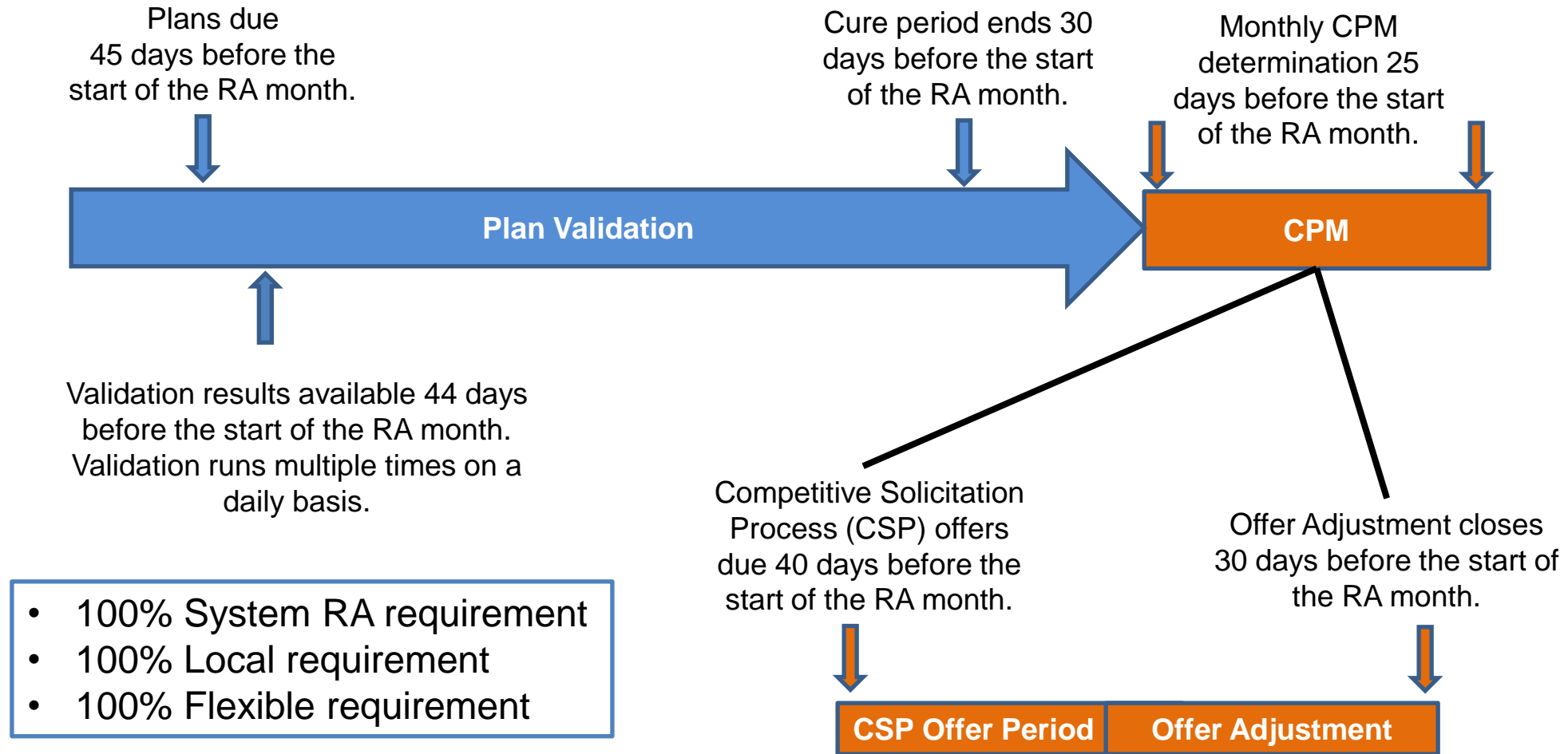


Timeline for Annual RA showings to CAISO

- **End of October:** LSEs and Suppliers make year ahead showings
- **November:** CAISO makes any deficiency determinations and LSEs have a chance to cure deficiencies
- **December:** CAISO may procure backstop capacity through the Capacity Procurement Mechanism (CPM)

- 90% System RA requirement for Summer Months - May to September
- 100% Local requirement all 12 months
- 90% Flexible requirement for each month

Timeline for Monthly RA showings to CAISO



Capacity Procurement Mechanism (CPM)

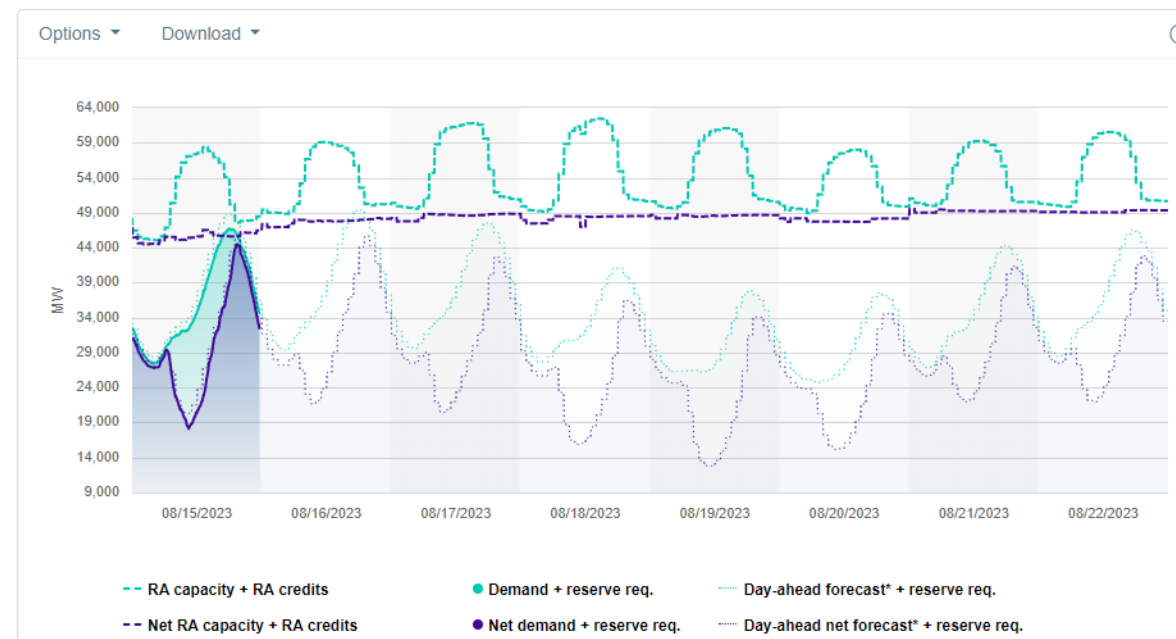
- If there are deficiencies in RA showings versus RA requirements, the CAISO has authority to procure additional capacity via CPM
 - Year-ahead or month-ahead
 - System, local, or flexible capacity needs
- CAISO's CPM authority also extends to other reliability needs:
 - Exceptional dispatch
 - Significant events
- Suppliers may submit offers to sell capacity into a Competitive Solicitation Process (CSP)
 - Soft offer cap of \$6.31/kW-month
 - CPM costs associated with RA deficiencies are allocated pro rata to deficient LSEs

Operationalizing resource adequacy in the CAISO market

- In general, RA resources have obligations to offer RA capacity in the CAISO day-ahead and real-time markets 24x7
 - If not available, resources submit outages and outage substitution rules may apply
- Bid insertion rules
- RA availability incentive mechanism (RAAIM)

7-day resource adequacy capacity trend

Resource adequacy capacity forecast for today plus the next 7 days, in megawatts, compared to demand forecast plus reserve requirements.



CAISO Resource Adequacy Modeling and Program Design Working Groups

- CAISO RA working groups will explore reforms to CAISO RA rules, requirements, and processes to ensure the future reliability and operability of the grid
- Within the scope of issues for evaluation:
 - Consistent, transparent, and timely information on the sufficiency of the RA fleet in the CAISO balancing authority area
 - Requirements for RA capacity and program tools (e.g., outage, must-offer, bid-insertion, and resource performance and availability rules)
- Goals include:
 - The CAISO's established modeling and visibility enable a reliable overall system
 - Procurement and trading is efficient, cost-effective, fungible, and affordable
 - RA program is implementable, adaptable, and compatible with different programs

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