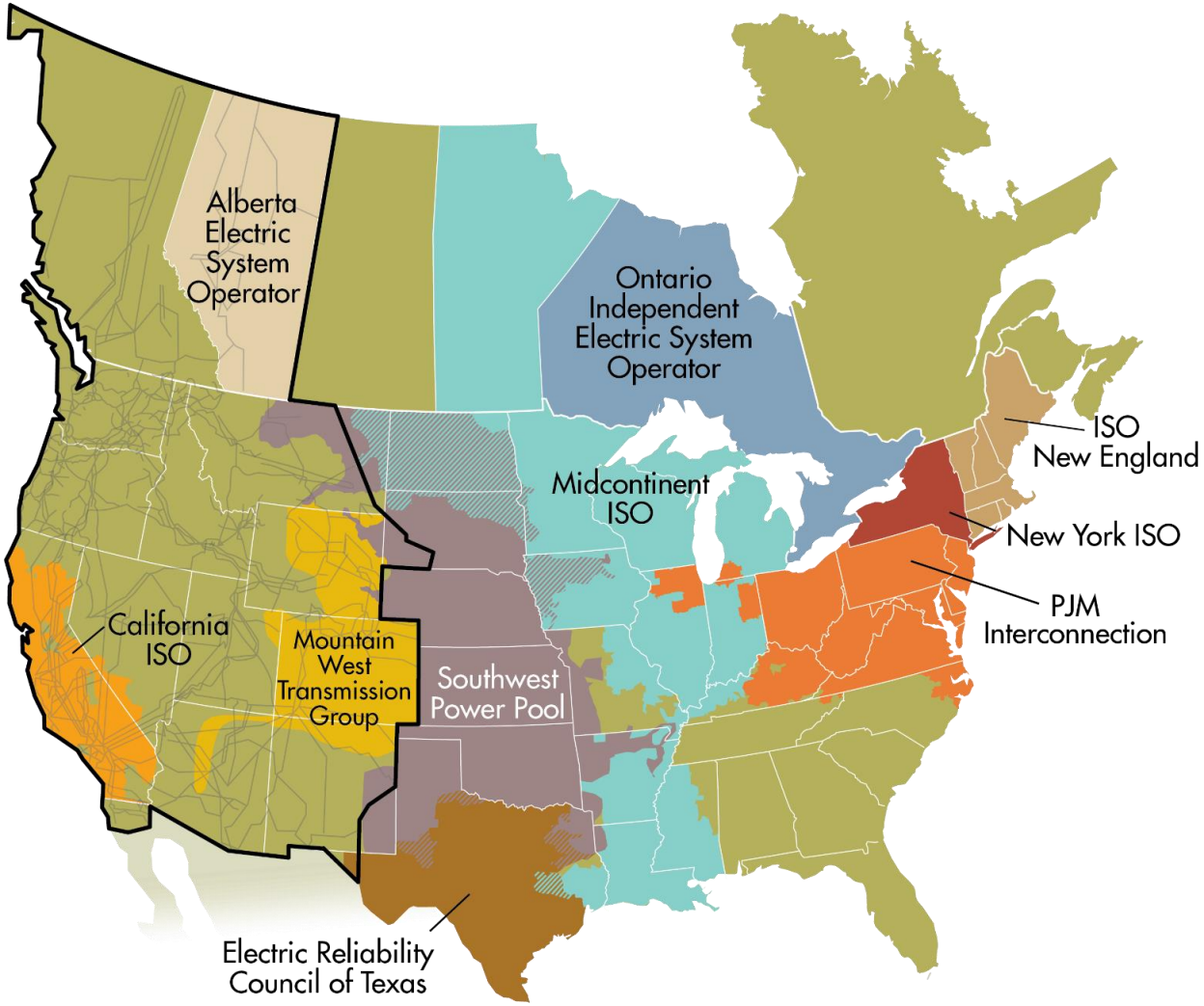
Capacity Trading: The CAISO Experience

Session 4
Cross-border Energy and Capacity Trading

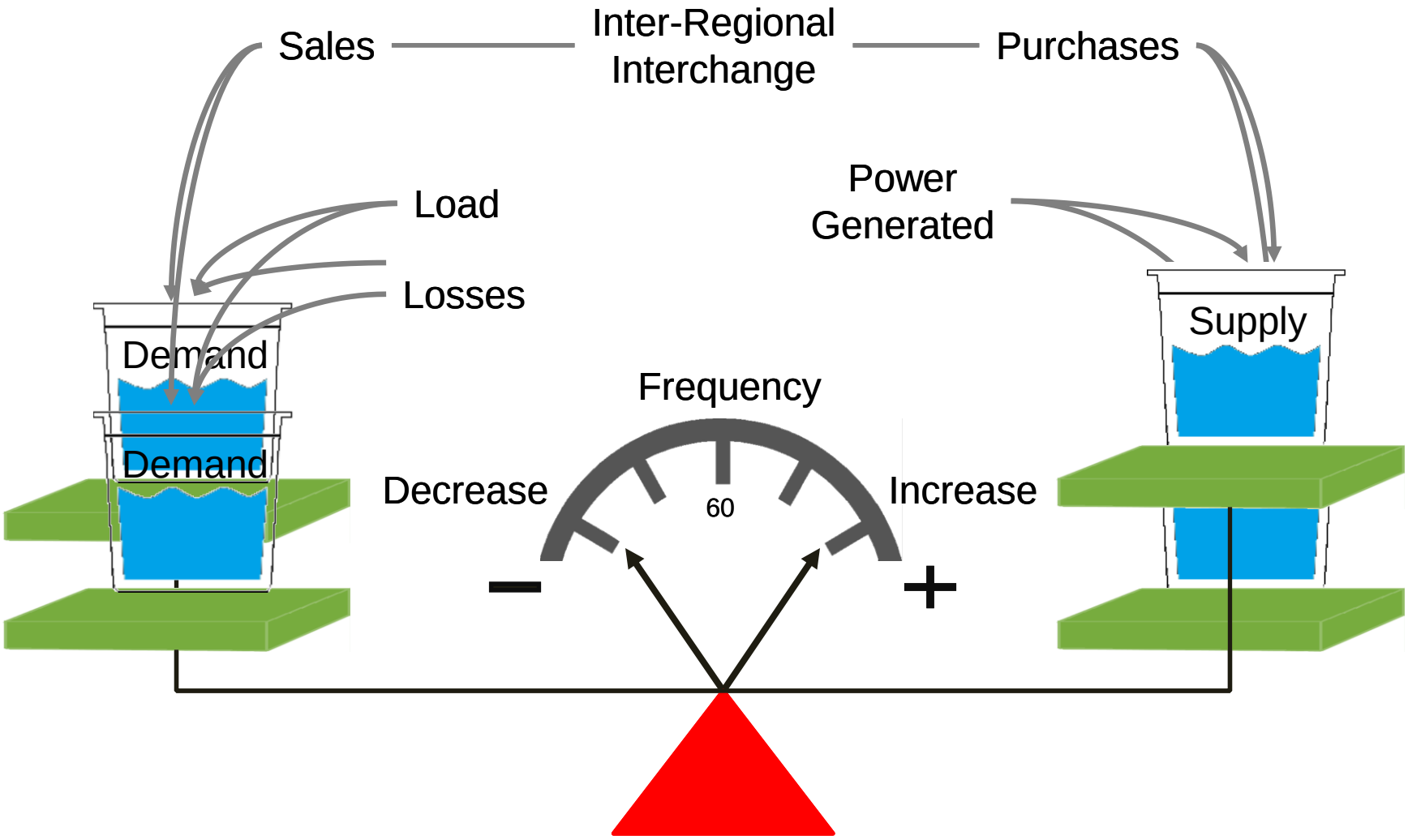
Mark Rothleder – VP Market Quality and Renewable Integration

August 20, 2018

Today's Electric Grid



The balancing of supply and demand

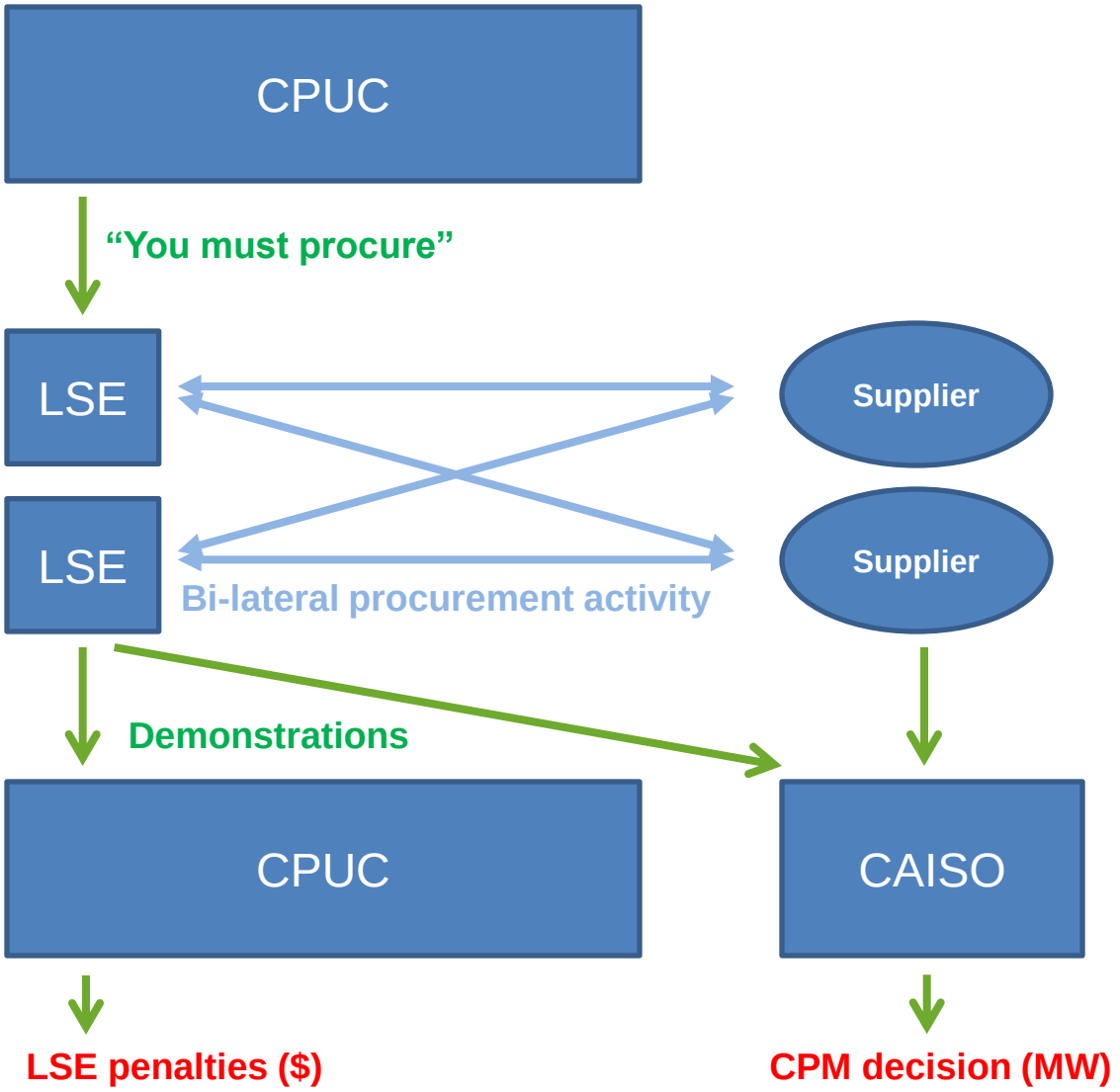


General Resource Adequacy Concepts

- System Capacity
  - Capacity eligible to satisfy system planning reserve margin including import capacity
- Local Capacity
  - Resource capacity that is effective in relieving constraint within defined transmission constrained area
- Flexible Capacity
  - Capacity of a resource that is operationally able to respond to Dispatch Instructions to manage variations in load and variable energy resource output.

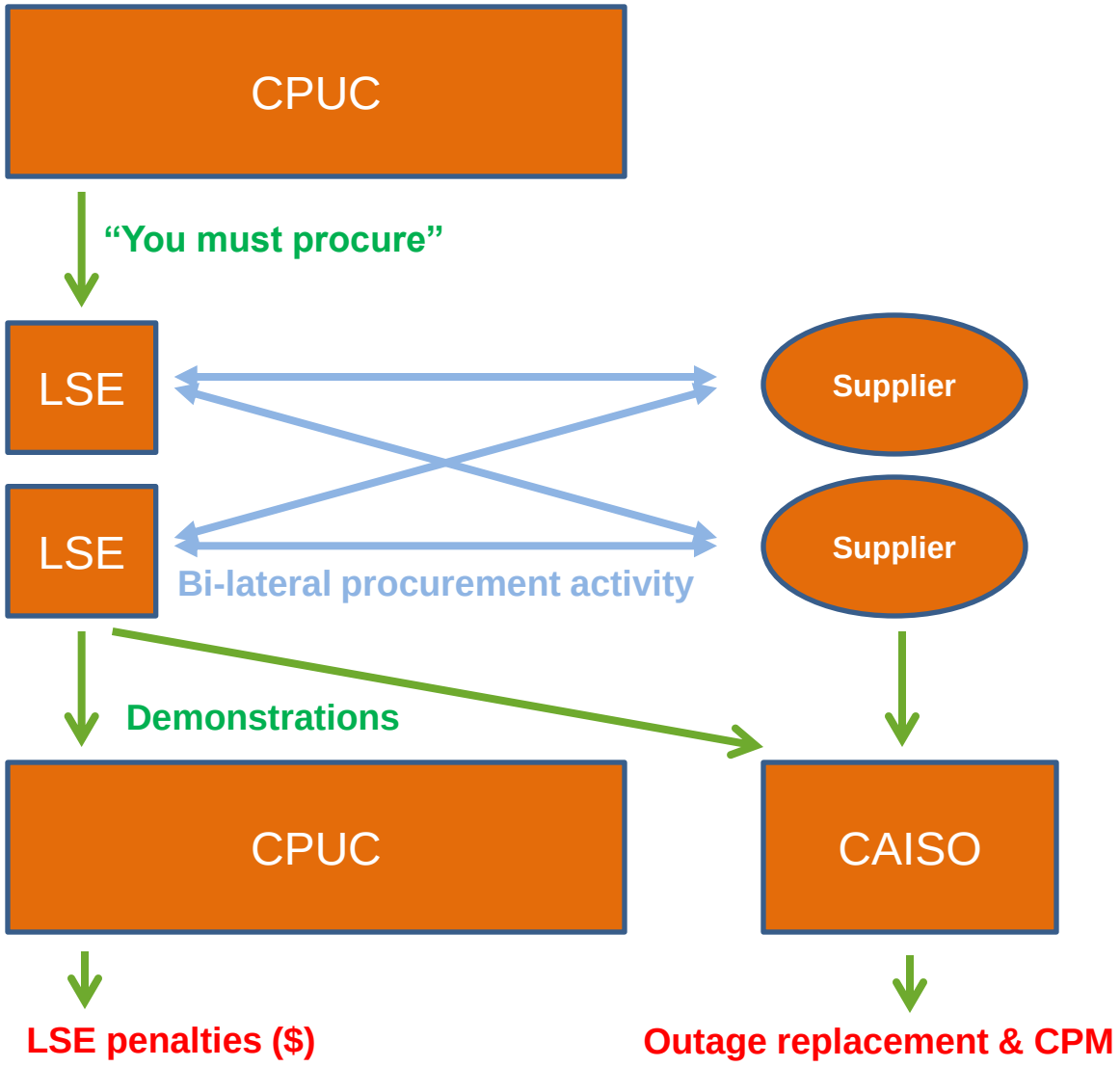
Annual procurement & demonstration of generic RA

Local regulatory authority (LRA) mandates procurement of **90%** of next **year**'s peak load forecast.



Monthly procurement & demonstration of generic RA

Local regulatory authority (LRA) mandates procurement of **115%** of next **month**'s peak load forecast.



“Import Deliverability” is assigned every year to LSEs

- **Assignment of RA import capability to LSEs –** Maximum import capability (MIC) on each intertie is available to LSEs for procuring RA capacity from external resources; it is not assigned directly to external resources.

- **Process for allocating MIC to LSEs –** Steps 2-13 in Tariff Section 40.4.6.2.1, Available Import Capability Assignment Process.

- **Annual determination of MIC –** MIC values for each intertie is calculated annually for a one-year term.

MIC Methodology - Step 1

- **Historically Based**
  - Select 4 hours by choosing 2 in each one of the last two years (and different days within the same year) with the highest total net import level when peak load was at least 90% of the annual system peak load.
  - The average of net import schedules (0 MW is assigned when net imports are negative) + the average of unused ETC (adjusted for future year availability) technically should represent the Maximum Import Capability (MIC) for each tie.
  - In order to assure that all pre-RA import commitments (already paid by ratepayers) are allowed to count for RA until they expire, an uplift is added to the above established methodology for certain branch groups and this higher number is published and divided among LSEs as MIC.

Forward-looking MIC – what motivated the change

- **Low RA import capacity at certain interties limits ability of external resources to provide RA capacity and their ability to obtain project financing**
  - MIC is calculated on amount of energy ISO Balancing Authority Area (“BAA”) imported historically during peak system load hours
  - Low MIC values at certain interties limited use of external resources in those areas to meet RA requirements
  - Inability to offer RA created a disadvantage for external renewable resources seeking contracts with load-serving entities within the ISO
  - Project financing for new resources depends on sufficient and stable long-term contractual revenue stream

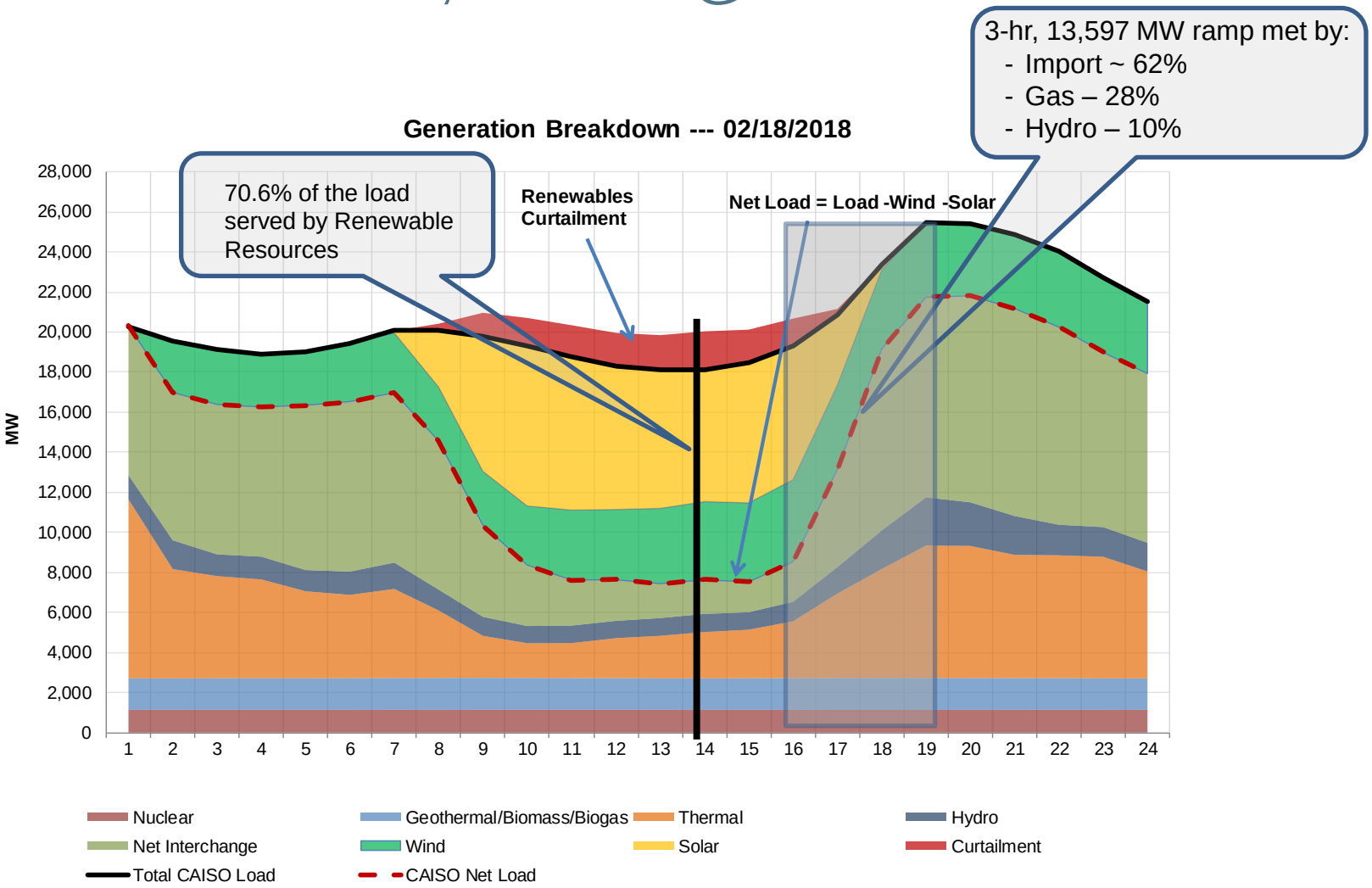
Expanding Resource Adequacy ("RA") Import Capability

Solution consists of two components

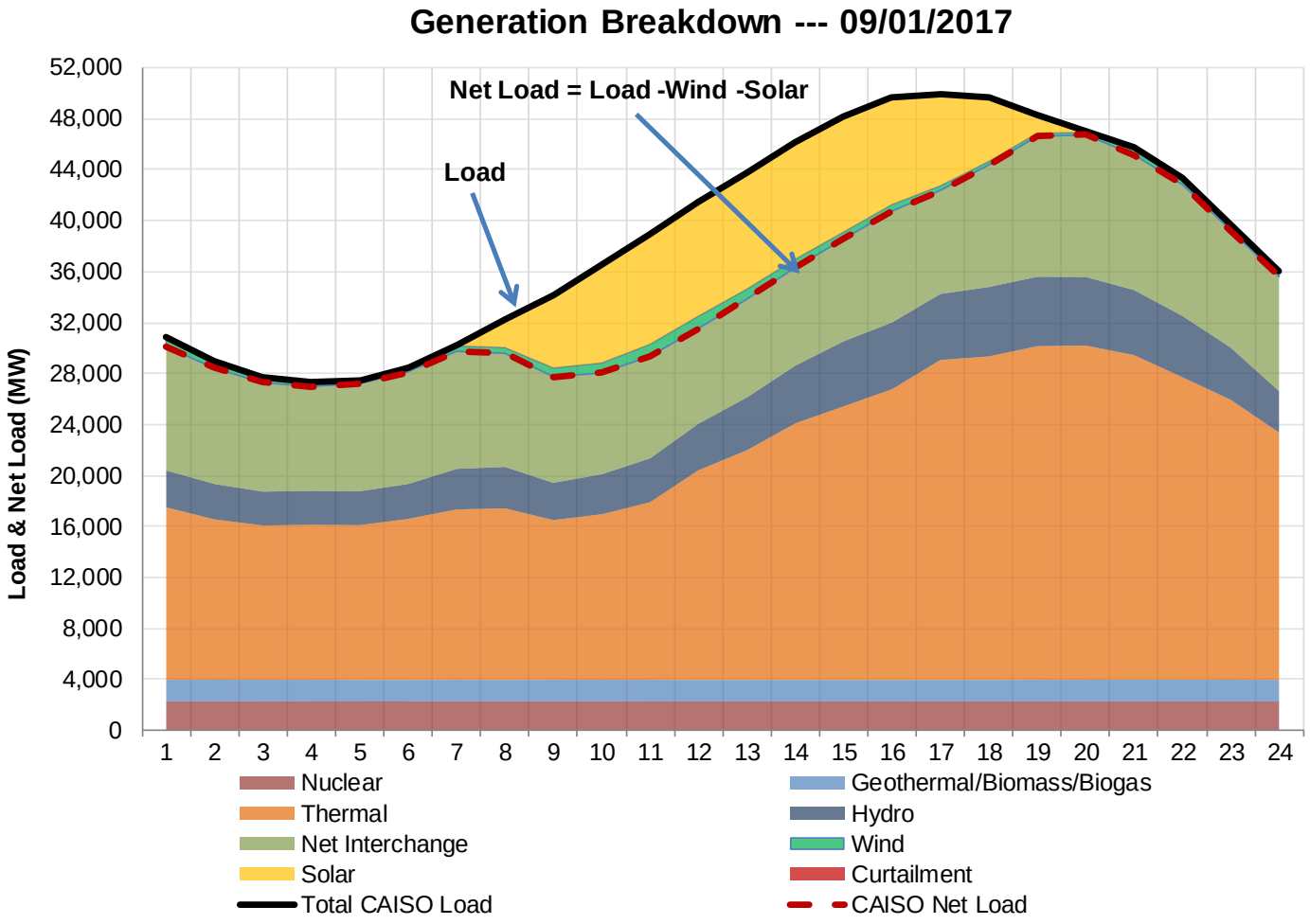
- Expansion of RA import capability is an element of public policy objective for Transmission Planning Process ("TPP") to identify needed transmission
  - Based on amount of external resources in 33% RPS portfolios, specify required or "target" Maximum Import Capability ("MIC") MW values for RA deliverability
  - Determine whether additional network upgrades are needed to support target MIC MW values
  - Include these upgrades in Comprehensive Transmission Plan
- In annual MIC assessment, expand MIC values to target levels as required in order to meet the public policy objectives

Appendix

On Sunday, February 18, 2018 the CAISO experienced a minimum net-load of 7,149 MW @ 14:06



In 2017, the CAISO peak load was 50,116 MW and occurred at 15:58:24 on Friday, September 1, 2017



15:58 to 18:44

- Net Load peaked 2 hours and 46 minutes after peak demand
- Peak load decreased by 2,148 MW
- Solar production decreased by 7,199 MW
- Net Load increased by 5,258 MW