



System Market Power Mitigation

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Market Surveillance Committee Meeting

General Session

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Agenda

- Pivotal supplier test trigger
- Market conditions when test would trigger
- System market power in energy needed to supply intra-hour ramp
- Evaluating and mitigating jointly pivotal supply within the CAISO balancing area

The ISO proposed to only perform pivotal supplier test when ISO is in the highest priced constrained region in the EIM

- This approach to evaluating for wider-area competitive conditions, while based on the approach used for other EIM balancing areas, discounts the competitive pressure from intertie import offers in the trigger itself
- The proposed design shifted the competitive impact of imports from the trigger itself into the subsequent pivotal supplier test by ensuring all import offers that the ISO could clear would be considered competitive supply
- The ISO has concerns about relying too heavily on binding import constraints as a pre-condition to its competitive supply evaluation, as there may be wider-area limitations to access to the ISO market

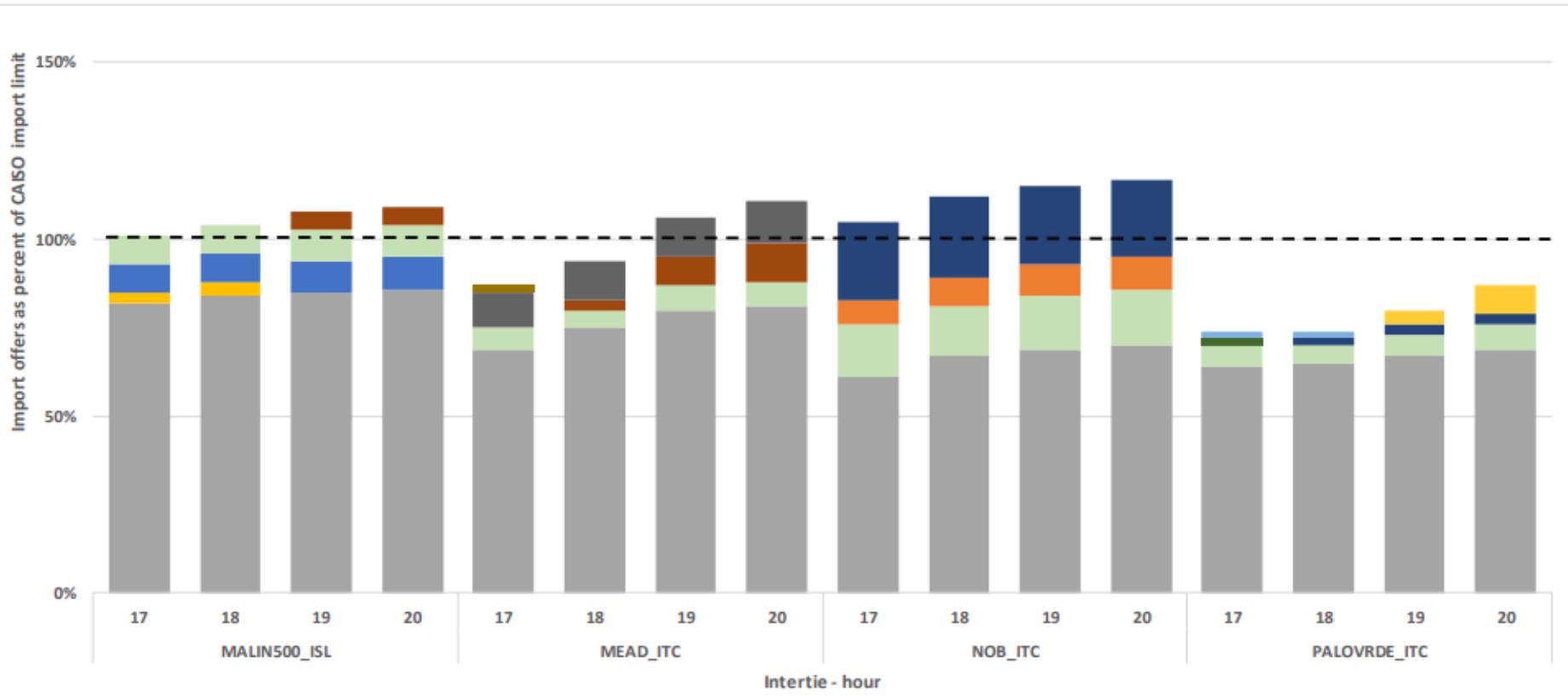
There may be limitations on access to our market that are beyond our borders

- Frequently unused import capability and consistent concentration of offers among a small number of participants on major interties may indicate that there are limitations on access to our market that are beyond our borders
- The offers that suppliers consistently make on the interties may be a reflection of broader transmission access between generators and our interties, not just the last path to get to the ISO
- EIM transfers, when not constrained by balancing area import/export limitations, represent a fairly large pool of economy energy whose resource-specific offers compete with offers across all balancing areas. Balancing area import/export constraints limit participating resources' competitive usefulness in HASP, FMM, and RTD.

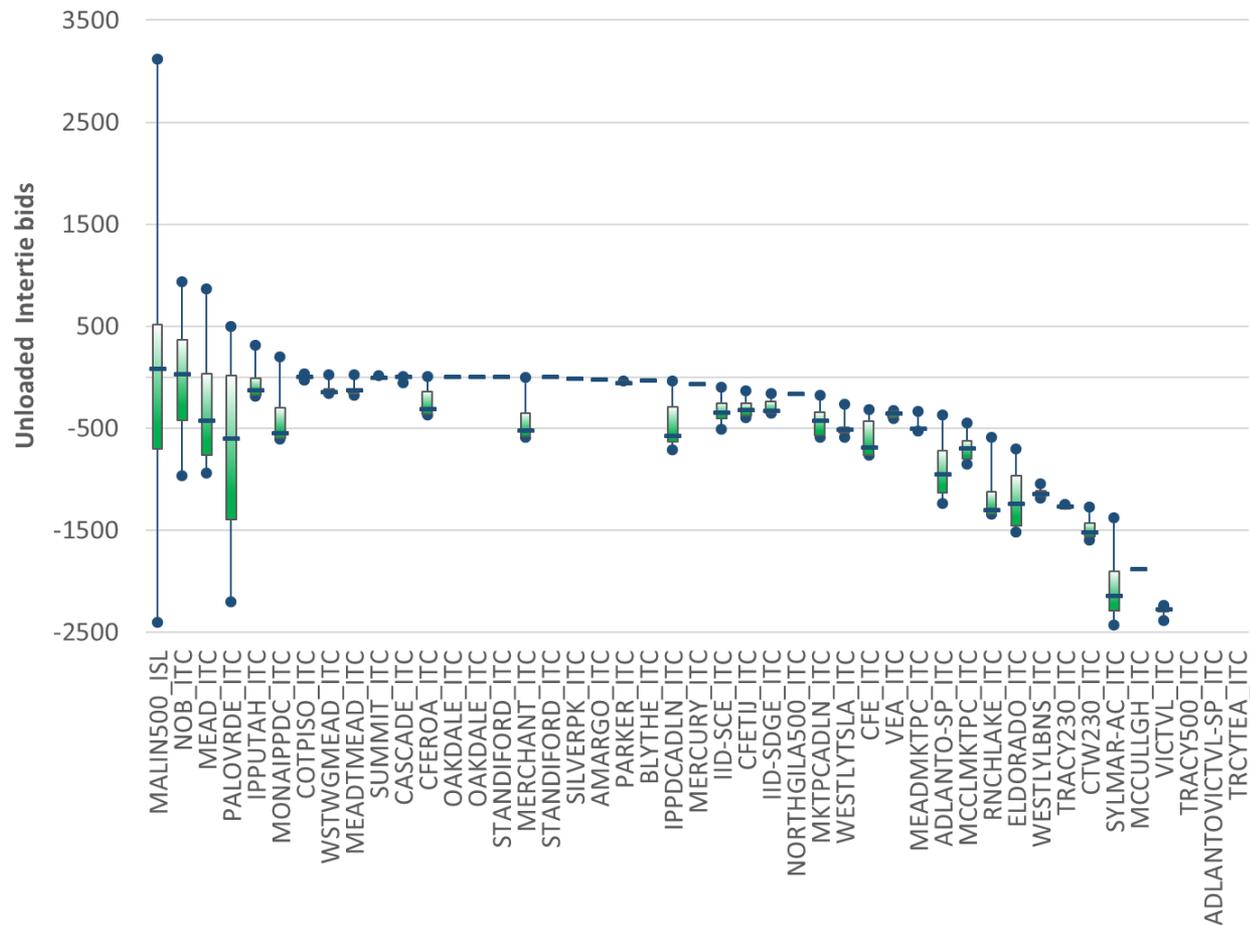
Available transmission beyond our border or available supply may be less than our import capability

Average supplier percent of import limit for hour – real-time market

August 2019



Available transmission beyond our border or available supply may be less than our import capability



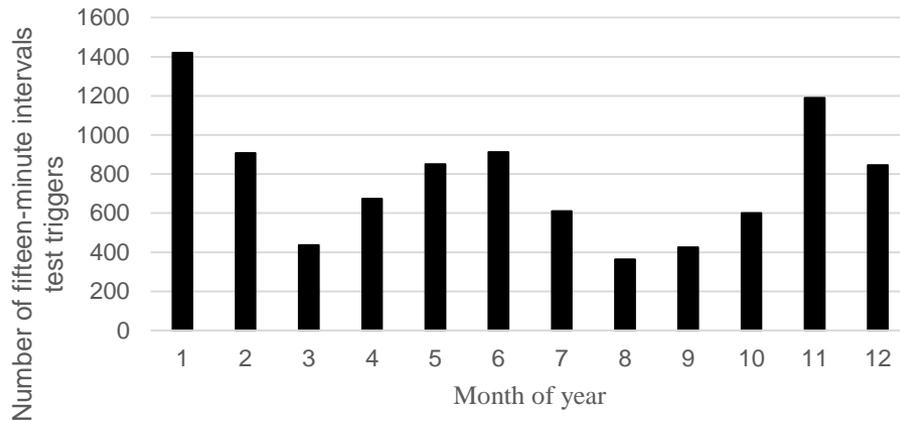
Bid volume available above intertie available capacity

Binding EIM transfers for triggering system market power mitigation test

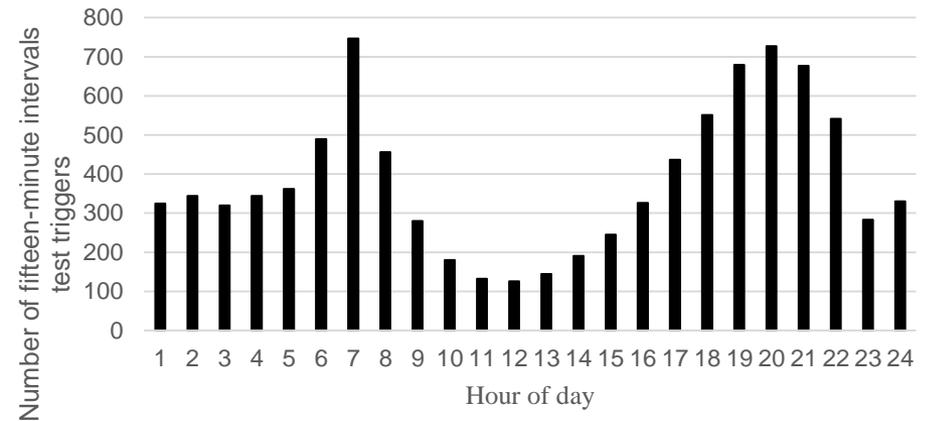
- Using binding intertie scheduling limits had drawbacks
 - Does not recognize competition from EIM transfers on other interties
 - Suppliers may not have access to the transmission beyond our border
 - There may not be more supply available to ISO demand
- Using EIM transfers to trigger the test resolved these drawbacks
 - Recognizes potential competition from EIM transfer on all interfaces
 - A measure of limitations on external supply ISO demand can readily access within the hour
- While the trigger itself is not based on all import offers at the ISO's interties, the pivotal supplier test does account for these competitive offers

The ISO was in the highest priced EIM region 26.4% of all fifteen-minute market intervals in 2019, most often occurring during winter and spring net load peak hours

Month of year when CAISO is in the highest priced constrained EIM region

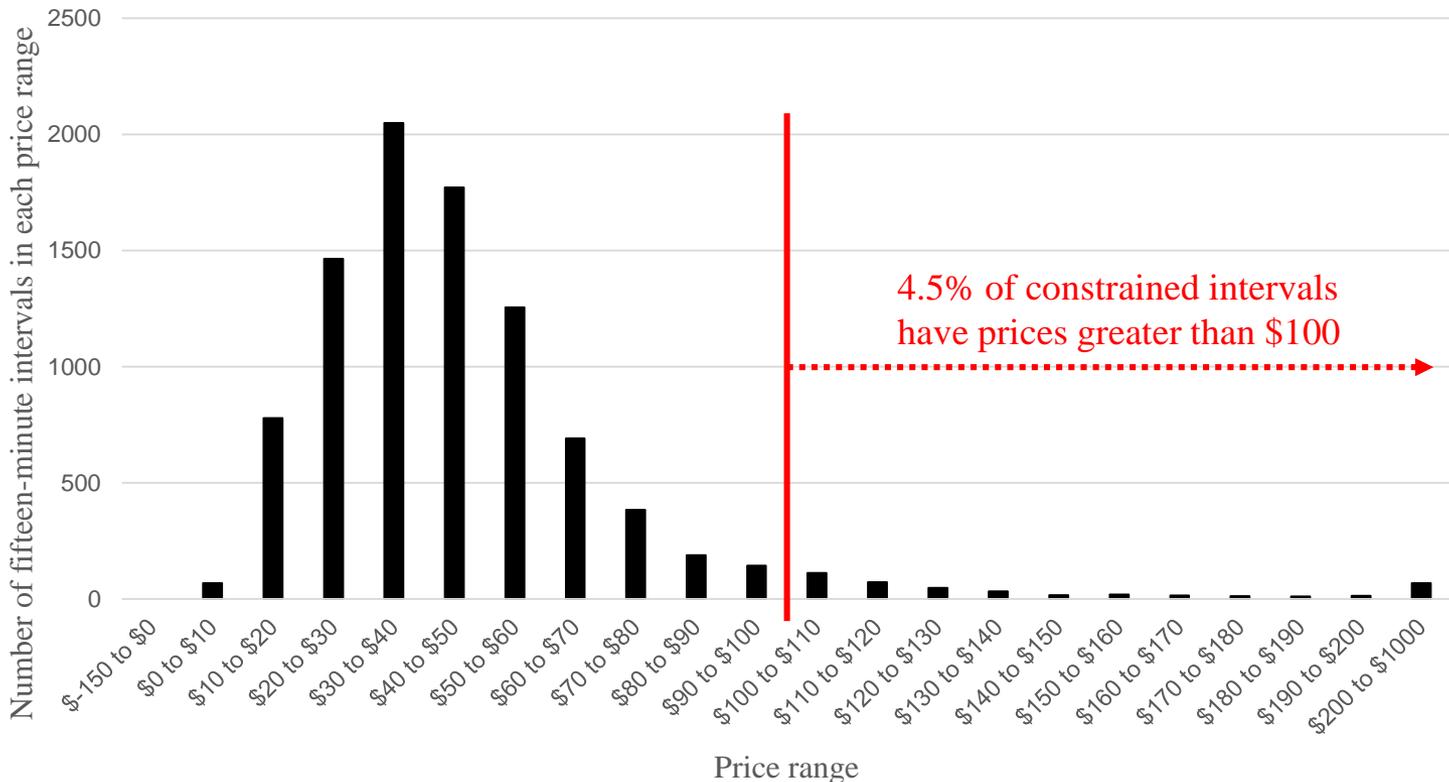


Hour of day when CAISO is in the highest priced constrained EIM region



Distribution of CAISO prices in the constrained 26.4% of intervals

Frequency of CAISO Price When Trigger Condition Is Met



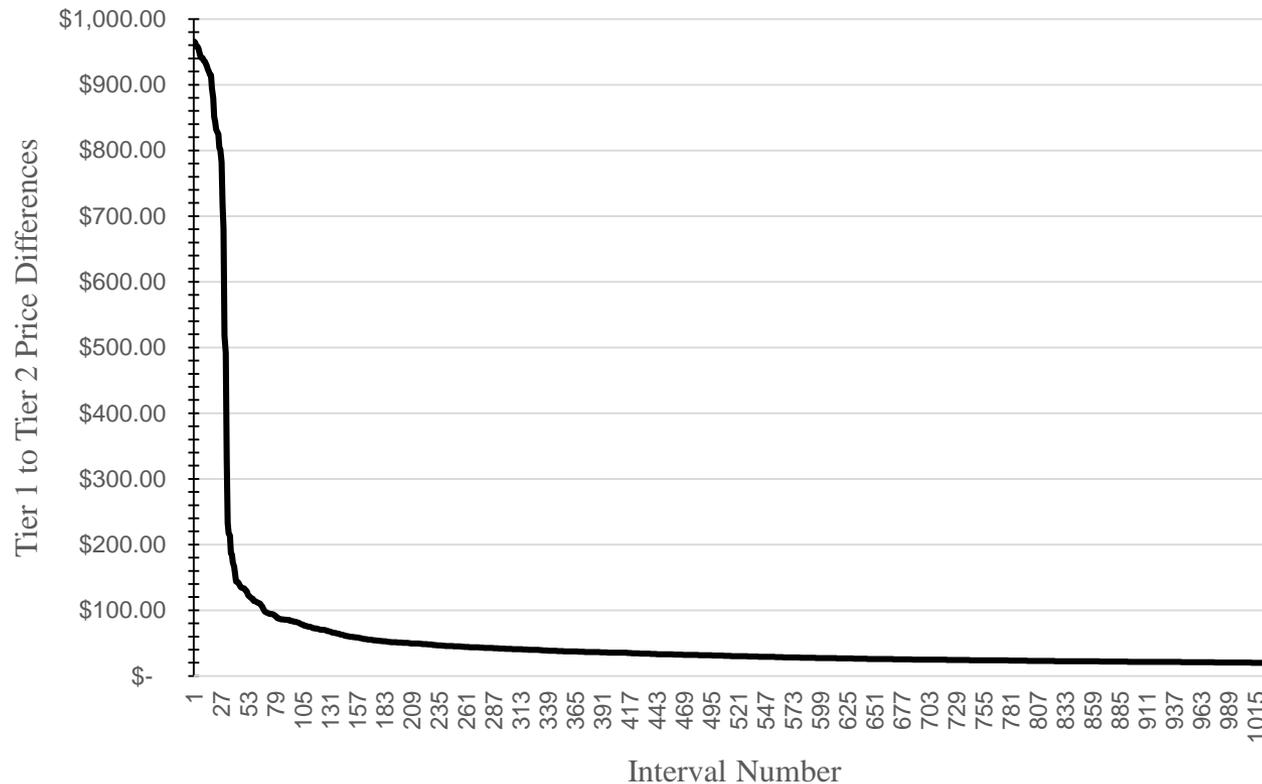
Distribution of CAISO prices when there are multiple priced regions in the EIM and the CAISO is in the highest priced region versus its prices otherwise

The price difference between Tier 1 and Tier 2 is much higher when Tier 2 has negative prices or when the highest priced region is greater than \$100

- The average price difference between Tier 1 and Tier 2 is **\$17.84** when the test would have been triggered
 - In 95.6% of these intervals, the Tier 2 price is positive
 - The average price difference between Tier 1 and tier 2 in these intervals is \$12.89
 - In 4.4% of triggered intervals, the Tier 2 price is negative
 - In many of these intervals, the Tier 2 price is near the price floor causing the average price difference between Tier 1 and tier 2 in these intervals to be \$115.19
- The average price difference between Tier 1 and Tier 2 is **\$70.90** when Tier 1 prices were greater than \$100

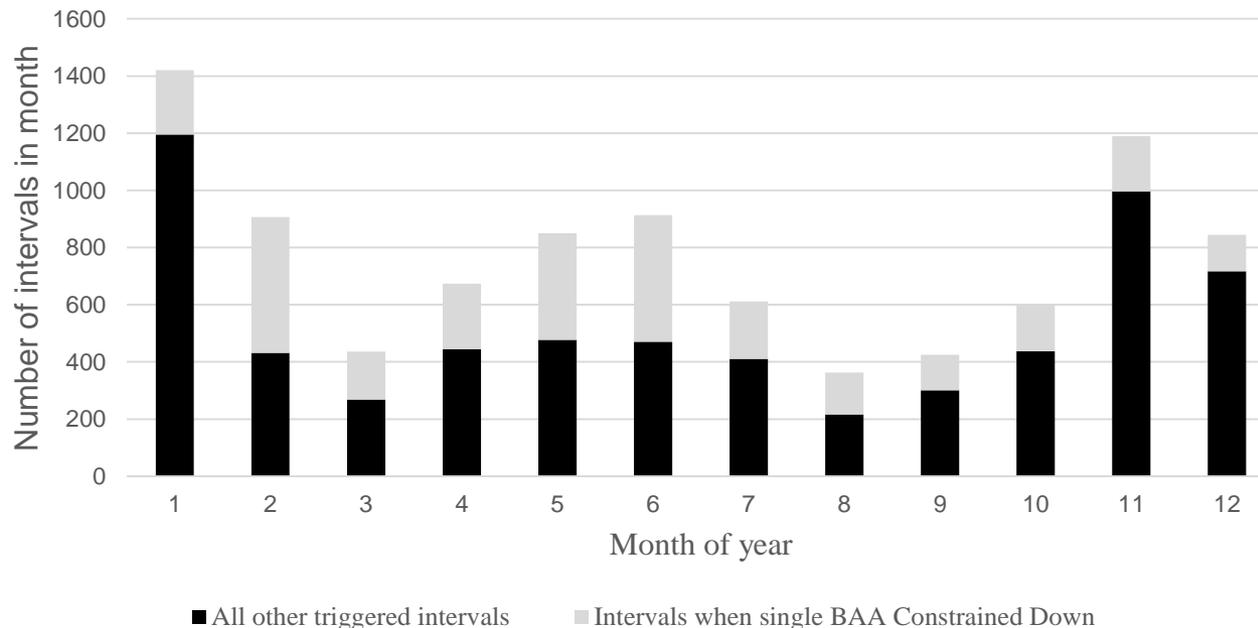
ISO is constrained up from the rest of the EIM by more than \$20 in approximately 3% of intervals

Tier 1 to Tier 2 price differences greater than \$20
when Tier 2 prices are positive



A single balancing area was constrained-down from the CAISO price region in 31% of the intervals in which the test would have triggered, occurring more often between February and June

Month of year when test triggers with a single BAA constrained-down



Months of the year when there are multiple priced regions in the EIM and the CAISO is in the highest priced region

Possible improvements to the trigger

- Consider using a minimum price threshold to better target high impact intervals
 - Could it make sense to only trigger the pivotal supplier test when prices are above \$100?
- Consider using a minimum price difference threshold between Tier 1 and Tier 2 to avoid mitigation process for low dollar differences
 - Does it make sense to trigger the pivotal supplier test when Tier 1 is constrained up by \$0.20?
- Additional considerations for when only one balancing area is constrained down
 - Does it make sense to trigger the pivotal supplier test when only one balancing area is constrained down?

Hourly block imports can increase competitiveness of the fifteen-minute market to a certain extent but cannot alleviate market power in ramping capability

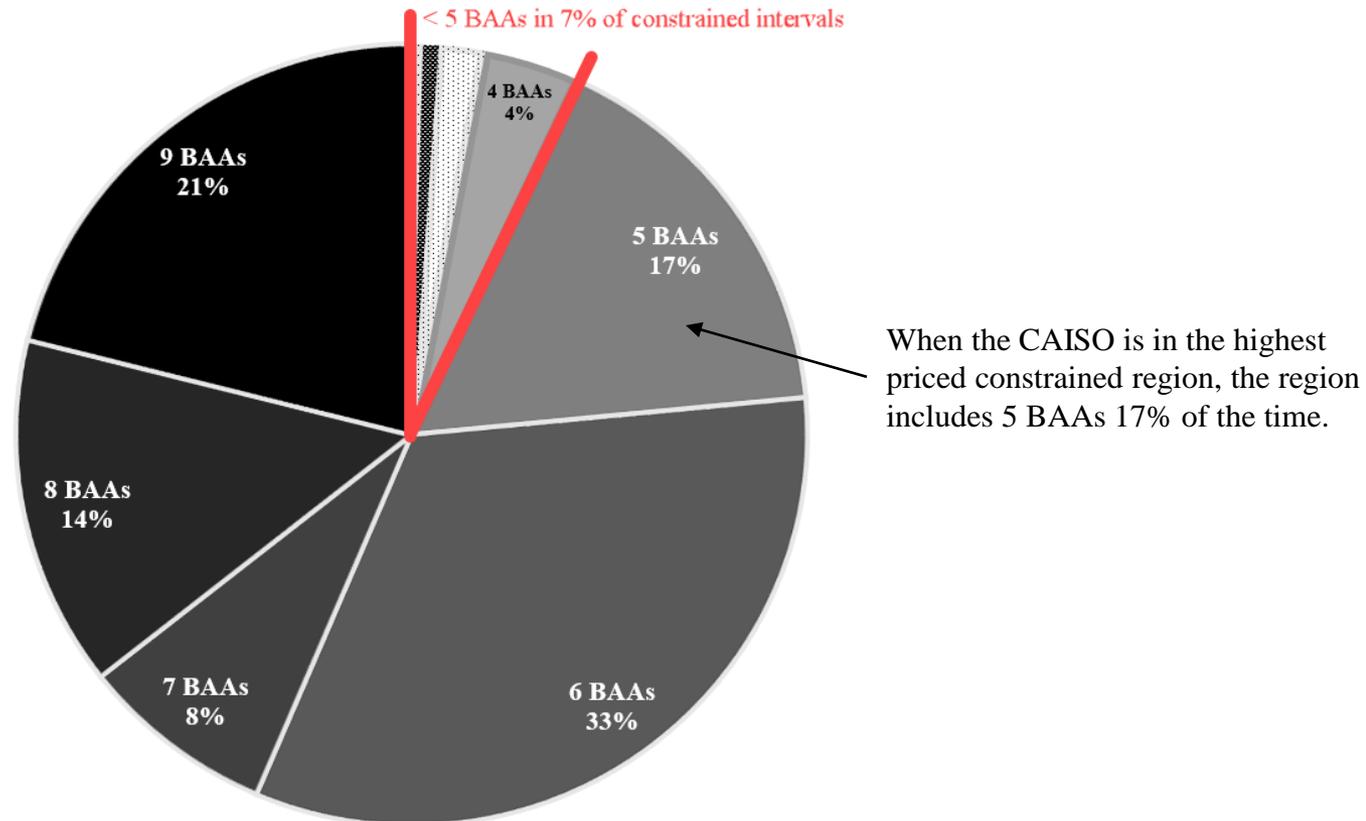
- ISO has two sources of directly competitive fifteen-minute supply
 - EIM transfers resulting from optimizing participating resources
 - 15-minute economic import offers at its import locations
- Hourly block imports offered in HASP increase competition in FMM to the extent that they unload non-pivotal ramping supply
 - Hourly block energy can unload non-pivotal ramping capability if awarded an energy schedule in HASP
 - Within the hour, the fifteen-minute market can still be uncompetitive regardless of how much import suppliers offer into HASP or how much inertia capability is available

ISO proposed to only mitigate jointly pivotal suppliers within the CAISO balancing area

- Non-pivotal suppliers do not have an incentive to exercise market power
 - Mitigate resource offers from any supplier when in combination with the two largest suppliers are required to meet demand
- Some stakeholders are concerned that the amount of mitigated supply would not be enough to meet demand
 - Is it appropriate that when a structural competitiveness test fails, unmitigated bids could set the price?
- Some stakeholders are concerned that an internal CAISO supplier may be affiliated with participating resources in the EIM as well as import offers on the CAISO interties
 - The test could consider these supplies as pivotal when the supplier affiliate is one of the three largest suppliers
 - However, it is not clear how offer mitigation could work if the affiliate group is jointly pivotal

ADDITIONAL INFORMATION

The ISO is rarely alone or grouped with fewer than 5 balancing areas in the highest-priced constrained region



Geographic scope of the highest priced region that includes the CAISO in 2019

When CAISO is import constrained in the EIM, it is often grouped with AZPS, NEVP, IPCO, PACE, and BANCSMUD

Entity	% of intervals that entity is in Tier 1 with CAISO
AZPS	96.1%
IPCO	93.2%
PACE	91.3%
NEVP	88.6%
BANCSMUD	68.3%
PACW	38.3%
PSEI	34.7%
PGE	33.1%
BCHA	22.7%

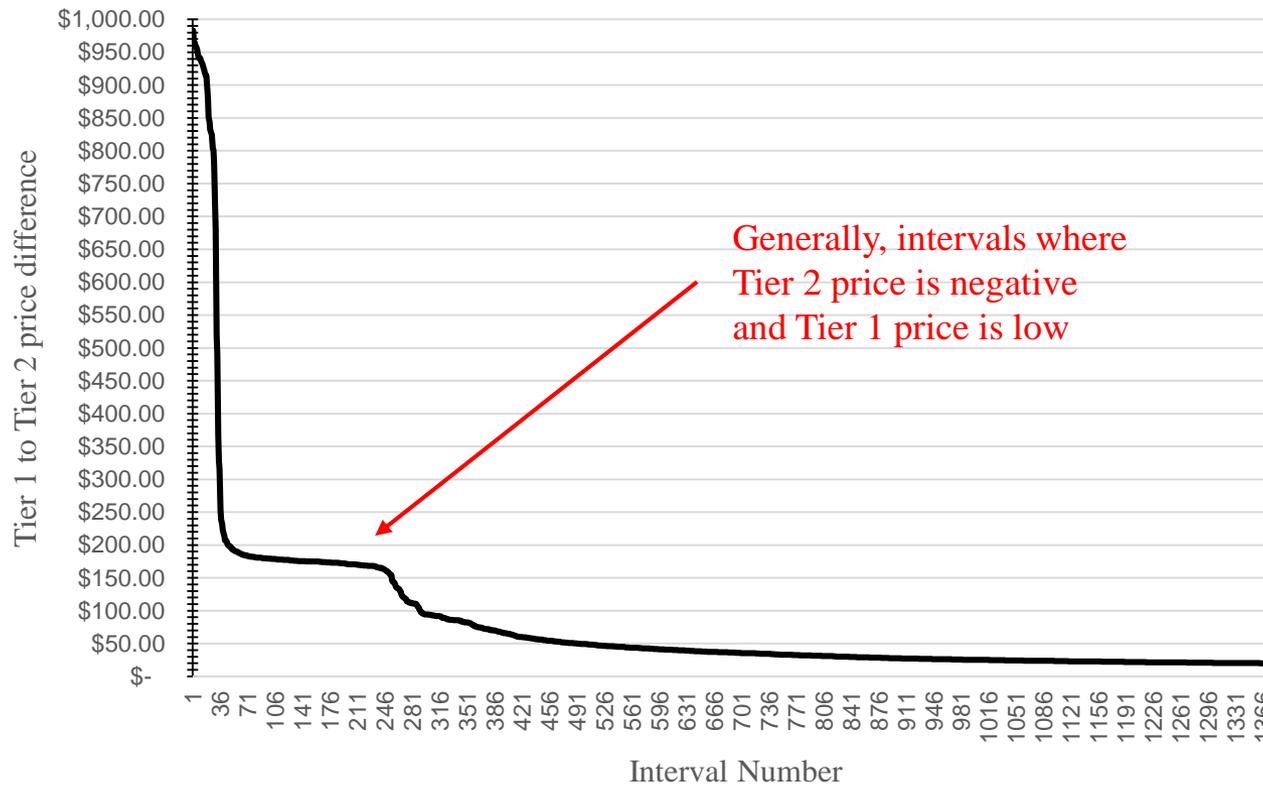
Entities in the highest priced region that includes the CAISO in 2019

In most of the intervals where one BAA is constrained down, the constrained-down BAA had a positive energy price

- A single balancing area was in the lower priced region in 31.1% of the intervals when there were two price regions and the ISO was in the highest priced region
- In 87% of these intervals, the constrained-down balancing area had a positive energy price
 - In these intervals, the average price difference between price tier 1 and price tier two is \$9.87
- In 13% of these intervals, the constrained-down balancing area had a negative energy price, generally close to the price floor
 - Because the constrained-down balancing area is generally close to the price floor, the price difference between price tier 1 and price tier 2 is generally very large

CAISO is constrained up from the rest of the EIM by more than \$20 in approximately 3% of intervals

Tier 1 to Tier 2 price differences greater than \$20 including intervals with negative Tier 2 prices



CAISO is constrained up from the rest of the EIM by more than \$20 in approximately 3% of intervals

Tier 1 to Tier 2 price differences greater than \$20
when Tier 2 prices are positive

