Energy Division Staff Comments

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Overview

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Maximum Import Bid Price and Hourly Shaping Factor

Overview of Maximum Import Bid Price (MIBP)

MIBP Definition

- It is the calculated price trigger that allows non-RA offers to be accepted above the $1,000/MWh soft cap, and up to the hard cap of $2,000/MWh.
- The MIBP is formed by multiplying the maximum bilateral block price from either Mid-Columbia or Palo Verde by an hourly shaping factor and a multiplier of 110%, to transform these 16-hr block prices to hourly prices.
- Intended to approximate energy prices outside of CAISO's BAA on an hourly basis.

Concerns with this Approach

1) ED Staff analysis shows that these 2 hubs can be very thinly traded with exceptionally low volumes and **at higher prices than the CAISO market itself**, meaning a few small trades can increase the bid cap from $1,000/MWh to $2,000/MWh for the entire CAISO market.
2) In addition, ED Staff has concerns with the methodology for calculating the Hourly Shaping Factor, and whether it is consistent with CAISO's Tariff filing.

Tariff Language vs BPM Language

- **CAISO's Tariff:** Divide the DA SMEC in that hour of a **previous representative trading day** by the average DA SMEC of the **same previous representative trading day** (Tariff section 30.7.12.5.3).

- **Business Practice Manual (BPM):** Divide the hourly DA SMEC from previous day, by the average SMEC from the **last high-priced day** in that same season with a price above $200/MWh.
- Market Instruments, BPM pg. 496:

  "The Hourly Energy Price Shaping Factor is calculated using the CAISO day-ahead system marginal energy cost (DA SMEC) for both the applicable trade date and for a recent high-priced day, where at least one hour of CAISO DA SMEC exceeds $200/MWh."

  " If there is no day within the season in which DA SMEC prices exceed $200/MWh, the CAISO looks back to the same season in the previous year and up to three previous years in order to find the most recent high-priced day above $200/MWh."

Hourly Shaping Factor Ratio Calculation, CAISO's Tariff

- The CAISO tariff, Section 30.7.12.5.3, states that the HSF is calculated for each hour by dividing the DA SMEC for that hour of a previous representative day, by the average DA SMEC in all on-peak hours of the same previous representative trading day.

30.7.12.5.3 Maximum Import Bid Price

The CAISO calculates hourly Maximum Import Bid Prices for the Day-Ahead Market and Real-Time Market, separately, including for on-peak and off-peak hours. The CAISO calculates the Maximum Import Bid Price as 110 percent of the greater of the published bilateral electric index prices for the Mid-Columbia or Palo Verde trading hub locations, multiplied by an hourly shaping ratio. As detailed in the CAISO Business Practice Manual, the CAISO calculates the hourly shaping ratio for each hour by dividing the Day-Ahead Market System Marginal Energy Cost for the CAISO Balancing Authority Area in that hour of a previous representative Trading Day by the average Day-Ahead Market System Marginal Energy Cost for the CAISO Balancing Authority Area in all on-peak hours of the same previous representative Trading Day. If for any given Trading Hour the CAISO cannot calculate the Maximum Import Bid Price, the applicable Maximum Import Bid Price will be the most recently available calculated Maximum Import Bid Price.

Source: Feb22-2021-TariffAmendment-PricingParameters-OrderNo831-ER21-1192.pdf (caiso.com)

How Does the Hourly Shaping Factor Affect MIBP?

Example 1: Over-estimates MIBP

- MIBP=(HSF * electric hub price) * 1.1
- The purpose of the HSF is to **translate the 16-hour block price of the index into hourly prices.**
- **HSF should average to 1.0 everyday, but it often does not.**
- From CAISO's BPM, this example shapes an average index price of $150 to an average of $366 (16-hour block is $150).
- We note that if the HSF were to equal 1.0, the MIBP would not break $1,000.
- In this example, the energy bid cap raises to $2,000 MWh for HE 19 and 20.

DAM 9/25/2020

Hour ending	Peak Flag	DA SMEC ($/MWh)	Hourly Shaping Factor	Electric hub price ($MWh)	MIBP ($/MWh)
6	On-peak	37	0.63	150.00	104.41
7	On-Peak	40	0.68	150.00	112.88
8	On-Peak	41	0.70	150.00	115.70
9	On-Peak	40	0.68	150.00	112.88
10	On-Peak	46	0.79	150.00	129.81
11	On-Peak	45	0.77	150.00	126.99
12	On-Peak	40	0.68	150.00	112.88
13	On-Peak	47	0.80	150.00	132.63
14	On-Peak	75	1.28	150.00	211.64
15	On-Peak	80	1.37	150.00	225.75
16	On-Peak	120	2.05	150.00	338.63
17	On-Peak	125	2.14	150.00	352.74
18	On-Peak	250	4.28	150.00	705.48
19	On-Peak	400	6.84	150.00	1128.77
20	On-Peak	380	6.50	150.00	1072.33
21	On-Peak	290	4.96	150.00	818.36
22	On-Peak	150	2.57	150.00	423.29
	Average	**130**	**2.22**	**150.00**	**366.19**

Source: Market Instruments, BPM pg 498.

How does the HSF effect MIPB?
Example 2: Under-estimates MIBP

- The HSF does not average to 1.0, it averages to 0.38.
- This lowers MIBP prices, because when HSF is multiplied by the hub price it reduces the hourly shaped prices, rather than *just* shaping them.
- In this example, the MIBP has no effects on the CAISO market since it does not exceed $1,000MWh for any hour.

RTM 2/15/2023

Hour ending	Peak Flag	SMEC ($/MWh)	Hourly Shaping Factor	Wtd avg Electric Hub Price ($/MWh)	MIBP ($MWh)
7	On-Peak	227.28	0.61	77.39	52.01
8	On-Peak	206.64	0.47	77.39	40.19
9	On-Peak	154.49	0.35	77.39	29.48
10	On-Peak	125.82	0.29	77.39	24.92
11	On-Peak	108.48	0.23	77.39	19.22
12	On-Peak	89.25	0.18	77.39	15.04
13	On-Peak	82.19	0.14	77.39	11.59
14	On-Peak	77.21	0.11	77.39	9.73
15	On-Peak	84.72	0.13	77.39	10.94
16	On-Peak	129.38	0.23	77.39	19.45
17	On-Peak	184.76	0.40	77.39	34.28
18	On-Peak	204.89	0.56	77.39	47.95
19	On-Peak	202.54	0.63	77.39	53.60
20	On-Peak	191.83	0.56	77.39	47.80
21	On-Peak	191.76	0.54	77.39	45.72
22	On-Peak	185.70	0.51	77.39	43.52
	Average	**152.93**	**0.37**	**77.39**	**31.59**

Department of Market Monitoring (DMM) Comments on Hourly Shaping Factor

DMM believes instead of the current implementation (which divides the hourly SMEC in the previous day by the average SMEC of the last high priced day), that the shaping factor should divide the hourly SMEC in the last high priced day by the average SMEC of that same last high priced day. The tariff describes the shaping factor as dividing the DA SMEC in that hour of a previous representative trading day by the average DA SMEC of the same previous representative trading day.[8] This formulation results in an hourly shaping factor that averages to one across the day and shapes bilateral prices to the pattern of prices on the last high priced day. The current implementation can yield the same result in some cases, but only if the previous day also happens to be the last high priced day.

Source: DMM Comments on Price Formation Enhancements: Rules for Bidding above the Soft Offer Cap Draft Final Proposal, pg. 5, May 8, 2024.

Implications

- The hourly shaping factor should average to 1.0 on every day.
- The hourly shaping factor drives the calculation of the MIBP. Any seemingly small discrepancy could potentially over-estimate the MIBP value, resulting in increased frequency of days in which the bid cap is lifted, especially during stressed system conditions.
- Likewise, CAISO's current methodology could also potentially under-estimate the MIBP value, resulting in CAISO not raising the bid cap when it might be appropriate (under the concept developed and approved in CAISO's initiative).

Liquidity of Bilateral Indices

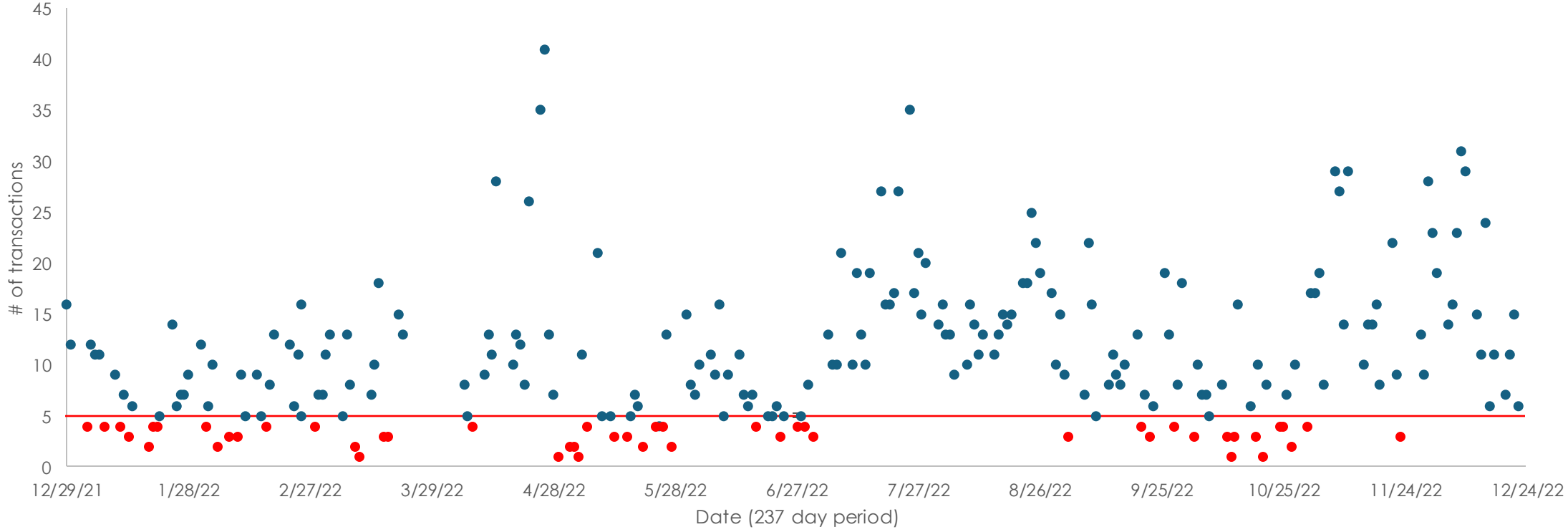
Bilateral Indices on Stressed System Days

- During stressed system conditions, the liquidity of bilateral indices can be extremely thin (i.e., few transactions, counterparties, and MW traded).
- The CAISO MIBP relies on bilateral energy trading markets at two hubs outside of California: Palo Verde and Mid-Columbia.
- For some days, there are as few as 3 transactions. These indices are small 25 MW transactions, when the CAISO market is clearing 40,000 MW+.

  **In other words, 3 transactions representing less than 0.002% of market transactions can determine the bid cap for the entire market.*
- The bilateral indices could be anticipated to become even more thinly traded in the future, with the implementation of EDAM and Markets+.

Thinly traded bilateral index, Palo Verde 2022

- Number of transactions per day at Palo Verde hub for year 2022.
- There were 50 instances where transactions fell below 5.
- FERC liquidity standards for transactions: "*Average daily number of transactions of five or more, on average for all non-holiday weekdays within a 90-day review period*"
- Even though the index might meet 90-day period liquidity standards, it is still thinly traded on stressed days.



Transactions at Palo Verde Index on 9/6/2022

- The published ICE Index for 9/6/2022:
  - Low price: $950/MWh, high price: $999/MWh, weighted avg: $982.67
  - 3 trades, 5 counterparties
  - Total MW quantity: 3 x 25 MW for 16 on-peak hours each
- ED staff identified 2 trades based on data from FERC's Electronic Quarterly Report (EQR) that could have been in the ICE index that day, based on their size and that they matched the high and the low price for the day.

	Seller	Buyer	Price	MW per hour	Source
1	?	?	999	25	-
2	EDF Trading	Dynasty Power	999	25	2023 EQR Day-Ahead Transaction Data Q3 Palo Verde
3	Macquarie	EDF Trading	950	25	2023 EQR Day-Ahead Transaction Data Q3 Palo Verde
		Average $/MWh	**982.67**		

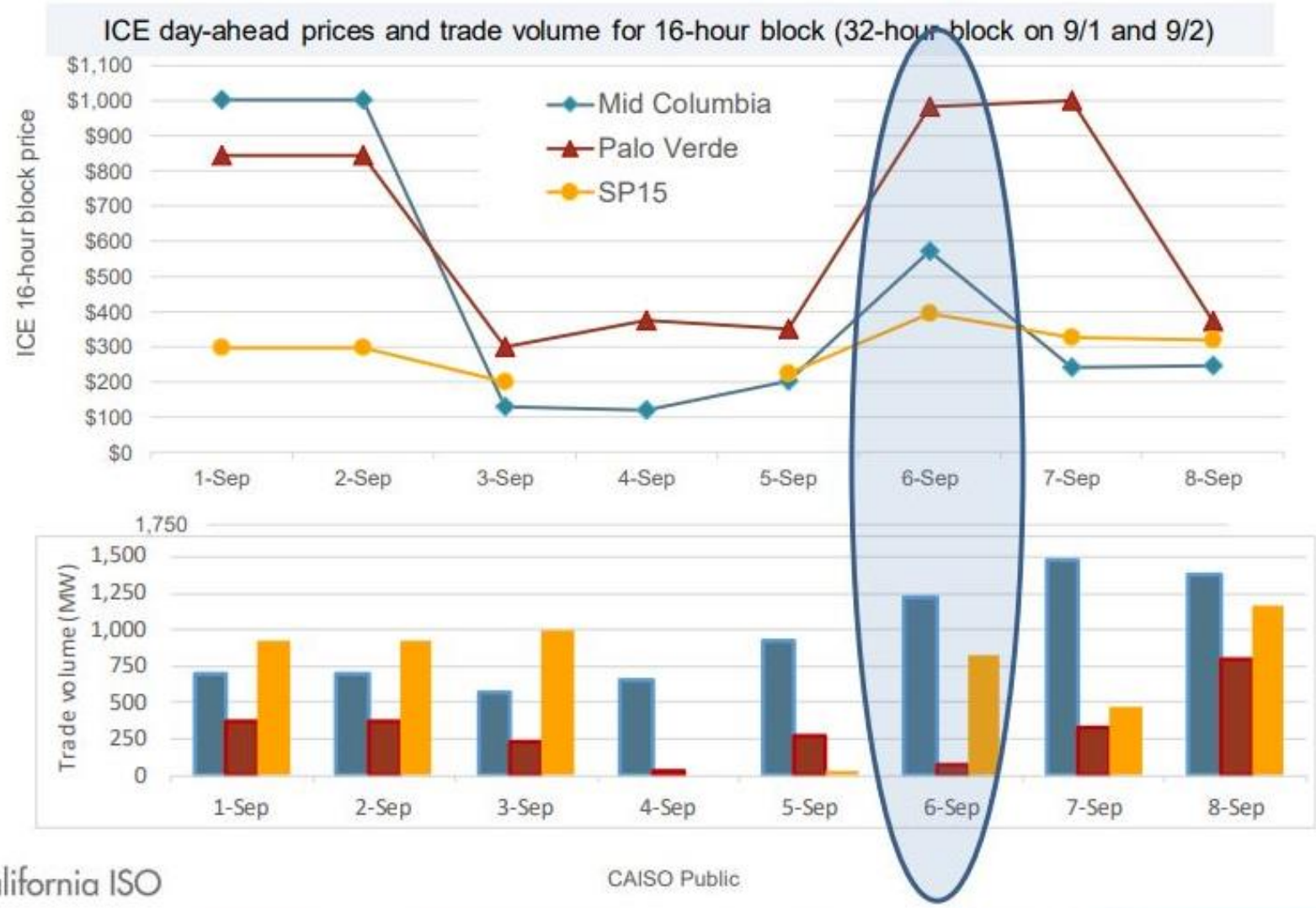
The EIA ICE Index data can be found here: ice_electric-2022final.xlsx (live.com

ICE Index Used for Day-Ahead MIBP

- CAISO does not use the published ICE index for the day-ahead MIBP calculation. Rather, CAISO pulls the available transactions at 9AM, before the trading day is complete.
- There are likely to be fewer transactions that have been completed by 9AM, than the number of transactions completed by the end of the day.
- Therefore, CAISO could be relying on ICE data that is likely to have even fewer transactions than the published ICE indices.
  - Recall, that there were only 3 transactions in the index on September 6, 2022.
  - It is not clear how many of those transactions were completed by 9AM.
- This snapshot of ICE data at 9AM or 10AM is not publicly available.

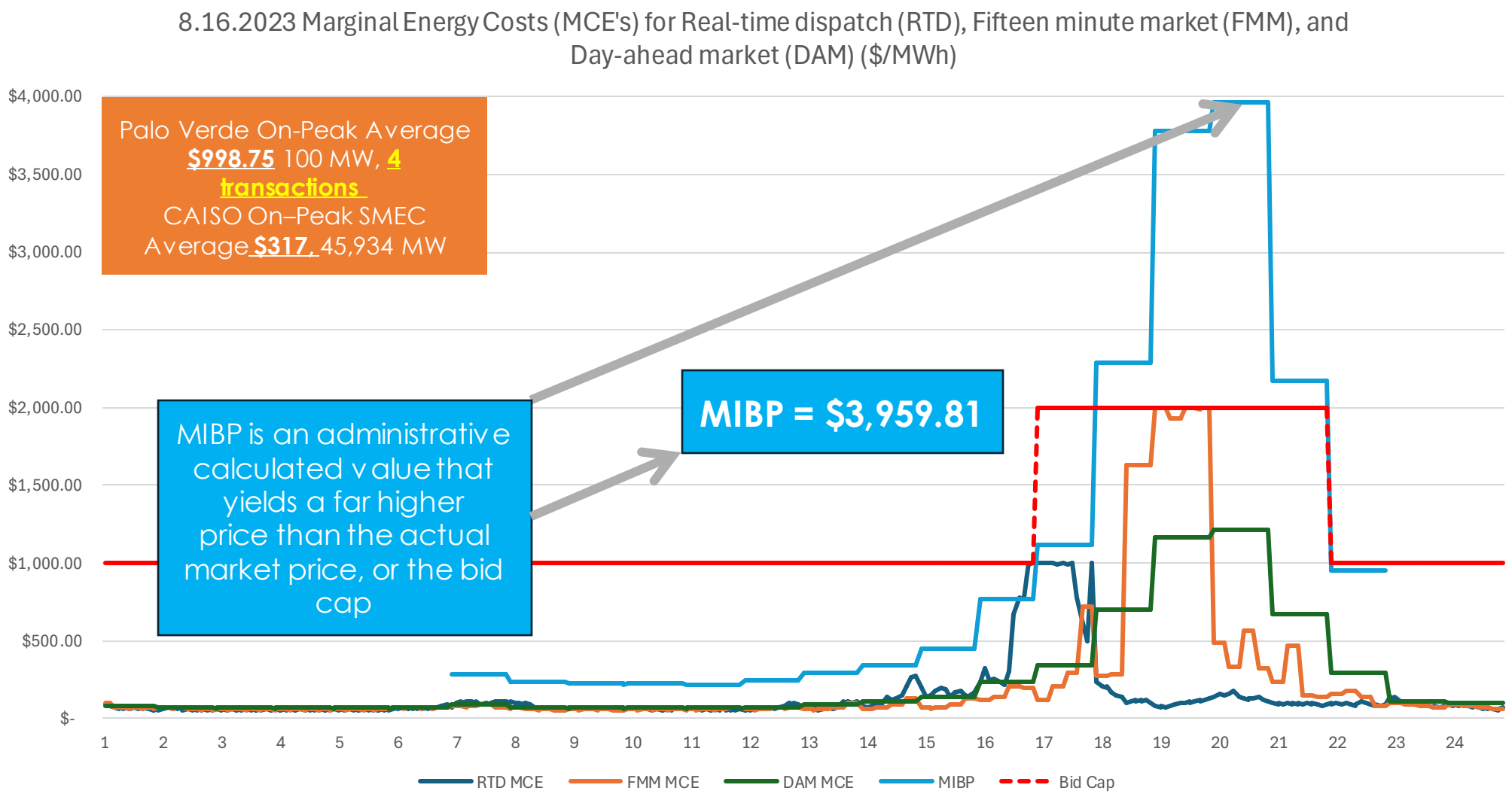
Price Separation at Mid-C and Palo Verde

High electric market prices for ICE at trading hubs outside CAISO triggered increase in CAISO import bid cap and penalty price to $2,000.



Source: Presentation-FERC-Market-Monitoring-Conference-California-ISO-Panel-3-Bilateral-Price-Indices-Jun-1-2023.pdf (caiso.com)

Price Separation- August 16, 2023



Next Steps

- **CAISO should re-examine the hourly shaping factor**
  - The HSF should shape the bilateral index block prices, not change them and not transform them (either higher or lower), as is currently the case, when relying on averages that are not from the previous day.

- **CAISO should examine liquidity of the bilateral indices.**
  - These indices are thinly traded, especially when CAISO pulls ICE index data from 9AM.
  - On stressed system days, the prices in these indices separate substantially from the CAISO market, even though the CAISO market has orders of magnitude greater numbers of transactions (e.g., 100 MW v. 40,000+ MW).
  - On stressed system days, it appears that there are few transactions, and in some cases no transactions, potentially opening the door to market manipulations and/or the exercise of market power.
  - Notably, from FERC regarding prices above the $1000 price cap:

    "We find that market power concerns are heightened during such periods because short-run marginal costs in this range may indicate that very few resources are available to provide additional supply. Supply may be limited during such periods because of fuel supply limitations or the physical limitations of resources (e.g., ramping constraints). Accordingly, resources with available supply during such periods likely face little competition, particularly in real-time and may therefore be able to exercise market power..." (FERC Order 831, Paragraph 144, Pg. 87789).