

## **Comments on FERC Order 831 – Import Bidding and Market Parameters: Final Proposal**

**Department of Market Monitoring**

September 10, 2020

### **Summary**

The Department of Market Monitoring (DMM) provides these comments on the ISO's *FERC Order 831 – Import Bidding and Market Parameters Final Proposal* (proposal).<sup>1</sup> DMM supports the ISO's final proposal overall as a reasonable approach to allowing bids over the \$1,000/MWh soft offer cap in compliance with FERC Order 831. The proposal is a vast improvement from the ISO's 2019 Order 831 compliance filing, and places more reasonable limits on instances in which the ISO will raise the power balance penalty price over \$1,000/MWh and allow import bids over \$1,000/MWh.

Prior to mid-August of this year, the day-ahead bilateral electricity price indices upon which the ISO's proposal is based had not reached levels that would have resulted in allowing import bids up to \$2000/MWh to set market clearing prices and triggering scarcity pricing of \$2,000/MWh under the ISO proposal. However, CAISO and west-wide market conditions over the last month have now provided several periods over which the potential effectiveness and implications of the ISO's proposed approach can be better assessed. System and market conditions since mid-August have highlighted the very real possibility for areas of WECC outside of the ISO to have tight supply conditions which may be the result of both market power and potential power shortages.

While system and market conditions such as those occurring since mid-August may continue to be limited in future years, the potential exists for such conditions to become more commonplace over the next few years. DMM believes it is prudent to fully analyze and consider how the proposed approach would have worked during such system and market conditions. Thus, these comments include an estimate by DMM of the "maximum import bid price" that would have resulted under the ISO's proposed approach under these recent unprecedented market conditions.

DMM believes this analysis suggests the proposed approach for allowing import bids up to \$2,000/MWh and triggering scarcity pricing of \$2,000/MWh based on day-ahead bilateral market prices may not be a very accurate way of reflecting actual real-time market conditions. Because the proposed approach is based on day-ahead bilateral price indices outside the ISO, this approach is unlikely to reflect actual real-time market and scarcity conditions in the CAISO and the Western Energy Imbalance Market during many intervals, and may allow for

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<sup>1</sup> *FERC Order 831 – Import Bidding and Market Parameters Final Proposal*, California ISO, August 24, 2020: <http://www.caiso.com/InitiativeDocuments/FinalProposal-FERCOrder831-ImportBidding-MarketParameters.pdf>

uncompetitively high prices during other intervals when there would be no need to raise import bid caps and penalty prices from \$1,000/MWh to \$2,000/MWh.

Analysis in these comments also highlight that on critical days when projected system conditions may be tightest, the volume of trades and number of entities trading power at the Palo Verde trading hub on the Intercontinental Commodity Exchange (ICE) may be very limited. In practice, it appears the proposed approach will need to be based directly on the availability and accuracy of this ICE price data to be implemented as described in the final proposal. Thus, DMM suggests that the ISO may need to establish some criteria for determining when insufficient bilateral price data may be available to calculate the import bid price threshold and develop alternative options for setting this threshold.

Finally, DMM's comments highlight that the ISO's proposal introduces mechanisms through which uncompetitive conditions or capacity shortfalls in BAAs outside of the ISO could result in \$2,000/MWh bids or shortage prices inside the ISO or Western EIM BAAs that have procured sufficient capacity with marginal costs below \$1,000/MWh. While the current proposal is a significant improvement from the ISO's 2019 Order 831 compliance filing, DMM recommends that the ISO reconsider numerous aspects of the current proposal as part of a more comprehensive review of Western EIM and CAISO scarcity pricing and export scheduling and pricing market designs – and the implications for these aspects of the market design on resource adequacy policy.

## I. Comments

### ***ISO's proposal provides much more reasonable limits on the power balance penalty price and import bid prices than the ISO's 2019 Order 831 compliance filing.***

On September 5, 2019 the ISO filed a tariff amendment that proposed changes to its market rules to comply with the requirements the Federal Energy Regulatory Commission established in Order No. 831. These changes included:

1. Increasing the power balance penalty price that sets the price when modeled supply is less than demand from \$1,000/MWh to \$2,000/MWh; and
2. Increasing the hard cap at which non-resource specific import resources can bid and set prices in ISO markets without any cost verification from \$1,000/MWh to \$2,000/MWh.

Those changes would have applied to all market intervals. DMM opposed the proposed changes as unjust, unreasonable, and unnecessary for the ISO to comply with Order 831.<sup>2</sup> The ISO subsequently withdrew the filing in order to develop the current proposal.

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<sup>2</sup> *Motion to Intervene and Comments of the Department of Market Monitoring of the California Independent System Operator Corporation*, Department of Market Monitoring, FERC Docket No. ER19-2757, September 26, 2019:  
<http://www.caiso.com/Documents/MotiontoInterveneandCommentsoftheDepartmentofMarketMonitoringonOrder831Compliance-ER19-2757-Sept262019.pdf>

The ISO now proposes to only raise the penalty price above \$1,000/MWh and to allow non-resource specific import bids over \$1,000/MWh “only for those intervals in which verified energy costs are greater than 1,000/MWh”.<sup>3</sup> The ISO defines this as being intervals in which its proposed “maximum import bid price” exceeds \$1,000/MWh or there is a cost-verified resource-specific bid greater than \$1,000/MWh.

The “maximum import bid price” will be based on the bilateral day-ahead multi-hour block electric hub prices. The ISO would take the maximum of the weighted average prices for different hubs in the west (i.e. mid-Columbia or Palo Verde) plus a 10% adder. In practice, during the high load months when conditions are tightest, prices for day-ahead bilateral trades at the Palo Verde trading hub tend to be higher than prices at the Mid-Columbia hub, so that prices at Palo Verde will usually be used to set the “maximum import bid price.”

Under the proposal, this 16-hour block price for peak energy (hours 7 through 22) will be converted into a “maximum import bid price” for each hour of the ISO day-ahead and real-time market based on the shape of the relative value of the 16 hourly prices from the most recent “high priced day”.<sup>4</sup>

The “maximum import bid price” will play a key role in determining the number of days in which the provisions are triggered which allow for bids up to \$2,000/MWh and scarcity pricing. If the “maximum import bid price” is greater than \$1,000/MWh (e.g. even just \$1,001/MWh), then the ISO will deem non-resource adequacy import bids and virtual bids up to \$2,000/MWh to be “cost verified.”

Whenever the “maximum import bid price” is greater than \$1,000/MWh, imports will be deemed to have “verified energy costs exceed[ing] \$1,000/MWh,” which in turn triggers the scarcity pricing provisions of the proposal. The ISO will raise the penalty price to \$2,000/MWh in intervals where (1) the power balance relaxation quantity exceeds a BAA-specific threshold based on the NERC BAL-001-2 BAAL<sub>Low</sub> limit; and (2) verified energy costs exceed \$1,000/MWh.<sup>5</sup> In these intervals, if the power balance constraint relaxation quantity is less than the NERC-based threshold, the penalty price will be the higher of the last cleared MW’s bid price or \$1,000/MWh.

Under the ISO proposal, the “maximum import bid price” is only applicable to resource adequacy imports. Thus, during any interval in which the “maximum import bid price” is over

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<sup>3</sup> CAISO Final Proposal, p. 4.

<sup>4</sup> CAISO Final Proposal, p. 29. The ISO “proposes to use the most recent day in which prices were at least an established amount in the day-ahead market, such as \$200/MWh”. The ISO notes in a footnote that the “CAISO proposes to retain the flexibility to establish this threshold based on further analysis and potentially modify them based on changes to system and market conditions”

<sup>5</sup> Thus, the penalty price may also be raised to \$2,000/MWh if a bid over \$1,000/MWh from a resource-specific resource within the ISO or a resource-specific import is “cost verified” prior to the market operation.

\$1,000/MWh, the ISO will accept non-resource adequacy import bids up to the \$2,000/MWh cap without any actual cost-verification. However, during intervals in which the “maximum import bid price” is not over \$1,000/MWh, the ISO proposal does not allow non-resource specific import bids to seek *ex ante* approval or *ex post* recovery of costs in excess of \$1,000/MWh.

DMM expects the number of intervals in which “verified energy costs” exceed \$1,000/MWh to only be a fraction of all intervals over the next few years. Therefore, the proposal is a vast improvement from the ISO’s 2019 Order 831 compliance filing, and places more reasonable limits on instances in which the ISO will raise the power balance penalty price over \$1,000/MWh and allow import bids over \$1,000/MWh.

***DMM believes numerous details of the proposed approach warrant further consideration which takes into account experience under recent system and market conditions.***

Prior to mid-August of this year, the day-ahead bilateral market price indices which the ISO proposes to use in its approach to cost-verification for import bids had not reached levels that would have resulted in approval of import bids over \$1,000/MWh as being eligible to set market clearing prices. However, ISO and west-wide market conditions since mid-August have now provided several periods over which the potential results, effectiveness and implications of the proposed approach can be more accurately assessed. While conditions such as those occurring over the last three weeks may continue to be limited in future years, the potential exists for such conditions to become more commonplace over the next few years.

These comments include a comparison of recent market prices under different conditions with DMM’s estimate of the “maximum import bid price” that would result under the ISO’s proposed approach. Based on this analysis, DMM believes that numerous details of the proposed approach warrant further consideration and potential modification or enhancement, as explained in these comments.

***Recent market events suggest the ISO should revisit market design proposals that assume bilateral electricity markets are competitive***

Discussions by stakeholders, the ISO, and the Commission in FERC Order 831 proceedings at FERC and the ISO, and the related system market power mitigation initiative at the ISO, have generally assumed that bilateral markets for electricity outside of CAISO will be competitive. The recent mid-August 2020 heat wave highlighted the very real possibility for areas of WECC outside of the ISO to have tight supply conditions which may be the result of both market power and power shortages. This risk of actual shortages clearly existed during this period and actual shortages may have occurred in some hours. However, during other hours these tight supply conditions have also created the potential for uncompetitive conditions in the ISO as well as other parts of the WECC. Therefore, DMM believes the ISO should revisit market design changes that rely on the assumption that bilateral markets outside of CAISO are competitive.

The ISO's current proposal will allow supply offers into the ISO and prices in ISO day-ahead and Western EIM real-time markets to exceed \$1,000/MWh and rise to \$2,000/MWh in situations when the ISO (and a subset of other Western EIM BAAs) may have sufficient resource adequacy capacity *with marginal costs below \$1,000/MWh* to cover its load and reserve requirements. This can occur when one or more other BAAs, potentially due to the exercise of physical withholding in energy markets outside of the ISO, may need to rely on exports out of the ISO or other BAAs in the Western EIM to cover their load and reserve requirements.

DMM does not believe that this realistic and important scenario was sufficiently contemplated in Order 831, which focused on “enabling RTOs/ISOs to dispatch the most efficient set of resources when *short-run marginal costs exceed \$1,000/MWh*” (emphasis added).<sup>6</sup> This scenario has also not been adequately contemplated in the ISO's system market power mitigation initiative, the ISO's Order 831 stakeholder initiative, or the current proposal.

Nonetheless, the ISO's proposal could allow any market power in bilateral markets outside of the ISO BAA or Western EIM BAAs to cause ISO and Western EIM prices to be set by bids of \$2,000/MWh when the marginal costs of supplying power to these BAAs is below \$1,000/MWh. As a result, the ISO's current proposal makes important changes to resource adequacy policy and scarcity pricing that DMM believes have not been adequately vetted or justified. DMM recommends that the ISO reconsider numerous aspects of the current proposal in an initiative that more comprehensively considers scarcity pricing and export scheduling and pricing market designs, and the implications for these aspects of the market design on resource adequacy policy.

***The proposal allows potentially uncompetitive and illiquid bilateral markets to justify \$2,000/MWh bids and scarcity prices.***

The ISO's proposal introduces mechanisms through which uncompetitive conditions or capacity shortfalls in BAAs outside of the ISO could result in \$2,000/MWh bids or shortage prices inside the ISO or Western EIM BAAs that have procured sufficient capacity with marginal costs below \$1,000/MWh.

Consider a scenario in which a few southwestern balancing areas outside of the ISO are concerned in the day-ahead time frame that they have not secured sufficient capacity to meet their load plus reserve requirements for HE 18 to 20. The ISO and all other WECC BAAs have sufficient capacity to meet their load plus reserve requirements, and gas prices are sufficiently low to keep the marginal costs of energy well below \$1,000/MWh. Marketers working on behalf of the BAAs concerned about resource sufficiency could attempt to satisfy the shortfall by self-scheduling exports out of the ISO in the day-ahead market. Marketers would also seek to purchase 16 hour peak blocks of electricity at the Palo Verde trading hub.

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<sup>6</sup> *Offer Caps in Markets Operated by Regional Transmission Organizations and Independent System Operators*, Federal Energy Regulatory Commission, Docket No. RM16-5-000, Order No. 831, November 17, 2016, p. 2: <https://cms.ferc.gov/sites/default/files/whats-new/comm-meet/2016/111716/E-2.pdf>

Under this scenario, if the supply at the Palo Verde hub is uncompetitive due to physical or economic withholding in the southwest, the multi-hour peak block price shaped according to the ISO's proposal can result in a maximum import bid price for the peak hours over \$1,000/MWh, and up to \$2,000/MWh. This would allow virtual bids and non-resource adequacy import bids up to \$2,000/MWh, and could trigger \$2,000/MWh power balance penalty prices in the day-ahead and real-time markets (or, penalty prices equal to the last cleared bid price for real-time power balance violations in the ISO below 233.7 MW threshold),

***The proposal would allow self-scheduled exports in the day-ahead market from the ISO to BAAs concerned about being short of capacity to trigger \$2,000/MWh prices or power balance constraint violations.***

The scenario described above can result in ISO and Western EIM prices being set by \$2,000/MWh power balance penalty prices or \$2,000/MWh import bids when the marginal cost of resources in the non-short BAAs are less than \$1,000/MWh. For example, assume the day-ahead load forecast plus reserves for the CAISO in HE 19 is 45,000 MWs and there is 46,000 MWs of resource adequacy capacity bidding into the ISO at prices below \$1,000/MWh. Assume a few southwestern BAAs are concerned about being short of capacity in HE 19, and so they self-schedule a combined 1,500 MWs of exports from CAISO in the day-ahead market. The extra 1,000 MWs of resource adequacy capacity and 500 MWs of non-RA import capacity would be needed satisfy these exports in the day-ahead market. In this case, the prices for the entire day-ahead market could be set by \$2,000/MWh non-resource adequacy imports.

In its analysis of the mid-August 2020 heat wave, DMM became aware that the ISO's real-time software would give the day-ahead market exports self-scheduled in real-time higher priority than ISO load. Therefore, real-time load in the ISO in excess of what cleared the day-ahead market can trigger real-time power balance constraint violations, priced at the penalty price, when excess resource adequacy capacity supports day-ahead exports out of the ISO.

In the example above, with the 1,500 MWs of day-ahead exports self-scheduling in real-time, any real-time load in excess of what cleared the day-ahead market would trigger a power balance constraint violation. The penalty price would be \$2,000/MWh if real-time load was more than 233.7 MWs (the NERC based threshold in the ISO's proposal) greater than what cleared the day-ahead market. Rather than being caused by an actual shortage, this could be caused by operators manually adjusting the real-time load forecast to defend against potential uncertainty in load and variable energy resources in future intervals.

***Under the proposal, non-resource adequacy imports could set prices at \$2,000/MWh even if there is not scarcity or a power balance violation.***

Under the ISO proposal, the "maximum import bid price" is only applicable to resource adequacy imports. Thus, during any interval in which the "maximum import bid price" is over \$1,000/MWh, the ISO will accept non-resource adequacy import bids up to the \$2,000/MWh cap without any actual cost-verification.

Consequently, in the hypothetical example described above, the same conditions of market power in the southwest outside of the ISO could incentivize the non-resource adequacy imports in the example above to bid \$2,000/MWh in HE 19 in the day-ahead (or real-time) market. In this example, the proposal would allow the 500 MW of self-scheduled exports not met by the ISO's excess resource adequacy to be met by the \$2,000/MWh non-resource adequacy imports in the day-ahead market. This would set the clearing price for all load in the ISO's day-ahead market at \$2,000/MWh, even though the load serving entities within the CAISO had contracted for excess resource adequacy capacity to bid at or below \$1,000/MWh.

***The proposal has significant implications for broader resource adequacy policy***

Resource adequacy policy and the ISO spot markets are currently designed with the intent to ensure that even when power is scarce in other BAAs, the ISO's load will be met and prices will be determined by bids that do not exceed \$1,000/MWh. As illustrated in the previous section, the ISO's proposal will significantly change this aspect of the resource adequacy design. Under the current proposal, even if load serving entities within CAISO secure sufficient resource adequacy capacity with marginal cost below \$1,000/MWh, CAISO load may be met at prices determined by bids of \$2,000/MWh whenever there are potential capacity shortages in other BAAs or market power is exercised in bilateral spot markets for electricity.

Although DMM would expect these conditions to arise in a limited number of hours each year, the proposal does constitute a significant shift in the resource adequacy product that load serving entities within the ISO purchase. DMM recommends that the ISO reconsider many aspects of the current proposal in an initiative that more comprehensively considers the ISO's scarcity pricing and export scheduling and pricing market designs, and the implications for these aspects of the market design on resource adequacy policy.

***The ISO should consider alternative options for limiting import and virtual bids over the \$1,000/MWh soft cap which can set market prices.***

Under the current proposal, when the "maximum import bid price" exceeds \$1,000/MWh (e.g. just \$1,001/MWh), all virtual bids and non-resource adequacy imports up to the \$2,000/MWh hard cap are automatically deemed to have been "cost verified" and can set market prices if dispatched. As discussed in these comments, market experience since mid-August has highlighted that non-resource adequacy imports may need to be dispatched to serve self-scheduled exports even when resource adequacy and resource sufficiency capacity procured by load serving entities would be sufficient to meet CAISO and Western EIM load. In these circumstances, \$2,000/MWh non-resource adequacy imports or virtual supply could set price for all load in the day-ahead market and \$2,000/MWh non-resource adequacy imports could set prices for all load in the fifteen-minute market. DMM believes that this warrants reconsidering the option to limit non-resource adequacy imports and virtual supply bids to the "maximum import bid price".

The ISO should also reconsider the option to continue to limit resource adequacy import bids to \$1,000/MWh even when the “maximum import bid price” exceeds \$1,000/MWh. In June 2020, the CPUC adopted a decision to require non-resource specific resource adequacy imports to bid at or below \$0/MWh during availability assessment hours starting with the 2021 compliance year.<sup>7</sup> As long as this decision is in effect, the ISO’s proposal to allow resource adequacy imports to bid up to the “maximum import bid price” will have no practical effect in most circumstances. However, continuing to limit resource adequacy import bids to \$1,000/MWh would provide several benefits.

In its June decision, the CPUC indicated it was “open” to a CAISO resource adequacy proposal that would not require resource adequacy imports to bid at or below \$0/MWh, but that “several aspects of the proposal require further development and regulatory approval before implementation”.<sup>8</sup> The ISO’s current proposal to allow import resource adequacy to bid above \$1,000/MWh when market power exists in bilateral markets outside of the ISO may become a barrier to the CPUC adjusting its rules in the future to allow import resource adequacy to bid marginal costs. Continuing to limit non-resource specific import resource adequacy bids to \$1,000/MWh could prevent this issue from becoming a barrier to future refinements to the CPUC’s Decision.

As discussed earlier in these comments, the current proposal changes the resource adequacy product from ensuring ISO area load will be met by \$1,000/MWh bids to only ensuring that ISO area load will be met by \$2,000/MWh bids. Continuing to cap import resource adequacy bids at \$1,000/MWh would decrease the extent to which the ISO’s proposal changes the definition of the resource adequacy product.

Finally, the CPUC’s June decision capping import resource adequacy bids at \$0/MWh only applies to Availability Assessment Hours, which do not include weekends or holidays. The recent heatwaves highlight that tight supply conditions occur and market power in bilateral electricity markets may be able to be exercised on weekends and holidays. The ISO’s proposal to allow import resource adequacy to bid up to the “maximum import bid price” would exacerbate the ability of import resource adequacy to contribute to the exercise of market power during peak hours on weekends and holidays until the CPUC and ISO can appropriately adjust Availability Assessment Hours.

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<sup>7</sup> *Decision Adopting Resource Adequacy Import Requirements*, California Public Utilities Commission, Decision 20-06-028, Rulemaking 17-09-020, June 25, 2020, p. 71:  
<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M342/K516/342516267.PDF>

<sup>8</sup> CPUC June 2020 Import RA Decision, p. 45.

## II. Analysis of proposed maximum import bid price

### Maximum import bid price

As discussed in the prior section of these comments, the “maximum import bid price” will play a key role in determining the number of days in which the provisions are triggered which allow for scarcity pricing and bids up to \$2,000/MWh. Since the “maximum import bid price” is not applied to non-resource adequacy non-resource specific resources, this section also refers to the “maximum import bid price” as the “import bid price threshold”.

### Analysis of import bid price threshold

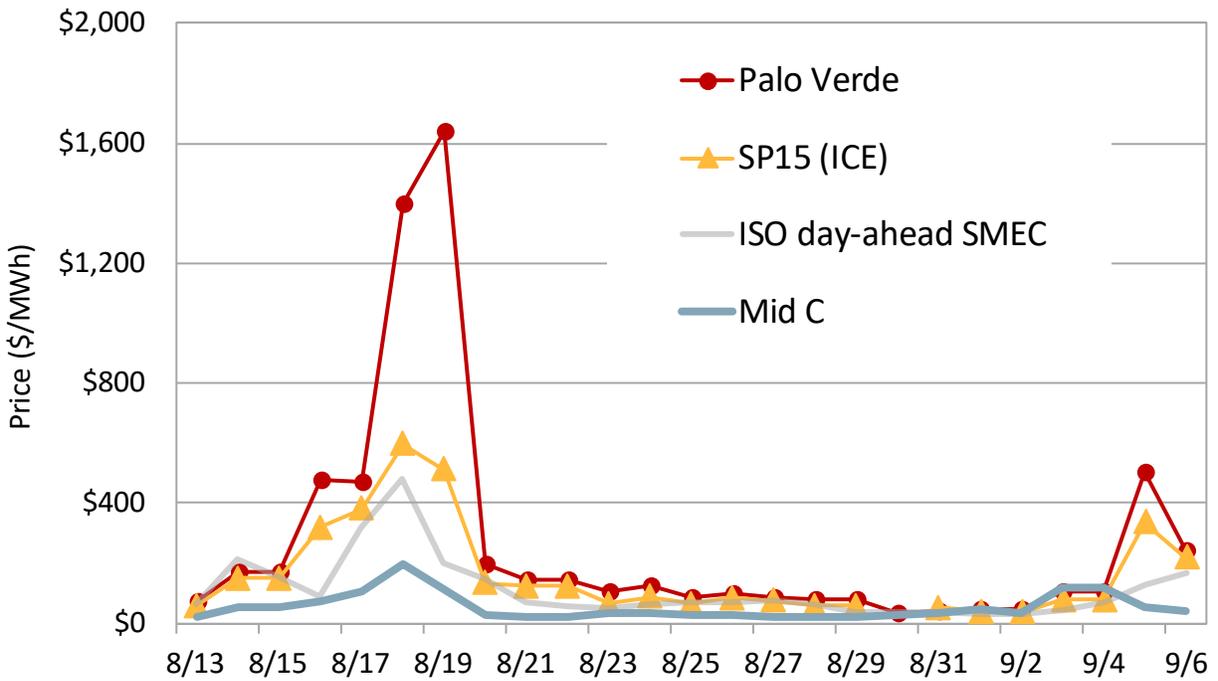
Prior to mid-August of this year, the day-ahead bilateral market price indices which the ISO proposes to use in its approach to cost-verification for import bids had not reached levels that would have resulted in approval of import bids over \$1,000/MWh as being eligible to set market clearing prices. However, market conditions since mid-August have now resulted in several periods over which the potential results and effectiveness of the proposed approach can be assessed. Over this period, bilateral prices reported for day-ahead trades at the Palo Verde trading hub reached levels that would have resulted in approval of import bid prices over \$1,000/MWh on five different days.

For this analysis, DMM has utilized day-ahead bilateral market price indices to estimate the bid price threshold that would be used in import bid cost-verification under the ISO’s approach. This approach starts with the weighted average price of day-ahead trades for 16 hour blocks of energy from HE 7 to 22 occurring on the Intercontinental Exchange (ICE). The maximum of the weighted average prices at the Palo Verde or Mid-Columbia trading hubs is used, along with a 10% adder.

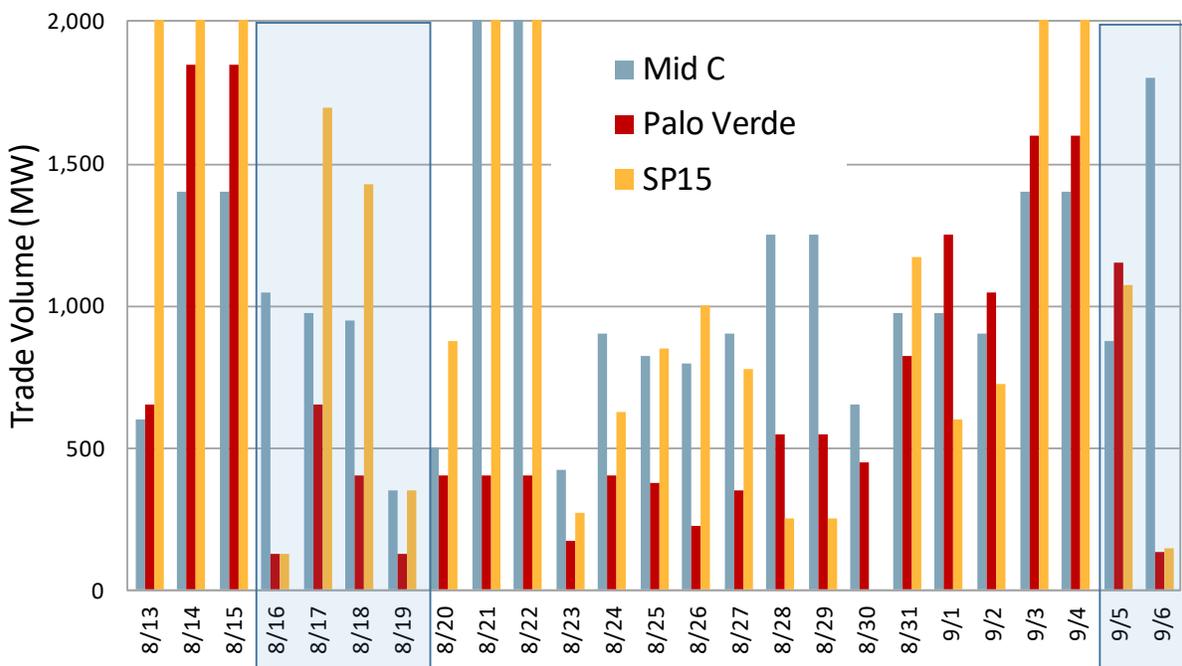
Figure 1 shows the day-ahead bilateral market price indices from ICE used in this analysis. As shown in Figure 1, the proposal to use the maximum of prices at the Mid-Columbia and Palo Verde trading hubs can have a dramatic effect on the proposed import bid price threshold. The days on which ICE day-ahead prices for power at Palo Verde would have resulted in an import bid price threshold above \$1,000/MWh correspond to the five days in Figure 1 when the weighted average price for 16-hour blocks of energy at Palo Verde sold on ICE was above \$400/MWh. On these days, ICE prices for trades at Palo Verde even exceeded ICE prices for similar blocks of energy at SP15 by a significant margin.

Figure 2 shows the volume of energy traded on ICE for each of the three main trading hubs. As shown in Figure 2, on most of the days when prices at Palo Verde rose above \$400/MWh, the volume of trades at Palo Verde (shown by the red bars) was relatively low. As discussed later in these comments, DMM believes that recent bilateral market experience highlights the potential design and implementation issues stemming from the fact that the proposal relies heavily on bilateral day-ahead price data from ICE.

**Figure 1. ICE day-ahead market prices for peak power (Hours 7-22)**

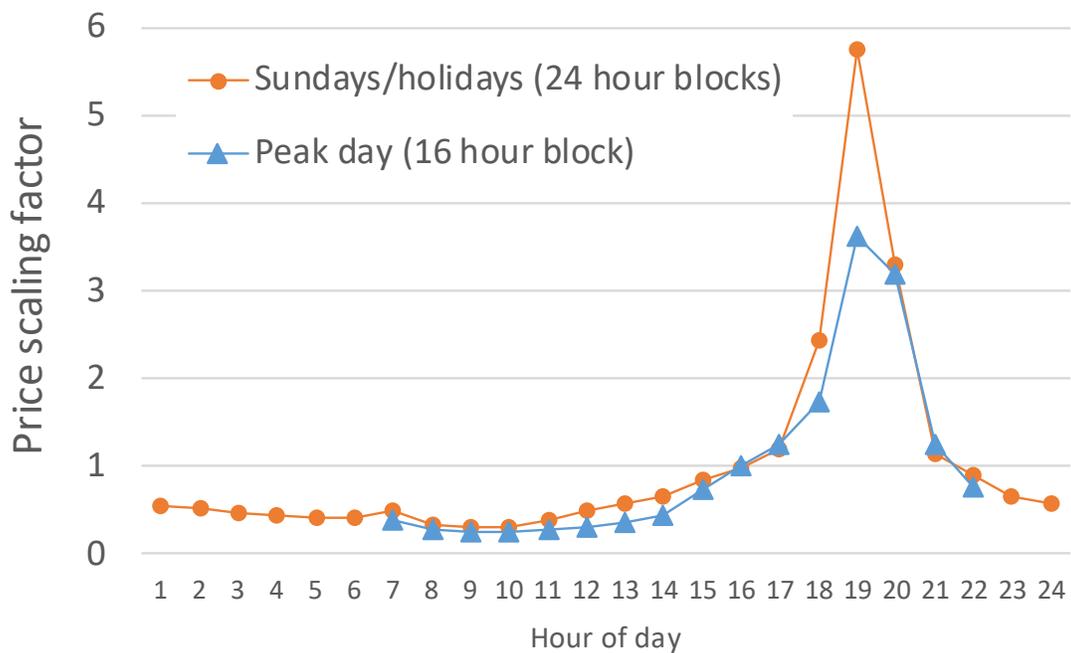


**Figure 2. ICE day-ahead market volumes for peak power (Hours 7-22)**



The day-ahead bilateral price from ICE used to set the maximum import bid price is then converted into 16 different hourly prices for hours ending 7 to 22. An hourly price curve reflective of day-ahead market prices is used to “shape” day-ahead bilateral market prices into hourly prices. The hourly curves used to “shape” hourly prices was developed based on day-ahead market prices on days between August 14 and September 7 when day-ahead prices cleared above \$200/MWh in one or more hours. These hourly curves are shown in Figure 3.

**Figure 3. Hourly scaling factors used to shape ICE day-ahead market prices for peak and off-peak period power**



Figures 4 and 5 show results of this analysis for August 14 to 21 for the day-ahead and real time markets, respectively. Figures 6 and 7 show results of this analysis for Saturday September 5 to Monday September 7.

As shown in Figures 4 and 5, because the proposed approach is based on bilateral prices in day-ahead trading, the resulting import bid price threshold is often much higher or lower than actual real-time prices. For example, on August 14 and 15 actual loads exceeded the day-ahead forecast and very tight supply conditions led the ISO to call for load curtailments. On both of these days, DMM's estimates of the proposed import bid price threshold was well below the \$1,000/MWh bid caps and was lower than prices in the day-ahead and real-time markets.

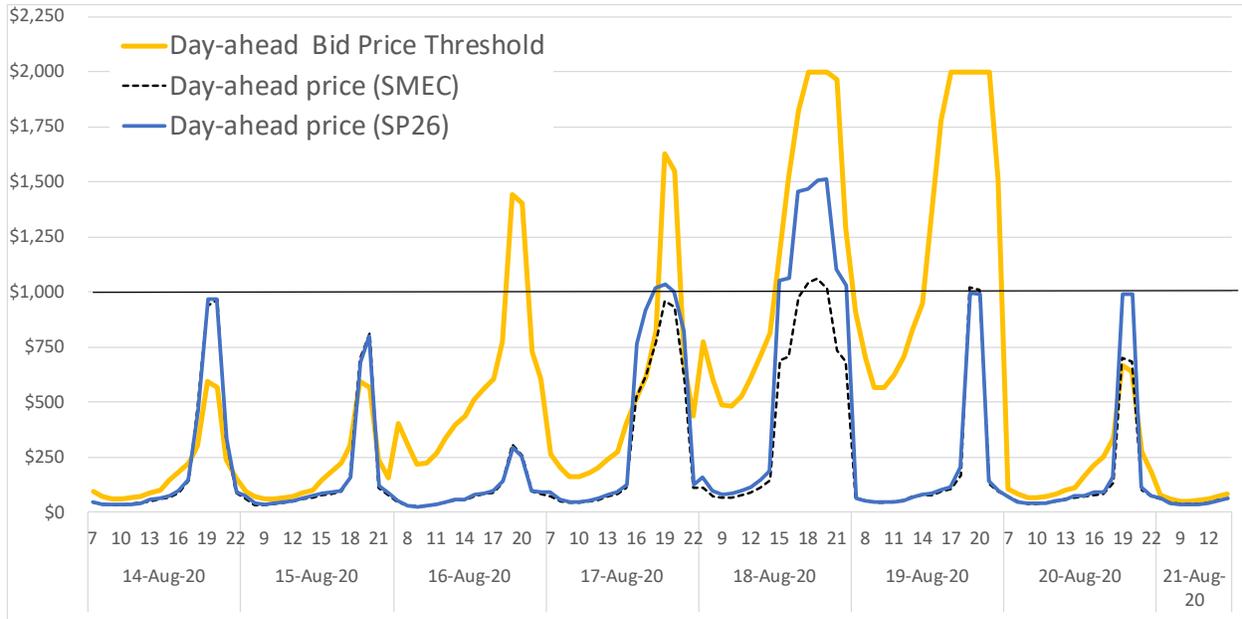
From August 16 to 19, DMM's estimate of the proposed import bid price threshold is well above the \$1,000/MWh bid cap during numerous hours. The reported price index for peak period power at the Palo Verde hub rose to about \$1,500/MWh on August 18 and 19, which would have resulted in an import bid price threshold at the \$2,000/MWh hard cap during multiple hours. As noted later in these comments, the trading volume on ICE was very limited on these two days – particularly on August 19. During this four day period, supply was expected to be very tight, but actual loads were significantly lower than day-ahead forecast and prices in the ISO real-time market remained below \$1,000/MWh.

As shown in Figures 6 and 7, the weighted average price of ICE trades for peak energy from hours 7 to 22 reached \$500/MWh on September 5. DMM's estimates of the proposed import bid price threshold was well above the \$1,000/MWh bid cap during hours 19 and 20 on this day. The ISO declared a Stage 2 emergency in the real-time market on this day prior to the evening ramping hours. As shown in Figures 6 and 7, prices in the ISO's day-ahead market remained well below the \$1,000/MWh cap on September 5, but reached \$1,000/MWh several hours in the real time market.

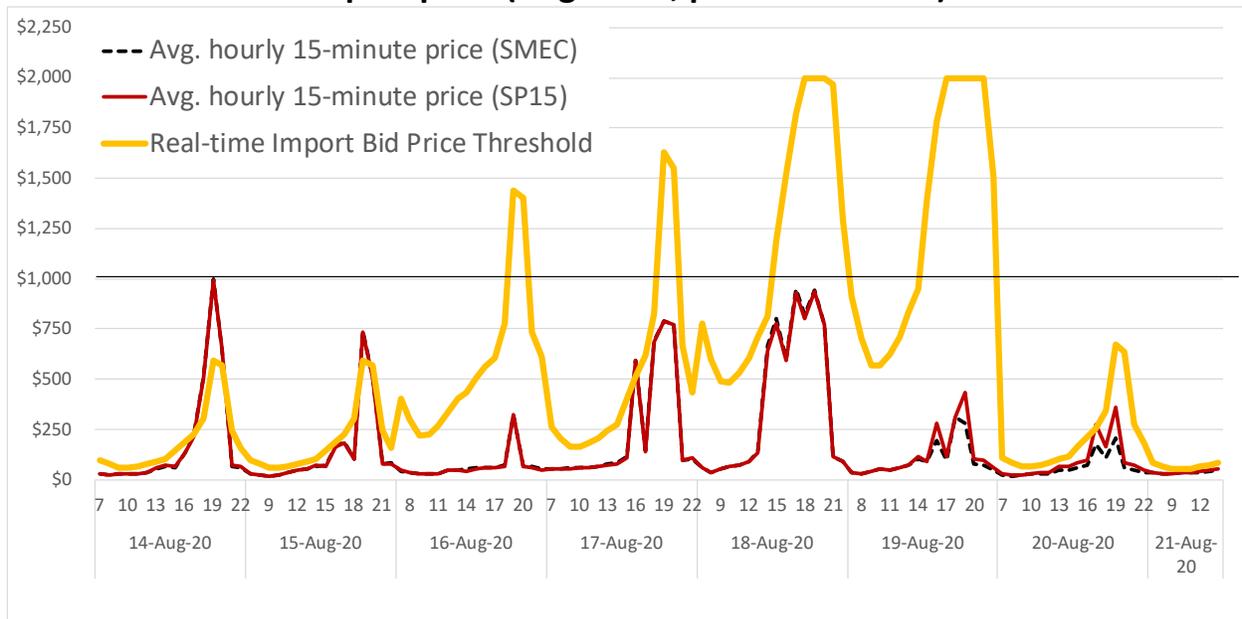
On Sunday September 6 and Monday September 7 (Labor Day), system conditions were expected to be very tight. These were off-peak days for which the only bilateral products offered on ICE were for 24 hour blocks of energy. For these days, DMM used the price curve for Sundays/holidays shown in Figure 3 to shape weighted average trades prices from ICE into hourly "maximum import bid price" values. As shown in Figure 6, DMM's estimate of the maximum import bid price" exceeded \$1,000/MWh on these days for only one hour (September 6, hour 19).

As shown in Figures 6 and 7, prices in the ISO's day-ahead ahead market remained under \$1,000/MWh on these days. In real time, the system marginal energy cost (SMEC) remained under \$1,000/MWh on these days, and the average hourly price in the 15-minute market for the SP15 hub was driven above \$1,000/MWh during only one hour on these two days.

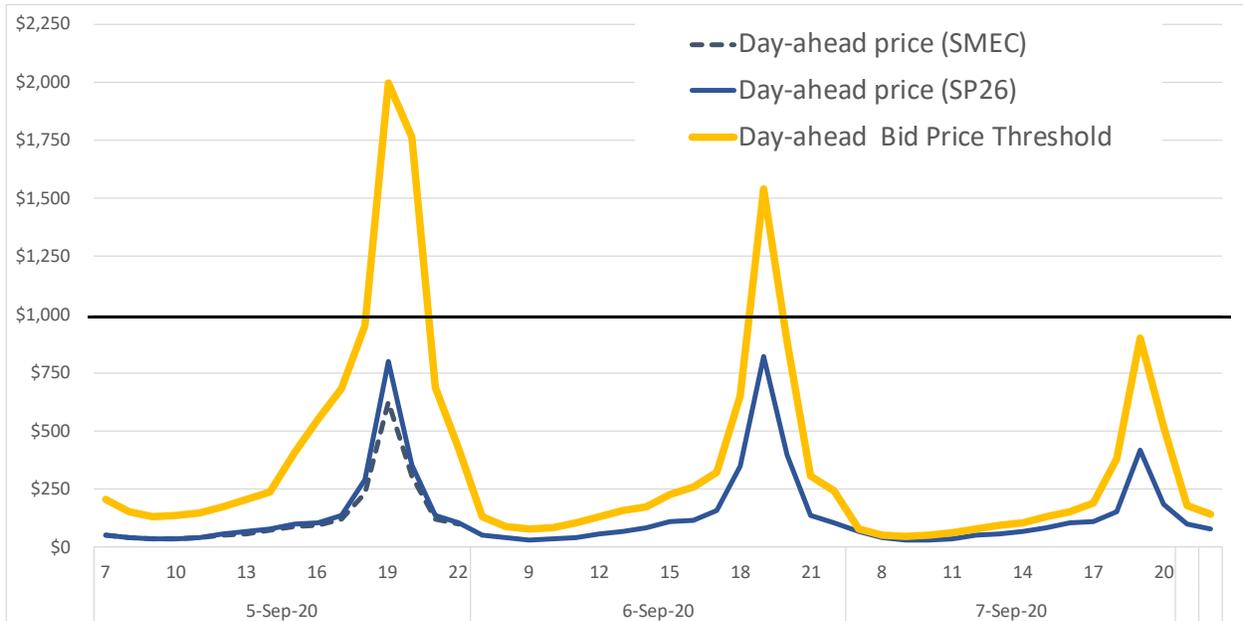
**Figure 4. CAISO day-ahead prices and potential maximum resource adequacy import bid price (Aug 14-21, peak hours 7-22)**



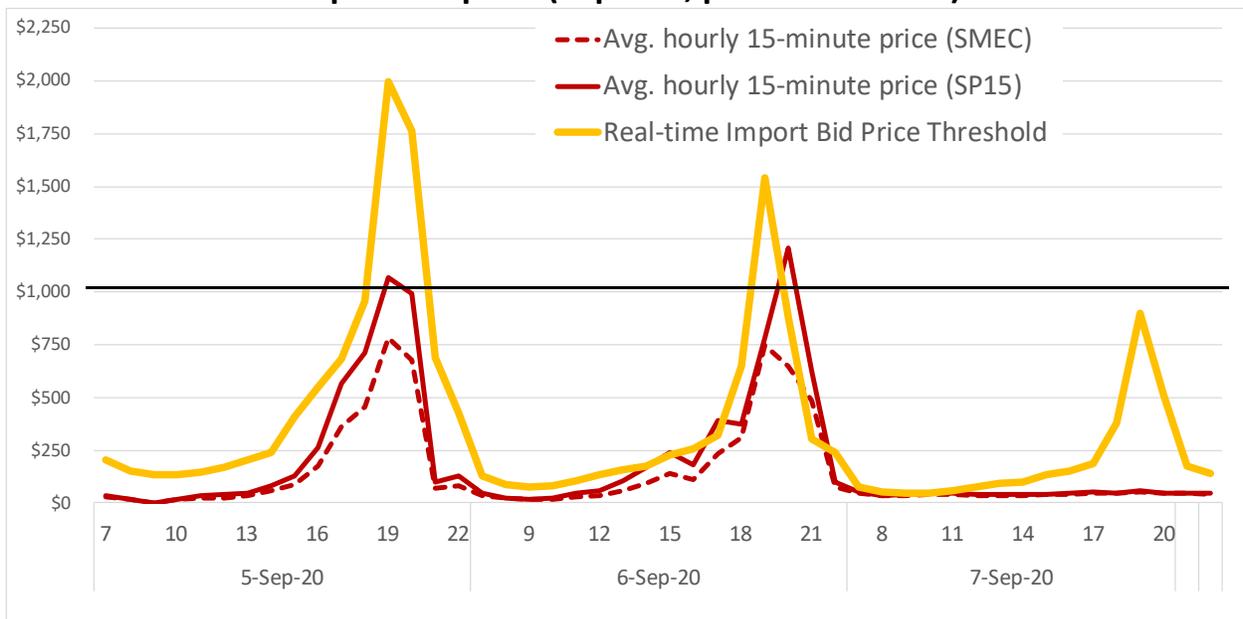
**Figure 5. CAISO real-time prices and potential maximum resource adequacy import price (Aug 14-21, peak hours 7-22)**



**Figure 6. CAISO day-ahead prices and potential maximum resource adequacy import bid price (Sept 5-7, peak hours 7-22)**



**Figure 7. CAISO real-time prices and potential maximum resource adequacy import bid price (Sept 5-7, peak hours 7-22)**



### **Liquidity of ICE trading hubs for electricity**

Analysis in these comments highlight that on critical days when projected system conditions may be tightest, the volume of trades and number of entities trading on ICE at the Palo Verde hub may be very limited. Thus, the ISO may need to establish some criteria for determining when insufficient bilateral price data may be available to calculate the import bid price threshold and develop alternative options for setting this threshold.

The ISO currently relies on Intercontinental Exchange (ICE) prices for the next-day and same-day gas markets to calculate cost-based bids used in mitigation. DMM assumes that the ISO would plan on also using ICE prices for peak period energy to calculate the import bid price threshold. Although other bilateral price data on day-ahead trading (such as SNL) may be available for use in the real-time market, DMM understands that ICE is the only source of bilateral electric price data available each morning in time for use in the day-ahead market (e.g. 8:30 am).

Figure 8 shows bilateral day ahead market price indices for peak power at the Palo Verde trading hub and the major trading hub in nearby Southern California (SP15) from August 13 to 21. As shown in Figure 8, price indices for the Palo Verde trading hub reported by ICE and SNL both tend to be highly correlated with bilateral prices for ICE trades at SP15. DMM understands that the SNL price index represents a weighted average that includes ICE trades along with other bilateral market trades.

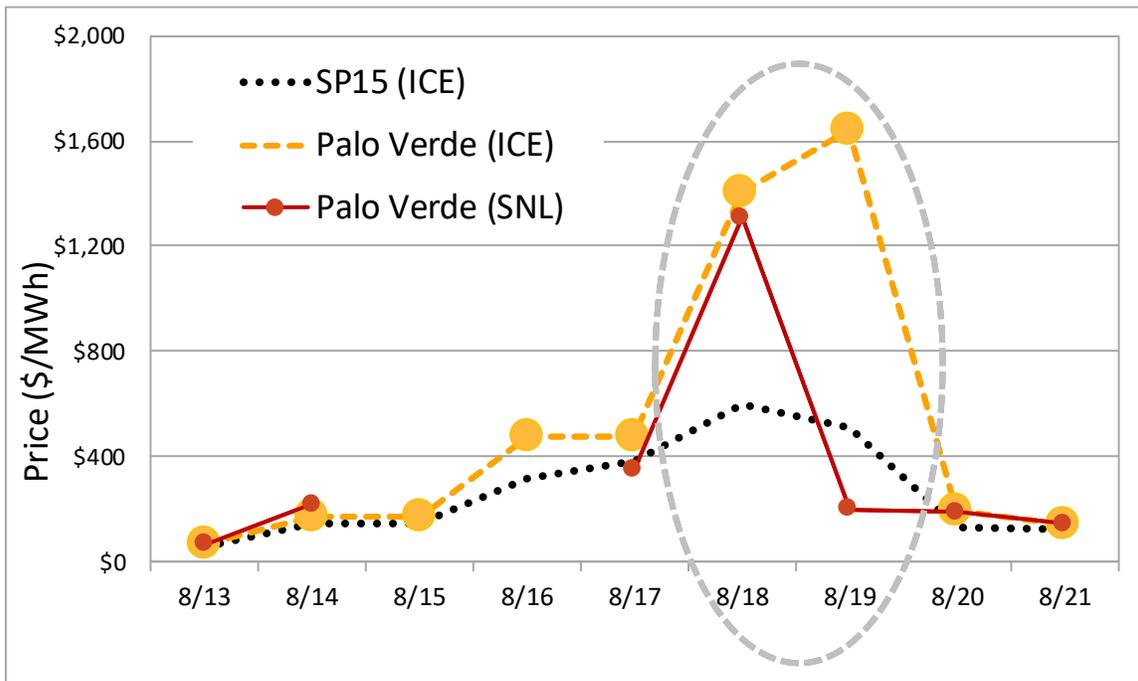
On August 18, both the ICE and SNL indices rose to about \$1,300/MWh at Palo Verde compared to about \$600/MWh at SP15. However, on August 19, the Palo Verde price index reported by ICE remained over \$1,300/MWh while the index for SNL dropped to about \$200/MWh. The dramatic difference in prices from the ICE and the SNL price index on August 19 highlight the potential issues involved in needing to relying on ICE prices to set the import bid price threshold.

As shown in Figure 9, the ICE day-ahead bilateral market price index for peak power trades at Palo Verde on August 18 and 19 was based on a relatively small trading volume (400 MW per hour on August 18 and only 125 MW per hour on August 19). The number of trades and entities transacting on ICE for power at Palo Verde was also very low on these days.<sup>9</sup> These data suggests that the market for day-ahead peak energy at Palo Verde on ICE was quite limited and potentially illiquid. In addition, the much lower weighted average price reported by SNL for August 19 suggests that, on that day, trades on ICE were not representative of overall bilateral market prices for peak power at Palo Verde on that day.

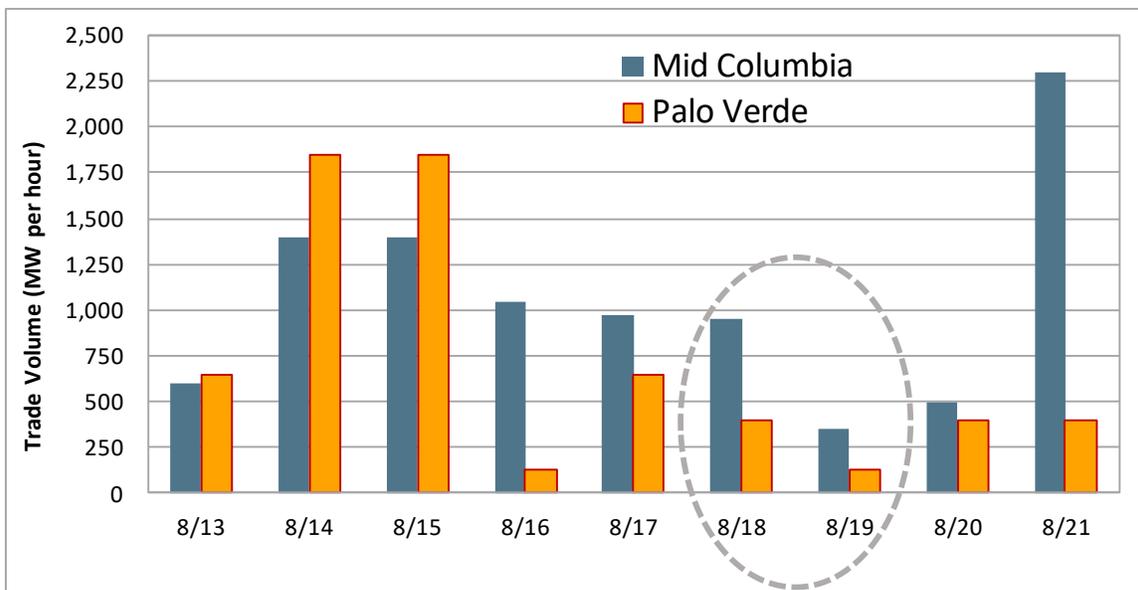
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<sup>9</sup> On August 18 there were 16 trades for day-ahead energy (peak) at Palo Verde on ICE made by 10 entities. On August 19 there were 5 trades for day-ahead energy (peak) at Palo Verde on ICE made by 5 entities.

**Figure 8. Day-ahead bilateral prices (peak hours 7-22)**



**Figure 9. ICE day-ahead market volumes (peak hours 7-22)**



### Assessing bilateral market liquidity

A 2004 FERC staff report included recommended criteria for deeming a bilateral power trading index to be sufficiently liquid for use in other applications.<sup>10</sup> The FERC criteria are based on daily averages over a 90-day period, rather than minimum daily values. Based on these criteria, daily power indices should meet at least one of the following conditions for all non-holiday weekdays within the 90 day review period:

1. Average daily volume traded of 4,000 MWh (or 250 MW x 16 hours).
2. Average daily number of transactions, over review period, of five or more.
3. Average daily number of counterparties, over the review period, of five or more.

Table 1 shows data on the liquidity of the ICE trades for power at Palo Verde for the days on which DMM’s analysis indicates that the “maximum import bid price” would have exceeded \$1,000/MWh based on the final weighted average ICE price for Palo Verde. As shown in Table 1, on three of the six days in which DMM’s estimate of the “maximum import bid price” exceeded \$1,000/MWh for one or more hours, day-ahead trading for power at Palo Verde was below the average daily requirements suggested in the 2004 FERC staff report.

**Table 1. Liquidity of ICE trading for day-ahead power at Palo Verde**

Date	Day	Product (hours)	High	Low	Avg	Volume (MW)	Trades	Companies
8/16	Sun	Off-peak (16)	\$500	\$390	\$478	125	3	5
8/17	Mon	Peak (16)	\$500	\$425	\$473	650	25	16
8/18	Tues	Peak (16)	\$1,515	\$1,000	\$1,400	400	16	10
8/19	Wed	Peak (16)	\$1,750	\$1,498	\$1,639	125	5	5
9/5	Sat	Peak (16)	\$615	\$375	\$503	1,150	46	19
9/6	Sun	Off-peak (24)	\$275	\$225	\$244	133	4	6

<sup>10</sup> Report on Natural Gas and Electricity Price Indices, May 25, 2004, pp.61-62.

<https://www.ferc.gov/sites/default/files/2020-05/20040505135203-Report-Price-Indices.pdf>

### **Bilateral price data available for use in day-ahead market**

Under the ISO's proposal, DMM assumes the ISO would need to rely on the weighted average prices of ICE trades for peak power the next day at about 8:30 a.m. each day in order to be able to calculate the import bid price threshold for the ISO's day-ahead market, as is currently done for gas prices. This means that the weighted average ICE price that is used to calculate the import bid price threshold for the day-ahead market would be based on an even lower number of trades than the final weighted average ICE price (which is published about 1 pm each day) that is used for the import bid price threshold for the real-time market the following day.<sup>11</sup>

### **FERC cost justification requirement for bilateral trades over \$1,000/MWh**

The bilateral sales at Palo Verde in ICE over \$1,000/MWh on August 17 and 18 are subject to cost verification and potential refund under FERC's \$1,000/MWh soft cap for bilateral sales in the WECC. DMM has intervened in the process for cost justification of these trades before FERC, noting that "due to the potential direct and indirect effects of bilateral market indices on prices in the CAISO and Western Energy Imbalance Market, DMM encourages the Commission to carefully scrutinize transactions and conditions leading to extremely high prices in excess of the soft cap which play a role in setting these bilateral price indices." <sup>12</sup>

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<sup>11</sup> DMM does not have access to detailed data on ICE trades to compare the price and liquidity of weighted average prices on ICE at 8:30 a.m. with the final price and liquidity at the end of the day.

<sup>12</sup> <http://www.caiso.com/Documents/MotiontoInterveneandCommentsoftheDepartmentofMarketMonitoring-WECCSoftOfferCap-Sept12020.pdf>