**UNITED STATES OF AMERICA**
**BEFORE THE**
**FEDERAL ENERGY REGULATORY COMMISSION**

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| **California Independent System Operator Corporation** | **)** **)** | **Docket No. ER19-538-000** |

**MOTION TO INTERVENE AND COMMENTS**
**OF THE DEPARTMENT OF MARKET MONITORING**
**OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION**

Pursuant to Rules 212 and 214 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission ("FERC" or "Commission"), 18 C.F.R. §§385.212, 385.214, the Department of Market Monitoring (DMM), acting in its capacity as the Independent Market Monitor for the California Independent System Operator Corporation ("CAISO"), submits this motion to intervene and comments in the above captioned proceeding.

## I. MOTION TO INTERVENE

DMM respectfully requests that the Commission afford due consideration to this motion to intervene and comments, and afford DMM full rights as a party to this proceeding. The CAISO tariff states that "DMM shall review existing and proposed market rules, tariff provisions, and market design elements and recommend proposed rule and tariff changes to the CAISO, the CAISO Governing Board, FERC staff, the California Public Utilities Commission, Market Participants, and other interested entities."[1] As this proceeding involves tariff provisions which impact the efficiency of the CAISO's markets, it implicates matters within DMM's purview.

[1] CAISO Tariff Appendix P, Section 5.1.

## II. COMMENTS

### Overview

In this proceeding, the CAISO proposes tariff revisions regarding the conformance (or manual adjustment) of load forecasts in the balancing authority areas that participate in the CAISO markets. Most notably, the CAISO is proposing to change the criteria used to determine when the *load conformance limiter* is triggered. As explained in the CAISO filing, the load conformance limiter is "an automated functionality that ensures the system operator-initiated conformances to load forecasts that enter the market optimization do not exceed the actual market ramping capability and are consistent with actual system needs."[2] When this limiter is triggered due to insufficient upward ramping capacity to meet projected demand in the 15-minute and 5-minute markets, the market price is set based on the highest bid dispatched rather than the $1,000/MWh penalty price.

DMM supports the CAISO's proposed enhancements to the load conformance limiter as an improvement over the current approach. Under the proposed method, the load conformance limiter would be triggered by a measure based on the *change* in load adjustments from one interval to the next, rather than the total level of the load adjustment. This change will significantly reduce the intervals in which the limiter is triggered. DMM's on-going monitoring suggests that the proposed approach is likely to reduce the frequency in which the limiter is

[2] *Tariff Amendment to Enhance Detail on Load Forecast, Conformance* California Independent System Operator, ER19-538-000, December 12, 2018 ("CAISO filing"), p.8-13. http://www.caiso.com/Documents/Dec12-2018-TariffAmendment-ImbalanceConformanceEnhancement-ER19-538.pdf

triggered when the power balance constraint is relaxed due to excessive manual adjustments rather than by an actual scarcity of ramping capacity.

However, analysis by DMM, included in these comments and prior DMM reports, shows that under current market conditions, the load conformance limiter will not have a significant impact on average prices in the CAISO — *with* or *without* the proposed changes. This is because in most intervals when the limiter is triggered in the CAISO, the highest priced bids dispatched are currently at or near the $1,000/MWh bid cap, so that the resulting price would often be very similar with or without the limiter.

Analysis provided in these comments indicates that the proposed changes to the load conformance limiter may have a significant impact on prices in two EIM balancing areas. This analysis shows that if the proposed method had been in place during 2018, average prices in the Arizona Public Service area would have increased by almost $4/MWh (11%) in the 15-minute market and $5/MWh (14%) in the 5-minute market. In the NV Energy area, average prices would have increased by around $2/MWh (6%) in the 15-minute market and almost $3/MWh (8%) in the 5-minute market. In all other EIM areas the difference in the price impact of the proposed approach relative to the current method would have been minimal due to the low frequency of supply insufficiencies.

DMM has also noted that the proposed changes to the load conformance methodology could have a significant impact on prices when the CAISO raises the penalty prices for supply insufficiencies and the energy bid cap applied to qualifying

resources to $2,000/MWh pursuant to FERC Order No. 831.[3] To mitigate this potential price impact, DMM has recommended that the CAISO seek to reduce the need for operators to make manual adjustments to the projected demand in the real-time market.

DMM's earlier comments in the CAISO stakeholder process included analysis of the use of load adjustments and the impact of the proposed changes based on data for 2016 and 2017.[4] The following sections of these comments provide an update of this analysis for January through November 2018. The comments also include an analysis of the impact of the current and proposed conformance limiter on prices in each of the EIM balancing areas.

**Impact of the proposed changes in the CAISO**

Figure 1 shows the frequency of under-supply infeasibilities in the CAISO between January and November, 2018, and whether the current load conformance limiter triggered or proposed limiter would have triggered. There were no valid over-supply infeasibilities in the CAISO during this period. As shown in Figure 1, in the 15-minute market the current limiter was triggered during about 89 percent of under-supply infeasibilities, while the proposed limiter would have triggered during only about 28 percent of under-supply infeasibilities. In the 5-minute market, the current limiter was triggered during about 70 percent of under-supply infeasibilities, while the

[3] Under Order No. 831, offers up to $2,000/MWh from resources with verified cost-based bids, imports and virtual resources may set market energy prices. The CAISO plans to raise penalty prices to over $2,000/MWh all hours as part of compliance with Order 831.

[4] *Comments on the Load Conformance Limiter Enhancement Straw Proposal*, Department of Market Monitoring, December 20, 2017. http://www.caiso.com/Documents/DMMComments-ImbalanceConformanceEnhancements-IssuePaper-StrawProposal.pdf.

proposed limiter would have triggered during only about 18 percent of under-supply infeasibilities.

**Figure 1. Triggering of load conformance limiter for under-supply infeasibilities with and without proposed changes (January – November 2018)**

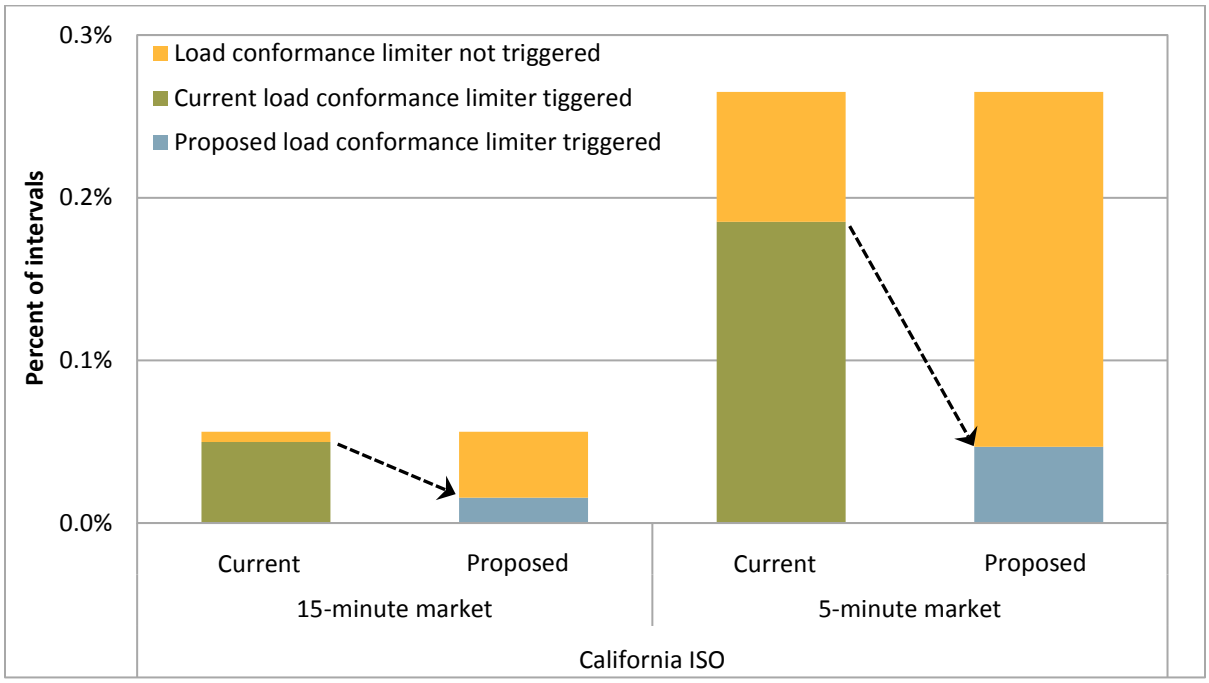



Figure 2 shows the frequency of under-supply infeasibilities in the CAISO's 5-minute market during 2018 when the load conformance limiter triggered and the resulting system marginal energy price (set by the highest bid dispatched). As shown in Figure 2, resulting prices were greater than $950/MWh in around 90 percent of these intervals. As shown in Figure 3, the conformance limiter has had a minimal impact on average 5-minute prices for the PG&E area in 2018.[5] The proposed changes would also have had an even smaller impact on 15-minute prices.

[5] DMM used PG&E load area prices for this analysis. These are representative of the impact on system market energy prices throughout the CAISO system during most intervals.

**Figure 2. Distribution of system marginal energy prices after the limiter triggered (January – November 2018)**

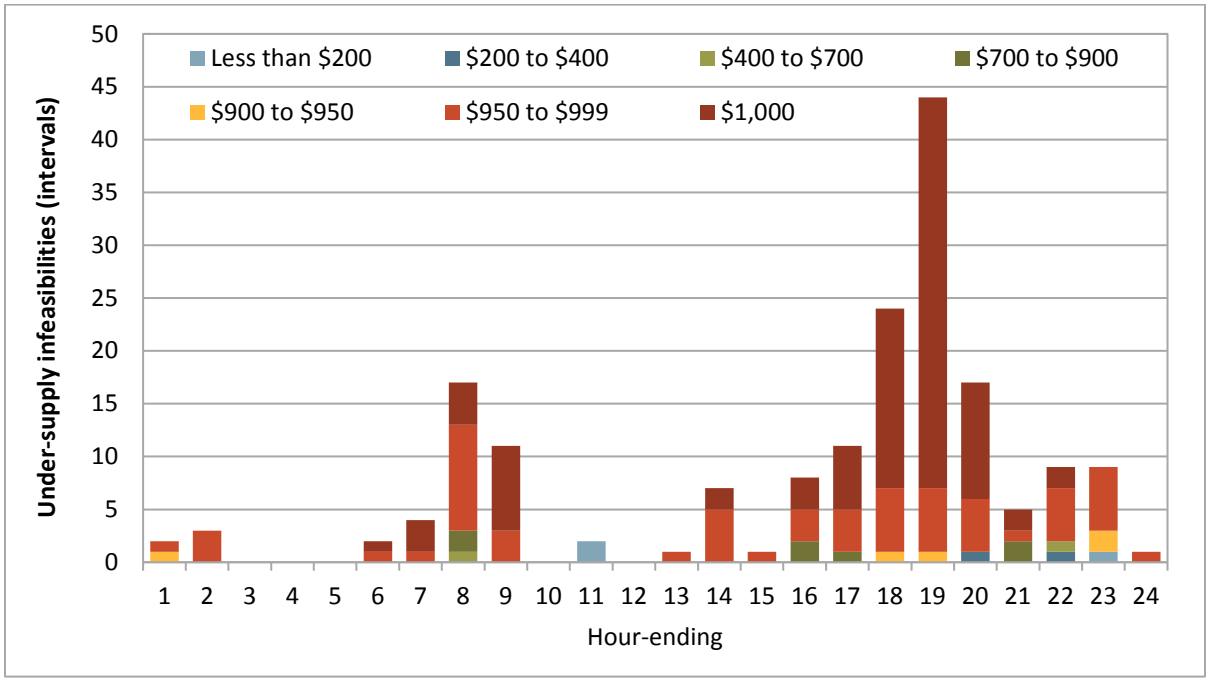
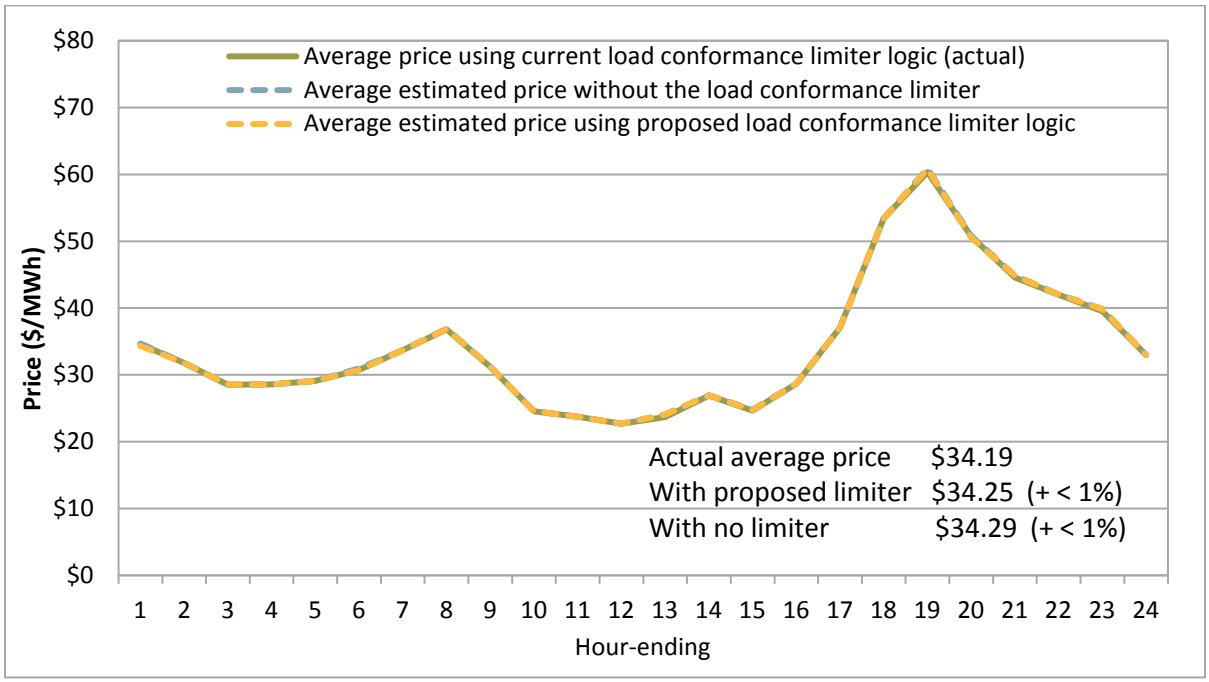



**Figure 3. Impact of load conformance limiter on average 5-minute PG&E LAP prices (January – November 2018)**



In the majority of cases in 2018 when the current limiter triggered, the highest dispatched economic bids were at or near the bid cap of $1,000/MWh such that the resulting price for the under-supply infeasibility, with or without the limiter, was often similar. In most of these cases, proxy demand response (PDR) resources (bid in at the bid cap) were dispatched to provide energy and set the market price. Other unit types including energy storage resources (batteries) and biogas have also been dispatched at bids near the bid cap during these instances when the load conformance limiter triggered.

As noted in DMM's comments the CAISO Board of Governors, DMM has previously expressed concern that most or all proxy demand response ("PDR") resources dispatched in the real-time market cannot (and do not) respond to 15-minute or 5-minute dispatches.[6] The CAISO plans to address this issue as part of its energy storage and distributed energy resources phase 3 (ESDER 3) initiative.[7] The ESDER3 proposal would allow demand resources the option of only submitting hourly block or 15-minute dispatchable bids in the real-time market. These new bid options are designed to provide an effective tool for scheduling coordinators to prevent infeasible real-time dispatches for PDR resources that cannot respond on a 15-minute or 5-minute basis. This proposal was approved by the Board in August and is planned for implementation in fall 2019.

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[6] *Department of Market Monitoring Comments on Imbalance Conformance Enhancements Proposal*, memo to Board of Governors, May 9, 2018, p.7. (included as Attachment G of CAISO filing).

[7] *Decision on the Energy Storage and Distributed Energy Resource phase 3 (ESDER 3) proposal*, memo to Board of Governors from Keith Casey, August 29, 2018. http://www.caiso.com/Documents/Decision_EnergyStorage_DistributedEnergyResourcesPhase3Proposal-Memo-Sep2018.pdf

**Impact of the proposed changes in the EIM**

Analysis of 2018 data by DMM indicates that the proposed changes to the load conformance limiter may have a more significant impact on prices in some of the EIM areas than in the CAISO. Figure 4 shows the frequency of infeasibilities in the 5-minute market in which the current or proposed conformance limiter logic would have been triggered in 2018. [8]

The green bars in Figure 4 represent intervals when the current limiter logic was triggered, but the limiter would not be triggered under the proposed approach. For intervals with ramping shortages in this category, the proposed approach would *increase prices* relative to the current method since prices would have been set by the $1,000/MWh penalty parameter under the proposed approach, rather than being set by the highest priced bid dispatched under the current method.

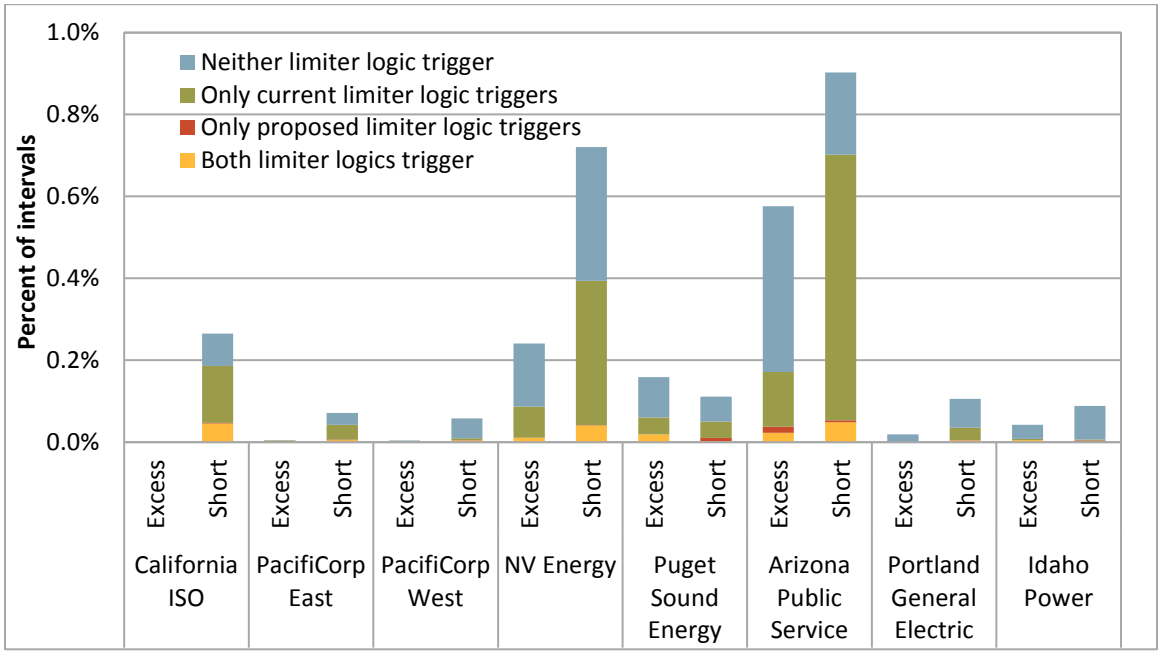
The red bars in Figure 4 represent the small number of intervals when the current limiter logic was not triggered, but the limiter would have been triggered under the proposed approach. For intervals with shortages in this category, the proposed approach would *decrease prices* relative to the current method since prices would be set by the highest price bid dispatched rather than the $1,000/MWh penalty parameter.

[8] In Figure 4, intervals when the power balance constraint needed to be relaxed in the negative direction due to excess supply are labeled “Excess”. Intervals when the power balance constraint needed to be relaxed in the positive direction due to shortage of upward ramping are labeled “Short”.

The blue bars in Figure 4 show intervals in which the limiter would not be triggered under either method, so the change has *no price impact*.

The yellow bars in Figure 4 show intervals in which the limiter would be triggered under both methods, such that the two approaches would have the same impact on prices.

**Figure 4. Frequency of load conformance limiter in the 5-minute market (January – November 2018)**




As shown in Figure 4, the conformance limiter has been triggered most frequently in the NV Energy and Arizona Public Service balancing areas. Under the proposed method, the portion of intervals in which the conformance limiter is triggered would be greatly reduced in these two balancing areas. The price impact of both approaches is also highest in these two EIM balancing areas. Under the current approach, the load conformance limiter was triggered for under-supply conditions during almost 0.4 percent of intervals in the NV Energy area and 0.7 percent of

intervals in the Arizona Public Service area. The resulting price after the load conformance limiter triggered for an under-supply infeasibility in the EIM was $300/MWh or less in almost 90 percent of intervals in these areas.

Table 1 summarizes the estimated impact of the proposed method for triggering the conformance limiter on average prices in each EIM area during 2018.[9] If the proposed load conformance limiter method had been in effect, average prices in the Arizona Public Service area would have been higher by almost $4/MWh (11%) in the 15-minute market and about $5/MWh (14%) in the 5-minute market. In the NV Energy area, average prices would have been about $2/MWh (6%) higher in the 15-minute market and almost $3/MWh (8%) higher in the 5-minute market. In the other EIM areas the impact of the proposed approach relative to the current method would be minimal.

As previously noted, the proposed approach could have a higher impact on EIM prices when the CAISO raises the penalty prices for supply insufficiencies to $2,000/MWh pursuant to FERC Order No. 831.

[9] Powerex is not a balancing authority area or transmission service provider like the other EIM entities and do not have the ability to enter conformances.

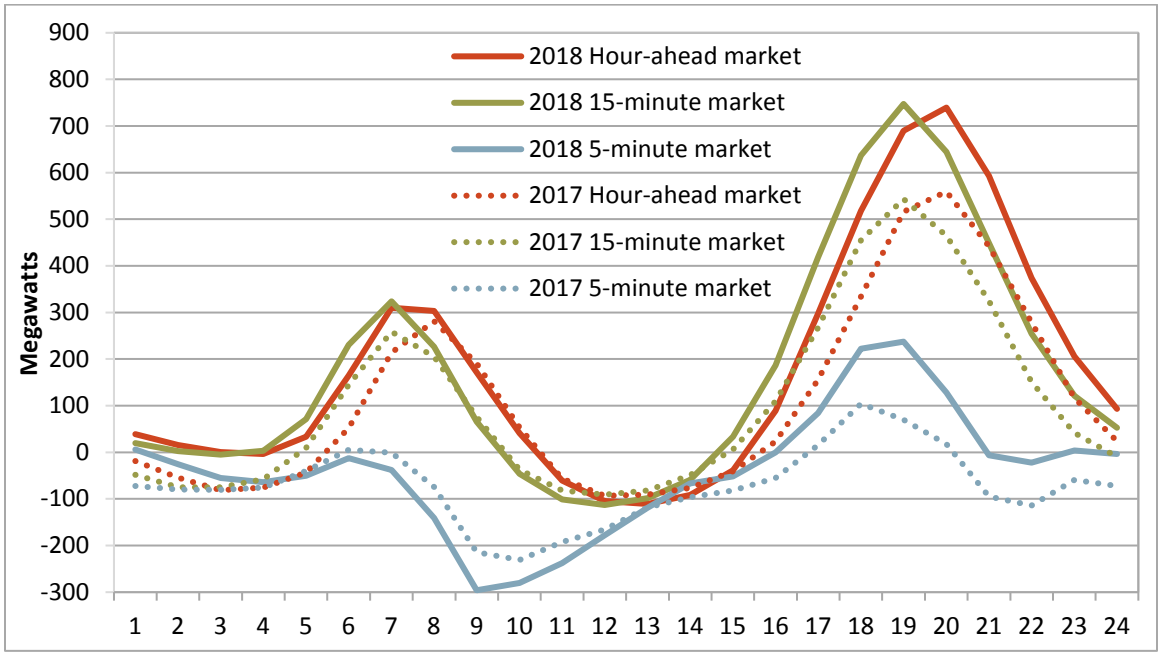
**Table 1. Impact of proposed load conformance limiter in EIM (January – November 2018)**

| | Average EIM price (with current conformance limiter) | Average estimated price with the proposed conformance limiter | Estimated impact of proposal | |
|---|---|---|---|---|
| | | | Dollars | Percent |
| ***PacifiCorp East*** | | | | |
| 15-minute market (FMM) | $28.72 | $28.82 | $0.10 | |
| 5-minute market (RTD) | $28.38 | $28.60 | $0.22 | |
| ***PacifiCorp West*** | | | | |
| 15-minute market (FMM) | $24.61 | $24.61 | $0.00 | |
| 5-minute market (RTD) | $24.17 | $24.20 | $0.03 | |
| ***NV Energy*** | | | | |
| 15-minute market (FMM) | $35.47 | $37.49 | $2.02 | 6% |
| 5-minute market (RTD) | $34.95 | $37.81 | $2.86 | 8% |
| ***Puget Sound Energy*** | | | | |
| 15-minute market (FMM) | $24.93 | $24.95 | $0.03 | |
| 5-minute market (RTD) | $24.22 | $24.43 | $0.21 | |
| ***Portland General Electric*** | | | | |
| 15-minute market (FMM) | $24.79 | $24.79 | $0.00 | |
| 5-minute market (RTD) | $24.09 | $24.31 | $0.23 | |
| ***Arizona Public Service*** | | | | |
| 15-minute market (FMM) | $34.61 | $38.44 | $3.84 | 11% |
| 5-minute market (RTD) | $34.20 | $39.15 | $4.95 | 14% |
| ***Idaho Power*** | | | | |
| 15-minute market (FMM) | $22.09 | $22.09 | $0.00 | |
| 5-minute market (RTD) | $21.60 | $21.60 | $0.00 | |
| ***California ISO (LAP average)*** | | | | |
| 15-minute market (FMM) | $38.68 | $38.69 | $0.01 | |
| 5-minute market (RTD) | $38.26 | $38.31 | $0.05 | |

## Recommendations

DMM has recommended that the CAISO seek to make improvements to reduce the need for operators to make large manual adjustments to the real-time imbalance demand, particularly in the very predictable ramping pattern in which adjustments have been made in recent years.[10] Figure 5 shows the average load adjustment made by CAISO in each interval of the day during 2018 and 2017 in the real-time market. As shown in Figure 5, the average magnitude of load adjustments increased in 2018, with a continued pattern of significant load adjustments which mirror the net load curve of the CAISO system.

**Figure 5. Average load conformance in CAISO (January – November 2018)**




[10] e.g. see *Attachment G of* CAISO filing, p.2-5.

The CAISO's filing highlights a variety of enhancements which CAISO expects will reduce the need for load conformance in the future. These include (1) improving real-time forecasting of renewable resources, (2) implementation of a 15-mintue day-ahead market, and (3) improvements in the flexible ramping product.[11] The CAISO's filing also indicates that the CAISO is undertaking a variety of efforts to improve system operator situational awareness and system operator tools and processes.[12]

Implementing various enhancements which avoid any unnecessarily large load adjustments will become increasing important when the CAISO raises the bid cap for eligible resources and the penalty prices for supply insufficiencies to $2,000/MWh pursuant to FERC Order No. 831. As previously noted, raising the penalty price to over $2,000/MWh will significantly increase the price impact of supply insufficiencies which are not mitigated by the load conformance limiter.

In addition, the criteria used by the CAISO to cost verify any bids over $1,000/MWh pursuant to Order 831 may also have a more significant impact on real-time prices under the changes to the load conformance limiter being proposed. Bids over $1,000/MWh which are dispatched in the real-time market may set prices when the conformance limiter is triggered. Bids over $1,000/MWh may also set prices when large upward load adjustments are made but the load conformance limiter is not triggered. As previously noted, the highest priced bids dispatched are often by demand response and battery storage resources with bids at or near the bid cap.

[11] CAISO filing, pp.21-22.
[12] CAISO filing, p. 22.

Any bids over the current cap of $1,000/MWh from these demand side response or battery storage resources should be carefully scrutinized.

## III. CONCLUSION

DMM supports the proposed changes to the load conformance limiter as an improvement over the current approach. As described in these comments, DMM recommends that the CAISO take steps to mitigate the potential future price impacts of the proposed changes and the planned elimination of the conformance limiter. DMM respectfully requests that the Commission afford due consideration to these comments as it evaluates the proposed tariff provisions before it in this proceeding.

Respectfully submitted,

***/s/ Eric Hildebrandt***

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Independent Market Monitor for the California
Independent System Operator

Dated: January 2, 2019

## CERTIFICATE OF SERVICE

I hereby certify that I have served the foregoing document upon the parties listed on the official service lists in the above-referenced proceedings, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated at Folsom, California this 2nd day of January, 2019.

*/s/ Anna Pascuzzo*
Anna Pascuzzo