UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

California Independent System Operator Corporation	**)** **)**	**Docket No. ER18-2520-000**

COMMENTS OF THE DEPARTMENT OF MARKET MONITORING FOR THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

Pursuant to Rules 211, 212, and 214 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission ("FERC" or "Commission"), 18 C.F.R. §§ 385.211, 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 these comments in the above-captioned proceeding.

The CAISO is seeking approval for tariff amendments to extend seven measures aimed at addressing the limited operability of the Aliso Canyon gas storage facility which were first approved in 2016 on a temporary basis.[1] DMM supports extension of all of these temporary measures except the measure allowing CAISO to apply a *gas price scalar* to increase the gas price used in calculating caps for commitment costs and default energy bids used in real-time market power mitigation for gas-fired generating units in the SoCal Gas and SDG&E gas regions (SoCalGas system). As explained in these comments, DMM believes these gas price scalars weaken market power

[1] *Filing to Temporarily Extend Previously Approved Measures to Address Potential Gas Limitations*, September 29, 2018, ER18-2520,000, ("CAISO transmittal letter") http://www.caiso.com/Documents/Sep28-2018-TariffAmendment-AlisoCanyonGas-ElectricCoordination-Phase4-ER18-2520.pdf

mitigation and increase costs in the CAISO system, but have proven to be a crude and ineffective tool for limiting gas usage when needed for system reliability.

While DMM supports temporary extension of the CAISO's ability to enforce a *maximum gas constraint* for groups of units in the SoCalGas system, DMM continues to recommend that the CAISO refine how it utilizes the maximum gas constraint and improve how gas usage constraint limits are set and adjusted in real-time. Market performance during the limited times the CAISO has utilized maximum gas constraints shows that this measure can increase market costs significantly and should be more effectively designed and implemented to ensure it is an effective tool for helping to ensure reliability.

I. MOTION TO INTERVENE

DMM respectfully requests that the Commission afford due consideration to these comments and motion to intervene, and afford DMM full rights as a party to this proceeding. The mission of DMM – like that of all Independent Market Monitors – is as follows:

> To provide independent oversight and analysis of the CAISO Markets for the protection of consumers and Market Participants by the identification and reporting of market design flaws, potential market rule violations, and market power abuses.[2]

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."[3] As this proceeding involves CAISO tariff provisions which affect the efficiency and potential for market power in the CAISO markets, it implicates matters within DMM's purview.

[2] CAISO Tariff Appendix P, Section 1.2.

[3] CAISO Tariff Appendix P, Section 5.1.

II. COMMENTS

As summarized in the CAISO's filing, the temporary measures which the CAISO is seeking to extend date back to summer 2016 and have already been extended twice. CAISO now has well over two years of experience with these measures covering a period spanning three summers and two winters. Two of these measures – the gas price scalars and the gas usage constraints have now been *activated* and *not activated* during a wide range of gas supply situations. The effectiveness and impact of both these measures can now be assessed by examining market performance under tight gas and electric supply conditions *with* and *without* these measures. This market experience has shown that the gas cost scalars can undermine market power mitigation rules and increase market costs but are not an effective tool to manage electric or gas system reliability and are not necessary for that purpose. This market experience also shows that the effectiveness of the maximum gas usage constraint has been limited and that further refinements are needed in how the CAISO implements this tool.

A. Gas Price Scalars

The static nature of the gas price scalars makes them a crude and ineffective tool for mitigating tight gas market conditions in the CAISO's real time market.

When the 175 percent gas price scalar for commitment costs is in effect, bid caps for start-up and minimum load costs in the real-time market are calculated using gas costs which are 175 percent of the SoCal Citygate next day gas price index normally used under the CAISO tariff. When combined with the additional 25 percent head room above costs normally incorporated in commitment cost bid caps, the 175 percent scalar raises the bid caps to about 200 percent of the CAISO's calculation of commitment costs. When the 125 percent scalar for default energy bids is in effect, energy bid caps for units in the SoCalGas

area used in local market power mitigation are calculated using a 125 percent of the SoCal Citygate price. When combined with the 10 percent adder also incorporated in all default energy bids, the scalar raises the caps used in energy bid mitigation to about 135 percent of the CAISO's calculation of each unit's actual marginal energy costs.

The static nature of the process for activating and setting the gas price scalars makes this measure a very crude and ineffective tool for managing reliability and mitigating market power. As described in the CAISO's filing:

> First, there is an inherent delay in actually applying the scalars, which means there may be days when the scalars could have worked but the CAISO could not have activated them in time to capture the increased costs experienced in the south. If CAISO detects conditions that warrant activation of the scalars early in the morning, the CAISO must activate the scalars manually as part of the scheduled calculation that takes place at the end of the day each night. The scalars then become effective on next trade date ….Second, because the CAISO cannot just switch the scalars on and off dynamically, once it puts them on it may have to leave them on for some time if believes conditions may warrant their use.[4]

These problems are further exacerbated by the CAISO's use of static values of 175 percent and 125 percent, rather than scalars based on actual gas market prices and conditions. As a result of these limitations, DMM has observed the following trend when the CAISO has activated the scalars. After a day on which same day gas market prices at SoCal Citygate increase significantly above the next day index used to set real-time bid caps, the CAISO activates the scalars for the following operating day. On subsequent days when the scalars are left in place, same day gas prices return to levels at or below the normal 25 percent and 10 percent headroom incorporated in commitment cost bid caps and default energy bids.

[4] CAISO transmittal letter, p. 25

DMM has highlighted numerous examples of this pattern in prior reports and comments to the Commission.[5] As a result of this pattern, gas prices used in calculating bid caps in the real-time market for units in the SoCalGas area have been lower than may have been warranted on some days and have been too high to mitigate local market power on many other days. As noted in DMM's prior comments to the Commission, this problem could be eliminated if the CAISO developed the capability to update gas costs used in the real-time market based on actual observed same day gas market prices and conditions.[6] DMM continues to recommend the CAISO begin development of this capability as the best way to ensure system reliability, efficiency and effective market power mitigation without relying on the gas cost scalars.

The gas price scalars were designed to be a temporary short term measure, but CAISO continues to rely on extensions of this authority.

The initial values of the gas price scalars were suggested by DMM in spring 2016 for use on a temporary basis to allow the CAISO access to a measure to protect against the substantial uncertainties about the impact of Aliso Canyon limitations would have on gas markets. By September 2016, DMM advised the CAISO that the gas price scalars did not appear to be providing a significant benefit in terms of helping to manage gas usage. DMM also began recommending that the CAISO initiate steps needed to implement a process for updating gas prices used in the real-time market based on same day trade prices on the

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[5] *Comments of the Department of Market Monitoring*, Docket No. ER17-2568, October 26, 2017. pp.8-12. http://www.caiso.com/Documents/Oct26_2017_DMMComments-AlisoCanyonElectric-GasCoordinationPhase3_ER17-2568.pdf.

Q1 2018 Report on Market Issues and Performance, Department of Market Monitoring, July 10, 2018, pp. 53-55. http://www.caiso.com/Documents/2018FirstQuarterReportonMarketIssuesandPerformance.pdf

[6] *Comments of the Department of Market Monitoring*, Docket No. ER17-2568, op. cit., pp.10-12.

Intercontinental Exchange (ICE) each morning. [7] DMM noted that this process would be essentially the same as the process that the CAISO had successfully begun using in October 2016 to update next day gas prices used in the day-ahead market each morning pursuant to the CAISO's Aliso Canyon 2 filing.

When the CAISO initiated the Commitment Cost and Default Energy Bid Enhancements (CCDEBE) initiative in November 2016, DMM recommended that the CAISO adopt a phased approach under which the CAISO first focused on implementing the ability to update real-time gas prices each morning based on same day gas market conditions by fall 2017.[8] DMM recommended pursuing more complicated and potentially controversial aspects of the CCDEBE initiative -- such as dynamic mitigation of commitment costs -- as part of a separate second phase. This recommendation was rejected by the CAISO, which indicted this gas price issue would be addressed by a "long-term market solution planned implementation in fall 2018."[9]

In June 2017, additional analysis by DMM did not support the need to routinely scale up gas prices used for bid caps in the real-time market above the next day gas price indices normally used for units in the SoCalGas area. DMM noted that "without tight gas conditions, the extra headroom is distorting market dispatch and increasing both prices and

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[7] *Comments on the Draft Final Proposal for Aliso Canyon Gas-Electric Coordination – Phase 2*, Department of Market Monitoring September 28, 2016, pp.2-5. http://www.caiso.com/Documents/DMMComments_AlisoCanyonGas-ElectricCoordinationPhase2DraftFinalProposal.pdf

[8] *Comments on the Commitment Costs and Default Energy Bid Enhancements – Issue Paper*, Department of Market Monitoring November 29, 2016, pp.3-4, 11-14. http://www.caiso.com/Documents/DMMComments-CommitmentCostsandDefaultEnergyBidEnhancementsIssuePaper.pdf

[9] *Commitment Costs and Default Energy Bid Enhancements Straw Proposal*, June 30, 2017. p. 13. http://www.caiso.com/Documents/StrawProposal_CommitmentCosts_DefaultEnergyBidEnhancements.pdf

bid cost recovery payments." [10] DMM supported the CAISO's September 2017 request to the Commission to temporarily extend the CAISO's authority to utilize the gas cost scalars only after the CAISO deactivated these scalars by setting them to 100 percent in July 2017.[11]

DMM's October 2017 comments to the Commission noted that DMM believes that these gas cost scalars are "a very crude tool for seeking to manage potential reliability issues associated with gas limitations in the real-time market while protecting against market power."[12] DMM continued to recommend the CAISO begin taking steps to modify its software and processes so that bid caps for commitment costs and energy used in the real time market can be modified based on same day gas price and market information available each morning. DMM recommended this approach as providing "much better protections than the gas cost scalars in terms of system reliability, cost recovery and market power mitigation."[13]

The CAISO's November 2017 answer to DMM's comments on the Aliso Canyon Phase 3 filing again asserted that the CCDEBE stakeholder initiative would obviate DMM's recommendation to update gas prices used to calculate bid caps in the real-time market and indicated that the CCDEBE proposal was planned to go into effect as of fall 2018.[14]

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[10] *Comments on Aliso Canyon Gas-electric Coordination Phase 3 Initiative*, Department of Market Monitoring, June 14, 2017, p.1. http://www.caiso.com/Documents/DMMComments_AlisoCanyonGas_ElectricCoordinationPhase3StrawProposal.pdf

[11] Setting the scalars to 100 percent means that the gas price indices normally used are not increased, so that the scalars are essentially de-activated.

[12] *Comments of the Department of Market Monitoring*, Docket No. ER17-2568, op. cit., p.7.

[13] Ibid, p. 8.

[14] *Answer of the California Independent System Operator to Comments of the Department of Market Monitoring,* ER17-2568-000. November 8, p. 5.

However, the CAISO now indicates that the gas price scalars "will only be necessary until the CAISO implements new commitment costs and default energy bid enhancements in 2019," explaining that "the CAISO expected to implement the CCDEBE changes by the end of 2018, which would have implemented more permanent solutions to provide market participants greater flexibility to reflect their gas-related costs in the CAISO markets. However, the CAISO has determined it will need to delay its implementation until the fall of 2019."[15]

The CASIO has recently delayed filing the CCDEBE proposal approved by the CAISO Board in March 2018 with the Commission while CAISO considers further changes to market power mitigation rules. Given past experience with CCDEBE and other initiatives – and the complexity of the various modifications to local market power mitigation rules and software included in the CCDEBE initiative – DMM believes there is a significant chance that the changes the CAISO feels are needed to replace the gas price scalars will not be implemented in fall 2019. Moreover, as explained below, the final CCDEBE proposal approved by the CAISO Board in March 2018 does not contain measures that would address the issues that the CAISO currently cites in its filing as justification for extension of the gas cost scalars.

http://www.caiso.com/Documents/Nov8_2017_Answer_Comments_DMM-AlisoCanyonElecgtric-GasCoordinationEnhancementsPhase3_ER17-2568.pdf

[15] CAISO transmittal letter, p.3.

The CCDEBE proposal approved by the CAISO Board will not address the Aliso Canyon issues which CAISO cites as the reason for the temporary gas cost scalars.

The final CCDEBE proposal approved by the CAISO Board in March 2018 does not include any provisions to ensure that commitment cost bid caps and default energy bids used to mitigate market power in the real time market will reflect the actual price of gas in the same day market in the SoCalGas area. Under the final CCDEBE proposal, participants will be allowed to increase bids for gas-fired units used in mitigation above current caps up to a *reasonableness threshold* set by the ISO. The CAISO will set default reasonableness thresholds in the CAISO tariff by a fixed static value that is 10 percent higher than the next day gas price index currently used in calculating bid caps. On Mondays (or the first trade day after a holiday) the ISO will set this threshold to a fixed value of 25 percent.

The 10 to 25 percent *reasonableness thresholds* incorporated in the CCDEBE proposal are equivalent to *gas cost scalars* of 110 and 125 percent, respectively. In its September 28 filing, CAISO contends that the temporary gas price scalars for energy and commitment costs should continue to be set at 125 percent and 175 percent, respectively, in order to achieve the CAISO's rationale for the scalars. Thus, the CAISO's assertion that the much lower 110 to 125 percent levels incorporated in the CCDEBE reasonableness thresholds will replace the need for the 125 to 175 percent gas cost scalars is inconsistent. Moreover, the lower reasonableness thresholds in the final CCEDBE proposal will be applicable to <u>all</u> resources in the CAISO system, while use of the gas cost scalars is limited to resources in the SoCalGas area to have the impact on the merit order of commitment costs which the CAISO contends is necessary.

These inconsistencies illustrate how the final CCDEBE approved by the CAISO Board does not address the fundamental market design issues that the CAISO contends are being addressed by the temporary gas cost scalars. As noted in DMM's comments on the final CCDEE proposal approved the CAISO Board:

> Because these new fuel volatility scalars are static, this will make bid caps used in mitigation too high most days (i.e. when the scalars exceed the actual variation in gas prices), while making bid caps too low on the few days each year when gas prices in the same day market jump significantly above next-day gas market prices. This very static approach is contrary to the key objective the ISO set for this initiative – i.e. to make bids used in real-time mitigation more reflective of actual marginal costs.[16]

DMM did not support approval of the final CCDEBE proposal initiative by the CAISO Board in March 2018, noting that "DMM continues to recommend a more dynamic approach for adjusting reasonableness thresholds based on gas market trade data available at the start of each operating day.[17] The CASIO has now delayed filing of the final CCDEBE proposal approved by the CAISO Board with the Commission while CAISO considers further changes to market power mitigation as part of a new stakeholder initiative on *Local Market Power Mitigation Enhancements.*

Shortly before submitting its Aliso Canyon Phase 4 filing, the CAISO added a provision in its new *Local Market Power Mitigation Enhancements* initiative to establish a process for allowing gas prices used in setting energy and commitment cost bid caps in the real-time market to be updated based on actual same day gas prices and market

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[16] *Comments on Revised Draft Final Proposal for Commitment Cost and Default Energy Bid Enhancements*, Department of Market Monitoring, February 28, 2018, p.3. http://www.caiso.com/Documents/DMMComments-CommitmentCostsandDefaultEnergyBidEnhancementsRevisedDraftFinalProposal.pdf

[17] *Memorandum to ISO Board of Governors, Re: Department of Market Monitoring Comments on CCDEB Proposal*, March 14, 2018. p.1 http://www.caiso.com/Documents/Decision_CCDEBEProposal-Department_MarketMonitoringMemo-Mar2018.pdf

conditions.[18] It appears this provision addresses DMM's prior recommendations to update bid caps for energy and commitment costs based on actual same day gas prices. However, these additional modifications are not scheduled to be submitted to the CAISO Board for consideration until at least March 2019.

As previously noted, DMM believes that under the CAISO's current approach there is a significant chance that changes the CAISO feels are needed to replace the gas price scalars may not be implemented in fall 2019 as planned. Thus, DMM continues to recommend that the CAISO adopt a phased approach under which the CAISO places priority on first implementing the ability to adjust bid caps in the real-time market based on conditions in the same day gas market. Implementation of more complicated modifications to the market power mitigation software can be part of a separate second phase in order avoid further delay in addressing the key issue of gas prices used to calculate bid caps for the real-time market.

Gas cost scalars have not been effective or needed for enabling participants to manage high same day gas prices.

As noted in the CAISO's filing, since the CAISO's authority to utilize the gas cost scalars was extended by the Commission in November 2017, the CAISO has only utilized these scalars during a limited number of days. Over this time, the CAISO's markets and system operated efficiently and reliably *without* the scalar in effect during extended periods of time covering a wide range of gas and electric market and system conditions – including many periods of tight gas supply and high gas and electric

[18] *Local Market Power Mitigation Enhancements Issue Paper/Straw Proposal*, September 13, 2018, pp.29-30. http://www.caiso.com/Documents/IssuePaperandStrawProposal-LocalMarketPowerMitigationEnhancements.pdf

demand. However, the CAISO's filing does not demonstrate any discernable difference in market or system performance during periods when the scalars *were* or *were not* in effect.

For example, one of the key reasons for the CAISO to activate the gas cost scalars is a significant increase in same day gas prices at SoCal Citygate rise above the next day gas index normally used to determine bid caps for the real time market. Figures 1 and 2 compare the difference between next day and same day gas prices for the 72 days in which the scalars were in effect with the 232 days the scalars were *not* in effect from December 2017 to September 2018. These charts provide histograms of the percentage difference between (1) each trade in the ICE same day market at SoCal Citygate compared to (2) the next day gas index used by the CAISO to set bid caps in the real-time market.

Dotted vertical lines in the charts represent the 10 percent adder included in default energy bids and the 25 percent headroom included in commitment cost bid caps when the gas cost scalars are not in effect. Figure 1 also includes a line at the 200 percent level, which approximates the total headroom included in commitment cost bid caps when the 175 percent gas cost scalar is in effect.[19]

[19] 175 percent gas price scalar + 25 percent normal headroom ≈ 200 percent.

Figure 1. Trade prices in same day gas market on days with gas cost scalars activated by CAISO (December 2017-Sept 2018)

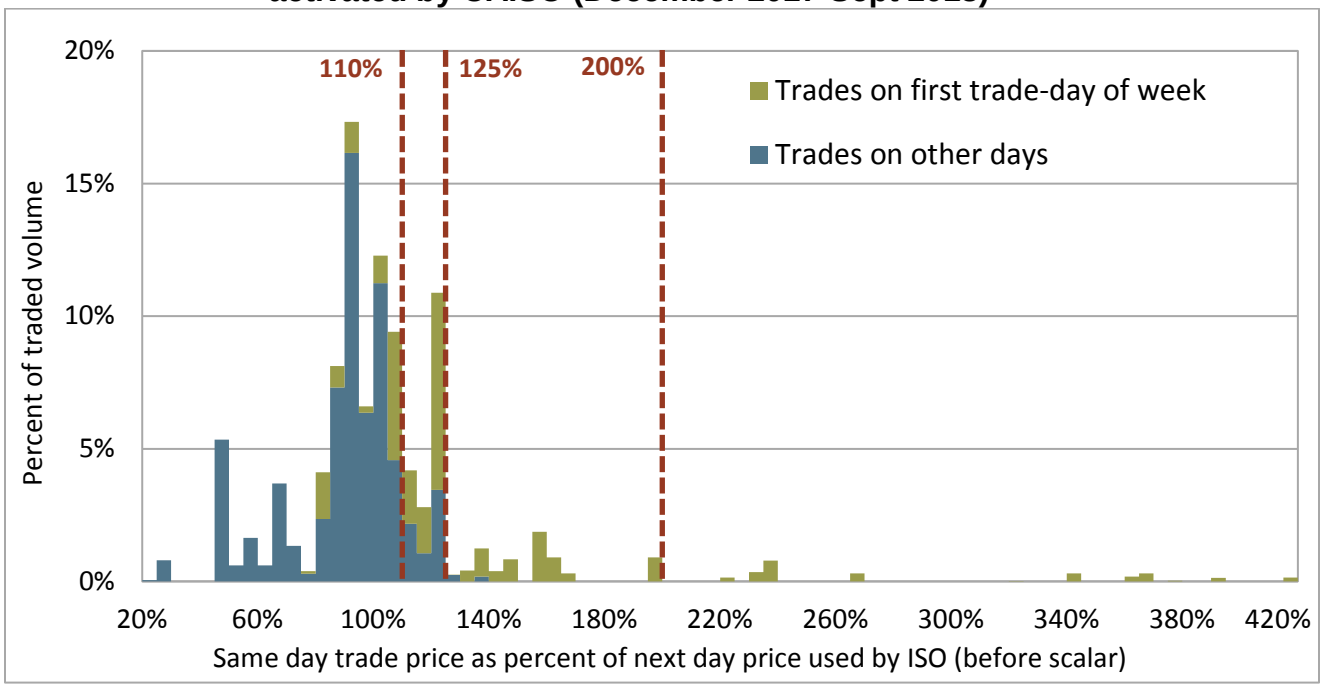
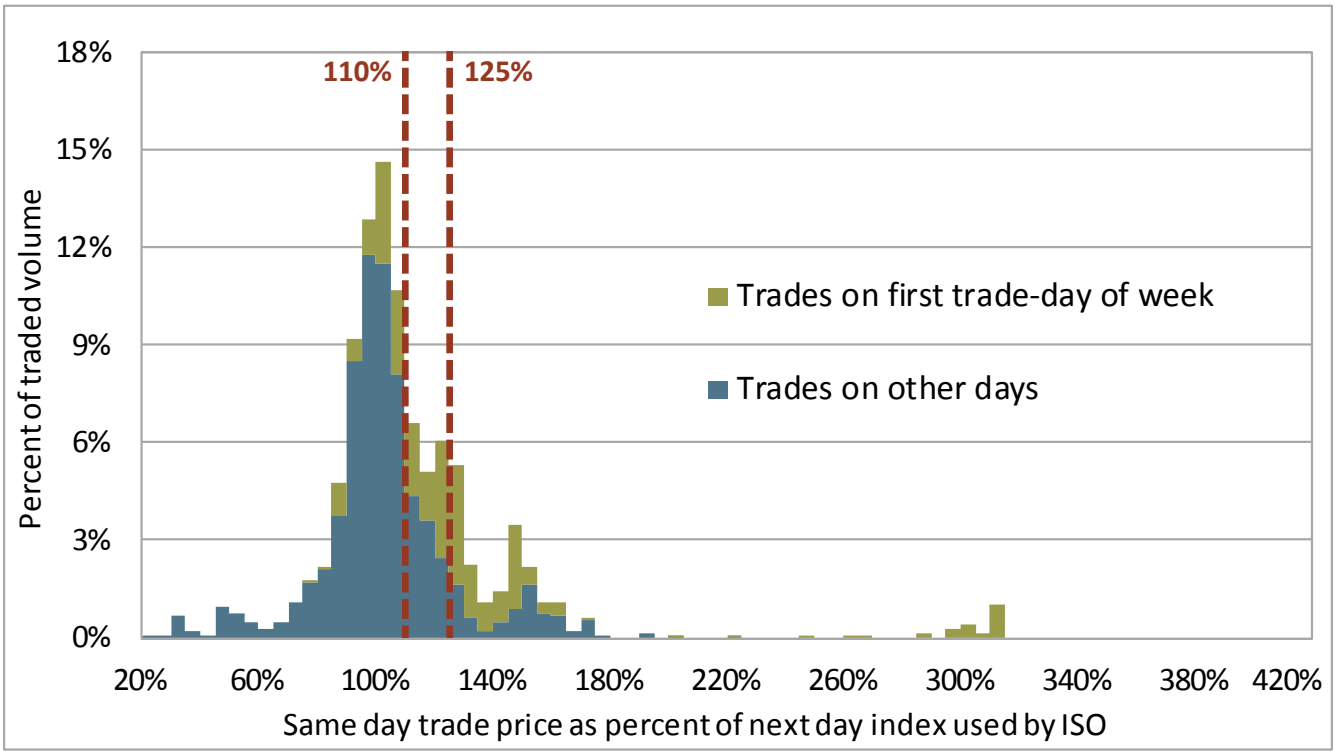


Figure 2. Trade prices in same day gas market on days without gas cost scalars activated by CAISO (December 2017-Sept 2018)



As shown in Figure 1, trade prices for same day gas were usually much lower than the ~200 percent headroom for commitment cost bids allowed on the 72 days when the 175 percent gas cost scalar was in effect. Meanwhile, a significant number of same day gas trades were at prices well above the ~200 percent head room incorporated commitment cost bids even when the 175 percent scalar was in effect.

As shown in Figure 2, on the 232 days when the scalars were not in effect, the price of many same day gas trades was significantly higher than next day index used by the CAISO. However, the CAISO's filing does not demonstrate any difference in market performance related to default energy bids and commitment cost bid caps during the 72 days when the scalars were in effect compared to the 232 days when the scalars were not in effect.

The next day gas index used by CAISO for the real-time market bid caps reflects tight supply conditions in the SoCal gas system without the gas cost scalars.

As noted in the CAISO's fling, next day gas prices at SoCal Citygate have been systematically higher than prices in other gas regions (such as PG&E Citygate) over the last year.[20] This price difference has been particularly significant on days when electric and gas market and system conditions were relatively tight in the SoCalGas area.

As shown in Figures 3 and 4, the difference in next day gas prices at SoCal Citygate compared to PG&E Citygate is clearly correlated with the declaration of Operational Flow Orders (OFOs) and the different gas imbalance charges associated with these OFOs. Figure 4 shows the same data in Figure 3, but has a truncated scale to better highlight price differences in the $.50 to $2/MBtu range.

[20] CAISO transmittal letter, p. 23.

This gas price trend is further illustrated in Table 1, which compares average next day gas prices at SoCal and PG&E Citygates during days when different levels of OFOs were in effect over the last year. As shown in Table 1, on days when higher stage OFOs have been declared (with potential imbalance charges of $5 to $25/MBtu), next day prices at SoCal Citygate have been an average of 62 and 81 percent higher than at PG&E Citygate, respectively. This gas price difference is approximately equal to the 175 percent scalar for commitments costs used by the CAISO when the scalars are activated.

Table 1. Average in next day gas price at SoCal Citygate vs PGE Citygate by OFO type (October 2017 – September 2018)

Low OFO Charge	Days	PG&E Citygate	SoCal Citygate	Average gas price difference between Socal and PG&E	
none	229	$3.00	$4.26	$1.26	30%
$0.25	49	$2.85	$3.26	$0.41	13%
$1.00	58	$2.94	$4.81	$1.88	39%
$5.00	25	$2.95	$7.67	$4.72	62%
$25.00	4	$3.20	$16.88	$13.68	81%
Total	365	$2.97	$4.59	$1.62	35%

Figure 3. Difference in next day gas price at SoCal Citygate vs PGE Citygate ($/MMBtu)

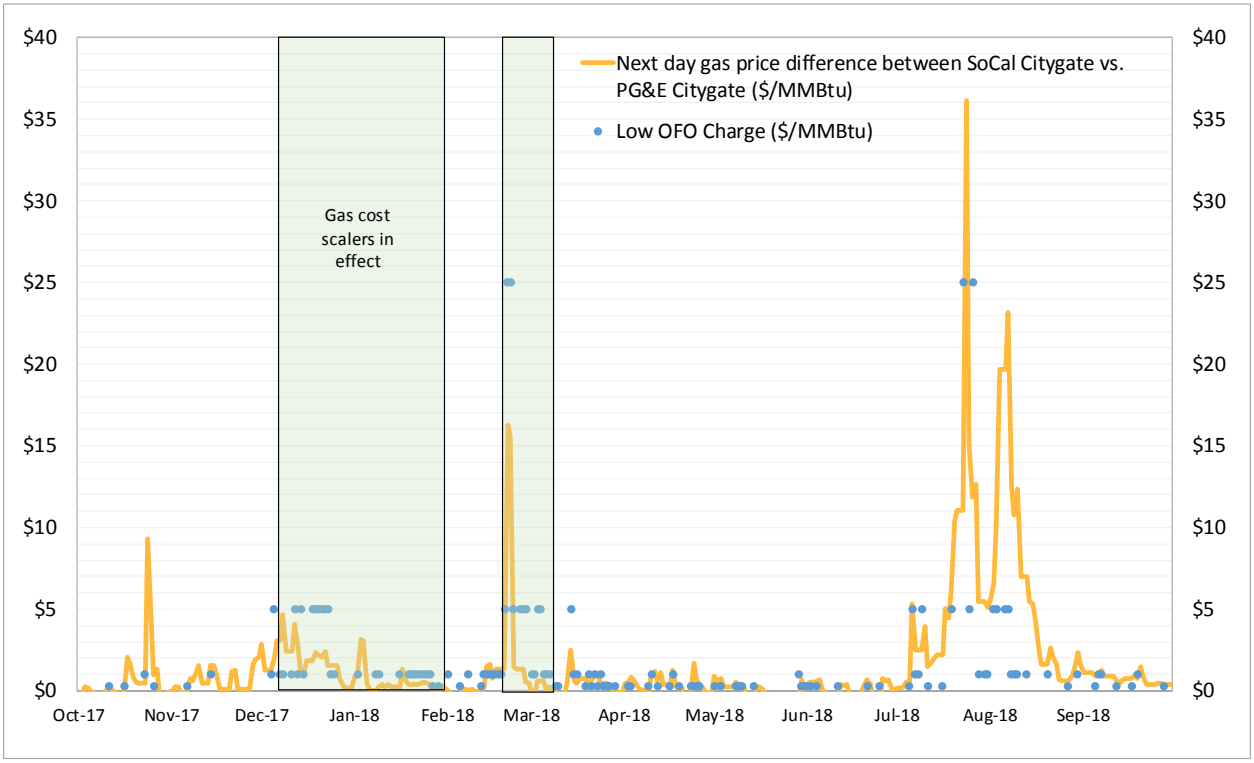
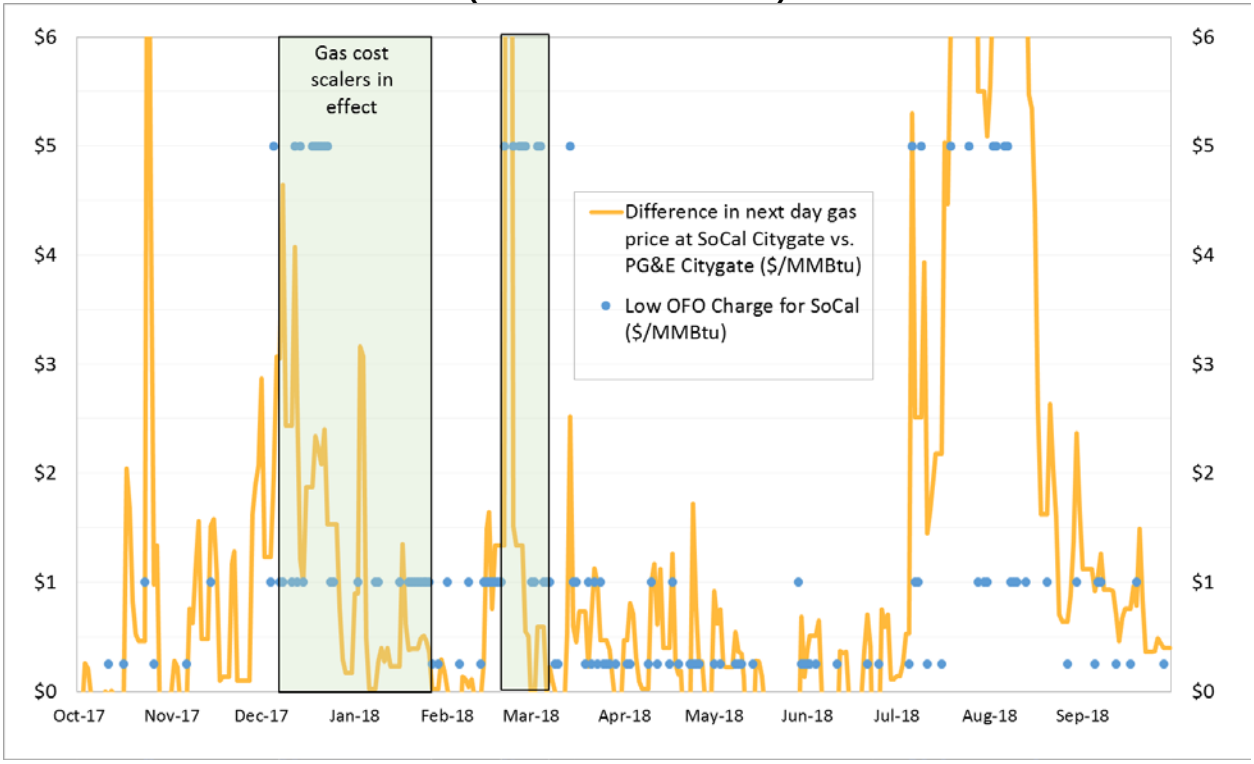


Figure 4. Difference in next day gas price at SoCal Citygate vs PGE Citygate (truncated at $6/MMBtu)



Gas cost scalars are not effective or necessary to ensure units in the SoCalGas system are higher in the merit order than units in the rest of the system.

Despite the systematically higher gas prices at SoCal Citygate, CAISO contends that the gas cost scalars are still needed to ensure generation in Southern California is "displaced" in the merit order by capacity elsewhere in the CAISO:

> Although this natural price separation between gas prices in the SoCalGas system and the PG&E system economically displaced gas generation in Southern California, the goal of activating the scalars is to ensure that there is further separation if needed and displace generation from the Southern California area …. . The goal of the scalars is to capture the cost of increased constraints in the south and ameliorate the market's ability to issue an economic dispatch that reflects the costs of the constraints in the south. It is entirely possible that prices between the south and the north will separate but it may not be enough to address a particular issue on the gas system in the south.[21]

To support the hypothetical scenario described above in the CAISO's filing, the CAISO provides a comparison minimum load bid caps (referred to *as proxy costs*) for gas-fired generation in the SoCalGas system to generation in the rest of the CAISO system *with* and *without* the 175 percent gas price scalar.[22] To highlight potential impact of the scalar, the CAISO selects a day when gas prices were about the same in the CAISO's different gas regions (March 1, 2018). However, both charts included in CAISO filing are entirely hypothetical examples which assume that all gas units in the CAISO system bid up to the maximum level allowed by commitment cost bid caps. As indicated in various prior DMM reports and filings, both of the CAISO's hypothetical bidding scenarios are unrealistic, since most units do not bid at these bid caps.[23]

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[21] CAISO transmittal letter, p. 23.

[22] CAISO transmittal letter, p. 24-25.

[23] *Q1 2018 Report on Market Issues and Performance*, op. cit., pp. 53-55.

DMM has previously provided analysis to the CAISO and stakeholders showing comparisons of *actual* commitment cost bids when the 175 percent scalar was activated with a scenario where these same actual bids submitted are capped at the normal level (i.e. 125 percent of calculated costs).[24] Figures 5 and 6 provide this analysis for the day used in the CAISO's filing (March 1, 2018). These figures show the same type of *minimum load cost duration curve* that is provided in Figure 2 of the CAISO's filing.[25] However, Figure 5 shows the *actual* minimum bids submitted on this day, rather than the theoretical bids in the CAISO's analysis. Figure 6 shows the same data with any bids in excess of the normal bid cap limited to the normal maximum limit (i.e. 125 percent of total proxy costs).[26]

As shown in Figures 5 and 6, the actual minimum bids for some units in the SoCalGas area were higher due to additional headroom created by the 175 percent gas cost scalar. However, the scalar had minimal impact on the overall merit order of the minimum load bids for units in the SoCalGas area compared to units in the rest of the system. While the scalars allowed a relatively small amount of capacity in the SoCalGas system to be even higher in the merit order, the overall amount of capacity in the SoCal area in the lower end of the merit order was about the same.

Figures 5 and 6 also illustrate the metric which DMM has utilized in prior reports and presentations to measure and track the impact of the gas cost scalars on the actual merit order of commitment costs of gas units in the SoCal gas area relative to gas units

[24] *Q1 2018 Report on Market Issues and Performance*, o*p. cit.,* pp. 55-57.

[25] CAISO transmittal letter, p. 24-25.

[26] Figure 3 in DMM's comments can be compared to the bottom chart in Figure 2 of the CAISO's filing (p.25). Figure 4 in DMM's comments can be compared to the top chart in CAISO's Figure 2.

in the rest of the CAISO.[27] The metric represents the percentage of the total gas fired capacity in the SoCal gas system that is in the upper end of the overall merit order minimum load costs for gas units. [28]

For example, based on the actual minimum load bids shown in Figure 5, units in the SoCal gas area accounted for 56 percent of the gas-fired capacity in the upper end of the bid curve on March 1, 2018. As shown in Figure 6, if the 175 percent gas cost scalar had not been in effect and actual minimum load bids were capped at the 125 percent of each unit's proxy costs, units in the SoCal gas area would still have accounted for 54 percent of the gas-fired capacity in the upper end of the bid curve.

Figure 7 shows this metric for all of the days when the 175 percent gas cost scalar was in effect in spring 2018. The red line shows this metric when calculated using theoretical proxy minimum load bids calculated assuming all units bid to the maximum allowed with the 175 percent scalar in effect. The solid blue line shows this metric calculated using the actual minimum load bids submitted (as illustrated in Figure 5). The dotted yellow line shows this metric calculated after capping actual bids at 125 percent of proxy costs (as illustrate in Figure 6).

[27] *Q1 2018 Report on Market Issues and Performance*, Department of Market Monitoring, op. cit. pp. 55-57.

[28] The metric defines the "upper end" of the commitment cost merit order based on the total gas-fired capacity being offered from units in the SoCal gas system (e.g.usually around 9,500 MW). The metric calculates the percentage of the capacity in this upper portion of the bid curve that is comprised of units in the SoCal gas system. If 60 percent of the units in this upper end of the bid curve are in the SoCal system, the metric equals 60 percent. Thus, if all gas-fired capacity in the SoCal gas system has higher minimum load bid costs than all the units in the rest of the system, the metric equal 100 percent.

Figure 5. Actual real-time minimum load bids on March 1, 2018 (with 175 percent gas cost scalar in effect)

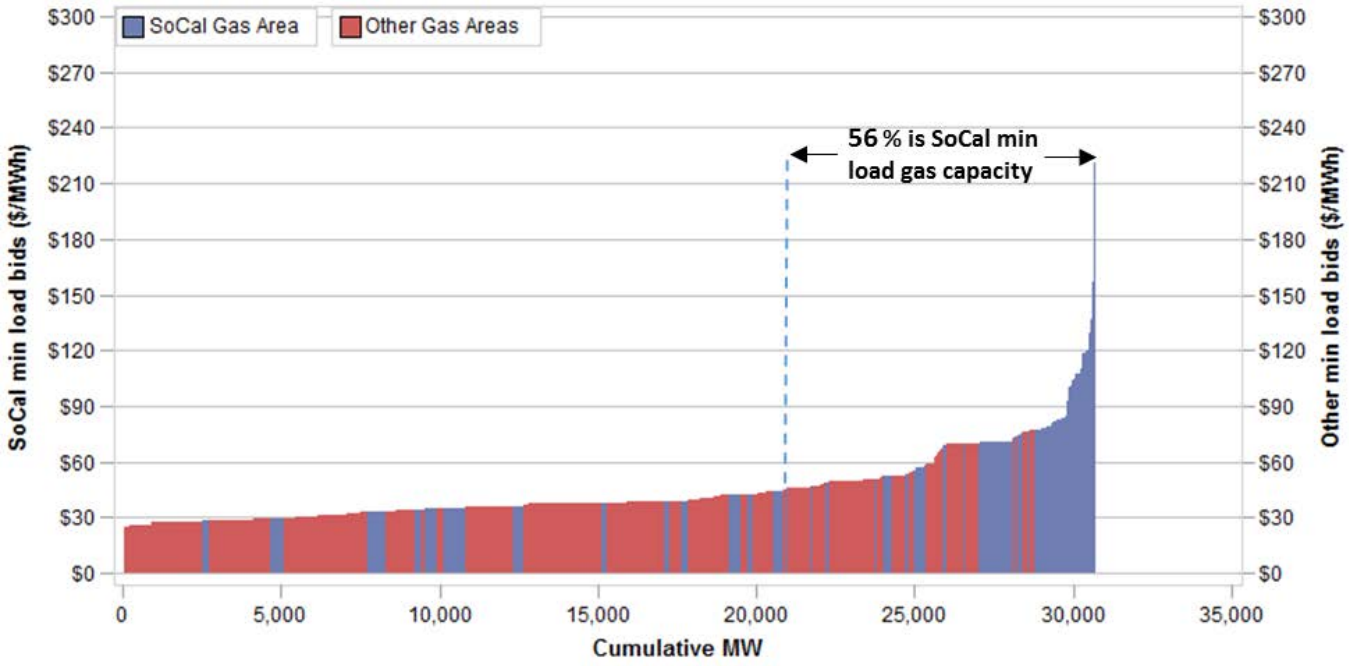


Figure 6. Real-time minimum load bids on March 1, 2018 if capped at 125% of proxy costs (without 175 percent gas cost scalar)

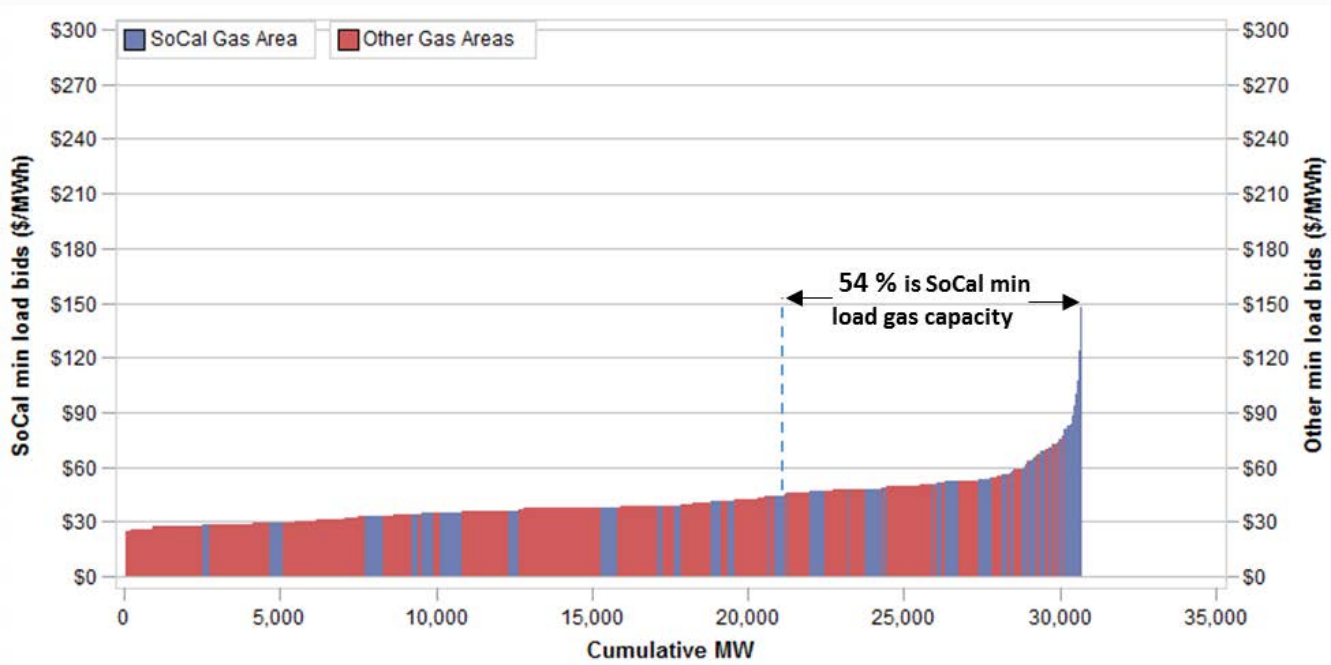
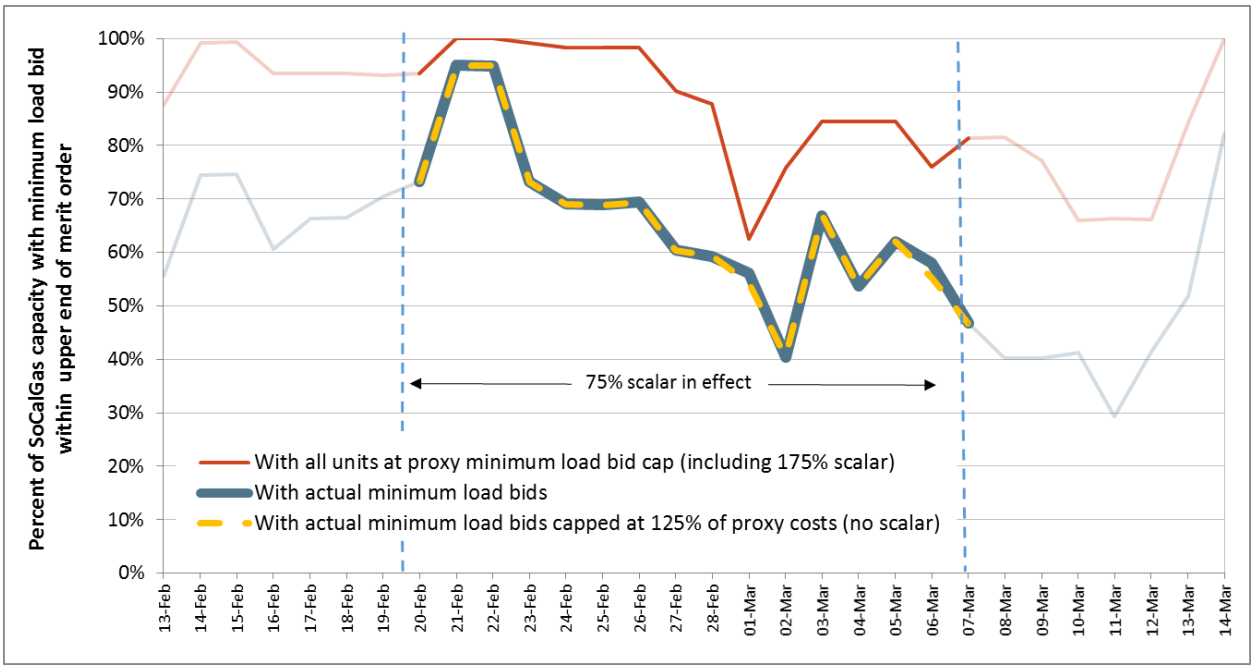


Figure 7. Metric of merit order of minimum load bids for units in SoCal gas area compared to rest of CAISO system (with and without 175 percent gas cost scalar)



As illustrated by Figure 7, the 175 percent gas cost scalar had little or no effect on the merit order of units as measured using this metric. This is shown by the almost complete overlap of the solid blue and dotted yellow lines in Figure 7. While some units took advantage of the scalar to bid higher, these units tended to be relatively high in the merit order without the scalar. On some days, the metric is relatively high (i.e. from 80 to 90 percent) with and without the gas scalar. This reflects the fact that on days when electric and gas market and system conditions were relatively tight during this period, next day gas prices at SoCal Citygate were notably higher than prices at other gas delivery points in the CAISO, as previously discussed in these comments.

The gas cost scalars weaken market power mitigation and increase costs in the CAISO system.

The CAISO has not assessed the impact of the gas cost scalars on bid cost recovery payments or energy market prices. As noted in DMM's 2017 annual report, DMM estimates that activation of the 175 percent gas price scalar for commitment costs has resulted in over $7 million in excess real time market bid cost recovery payments to resources utilizing the higher bidding limits in 2016-2017. [29] These excess payments were estimated by calculating bid cost recovery payments after assuming that resources using the scalars only bid up to their proxy cost cap calculated without any scalars. The 125 percent gas price scalar applied to default energy bids can also have the effect of raising energy prices when local market power mitigation is triggered.

In 2018, the gas cost scalars have been activated only on a limited number of days and were not in effect during the recent summer months. Without the scalars activated, bid cost recovery attributed to the real-time market totaled about $45 million, compared to $25 million in the third quarter of 2017. Of the $45 million total, about $33 million was awarded to gas resources in the SoCalGas service area. A large portion of these payments in Q3 2018 were associated with exceptional dispatches issued by grid operators to keep specific units in the SoCalGas area on-line in the real-time market to protect against load forecast uncertainty.

Analysis by DMM indicates that gas resources which received significantly high real-time bid cost recovery payments typically bid their start-up and minimum load costs at the 125 percent proxy cost cap on most days in the third quarter. Thus, if the 175

[29] *2017 Annual Report on Market Issues and Performance,* Department of Market Monitoring, June 2018, pp.98-99. http://www.caiso.com/Documents/2017AnnualReportonMarketIssuesandPerformance.pdf

percent gas cost scalar had been in effect, it is likely this would have significantly increased real-time bid cost recovery payments even further.

B. Maximum gas constraint

The CAISO also proposes to extend its temporary tariff authority to implement a maximum gas constraint (or gas nomogram) that limits the maximum amount of natural gas that can be burned by groups of natural gas-fired resources. DMM continues to believe that, as indicated in DMM's October 2017 comments to the Commission, "the CAISO's limited experience with maximum gas constraints suggests that while such constraints may be a useful tool in the future, additional refinement of the software and operational processes through which the constraints are implemented is necessary." [30]

Improvements are needed in how gas usage constraints are set and managed in the market model and in the real-time market.

In order to allow the market pricing and dispatch to accurately reflect physical limitations on the gas system, the maximum gas constraints must be properly calibrated and managed. In practice, establishing and managing a gas constraint in the CAISO market model requires a substantial degree of judgement by grid operators. As explained in the CAISO's business practice manual, CAISO operators must convert a potential limit on cumulative gas flow over a day or multi-hour period into a constraint applicable to each market interval in which a gas constraint will be enforced CAISO (hourly, 15-minutes and/or 5-minutes).

To do this, the CAISO's business practice manual indicates the CAISO will "distribute the daily limitation across the hours by a ratio of hourly load forecast to daily

[30] *Comments of the Department of Market Monitoring*, Docket No. ER17-2568, op cit. p.12.

load forecast to support greater electric flexibility, unless the CAISO has coordinated an alternative specific gas limitation with the gas company."[31] CAISO operators may then modify the constraint limit based on the CAISO's observations of actual or expected system conditions. The CAISO's business practice manual indicates that, in the real-time market, the CAISO will then seek to adjust the maximum gas usage constraint to "recapture portions of the allocated range unused for earlier intervals." [32]

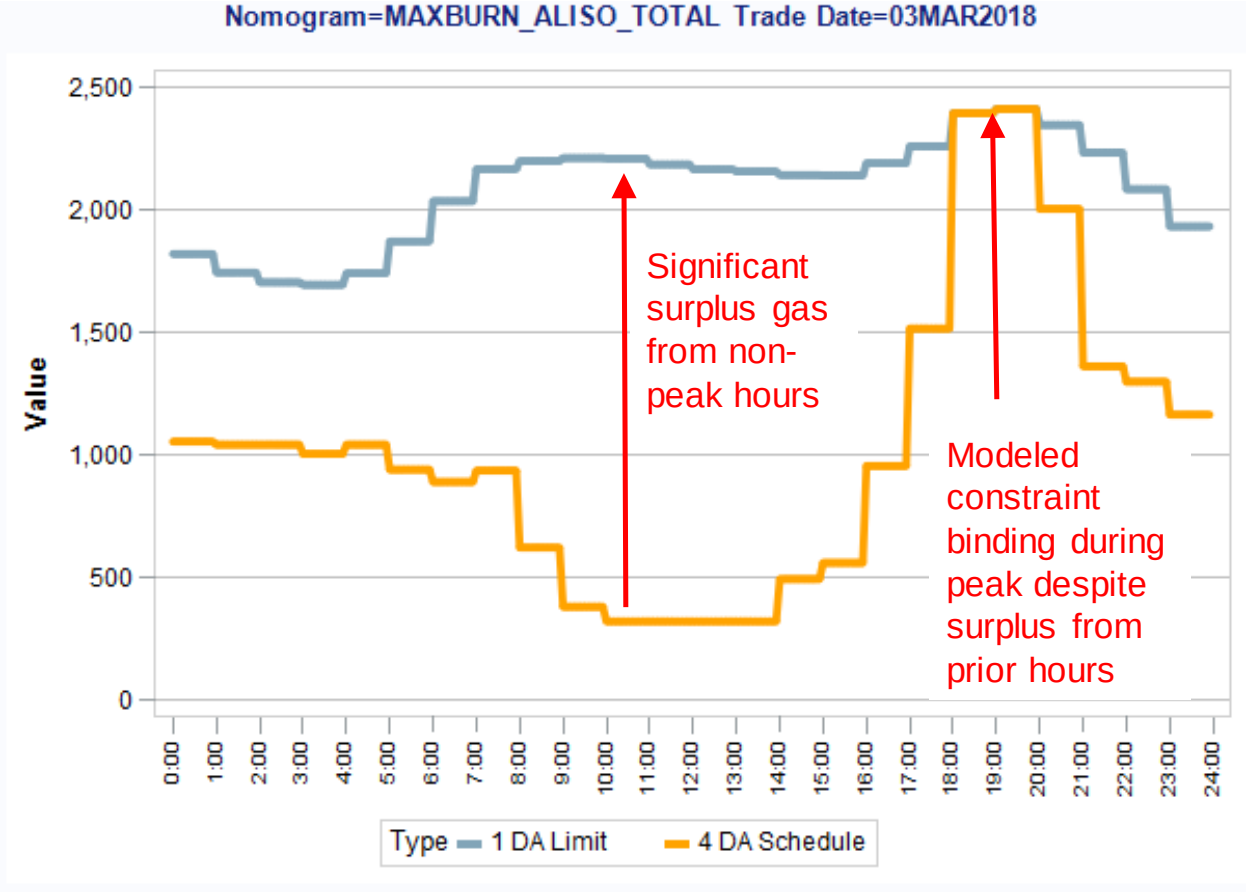
DMM's October 2017 comments provided an empirical example from January 23-26, 2017 illustrating the issues involved in effectively setting and managing the maximum gas usage constraint.[33] As shown in that example, the CAISO set the constraint for each 15-minute market intervals over these days to follow the basic shape of CAISO system loads. During most hours, modeled gas usage was well below the maximum limit set by the CAISO for each 15-minute intervals. However, during the peak evening ramping hours modeled gas usage hit or exceeded the limit set by the CAISO for 15-minute intervals during this period. In that example, excess gas should actually have been available during the evening ramping hours when the gas usage constraint was binding and the need for fast ramping capacity from gas-fired units was most critical.

This issue continues in 2018. Figure 8 shows another example of this pattern from one of the days in which the gas usage constraint was used in the day-ahead market in spring 2018. During most hours, modeled gas usage was well below the maximum hourly limit set by the CAISO. However, the constraint was binding during

[31] *Business Practice Manual for Managing Full Network Model*, California ISO, p. 83.
[32] Ibid.
[33] *Comments of the Department of Market Monitoring*, Docket No. ER17-2568, op. cit. pp.15-16.

the peak evening ramping hours. Again, this suggests that excess gas should have actually have been available during the evening ramping hours when the gas usage constraint was binding and the need for fast ramping capacity from gas-fired units was most critical.

Figure 8. Gas burn constraint and modeled gas usage in day-ahead market March 3, 2018



Additional transparency is needed on the inputs and formulation of gas usage constraints.

As noted in the CAISO's filing, CAISO implemented a change to the maximum gas constraint in February 2018 which involved multiplying both the left- and right-hand side of the gas constraint by a factor of 100 (which is an approximation of the heat rate of an average unit). CAISO is currently adding additional detail to the business practice manual to clarify how the constraint is formulated and "how the constraint may be shaped".[34] DMM recommends that any further modification to the formulation of the maximum gas constraint be clearly explained and documented for DMM and stakeholders in a timely manner.

III. Conclusion

DMM supports extension of all of the temporary measures the CAISO is seeking to extend except the measure allowing CAISO to apply a *gas price scalar* to increase the gas price used in calculating caps for commitment costs and default energy bids used in market power mitigation for units in the SoCalGas area. DMM believes these gas price scalars weaken market power mitigation and increase costs in the CAISO system, but have proven to be a crude and ineffective tool for limiting gas usage when needed for system reliability.

As explained in this filing, the final CCDEBE proposal approved by the CAISO Board in 2018 does not contain measures that would address the gas price issues that the CAISO currently cites as justification for extension of the gas cost scalars. DMM believes that with the CAISO's current approach there is a significant chance that the changes the CAISO feels are needed to replace the gas price scalars may not be

[34] CAISO transmittal letter, p.31.

implemented in fall 2019. Thus, DMM continues to recommend that the CAISO address the Aliso Canyon gas issue by placing a priority on implementing the ability to adjust bid caps in the real-time market based on conditions in the same day gas market.

While DMM supports temporary extension of the CAISO's ability to enforce a maximum gas constraint for groups of units in the SoCalGas system, DMM continues to recommend that the CAISO further refine how it utilizes the maximum gas constraint and improve how gas usage constraint limits are set and adjusted in real-time. DMM also recommends that any further modifications to the formulation of the maximum constraint be more clearly explained and documented for DMM and stakeholders in a timely manner.

DMM respectfully requests that the Commission afford due consideration to these comments as it evaluates the proposed tariff provisions before it.

Respectfully submitted,

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Independent Market Monitor for the California
Independent System Operator Corporation

Dated: October 19, 2018

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 19th day of October, 2018.

/s/ Anna Pascuzzo
Anna Pascuzzo