

Memorandum

To: ISO Board of Governors

From: Eric Hildebrandt, Executive Director, Market Monitoring

Date: March 14, 2018

Re: Department of Market Monitoring Comments on CCDEBE Proposal

This memorandum does not require Board action.

EXECUTIVE SUMMARY

The Department of Market Monitoring (DMM) supports the goal of providing greater bidding flexibility and ensuring that bid caps used in mitigation are sufficient to cover each resource's actual marginal costs. DMM also supports development of a more dynamic approach to mitigation of commitment costs as a way of achieving these goals.

Although Management's final proposal now includes the basic framework for dynamic mitigation of commitment costs, the proposal still has several significant gaps, implementation uncertainties and risks. These remaining gaps in the proposal should be addressed before proceeding to seek approval for this major market design change. DMM also recommends that commitment cost bid caps be raised on a more gradual basis only after the effectiveness of dynamic mitigation is confirmed based on actual operational experience.

Management's proposal also includes rule changes that will allow suppliers to request increases in cost-based bid caps used to mitigate potential market power, gaming and manipulation of bid cost recovery (BCR) payments. Under the proposal, the ISO will screen requests for bid cap increases using *reasonableness thresholds* that add to the headroom already included in bid caps used when mitigation is triggered. However, bid caps for gas-fired units will continue to be based on gas prices in the next day market that occurs the day prior to each operating day. 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.

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. DMM's analysis shows that when the price of gas in the same day market increases significantly above next day gas prices used by the ISO, the same day market at major gas trading hubs is sufficiently liquid and provides a very accurate basis for adjusting the

reasonableness thresholds. The more dynamic approach for determining reasonableness thresholds proposed by DMM will ensure greater market efficiency, reliability and more accurate mitigation than the very static approach being proposed by the ISO.

DYNAMIC MITIGATION OF COMMITMENT COSTS

Background

The DMM and the ISO's Market Surveillance Committee (MSC) have supported providing greater bidding flexibility through automated mitigation of commitment cost for nearly 10 years. However, due to the complexity of developing this feature, this has proven to be a difficult enhancement to design. As described in the MSC opinion on the ISO proposal, due to the "lumpiness" of capacity commitments, transmission and capacity constraints which actually drive commitments frequently (or usually) are not binding in the market software. This makes mitigation of commitment costs more difficult than mitigation of energy bids, which is triggered when congestion occurs on non-competitive transmission constraints.

This basic problem is further exacerbated by the complexity of the ISO's market software, which is the most sophisticated and complex of all ISOs. In addition to having more complex network and market constraints incorporated in the market software, the ISO software also includes the most complex modeling of individual resources – with many resources now being modeled as multi-stage generator (MSG) units. The ISO's software also includes multi-interval optimization, so that unit commitments are driven by the interaction of all these network, market and unit constraints over multiple future market intervals.

Due to these various complexities, it is often very difficult, or even impossible, to identify the constraints that drive commitments (or prevent de-commitments). Thus, DMM has recommended that the ISO carefully design and test any approach for mitigating commitment costs before implementation.

Management Proposal

The ISO's proposal will establish a new process for dynamic mitigation of commitment cost bids. Under this new process, suppliers will be able to submit market bids for start-up and minimum load costs in excess of the current cap of 125 percent of estimated costs. These market bids for start-up and minimum load costs will be used unless the resources are determined to have potential market power through an automated test built into the ISO software. The ISO proposes to allow market based commitment bids of up to at least 187.5 percent initially and to increase the cap to at least 330 percent 18 months later.¹

¹ 150 percent of reference levels (which include a 25 percent adder) = 187.5 percent of estimated costs. 300 percent of reference levels (which include a 10 percent adder) = 330 percent. The actual caps could be significantly higher if the supplier has a reference level adjustment.

The current 125 percent cap on commitment cost bids was implemented in the wake of manipulation of the ISO market software by JP Morgan in 2011 and 2012. This cap has served as a key mitigation measure to protect against similar manipulative strategies, local market power in unit commitment, and software gaps and bugs affecting bid cost recovery (BCR) payments. Raising bid caps from 125 percent to 187.5 percent of costs increases the potential profit margin from such market behavior by 350 percent (i.e. from 25 percent to 87.5 percent of cost). Thus, DMM believes the remaining gaps in the proposal should be addressed, and commitment cost bid caps should be raised on a more gradual basis only after the effectiveness of dynamic mitigation is confirmed based on actual operational experience.

Gaps in Proposal

While the ISO's newest proposal addresses many of the flaws identified in the ISO's prior proposals, the final proposal still has several significant gaps and implementation uncertainties and risks. As noted in DMM's comments on the final proposal, these gaps include the following:

- **Economic withholding.** Under the revised final proposal, units that are not committed will often not be subject to mitigation of commitment costs – even if the resource owner has been determined to have structural market power. This means that dynamic mitigation will fail to mitigate economic withholding (e.g. bidding lower cost units at a higher price, so that a higher cost unit must be dispatched).²
- **Inter-temporal constraints and gaming.** The proposal does not ensure mitigation will be triggered when units are committed or de-committed due to inter-temporal modeling and resource constraints. A specific example of this gap is provided in DMM's comments on the ISO's final proposal.³
- **Manual dispatches and intervention by grid operators.** The proposal fails to ensure mitigation for exceptional dispatches and or any commitments (or blocking of de-commitments) that occur as a result of various forms of manual intervention in the market dispatch by grid operators.⁴ DMM's experience

² Revised Draft Final Proposal, p. 71.

³ *Comments on Revised Draft Final Proposal for Commitment Cost and Default Energy Bid Enhancements*, Department of Market Monitoring, February 28, 2018, pp. 18-19.
<http://www.caiso.com/Documents/DMMComments-CommitmentCostsandDefaultEnergyBidEnhancementsRevisedDraftFinalProposal.pdf>

⁴ *Comments on the Commitment Costs and Default Energy Bid Enhancements – Issue Paper*, Department of Market Monitoring, November 29, 2016, p. 5:
<http://www.caiso.com/Documents/DMMComments-CommitmentCostsandDefaultEnergyBidEnhancementsIssuePaper.pdf>.

suggests that in many – if not most – cases when operators cause units to be committed or transitioned, operators have very little choice between different resources to meet reliability or market needs. If such alternatives exist, operators have limited ability to identify and choose the lowest cost option. Thus, the ISO needs to develop additional rules for mitigating commitments (or blocked de-commitments) resulting from exceptional dispatch and other forms of manual intervention by grid operators.

Missed Mitigation and Other Software Issues

In addition to these market design gaps, DMM notes that the ISO's current method of dynamically mitigating energy bids based on projected congestion on transmission constraints has historically failed to trigger mitigation during about 10 percent of intervals when congestion actually occurs in the day-ahead and 15-minute markets (in which unit commitments, transitions and de-commitments are made).⁵

The MSC has noted that the potential for such “missed mitigation” of commitments will also occur under the ISO's proposal and has suggested that the ISO consider adding ex post mitigation when such “missed mitigation” can be detected.⁶ DMM notes that the cost of missed mitigation of commitment costs may be much higher than costs of missed mitigation on the energy markets, due to the “lumpiness” and minimum run times of unit commitments. However, the ISO's proposal does not include any provisions for such mitigation.

DMM also notes that relatively complicated software changes, such as the ISO's dynamic mitigation proposal, are subject to significant implementation errors and unexpected performance issues.⁷ Thus, the complexity of dynamic mitigation of commitment costs warrants a more cautious approach to raising the commitment cost bid caps.

CAPS FOR BIDS USED IN MITIGATION

Management's proposal also includes changes that will allow increases in bid caps used when mitigation is triggered. This increase will apply to default energy bids (DEBs) used in the existing process for mitigation of energy bids as well to start-up and minimum load bids used when the new dynamic approach for mitigation of commitment costs is triggered.

⁵ *2016 Annual Report on Market Issues and Performance*, Department of Market Monitoring, pp. 146-148. <http://www.caiso.com/Documents/2015AnnualReportonMarketIssuesandPerformance.pdf>

⁶ *Opinion on Commitment Costs and Default Energy Bid Enhancements*, Market Surveillance Committee, March 5, 2018, pp.18-19. The MSC opinion states that ISO staff indicated “that after-the-fact alternative was considered but not adopted due to settlement complications and some stakeholder desires for all mitigation to take place prior to the market run.” (p.18)

⁷ Recent examples of such errors and unintended performance issues in the real-time market include (1) the flexible ramping product implemented in 2016, (2) the new dynamic energy bid mitigation implemented in 2016 and 2017, and (3) the Aliso canyon gas constraint implemented in 2017-2018.

Reasonableness Thresholds

Currently, bid caps for start-up and minimum load commitment costs include a 25 percent *headroom scalar* above estimated costs. Default energy bids (DEBs) used when energy price mitigation is triggered include a 10 percent headroom scalar that is applied above marginal costs. The ISO proposal will increase the headroom above the current 25 percent and 10 percent scalars already applied to cost-based bids.

Under the ISO proposal, participants will be allowed to increase bids for gas-fired units used in mitigation above current bid cap levels up to a *reasonableness threshold* set by the ISO. The ISO will set default reasonableness thresholds that allow bids to be increased above the current caps by an amount that reflects a gas price that is 10 percent higher than the next-day gas price index currently used in calculating bid caps. The ISO refers to this increase in the gas price used in calculating bid caps as a *fuel volatility scalar*. On Mondays (or the first trade day after a holiday) the ISO will set this fuel volatility scalar to 25 percent.

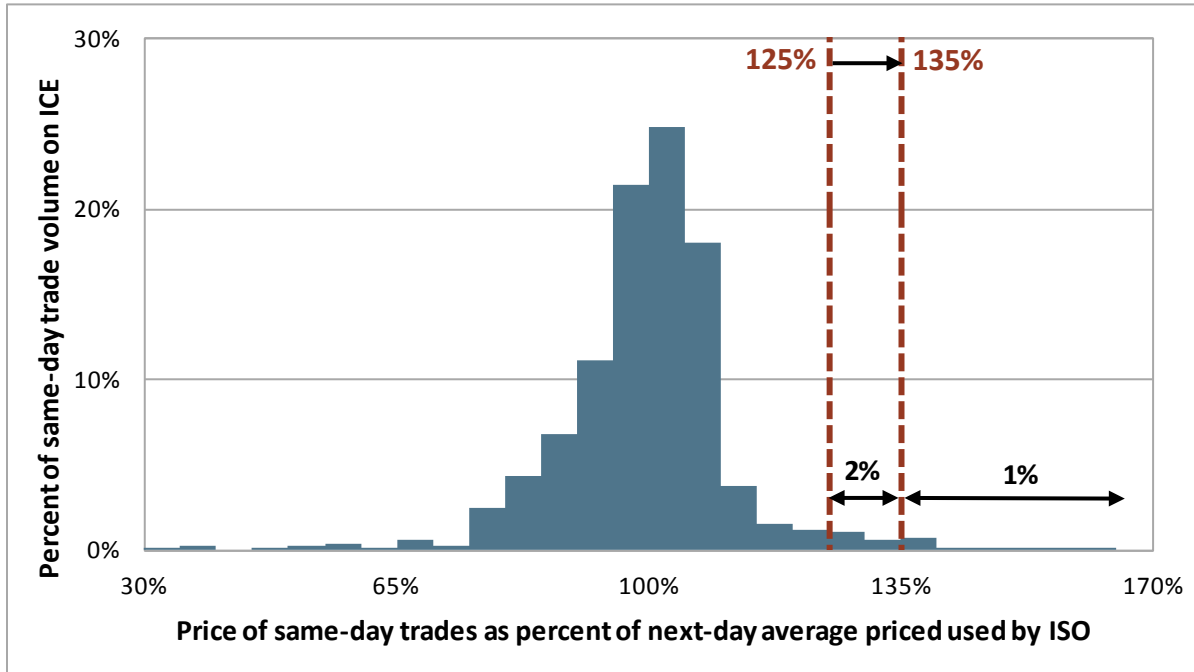
Figures 1 and 2 show the impact of this new reasonableness threshold based on prices of actual gas trades reported on the Inter-continental Commodity Exchange (ICE) for the SoCal Citygate since the start of special gas balancing rules related to Aliso Canyon that were implemented in July 2016.

- As shown in Figure 1, about 97 percent of gas traded in the same day market (excluding the first trade day of each week) was purchased at a price within 25 percent of the next day gas index used by the ISO to calculate real-time commitment cost bid caps (i.e. within the 25 percent headroom scalar already included in these bid caps). The extra 10 percent reasonableness threshold proposed by the ISO increases this total by 2 percent to 99 percent.
- As shown in Figure 2, on the first trade day of each week, about 88 percent of gas traded in the same day market was purchased at a price within 25 percent of the ISO's next day gas index. The extra 25 percent reasonableness threshold proposed by the ISO for the first trade day of each week increases this total by 8 percent to 96 percent.
- In the same-day gas market at PG&E Citygate, 100 percent of same day trade prices on ICE were within the 25 percent headroom scalar already included in commitment bid caps.⁸

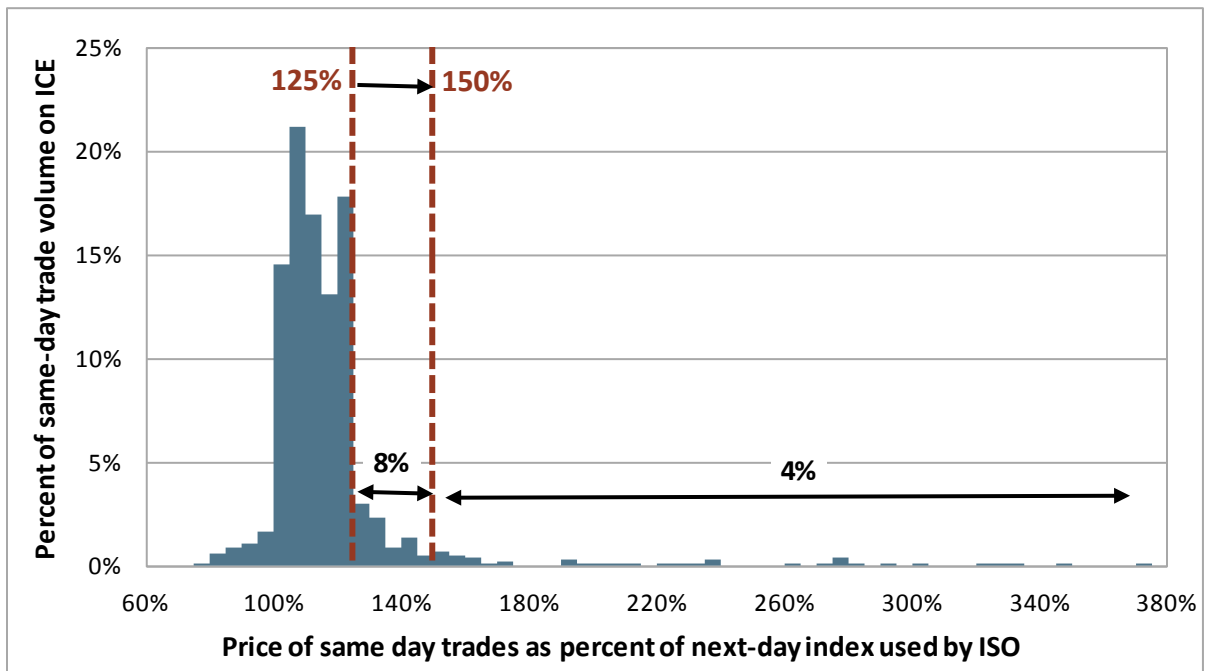
These data show that static reasonableness thresholds likely provide very limited value, and will be “too high” most days, but will be “too low” on a large portion of the limited number of days when same day prices rise well above the 25 percent headroom already incorporated in commitment cost bid caps.

⁸ *DMM Comments on Revised Draft Final Proposal for Commitment Cost and Default Energy Bid Enhancements*, pp. 3-4.

**Figure 1. Price of same-day gas trades compared to next day index used by ISO
July 2016 – February 2017**



**Figure 2. Price of same-day gas trades compared to next day index used by ISO
July 2016 – February 2017 (First trade day of week)**



Figures 1 and 2 also demonstrate that the ISO's bid caps are almost always sufficient to ensure suppliers' bids can reflect their actual gas costs, and that assertions by the ISO and some participants to the contrary are not supported by market data. This conclusion is further demonstrated by the fact that no entity has pursued cost recovery under ISO tariff provisions that have been in place since 2016 allowing suppliers to request payment for any gas costs that have been unrecovered due to bid caps.

Resource Specific Feedback Loop

DMM provided more detailed comments on the ISO's final proposal as part of the stakeholder process in which we identify several other questions and concerns about the ISO's final proposal. One of these concerns involves the *resource specific feedback loop*, which will allow the ISO to set different reasonableness thresholds for each individual resource.⁹ DMM has requested further clarification of this potentially important feature, since its impact hinges on how the provision is interpreted or applied in practice. While this feature could provide a potentially valuable way of customizing reasonableness thresholds, the approach proposed by the ISO for setting these resource specific values is also very static and backward looking. If not appropriately implemented, this *resource specific feedback loop* could be a loophole that may undermine the overall bid mitigation process.

Gas Supply Limitations and Penalties

DMM has also expressed questions and concerns about how supplier's estimate of any risk of gas limitations and pipeline imbalance charges should be treated.¹⁰ DMM objects to the ISO's proposal to apparently allow (and even encourage) suppliers to simply "bake in" the full cost of potential gas penalties into cost-based bids used in mitigation. Suppliers have freedom to include such items in market bids, but should not be allowed to increase bids used in mitigation beyond levels consistent with prevailing gas market prices. Any limitations on gas supply or "scarcity" of gas supply available in the market are reflected in the gas market prices at which suppliers may procure gas and the electricity market prices they receive.

If gas supply is not available, suppliers should declare units unavailable due to supply limitations. In practice, when severe supply limitations or actual scarcity exists, resources may have gas supply curtailed and the ISO has indicated it will use gas nomograms to ration available supplies in the most efficient manner. If resources are dispatched and subject to mitigation under such conditions, it is because these resources are needed for

⁹ *DMM Comments on Revised Draft Final Proposal for Commitment Cost and Default Energy Bid Enhancements*, pp. 6-8.

¹⁰ *DMM Comments on Revised Draft Final Proposal for Commitment Cost and Default Energy Bid Enhancements*, pp. 9-10.

reliability. There is no need to rely on suppliers with market power to raise the mitigated bids for these resources in order for the ISO to effectively manage reliability.

DMM Proposal for Setting Reasonableness Thresholds

Since September 2015, DMM has been recommending that the ISO utilize gas trade information that is available each morning for day-of trades to update gas prices used in calculating bid caps or “reference levels” used in the real-time market.¹¹ DMM’s recommendation to utilize this available gas market information to screen the reasonableness of bids is consistent with how most – or all – other ISOs in the U.S. assess and approve cost-based reference bids used in real time market power mitigation.

As explained in DMM’s prior comments, DMM proposes that same-day gas market trade information available each morning be used to set reasonableness thresholds. Such adjustments to reasonableness thresholds would only be necessary on the limited number of days when gas is trading at prices in excess of levels covered by the 25 percent and 10 percent headroom scalars already included in bid caps.¹²

DMM’s analysis indicates that there is sufficient same-day gas market information and liquidity to update reasonableness thresholds used in the real-time market for all resources served by California’s major gas trading hubs (see Attachment A). These hubs cover most of the resources that are in transmission constrained areas and are therefore subject to mitigation in the ISO/EIM footprint.

For units outside of these major gas areas, the ISO could use less accurate thresholds such as the static thresholds proposed by the ISO or utilize more manual processes or other gas information. However, DMM encourages the ISO to develop processes to accommodate more dynamic changes to reasonableness thresholds for EIM resources on the limited number of days when significant increases in gas prices occur.

DMM believes that with respect to this aspect of DMM’s proposal, the ISO should not let the “perfect get in the way of the good.” Although the ISO may not be able to get access to gas price data for all resources in the ISO/EIM footprint on all days, this is not a reason for the ISO not to utilize the gas trade data that is readily available for a large portion of the units most likely to be mitigated on the limited number of days when gas prices exceed the next day index by a significant degree.

¹¹ *Report on natural gas price volatility*, Department of Market Monitoring, September 21, 2015, p.2. http://www.caiso.com/Documents/DMMReport-gas_price_analysis_september2015.pdf

¹² *DMM Comments on Revised Draft Final Proposal for Commitment Cost and Default Energy Bid Enhancements*, pp. 14-16.

CONCLUSION

DMM does not support the ISO's final proposal for dynamic mitigation. The remaining gaps in the proposal should be addressed, and the commitment cost bid caps should be raised on a more gradual basis only after the effectiveness of dynamic mitigation is confirmed based on actual operational experience.

The ISO continues to propose a very static approach for determining bid caps used when mitigation of commitment costs and energy bids is triggered by dynamic tests. Under the ISO's proposal, bid caps used in mitigation of gas-fired units will continue to be based primarily on prices in the next day gas market that occurs the day prior to each operating day. 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.

DMM continues to recommend that the ISO adopt a more dynamic approach which would allow these reasonableness thresholds to be adjusted by the ISO based on gas market trade data available at the start of each operating day. The approach for determining reasonableness thresholds proposed by DMM will ensure greater market efficiency, reliability and mitigation than the very static approach being proposed by the ISO.

Attachment A. Analysis of Liquidity and Volatility of Same-Day Gas Trading

This attachment provides analysis of the liquidity and volatility of the same-day gas market for the major gas trading hubs in the ISO system (SoCal and PG&E Citygate). These gas areas serve most of the generation in the ISO/EIM footprint that is located within transmission constrained areas and is most frequently subject to mitigation.

DMM's analysis indicates that there is sufficient same-day gas market information and liquidity to update reasonableness thresholds used in the real-time market for all resources served by these major gas trading hubs. This analysis also shows that adjustments to reasonableness thresholds would only be necessary on the limited number of days when gas is trading at prices in excess of levels covered by the 25 percent and 10 percent headroom scalars already included in bid caps.

Background

DMM has proposed that same-day gas market trade information available each morning be used to set the reasonableness thresholds that the ISO is proposing to use in automated pre-verification of energy and commitment cost bids used in mitigation. The ISO has declined to pursue this recommendation, citing the following three reasons:

- The same-day trading information on the Intercontinental Exchange (ICE) that DMM recommends using does not conform with a FERC *Policy Statement on Natural Gas Price Indices*.
- Even if FERC would allow the ISO to use the same-day trade information from ICE to set reasonableness thresholds, this would entail significant manual work.
- ICE real-time trades are illiquid and may not be representative of a supplier's actual gas costs.

The policy statement cited by the ISO was established over 14 years ago in the wake of investigations revealing manipulation and misreporting of price data used in some commonly used gas and electric price indices (e.g. Platts).¹³ As stated in a 2005 Report by FERC staff:

For each index location used in a jurisdictional tariff, the published index must report a minimum level of activity at that location, measured by volumes or number of transactions at the relevant location(s). The minimum volume levels are 25,000 MMBtu/day or 4000 MWh/day, and the minimum transaction levels are five trades (daily index), eight trades (weekly index), or ten trades (monthly index).

¹³ *Report on Natural Gas and Electricity Price Indices*, prepared by the Staff of the Federal Energy Regulatory Commission, May 5, 2004. PL03-3-004 and AD03-7-004.

The indices referenced in this 2004 report were published indices based on bilateral market data. The Intercontinental Commodity Exchange (ICE) did not exist at that time. In recent years, the majority of physical natural gas trading has moved to electronic platforms, such as ICE.¹⁴ The ICE is monitored by FERC and has an internal monitoring unit.

DMM has recommended using ICE same-day trade data available each morning as the primary basis for setting the reasonableness thresholds that the ISO is proposing to use in automated pre-verification of energy and commitment cost bids used in mitigation. DMM does not consider this to be akin to using this information as a *price index* that is used to directly settle any transactions or set market prices. As the ISO notes, suppliers will be required to specifically request bids up to these levels and will be expected to support and justify requests for bids that go up to or exceed these reasonableness thresholds. Nonetheless, DMM's analysis indicates that the ICE data DMM proposes be used should meet the criteria suggested by FERC for determining market liquidity.

Analysis

Figures A.1 and A.2 compare the volume of gas traded in the ICE same-day market at the SoCal and PG&E Citygate points compared to the weighted average price at these points since January 2016.

- The price in these charts is shown as the percentage difference between the same day price and the next day price index used by the ISO to calculate set cost-based bids.
- The horizontal dotted line shows the liquidity benchmark suggested by FERC (25,000 MMBtu/day).
- The vertical dotted line shows the minimum headroom included in cost-based bids calculated by the ISO (10 percent for Default Energy Bids).

As shown in these figures, on almost all days when prices in the same day market exceed the next day index used by the ISO by 10 percent, the volume of gas trades in the same day market exceeds the liquidity benchmark suggested by FERC (25,000 MMBtu/day). Table A.1 provides a more detailed statistical summary of these data.

¹⁴ See *The Evolution of North American Natural Gas Benchmarks*, Platts http://img.en25.com/Web/Platts/%7B3d744943-3273-4e3b-b022-54809545fe90%7D_Platts_ICE_NA_natural_gas_indices_infographic.pdf

Figure A.1. SoCal Citygate Same-day Liquidity on ICE (January 2016 – March 2, 2018)

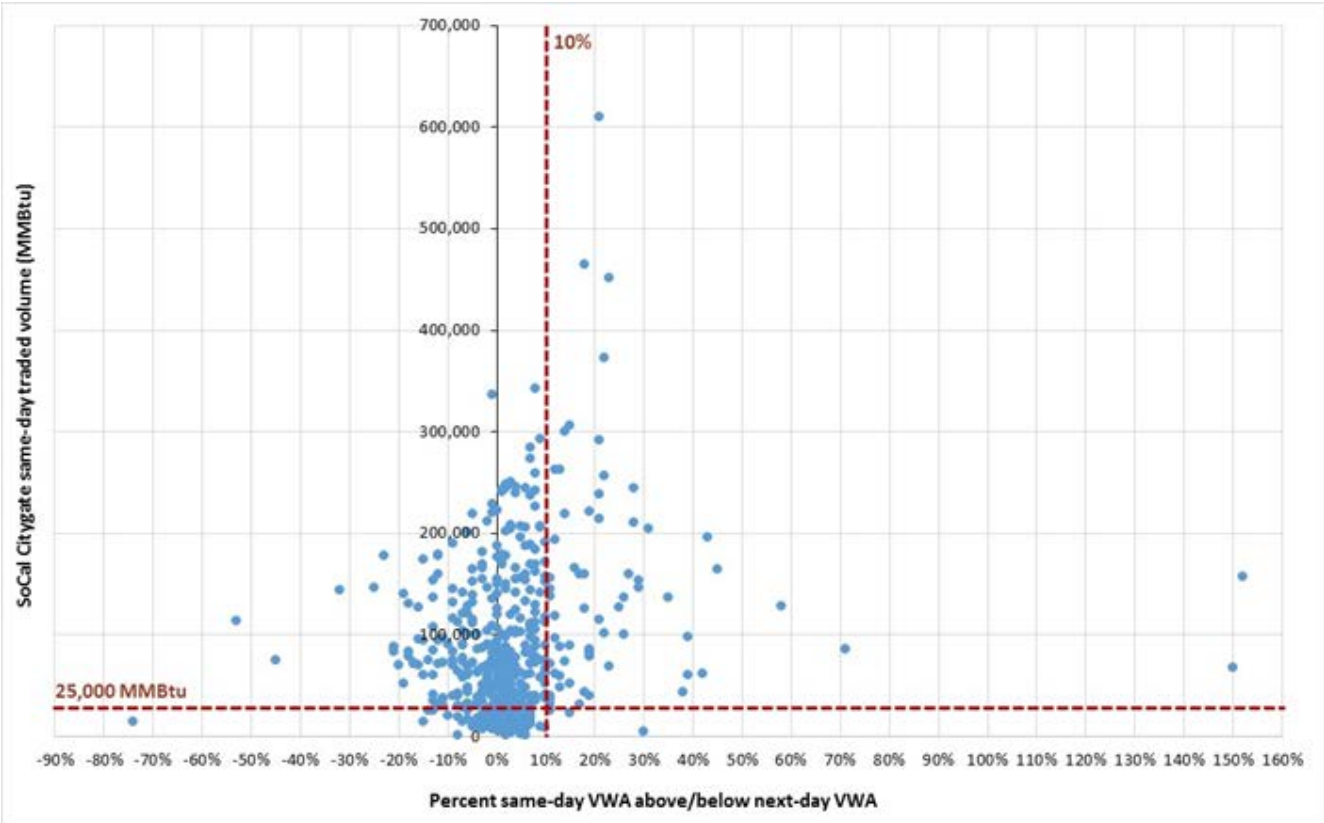


Figure A.2. PG&E Citygate Same-day Liquidity on ICE (January 2016 – March 2, 2018)

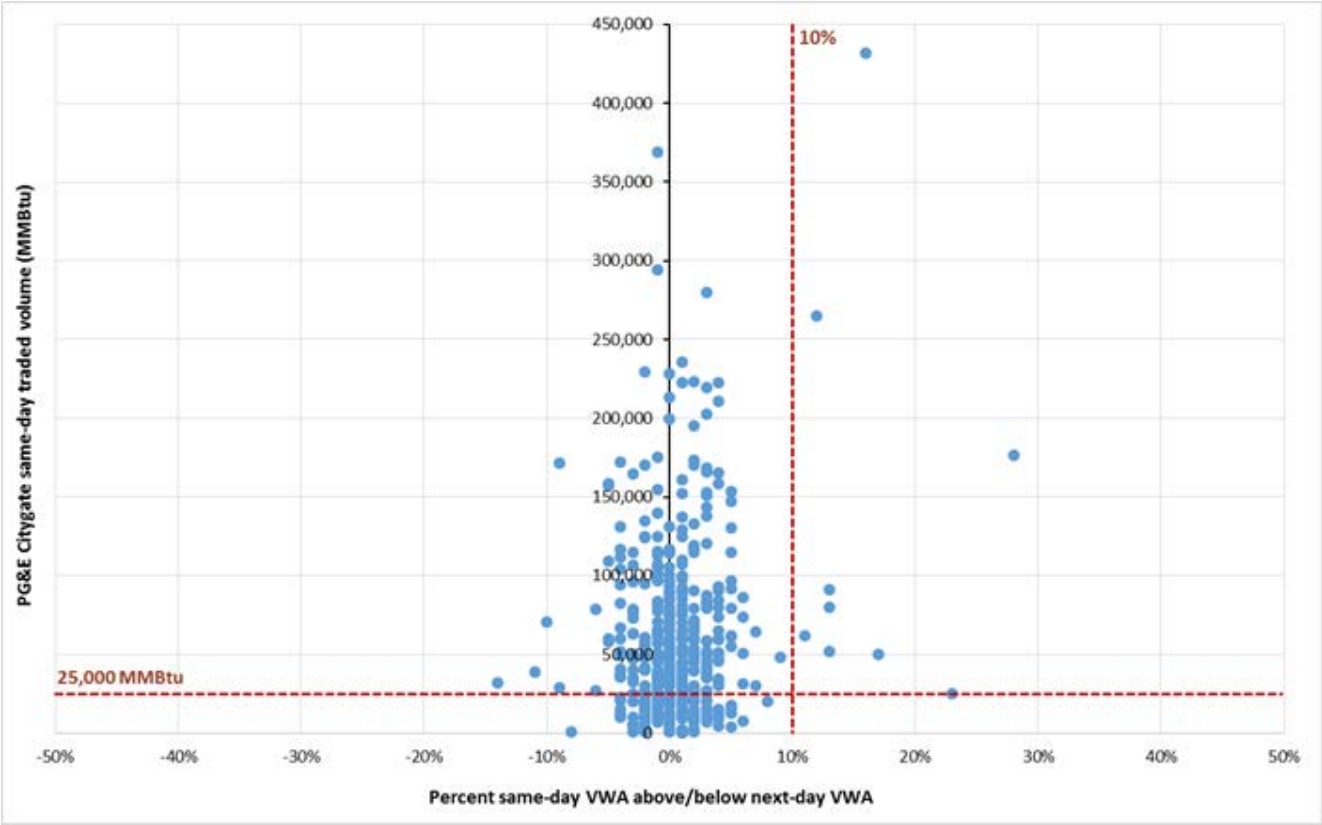


Table A.1 Same-day Liquidity on ICE (January 2016 – March 2, 2018)

	SoCal Citygate	PG&E Citygate
Total days (excluding holidays and weekends)	543	543
Days with same-day trades	511 (94%)	480 (88%)
Days with transactions ≥ 5 and trade volume $\geq 25,000$ MMBtu	394 (73%)	293 (54%)
Days when average same-day price exceeded next-day price by 10%	72 (13%)	9 (2%)
Days when average same-day price exceeded next-day price by 10% and First trade day of week (mostly Monday)	52 (10%)	8 (1.4%)
Days when same-day average price exceeded 10% of next-day average AND Transactions < 5 OR Trade volume $< 25,000$ MMBtu	5 (1%)	1 (0.2%)

As shown in Table A.1, over the 26 month period since January 2016:

- The number and volume of gas trades in the ICE same-day market meets the criteria for indexes outlined by FERC during a very high percentage of days for both SoCal and PG&E Citygate (73% and 54%, respectively)..
- The average price in the ICE same-day market for SoCal Citygate exceeded the next-day gas index by 10 percent only about 13% of the days, with most of these occurring on the first trade day of the week.
- There were only 5 days (1%) when the average price in the ICE same-day market for SoCal Citygate exceeded the next-day index by 10 percent and the number and volume of trades in the ICE same-day market did not meet this criteria.
- In the same-day market for PG&E Citygate, average price in the ICE same-day market rarely exceeds the next-day index by 10 percent. On the 9 days when this occurred, ICE market trading met the FERC criteria all but one day.