Memorandum

To: ISO Board of Governors

From: Benjamin F. Hobbs, Chair, ISO Market Surveillance Committee

Date: November 6, 2019

Re: **Briefing on MSC activities from Sept. 10, 2019 to Nov. 4, 2019**

This memorandum does not require Board action.

During the period covered by this memorandum, the MSC held a general session meeting in Folsom on October 11, 2019.[1] The presentations and discussions are briefly summarized in the first section below. During this time, the MSC also prepared a draft opinion on mitigation of system-wide market power, which the MSC adopted as a final opinion during the November. 5, 2019 general meeting by telephone. The draft recommendations are summarized in the second section below.

The next general session meeting of the MSC is scheduled for December 6, 2019.

General Session Meeting of Oct. 11, 2019

The general session meeting had three major items. The first addressed the possible need for mitigating market power at a system level, and included extensive discussions by MSC members of the issues, including members' analyses of market data from 2018 and a theoretical economic model of the effect of real-time mitigation of system market power upon day-ahead market power. The second major item was a review of the recent ISO staff analysis of price performance in the ISO market. The third major item addressed the need for improvements in the flexible ramp product in the energy imbalance market, and alternatives under consideration by the ISO for accomplishing those improvements. The presentations and discussion under each agenda item are summarized below.

System-level market power discussion. Three presentations were made during this agenda item. The first was by Perry Servedio, Lead Market Design Policy Developer at the ISO, which summarized the staff's conceptual proposal for mitigation of system level market power in the real-time market. This proposal would only mitigate offers within the California ISO balancing area, and only when the three most important interties are congested. His presentation was followed by presentations by two of the MSC members, Dr. Scott Harvey and Dr. Ben Hobbs.

[1] All presentations and recordings of the meeting can be found at http://www.caiso.com/informed/Pages/BoardCommittees/MarketSurveillanceCommittee/Default.aspx

An active audience discussion followed Mr. Servedio's presentation. Some discussion addressed the possible extension that Mr. Servedio discussed from the California ISO area to neighboring energy imbalance areas when there is no congestion among those areas. Extensive stakeholder discussion concerned the issue of whether the western interconnection is competitive. The observation that "resource adequacy" imports often offered at $1000/MWh was discussed, including alternative explanations of possible market power or lack of backing physical resources.

Dr. Harvey then made a detailed presentation that addressed three topics:

1. High level design issues for a mechanism to mitigate system-level market power;
2. Competition in the California market from imports and implications for the geographic scope of system-level mitigation; and
3. The time-frame for mitigation (real-time, day-ahead, or both).

Stakeholders discussed several issues during Dr. Harvey's presentation. One concerned what default energy bids should be used for energy imports that are not associated with physical resources, if there was import offer mitigation. Another issue discussed the possible advantages and disadvantages of a "conduct & impact"-based approach to mitigation, as opposed to the ISO's present approach of using a structural test (essentially, of market concentration) followed by mitigation to a default energy bid. A third set of issues involved concerns over possible day-ahead market power, and the relative rapidity and ease with which market power mitigation can be implemented in the real-time market alone.

Finally, Dr. Hobbs summarized a theoretical economic analysis that showed that under simplified assumptions, mitigation in just the real-time market could also indirectly mitigate market power in the day-ahead market. The degree to which this could occur depends on the extent to which real-time supply is as price-elastic as day-ahead supply, and the effectiveness of virtual (or "convergence") bidding. It also depends on the extent of market power. Residual unit commitment in the day-ahead market is a complicating factor; it could increase the amount of real-time supply and its elasticity. However, energy offers and energy market efficiency is not an objective of the residual commitment process, and so the wrong units from an overall efficiency point of view might be committed, resulting in less indirect mitigation of day-ahead market power.

Price performance analysis discussion. The second agenda item was the September 23, 2019 report by ISO staff about price performance in the ISO energy market.[2] This study was in part prompted by MSC concerns expressed in a January 2019 opinion[3] about several issues in the energy market that could affect the willingness of importers to offer in the day-ahead and hour-ahead markets, the prices at which they offer, and their willingness and ability to deliver their scheduled imports in the real-time market. Dr. Guillermo Bautista-

[2] www.caiso.com/Documents/FinalReport-PricePerformanceAnalysis.pdf

[3] J. Bushnell, S. Harvey, and B.F. Hobbs, "Opinion on Intertie Deviation Settlements," Market Surveillance Committee of the California ISO, January 16, 2019, www.caiso.com/Documents/MSC-OpinionontertieDeviationSettlment-Jan18_2019.pdf

Alderete, Director of Market Analysis and Forecasting at the ISO, summarized the report's conclusions.

Subsequent discussion addressed the issue of how congestion in the fifteen-minute market on the interties is systematically lower than in the hour-ahead market, which increases prices received by importers and may deprive the ISO of congestion revenue.

Flexible ramping product enhancements discussion. This agenda item began with an overview presentation by Don Tretheway, Senior Advisor, Market Design Policy at the ISO. A focus of the presentation and subsequent discussion was on the evidence of, and incentives for, the procurement of flexible ramping product in the energy imbalance market that is not deliverable when the 5-minute market actually needs it in order to avoid power balance violations. The incentive problem is that the market procures the product on a zonal basis, and generators whose energy output is constrained downward or is otherwise less valuable to the market due to transmission congestion within a zone are more likely to be chosen to provide the product. This is because the apparent opportunity cost of that product is less than for fully dispatchable generators within the zone. However, for precisely the same reasons, energy from those generators may not be accessible if unexpected upward net load ramps are experienced by the system.

Mr. Tretheway then discussed several alternative enhancements that are under consideration that would address this problem, including going to smaller zones (consistent with the present model) or a fully nodal procurement that would involve consideration of redispatch under additional scenarios of net load that represent steeper up- and/or down-ramps than are forecast. The theoretical and computational advantages of each were subsequently discussed by the MSC, stakeholders, and ISO staff.

Draft Opinion on System-level Market Power Mitigation

The MSC has been asked to comment on the ISO's proposal to commence a stakeholder proceeding to consider the possible implementation of a process to mitigate what is referred to as system-level market power in its markets.[4] The term "system market power" is used to refer to the potential for the exercise of market power across a region that encompasses most or all of the ISO balancing area, in contrast to the exercise of local market power within a transmission constrained sub-region within the ISO balancing area. The proposed proceeding follows a set of ISO and Department of Market Monitoring analyses that identified hours during 2018 during which the ISO day-ahead market exhibited structural conditions, in the form of failure of a three pivotal supplier test, that could allow the exercise of system market power.[5] Further, those studies indicated that system market power could become more of a potential problem in the future as supply conditions in the ISO market tighten due to the planned retirement of once-through cooling generating units.

[4] California ISO, "System-Level Market Power Mitigation Initiative Scoping Document", www.caiso.com/Documents/ScopingDocument-SystemMarketPowerMitigation.pdf

[5] California ISO, "Analysis of Structural System-Level Competitiveness in the CAISO Balancing Authority Area," April 29, 2019, www.caiso.com/Documents/SystemMarketPowerAnalysis-May6-2019.pdf ; CAISO Department of Market Monitoring, "Comments on CAISO's Analysis of Structural System-Level Competiveness," May 20, 2019, www.caiso.com/Documents/DMMComments-SystemMarketPowerAnalysis.pdf .

The Opinion includes:

- A summary of the recommendations;
- A review of market power mitigation in the ISO market, including a summary of the analysis in the Opinion's Appendix A of day-ahead prices in 2018 and the extent to which they may have been affected by system-level market power;
- An in-depth discussion of design issues that need to be considered in defining a system-level market power mitigation system;
- An appendix (Appendix A) that provides a detailed analysis of several questions about performance of the day-ahead market, including:
    - *Was local market power mitigation appropriately triggered by the existence of transmission congestion?*
    - *How often did the three pivotal supplier test fail in the day-ahead market, and what is the relationship of test failures to observed prices?*
    - *Was the level of import supply constrained by congestion on the major interties, or was it constrained by internal ISO congestion, potentially contributing to an exercise of system market power?*
    - *Is there clear evidence that prices materially exceeded competitive levels in these hours, reflecting the exercise of system market power?*
- An appendix (Appendix B) documenting a theoretical model and its results that establishes some conditions under which real-time system-wide market power mitigation would also largely or completely mitigate market power in the day-ahead market. (A summary of this analysis is presented above in the report of the October 11, 2019 general session meeting.)

The draft recommendations are summarized below.

The MSC has reviewed the analyses by both the DMM and ISO staff on historic supply conditions. The MSC concludes from these analyses that pivotal supplier tests indicate that there might have been some limited potential for market power at the system level, but, according to analyses of prices and costs that have been carried out to date, this market power has not been exploited very frequently or aggressively. Retroactive analysis by the ISO's Department of Market Monitoring indicates that little to no market power was exercised in most hours in which the three pivotal supplier test "failed" according to these analyses. Based upon analysis of 2018 outcomes, the MSC concludes that the development of a design for system-level market power mitigation would not appear to offer significant benefits *under those conditions*.

However, there is growing concern that market conditions may evolve in a way that exacerbates the potential for system-level market power. If retiring natural gas resources are not replaced by resources with the ability to meet system energy and flexibility needs, this could lead to periods in which a smaller number of resources would be capable of meeting those needs, potentially leading to shortages and high prices. Moreover, if the ISO becomes increasingly dependent on

resources outside the ISO to meet ISO load, there would be a potential for the ISO to become transmission constrained to a degree that has not occurred in the past and which might enable the exercise of system market power by a limited set of dispatchable resources remaining within the ISO.

Adding to concerns over future supply conditions is the fact that California currently operates under an arguably less stringent mitigation criterion than other balancing area authorities in the energy imbalance market with respect to the application of market power mitigation when the balancing area as a whole is transmission constrained. Given this fact, it seems that a reasonable place to start is a proceeding that would develop mitigation protocols that are analogous to those applied outside of California in the energy imbalance market with respect to constraints on import supply. It is our understanding that this is essentially what ISO management is proposing as Phase I of a system market power stakeholder proceeding.

Therefore, the MSC supports the next step of a stakeholder proceeding that would further refine the details of system-level market power mitigation. The MSC notes that application of market power mitigation only in real-time may not constrain the exercise of market power as tightly as if it were also applied in the day-ahead market as well, and there are some risks of unintended consequences of applying this mitigation only to real-time, and not in the day-ahead market. However, these risks appear to be outweighed by the advantages of starting by applying system market power mitigation only in the real-time market. First, there is a much better prospect of timely implementation of what would effectively be an extension of the existing energy imbalance market mitigation framework. Second, there are several difficult technical and policy questions that arise when extending mitigation to the day-ahead market that would likely require a lengthier stakeholder process to resolve. Third, the day-ahead market may itself change in non-trivial ways under current initiatives and with the prospect of extension to other energy imbalance market entities. This creates the risk that any system market power mitigation design developed for the current day-ahead design might be used for a very short period of time, or perhaps not used at all, before changes in the day-ahead might require implementation of a materially different market power mitigation design. Fourth, our theoretical analysis (Appendix B) indicates that real-time mitigation together with convergence bidding are likely to be at least partially effective in mitigating market power in the day-ahead market. These factors argue for starting with the real-time market and coordinating extension to day-ahead with other policy initiatives as a second phase.

The MSC is also supportive of the principle articulated in the ISO's initiative scoping document that system mitigation should be limited to resources within the ISO footprint. Mitigation of import bids not subject to resource adequacy requirements would likely prove ineffectual at best and counter-productive at worst. The application of market power mitigation to resource adequacy imports raises other policy issues that should likely first be addressed in ongoing resource adequacy proceedings. For example, deficiencies in the must offer obligation for import supply would be better addressed within the resource adequacy framework than with market power mitigation rules that would only apply when triggered by the potential for the exercise of market power.

An additional issue that would require addressing if imports were subject to market power mitigation would concern the format of import offers. In particular, application of cost-based offer price mitigation to import offers in the day-ahead market would require modifications to the day-ahead market design for imports that would allow import resource adequacy suppliers to submit

resource specific 3-part bids for start-up costs, minimum load costs, incremental energy, as well as physical parameters such as start-up time, minimum run time, minimum down time, and the other parameters submitted by internal resources.

Under any mitigation regime choice, California will need to continue the process of regional integration and will likely need to increasingly rely upon imported supply to support a reliable and competitive market in California. Forward contracting for imports will be important and, as discussed in Appendix A of the Opinion, the current policy for evaluating import-based resource adequacy is flawed. However, import supply offered at $1000/MWh does not necessarily reflect an effort to exercise west-wide market power. Instead, at least in some cases, it signals the existence of west-wide scarcity or represents resource adequacy supply that is not supported by any physical resource.

The MSC furthermore supports the principle that mitigation at this time should, as with other energy imbalance market areas, be limited to periods where the ISO area is import constrained due to transmission limitations. Mitigation of California generation in the absence of import constraints can be justified only under an assumption that the west as a whole is structurally uncompetitive at times, and the MSC has not seen evidence supporting such an assumption. Absent changes to the 3-pivotal supplier test and other aspects of the mitigation process, application of system wide mitigation even in the absence of congestion could result in much more frequent mitigation of all resources in California. Therefore, the MSC believes that a change to mitigate resources even in the absence of transmission congestion would need to be done in conjunction with a detailed review of many other aspects of the mitigation process. This would not be practical as part of a Phase I plan for system-wide mitigation. However, if the ISO initiates a second phase of the proposed proceeding in which mitigation of both day-ahead and real-time markets would be considered, there would be an opportunity to reconsider the conditions under which mitigation should be triggered.