California ISO | WESTERN ENERGY MARKETS

Memorandum

To: ISO Board of Governors and Western Energy Markets Governing Body

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

Date: May 19, 2025

Re: **Briefing on Market Surveillance Committee activities: December 11, 2024 – May 18, 2025**

This memorandum does not require ISO Board of Governors or Western Energy Markets Governing Body action.

During the period of time covered by this memorandum, the Market Surveillance Committee (MSC) of the California ISO held two general session meetings, one on March 28 and the other on May 2, 2025. The ISO's extended day-ahead market congestion revenue allocation initiative was the subject of an agenda item in both meetings, as discussed below. In addition, the March 2025 meeting included a staff presentation on the congestion revenue rights enhancements working group deliberations, along with MSC member presentations on congestion revenue rights principles and issues. The MSC members' presentations focused on modeling of unpriced transmission flows and the Department of Market Monitoring's proposal for a "willing seller" mechanism for allocation of rights. Each presentation at these meetings was accompanied by significant follow-up questions and discussion among the attending stakeholders, ISO staff, and MSC members.

Below are briefly summarized the substance of the presentations and highlights of the accompanying discussion. All meeting presentations are available on the MSC website.[1]

MSC General Session Meeting, March 28, 2025

Congestion Revenue Rights Discussion. This agenda item began with a presentation authored by Partha Malvadkar, Principal of Resource Adequacy and Infrastructure Policy, and Hilary Staver, Lead Policy Developer, Market Policy Development at the ISO, and presented by Mr. Malvadkar. He summarized the goals and deliberations of the congestion revenue rights working group, which by that point had met four times as of the MSC meeting date. The group had considered the present rights market structure and a root cause analysis of the congestion rights revenue inadequacy and market performance since 2019, and was working on problem statements. Three foci of the discussions included: causes and potential measures to reduce revenue insufficiency of congestion revenue

[1] www.caiso.com/informed/Pages/BoardCommittees/MarketSurveillanceCommittee/Default.aspx

rights; auction inefficiency goals definition and potential measures to enhance efficiency; and possible updates to design of congestion revenue rights to accommodate changing hedging needs. These changing needs include adjustments to time-of-use period definition and opportunities to hedge charging load for batteries.

The staff presentation was followed by presentations by MSC members Drs. Jim Bushnell and Scott Harvey.

Dr. Bushnell's presentation emphasized general principles and concerns in designing congestion revenue rights that are effective hedges and revenue sufficient. He described the volatility of congestion costs that occur at different time scales (daily, monthly, and the long term), showing data for selected point-to-point rights in the ISO market. He suggested that relatively little attention has been paid to designing congestion rights systems effectively provide the longer term hedges that might be most helpful in facilitating financing of long term resource investments. He also expressed concern that the 2018 changes in settlements designed to reduce revenue insufficiencies of congestion rights may also have degraded their hedging values. Dr. Bushnell proposed some changes in how revenue insufficiencies are managed, including emphasizing maintaining the number and quality of high value rights, and allocating shortfalls across all rights in the market rather than specific rights impacted by constraints responsible for shortfalls.

Dr. Bushnell then discussed the Department of Market Monitoring "willing seller" proposal to allocate congestion rights, raising three questions:

1. Is the current allocation process efficient and/or equitable?
2. How does the allocation process impact “willingness” to sell?
3. How does regulatory oversight/guidance impact the initial requests for rights in the allocation process, and the willingness to sell them in an auction?

He then described a spectrum of possible outcomes from implementing a willing sellers proposals. This ranges from a possible increase in the price of rights (which might reduce the auction inefficiency) to less availability of certain rights, which might be mitigated by creating bilateral hubs, to substantial decreases in availability of congestion revenue rights in the market. Extensive discussion with interested stakeholders ensured.

MSC Member Dr. Scott Harvey then made a presentation in which he made several observations about congestion rent shortfalls and pricing. First, he discussed the ISO's root cause analysis of negative priced (or market) transmission flows on two binding transmission constraints that occurred in mid-2024. Those flows occurred after adjustments were made earlier that year in the market software that lowered the threshold for shift factor truncation. Such negative priced flows have not occurred in other ISOs and indicate the presence either of issues with calculating market flows or

other software implementation or design problems. The ISO's root cause analysis showed that shift factor truncation was a partial but not complete explanation of the negative priced flows.

Identifying the cause of the unpriced flows could reduce congestion rent shortfalls, and result in more appropriate assignment of financial responsibility for congestion impacts to resources. Dr. Harvey recommended further assessment of the issue. This assessment would also help the ISO and stakeholders evaluate whether changes to the time of day granularity of CRRs would improve modeling, reduce congestion rent shortfalls and potentially enable more refined congestion hedging. Dr. Harvey suggested two issues associated with the remaining unpriced flows that need further study. These included loop (or "parallel") flows from transactions in other balancing authority areas, and flows from existing transmission contracts and transmission ownership rights.

Second, Dr. Harvey reviewed several questions and issues with the Department of Market Monitoring's "willing seller" design for congestion revenue rights reallocation.[2] He discussed the following features and issues with the proposal:

- Liquidity is a concern, especially the ability for load serving entities to exit counterflow positions as market conditions evolve, and for extended day-ahead market and energy imbalance market entities to hedge congestion on ISO wheel-throughs or parallel flows. The reason why illiquidity could be a problem is requirement to find matching buyers (or set of buyers) for both the source and sink without regard to the availability of transfer capability. Dr. Harvey suggested sets of market simulations to assess the impact of willing seller/buyer provisions in recent rights auctions.
- Dr. Harvey suggested that CRR buyers providing liquidity have to guess the exact sources and sinks that will be for sale in the auction, which could make the auction design intrinsically inefficient. He suggested that buyers cannot offer to buy CRRs from a variety of potential source-sink combinations without risking buying far more CRRs than they intend. This led to discussion with attending stakeholders about rights covering wheel-throughs the ISO system.
- Dr. Harvey commented on the usefulness of further information about the Department of Market Monitoring's analysis of their proposal. These include, for instance: (i) complexities involved in assessing liquidity in monthly reconfiguration auctions within the Department of Market Monitoring's analysis based on historical data that includes the sale of congestion revenue rights purchased by non-load serving entities in the seasonal auctions; (ii) the breakdown of exchanges of positively versus negatively priced rights by type of market participant; (iii) details of willing seller auction outcomes for interties; and (iv) apparent large losses incurred by financial participants when taking on

[2] www.caiso.com/documents/willing-counterparty-whitepaper-oct-23-2024.pdf

counterflow (negatively priced) rights, which were identified in the Department's willing-seller report.

Extended Day Ahead Market (EDAM) Congestion Revenue Allocation Discussion. A presentation by ISO staff members Milos Bosanac (Regional Markets Sector Manager, Market Policy Development) and James Lynn (Principal, Market Settlement Design) began this agenda item. That presentation briefly summarized the development of the EDAM proposal, including the revisions that PacifiCorp submitted to revise its Open Access Transmission Tariff and the concerns subsequently raised by other stakeholders about the allocation of congestion rents, especially those associated with parallel flows causing congestion within a balancing authority area that stemmed from transactions in one or more other areas. The presentation then described the ISO policy initiative addressing how rents arising from parallel flows could be allocated in order to address concerns that there could be significant shifts in rents among balancing authorities compared to the present situation, and that the ability of balancing authorities to ensure that transmission rights holders under the present open access tariff would remain hedged under the extended day ahead market.

Using simple examples of parallel flows involving multiple balancing authorities, Mr. Bosanac contrasted the allocation of congestion rents associated with parallel flows under the approved extended day-ahead market tariff (in which balancing authorities retain rents associated with their internal transmission constraints) with a possible transitional system in which parallel flow rents associated with certain transactions are instead retained by the balancing authorities in which the sources and sinks of the transactions are located. This led to extensive discussion among attendees of how parallel flows are handled today, and whether inefficient incentives might be provided by the transition proposal for existing rights holders to self-schedule rather than bid economically into the market. Mr. Bosanac explained that the intention of the transition proposal is to provide time for a stakeholder process to explore alternative congestion hedging designs, collect data needed to evaluate those designs, and to develop a design for final implementation. The presentation then outlined more detailed examples, and the proposed timeline for development of the transition congestion management system and its consideration by the ISO Board of Governors and Western Energy Markets Governing Body.

Following the ISO staff presentation, Dr. Harvey of the MSC made a presentation that addressed three related topics: (1) basic concepts numerical examples that illustrate the issues to be addressed in the extended day-ahead market congestion revenue allocation proposal; (2) a proposed set of considerations to be dealt with in designing the proposal; and (3) the future evolution of the extended day-ahead market.

Among the considerations he raised were the following. One is that open access transmission tariff rights provide better transmission service than present open access tariff transmission rules because the former potentially have the following advantages:

- They settle like congestion revenue rights without regard to feasibility of those rights;
- They do not subject transactions to transmission loading relief procedures in case of infeasibilities; and
- They pay for counterflow, depending on the precise design.

These advantages should be recognized, and compromises are likely to be necessary in the transition or long run design of the extended day-ahead market. Another is that tying payments of congestion rents to usage of rights provides inefficient incentives to schedule in order to receive those payments, and may also yield infeasibilities and thus congestion revenue insufficiencies. A third is that providing firm transmission schedules in the resource sufficiency evaluation might be a less distorting alternative. A fourth is the open question about whether the congestion revenue shifts due to parallel flows are significant or not. Stakeholders raised questions about the magnitude of congestion revenue shifts among regions that might occur, and the data is not presently available. A question is whether these shifts are small enough in magnitude such that potential distortions from inefficient self-scheduling incentives might be negligible.

Turning to the long term development of the extended day-ahead market, Dr. Harvey observed that like the western energy imbalance market, the day-ahead market would develop over time by adding balancing authorities, unlike the “big bang” evolution of some eastern ISOs. This difference in market evolution makes it necessary to have interim rules until day-ahead market has grown to the point where development and agreement on a long run design is workable. One interim rule could be the definition of flow entitlements. Eastern ISOs with joint congestion management agreements make payments to compensate for flow impacts over a predetermined level on a binding transmission constraint in adjacent markets.

Dr. Harvey recommended that attention be paid to the handling of congestion costs from loopflows arising from future sales of open access transmission tariff service. For instance, should simultaneous feasibility tests be imposed? Should there be constraint-by-constraint limits on loopflow credits, with flows above those limits paying congestion costs? Dr. Harvey proposed a long-term goal of development and implementation of some type of financial congestion hedge that does not create use-it-or-lose-it incentives and supports economic dispatch across real-time and day-ahead markets. An interim mechanism that assigns congestion rents on internal constraints to balancing areas and divides congestion rents on inter-balancing area constraints can provide a starting point for extended day-ahead market evolution.

MSC General Session Meeting, May 2, 2025

Market power mitigation for balancing authority areas discussion. This agenda item began with a presentation authored by Kun Zhao, Lead Quantitative Analyst, and Scott Lehman, Market Validation and Quality Analyst, both with Market Performance and Advanced Analytics at the ISO. Dr. Zhao presented, and began with an overview of the ISO's market power mitigation process, with a focus on dynamic competitive path analysis and how it is applied to balancing authority areas of the western energy imbalance market. Presently, the ISO area is assumed to be competitive and the dynamic competitive path analysis is only applied to non-ISO areas. The presentation's first half presented the result of a counterfactual set of runs; the purpose of those runs was to assess whether the ISO area would pass that path analysis if its competitiveness was also assessed. The results showed that based on the current methodology, the ISO area would be identified as noncompetitive in most evening peak intervals, especially in the summer. This would be the case because ramp and capacity limitations would mean that if the three largest sellers withdrew all of their capacity from the market, including the capacity needed to meet their own regulated retail load-serving obligations, load would not be met in the area during periods of steep solar ramp down.

The remaining part of Dr. Zhao's presentation summarized a possible revision of the competitive path assessment to consider potential supply contributions from other balancing authority areas with excess capacity, which could reduce the failure rate. In particular, this revision would involved a "grouping approach" to considering available supply in a broader set of areas. The presentation summarized a series of analyses, including some in which the ISO's area was also considered as potentially noncompetitive. Overall, the effect of the potential grouping approach, including the ISO as a potential noncompetitive area, was to lower pass rates for each and every balancing area authority compared to the present method (which does not group but also assumes the ISO is competitive). Thus, the effect of including the ISO area as potentially noncompetitive within current methods for analyzing market power is not offset by the proposed grouping method.

Discussion by MSC members and attending stakeholders of the staff presentation addressed several aspects of the method and results. One aspect that was focused on was the treatment of market participants who have load obligations in addition to resources. Generally, an assumption that a regulated utility with more resources than its obligations to serve retail load could pull all its resources out of the market, including those needed to meet those obligations, was viewed as overly conservative (that is, would tend to overstate the potential for market power). A result that was discussed was that often larger areas would be found to be less competitive than smaller subsets of areas, which one discussant pointed out appeared counterintuitive.

MSC members Bushnell and Harvey then made presentations addressing several issues in the ISO's market power mitigation methodology. Dr. Bushnell's presentation began by contrasting the "ex ante" philosophy of traditional anti-trust policy in the US (e.g., merger

analysis and market-based rates) with the unique approach used in electricity markets of "ex post" testing for uncompetitive offering behavior and possible consequences in day-ahead or real-time market runs and subsequent offer mitigation if potential market power is detected. The availability of fuel cost data and the potential for very transient but severe market power have been justifications for the electricity market approach. There are growing challenges to this approach, as markets expand to regions with less transparent and liquid fuel markets, while the growth of storage means marginal costs of resources increasingly reflect opportunity costs rather than fuel costs, and the consequences of "false positives" (premature draining of batteries) might be growing.

Dr. Bushnell advocated for two changes in the ISO's mitigation framework, each with a goal of further limiting mitigation to suppliers and circumstances where market power will be most likely to be a concern. The first change would be to evaluate suppliers based upon their "net" position of supply minus load obligation, rather than just their gross supply portfolios. The second suggested change would be to limit mitigation only to suppliers who fail a (net) pivotal supplier test, rather than to all suppliers.

Dr. Harvey's presentation focused on three issues in market power mitigation: (1) definition of the relevant gas hubs for determining fuel price for default energy bids; (2) issues involved in use of next-day versus intra-day gas prices for that purpose in real-time and in the use of gas index prices calculated for morning trading to calculate default energy prices for gas purchased in the afternoon cycle after publication of day-ahead schedules ; and (3) use of default bids to determine commitment cost offers without regard to the potential for the exercise of market power. Concerning the first issue, a key issue is gas network constraints, which might make gas supplies from the least cost gas hub unavailable to a particular resource. As a result, commitment costs or running costs could be underestimated, resulting in commitment at a loss and resulting inefficiencies.

Regarding the second issue covered in Dr. Harvey's presentation, afternoon gas market prices are more relevant to the cost of buying gas to cover incremental integrated forward market schedules, and extended day-ahead market schedules in the future, than the cost of gas in morning trading before day-ahead schedules are known. Similarly, intra-day prices are more relevant to western energy imbalance (i.e., real-time) markets, and tend to be higher than day-ahead prices. However, intra-day prices tend to be more volatile, and the lack of storage at many gas trading points in the western energy imbalance market can add a large but difficult to estimate premium relative to day-ahead or real-time gas purchase costs. This is a reason not to apply default energy bids to start-up costs of resources lacking market power in that market.

Finally, regarding the third issue addressed by Dr. Harvey, changes to limit commitment cost mitigation to situations where there was a potential for the exercise of market power was considered in the 2018 ISO initiative on commitment costs and default energy bid enhancements. The Department of Market Monitoring raised several concerns at that time, particularly with the large all-at-once increase in the commitment cost cap, mitigation of

resources committed out-of-market, and the possibility of increasing offer prices in real-time after a unit has been committed in the short-term unit commitment process. Dr. Harvey suggested that these issues could be addressed by the ISO (and have already been addressed by other ISOs). He also suggested that the ISO needs to reconsider working on the implementation of the mitigation design considered in 2018, and develop modifications that address reasonable market power mitigation concerns, with the objective of lessening the ISO market and ratepayer impact of flaws in the calculation of default energy bids for gas-fired generation. Dr. Harvey suggested possible ways to modify mitigation to handle some of the concerns.

Extended day-ahead market congestion revenue allocation discussion. This agenda item consisted of presentations by ISO staff and Dr. Harvey on several issues raised by parallel flow ("loop flow") congestion costs in the extended day-ahead market, and extensive discussion by meeting participants of these issues as well as a particular issue raised by stakeholders and ISO staff.

The ISO staff presentation was prepared by James Lynn, Principal, Market Settlement Design and Dr. George Angelidis, Executive Principal, Power Systems, and was presented by Mr. Lynn. He provided an overview of stakeholder comments on the March 17th issue paper, and the key features of the draft final proposal.[3]

During the public comment period at the start of the MSC meeting and then during Mr. Lynn's presentation, a particular issue concerning the apparent asymmetry in the transition proposal was discussed at length. The asymmetry is between:

1. the ISO proposal that during the transition period that certain transactions (balanced self-schedules that exercising open access transmission tariff rights within non-ISO balancing authority areas) be hedged against congestion cost components of their nodal prices that are associated with loop flows outside of their areas, and
2. the maintenance of the present practice of including only within-ISO congestion components in settlements of congestion revenue rights in the ISO area. This would mean that congestion components from non-ISO lines in other balancing authorities would not be included in those settlements during the transition period of enhanced day-ahead market operation.

This issue was raised by a stakeholder, and was confirmed as an important question by Mr. Lynn attending the call.

Because data is not now published on the likely magnitude of congestion components associated with loop flows from transactions within the ISO area or non-ISO areas, whether this asymmetry is large or not cannot be assessed. However, MSC member Dr. Harvey commented that there is time to study this now, and shouldn't be deferred until later in the

[3] https://stakeholdercenter.caiso.com/StakeholderInitiatives/Extended-day-ahead-market

proposed three-year transition period for the extended day-ahead market. Congestion components and loop flows could be approximated based on existing western energy imbalance market runs, and would be very informative on this particular issue and for decisions about transition phase congestion management in general. Dr. Bushnell mentioned an example of another issue that could be addressed either immediately or in the transition phase, which is whether there would be sufficient congestion revenues in the extended market to cover all congestion components for existing firm transmission rights. Mr. Lynn replied that the effort required to do such studies would be large, and there will need to be an internal discussion at the ISO about what would be involved and the feasibility of such studies. Some stakeholders did compliment the addition of a data analysis plan in the draft final proposal.

Closing out this agenda item was a presentation by Dr. Harvey of an extensive set of simple numerical examples to highlight several issues, and his suggestions for possible ways to address of these issues. The issues focused in on his examples including economically inefficient schedules and cost and benefit shifting that can occur due to:

- Inefficient self-scheduling incentives in order to increase loop-flow congestion cost allocations, and the possible inefficient commitment and dispatch that can result. In particular, the "use it or lose it" nature of these incentives are reminiscent of problems that the PJM market had to quickly act to correct in 1997.[4]
- How counterflows benefits might be inefficiently treated under the draft final proposal, creating an incentive for a transaction to be economically bid when counterflow payments might be large, while being self-scheduled when that is not the case.

Dr. Harvey then identified several additional issues, including:

- Potential for inconsistent treatment of congestion in the extended day-ahead and energy imbalance markets
- Potential for scheduling of phantom generation (e.g., overstating intermittent generation) to realize the congestion rebate value of firm transmission rights
- A potential market rule that would require day-ahead self-schedules to be inflexibly self-scheduled in real-time, with negative reliability and efficiency implications.

Dr. Harvey then proposed some alternatives for consideration to manage several of these issues. His proposal for financial flow entitlements, which he first suggested in the March 2025 meeting (*supra.*), was elaborated upon, and was commented upon favorably by several stakeholders in their May 5, 2025 comments.[5]

[4] The first Appendix in Dr. Harvey's presentation summarizes PJM's 1997 experience.

[5] https://stakeholdercenter.caiso.com/Comments/AllComments/e5b46c3b-afc9-47f9-a651-e732eba8c190