Memorandum

To: ISO Board of Governors

From: Keith Casey, Vice President, Market & Infrastructure Development

Date: March 20, 2019

Re: **Decision on local market power mitigation enhancements proposal**

This memorandum requires Board action.

EXECUTIVE SUMMARY

Management proposes several market enhancements to address market participant concerns that the ISO market's current market power mitigation process can result in the dispatch of resources at prices below their costs. This issue is particularly acute in the Western Energy Imbalance Market because of the Northwest's numerous hydro resources that have opportunity costs for energy sales because of their water limitations. Suppliers operating these resources may have disincentives to offer these needed flexible hydro resources to the EIM if they cannot reflect their costs.

First, Management proposes to create a standard default energy bid for hydro resources. The ISO's market power mitigation process reduces a market participant's submitted energy bid to a resource's default energy bid, calculated by the ISO, in the event it detects market power. Default energy bids are intended to reflect a resource's actual marginal costs of energy. Management proposes a new option for default energy bids specifically designed for hydro resources that better estimates these resources' actual costs, which typically consist of opportunity costs reflecting their limited water availability. Today, the ISO typically calculates default energy bids for hydro resources using formulas developed through confidential individual negotiations under negotiated default energy bid provisions. Market participants state that the current default energy bid formulas do not always account for the many frequently changing factors affecting water availability and can fail to account for the true value of their stored water.

Management's proposed hydro default energy bid accounts for the variability in the many factors affecting water availability and for market participants' ability to make bilateral sales of energy from these resources at a different location than the resource. This component is particularly important for suppliers that participate in the bilateral energy market in addition to the EIM. This standard hydro resource default energy bid provides the overall market with transparency into these resources' default energy bids

and provides a standard starting point for any hydro resource negotiated default energy bids.

Second, Management proposes enhancements to the ISO's market power mitigation process to limit instances of resources being dispatched for additional energy only because the market power mitigation process mitigated the supplier's submitted bid to a resource's default energy bid.

These enhancements to the market power mitigation process include a proposal to limit the EIM from dispatching additional energy from resources in balancing authority areas outside of the ISO under certain bid mitigation circumstances. This element falls under the EIM Governing Body's primary decisional authority as it applies to balancing authority areas other than the ISO.

The default energy bid and market power mitigation process enhancements described above are particularly important to encourage participation in the voluntary EIM. It is important to ensure that the market dispatches hydro resources based on their actual costs so that suppliers are encouraged to make these valuable, clean flexible resources available to the ISO market. Not only do hydro resources provide carbon-free energy, but they are also valuable in managing the variability of other renewable resources.

Regarding gas-fired resources, Management also proposes enhancements that will allow the ISO market to use more up-to-date natural gas cost information to calculate default energy bids and commitment cost bid caps. Management's proposed enhancements modify an approach the ISO Board of Governors approved last year but Management has not yet filed with the Federal Energy Regulatory Commission.[1]

Finally, Management proposes to amend the listed natural gas price indices to reflect that the names of these indices have changed.

Management proposes the following motion:

> ***Moved, that the ISO Board of Governors approves the local market power mitigation enhancements proposal described in the memorandum dated March 20, 2019; and***
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> ***Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposal described in the memorandum, including any filings that implement the overarching initiative policy but contain discrete revisions to incorporate Commission guidance in any initial ruling on the proposed tariff amendment.***

[1] Management has not yet filed to implement the changes approved by the Board of Governors because it delayed implementation until Fall 2019.

Management presented this local market power mitigation proposal to the EIM Governing Body on March 12, 2019. The EIM Governing Body approved Management's proposal to limit the EIM from dispatching additional energy from resources in balancing authority areas outside of the ISO under certain bid mitigation circumstances. This element of Management's proposal is on the ISO Board of Governor's consent agenda. The EIM Governing Body will also be providing advisory input to the Board regarding the remaining elements of this proposal.

PROPOSAL

The following sections describe Management's proposal.

Hydro resource default energy bid

Management proposes to create a new default energy bid category specific to hydro resources with water storage. Management's proposed hydro resource default energy bid provides a reasonable estimate of hydro resources' opportunity costs due to their water availability limitations. This design acknowledges that the ISO cannot precisely determine a hydro resource's available water supply and attempting to do so could interfere with suppliers' operation of their water systems.

Hydro resources with a limited water supply have opportunity costs because they can only produce a limited amount of energy over a given time period. This opportunity cost represents the revenue a resource would receive if it conserves its water supply so that it can produce energy when prices are highest and energy is most valuable to the system. For example, if a resource only has enough water to produce energy during one month of the year, and energy prices in the highest-priced month are $75/MWh, the resource would have a $75/MWh opportunity cost.

There is not an existing standard default energy bid option to account for hydro resources' opportunity costs. Accounting for opportunity costs currently requires suppliers and the ISO to agree on a negotiated default energy bid, which has been problematic for many suppliers because the current default energy bid negotiation process has not resulted in default energy bids that accurately account for the value of their stored water.

Market participants have stated that there is a high degree of subjectivity in interpreting the output of the models that they use to calculate the water available for energy generation each day and their resources' resultant opportunity costs. They have explained that these models are complex because they estimate water availability based on many factors that affect both reservoir inflows and outflows. These can include weather, upstream and downstream conditions including the status of other reservoirs in a hydro system, and legal restrictions and obligations such as flow restrictions due to wildlife and other water use considerations. They have also stated that the amount of water they have available to support offers for energy to the EIM can also depend on their own electrical load they have to serve each day.

Because of these factors, the amount of water they have available to offer energy to the ISO market, including the EIM, can vary day-to-day, and even within the day, which means their opportunity costs can be highly subjective because they cannot be precisely calculated even with complex models. This can make it impractical to calculate a specific hydro resource's opportunity cost with a high degree of precision, even using a negotiated default energy bid. Consequently, Management proposes a standard hydro default energy bid that approximates a resource's opportunity costs by considering current gas prices and the resource's water storage horizon. This approach does not attempt to precisely model each resource's operation, but is rather based on the typical operation of a typical hydro resource.

A hydro resource's opportunity costs should also reflect the supplier's ability to make bilateral energy sales outside of the ISO market at other locations besides the resource's location. This would be the case if the supplier has Open Access Transmission Tariff rights to transmission from the resource's location to a different geographic location where it makes sales. The opportunity cost would reflect the sales price at the different geographic location. This issue is particularly acute in the EIM because EIM participants often sell energy from their hydro resources outside of their respective balancing authority areas. Management's proposed hydro resource default energy bid also reflects this opportunity cost.

Management proposes that the hydro default energy bid for a resource be calculated each day as the highest of the following three components:

- Short-term: this component reflects a hydro resource's opportunity costs due to short-term water availability limitations, ensuring the ISO market does not dispatch a hydro resource too often on any particular day. Even if a hydro resource has long-term water storage, it may have a limited amount of water available over the day on some or all days.

- Long-term/geographical: this component reflects a hydro resource's opportunity costs due to long-term water storage or the supplier's ability to make sales at another geographic location. This component ensures the ISO market will not dispatch a hydro resource conserving its water if energy prices are anticipated to be higher in a future month or are higher in the bilateral market at another geographic location.

- Gas floor: this component accounts for the supplier's energy replacement costs if the ISO market's dispatch exhausts a resource's short-term water availability. It also helps ensure the ISO market does not dispatch a hydro resource such that it exceeds its short-term water availability limitations in the event real-time energy prices are significantly higher than the day-ahead index used by the short-term component.

The hydro resource default energy bid uses the highest of these three components, which represents the limitations that are applicable on a particular day. For example, if the short-term component is highest, then energy prices are high on that day and the short-term component should set the level of the default energy bid so that the ISO market respects the resources' short-term limitations.

The short-term component approximates a resource's short-term opportunity costs based on anticipated energy prices ranging from the next day to the next month. Management proposes to set the default energy bid at a high enough price so that the ISO real-time market does not dispatch the resource more than four hours per day. Market participants generally came to a consensus that four hours per day represents a reasonable approximation of most hydro resources' short-term water limitations. The market will calculate this price using the higher of the day-ahead, balance of month, or upcoming month energy prices from published bilateral market energy price indices. These prices will be from a fixed trading hub for each resource that is most representative of its EIM prices. The short-term component is then determined by increasing the price by a multiplier designed to limit the market dispatch of most hydro resources to no more than four hours per day.[2]

The long-term/geographical component uses the higher of day-ahead, balance of month, or upcoming month energy prices looking out for the number of months equal to the hydro resource's storage horizon. A resource's storage horizon will be the number of months, up to 12, between the times the hydro resource's water reservoir is historically at peak levels. This is the maximum amount of time that using water to produce energy affects a hydro resource's ability to produce energy in the future.

The gas floor component calculates the price of energy from a gas resource based on the natural gas published index price for the hydro resource's location and based on a typical natural gas-fired turbine generator's fuel consumption.

Limit dispatch at mitigated bid prices

Currently, the ISO market may dispatch a resource to provide energy when the resource appears economic because the market power mitigation process reduced the supplier's submitted bid price to a resource's default energy bid. Even with the proposed hydro default energy bid, there is the potential that the default energy bid may not fully account for a supplier's costs. Consequently, Management proposes two enhancements that will reduce the frequency with which the EIM dispatches resources because it reduced the supplier's submitted bid to the resource's default energy bid. The first of these enhancements falls under the EIM Governing Body's primary decisional authority and was approved by the EIM Governing Body on March 12, 2019.[3]

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[2] Based on current market conditions the multiplier is currently 1.4.

[3] Background on that element can be found in Management's March 5, 2019 memo to the EIM Governing Body https://www.westerneim.com/Documents/DecisionsLocalMarketPowerMitigationEnhancementsProposal-Memo-Mar2019.pdf

The second of these enhancements will prevent the ISO market from dispatching a resource to export power from a transmission-constrained region at mitigated bid prices only because the market detected market power when power was being imported to the region in an earlier market interval. These regions can include EIM balancing authority areas or other transmission-constrained regions, including within the ISO balancing authority area.

This situation is undesirable because the ISO market should not force a supplier to sell energy at mitigated bid prices in market intervals in which it does not detect market power. These enhancements will prevent this result by ensuring mitigated bid prices are at least as high as competitive prices outside of the region and by preventing the market from automatically mitigating a resource's energy bids in subsequent real-time market intervals when it detects market power in a single interval.

Natural gas prices

Management also proposes enhancements to allow the ISO market to use more up-to-date natural gas cost information to calculate default energy bids and commitment cost bid caps. These enhancements are focused on gas-fired resources but are also applicable to the gas floor component of the hydro default energy bid.

The ISO market calculates default energy bids for gas-fired resources based on published natural gas price indices. A supplier's actual gas costs may be higher than a published price if there is gas price volatility or if gas prices at the standard trading hubs that the published indices are based on are not representative of the prices at a particular resource's location.

Under enhancements approved by the ISO Board of Governors in 2018, but not yet filed with the Federal Energy Regulatory Commission, suppliers would be able to request that the ISO calculate a resource's default energy bid or commitment cost bid cap using the supplier's actual gas costs if they are greater than the published index price. This approach would be allowed to the extent the price change was no greater than 25 percent more than the published index price for Mondays and days after holidays and no greater than 10 percent more than the published index price for other days.

Management proposes to modify the above-described approach. For the real-time market, Management proposes that rather than using the fixed criteria of 25 percent and 10 percent more than the published index price, the ISO will approve supplier requests based on a gas price index published on the morning of the real-time market, and based on requests from suppliers for the ISO to review their gas procurement costs for a specific resource. These provisions would also extend to the day-ahead market.

The updated gas prices would also be used to calculate the gas floor component of the hydro resource default energy bids.

Management also proposes to change the gas price index the ISO market uses to calculate default energy bids and commitment cost bid caps for Mondays. The market currently uses a gas price index for Mondays based on purchasing gas in a package on Friday for delivery over the weekend and on Monday. However, suppliers can purchase gas separately for Mondays when demand for gas is especially higher than over the weekend. The gas price index publishers publish a separate Monday gas price when this occurs. Management proposes to use this Monday gas price when it is published and represents sufficiently liquid trading.

Finally, Management proposes to amend the natural gas price indices listed in the tariff to reflect that the names of these indices have changed.

STAKEHOLDER POSITIONS

Stakeholders generally strongly support Management's proposed hydro default energy bid, particularly those that operate hydro resources in balancing areas participating in the EIM outside of the ISO balancing authority area. They state that the proposed hydro default energy bid provides a reasonable estimation of hydro resources' opportunity costs and will prevent the ISO market's dispatch from interfering with their water management.

The ISO Department of Market Monitoring agrees with the general framework of the hydro default energy bid, but does not believe that the hydro default energy bid should incorporate prices at different locations than a resource's location. They state that this pricing aspect inappropriately mixes the value of transmission with energy prices. For example, for the ISO balancing authority area, the current ISO market nodal energy prices, reflecting energy value, are separate from transmission's value that the congestion revenue rights market reflects.

While Management agrees DMM's observation is true at a theoretical level, in practice not allowing suppliers to reflect the opportunity cost of sales at other locations would interfere with the bilateral market. Suppliers point out their energy sales for deliveries at locations other than their hydro resource's location are nonetheless linked to the output of that hydro resource. This is because energy purchasers often specifically purchase energy produced by hydro resources to meet carbon reduction goals. In addition, suppliers point out that in practice, in the bilateral market, transmission's value cannot be separated from energy's value because there is not a robust market for their unused transmission.

The ISO Department of Market Monitoring also opposes Management's proposal to base hydro resources' default energy bids on a storage horizon value that does not change throughout the year. They maintain this approach can inappropriately inflate a resource's default energy bid in the later months of the year when the horizon could extend past the winter months when a reservoir could no longer store water and the operator would instead have to let it flow through the reservoir.

Management believes its proposal for using a fixed storage horizon reasonably balances the practical considerations of implementation complexity and the difficulties in precisely modeling every hydro resource's operation. For example, there is the possibility that some hydro resources do not face maximum storage limitations each year. In addition, any default energy bid price inflation due to using a fixed storage horizon will be small and market power is not as much of a concern in the later months of the year as it is in other months. Nevertheless, Management will monitor default energy bids produced under this approach and suppliers submitted bids to ensure this is the case.

Stakeholders generally support the provisions to increase the accuracy of the natural gas prices the ISO market uses to calculate default energy bids and commitment cost bid caps.

The ISO Market Surveillance Committee generally supports Management's proposal, stating that the benefits of Management's proposal outweigh any drawbacks. However, they suggest that, in order to include a remote bilateral trading hub in a default energy bid, suppliers should have to demonstrate their transmission rights are not already fully committed and cannot be sold if unused.

In response to the Market Surveillance Committee's suggestion that suppliers should have to demonstrate their transmission rights to a remote location are not already fully committed, Management commits to incorporate this requirement in the tariff provisions implementing its proposal. Management believes suppliers have already presented information in this initiative's stakeholder process demonstrating there generally is no ability to bilaterally sell such unused transmission rights.

Attachment A presents a summary of stakeholder comments and Management's responses.

The Market Surveillance Committee provided a formal opinion on Management's proposals, which is included as Attachment B.

CONCLUSION

Management requests the Board of Governors approve this proposal. The local market power mitigation enhancements proposal will encourage flexible resources to participate in the ISO and EIM market and improve the accuracy of the ISO's market power mitigation provisions, which will lead to more efficient real-time market price formation.