Memorandum

To: Energy Imbalance Market Governing Body

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

Date: March 5, 2019

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

This memorandum requires EIM Governing Body 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. This includes 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 of Management's proposal falls under the EIM Governing Body's primary approval authority. All of the other enhancements proposed in this memorandum fall under the EIM Governing Body's advisory role.

The 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, 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 EIM Governing Body approves an optional feature to limit the EIM from dispatching additional energy from resources in balancing authority areas outside of the ISO in the event of bid mitigation, as described in the memorandum dated March 5, 2019.***

PROPOSAL

The following sections describe Management's proposal.

Hydro resource default energy bid

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

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 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. 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 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 addresses instances when the ISO market increases exports out of (or decreases imports into) an EIM balancing authority area only because of a mitigated bid price. This occurs when the market mitigates the bids of all resources' bids in a balancing authority area because the balancing authority area is in an import-constrained area.[3] The ISO real-time market schedules resources in each market interval based on two runs. The market completes the first run using a supplier's submitted energy bid. If market power is detected, the bid is mitigated to the resource's default energy bid. The market then conducts a second run to determine final schedules and prices. This can result in the market dispatching additional energy from resources because of their mitigated bid prices.

Management proposes to add an optional feature for EIM entities to limit additional dispatch of resources when their balancing authority area is subject to bid mitigation. The additional dispatch would be limited to the net energy transfer out of the balancing

[2] Based on current market conditions the multiplier is currently 1.4.
[3] This issue only extends to EIM balancing authority areas, which are subject to bid mitigation at a balancing authority area level, because they do not have a competitive number of suppliers at a system level under all conditions.

authority area the market scheduled in the first market run using the submitted bids for an interval, plus the amount of flexible ramping product the market scheduled the balancing authority area to provide in excess of its flexible ramping product requirement.

Management proposes that the dispatch limit be based on each balancing authority area's flexible ramping product requirement and awards to reflect that, while the EIM is a voluntary market, the EIM design assumes that flexible ramping capability is shared between balancing authority areas. This is accounted for in the EIM resource sufficiency test through the reduction of the overall flexible ramping product requirement by an amount that reflects the diversity benefit of pooling multiple balancing authority areas' flexibility requirements. The amount of a balancing authority area's flexible ramping product awards in excess of its individual requirement reflects the amount of flexibility that the market has determined is optimal for a balancing authority area to contribute to the EIM's overall system requirement.

This feature would enable an EIM balancing authority area to limit additional dispatch as a result of mitigation if they find their default energy bids do not accurately represent their costs. However, if an EIM balancing authority area believes its default energy bids accurately represent their costs, there is no economic reason to limit their economic dispatches with other balancing authority areas. In that circumstance, they would be unlikely to use this feature.

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 a 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.

Some stakeholders question the need to limit additional energy transfers between EIM balancing authority areas when the market mitigates resources' bids in an exporting balancing authority area. They believe this may result in limiting EIM benefits obtained through energy transfers or anomalous market outcomes.

Management addressed the potential to reduce EIM benefits by leaving it up to each balancing authority area participating in the EIM to decide if the market limits its exports in the event of bid mitigation. Management also notes that without the feature to limit transfers in the event of bid mitigation, EIM participants may reduce the amount of supply and transmission capacity they make available to the ISO market. Management has not identified any significant market anomalies that will result from the feature, but commits to monitoring the feature to identify any if they occur.

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. They also believe Management's proposal to limit to the EIM's additional dispatch because of bid mitigation should be based on a balancing authority area's total flexible ramping product award.

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.

Management respectfully disagrees with the Market Surveillance Committee's suggestion that additional dispatch because of bid mitigation should be based on a balancing authority area's total flexible ramping product award, rather than first subtracting the balancing authority area's flexible ramping product requirement. Management believes the amount of energy a balancing authority area should have to export should be based on the results of the market at suppliers' submitted bid prices. Consequently, Management does not believe it is appropriate for the market to dispatch a balancing authority area to export more energy at mitigated bid prices than it originally dispatched as flexible ramping exports at the supplier's submitted bid prices.

CONCLUSION

Management requests the EIM Governing Body approve the portion of Management's proposal that is under its primary approval authority, which is Management's proposal for the optional feature to limit the EIM from dispatching additional energy from resources in balancing authority areas outside of the ISO in the event of bid mitigation. This proposal is only applicable to balancing authority areas in the EIM outside of the ISO balancing authority area. This proposal will provide additional incentives for EIM participants to make supply and transmission available to the EIM by limiting resource dispatches to export power only because the market mitigated bid prices. Management also requests the EIM Governing Body provide advisory input to the ISO Board of Governors supporting the other proposed enhancements described in this memorandum.

EIM Governing Body **March 12, 2019** **Decisions on Local Market Power Mitigation Enhancements Proposal**

General Session

Motion

Moved, that the EIM Governing Body approves an optional feature to limit the EIM from dispatching additional energy from resources in balancing authority areas outside of the ISO in the event of bid mitigation, as described in the memorandum dated March 5, 2019.

Moved: Prescott **Second: Fong**

EIM Governing Body Action: **Passed**	Vote Count: **5-0**
Fong	Y
Kavulla	Y
Linvill	Y
Prescott	Y
Schmidt	Y

Motion Number: 2018-03-G7.1