Comments on Energy Imbalance Market Year 1 Enhancements Draft Final Proposal

Department of Market Monitoring
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I. Summary

The Department of Market Monitoring (DMM) appreciates the opportunity to comment on the Energy Imbalance Market Year 1 Enhancements Draft Final Proposal. DMM supports the ISO's proposed design changes to the Energy Imbalance Market (EIM) scheduled for implementation when NV Energy joins the EIM in October 2015. In the comments below, we discuss concerns raised by stakeholders regarding transfer costs for prioritizing EIM internal interties and the greenhouse gas (GHG) flag and cost based bid adder.

DMM has closely reviewed the proposed approach for modeling EIM transfer limit constraints based on the level of detail provided in the ISO's final proposal. Based on the analysis below, DMM concurs with the ISO and the Market Surveillance Committee (MSC) that if the transfer cost used in the market software is set at a relatively low value, the proposed approach should allow the ISO to efficiently utilize EIM transfer capacity while limiting the impact of the transfer cost on locational market prices and efficiency of dispatch.

DMM supports the ISO's proposal for the GHG flag and cost-based bid adder. Some stakeholders have expressed concerns about the need for the flexibility to adjust the GHG flag on an hourly basis (rather than daily) and requested that DMM review this market design feature for potential gaming or other detrimental market impacts. DMM has reviewed this issue, and while we see limited value or need for this additional hourly flexibility, we also do not have any significant concerns about potential gaming or other detrimental impacts of this bidding flexibility. Nonetheless, DMM will monitor any bidding behavior that may indicate any attempt to detrimentally affect market outcomes by hourly changes in GHG bidding.

II. Modification of EIM Transfer Limit Constraints – EIM Transfer Cost

DMM has carefully evaluated the EIM transfer cost proposed in the EIM Year 1 Enhancements Draft Final Proposal. As proposed by the ISO, the transfer cost will be carefully tested prior to implementation and restricted to the smallest effective value. Our analysis below concludes that if the transfer cost used in the market software is set at a relatively low value, the proposed approach should allow the ISO to efficiently utilize EIM transfer capacity while limiting the impact of the transfer cost on locational market prices and efficiency of dispatch.

The ISO technical paper, "Energy Transfer Scheduling in Energy Imbalance Market"[1], defines the EIM transfer cost as:

$C_{j,k}$ The transmission cost of the Energy Transfer scheduless of EIM BAA *j* from/to BAA *k* in the EIM Area.

As we understand the draft final proposal and ISO discussions on this topic in stakeholder meetings, the ISO would consult with the EIM entity to declare preferences of optimal scheduling paths for EIM transfers where multiple options exist. The EIM transfer cost to be reflected in the market optimization would be determined by the ISO to indicate the declared preferences among optimal paths. This would imply that the transfer cost should be path-specific rather than being defined at the BAA level as indicated in the formulation above. While DMM understands that the Phase 1 proposal includes the transfer cost only as an optimization parameter, defining the cost as path-specific is especially important should this value ever reflect a true cost of wheeling or transmission access. In the comments below we assume that the implementation of this cost will be path-specific and recommend the ISO clarify this point in the technical paper.

DMM has not identified significant problems with the ISO consulting with the EIM entity to determine preferences among multiple optimal scheduling paths for EIM transfers. We have carefully considered the implications of different transfer cost parameters imposed by the ISO to achieve these priorities. As described in the examples below, under some scenarios, a large transfer cost parameter could create dispatch inefficiencies or create price separation between EIM BAAs. However, a sufficiently small transfer cost makes scenarios in which dispatch inefficiencies could arise unlikely and minimizes impacts on prices. For these reasons, DMM supports the ISO proposal to use a small EIM transfer cost parameter imposed after sufficient testing and analysis of market impacts.

Example 1:

This example illustrates that if the costs of the marginal resources of 2 EIM BAAs were so identical that the transfer cost parameter was pivotal in determining whether or not a transfer would occur, then scenarios can arise in which the most efficient participating resources or external intertie resources are not dispatched.

Consider two EIM BAAs: BAA #1 and BAA #2. There exist two possible interties between these BAAs, interties A and B. The preferred intertie, A, is both an EIM internal intertie between the BAAs, and an external scheduling point for BAA #1. Each of these interties has a total import scheduling limit of 100 MW into BAA #1. Assume no transmission losses.

Assume that BAA #1 has a real time imbalance of -175 MW. There is 260 MW of available capacity to meet this imbalance:

[1] http://www.caiso.com/Documents/TechnicalPaper-EnergyImbalanceMarket-EnergyTransferScheduling.pdf

Resource	Quantity	Bid Price
External Import at Intertie A	60 MW	$40.10
EIM Transfer from BAA #2	125 MW	$40.00
Internal Generation in BAA #1	75 MW	$40.15

With no prioritization of scheduling paths for EIM transfers, the least cost solution to meet an imbalance of -175 MW in BAA #1 would entail utilizing the entire 125 MW EIM transfer (from the marginal participating resource in EIM BAA #2) at $40.00 and 50 MW of external import schedule at intertie A at $40.10. The EIM transfer would use available capacity on interties A and B, and import scheduling limits on interties A and B would not bind. The system energy price would be set at $40.10 by the import schedule at intertie A.

Assume now that the EIM entity has prioritized intertie A as the preferred path for EIM transfers from BAA #2 to BAA #1. Assume that the ISO has declared this preference in the model by imposing a transfer cost parameter of $0.20 for EIM transfers over intertie B. This results in the model perceiving the cost of EIM transfers from the marginal participating resource in BAA #2 over Intertie B being $40.20. As a result of the $0.20 transfer cost over intertie B, the optimization considers $40.15 internal generation in BAA #1 to be more cost-effective for meeting demand in BAA #1 than a transfer of $40.00 internal generation in BAA #2 over intertie B.

The large transfer cost parameter impacts the dispatch in two ways in this example. First, it results in a suboptimal amount of transfer of participating resource generation from BAA #2 to BAA #1. Even though the cost of the generation would be the same $40.00 regardless of the intertie over which it was scheduled, the optimization would view transfers over intertie B as too expensive. Internal generation in BAA #2 would be transferred from BAA #2 to BAA #1 up to the 100 MW limit of intertie A. 25 MW of efficient generation in BAA #2 would be unused.

Moreover, a large transfer cost parameter could result in a suboptimal amount of external imports being scheduled at the ‘prioritized’ intertie. To meet demand in BAA #1, the optimization must choose between $40.00 generation being transferred over intertie A, $40.10 external imports at intertie A, $40.20 generation being transferred from BAA #2 over intertie B, and $40.15 generation internal to BAA #1. With the $0.20 transfer cost making transfers over intertie B uneconomic relative to generation inside BAA #1, the otherwise cost-effective external imports at the prioritized intertie A would be crowded out by $40.00 generation being transferred over that preferred intertie up to the limit of 100 MW.

Fortunately, the transfer cost impact on dispatch described in this example would only occur in the unlikely scenario of the costs, including losses, of the marginal resources of 2 BAAs being so identical that the transfer cost parameter was pivotal in determining whether or not a transfer would occur. With the transfer cost being limited to pennies or less, such a scenario is unlikely to occur, and in an instance in which it did, the resulting dispatch inefficiency would be de minimus.

Example 2:

This example illustrates how the transfer cost can be reflected in the LMP of an EIM BAA.

Consider again two EIM BAAs: BAA #1 and BAA #2. There exist two possible interties between these BAAs (interties A and B), and each are EIM internal interties. Each of these interties has a total import scheduling limit of 100 MW into BAA #1.

Assume that BAA #1 has a real time imbalance of -110 MW. There is 200 MW of available capacity to meet this imbalance:

Resource	**Quantity**	**Bid Price**
EIM Transfer from BAA #2	125 MW	$40.00
Internal Generation in BAA #1	75 MW	$45.00

With no prioritization of scheduling paths for EIM transfers, the least cost solution to meet an imbalance of -110 MW in BAA #1 would transfer 110 MW of $40.00 generation from BAA #2 to BAA #1. The EIM transfer would use available transfer capacity on interties A and B. The import scheduling limits on interties A and B would not bind. The system energy price would be set at $40.00 by the EIM transfer.

Assume now that the EIM entity has prioritized intertie A as the preferred path for EIM transfers from BAA #2 to BAA #1. Assume that the ISO has declared this preference in the model by imposing a transfer cost parameter of $0.01 for EIM transfers over intertie B. The optimization now sees the cost of a transfer from BAA #2 to BAA #1 over intertie B to be $40.01. The optimal dispatch will now be to transfer a MW quantity over intertie A at a cost of $40.00 until that preferred intertie reaches its limit of 100 MW. The final 10 MW of demand imbalance in BAA #1 will be met by a transfer over intertie B at a cost of $40.01. The LMP in BAA #1 should be $40.01. The LMP in BAA #2 should be $40.00. Intertie A will be a binding constraint with a shadow price of $0.01, because relaxing the intertie A constraint 1 MW would allow an additional 1 MW transfer at $40.00 over intertie A and 1 MW less transfer at $40.01 over intertie B.

This example illustrates that when the quantity of transfers from BAA #2 to BAA #1 that are cost effective in meeting demand imbalance in BAA #1 exceed the limit of the preferred intertie, the transfer cost parameter can create an incremental price separation between the EIM BAAs.[2] Carefully testing the transfer cost parameter prior to implementation and restricting it to the smallest effective value should limit this impact.

[2] The transfer cost can also create price separation between the EIM BAAs when the preferred internal intertie is also an external intertie scheduling point and the combined quantity of external import intertie bids at the intertie, and transfers from BAA #2 over the preferred intertie, that are cost effective to meet demand in BAA #1 exceed the limit of the preferred intertie.

However, a slightly higher (or lower) LMP in an EIM BAA than would arise in the absence of a transfer cost may over time increase the costs of incremental real-time purchases while proportionately increasing the revenues of incremental real-time sales, both within one BAA and across BAAs. If the distribution of the settlement impact on participants becomes unexpectedly significant over time, the ISO may be able to design a post-process redistribution of the impact of the transfer cost on the LMP (by isolating the impact of the transfer cost on the EIM internal intertie constraints' shadow prices). Such a redistribution could occur between BAAs and between market participants within the same BAA.

III. GHG Flag and Cost Based Bid Adder

In the Issue Paper and Straw Proposal, the ISO proposed the creation of a Master File flag to indicate scheduling coordinators' willingness for resource output to be deemed delivered to California. Stakeholder response prompted a proposed change which would allow a scheduling coordinator to determine, on an hourly basis, the GHG bid and MW limit that it would allow to be deemed delivered to the ISO.

The draft final proposal states that the MW quantity willing to be deemed delivered to the ISO would be submitted hourly with a separate GHG bid subject to a daily cost-based cap with a 10% adder. Based on our understanding of the proposal, DMM is supportive of this approach. Further, as indicated in DMM's comments on the Energy Imbalance Market Draft Final Proposal, DMM would not oppose a higher cost-based cap of up to 150% - 200% of estimated GHG costs if needed.

Stakeholder response to the ISO's initial proposed creation of a binary Master File flag resulted in the current proposal which allows the GHG quantity and bid to be submitted hourly. DMM understands that this hourly (as opposed to daily) flexibility was intended to allow increased flexibility and reduced complication in the bidding of capacity willing to be deemed delivered to the ISO. We appreciate these points and have considered possible implications of an hourly GHG nomination. While we do not believe this approach will be problematic, DMM will be alert to behaviors that may indicate an attempt to affect market outcomes by changing hourly GHG nominations.