Memorandum

To: ISO Board of Governors

From: Eric Hildebrandt, Director, Market Monitoring

Date: July 8, 2014

Re: **Market monitoring report**

This memorandum does not require Board action.

EXECUTIVE SUMMARY

This memo provides comments by the Department of Market Monitoring (DMM) on Management's recommendation on market power mitigation in the energy imbalance market (EIM) being presented to the Board for decision. DMM strongly supports Management's recommendation to apply market power mitigation procedures when transfer limits from the ISO into EIM BAAs become binding, restricting the availability of competitive supply from outside the EIM BAA.

Following approval of Management's EIM proposal at the November 2013 Board meeting, DMM has performed a more detailed analysis of the structural competitiveness of the PacifiCorp BAAs based on additional information that is now available.[1] This analysis indicates that the potential demand for imbalance energy from non-PacifiCorp load and generation deviations may be relatively low. However, the amount of non-PacifiCorp supply available to meet this demand remains uncertain and may vary under different market and system conditions. Consequently, DMM cannot conclude that the two PacifiCorp BAAs will be structurally competitive and therefore recommends that market power mitigation procedures be applied when scheduling constraints into either of these BAAs becomes binding.

After the EIM is implemented, DMM will continue to assess the structural competitiveness of the EIM and seek to develop other options that might be employed to refine the ISO's current market power mitigation provisions. After the EIM data becomes operational, DMM will also be able to assess the competiveness of the EIM using actual market data. DMM is also working with the ISO to seek to develop a more automated dynamic approach for assessing the structural competiveness of EIM BAAs based on actual market conditions each hour, such as the actual amount of scheduling capacity from the ISO into EIM BAAs each hour.

[1] *Assessment of Potential Market Power in Energy Imbalance Market*, Updated June 30, 2014, Prepared by Department of Market Monitoring. http://www.caiso.com/Documents/UpdatedAssessment-PotentialMarketPower-EnergyImbalanceMarket_corrected.pdf

BACKGROUND

The Department of Market Monitoring (DMM) worked closely with the ISO and other parties in developing the energy imbalance market (EIM) proposal approved by the ISO Board of Governors on November 7, 2013. Under the EIM proposal presented to the Board and approved under FERC's June 19, 2014 order, the ISO's current local market power mitigation (LMPM) provisions would be applied when congestion occurred on constraints within each of the two PacifiCorp balancing authority areas (BAAs) scheduled to participate in the initial EIM in October 2014.

As the ISO's EIM proposal was being developed, DMM recognized that market power mitigation procedures may also need to be applied when scheduling constraints into the PacifiCorp BAAs from ISO become binding but needed additional information from PacifiCorp and other entities within the PacifiCorp BAAs to adequately assess this. When scheduling constraints into the PacifiCorp BAAs become binding the potential for market power can arise because the amount of competitive supply from the ISO would be limited. Therefore, some supply from within these EIM BAAs would be needed to meet the demand for imbalance energy in these areas. In such cases, the potential for market power stems from the high portion of resources within the PacifiCorp BAA owned or controlled by PacifiCorp's merchant affiliate (PacifiCorp Energy).

When the ISO's EIM design was approved by the Board of Governors in November 2013, there was an understanding that further information on supply, demand within the PacifiCorp BAAs and transfer limitations into the PacifiCorp BAA was required to determine whether market power mitigation should be applied to when the supply of competitive power from the ISO was limited by scheduling constraints into these areas. The ISO and DMM committed to further assess the structural competiveness of the EIM based on additional information that may become available and return with a recommendation in summer 2014.

The ISO's March 2014 EIM tariff filing proposed that the ISO Board would have the authority to determine, based upon a study and recommendation from Management, whether market power mitigation tests would be applied to scheduling constraints between different BAAs in the EIM. FERC's June 19, 2014 order rejected this provision. The order indicated that the ISO may file with the Commission to implement real-time local market power mitigation on EIM interties if it believes, and can demonstrate, that such mitigation is warranted after the DMM completes its assessment of structural market power in PacifiCorp's BAAs.

DMM has concluded a more detailed analysis of the structural competitiveness of the PacifiCorp BAAs based on additional information on these factors which is currently available. This memo summarizes key findings of this report and DMM's recommendation on this issue.

STRUCTURAL ANALYSIS OF MARKET POWER

As noted in DMM's November 2013 Board memo, structural competiveness of the two PacifiCorp EIM BAAs can be assessed based on three main factors:

- **Demand for imbalance energy from other load serving entities and intermittent resources**. The incentive for the exercise of market power in the EIM will depend largely on the amount of net imbalance energy demand associated with load and generation deviations by entities other than PacifiCorp, such as other load serving entities and intermittent resources.
- **Scheduling constraints between EIM balancing authority areas and the ISO.** The ability for any entity to exercise market power within the two PacifiCorp BAAs can be limited by competition from energy scheduled into these BAAs from the ISO in the EIM dispatch process.
- **The amount and ownership of generation participating in EIM**. Although there may be a substantial amount of generation within the PacifiCorp BAAs owned by entities other than PacifiCorp, it is also uncertain how much of this generation will participate in the EIM, particularly in the initial phases.

Demand for Imbalance Energy

One key factor affecting the potential for market power in the Energy Imbalance Market is the demand for Imbalance Energy. Most of the imbalance energy met in the EIM may be associated with PacifiCorp's own load and generation deviations. The incentive and ability for the exercise of market power in the EIM will depend largely on the amount of net imbalance energy demand associated with load and generation deviations by entities other than PacifiCorp, such as other load serving entities and intermittent resources.

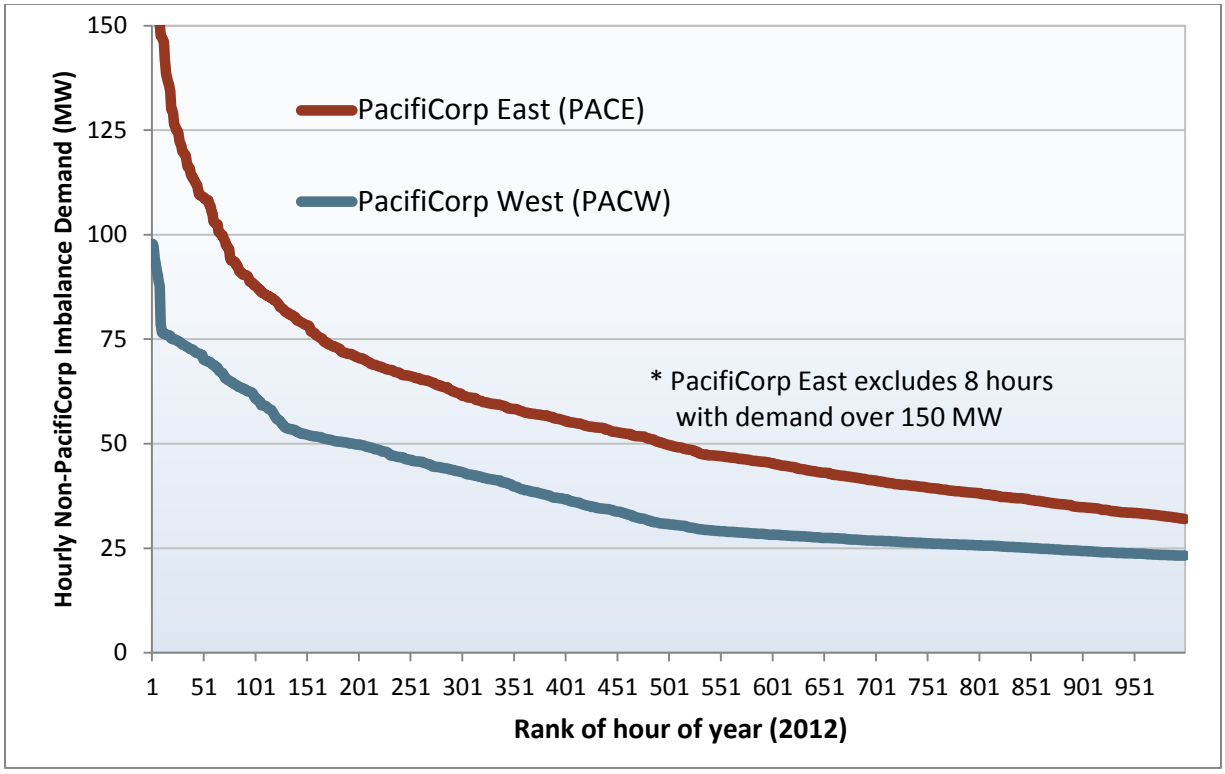
For this analysis, DMM requested and obtained data on the demand for imbalance energy in the two PacifiCorp Balancing Areas. The data only include imbalance energy demand for entities excluding PacifiCorp. The data include load deviations from non-PacifiCorp load serving entities, as well as generation deviations from non-PacifiCorp generation.

Figure 1 shows hourly 2012 imbalance energy data for the PacifiCorp East and PacifiCorp West BAAs as an hourly duration curve (i.e. sorted in descending order of the amount of hourly non-PacifiCorp demand for imbalance energy). As shown in Figure 1:

- In the PacifiCorp East BAA, the non-PacifiCorp demand for imbalance energy exceeded 150 MW only about 8 hours and was over about 90 MW during only 100 hours in 2012.

- In the PacifiCorp West BAA, the non-PacifiCorp demand for imbalance energy never exceeded 100 MW and was over about 60 MW during only 100 hours in 2012.

Figure 1. Demand for imbalance energy excluding PacifiCorp during top 100 hours (2012)



EIM Transfer Scheduling Constraints

The potential for market power within the two PacifiCorp BAAs can be limited by competition from imports from the ISO. Figure 2 illustrates DMM's understanding of the maximum amount of the scheduling limits that may be incorporated in the EIM at the point of implementation in October 2014.

As shown in Figure 2, the initial scheduling limit into the PacifiCorp East BAA from PacifiCorp West BAA during any 15-minuteinteval is 0 MW. This would preclude any energy being scheduled from the ISO into PacifiCorp East, even when scheduling capacity exists from the ISO into PacifiCorp West.

As also shown in Figure 2, currently available information indicates that up to 470 MW of additional energy may be scheduled into the PacifiCorp West BAA from the ISO during any 15-minute interval. In practice, however, DMM understands that this scheduling limit may be lower during any time period for at least three reasons:

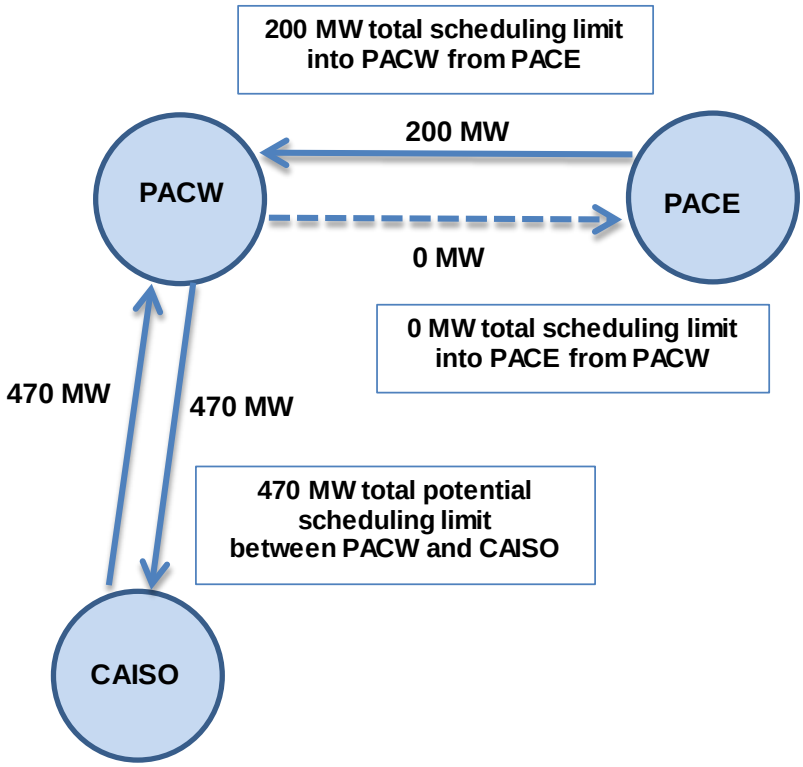
- PacifiCorp Energy (which is the PacifiCorp interchange right's holder for the scheduling rights being used for EIM scheduling) will make an hourly determination as to how much of its firm transmission capacity to make available for EIM transfers.

- As is the case today, the California Oregon Interface can be derated for operational reasons which could lead to curtailments of PacifiCorp Energy's scheduling rights which are being used for EIM scheduling.

- PacifiCorp will also be required to abide by any additional transfer limitations for dynamic transfers imposed by BPA as the path operator.

Thus, the amount of transfer capacity available in the EIM between the ISO and the two PacifiCorp BAAs also remains uncertain at this time and may be somewhat dynamic from hour to hour. [2]

Figure 2. Potential EIM Inter-BAA scheduling limit constraints



[2] Two other provisions included in the ISO's proposal could reduce the actual scheduling limit into PacifiCorp West from the ISO. If it is determined that there is insufficient ramping capability within an EIM BAA or combination of BAAs to meet the ramping requirement of a BAA or group of BAA's, the amount of energy scheduled into the EIM may be frozen. The EIM design also includes a provision to freeze transfers between the EIM BAAs and the ISO system in the event of an EIM disruption (Section 29.7 j (2)).

Non-PacifiCorp Supply

Based on information for generating resources being registered to be eligible to participate in the EIM, there may be a substantial amount of PacifiCorp generation within the PacifiCorp BAAs relative to the potential demand of imbalance energy. According to PacifiCorp, about 160 MW of additional gas-fired within the PacifiCorp East BAA owned or controlled by one or more other entities may also participate in the EIM upon implementation on October 2014.

Table 1 summarizes the maximum capacity of coal and gas-fired resources within the PacifiCorp East BAA that may participate based on currently available information from the ISO and PacifiCorp. As shown in Table 1, about 92 percent of the gas-fired generation and 96 percent of the total thermal generation within PacifiCorp East that may participate in EIM in October 2014 is owned or controlled by PacifiCorp. There is no hydro generation within PacifiCorp East that may participate in EIM.

Table 2 summarizes the maximum capacity of hydro and gas-fired resources within the PacifiCorp West BAA that may participate based on currently available information from the ISO and PacifiCorp. As shown in Table 2, all of the hydro and gas-fired generation that may participate in EIM in October 2014 is owned or controlled by PacifiCorp. There is no coal generation within PacifiCorp West that is expected to participate in EIM.

Table 1. Maximum Capacity of Coal and Gas Resources in PacifiCorp East BAA Potentially Participating in EIM

	Maximum MW		
Type	**PacifiCorp**	**Other**	**Total**
Coal	2,287	0	2,287
Natural gas	1,725	160	1,885
Total	4,012	160	4,172

Table 2. Maximum Capacity of Gas and Hydro Resources in PacifiCorp West BAA Potentially Participating in EIM

	Maximum MW		
Type	**PacifiCorp**	**Other**	**Total**
Natural gas	977	0	977
Hydro	431	0	431
Total	1,408	0	1,408

While the total amount of generation that may participate in EIM within the PacifiCorp BAAs may be high relative to the potential demand of imbalance energy, the portion of capacity from participating EIM resources that will actually be offered into the EIM cannot be determined for several reasons:

- These resources may submit base schedules for any portion of their capacity that they may utilize to meet load obligations, day-ahead sales into the ISO market or bilateral sales outside these BAAs.
- Entities controlling these resources may also choose to reserve this capacity to serve as potential sources of supply for inter-tie bids submitted to the ISO's 15-minute market.
- Entities participating in EIM are under no obligation to bid all their available capacity into the EIM.

As EIM is implemented, additional information may become available which may provide a basis for projecting the amount of other supply that may be offered in the EIM and the competiveness of this supply.

SUMMARY AND RECOMMENDATIONS

As indicated in this memo, the potential demand for imbalance energy from non-PacifiCorp load and generation deviations may be relatively low. However, the amount of non-PacifiCorp supply available to meet this demand remains uncertain and may vary under different market and system conditions.

- In the PacifiCorp East BAA, the non-PacifiCorp demand for imbalance energy exceeded 150 MW only about 8 hours and was over about 90 MW during only 100 hours in 2012. However, the scheduling limit for transfers from the ISO though PacifiCorp West into PacifiCorp East will be 0 MW. Thus, at this time, it cannot be assumed that there will be sufficient supply from non-PacifiCorp resources to ensure a structurally competitive market.

- In the PacifiCorp West BAA, the non-PacifiCorp demand for imbalance energy never exceeded 100 MW and was over about 60 MW during only 100 hours in 2012. This compares to a scheduling limit for transfers from the ISO into PacifiCorp West of up to 470 MW. While this may make PacifiCorp West structurally competitive many hours, the actual amount of scheduling capacity into this BAA from the ISO remains uncertain and could be below the non-PacifiCorp demand for imbalance energy (or even 0 MW) in some hours.

Consequently, based on currently available information, DMM cannot conclude that the two PacifiCorp BAAs will be structurally competitive and therefore recommends that market power mitigation procedures be applied when scheduling constraints into either of these BAAs becomes binding.

As the EIM is implemented, DMM will continue to assess the structural competitiveness of the EIM BAAs and seek to develop other options that might be employed to refine the ISO's current market power mitigation provisions to the EIM. As actual EIM data becomes available, DMM will be able to employ the pivotal suppler and residual demand index tests outlined in this report using actual data to assess the structural competitiveness of the PacifiCorp BAAs.

DMM is also working with the ISO to seek to develop a more automated dynamic approach for assessing the structural competiveness of EIM BAAs based on actual market conditions each hour, such as the actual amount of scheduling capacity from the ISO into EIM BAAs each hour. For example, with this approach, the scheduling constraint into an EIM BAA could be deemed competitive and excluded from market power mitigation procedures if the scheduling capacity into the BAA from the ISO (or other competitive EIM BAAs) was sufficient to exceed the demand for imbalance energy by entities other than the major supplier(s) within that BAA.