California Independent
System Operator Corporation

July 23, 2014

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: California Independent System Operator Corporation
ISO Tariff Amendments to the Energy Imbalance Market
Docket No. ER14-____-000

Dear Secretary Bose:

The California Independent System Operator Corporation ("CAISO") proposes this amendment to the CAISO tariff to address three matters prior to implementation of the Energy Imbalance Market on October 1, 2014.[1] The Energy Imbalance Market is the set of rules and procedures governing the inclusion of balancing authority areas other than the CAISO's balancing authority area in the operation of the CAISO's real-time market.

First, consistent with section 29.39(d) of the CAISO tariff, as amended by the CAISO's July 21, 2014 compliance filing in Docket No. ER14-1386, the CAISO requests authorization to include PacifiCorp EIM transfer constraints in the local market power mitigation procedures under Section 39.7. The CAISO also proposes two tariff amendments: (1) a new provision to account for transition costs of multi-stage EIM participating resources that use a fuel source other than natural gas; and (2) clarification that the general settlement provisions apply equally to EIM market participants. The CAISO requests a September 23, 2014 effective date for these tariff amendments and authorization, concurrent with the effective date of the Energy Imbalance Market tariff provisions accepted by the Commission in its June 19, 2014 order approving the Energy Imbalance

[1] The CAISO submits these amendments pursuant to Section 205 of the Federal Power Act, 16 U.S.C. § 824d (2012).

Market.[2]

I. Background

In its June 19, 2014, the Commission conditionally accepted the CAISO's amendment establishing the Energy Imbalance Market.[3] On July 21, 2014, the CAISO submitted its compliance filing consistent with the Commission's directives. The amendments and request for authorization in this filing compliment that compliance filing and clarify certain elements of the tariff in anticipation of the October 1, 2014 implementation date.

Two of the matters described below were discussed with stakeholders and approved by the CAISO Board of Governors.[4] One of these is a request for authorization to include PacifiCorp's EIM transfer constraints in the market power mitigation procedures upon implementation of the Energy Imbalance Market. The Commission anticipated that the CAISO might seek such authorization in its June 19 order.[5]

The second is an amendment that would allow recovery of transition costs by EIM participating resources with a fuel source other than natural gas. The tariff currently only provides for recovery of transition costs for natural gas fired multi-stage generating resources.[6] The CAISO identified this gap after the initial EIM tariff filing and proposes this change to support non-discriminatory implementation of multi-stage generation resources in the Energy Imbalance Market.

The third matter is an amendment to clarify a provision of the tariff accepted by the Commission in its June 19 order. The CAISO considers this clarification to be consistent with the policy approved by the CAISO Board of Governors at its November 2013 meeting and the tariff provisions accepted in the June 19 order, and it was therefore not separately presented to stakeholders. This change clarifies that the settlement and billing of EIM market participant transactions are subject to all settlement provisions generally applicable to CAISO market participant transactions. The Energy Imbalance Market is not a separate market and must be subject to the same rules as other CAISO market transactions.

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2 *Cal. Indep. Sys. Operator Corp.,* 147 FERC ¶ 61,231 (2014).

3 *Id*.

4 *See* EIM Go-Live Enhancements Draft Final Proposal; and Memorandum, CAISO Board of Governors, EIM Go-Live Enhancements.

5 *Cal. Indep. Sys. Operator Corp.,* 147 FERC ¶ 61,231 (2014), at PP 220.

6 CAISO Tariff section 30.4.2.

II. The CAISO Requests Authorization to Include EIM Transfer Constraints in its Market Power Mitigation Procedures at Start-Up.

In section 29.39(d) of its Energy Imbalance Market proposal, the CAISO proposed to make real-time market power mitigation procedures apply to EIM transfer constraints based upon authorization from the CAISO Board of Governors. In the June 19 order, the Commission rejected this proposal and directed the CAISO to subject the implementation of such procedures to filing with, and acceptance by, the Commission.[7] The CAISO revised its tariff accordingly in the compliance filing submitted July 21. The Commission, in addition, declined to require real-time local market power mitigation on EIM interties at start-up of the Energy Imbalance Market, as some parties had requested.[8]

The CAISO's Department of Market Monitoring published an *Assessment of Potential Market Power in Energy Imbalance Market* recommending the inclusion of EIM transfers between the PacifiCorp balancing authority areas and into the PacifiCorp West balancing authority area from the CAISO in the market power mitigation process because the PacifiCorp balancing authority areas are not structurally competitive.[9] Dr. Eric W. Hildebrandt has provided a declaration that explains the report's findings and recommendations.[10] The CAISO's Market Surveillance Committee also discussed this topic at its meeting on May 19, 2014. The Market Surveillance Committee supports the recommendation and provided an opinion to that effect, which was discussed with stakeholders on July 8, 2014.[11] Stakeholders also support this proposal.[12]

The CAISO reviewed the Department of Market Monitoring structural competitiveness assessment of the Energy Imbalance Market, as well as the Market Surveillance Committee opinion, and agrees that the PacifiCorp balancing authority cannot be considered structurally competitive. This finding is appropriate because:

- participation by resources is voluntary with no must offer obligations and the depth of market bids is uncertain at the start of the EIM;
- transmission capacity to support EIM transfer limits is voluntarily provided on an hourly basis; and

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7 *Id*. at PP 218.

8 *Id*. at PP 219.

9 The Department of Market Monitoring report is included as Attachment C.

10 Dr. Hildebrandt's declaration is included as Attachment D.

11 The Market Surveillance Committee opinion is included as Attachment E.

12 *See* PacifiCorp comments; PG&E comments; and SCE comments.

- incremental EIM transfer limits into an EIM balancing authority area can be restricted when the EIM entity fails the flexible ramping test included in the hourly resources sufficiency evaluation.

Accordingly, the CAISO requests that the Commission authorize it to apply the market power mitigation procedures to EIM transfer constraints between PacifiCorp's East and West balancing authority areas and from the CAISO balancing authority area into PacifiCorp's West balancing authority area at start-up of the Energy Imbalance Market based upon the findings and recommendations in the Department of Market Monitoring report.

The CAISO continues to evaluate its approach to address market power mitigation of EIM transfer constraints such as those noted above. Transmission capacity made available to support EIM transfers can change from one interval to the next. As a result, the CAISO believes that in the long run a more dynamic approach could provide additional flexibility and allow administration of market power mitigation of EIM transfer constraints across a larger area with a greater number of participants. A dynamic approach to mitigation of EIM transfer constraints will require the CAISO to develop objective rules regarding the activation and deactivation, as recognized by the Commission in its June 19 order, through a stakeholder process.[13] While the CAISO believes this approach preferable, the CAISO has not fully developed a proposal for a more dynamic approach that it can present at this time.

The CAISO plans to commence a new stakeholder initiative that considers the historical energy imbalances and the EIM transfer capability made available each hour to dynamically subject the EIM transfer constraints to the market power mitigation process. The CAISO hopes through this initiative to be able to propose a more dynamic approach concurrent with planned implementation of NV Energy's participation in the Energy Imbalance Market on October 1, 2015.

III. Multi-Stage EIM Participating Resources with a Fuel Source Other Than Natural Gas Need to Recover Their Transition Costs

Multi-stage generating units are characterized by multiple operating configurations. Typically, multi-stage generating units comprise two or more generating units that can be operated separately or in concert. A good example is a combined-cycle unit which has interconnected gas and steam turbines generating electricity. The gas turbines generate electricity and, in so doing, create heat, which is in turn used to create steam to run a steam turbine. As a result, these units can operate in several different configurations that consist of the various combinations of gas and steam turbines. The ability to operate in multiple configurations makes multi-stage generating units more efficient and flexible than those with a single configuration. However, it also requires

[13] 147 FERC ¶ 61,231 (2014) at PP 220.

comprehensive modeling of the various configurations in order to take advantage of that flexibility, and to avoid the infeasible dispatch of the resources.

Transition costs occur when a multi-stage generation resource moves from one configuration to another. The current tariff only contemplates transition costs for gas-fueled multi-stage generation resources.[14] During preparation for implementation of the Energy Imbalance Market, the CAISO determined that certain EIM participating resources plan to use multi-stage generation modeling for non-gas resources. In order to accommodate such resources, the CAISO proposed to modify the tariff to allow for the calculation of transition costs using a fuel source other than natural gas. The CAISO proposes that multi-stage EIM participating resources with a fuel source other than natural gas negotiate a transition cost with the CAISO, in consultation with the Department of Market Monitoring.[15] The negotiations would be conducted in accordance with the established procedures for the negotiation of default energy bids.[16]

IV. Settlement and Billing Procedures Must Clearly Apply Equally to EIM Market Participants

At the request of stakeholders, the CAISO included all charges that it will bill to EIM market participants in section 29.11.[17] The CAISO will settle these charges according to the procedures and timelines set forth in section 11—just as it does with respect to all other market participant transactions.[18] Stakeholders understood and accepted this framework and it is reflected in the tariff accepted by the Commission in its June 19 order.[19] Upon further review, however, the CAISO determined that the tariff language approved in the June 19 Order may not fully encompass all the intended procedures. In particular, the language specifically refers only to the assessment of charges and not the associated payments and collections. The CAISO is concerned that some party may in the future argue that the CAISO is not entitled to offset and other procedures necessary to support settlement equality among all market participants. An EIM market participant bankruptcy proceeding represents one

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[14] CAISO Tariff section 30.4.2.

[15] Proposed amendment to CAISO Tariff section 29.30.

[16] CAISO Tariff section 39.7.1.3.

[17] CAISO Tariff section 29.11(a).

[18] Section 29.11(*l*). This includes charges and fees related to the settlement process itself that are set forth in section 11.

[19] *See* Response to Draft EIM Tariff Stakeholder Comments at: http://www.caiso.com/Documents/Matrix_Responses_StakeholderComments_EnergyImbalanceMarketDraftTariffLanguage.pdf; and Response to Final Draft EIM Tariff Stakeholder Comments at:

scenario where it would be important to have certainty that all of the generally applicable settlement provisions of section 11 apply equally to EIM transactions. The CAISO and its market participants should not be exposed a risk that EIM market transactions could be settled differently than other market transactions, no matter how remote.

The CAISO therefore proposes to include additional language in section 29.11(l), primarily to reflect an understanding that the references in this section include all payment and collection procedures, not just settlement procedures and timelines. The proposed change will further clarify that the Energy Imbalance Market is settled consistent with other CAISO markets.

V. Effective Date

The CAISO requests an effective date for the proposed tariff changes of September 23, 2014, for a first trading date of October 1, 2014.

VI. Service

The CAISO has served copies of this filing upon all scheduling coordinators, the California Public Utilities Commission, and the California Energy Commission. In addition, the CAISO has posted the filing on the CAISO website.

VII. Contents of this Filing

In addition to this transmittal letter, this filing includes the following attachments:

Attachment A	Clean CAISO tariff sheets incorporating this tariff amendment
Attachment B	Red-lined document showing the revisions contained in this tariff amendment
Attachment C	Structural Competitiveness Assessment
Attachment D	Declaration of Eric M. Hildebrandt
Attachment E	Market Surveillance Committee Opinion

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http://www.caiso.com/Documents/Matrix_Responses_StakeholderComments_EnergyImbalanceMarketDraftFinalTariffLanguage.pdf

VIII. Correspondence

The CAISO requests that all correspondence, pleadings, and other communications concerning this filing be served upon the following:

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IX. Conclusion

The CAISO respectfully requests that the Commission accept this filing and permit the proposed tariff changes to be made effective as requested herein.

Respectfully submitted,

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Attachment A – Clean Tariff Sheets

California Independent System Operator Corporation

July 23, 2014

29.11. Settlements And Billing For EIM Market Participants.

(a) **Applicability.** Section 29.11, rather than Section 11, shall apply to the CAISO Settlement with EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators, except as otherwise provided, but not to other Scheduling Coordinators.

(b) **Imbalance Energy.**

(1) **FMM Instructed Imbalance Energy.**

(A) **Calculation.**

(i) **EIM Participating Resources.** The CAISO will calculate an EIM Participating Resource's FMM Instructed Imbalance Energy in the same manner as it calculates FMM Instructed Imbalance Energy under Section 11.5.1.1, except that references to the Day-Ahead Schedule in the relevant Appendix A definitions shall be deemed references to the EIM Base Schedule and that the CAISO will include any Energy from an EIM Manual Dispatch of the EIM Participating Resource in the FMM that is identified by the EIM Entity Scheduling Coordinator prior to the start of the FMM.

(ii) **Non-Participating Resources.** The CAISO will calculate the FMM Instructed Imbalance Energy of non-participating resources in an EIM Entity Balancing Authority Area as the sum of the Energy, if any, from EIM Manual Dispatch of the non-participating resource and any deviation from the EIM Base Schedule due to physical changes in any non-participating resource's output that the EIM Entity Scheduling Coordinator reports to the CAISO prior to the FMM.

(B) **Settlement.** The CAISO will settle—

(i) the FMM Instructed Imbalance Energy with the EIM Participating Resource Scheduling Coordinator for EIM Participating Resources; and

(ii) with the applicable EIM Entity Scheduling Coordinator for non-participating resources in an EIM Entity Balancing Authority Area.

(2) **RTD Instructed Imbalance Energy.**

(A) **Calculation.**

(i) **EIM Participating Resources.** The CAISO will calculate an EIM Participating Resource's RTD Instructed Imbalance Energy in the same manner in which it calculates FMM Instructed Imbalance Energy under Section 11.5.1.2, except that the CAISO will include any Energy from an EIM Manual Dispatch of the EIM Participating Resource in the RTD that is identified by the EIM Entity Scheduling Coordinator.

(ii) **Non-Participating Resources.** The CAISO will calculate the RTD Instructed Imbalance Energy of non-participating resources in an EIM Entity Balancing Authority Area as the Energy, if any, from EIM Manual Dispatch of the non-participating resource in the RTD that is identified by the EIM Entity Scheduling Coordinator.

(B) **Settlement.** The CAISO will settle the RTD Instructed Imbalance Energy—

(i) with the EIM Participating Resource Scheduling Coordinator for EIM Participating Resources; and

(ii) with the applicable EIM Entity Scheduling Coordinator for non-participating resources in an EIM Entity Balancing Authority Area.

(3) **Uninstructed Imbalance Energy.**

(A) **EIM Participating Resources.**

(i) **Calculation.** For EIM Participating Resources and an EIM Entity Balancing Authority Area's dynamic import/export schedules with external resources, the CAISO will calculate Uninstructed Imbalance Energy in the same manner in which it calculates Uninstructed Imbalance Energy under Section 11.5.2.1.

(ii) **Settlement.** The CAISO will settle the Uninstructed Imbalance Energy with the EIM Participating Resource Scheduling Coordinator or the EIM Entity Scheduling Coordinator, as applicable.

(B) **Non-Participating Resources.**

(i) **Calculation.** For non-participating resources in an EIM Entity Balancing Authority Area, the CAISO will calculate Uninstructed Imbalance Energy as the difference between the 5-minute Meter Data and the EIM Base Schedule or, if the EIM Scheduling Coordinator reported physical changes in a non-participating resource's output to the CAISO prior to the FMM, the FMM Schedule, less any EIM Manual Dispatch Energy of non-participating resources.

(ii) **Settlement.** The CAISO will settle the Uninstructed Imbalance Energy for non-participating resources in an EIM Entity Balancing Authority Area at the applicable

RTD Locational Marginal Price with the applicable EIM Entity Scheduling Coordinator.

(C) **Non-Participating Load.**

(i) **Calculation.** For non-participating Load in an EIM Entity Balancing Authority Area, the CAISO will calculate Uninstructed Imbalance Energy in accordance with Section 11.5.2.2, except that the CAISO will determine deviations based on the EIM Base Load Schedule.

(ii) **Settlement.** The CAISO will settle Uninstructed Imbalance Energy for non-participating Load in an EIM Entity Balancing Authority Area at the applicable Hourly Real-Time LAP price with the applicable EIM Entity Scheduling Coordinator.

(c) **Unaccounted For Energy of EIM Entities.**

(1) **Calculation.** The CAISO will calculate Unaccounted For Energy for each EIM Entity Balancing Authority Area as the difference between metered Demand, and the sum of the metered Supply and the metered values at the interties, adjusted for losses.

(2) **Settlement.** The CAISO will settle Unaccounted For Energy with the applicable EIM Entity Scheduling Coordinator at the applicable Hourly Real-Time LAP price.

(d) **Charges for Over- and Under-Scheduling of EIM Entities.**

(1) **Under-Scheduling Charges.**

(A) **Level 1 Charge.** If, during any Trading Hour, the metered Demand within an EIM Entity Balancing Authority Area exceeds the EIM Base Schedule of Supply submitted by the EIM Entity by more than 5% but less than or equal to 10% and by at least 2 MW, the CAISO shall charge the applicable EIM Entity

Scheduling Coordinator for all Uninstructed Imbalance Energy at the EIM Entity Load Aggregation Point at a price that is 125% of the Hourly Real-Time LAP Price.

(B) **Level 2 Charge.** If, during any Trading Hour, the metered Demand within an EIM Entity Balancing Authority Area exceeds the EIM Base Schedule of Supply submitted by the EIM Entity by more than 10% and by at least 2 MW, the CAISO shall charge the applicable EIM Entity Scheduling Coordinator for all Uninstructed Imbalance Energy at the EIM Entity Load Aggregation Point at a price that is 200% of the Hourly Real-Time LAP price.

(2) **Over-Scheduling Charges.**

(A) **Level 1 Charge.** If, during any Trading Hour, the metered Demand within an EIM Entity Balancing Authority Area is less than the EIM Base Schedule of Supply submitted by the EIM Entity by more than 5% but less than or equal to 10% and by at least 2 MW, the CAISO shall pay the applicable EIM Entity Scheduling Coordinator for all Uninstructed Imbalance Energy at the EIM Entity Load Aggregation Point at a price that is 75% of the Hourly Real-Time LAP Price.

(B) **Level 2 Charge.** If, during any Trading Hour, the metered Demand within an EIM Entity Balancing Authority Area is less than the EIM Base Schedule of Supply submitted by the EIM Entity by more than 10% and by at least 2 MW, the CAISO shall pay the applicable EIM Entity Scheduling Coordinator for all Uninstructed Imbalance Energy at the EIM Entity Load Aggregation Point at a price that is 50% of the Hourly Real-Time LAP Price.

(3) **Distribution of Revenues.**

(A) **Apportionment.** The CAISO will calculate the total daily excess revenues received from under-scheduling charges and over-scheduling charges under Section 29.11(d)(1) and (2) and apportion them to Balancing Authority Areas in the EIM Area that were not subject to either under-scheduling or over-scheduling charges during the Trading Day according to metered Demand.

(B) **Allocation.** The CAISO will allocate—

(i) the amounts apportioned to EIM Entity Balancing Authority Areas pursuant to Section 29.11(d)(3)(A) to the applicable EIM Entity Scheduling Coordinator; and

(ii) the amounts apportioned to the CAISO Balancing Authority Area pursuant to Section 29.11(d)(3)(A) to Scheduling Coordinators in the CAISO Balancing Authority Area according to metered Demand.

(4) **Exemption.** An EIM Entity will be exempt from under-scheduling and over-scheduling charges under Section 29.11(d)(1) and (2) if it uses the Demand Forecast prepared by the CAISO in its EIM Resource Plan and it approves EIM Base Schedules for its resources within +/- 1% of the CAISO Demand Forecast, as determined according to the Business Practice Manual for the Energy Imbalance Market.

(e) **Neutrality Accounts.**

(1) **In General.** The CAISO will collect neutrality amounts from EIM Market Participants to recover differences in Real-Time Market payments made and Real-Time Market payments received.

(2) **Real-Time Congestion Offset.** The CAISO will assess EIM Entity Scheduling Coordinators a Real-Time Congestion Offset allocation calculated pursuant to Section 11.5.4.1.1.

(3) **Real-Time Imbalance Energy Offset Allocation.** The CAISO will assess EIM Entity Scheduling Coordinators a Real-Time Imbalance Energy Offset allocation calculated pursuant to Section 11.5.4.1.

(4) **Real-Time Marginal Cost of Losses Offset.** The CAISO will allocate the Real-Time Marginal Cost of Losses Offset to EIM Entity Scheduling Coordinators pursuant to Section 11.5.4.1.2.

(5) **Other Neutrality Adjustments.** The CAISO will levy additional charges on or make additional payments to EIM Market Participants as adjustments in accordance with Section 11.14.

(f) **Real-Time Bid Cost Recovery.**

(1) **In General.** The CAISO will provide EIM Participating Resources RTM Bid Cost Recovery.

(2) **Calculation of Real-Time Bid Cost Recovery.** The CAISO will calculate Real-Time Bid Cost Recovery in accordance with Section 11.8.4, except that the CAISO will treat a non-zero EIM Base Schedule of an EIM Participating Resource as a Self-Schedule and the EIM Participating Resource will not be eligible for recovery of Start-Up Costs and Minimum Load Costs, in accordance with the treatment of costs during self-commitment intervals as specified in Section 11.8.4.1.2.

(3) **Allocation of EIM Entity RTM Bid Cost Uplift.**

(A) **Calculation of Charge.** The Net RTM Bid Cost Uplift will be determined for each EIM Entity Balancing Authority Area in accordance with the methodology set forth in Section 11.8.6.

(B) **Settlement.** The CAISO will assess the Net RTM Bid Cost Uplift calculated for each EIM Entity Balancing Authority Area to the applicable EIM Entity Scheduling Coordinator in accordance with Section 11.8.6.6.(ii).

(g) **Flexible Ramping Constraint Allocation.**

(1) **Calculation.** The CAISO will calculate awards for Flexible Ramping Constraint capacity according to Section 11.25.2 and rescission for non-performance in accordance with 11.25.3, except that the Real-Time Ancillary Service Market Price for Spinning Reserves will be deemed to be zero in determining awards to EIM Participating Resources.

(2) **Apportionment of Costs.** The CAISO will apportion Flexible Ramping Constraint costs to each EIM Entity Balancing Authority Area and the CAISO Balancing Authority Area in accordance with Section 11.25.4.

(3) **Cost Allocation.** The CAISO will allocate each EIM Entity's Flexible Ramping Constraint costs to the applicable EIM Entity Scheduling Coordinator in accordance with Section 11.25.5(b).

(h) **EIM Initial Fee.** The CAISO will charge Balancing Authority Areas that enter into an EIM Implementation Agreement pursuant to Section 29.2(b) an initial fee to cover a share of the capital and operations and maintenance costs associated with setting up the Real-Time Market to accommodate the participation of the Balancing Authority as an EIM Entity. The fee will be established by the EIM Implementation Agreement entered into pursuant to Section 29.2(b)(1) as accepted by FERC.

(i) **EIM Administrative Charge.**

(1) **In General.** The CAISO will charge EIM Market Participants a fixed EIM Administrative Charge equal to the product of $0.19/MWh and the sum of—

(A) the total gross absolute value of FMM Instructed Imbalance Energy, gross absolute value of RTD Imbalance Energy, and gross absolute value of Uninstructed Imbalance Energy of the EIM Market Participant's Supply, and

(B) the gross absolute value of Uninstructed Imbalance Energy of the EIM Market Participant's Demand.

(2) **Minimum EIM Administrative Charge.** The CAISO will calculate the minimum EIM Administrative Charge as the product of $0.19/MWh and—

(A) five percent of the total gross absolute value of Supply of all EIM Market Participants; plus

(B) five percent of the total gross absolute value of Demand of all EIM Market Participants.

(3) **Allocation of Minimum EIM Administrative Charge.** To the extent that the full amount charged pursuant to Section 29.11(i)(1) is less than the amount calculated under Section 29.11(i)(2), the ISO will allocate the difference to the EIM Entity Scheduling Coordinator.

(4) **Application of Revenues.** The CAISO will apply revenues received from the EIM Administrative Charge against the costs to be recovered through the Grid Management Charge as described in Appendix F, Schedule 1, Part A.

(j) **Variable Energy Resource Forecast Charge.**

(1) **In General.** The CAISO will charge EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators a fee for the Variable Energy Resource forecasting services in accordance with Appendix F, Schedule 4.

(2) **Waiver.** The CAISO will waive the Variable Energy Resource forecast charge if an EIM Entity has an independent forecast for its Variable Energy Resources and provides the independent forecast to the CAISO.

(k) **Transmission Service.** The CAISO will charge EIM Market Participants for transmission service according to Section 29.26.

(l) **Settlement.** With regard to the CAISO's assessment and payment of charges to, and collection of charges from, EIM Market Participants pursuant to Sections 11 and 29.11, the CAISO shall assess, pay and collect such charges, address disputed invoices, assess, pay and collect Settlement-related fees and charges,

including those under Sections 11.21, 11.28, and 11.29, and make any financial adjustments in accordance with the terms and schedule set forth in Section 11.

(m) **Charges Related to RTM Participation of Interties.** In the event that an EIM Entity enables participation in the Real-Time Market on EIM External Interties, the EIM Entity Scheduling Coordinator shall also be subject to any applicable charges under Sections 11.31 and 11.32.

* * *

29.30 Bid and Self-Schedule Submission For CAISO Markets. The provisions of Section 30 that are applicable to the Real-Time Market shall apply to EIM Market Participants, except that EIM Participating Resources that are also Multi-Stage Generating Resources may negotiate a Transition Cost multiplier with the ISO, in consultation with Department of Market Monitoring, consistent with the procedures in Section 39.7.1.3 in the event that the monthly Thousand British Thermal Units (MMBtu) Gas Price Index used in Section 30.4.2 does not account for the fuel source of the Generating Unit.

Attachment B – Marked Tariff Sheets

California Independent System Operator Corporation

July 23, 2014

29.11. Settlements And Billing For EIM Market Participants.

(a) **Applicability.** Section 29.11, rather than Section 11, shall apply to the CAISO Settlement with EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators, except as otherwise provided, but not to other Scheduling Coordinators.

(b) **Imbalance Energy.**

(1) **FMM Instructed Imbalance Energy.**

(A) **Calculation.**

(i) **EIM Participating Resources.** The CAISO will calculate an EIM Participating Resource's FMM Instructed Imbalance Energy in the same manner as it calculates FMM Instructed Imbalance Energy under Section 11.5.1.1, except that references to the Day-Ahead Schedule in the relevant Appendix A definitions shall be deemed references to the EIM Base Schedule and that the CAISO will include any Energy from an EIM Manual Dispatch of the EIM Participating Resource in the FMM that is identified by the EIM Entity Scheduling Coordinator prior to the start of the FMM.

(ii) **Non-Participating Resources.** The CAISO will calculate the FMM Instructed Imbalance Energy of non-participating resources in an EIM Entity Balancing Authority Area as the sum of the Energy, if any, from EIM Manual Dispatch of the non-participating resource and any deviation from the EIM Base Schedule due to physical changes in any non-participating resource's output that the EIM Entity Scheduling Coordinator reports to the CAISO prior to the FMM.

(B) **Settlement.** The CAISO will settle—

(i) the FMM Instructed Imbalance Energy with the EIM Participating Resource Scheduling Coordinator for EIM Participating Resources; and

(ii) with the applicable EIM Entity Scheduling Coordinator for non-participating resources in an EIM Entity Balancing Authority Area.

(2) **RTD Instructed Imbalance Energy.**

(A) **Calculation.**

(i) **EIM Participating Resources.** The CAISO will calculate an EIM Participating Resource's RTD Instructed Imbalance Energy in the same manner in which it calculates FMM Instructed Imbalance Energy under Section 11.5.1.2, except that the CAISO will include any Energy from an EIM Manual Dispatch of the EIM Participating Resource in the RTD that is identified by the EIM Entity Scheduling Coordinator.

(ii) **Non-Participating Resources.** The CAISO will calculate the RTD Instructed Imbalance Energy of non-participating resources in an EIM Entity Balancing Authority Area as the Energy, if any, from EIM Manual Dispatch of the non-participating resource in the RTD that is identified by the EIM Entity Scheduling Coordinator.

(B) **Settlement.** The CAISO will settle the RTD Instructed Imbalance Energy—

(i) with the EIM Participating Resource Scheduling Coordinator for EIM Participating Resources; and

(ii) with the applicable EIM Entity Scheduling Coordinator for non-participating resources in an EIM Entity Balancing Authority Area.

(3) **Uninstructed Imbalance Energy.**

(A) **EIM Participating Resources.**

(i) **Calculation.** For EIM Participating Resources and an EIM Entity Balancing Authority Area's dynamic import/export schedules with external resources, the CAISO will calculate Uninstructed Imbalance Energy in the same manner in which it calculates Uninstructed Imbalance Energy under Section 11.5.2.1.

(ii) **Settlement.** The CAISO will settle the Uninstructed Imbalance Energy with the EIM Participating Resource Scheduling Coordinator or the EIM Entity Scheduling Coordinator, as applicable.

(B) **Non-Participating Resources.**

(i) **Calculation.** For non-participating resources in an EIM Entity Balancing Authority Area, the CAISO will calculate Uninstructed Imbalance Energy as the difference between the 5-minute Meter Data and the EIM Base Schedule or, if the EIM Scheduling Coordinator reported physical changes in a non-participating resource's output to the CAISO prior to the FMM, the FMM Schedule, less any EIM Manual Dispatch Energy of non-participating resources.

(ii) **Settlement.** The CAISO will settle the Uninstructed Imbalance Energy for non-participating resources in an EIM Entity Balancing Authority Area at the applicable

RTD Locational Marginal Price with the applicable EIM Entity Scheduling Coordinator.

(C) **Non-Participating Load.**

(i) **Calculation.** For non-participating Load in an EIM Entity Balancing Authority Area, the CAISO will calculate Uninstructed Imbalance Energy in accordance with Section 11.5.2.2, except that the CAISO will determine deviations based on the EIM Base Load Schedule.

(ii) **Settlement.** The CAISO will settle Uninstructed Imbalance Energy for non-participating Load in an EIM Entity Balancing Authority Area at the applicable Hourly Real-Time LAP price with the applicable EIM Entity Scheduling Coordinator.

(c) **Unaccounted For Energy of EIM Entities.**

(1) **Calculation.** The CAISO will calculate Unaccounted For Energy for each EIM Entity Balancing Authority Area as the difference between metered Demand, and the sum of the metered Supply and the metered values at the interties, adjusted for losses.

(2) **Settlement.** The CAISO will settle Unaccounted For Energy with the applicable EIM Entity Scheduling Coordinator at the applicable Hourly Real-Time LAP price.

(d) **Charges for Over- and Under-Scheduling of EIM Entities.**

(1) **Under-Scheduling Charges.**

(A) **Level 1 Charge.** If, during any Trading Hour, the metered Demand within an EIM Entity Balancing Authority Area exceeds the EIM Base Schedule of Supply submitted by the EIM Entity by more than 5% but less than or equal to 10% and by at least 2 MW, the CAISO shall charge the applicable EIM Entity

Scheduling Coordinator for all Uninstructed Imbalance Energy at the EIM Entity Load Aggregation Point at a price that is 125% of the Hourly Real-Time LAP Price.

(B) **Level 2 Charge.** If, during any Trading Hour, the metered Demand within an EIM Entity Balancing Authority Area exceeds the EIM Base Schedule of Supply submitted by the EIM Entity by more than 10% and by at least 2 MW, the CAISO shall charge the applicable EIM Entity Scheduling Coordinator for all Uninstructed Imbalance Energy at the EIM Entity Load Aggregation Point at a price that is 200% of the Hourly Real-Time LAP price.

(2) **Over-Scheduling Charges.**

(A) **Level 1 Charge.** If, during any Trading Hour, the metered Demand within an EIM Entity Balancing Authority Area is less than the EIM Base Schedule of Supply submitted by the EIM Entity by more than 5% but less than or equal to 10% and by at least 2 MW, the CAISO shall pay the applicable EIM Entity Scheduling Coordinator for all Uninstructed Imbalance Energy at the EIM Entity Load Aggregation Point at a price that is 75% of the Hourly Real-Time LAP Price.

(B) **Level 2 Charge.** If, during any Trading Hour, the metered Demand within an EIM Entity Balancing Authority Area is less than the EIM Base Schedule of Supply submitted by the EIM Entity by more than 10% and by at least 2 MW, the CAISO shall pay the applicable EIM Entity Scheduling Coordinator for all Uninstructed Imbalance Energy at the EIM Entity Load Aggregation Point at a price that is 50% of the Hourly Real-Time LAP Price.

(3) **Distribution of Revenues.**

(A) **Apportionment.** The CAISO will calculate the total daily excess revenues received from under-scheduling charges and over-scheduling charges under Section 29.11(d)(1) and (2) and apportion them to Balancing Authority Areas in the EIM Area that were not subject to either under-scheduling or over-scheduling charges during the Trading Day according to metered Demand.

(B) **Allocation.** The CAISO will allocate—

(i) the amounts apportioned to EIM Entity Balancing Authority Areas pursuant to Section 29.11(d)(3)(A) to the applicable EIM Entity Scheduling Coordinator; and

(ii) the amounts apportioned to the CAISO Balancing Authority Area pursuant to Section 29.11(d)(3)(A) to Scheduling Coordinators in the CAISO Balancing Authority Area according to metered Demand.

(4) **Exemption.** An EIM Entity will be exempt from under-scheduling and over-scheduling charges under Section 29.11(d)(1) and (2) if it uses the Demand Forecast prepared by the CAISO in its EIM Resource Plan and it approves EIM Base Schedules for its resources within +/- 1% of the CAISO Demand Forecast, as determined according to the Business Practice Manual for the Energy Imbalance Market.

(e) **Neutrality Accounts.**

(1) **In General.** The CAISO will collect neutrality amounts from EIM Market Participants to recover differences in Real-Time Market payments made and Real-Time Market payments received.

(2) **Real-Time Congestion Offset.** The CAISO will assess EIM Entity Scheduling Coordinators a Real-Time Congestion Offset allocation calculated pursuant to Section 11.5.4.1.1.

(3) **Real-Time Imbalance Energy Offset Allocation.** The CAISO will assess EIM Entity Scheduling Coordinators a Real-Time Imbalance Energy Offset allocation calculated pursuant to Section 11.5.4.1.

(4) **Real-Time Marginal Cost of Losses Offset.** The CAISO will allocate the Real-Time Marginal Cost of Losses Offset to EIM Entity Scheduling Coordinators pursuant to Section 11.5.4.1.2.

(5) **Other Neutrality Adjustments.** The CAISO will levy additional charges on or make additional payments to EIM Market Participants as adjustments in accordance with Section 11.14.

(f) **Real-Time Bid Cost Recovery.**

(1) **In General.** The CAISO will provide EIM Participating Resources RTM Bid Cost Recovery.

(2) **Calculation of Real-Time Bid Cost Recovery.** The CAISO will calculate Real-Time Bid Cost Recovery in accordance with Section 11.8.4, except that the CAISO will treat a non-zero EIM Base Schedule of an EIM Participating Resource as a Self-Schedule and the EIM Participating Resource will not be eligible for recovery of Start-Up Costs and Minimum Load Costs, in accordance with the treatment of costs during self-commitment intervals as specified in Section 11.8.4.1.2.

(3) **Allocation of EIM Entity RTM Bid Cost Uplift.**

(A) **Calculation of Charge.** The Net RTM Bid Cost Uplift will be determined for each EIM Entity Balancing Authority Area in accordance with the methodology set forth in Section 11.8.6.

(B) **Settlement.** The CAISO will assess the Net RTM Bid Cost Uplift calculated for each EIM Entity Balancing Authority Area to the applicable EIM Entity Scheduling Coordinator in accordance with Section 11.8.6.6.(ii).

(g) **Flexible Ramping Constraint Allocation.**

(1) **Calculation.** The CAISO will calculate awards for Flexible Ramping Constraint capacity according to Section 11.25.2 and rescission for non-performance in accordance with 11.25.3, except that the Real-Time Ancillary Service Market Price for Spinning Reserves will be deemed to be zero in determining awards to EIM Participating Resources.

(2) **Apportionment of Costs.** The CAISO will apportion Flexible Ramping Constraint costs to each EIM Entity Balancing Authority Area and the CAISO Balancing Authority Area in accordance with Section 11.25.4.

(3) **Cost Allocation.** The CAISO will allocate each EIM Entity's Flexible Ramping Constraint costs to the applicable EIM Entity Scheduling Coordinator in accordance with Section 11.25.5(b).

(h) **EIM Initial Fee.** The CAISO will charge Balancing Authority Areas that enter into an EIM Implementation Agreement pursuant to Section 29.2(b) an initial fee to cover a share of the capital and operations and maintenance costs associated with setting up the Real-Time Market to accommodate the participation of the Balancing Authority as an EIM Entity. The fee will be established by the EIM Implementation Agreement entered into pursuant to Section 29.2(b)(1) as accepted by FERC.

(i) **EIM Administrative Charge.**

(1) **In General.** The CAISO will charge EIM Market Participants a fixed EIM Administrative Charge equal to the product of $0.19/MWh and the sum of—

(A) the total gross absolute value of FMM Instructed Imbalance Energy, gross absolute value of RTD Imbalance Energy, and gross absolute value of Uninstructed Imbalance Energy of the EIM Market Participant's Supply, and

(B) the gross absolute value of Uninstructed Imbalance Energy of the EIM Market Participant's Demand.

(2) **Minimum EIM Administrative Charge.** The CAISO will calculate the minimum EIM Administrative Charge as the product of $0.19/MWh and—

(A) five percent of the total gross absolute value of Supply of all EIM Market Participants; plus

(B) five percent of the total gross absolute value of Demand of all EIM Market Participants.

(3) **Allocation of Minimum EIM Administrative Charge.** To the extent that the full amount charged pursuant to Section 29.11(i)(1) is less than the amount calculated under Section 29.11(i)(2), the ISO will allocate the difference to the EIM Entity Scheduling Coordinator.

(4) **Application of Revenues.** The CAISO will apply revenues received from the EIM Administrative Charge against the costs to be recovered through the Grid Management Charge as described in Appendix F, Schedule 1, Part A.

(j) **Variable Energy Resource Forecast Charge.**

(1) **In General.** The CAISO will charge EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators a fee for the Variable Energy Resource forecasting services in accordance with Appendix F, Schedule 4.

(2) **Waiver.** The CAISO will waive the Variable Energy Resource forecast charge if an EIM Entity has an independent forecast for its Variable Energy Resources and provides the independent forecast to the CAISO.

(k) **Transmission Service.** The CAISO will charge EIM Market Participants for transmission service according to Section 29.26.

(l) **Settlement ~~Process~~.** With regard to the CAISO's assessment and payment of charges to, and collection of charges from, EIM Market Participants pursuant to Sections 11 and 29.11, the CAISO shall assess, pay and collect such charges, address disputed invoices, assess, pay and collect Settlement-related fees and

charges, including those under Sections 11.21, 11.28, and 11.29, and make any financial adjustments in accordance with the ~~Settlements process~~terms and schedule set forth in Section 11.

(m) **Charges Related to RTM Participation of Interties.** In the event that an EIM Entity enables participation in the Real-Time Market on EIM External Interties, the EIM Entity Scheduling Coordinator shall also be subject to any applicable charges under Sections 11.31 and 11.32.

* * *

29.30 Bid and Self-Schedule Submission For CAISO Markets. The provisions of Section 30 that are applicable to the Real-Time Market shall apply to EIM Market Participants, except that EIM Participating Resources that are also Multi-Stage Generating Resources may negotiate a Transition Cost multiplier with the ISO, in consultation with Department of Market Monitoring, consistent with the procedures in Section 39.7.1.3 in the event that the monthly Thousand British Thermal Units (MMBtu) Gas Price Index used in Section 30.4.2 does not account for the fuel source of the Generating Unit.

Attachment C – Structural Competitiveness Assessment

California Independent System Operator Corporation

July 23, 2014

California Independent System Operator Corporation

California ISO

Assessment of Potential Market Power in Energy Imbalance Market

Updated June 30, 2014

Prepared by: Department of Market Monitoring

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Executive Summary

The ISOs' Energy Imbalance Market (EIM) Design was approved by the Board of Governors in November 2013. Under this design, the ISO's current local market power tests and provisions will be applied to congested constraints within each individual Balancing Authorities Area (BAA) participating in the EIM. At that time, it was determined that further information was required to determine whether these market power mitigation provisions should also be applied to scheduling constraints limiting transfers of energy into EIM BAAs from the ISO and other EIM BAAs. Applying market power mitigation tests and procedures when these scheduling limits became binding would mitigate potential market power that may exist on a broader level due to a high concentration of ownership of supply resources throughout an EIM BAA.

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 and but stated 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. Management intends to submit a recommendation on this issue to the Board at the July 2014 meeting.

DMM has continued to collect additional information and assess the potential need to include the scheduling constraints between BAAs in the EIM market power mitigation procedures. As summarized in this report, DMM continues to believe that based on currently available information it 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 become 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.

1 Background

The ISO's 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 ISO's initial proposal, the ISO's current Local Market Power (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. However, when scheduling constraints into these BAAs from the ISO become binding, no market power mitigation provisions would be applied. This approach reflected an assumption that the two PacifiCorp BAAs — like the ISO — be workably competitive on a BAA-wide level.

As the ISO's proposal was developed, DMM gained additional understanding of the potential market structure within the two PacifiCorp BAAs and the amount of scheduling capacity that could make competitive supply from the ISO available for transfer into these BAAs. However, given the uncertainty about these factors, DMM indicated it could not conclude that the PacifiCorp EIM BAAs would be structurally competitive on a BAA-wide level. Specifically, the potential for market power stemmed from the high portion of resources within the PacifiCorp BAA owned or controlled by PacifiCorp's merchant affiliate (PacifiCorp Energy).

Consequently, DMM recommended that further analysis and consideration be given to applying market power mitigation provisions on a wider level than was provided for in the ISO's initial EIM market design. Specifically, DMM indicated it may be necessary to also apply the ISO's market power mitigation procedures when scheduling constraints into EIM BAAs become binding in order to mitigate potential market power that may exist in these BAAs.

Some stakeholders and the ISO's Market Surveillance Committee (MSC) voiced similar concerns about the need for expanded market power mitigation. Other stakeholders believed expanded market power mitigation was unnecessary or inappropriate. Some of these concerns were based on it would be difficult to develop Default Energy Bids for use in market power mitigation that reflect the true opportunity cost of complex hydro resources in parts of the West.

The ISOs' EIM design was approved by the Board of Governors in November 2013. With respect to the subject of market power mitigation, there was an understanding that further information was required to determine whether market power mitigation should be applied to transfers between balancing authorities participating in the EIM. Therefore, 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 and but stated 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 continued to collect additional information and assess the potential need to include the scheduling constraints between BAAs in the EIM in market power mitigation procedures. This report presents results of this analysis and its resulting recommendations.

2 PacifiCorp EIM Market Power Mitigation

The ISO's proposed EIM design includes provisions to mitigate market power in the real-time market within each BA participating in the EIM. This process mirrors market power mitigation (LMPM) currently applied in the ISO's real-time market. This section describes the ISO's current market power mitigation procedures and how these will be applied under the ISO's proposed EIM design.

As in the ISO real-time market, EIM market power mitigation procedures will performed on a 15-minute basis based on projected system and market conditions 37 minutes in advance of each 15-minute interval. This process utilizes results of the ISO's 15-minute dispatch runs to identify future 15-minute intervals when congestion is projected to occur on specific individual constraints. For each constraint that is projected to be binding, a 3-pivotal supplier test is performed to determine if the supply available to relieve the binding constraint is structurally competitive or non-competitive.

If this test determines that the constraint is structurally non-competitive, bids of resources that are effective at relieving congestion on the constraint are subject to potential bid mitigation. Under the EIM design, only resources within the BAA in which this constraint is located will be subject to this bid mitigation.

Resources subject to bid mitigation may have their market bids lowered if these bids exceed the higher of the maximum of (1) a competitive market price calculated based on system energy prices plus any congestion on competitive constraints, or (2) Default Energy Bids that reflect the marginal cost or opportunity costs of the resource.

Bids mitigated in the 15-mimnute process will remain mitigated in the 5-minute process. No additional bid mitigation is performed if congestion occurs on a constraint in the 5-minute market that was not projected to occur in the 15-minute process.

Based on input from DMM, the ISO's EIM proposal includes three modifications in how these market power mitigation procedures will be applied in EIM compared to the ISO's current market power mitigation procedures.

First, real-time LMPM procedures will be applied separately within the ISO and each EIM BAA by performing tests for constraint competitiveness and bid mitigation only on resources within the same BAA in which a constraint is located. This ensures that resources can only be subject to bid mitigation for market power within the same BAA in which they are located. This component of the EIM design was chosen to prevent potentially low scheduling limits between EIM BAAs in a given interval from undermining the results of local market power mitigation on constraints within a BAA.

Second, all suppliers participating in the EIM will be considered potentially pivotal suppliers in the three pivotal supplier test used to determine the competitiveness of constraints. In the ISO, suppliers classified as net buyers are not considered potentially pivotal suppliers. Therefore, supply controlled by participants classified as net buyers is not excluded under the 3 pivotal supplier test since participants that are consistently net buyers in the ISO market do not have an incentive to raise prices. However, DMM believes it is not possible to reliably determine which entities are net sellers or net buyers of imbalance energy or the net impact that congestion has on an entity's overall settlement each time interval in the EIM.

Finally, a different reference bus for determining shift factors used in the LMP decomposition step of the LMPM procedures may be utilized based on the topology and control of resources within each EIM BAA.

The goal is to select a reference bus at which the congestion component of LMPs are least influenced by market power. After further review of this issue, however, DMM has recommended that the ISO initially use the same reference buses used in the CAISO's current LMPM procedures. This recommendation is based on DMM's assessment that the congestion component of LMPs at these buses will not be significantly influenced by market power within BAAs that will join the EIM. However, as the ISO gains more experience with BAAs in the EIM, it may be possible to identify a different reference bus in each EIM BAA that would be more appropriate for use in the LMP decomposition.

As noted above, one remaining issue in the ISO's EIM market power mitigation design is whether the scheduling constraints between EIM BAAs and the ISO should be subjected to these market power mitigation procedures when these constraints become binding into an EIM BAA, or combination of EIM BAAs.

Including these EIM scheduling constraints in market power procedures is akin to treating them like any other constraint within the combined ISO and EIM footprint. For example, if congestion occurs into the Pacific Gas & Electric (PG&E) service territory on the major transmission line connecting PG&E service territory with southern California (Path 15), the competiveness of this constraint is assessed based on the supply of resources effective in relieving this congestion in the PG&E area north of Path 15. These resources are subject to bid mitigation if Path 15 is deemed structurally non-competitive in the south-to-north direction.

Excluding these EIM scheduling constraints from market power mitigation procedures is akin to treating them like an inter-tie constraint from another BAA into the ISO. When interties into the ISO become congested in the import direction, the competitiveness of these interties is not assessed based on the available supply within the ISO to relieve this import congestion. This reflects the assumption incorporated in the ISO market design that the supply within the total ISO system, that is effective in relieving import congestion, is sufficiently competitive and is unnecessary to mitigate bids of all resources within the ISO to relieve import congestion on these interties. In the case of the ISO, years of experience have confirmed that the total supply within the ISO system available when import congestion does occur on interties is generally highly competitive.

3 Structural Competiveness of EIM BAAs

3.1 Methodological Framework

As indicated in DMM's memo to the Board on the EIM design, prior to the establishment of any new market, the potential competiveness of this market can only be assessed based on structural criteria, rather than market conduct or performance.[1] The degree of structural market power in the two PacifiCorp EIM balancing authority areas will depend on a number of factors. Three main factors include the following:

- **Net demand for imbalance energy from other load serving entities and intermittent resources**. Most of the imbalance energy met in the EIM may be associated with PacifiCorp's own load and generation deviations. Structurally, the incentive for the exercise of market power in the EIM will also 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. As described in Section 3.2, DMM has obtained information on the demand for imbalance energy associated with these entities for use in this analysis.

- **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. As described in Section 3.3, although DMM has obtained additional information and clarification about the amount of EIM scheduling capacity between the ISO and the two PacifiCorp BAAs, the actual amount of this EIM scheduling capacity under actual market and system conditions remains uncertain at this time.

- **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, if any, of this generation will participate in the EIM, particularly in the initial phases. As described in Section 3.4, the amount and competiveness of any non-PacifiCorp supply within the PacifiCorp BAAs that will be offered in the EIM remains uncertain at this time.

Based on these supply and demand conditions, the structural competitiveness of an individual EIM BAA and the combination of the two PacifiCorp BAAs can be assessed using a single pivotal supplier test. This test essentially examines whether there is sufficient supply from non-PacifiCorp resources to meet the net demand for imbalance energy by non-PacifiCorp loads and resource deviations within each EIM BAA.

A simplified mathematical formulation of this single pivotal supplier test can be expressed as the *residual supply index* for any dispatch period as follows:

$$\frac{\text{Scheduling Limit}_{ISO \rightarrow BAA} + \text{Non-PacifiCorp Supply}_{BAA}}{\text{Non-PacifiCorp Demand}_{BAA}}$$

[1] Insert footnote and hyperlink.

Where:

Scheduling Limit $_{ISO \rightarrow BAA}$ = the scheduling limit for additional EIM energy transfers from the ISO to the BAA in the dispatch period.

Non-PacifiCorp Supply $_{BAA}$ = the amount of energy bids available for dispatch in the EIM from other suppliers within the BAA in the dispatch period.

Non-PacifiCorp Demand $_{BAA}$ = the net demand for imbalance energy from non-PacifiCorp loads and generation deviations in the BAA in the dispatch period.

When this ratio, or residual supply index, is less than 1, PacifiCorp is individually pivotal, so that some of its supply would be needed to meet the demand for imbalance energy from non-PacifiCorp loads and generation deviations.

When the residual supply index is equal to or greater than 1, PacifiCorp would not be individually pivotal, since the demand for imbalance energy from non-PacifiCorp loads and generation deviations could be net by transfers from the ISO and/or other suppliers within the BAA.

A more detailed description of this approach is provided in Appendix A. In practice, DMM notes that it may be appropriate to utilize a more stringent test – such as the three pivotal supplier test used on the ISO's market power mitigation test – in the event that only a limited number of suppliers account for large portions of the residual supply from suppliers other than PacifiCorp within the EIM BAAs. However, for the sake of this initial analysis, we have illustrated this approach using a simple single pivotal supplier test. DMM also notes that this approach may be employed to assess the structural competiveness of EIM BAAs after implementation of the EIM as actual market data become available. This is discussed in the final section of this report.

The following sections summarize additional information that DMM has been able to obtain on each of three factors affecting the structural competiveness of the PacifiCorp EIM BAAs.

3.2 Demand for Imbalance Energy

One key factor affecting the potential for market power in the Energy Imbalance Market is the demand for Imbalance Energy. 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. The deviations are differences between base schedules and metered quantities. PacifiCorp has indicated that the data also exclude some demand that is not subject to standard imbalance energy charges. Only data for 2012 are available at this time. Figure 1 and Figure 2 show hourly 2012 imbalance energy data for the PacifiCorp East and PacifiCorp West BAAs, respectively, 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 2:

- 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 100 MW and over about 60 MW during only 100 hours in 2012.

Figure 1. Annual duration curve of non-PacifiCorp imbalance energy demand (2012)

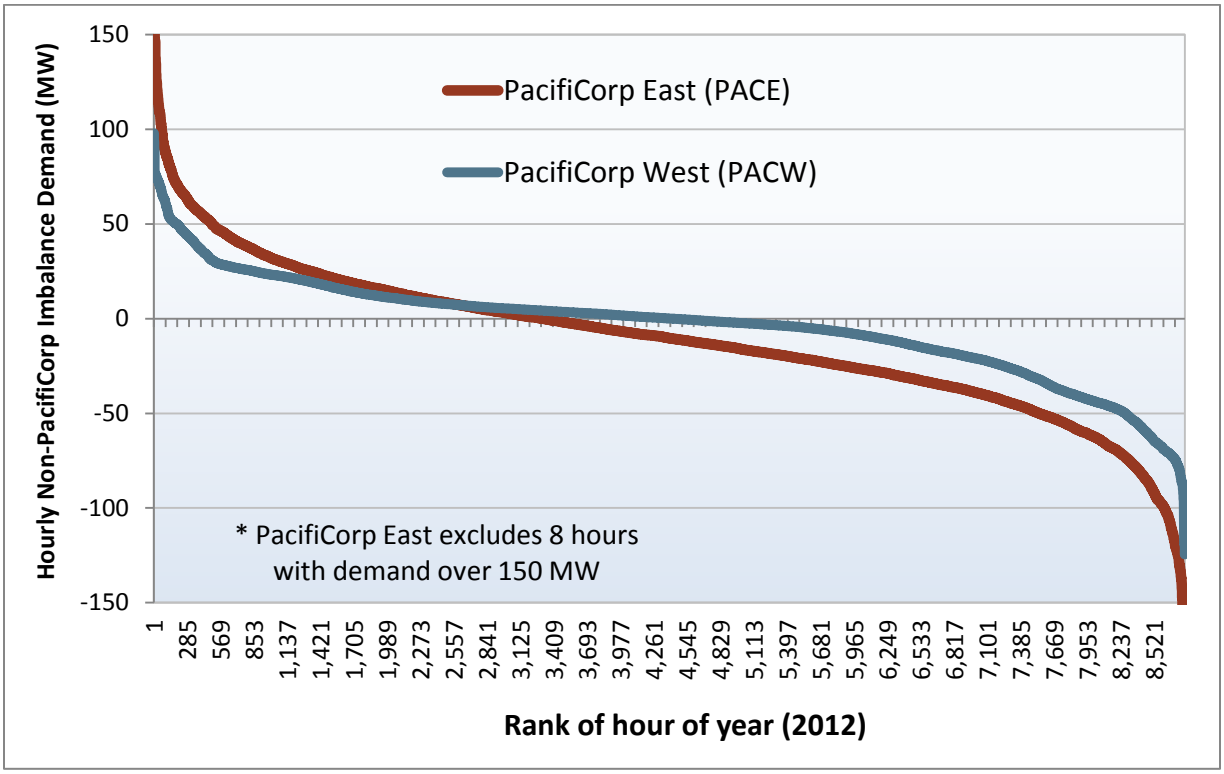
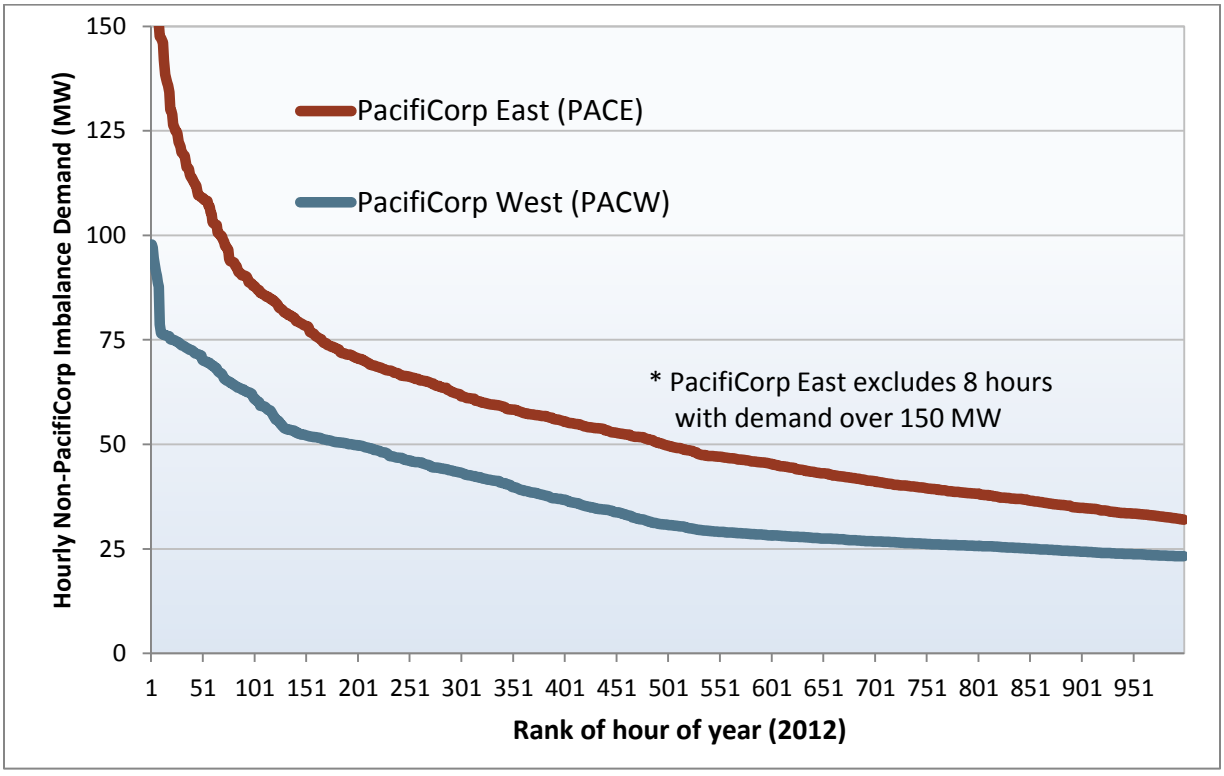


Figure 2. Duration curve of non-PacifiCorp imbalance energy demand (Highest 1000 hours)



In the EIM, demand for imbalance energy will be settled on both a 15-minute and 5-minute basis. Demand for imbalance energy in the 15-minute market is based on the difference between base load and generation schedules and the 15-minute market load forecasts and generation schedules. Demand for 5-minute imbalance energy will be based on the difference between 15-minute market load forecasts and generation schedules and metered load and generation.

Currently, imbalance energy data is only available on an hourly level, since this is the granularity of current imbalance energy settlements in the PacifiCorp BAAs. Thus, actual demand for imbalance energy during 15-minute intervals within each hour would often be higher. However, the degree of variation within each hour cannot be determined at this time.

The amount of 5-minute demand for imbalance energy may be lower (since this will be measured based on the difference between 15-minute load and generation schedules compared to actual 5-minute loads and generation). However, the amount of non-PacifiCorp supply within the EIM BAA and which can be scheduled into the EIM BAAs will also be more limited on a 5-minute basis.

3.3 EIM Scheduling Constraints

The incentive for any entity to exercise market power within the two PacifiCorp BAAs can be limited by competition from imports from the ISO. Figure 3 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 3, 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.

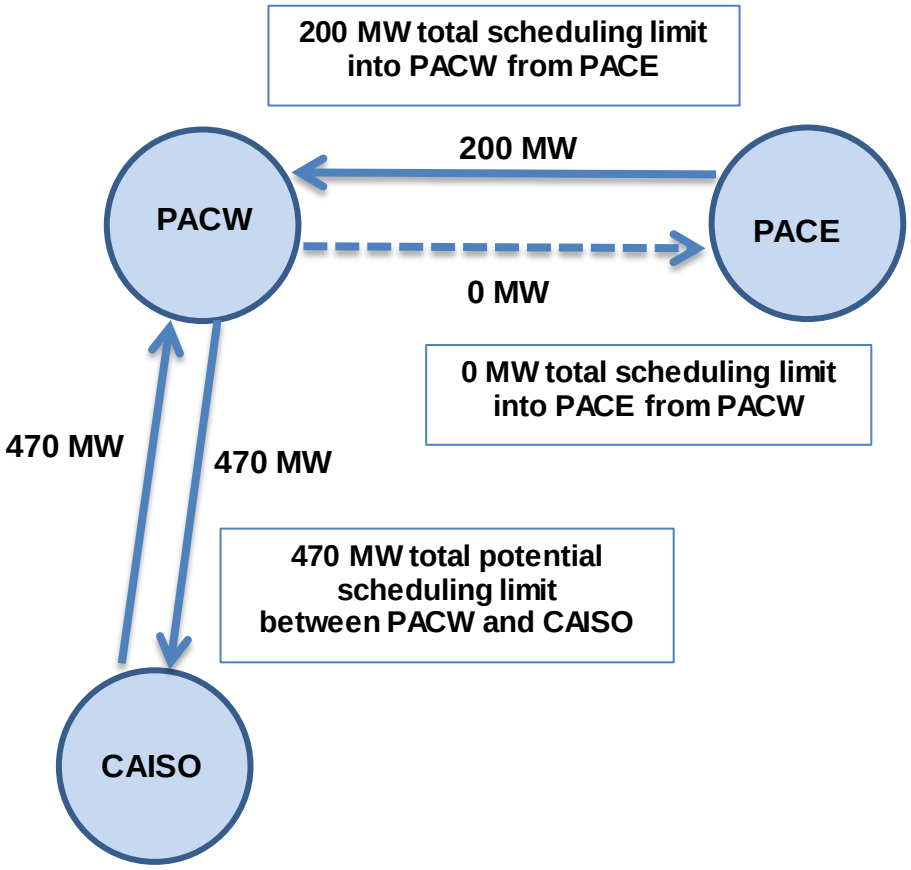
As shown in Figure 3, the amount of additional energy that may be scheduled into the PacifiCorp West BAA from the ISO during any 15-minute interval be up to 470 MW. In practice, however, DMM understands that this scheduling limit may be lower during any time period for at least three reasons:

- 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 (COI) 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.

Figure 3. Potential EIM Inter-BAA scheduling limit constraints



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)). PacifiCorp

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.

3.4 Non-PacifiCorp Generation

Based on information submitted by PacifiCorp to the ISO 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.

In addition to the generation shown in Tables 1 and 2, there are over 1,000 MW of wind capacity that may participate in these two BAAs. These wind resources will presumably only submit offers for decrease output below their base schedules, and will therefore not help to mitigate potential market power in the market for incremental imbalance energy.

As shown in Table 3, PacifiCorp owns or controls about 78 percent of this wind capacity, with about 224 MW being owned or controlled by one or more other entities. DMM does not have information at this time on the amount of this non-PacifiCorp wind generation within the two different PacifiCorp BAAs.

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, it is important to note 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.
- Finally, 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.

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

Table 3. Maximum Capacity of Wind Resources Potentially Participating in EIM

	Maximum MW		
Type	**East**	**West**	**Total**
PacifiCorp	594	195	789
Other	n/a	n/a	224
Total	---	---	1,013

4 Conclusions and Recommendations

As indicated in this report, historical data indicate the potential demand for imbalance energy from non-PacifiCorp load and generation deviations may be relatively low. These data also provide a basis for projecting the upper end of demand that might be expected. 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.[2]

In the PacifiCorp West BAA, the non-PacifiCorp demand for imbalance energy was 100 MW and 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 or most 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.[3]

Consequently, DMM continues to believe that based on currently available information it 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. Specifically, 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.

[2] Within the framework of the pivotal supplier/residual supply index methodology outlined in Section 3.1 and Appendix A of this report, this is equivalent to assuming that during some hours there may not be any residual supply from the ISO or other non-PacifiCorp suppliers within the EIM, so that the residual supply index may equal 0.

[3] Again, within the methodological framework outlined in Section 3.1 and Appendix A of this report, this is equivalent to assuming that during some hours the residual supply from the ISO or other non-PacifiCorp suppliers within the EIM will be less than non-PacifiCorp demand for imbalance energy, so that the residual supply index may be less than 1.0.

Appendix A - Background

This document provides detail on a potential test the Department of Market Monitoring (DMM) could use to assess the existence of structural market power in an EIM area. The test would assess whether or not a single dominant supplier has the incentive to exercise market power which the dominant supplier could exert unilaterally in order to increase EIM prices paid by unaffiliated entities for imbalance demand in the 15-minute and 5-minute EIM markets. The test would be conducted for each EIM transfer constraint into an EIM balancing authority area (or combination of EIM balancing authority areas, excluding ISO) prior to EIM going live for the balancing authority area. DMM would repeat the test when DMM determined that conditions affecting the assessment of structural market power, including the quality and quantity of data used in the test, may have changed materially.

If the structural market power test results indicate the existence of structural market power from an EIM transfer constraint into an EIM area, DMM would recommend that the relevant EIM transfer constraint be included in the real-time Dynamic Competitive Path Assessment. Every 15 minutes, the real-time Dynamic Competitive Path Assessment would then determine whether or not the EIM transfer constraint into the EIM area is a non-competitive path. DMM recommends that an EIM transfer constraint be included in the Dynamic Competitive Path Assessment until DMM conducts a structural market power test that indicates the constraint does not create structural market power in the EIM balancing authority area (or combination of EIM balancing authority areas).

If the structural market power test results indicate that the EIM transfer constraint does not create structural market power in the EIM area, DMM would recommend that the EIM transfer constraint in the direction into the EIM area not be included in the real-time Dynamic Competitive Path Assessment. DMM would recommend the EIM transfer constraint be deemed a competitive path for each 15-minute and 5-minute EIM market run. DMM would recommend that such an EIM transfer constraint be excluded from the Dynamic Competitive Path Assessment until DMM conducted a structural market power test that indicated the EIM transfer constraint created structural market power in the EIM area.

A.1 Methodology definition

In many cases, DMM expects that it will be appropriate to perform a structural market power test to assess if one dominant supplier in an EIM balancing authority area has incentive to unilaterally exert market power in order to raise the EIM prices paid by unaffiliated entities for real-time energy demand imbalances. In order to make this assessment, the test determines if the supply of real-time power[4] whose price cannot be unilaterally set by the dominant supplier (or its affiliates) is sufficient to meet unaffiliated entities' real-time demand imbalances[5] that settle on EIM prices.

[4] Power supplied in real-time is either an increase in power injections relative to base schedules of imports or internal generation, or a decrease in power withdrawals relative to base schedules of exports or internal load.

[5] Power demanded in real-time is either an increase in power withdrawals relative to base schedules of exports or internal load, or a decrease in power injections relative to base schedules of imports or internal generation.

In particular, DMM proposes to calculate the following structural market power ratio to test for structural market power held by entity, *c*, due to an EIM transfer constraint governing schedules into an EIM balancing authority area (or combination of EIM balancing authority areas), *a*, for each time period, *t*:

$$SMPR_{c,a,t} = \frac{\sum_{b\in\{B\}} Tr_{b,a,t}^{cap} + \sum_{e\neq c}\left[L_{e,a,t}^{dec,bid} + E_{e,a,t}^{dec,bid} + G_{e,a,t}^{inc,bid}\right] + \sum_{s\in\{S_a\}} \max\left(Lim_s^{imp}, \sum_{e\neq c} I_{e,s,t}^{inc,bid}\right)}{-\left(\sum_{e\neq c}\left[L_{e,a,t}^{inc,clear} + E_{e,a,t}^{inc,clear} + G_{e,a,t}^{dec,clear} + I_{e,a,t}^{dec,clear}\right]\right)} \quad (1)$$

Where:

- $\{B\}$ is the set of EIM balancing authority areas not in area, a, in which entity, c, has been deemed to not have structural market power.
- $Tr_{b,a,t}^{cap}$ is the incremental (relative to base schedules) EIM transfer capacity from EIM balancing authority area, *b*, into the EIM area, *a*, during period, t, $Tr_{b,a,t}^{cap} \geq 0$.
- $L_{e,a,t}^{dec,bid}$ is the quantity of load reduction relative to base schedule offered by entity, *e*, in area, *a*, in period, *t*. For load resources that do not submit economic decremental offers into EIM but instead self-schedule at the load forecast (ie, the majority of current load resources), $L_{e,a,t}^{dec,bid}$ will simply be entity *e*'s scheduled quantity of load reduction relative to its base schedule in area *a* for period *t*. Note that $L_{e,a,t}^{dec,bid}$ does not include the decremental imbalance load from the entity, *c*, or affiliates of *c*. Because incremental load is a withdrawal, and hence a negative injection, $L_{e,a,t}^{dec,bid} \geq 0$.
- $E_{e,a,t}^{dec,bid}$ is the quantity of entity *e's* base scheduled exports at External EIM Intertie scheduling points into area, *a*, that are bid into the 15-minute EIM market not as self-schedules. These are decremental export bids. Note that $E_{e,a,t}^{dec,bid}$ does not include decremental exports offered from the entity, *c*, for whom structural market power is being assessed, or affiliates of *c*. Because an incremental export is a withdrawal, and hence a negative injection, $E_{e,a,t}^{dec,bid} \geq 0$.
- $G_{e,a,t}^{inc,bid}$ is the quantity of internal generation offered from entity, *e*, in area, *a*, that is incremental to *e*'s base schedules from internal generation in *a*. Note that $G_{e,a,t}^{inc,bid}$ does not include supply offered from the entity, *c*, for whom structural market power is being assessed, or affiliates of *c*. $G_{e,a,t}^{inc,bid} \geq 0$.
- $\{S_a\}$ is the set of all External EIM Interties into EIM area, *a*.
- Lim_s^{imp} is the import scheduling limit on the External EIM Intertie, *s*, into EIM balancing authority, *a*. $Lim_s^{imp} \geq 0$.

- $I_{e,s,t}^{inc,bid}$ is the quantity of imports offered into the 15-minute EIM market from entity, *e*, at External EIM Intertie scheduling point, *s*, into area, *a*, that is incremental to *e*'s base scheduled imports at *s*. Note that $I_{e,s,t}^{inc,bid}$ does not include imports offered from the entity, *c*, for whom structural market power is being assessed, or affiliates of *c*. $I_{e,s,t}^{inc,bid} \geq 0$.

- $L_{e,a,t}^{inc,clear}$ is the quantity of real-time imbalance load energy of entity, *e*, in area, *a*, that is incremental to *e*'s base scheduled load. Note that $L_{e,a,t}^{inc,clear}$ does not include the incremental imbalance load from the entity, *c*, or affiliates of *c*. Because incremental load is a withdrawal, and hence a negative injection, $L_{e,a,t}^{inc,clear} \leq 0$.

- $E_{e,a,t}^{inc,clear}$ is the quantity of real-time scheduled exports of entity, *e*, at External EIM Intertie scheduling points into area, *a*, that are incremental to *e*'s base scheduled exports. Note that $E_{e,a,t}^{inc,clear}$ does not include real-time incremental exports scheduled by the entity, *c*, for whom structural market power is being assessed, or affiliates of *c*. Because an incremental export is a withdrawal, and hence a negative injection, $E_{e,a,t}^{inc,clear} \leq 0$.

- $G_{e,a,t}^{dec,clear}$ is the quantity of decremental real-time energy cleared by the internal generation of entity, *e*, in area, *a*. In other words, $G_{e,a,t}^{dec,clear}$ is the reduction in energy from *e*'s base scheduled generation to *e*'s real-time generation schedules. Note that $G_{e,a,t}^{dec,clear}$ does not include real-time decremental supply from the entity, *c*, for whom structural market power is being assessed, or affiliates of *c*. Because a decremental supply is a withdrawal, and hence a negative injection, $G_{e,a,t}^{dec,clear} \leq 0$.

- $I_{e,a,t}^{dec,clear}$ is the quantity by which *e*'s 15-minute market scheduled imports at External EIM Interties into *a* were reduced relative to *e*'s base scheduled imports into *a*. Note that $I_{e,a,t}^{dec,clear}$ does not include real-time decremental imports from the entity, *c*, for whom structural market power is being assessed, or affiliates of *c*. Because a decremental import is a withdrawal, and hence a negative injection, $I_{e,a,t}^{dec,clear} \leq 0$.

DMM will assess the extent to which the ratio (1) exceeds 1.0 over an appropriate period of time in order to determine if entity, *c*, has structural market power in the area, *a*, defined by the EIM transfer constraint under consideration. If any entity, *c*, is found to have structural market in the area, *a*, then DMM would recommend the EIM transfer constraint that defines the area, *a*, be included in the real-time Dynamic Competitive Path Assessment.

A.2 Methodology discussion

The structural market power ratio (1) tests, for each time period *t*, if the supply of power whose price cannot be unilaterally set by the dominant supplier (or its affiliates) in a balancing authority area (or combination of balancing authority areas) is sufficient to meet the real-time energy demand imbalances from all entities other than the dominant supplier. The area being assessed for structural market power is *a*. It is DMM's current understanding that a net scheduled interchange constraint will be enforced not

only for each BAA, but also for each subset of BAAs (excluding CAISO). This constraint will limit the net injections (supply plus load, where load is a negative injection) from all nodes within the defined area to stay within the total EIM transfer capacity into (or out of) the area from (or to) all EIM BAAs not included in the area. The market power test is therefore testing for the market power created by the net scheduled interchange constraint that defines the area, *a*. It is not simply testing for market power in each specific EIM BAA. The entity or group of entities being assessed for possessing market power is entity *c*. The numerator of ratio (1) is the sum of sources of real-time supply offered into area *a,* whose prices cannot be unilaterally set by *c*. The denominator is the sum of real-time energy demanded by entities other than the dominant supplier in area *a*.

The first term in the numerator is the incremental (relative to base schedule transfers) EIM transfer capacity into area *a* from all EIM balancing authority areas not in area *a*. For example, consider the assessment of the area comprising of the combination of balancing authority areas PACW and PACE for unilateral market power held by the group of affiliated entities under MidAmerican Holdings. The incremental EIM transfer capacity from CAISO into PACW and from CAISO into PACE will be included in the numerator of (1) in this assessment. Assume the total EIM transfer capacity into PACW and PACE from CAISO is 300 MW for a particular interval, and there were IFM schedules over PacifiCorp transmission from PACW into CAISO of 60 MW (and 0 MW of such IFM schedules between PACE and CAISO). The incremental EIM transfer capacity into area *a,* that would be included in the numerator of (1) would be 360 MW. If, instead, there were net IFM schedules over PacifiCorp transmission from CAISO into PACW of 170 MW, the incremental EIM transfer capacity into *a*,that would be included in the numerator of (1) would only be 130 MW.

The rest of the numerator of (1) represents the power supply offered into area, *a,* during interval, *t*, that can compete with the dominant supplier for meeting the real-time demand imbalances of entities other than the dominant supplier. Only the bids from internal generation and imports (on external EIM interties) that are incremental to an entity's base schedules can be used to meet incremental real-time demand imbalances. Therefore, we do not count the bids of internal generation or imports up to the base schedule quantity in the numerator of (1). On the other hand, only the bids from exports and internal load that are decremental to an entity's base schedules can be used to meet incremental real-time demand imbalances. Therefore we do not count bids for exports and load in excess of the base export and load schedules in the numerator of (1). Note that incremental import bids are capped at the import scheduling limit of the relevant external EIM intertie to reflect the limit on the actual supply that can be provided at each intertie.

The denominator is the real-time demand imbalance from all entities other than the dominant supplier during hour, *t*. Real-time demand imbalance consists of any quantity that is a withdrawal relative to the base schedule. Real-time demand therefore consists of increases in the cleared quantity of internal load and exports relative to base scheduled load and exports. However, decreases in supply in real-time relative to base schedules are also withdrawals. Therefore, real-time demand also includes decreases in the cleared quantity of internal generation and imports at external EIM interties relative to base scheduled generation and imports.

If the real-time supply offered by entities other than *c* (i.e., the numerator) exceeds these entities' demand for real-time withdrawals (i.e., the denominator), then *c* is not unilaterally pivotal in setting the real-time price for power in area *a*. If, on the other hand, the real-time supply offered by entities other than *c* is not sufficient to meet these entities' demand for real-time withdrawals in area *a*, then the dominant supplier is pivotal in meeting the area's demand for real-time withdrawals, and therefore has market power via the constraint defining area, *a*.

This methodology can be easily extended to test for market power by any combination of entities. This can be accomplished by considering the combination of entities being tested for market power in area *a* as one entity, *c*. The ratio would then be applied in the same way as it would be applied for one entity.

Note that ratio (1) may be insufficient for assessing structural market power in the 5-minute market. DMM will continue to consider options for assessing structural market power in the 5-minute market prior to recommending that a particular EIM transfer constraint be deemed competitive and therefore automatically excluded from the real-time Dynamic Competitive Path Assessment.

A.3 Methodology applied to PacifiCorp prior to EIM go-live

Prior to EIM going live for PacifiCorp, DMM will not have sufficient historical data to completely perform the above methodology. DMM has instead relied on hourly imbalance energy data provided by PacifiCorp and conservative assumptions about the supply that can be expected to be offered into EIM by non-PacifiCorp entities.

In particular, DMM's understanding is that PacifiCorp the EIM transfer capacity into the PAC balancing authority areas may be 0 for any given hour, due to either a decision by PacifiCorp Energy or factors beyond PacifiCorp Energy's control that may limit these scheduling rights. In its analysis, DMM will therefore set the transfer capacity in the numerator of (1) to 0.

Similarly, DMM's understanding is that PacifiCorp is proposing to not allow imports or exports at any external EIM interties in the EIM 15-minute market. In its analysis, DMM will therefore set the incremental import offers and decremental export offers in the numerator of (1) to 0.

The analysis is therefore by necessity a simplified assessment of the extent to which the incremental non-PacifiCorp internal generation capacity likely to be offered into EIM in real-time is sufficient to meet the non-PacifiCorp incremental load during hours when that real-time load imbalance was an increase relative to its base schedules.

Attachment D – Hildebrandt Declaration

California Independent System Operator Corporation

July 23, 2014

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

California Independent System Operator Corporation	**)**	**Docket No. ER14-____-000**

DECLARATION OF
ERIC W. HILDEBRANDT
ON BEHALF OF THE
CALIFORNIA INDEPENDENT SYSTEM
OPERATOR CORPORATION

I, Eric W. Hildebrandt, declare as follows:

1. I am the Director of Market Monitoring for the California Independent System Operator Corporation ("CAISO"). My business address is 250 Outcropping Way, Folsom, CA 95630.

I. EXPERIENCE AND QUALIFICATIONS

2. I have over twenty-two years of experience in the electric utility industry, along with a Bachelor of Arts in Political Economy from the Colorado College and a Master of Science and Ph.D. in Energy Management and Policy from the University of Pennsylvania. I began working at the CAISO in August 1998 and have specialized in the field of market analysis, monitoring and market power mitigation for the last sixteen years.
3. As Director of the Department of Market Monitoring ("DMM"), which serves as the CAISO's independent market monitor, I am responsible for monitoring and analyzing the efficiency of the CAISO markets, as well as

providing recommendations on market rules that will promote market efficiency and effectively mitigate market power and manipulation. Before becoming director, I served in several managerial positions in the DMM that involved similar responsibilities.

4. Since early 2013, I have worked closely with the CAISO staff in their development of the proposal, known as the Energy Imbalance Market ("EIM"), to expand the CAISO's real-time market to accommodate participation by Balancing Authority Areas ("BAA") beyond the CAISO's Balancing Authority Area. DMM played the lead role in assessing the need for market power mitigation in the EIM and identifying modifications needed to extend the CAISO's current market power mitigation rules to EIM.

II. BACKGROUND

5. This declaration accompanies the transmittal letter for the CAISO's proposed tariff amendments to enhance the EIM design approved by the Federal Energy Regulatory Commission ("Commission") in its June 19 order approving the EIM, subject to certain compliance matters. As explained in the transmittal letter, the June 19 order allowed the CAISO to implement real-time local market power mitigation procedures on constraints into EIM BAAs if the CAISO determines such mitigation in the PacifiCorp balancing authority areas is warranted based on a structural assessment of market power conducted by DMM and, the Commission approves the implementation.

6. This declaration summarizes the findings and recommendations of DMM's *Assessment of Potential Market Power in Energy Imbalance Market,* dated June 30, 2013. In this report, the DMM recommended that constraints into PacifiCorp BAAs from the CAISO and between the two PacifiCorp BAAs be included in the market power mitigation process. DMM made this recommendation because uncertainties about EIM market conditions precluded the DMM from finding that the PacifiCorp BAAs will be structurally competitive.
7. This declaration also provides additional details about and clarification of the market power mitigation tests and procedures that the CAISO will apply when constraints into PacifiCorp BAAs from the CAISO or other EIM BAAs become binding, thereby limiting the supply of competitive power that may be transferred into PacifiCorp BAAs. This additional information explains the impact this proposed tariff modification will have on actual market outcomes and also addresses several key concerns and misunderstandings that some stakeholders have expressed as part of the EIM stakeholder process.
8. Finally, the declaration describes further market monitoring, analysis, reporting on structural market power that DMM will perform after EIM implementation and potential market design enhancements that DMM may recommend to address the issue of structural market power.

III. STRUCTURAL ASSESSMENT OF POTENTIAL MARKET POWER

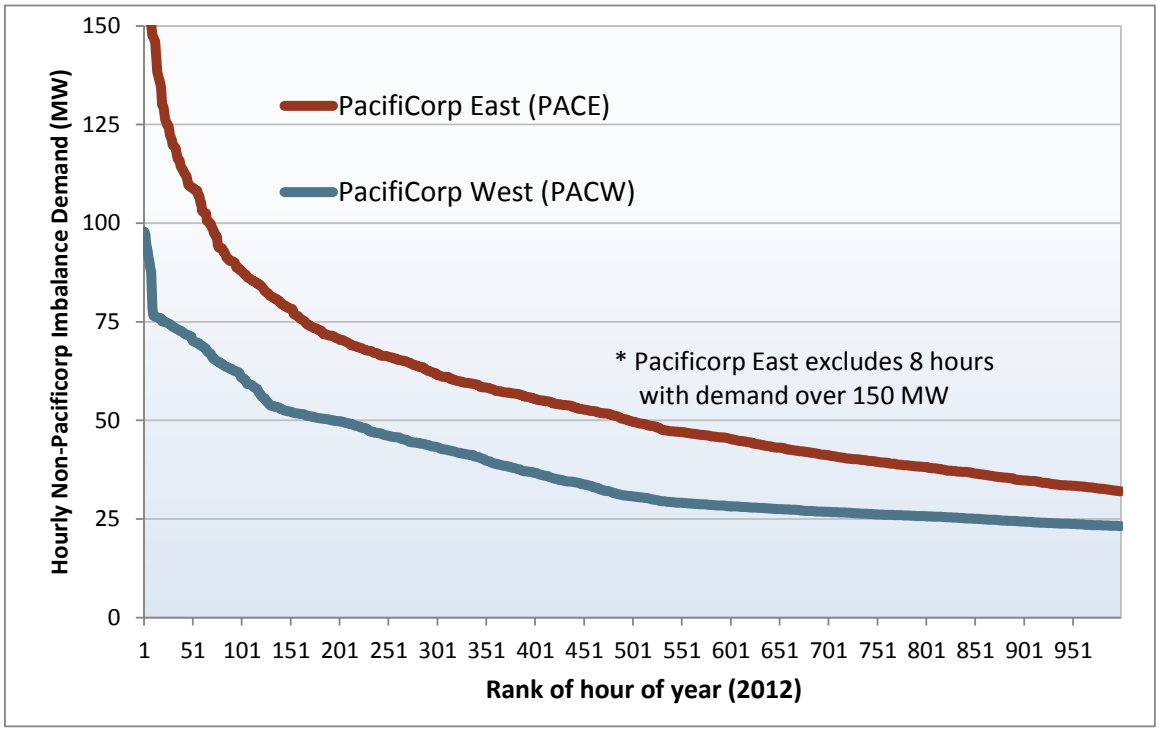
A. Demand for Imbalance Energy

9. One key factor affecting the potential for market power in the EIM is the demand for imbalance energy. Most of the imbalance energy through the EIM in PacifiCorp's BAA will be associated with PacifiCorp's own load and generation deviations. The incentive for PacifiCorp to exercise market power in the EIM and its ability to do so will depend largely on the net demand for non-PacifiCorp imbalance energy. This demand stems from deviations by load and generation resources of entities other than PacifiCorp, which includes other load serving entities and intermittent generation resources (such as wind) located within the PacifiCorp BAAs. Under PacifiCorp's EIM tariff provisions, these deviations will be settled based on the Locational Marginal Prices ("LMPs") in the EIM.

10. For this analysis, DMM requested and obtained data on the demand for imbalance energy in the two PacifiCorp BAAs associated with load and generation deviations of entities other than PacifiCorp. Figure 1 shows the top 1,000 hourly amounts of non-PacifiCorp demand for imbalance energy in 2012 for the PacifiCorp East and PacifiCorp West BAAs, in descending order. 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.

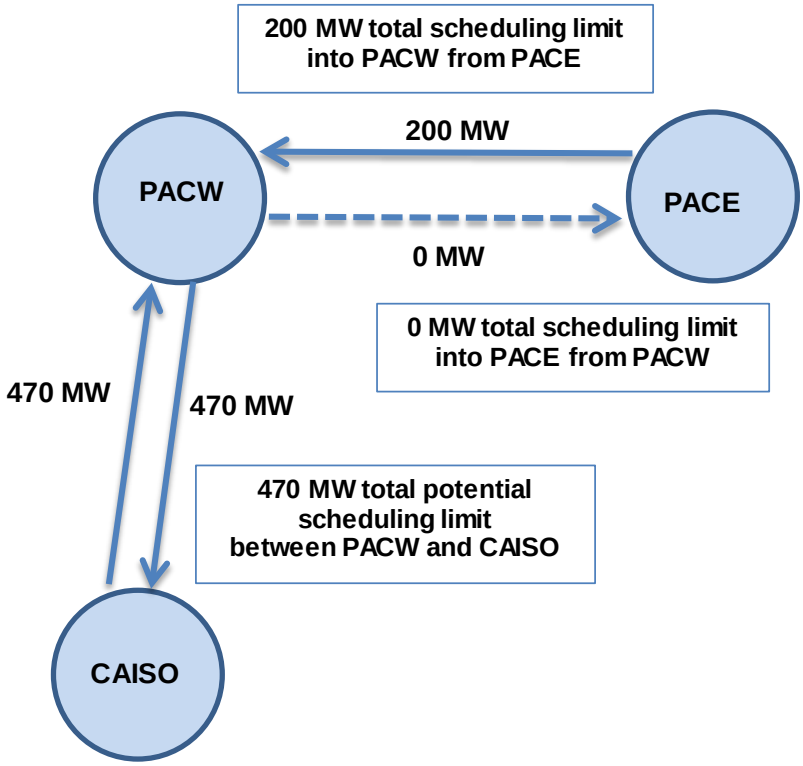
Figure 1. Demand for imbalance energy excluding PacifiCorp during top 1,000 hours (2012)



B. EIM Transfer Constraints

11. Another factor affecting the potential for market power within the PacifiCorp BAAs is the amount of competitive supply that may be transferred from the CAISO into the PacifiCorp BAAs in the EIM. Figure 2 illustrates DMM's understanding of the maximum amount of the transfer capacity that may be available in the EIM at the point of implementation in October 2014.

Figure 2. Potential EIM Inter-BAA scheduling limit constraints



12. As shown in Figure 2, currently available information indicates that up to 470 MW of transfer capacity may be available for EIM participating resources energy to be dispatched and delivered into the PacifiCorp West BAA from the CAISO 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. First, 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. Second, as is the case today, the California Oregon Intertie can be derated for operational reasons, which could lead to curtailments of the PacifiCorp Energy's scheduling rights that are being used for EIM

transfers. Third, PacifiCorp must abide by any additional transfer limitations for dynamic schedules imposed by the Bonneville Power Administration as the path operator. Thus, the amount of transfer capacity available in the EIM between the CAISO and the PacifiCorp West BAA remains uncertain at this time and may be somewhat dynamic from hour to hour.[1]

13. As also shown in Figure 2, the initial scheduling limit into the PacifiCorp East BAA from PacifiCorp West BAA during any 15-minute interval is 0 MW. This will preclude any energy being scheduled from the CAISO into PacifiCorp East, even when scheduling capacity exists from the CAISO into PacifiCorp West. Since the scheduling limit into the PacifiCorp East BAA will be included as a constraint in the market software (set to 0 MW), this constraint will become binding (i.e. congested) when the cost of supply needed to meet demand in the PacifiCorp East BAA is higher than the cost of supply in the EIM outside of the PacifiCorp East BAA. As discussed in Section IV of this declaration, under the tariff enhancements being proposed by the CAISO this congestion will trigger the application of market power mitigation tests and procedures on supply within the PacifiCorp East BAA. [

[1] Two other provisions included in the CAISO's proposal could reduce the actual scheduling limit into PacifiCorp West from the CAISO. 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 BAAs, 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 CAISO system in the event of an EIM disruption (Section 29.7 j (2)).

C. Non-PacifiCorp Supply within PacifiCorp BAAs

14. Current information for registration of generating resources to participate in the EIM indicates that there is likely to be a substantial amount of PacifiCorp generation within the PacifiCorp BAAs relative to the potential demand of imbalance energy. However, only about 160 MW of additional gas-fired generation owned or controlled by other entities within the PacifiCorp East BAA will likely be registered to participate in the EIM upon implementation in October 2014.

15. Table 1 summarizes the maximum capacity of coal and gas-fired resources within the PacifiCorp East BAA that will likely be registered to participate, based on currently available information from the CAISO 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 will likely be registered to participate in EIM in October 2014 is owned or controlled by PacifiCorp. There is no hydro generation within PacifiCorp East likely to be registered to participate in the EIM.

16. Table 2 summarizes the maximum capacity of hydro and gas-fired resources within the PacifiCorp West BAA likely to be registered to participate based on currently available information from the CAISO and PacifiCorp. As shown in Table 2, all of the hydro and gas-fired generation likely to be registered to participate in EIM in October 2014 is owned or

controlled by PacifiCorp. There is no coal generation within PacifiCorp West that is likely to participate in the 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

17. While the total amount of non-PacifiCorp generation that will likely be registered to participate in EIM within the PacifiCorp BAAs may be high relative to the potential demand of imbalance energy, the portion of capacity that participating EIM resources will actually offer into the EIM cannot be determined for several reasons. First, 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 CAISO 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 CAISO's 15-minute market. Finally, entities participating in EIM are under no obligation to bid available capacity into the EIM.

18. 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.

D. Summary and Recommendations

19. Although the potential demand for imbalance energy from non-PacifiCorp load and generation deviations may be relatively low, the amount of non-PacifiCorp supply from the CAISO and other EIM participants available to meet this demand remains uncertain and may vary under different market and system conditions. Consequently, based on currently available information, DMM cannot conclude that the two PacifiCorp BAAs will be structurally competitive. DMM therefore recommends that market power mitigation procedures be applied when constraints on PacifiCorp's EIM Internal Interties (i.e. EIM transfer constraints) become binding. This currently encompasses EIM Transfers from the PacifiCorp East BAA and CAISO BAA in the PacifiCorp West BAA, and into the PacifiCorp East BAA from the PacifiCorp West BAA.

20. In the PacifiCorp East BAA, the non-PacifiCorp demand for imbalance energy exceeded 150 MW in only about 8 hours and was over about 90 MW during only 100 hours in 2012 (Figure 1). However, the scheduling

limit for transfers from the CAISO though PacifiCorp West into PacifiCorp East will be 0 MW (Figure 2). Although there are 160 MW of additional gas-fired generation within the PacifiCorp East owned or controlled by one or more non-PacifiCorp entities that may participate in EIM in October 2014, it is uncertain how much if any of this capacity will actually be available for dispatch in the EIM at any time. Thus, at this time, it cannot be assumed that there will be sufficient supply from non-PacifiCorp resources to ensure a structurally competitive market.

21. 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). This compares to a scheduling limit for transfers from the CAISO into PacifiCorp West of up to 470 MW (Figure 2). While this may make PacifiCorp West structurally competitive in many hours, the actual amount of scheduling capacity into this BAA from the CAISO remains uncertain and could be below the non-PacifiCorp demand for imbalance energy (or even 0 MW) in some hours. There is no non-PacifiCorp generation in the PacifiCorp West BAA that is expected to participate by the time the EIM is implemented in October 2014.

22. The EIM tariff approved by the June 19 order indicates that DMM will assess the structural competiveness of EIM transfer constraints into an EIM BAA based on factors which may include (1) the demand for real-time imbalance energy within the EIM BAA, (2) the supply owned or controlled by different entities within the EIM BAA, and (3) the potential supply from

EIM transfer constraints into the EIM BAA.[2] This assessment of structural market power utilizes information on these three basic factors to assess the structural competiveness of the PacifiCorp EIM BAAs.

23. The June 19 order indicates that the CAISO may propose additional tariff detail regarding how decisions about activation or deactivation of market power mitigation on EIM constraints into EIM BAAs EIM interties will be made.[3] At this time, the CAISO is not proposing to include a more specific methodology in the CAISO tariff for determining if EIM transfer constraints should be included or excluded from market power mitigation procedures. Instead, such determinations will remain subject to filing and approval by the Commission. DMM strongly supports this approach at this time in light of the unavailability of the types of quantitative data necessary for a market power analysis, such as information on market structures and other factors that may affect market competiveness, especially prior to the initial operation of any EIM BAA. As illustrated by the analysis in this declaration, even if a specific formula were be specified for assessing structural market power, the appropriate inputs needed for the assessment of structural market power would likely be subject to substantial uncertainty. In Section VI of this declaration, I describe how DMM will continue to re-assess and report on the structural competitiveness of the PacifiCorp BAAs as actual operational data become available after implementation of the EIM.

[2] 29.39(d)(1)).

[3] Order at PP 221.

IV. MARKET POWER MITIGATION PROCEDURES

24. This section provides additional details and clarification of the market power mitigation tests and procedures that the CAISO will apply when EIM transfer constraints into the PacifiCorp BAAs become binding, thereby limiting the supply of competitive power that may be transferred into the PacifiCorp BAAs. This section explains the impact this proposed tariff modification will have on actual market outcomes and also addresses several key concerns and misunderstandings that some stakeholders have expressed as part of the EIM stakeholder process.

25. The CAISO's EIM design includes provisions to mitigate market power in the real-time market within each BAA participating in the EIM. This process mirrors the local market power mitigation currently applied in the CAISO's real-time market. Including EIM transfer constraints into EIM BAAs simply treats these constraints like any other constraint within the EIM footprint. For example, if real-time congestion is currently projected to occur into the Pacific Gas & Electric (PG&E) service territory on the major transmission line connecting PG&E service territory with Southern California (Path 15), these same market power mitigation tests and procedures are applied. As described below, when mitigation procedures are triggered, bids are not simply mitigated to cost-based levels, as some market participants appear to assume or imply.

26. Under these procedures, if the market software projects congestion on a constraint during the real-time market process performed each 15 minutes, it performs a structural assessment of the competiveness of the constraints based on the supply of resources effective in relieving this congestion relative to the demand for counterflow needed to relieve congestion. It uses a three pivotal supplier test to determine if the supply of counter-flow available to relieve congestion on this constraint is competitive. Under this test, a constraint is deemed structurally competitive if there is sufficient supply that is effective at resolving the constraint after removing the supply controlled by the three largest suppliers.

27. Since the scheduling limit into the PacifiCorp East BAA will be included as a constraint in the market software (set to 0 MW), this constraint will become binding (i.e. congested) when the cost of supply needed to meet demand in the PacifiCorp East BAA is higher than the cost of supply in the EIM outside of the PacifiCorp East BAA. Under the tariff enhancements being proposed by the CAISO this congestion will trigger the application of this structural market power test on this scheduling constraint. Since this scheduling limit will be set to 0 MW, this test will be performed based on the demand for energy in the PacifiCorp East BAA and the available supply within the PacifiCorp East BAA (excluding the three largest suppliers).

28. If this structural test indicates the constraint is uncompetitive, the software applies a second set of procedures to identify any market bids that must be reduced or "mitigated". Only bids for units that can relieve congestion on noncompetitive constraints are subject to potential mitigation. Market bids from these units are lowered only if the bids exceed both (1) a competitive locational marginal price ("LMP") calculated by the market software (which excludes congestion from noncompetitive constraints), and (2) the default energy did (DEB) of the unit, which reflects the unit's marginal operating cost plus a 10 percent adder. The software will cap market bids exceeding both of these two values at the higher of the competitive LMP or the unit's DEB.

29. The competitive LMP used as a floor in bid mitigation is a market-based price that reflects real-time demand and supply conditions in the overall EIM footprint, and may often be substantially higher than a unit's market bid or DEB. This competitive LMP includes the real-time system marginal energy cost for the combined EIM system plus the congestion component on competitive constraints, but excludes the congestion component for any noncompetitive constraints. For the initial EIM implementation, the CAISO plans to calculate the congestion components of this competitive market price using the same reference bus currently used in mitigation of bids within the CAISO BAA[4] because it represents the bus least effected

[4] The reference bus the CAISO plans to use for this LMP decomposition is the Midway 500KV bus if Path 26 flow is from north to south and the Vincent 500KV bus if Path 26 flow is from south to north.

by market power in the EIM footprint based on currently available information on the potential for market power in the EIM BAAs.

30. For instance, assume a unit within an EIM BAA has a marginal cost of $30/MW and a DEB of $33/MW after application of the 10 percent adder. Further assume that market power mitigation procedures are triggered by congestion into this EIM BAA during a 15-minute interval on EIM transfer constraints that is noncompetitive due to a high concentration of ownership of supply resources in this EIM BAA. During this interval, the competitive LMP for this 15-minute interval used in mitigation is $40/MW. If the unit is bid into the EIM market at a price up to $40/MW, the bid would not be lowered. If the unit was bid at a higher price, such as $60/MW, the bid would be capped at the higher of (1) the competitive LMP ($40/MW) or (2) the unit's DEB ($33/MW). Thus, if the unit had a higher marginal cost of $50/MW, for example, the unit's bid would be reduced to its DEB of $55/MW ($50/MW + 10 percent adder).

31. Several entities not yet participating in the EIM have expressed concern that DEBs used in mitigation will not reflect the full opportunity costs of hydro systems with storage capabilities.[5] However, the CAISO tariff specifically provides for EIM participants to work with the CAISO to establish special customized negotiated bids that reflect the full opportunity costs of energy-limited resources or any other units with special characteristics affecting its marginal or opportunity costs. The

[5] June 19 Order at 206, P.79.

CAISO has successfully reached agreement with all entities with such resources (including some hydropower resources) that have indicated to the CAISO an intent to participate in EIM. If additional resources with different or more complex constraints or marginal costs participate in EIM, the CAISO and DMM will work with EIM participants to develop DEBs that accurately reflect their resources' marginal or opportunity costs plus a 10 percent adder. In the event that the parties cannot reach agreement under this negotiated bid option, a participant has the right to file a proposed DEB with FERC pursuant to Section 205 of the Federal Power Act.[6]

V. MARKET MONITORING AND REPORTING

32. After the EIM is implemented, DMM will closely monitor, analyze, and report on the efficiency and competitiveness of the EIM in its quarterly reports on overall CAISO market performance and in the six month reports on EIM competiveness required under the Commission's June 19 order. As actual operational data becomes available after implementation of the EIM, the structural competitiveness of the PacifiCorp BAAs can be re-assessed based on actual supply and demand conditions during each market interval. Appendix A of DMM's *Assessment of Potential Market Power in Energy Imbalance Market,* dated June 30, 2014 outlines a framework for such analysis based on a pivotal supplier test and residual supply index. DMM plans to use this framework along with other metrics

[6] 39.7.1.3.1

to report on the competiveness of the PacifiCorp BAAs. If, based on this analysis, DMM concludes that the two PacifiCorp BAAs will be structurally competitive during all or most hours, DMM may recommend that the CAISO file for Commission approval to exclude PacifiCorp constraints into EIM BAAs from market power mitigation procedures..

33. DMM will also continue to work with the CAISO, the Market Surveillance Committee, and stakeholders to develop more dynamic approaches that might be used to determine if EIM BAAs are structurally competitive based on actual real-time conditions. One approach under consideration would be based on the actual amount of EIM scheduling capacity into each EIM BAA from a competitive BAA that is available during each 15-minute interval relative to the demand for imbalance energy in that BAA. For example, if 200 MW of scheduling capacity were available into the PacifiCorp West BAA during a 15-minute interval, and the historical demand for imbalance energy (excluding PacifiCorp) were only 100 MW, the EIM scheduling constraint between the CAISO and PacifiCorp West could be excluded from mitigation tests and procedures. Such an approach could encourage growth and participation in EIM by alleviating concerns some entities have expressed about the impact of mitigation, while still providing a high level of protection against the potential for market power on an BAA-wide level.

I declare under penalty of perjury that the foregoing statements are true and correct to the best of my knowledge, information, and belief.

Executed this 23rd day of July, 2014.

Eric W. Hildebrandt

Attachment E – Market Surveillance Committee Opinion

California Independent System Operator Corporation

July 23, 2014

Opinion on
LMPM Implementation in the Energy Imbalance Market

by

James Bushnell, Member
Scott M. Harvey, Member
Benjamin F. Hobbs, Chair
Shmuel S. Oren, Member

Members of the Market Surveillance Committee of the California ISO

July 7, 2014

1. Introduction

The Market Surveillance Committee (MSC) of the California Independent System Operator (CAISO) has been asked to comment on the implementation of Local Market Power Mitigation (LMPM) within the forthcoming Energy Imbalance Market. The recommendation of both the management and the CAISO Department of Market Monitoring (DMM) is to apply the CAISO's existing LMPM framework with one additional, previously proposed, change. This change would allow LMPM to be applied when there is congestion over the EIM transmission transfer limits between EIM balancing authority areas (BAAs), in addition to the planned policy of applying it to uncompetitive transmission constraints that are internal to the EIM BAAs, effective on the EIM go-live date of October 2014. On June 19, 2014, the Federal Energy Regulatory Commission issued two orders[1] approving the CAISO's and PacifiCorp's tariff amendments to implement the EIM. In the CAISO order, FERC ordered that the DMM monitor and submit reports on the competitiveness of the EIM, and furthermore indicated that it would consider an ISO filing that would propose inclusion of inter-BAA transfer constraints in the EIM LMPM procedures.

We have discussed several aspects of the EIM design, including LMPM, in detail in our October 2013 opinion on this topic,[2] and at several MSC meetings over 2013 and 2014.[3] Our previous

[1] FERC, "Order Conditionally Accepting Proposed Tariff Revisions to Implement Energy Imbalance Market," Docket No. ER14-1386-000, June 19, 2014, www.caiso.com/Documents/Jun19_2014_ Order-ConditionallyAcceptingEIMTariffRevisions_ER14-1386.pdf; FERC, "Order Conditionally Accepting in Part and Rejecting in Part Proposed Tariff Revisions to Implement Energy Imbalance Market," June 19, 2014, Docket ER14-1578-000, www.ferc.gov/whats-new/comm-meet/2014/061914/E-5.pdf

[2] See J. Bushnell, S. Harvey, B. Hobbs, and S. Oren, "Opinion on Initial Implementation of the Energy Imbalance Market and Related Market Design Changes," Market Surveillance Committee of the California ISO, October 28, 2013, www.caiso.com/Documents/FinalOpinion_EnergyImbalanceMarketOct30_2013.pdf

[3] The EIM and, in particular, the application of LMPM to EIM have been discussed in MSC meetings in Folsom on July 2 and September 6, 2013, and March 11 and May 19, 2014. In addition, MSC members have participated in a number of stakeholder calls discussing the EIM design and implementation.

opinion expressed strong support for the creation of the EIM. However, in contrast to the market structure within CAISO, the supply and demand for energy in the areas that will begin participating in the EIM in October 2014 will be dominated by the vertically-integrated assets of PacifiCorp. There will remain in these areas a need for balancing services to accommodate the varying supplies of non-utility (particularly intermittent) generation as well as a relatively small amount of non-PacifiCorp load. With the adoption of the EIM, the pricing of imbalance energy will transition from an administrated rate overseen and approved by FERC to market-based pricing determined by the EIM dispatch. This transition would not be appropriate if the market-based balancing price were materially impacted by the exercise of market power.

In this opinion, we summarize the CAISO proposal for modifying the LMPM framework (Section 2) and our assessment of it (Section 3). In brief, we support the proposed change to the LMPM framework, as recommended by ISO management and DMM, as the best way, within the CAISO's current general approach to LMPM and based on the information currently available regarding the resources that will be participating in the EIM market, to deal with a market structure that is quite different than that inside the CAISO BAA. Without the proposed change, there is a risk that transmission customers within the EIM BAAs could be exposed to significant potential for market power in the supply of five minute imbalance energy. As discussed in our October 28, 2013 opinion,[4] it is not clear whether it will in practice be profitable for PacifiCorp to raise offer prices on its energy enough to cause transmission constraints to bind in order to sell imbalance energy at inflated prices, but it is a possibility that the CAISO should address in its initial design.

There are features of the energy imbalance markets in the PacifiCorp BAAs that will prevent the CAISO LMPM framework from being fully effective in mitigating market power within these non-CAISO balancing areas. The kind of must-offer obligation that applies within the CAISO region will not apply to the rest of the EIM, and it is not clear at this point in time what, if any, kind of must offer obligation will in practice apply to PacifiCorp in its role as the balancing authority area operator. Moreover, the transfer capability between the CAISO and other EIM BAAs available for use by the EIM will apparently be determined by PacifiCorp Energy with no obligation to make unscheduled transfer capability available to the EIM.[5]

Conversely, the CAISO's current LMPM design is structured to identify the potential for the exercise of locational market power in meeting load within a constrained region, and substantial changes would be necessary to adapt it to more accurately identify the potential for the exercise of market power in the supply of imbalance energy. Since it appears likely that the EIM will be expanded to include other balancing areas in the West (a development that we very much welcome), it will be important to eventually consider whether fundamental or further incremental changes to the CAISO LMPM framework will be desirable in the future. In the meantime, we believe that it will be important for DMM to monitor the MW quantity of supply offers in the non-CAISO BAAs and the amounts of transmission capability made available between the CAISO and the other BAAs to assess whether anti-competitive behavior is a problem and conversely

[4] See the discussion in Bushnell et al., op cit., pages 27-29.

[5] See PacifiCorp OATT, Attachment T, Section 5.1 Docket ER14-1578.

whether the proposed mitigation design is chronically triggering mitigation at times when there is no potential for the exercise of locational market power in the supply of imbalance energy, as would be the case when PacifiCorp is a net buyer of imbalance energy.

2. The CAISO Proposal for Modifying the LMPM for Application in the EIM

The guiding principle of the CAISO's local market power mitigation framework is that within the CAISO BAA, the potential for the exercise of market-power is likely to be significant only within constrained regions. It is generally accepted that in the absence of congestion, the CAISO market is workably competitive, so that prices are close to marginal cost at such times. Consequently, market-power mitigation would only be needed at times and locations where transmission constraints limit the access of sufficient number of competitive suppliers to such a constrained region. The CAISO approach to mitigating local market power is to first identify where such market power might be exercised, and then to mitigate bids of generation units able to meet load within the constrained region.

The identification step in the CAISO LMPM framework consists of identifying transmission paths that are both congested and deemed uncompetitive by a dynamic structural test (three pivotal supplier test), excluding from the analysis certain paths that are a priori designated as competitive. Since the broader CAISO market is considered competitive, this test has not historically been applied to intertie transmission constraints, which lie on paths to non-CAISO balancing areas. Even if CAISO were isolated from the rest of the WECC, its market should be reasonably competitive in the absence of internal congestion, given the present structure of the market and degree of forward contracting.

This assumption of a competitive market structure at the balancing area (BAA) level does not necessarily apply to the non-CAISO EIM areas. As DMM has described,[6] PacifiCorp controls 97% of the non-wind capacity that is expected to initially participate in PacifiCorp EIM BAAs. Thus, even in the absence of congestion internal to the PacifiCorp BAA, there is sufficient concentration of ownership of the generation expected to initially participate in the real-time imbalance market that mitigation could potentially be necessary.[7] Within the existing LMPM framework, the most straightforward way to accomplish this is to treat the EIM capacity on interties into these EIM areas (as well as internal constraints) as uncompetitive. This means that when the EIM transfer limit is binding (e.g., available transmission capacity is fully utilized in the real-time dispatch) into the EIM area, the three pivotal supplier structural test will be applied to that

[6] Of the total of 5480 MW of non-wind capacity listed in Tables 1 and 2 in "Assessment of Potential Market Power in Energy Imbalance Market," Department of Market Monitoring, California ISO (updated June 30, 2014, http://www.caiso.com/Documents/UpdatedAssessment-PotentialMarketPower-EnergyImbalanceMarket_corrected.pdf), 5320 MW is owned by PacifiCorp and 160 MW is owned by others.

[7] While it might be that mitigation would always be necessary because there is so little contested supply (e.g., generation not owned by PacifiCorp), it is also true that the *demand* for balancing services may also be quite modest.

entire EIM area. It is likely that the area will fail this test in the case of the PacifiCorp BAAs, meaning that all units will be subject to potential mitigation during periods in which the limit is constrained for imports into the PacifiCorp BAAs.[8]

Importantly, the CAISO's LMPM bases mitigated bids upon the higher of (1) DMM's estimate of unit-level costs (the default energy bid) and (2) the competitive baseline LMP, unless the actual bid is lower, in which case it is not mitigated. In this context, the competitive baseline LMP would be the CAISO energy price for import supply into the PacifiCorp BAAs absent congestion into or within to the PacifiCorp BAAs. In this way, the incremental cost of CAISO import supply would constitute a floor on the mitigated bids of units within a non-CAISO EIM BAA when the transfer limits bind from the CAISO into the non-CAISO BAA. To the extent that the cost of incremental CAISO supply exceeds the calculated default energy bid of units bidding into the EIM in PacifiCorp areas, the prices those units receive will not be sensitive to the precise default energy bid calculated for those units.

3. Assessment of the Proposal

We support this change to the LMPM framework and believe it a worthwhile step to support the competitiveness of the short-term energy imbalance market in EIM BAAs. This is because we believe that until the level of participation by non-PacifiCorp supply in the short-term energy imbalance market and the size of non-PacifiCorp imbalances are better known, we cannot be assured that the balancing energy market in the PacifiCorp BAAs will be workably competitive. There is currently uncertainty about the level of participation in the EIM by non-PacifiCorp generation located in PacifiCorp BAAs, and it is also difficult to forecast the level of demand for imbalance energy services by entities other than PacifiCorp. Experience with EIM may increase participation on both the supply and demand sides, but currently the supply of energy in the real-time energy imbalance market appears likely to be dominated by PacifiCorp. Therefore, this market should be treated as potentially uncompetitive for purposes of the LMPM when transmission and scheduling constraints into the EIM BAAs are binding.

However, there are two factors that increase the potential for market power and possibly dilute the effectiveness of the LMPM mechanism in non-CAISO BAAs. First, and most importantly, participation in the EIM by entities other than PacifiCorp is voluntary. Therefore while LMPM can mitigate the prices of offers into the EIM, it cannot compel suppliers to provide those offers

[8] Transmission pricing and access is another potential issue that could limit participation by non-PacifiCorp entities in the PacifiCorp BAAs. Although the FERC PacifiCorp EIM order does not allow PacifiCorp to charge an incremental non-firm transmission rate to participating resources, such resources must have point-to-point or network transmission service from PacifiCorp. If the effect of this is to preclude non-PacifiCorp resources from participating in the EIM, then this could restrict competition in the short run. On the other hand, allowing non-PacifiCorp resources free access to use of transmission in real-time, without having paid for point-to-point or network service could encourage free riding, which could discourage investment in transmission in the long run and thereby harm market competitiveness, while also providing inefficient incentives to shift transmission scheduling from forward markets into real-time. We simply note at this point that policies concerning short- and long-term transmission pricing and access can have important implications for competition and market efficiency, and those implications should be carefully considered in designing those policies.

in the first place. There is no general must-offer obligation (MOO) in non-CAISO BAAs. Moreover the extent of any MOO that would apply to PacifiCorp in its role as the balancing authority area is unclear. Therefore, even though the LMPM mechanism restrains the ability of dominant suppliers to raise their price offers in a way that affects market prices, the risk remains that a dominant supplier could raise prices by instead reducing the capacity they offer into the EIM.

Second, the amount of transfer capacity made available to the EIM will also be voluntarily offered into the market. In contrast to internal CAISO transmission, whose capacity is overseen by CAISO itself, the transfer capacity available to the EIM market will be determined by PacifiCorp Energy on an hourly basis.[9] This makes it even more important for the LMPM mechanism to be able to apply mitigation to these constraints, as a market entity will be able to influence the frequency of "congestion" on these transfer constraints through the amount of capacity made available to accommodate EIM transactions.

Unless a must-offer obligation is imposed on the non-CAISO BAAs, or unless they decide to become or join a FERC-regulated RTO, it will likely be difficult to alter these two factors, in which case, generator participation and transfer capacity availability will remain voluntary. Possible restraints on possibly anticompetitive behavior through physical withholding might then be limited to the relatively blunt instruments of FERC review and potential modification or cancellation of market-based rate authority,[10] actions by state utility commissions, in the case of generation assets that they regulate, and NERC and WECC rules applying to balancing authority area operators. We therefore recommend that DMM monitor the quantities of capacity offered into the non-CAISO BAAs and the amounts of transfer capability made available to the EIM for possibly anti-competitive behavior.[11]

Another factor impacting the competitiveness of the EIM imbalance market is that the competitive import supply available from the California ISO will reflect GHG costs, which the California ISO's Department of Market Monitoring has estimated will raise California ISO costs by around $6 per megawatt hour relative to what they would otherwise be.[12] We described the po-

[9] See PacifiCorp OATT, Attachment T, Section 5.1 Docket ER14-1578.

[10] FERC, Companies with Market-Based Rate Authority, www.ferc.gov/industries/electric/gen-info/mbr/list.asp

[11] We have also been informed that transfer capacity between the PacifiCorp-West BAA and the CAISO as well as the ability of counterflows to offset transfer capability between PacifiCorp-West and East BAAs are restricted by non-PacifiCorp policies concerning dynamic transfers. We note that such restrictions can result in less efficient use of transmission assets, with consequent economic and perhaps environmental costs. This of course would be counter to the goals of establishing the EIM. We recommend that DMM also monitor whether fewer benefits will being realized from the EIM as a result of these policies.

[12] See California ISO, Department of Market Monitoring, 2013 Annual Report on Market Issues and Performance," pp. 128-136.

tential for these GHG costs to enable PacifiCorp to realize small increases in imbalance energy revenues in our previous EIM opinion.[13]

An important factor to consider in monitoring the EIM market is that in the CAISO, market power mitigation is designed to potentially apply to *all* power transacted, while the relevant market in other EIM areas will be a much smaller balancing market. Even if structural tests indicate that a single firm dominates the aggregate market, this may not be fully reflective of the competitiveness of just the balancing portion of a region's market. There is currently very little data available about the historic, let alone future volume and composition of balancing supply and demand in the non-CAISO areas of the EIM.

In general, monitoring information will be very important for informing stakeholders and regulators about the benefits and competitiveness of the EIM as it expands to include PacifiCorp and eventually other BAAs in the western interconnection. Furthermore, it will be important to review the effectiveness of the CAISO LMPM framework and whether further adjustments or even a change in paradigm might be desirable as the EIM enlarges and encompasses other BAAs with diverse regulatory structures, resource mixes, and ownership patterns.

[13] See Bushnell et al., op. cit., pp. 28-29.