



California Independent  
System Operator Corporation

February 28, 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 Implement an Energy Imbalance  
Market  
Docket No. ER14-\_\_\_\_-000**

Dear Secretary Bose:

The California Independent System Operator Corporation submits the attached amendments to its Fifth Replacement FERC Electric Tariff.

Respectfully submitted,

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## TABLE OF CONTENTS

I.	Summary .....	2
II.	Background .....	4
A.	Consideration of an Energy Imbalance Market in the West.....	5
B.	Benefits of the Proposed Energy Imbalance Market .....	6
C.	Background of the ISO Proposal.....	6
D.	The Energy Imbalance Market Stakeholder Process .....	7
III.	Overview of the Energy Imbalance Market.....	9
A.	Basic Principles .....	9
B.	Participation in the Energy Imbalance Market.....	11
IV.	Market Design and Operation.....	13
A.	Introduction .....	13
B.	EIM Market Participants .....	14
C.	Communications .....	16
D.	Normal and Emergency Operations .....	17
E.	Outages and Critical Contingencies .....	20
F.	Metering .....	20
G.	Creditworthiness, Dispute Resolution, and Legal Matters .....	21
H.	Transmission System .....	22
I.	Market Operation .....	22
1.	Introduction.....	22
2.	Timeline and Other Components of Process .....	23
3.	Greenhouse Gas Regulation .....	25
4.	Market Actions .....	27
5.	Price Correction.....	30
V.	Cost Allocation, Settlements, and Billing .....	30
VI.	Transmission Charges.....	35
VII.	Administrative Fee.....	38
VIII.	Market Monitoring and Mitigation.....	40
IX.	Pro Forma Service Agreements.....	42
X.	Effective Date .....	42
XI.	Requests for Waiver .....	43

XII. Service .....	43
XIII. Contents of this Filing .....	43
XIV. Correspondence.....	44
XV. Conclusion.....	45



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The California Independent System Operator Corporation (“ISO”) proposes this amendment to the ISO tariff to provide other balancing authority areas the opportunity to participate in the real-time market for imbalance energy that the ISO currently operates in its own balancing authority area.<sup>1</sup> The amendment defines the set of rules and procedures governing this expansion of the real-time market as the Energy Imbalance Market, or EIM.<sup>2</sup> Specifically, to implement the Energy Imbalance Market, the ISO proposes the following tariff amendments: (1) a new section of the tariff with the provisions specific to the Energy Imbalance Market, set forth in section 29; (2) new definitions specific to the Energy Imbalance Market in Appendix A; (3) revisions to existing tariff provisions and definitions, as necessary to accommodate the Energy Imbalance Market; and (4) new pro forma agreements for use by participants in the Energy Imbalance Market, which are added to Appendix B.

The ISO requests a Commission order by June 20, 2014. This will provide market participants a level of certainty with respect to the market rules that will apply in the simulation scheduled for July 8, 2014. Moreover, the risk of

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<sup>1</sup> The ISO submits these amendments pursuant to Section 205 of the Federal Power Act, 16 U.S.C. § 824d (2012).

<sup>2</sup> The ISO uses “Energy Imbalance Market,” with initial capitalization, to refer to the specific proposal presented in this transmittal letter, and “energy imbalance market,” without capitalization, to refer to the concept of such a market generally. Capitalized terms not otherwise defined in this filing have the meanings set forth in Appendix A to the ISO tariff as revised by this filing, and references to numbered sections are references to sections of the ISO tariff as revised by this tariff filing, unless the context indicates otherwise.

meaningless results could be avoided if significant changes are known in advance. In addition, this will enable the ISO to make adjustments to its systems, if necessary, without delaying the market simulation.

The ISO requests a September 23, 2014 effective date for the tariff amendments, so that the necessary advance data submissions may be made for the Energy Imbalance Market to commence operations on October 1, 2014. The ISO requests a July 1, 2014 effective date for the various agreements to be executed by EIM market participants, just prior to market simulation.

## I. Summary

In this filing, the ISO sets forth the terms under which other balancing authority areas will have the opportunity to participate voluntarily in the ISO's real-time energy market to more efficiently meet their needs for imbalance energy. This proposal is the result of an extensive stakeholder effort and will provide benefits to these new market participants with minimal risk. The inefficiencies created by current arrangements, in which western balancing authorities other than the ISO generally meet their imbalance energy needs individually, using manual processes and ad hoc bilateral arrangements, are addressed by the Energy Imbalance Market.

The ISO's proposed Energy Imbalance Market does not represent a new market. Rather, the ISO proposal takes advantage of its successful existing real-time market by adding new procedures to accommodate the voluntary participation of other balancing authorities without disrupting the current market structure. This provides other balancing authority areas with the fundamental advantage of access to a real-time market based on a proven structure, which the ISO, with the assistance of stakeholders and guidance from the Commission, has enhanced since its introduction five years ago. The Energy Imbalance Market builds upon the ISO's recent introduction of a fifteen-minute market, in response to Order No. 764.<sup>3</sup>

As explained below, the ISO's proposed procedures accommodate

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<sup>3</sup> *Integration of Variable Energy Resources*, Order No. 764, FERC Stats. & Regs. ¶ 31,331, *order on reh'g and clarification*, Order No. 764-A, 141 FERC ¶ 61,212 (2012), *order on clarification and reh'g*, Order No. 764-B, 144 FERC ¶ 61,222 (2013) (collectively, "Order No. 764"). The ISO filed tariff revisions to implement the fifteen-minute market on November 26, 2013 in Docket No. ER14-480-000. On November 27, 2013, the ISO also filed tariff revisions in Docket No. ER14-495-000 to comply with directives in Order No. 764. These tariff revisions are currently pending before the Commission. The ISO requested that the Commission accept the tariff revisions effective April 1, 2014, and has assumed in this filing that those pending changes will be accepted without significant modification. Any changes to those pending tariff provisions made prior to the effective date of the tariff provisions proposed in this filing will be accounted for in accordance with Commission orders and regulations.

balancing authorities whose operations in advance of real-time operations (*i.e.*, day-ahead and other forward operations) differ from the ISO's day-ahead market. This feature provides flexibility for balancing authorities that elect to participate in the Energy Imbalance Market to do so without altering other aspects of their operations.

A number of studies demonstrate the benefits of such an expanded real-time market. One study that the ISO conducted jointly with PacifiCorp, the first balancing authority to express interest in the ISO proposal, identified annual economic benefits ranging from \$21 million to \$129 million. Notably, those benefits derive both from the wider and more diverse pool of supply resources and from the efficiencies of the ISO's automated market process. The latter benefits will be available even if transmission constraints limit interchange between balancing authority areas participating in the Energy Imbalance Market. In addition, the Energy Imbalance Market will facilitate the integration of renewable resources by capturing the benefits of geographical diversity of both load and resources and improve grid reliability by enhancing operational awareness over a larger area.

Each balancing authority that chooses to participate in the Energy Imbalance Market will remain responsible for maintaining the reliability of its balancing authority area. This includes meeting operating reserve and capacity requirements, scheduling and curtailment of the transmission facilities under its operational control, and manually dispatching resources out-of-market to maintain reliability. The proposed tariff revisions recognize the retention of these responsibilities by participating balancing authorities, as well as elements designed to ensure that each participating balancing authority area has sufficient resources to serve load while still realizing the benefits of increased resource diversity.

The ISO will financially settle the Energy Imbalance Market in a manner that appropriately recognizes the costs attributable to each participating balancing authority area. For example, the ISO will allocate bid cost recovery payments to resources, as well as neutrality amounts that track differences between payments received from load and payments to generation to each participating balancing authority, consistent with the ISO's cost allocation principles. The participating balancing authorities will be responsible for allocating these amounts according to their respective open access transmission tariffs. The ISO will use a process based on its existing local market power mitigation approach to mitigate market power in each balancing authority area participating in the Energy Imbalance Market, and will monitor and assess the application of market power mitigation before and after implementation.

The proposed tariff revisions also recognize the need for resources that serve load in the California ISO balancing authority area through the Energy Imbalance Market to comply with California's greenhouse gas cap and trade

regulations. As it currently does for resources participating in its real-time market, the ISO will allow Energy Imbalance Market resources to include the costs of compliance in their energy bids and will incorporate this cost into its dispatch of generation as appropriate. The ISO will not consider this cost when it dispatches this generation that is attributable to serving load outside the ISO and, therefore, greenhouse gas regulation compliance costs will not affect locational prices outside the ISO balancing authority area.

Transmission access to the Energy Imbalance Market will be provided under the applicable transmission service provider tariffs. As part of a reciprocal arrangement with PacifiCorp, the ISO proposes that there be no incremental transmission charge for the use of transmission to support Energy Imbalance Market transfers between participating balancing authority areas. The ISO believes that this approach is reasonable for implementation of the expanded real-time energy market. Within the first year of operation, the ISO will consider in consultation with stakeholders whether to continue this arrangement or to modify it.

Finally, the ISO has conducted a concurrent stakeholder process to design a governance structure to provide stakeholders input in Energy Imbalance Market matters through a transitional committee to the ISO's Board of Governors. The transitional committee will consider options for a long-term independent Energy Imbalance Market governance structure and advise the Board on associated market design matters. The ISO is working with stakeholders to form and seat the transitional committee. This filing does not propose any changes to governance.

## II. Background

Operation of a reliable and secure electrical system depends on maintaining balance in real-time between supply and demand. Accordingly, the Commission requires public utility transmission providers to offer energy imbalance service to transmission customers and generators as ancillary services under their pro forma tariffs.<sup>4</sup> In addition, balancing authorities are

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<sup>4</sup> See *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities and Recovery of Stranded Costs by Public Utilities and Transmitting Utilities*, Order No. 888, FERC Stats. & Regs. ¶ 31,036, at 31,705 (1996), *order on reh'g*, Order No. 888-A, FERC Stats. & Regs. ¶ 31,048, *order on reh'g*, Order No. 888-B, 81 FERC ¶ 61,248 (1997), *order on reh'g*, Order No. 888-C, 82 FERC ¶ 61,046 (1998), *aff'd in part and rev'd in part sub nom.* *Transmission Access Policy Study Group v. FERC*, 225 F.3d 667 (D.C. Cir. 2000), *aff'd sub nom.* *New York v. FERC*, 535 U.S. 1 (2002); *Preventing Undue Discrimination and Preference in Transmission Service*, Order No. 890, FERC Stats. & Regs. ¶ 31,241, *order on reh'g*, Order No. 890-A, FERC Stats. & Regs. ¶ 31,261 (2007), *order on reh'g*, Order No. 890-B, 123 FERC ¶ 61,299 (2008), *order on reh'g*, Order No. 890-C, 126 FERC ¶ 61,228, *order on clarification*, Order No. 890-D, 129 FERC ¶ 61,126 (2009).

responsible for maintaining balance between supply and demand in their areas. As a transmission provider and balancing authority, the ISO fulfills these responsibilities through its operation of an automated, bid-based real-time energy market, which determines the most economic commitment and dispatch of resources, taking into account system constraints.<sup>5</sup> The ISO settles the real-time market using locational marginal prices that reflect the energy clearing price, the marginal cost of congestion, and the marginal cost of losses at the delivery location and will do so in the Energy Imbalance Market.

### A. Consideration of an Energy Imbalance Market in the West

For the last several years, industry leaders in the West have examined the potential benefits of a regional energy imbalance market. Such a market could replace the energy imbalance services that utilities in the region currently offer under schedules 4 and 9 of their respective open access tariffs, as Order Nos. 888 and 890 require. The Western Electricity Coordinating Council (“WECC”) launched a major initiative and study effort in 2010. Late in 2011, a group of western public utilities commissioners (the “PUC-EIM” group) was formed under the Western Interstate Energy Board to advance the concept and understanding of an energy imbalance market. These efforts produced a consensus that an energy imbalance market spanning multiple balancing authority areas could produce significant economic and reliability benefits for customers throughout the region through increased efficiency and access to a deeper and wider pool of resources.<sup>6</sup>

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<sup>5</sup> In other balancing authority areas in the West, each utility generally maintains balance between supply and demand on an individual basis through the manual dispatch of generating resources available to it.

<sup>6</sup> See Energy and Environmental Economics, Inc., *PacifiCorp – ISO Energy Imbalance Market Benefits* (Mar. 13, 2013) (“PacifiCorp-ISO EIM Benefits Study”), which is provided in Attachment E to this filing and is available on the ISO website at <http://www.caiso.com/Documents/PacifiCorp-ISOEnergyImbalanceMarketBenefits.pdf>; and *Examination of Potential Benefits of an Energy Imbalance Market in the Western Interconnection* (Mar. 2013), prepared by the National Renewable Energy Laboratory, which is available on that organization’s website at <http://www.nrel.gov/docs/fy13osti/57115.pdf>. See also *Qualitative Assessment of Potential Reliability Benefits from a Western Energy Imbalance Market* (Feb. 26, 2013) (“FERC Staff Assessment of Potential Reliability”), which is available on the ISO website at <http://www.caiso.com/Documents/QualitativeAssessment-PotentialReliabilityBenefits-WesternEnergyImbalanceMarket.pdf>; and *Analysis of Benefits of an Energy Imbalance Market in the NWPP* (Oct. 2013), which is available on the Pacific Northwest National Laboratory website at [http://www.pnnl.gov/main/publications/external/technical\\_reports/PNNL-22877.pdf](http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-22877.pdf).

## B. Benefits of the Proposed Energy Imbalance Market

The ISO and PacifiCorp studied the benefits that the proposed Energy Imbalance Market would yield if it comprised only their balancing authority areas.<sup>7</sup> The study predicted annual economic benefits of between \$21 and \$129 million.<sup>8</sup> The overall Energy Imbalance Market benefits for customers fall into three categories:

- **Economic benefits:** The expanded pool of supply available to Energy Imbalance Market participants, including existing ISO market participants, would enable them to serve load with the most economic resources in the combined areas (subject to constraints) rather than with the more restricted set of resources currently available in each area. In addition, even if interchange between balancing authority areas participating in the Energy Imbalance Market is limited by transmission constraints, providing imbalance energy through the ISO's automated process in place of a balancing authority's existing manual process would produce significant savings.
- **Improved renewable integration:** The geographical diversity and a deeper pool of resources available through the Energy Imbalance Market would help integrate variable energy resources because the output variation in one region tends to counterbalance variation in another.
- **Increased reliability:** The Energy Imbalance Market would increase the ability of participating balancing authorities to maintain reliability by providing additional information and transparency amongst neighboring balancing authority areas, increasing the operational awareness and responsiveness to grid conditions across the larger footprint.<sup>9</sup>

The ISO/PacifiCorp study and the other studies of energy imbalance markets' potential demonstrate the significant economic and other benefits of moving forward with an energy imbalance market.

## C. Background of the ISO Proposal

In March 2012, the ISO provided the PUC-EIM group a conceptual proposal under which the ISO would provide energy imbalance services through its existing market platform to balancing authority areas that choose to

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<sup>7</sup> PacifiCorp's two balancing authority areas, PacifiCorp East and PacifiCorp West, will be the initial participants in the proposed Energy Imbalance Market, if approved by the Commission.

<sup>8</sup> See PacifiCorp-ISO EIM Benefits Study, *supra* note 6.

<sup>9</sup> See FERC Staff Assessment of Potential Reliability, *supra* note 6.

participate. The ISO explained that, under its proposal, interested balancing authorities would have the opportunity to participate voluntarily in the ISO's existing real-time market with a low up-front cost and a proven design. By leveraging its functioning market platform, the ISO could offer less risk and lower costs than could be achieved by creating a new market design and infrastructure.<sup>10</sup> In addition, because the ISO did not need to build a new platform for the regional energy imbalance market, its proposal offered balancing authorities the opportunity to begin participating in the market when they are ready to do so under a "pay-as-you-go" design. Participants would pay a one-time up-front fee to cover the cost of ISO modeling, licensing, and other preparatory work. Once operational, they would pay ongoing fees based on their level of participation, consistent with the ISO's grid management charge structure.

PacifiCorp expressed interest in the ISO proposal shortly after it was presented.<sup>11</sup> The ISO and PacifiCorp conducted the joint benefits study discussed above and subsequently executed a memorandum of understanding early in 2013. In March 2013, the ISO Board of Governors approved moving forward with PacifiCorp in parallel with an ISO stakeholder process to develop the design of the Energy Imbalance Market.<sup>12</sup> On June 28, 2013, the Commission approved an implementation agreement between the ISO and PacifiCorp to account for PacifiCorp's upfront costs.<sup>13</sup>

#### **D. The Energy Imbalance Market Stakeholder Process**

The ISO developed the design for the Energy Imbalance Market and the proposed tariff revisions and agreements through an extensive stakeholder

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<sup>10</sup> In 2012, the PUC-EIM group prepared a cost comparison of the ISO proposal together with a straw proposal based on a new market and organizational structure, assuming broad West-wide participation. It annualized the up-front costs over a 5-year basis and added them to the expected annual costs. This analysis showed a total annual cost for the ISO proposal of \$15 million to the western participants, compared with \$41 million annually for the alternative development of a new market and organizational structure.

<sup>11</sup> NV Energy has also announced its intent to join the Energy Imbalance Market, subject to approval of the Public Utilities Commission of Nevada.

<sup>12</sup> See Memorandum, ISO Board of Governors, Decision on PacifiCorp Energy Imbalance Market Implementation Agreement (Mar. 19, 2013) ("March 2013 Board Memorandum"), which is provided in Attachment F to this filing and is available on the ISO website at <http://www.caiso.com/informed/Pages/BoardCommittees/Default.aspx>.

<sup>13</sup> *Cal. Indep. Sys. Operator Corp.*, 143 FERC ¶ 61,298 (2013); see also FERC Docket No. ER14-1350-000 (pending amendment to the implementation agreement that would increase the implementation fee paid by PacifiCorp to cover additional scope).

process.<sup>14</sup> The ISO held five full-day stakeholder meetings over the course of about six months, including meetings in Phoenix and Portland to facilitate participation by stakeholders outside of California. In addition, the ISO held five technical workshops to discuss specific matured design elements of particular interest to stakeholders in more technical detail.<sup>15</sup> All of these materials are available to stakeholders for reference on the ISO website.<sup>16</sup>

Stakeholders unanimously supported the goal of establishing the Energy Imbalance Market. Not surprisingly, however, in light of the unprecedented scope of the initiative, stakeholders expressed differing views, and in some cases, concerns, with respect to specific design elements. The ISO prepared a detailed comment matrix at the conclusion of the stakeholder process, which addressed the concerns. The substance of each key issue, as well as some of the modifications the ISO has made to address stakeholder concerns, are discussed below in Part IV of this transmittal letter in connection with the design elements with respect to which they were raised.<sup>17</sup>

The ISO's Department of Market Monitoring and Market Surveillance Committee participated in the Energy Imbalance Market development process and support the proposal presented in this filing. The Department of Market Monitoring worked collaboratively with the ISO and stakeholders in developing the market design changes contained in this filing, which include several important modifications made to address issues they raised. The Market Surveillance Committee followed the stakeholder process closely and discussed the Energy Imbalance Market at three of its open meetings,<sup>18</sup> and offered an opinion supporting the Energy Imbalance Market and noting certain risks that it

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<sup>14</sup> PacifiCorp has also engaged with its stakeholders on open access transmission tariff changes to implement the Energy Imbalance Market, and expects to file those changes with the Commission on or about March 25, 2014.

<sup>15</sup> Individual technical workshops and materials covered bid cost recovery, flexible ramping requirements, market monitoring, neutrality, and congestion offset.

<sup>16</sup> The Energy Imbalance Market stakeholder process materials are available on the ISO website at <http://www.caiso.com/informed/Pages/StakeholderProcesses/EnergyImbalanceMarket.aspx>.

<sup>17</sup> The matrix of stakeholder comments is available with the November 2013 Governing Board materials on the ISO website at <http://www.caiso.com/informed/Pages/BoardCommittees/Default.aspx>.

<sup>18</sup> The Market Surveillance Committee considered the Energy Imbalance Market design issues and recommendations during open meetings held on July 2, 2013, October 30, 2013, and November 15, 2013. See materials related to these meetings available on the ISO website at <http://www.caiso.com/Informed/Pages/BoardCommittees/MarketSurveillanceCommittee/Default.aspx>.

advised the ISO to monitor. The ISO intends to monitor these matters during its implementation and operation of the Energy Imbalance Market.

The ISO Board of Governors approved the proposed design for the Energy Imbalance Market on November 7, 2013.<sup>19</sup> Broad stakeholder support was voiced in public comments and written submissions. There was discussion at the meeting of lingering concerns that had been raised and considered in the stakeholder process. With respect to the subject of market power mitigation, there was an understanding that further information is required to determine whether market power mitigation should be applied to transfers between balancing authorities participating in the Energy Imbalance Market. The Department of Market Monitoring therefore committed to assess the structural competitiveness of the Energy Imbalance Market and return with a recommendation. This will allow the ISO to move forward with implementation while allowing stakeholders and the Board the opportunity to consider whether to apply market power mitigation to transfers between participating balancing authorities prior to implementation of the Energy Imbalance Market.

The stakeholder process also separately addressed governance issues associated with the Energy Imbalance Market. The Board approved a charter in December 2013 for a transitional committee to advise the Board on matters relating to the Energy Imbalance Market and to develop a proposal for an independent governance structure for the Energy Imbalance Market.<sup>20</sup> The ISO also anticipates that this committee will engage in the consideration of future design features and enhancements.

### **III. Overview of the Energy Imbalance Market**

#### **A. Basic Principles**

The Energy Imbalance Market is not a new market. Rather, it is a set of

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<sup>19</sup> See Memorandum, ISO Board of Governors, Decision on Energy Imbalance Market Design (Oct. 31, 2013), and accompanying materials including a stakeholder comment matrix, memorandum from the Department of Market Monitoring, and memorandum from the Market Surveillance Committee (collectively, “November 2013 Board Materials”), which are provided in Attachment G to this filing and are available on the ISO website at

<http://www.caiso.com/informed/Pages/BoardCommittees/Default.aspx>.

<sup>20</sup> See Memorandum, ISO Board of Governors, Decision on Energy Imbalance Market Governance Proposal (Dec. 11, 2013) (“December 2013 Board Memorandum”), which is provided in Attachment H to this filing and is available on the ISO website at <http://www.caiso.com/informed/Pages/BoardCommittees/Default.aspx>. No changes to the ISO tariff are proposed in this filing in connection with governance. If governance-related tariff changes become necessary, the ISO will propose them at the conclusion of the governance process and proposal from the transitional committee.

rules and procedures that will allow balancing authorities in the West that elect to participate to satisfy their needs for imbalance energy through the real-time market currently operated by the ISO. The Energy Imbalance Market will use the ISO's existing market processes and infrastructure to optimally dispatch resources within the footprint of the ISO and participating balancing authority areas to meet their combined real-time imbalance needs in the most cost effective manner. The proposed Energy Imbalance Market represents modifications to the ISO's existing real-time energy market to accommodate the participation of other balancing authority areas.

Participation in the Energy Imbalance Market is voluntary for balancing authorities. Resource owners that are within a balancing authority area that elect to participate likewise can individually decide whether to participate by offering supply into the Energy Imbalance Market. Through the participating balancing authority, the market will fulfill the imbalance energy needs of load and resources that decided not to participate directly in the market. In order for balancing authorities to implement the Energy Imbalance Market in their balancing authority areas, it may be necessary for the balancing authorities to require customers to supply operational data and be subject to Energy Imbalance Market settlements, even if these customers have decided not to participate directly in the market. Transmission service providers in participating balancing authority areas would include these requirements in their open access tariffs.

A balancing authority's decision to participate in the Energy Imbalance Market does not involve "joining" the ISO on either a full or limited basis. The balancing authority continues to be responsible for satisfying all of its obligations under the applicable reliability standards. Similarly, transmission owners within the balancing authority area remain responsible for providing transmission service in accordance with the Commission's open access requirements. The ISO will not become the balancing authority or transmission service provider in a balancing authority area that participates in the Energy Imbalance Market. Neither will the ISO assume operational control over the transmission facilities in the balancing authority area (except to the extent a transmission owner or rights holder may have separately placed a facility or entitlement under the ISO's operational control).

Similarly, a balancing authority's participation in the Energy Imbalance Market does not, in itself, provide the opportunity to participate in other ISO markets, including the ISO's ancillary service market and day-ahead energy market (though the balancing authority and entities within its area may continue to make purchases and sales in those markets separately to the extent that they may do so under other provisions of the ISO tariff). A balancing authority's participation in the Energy Imbalance Market simply enables the balancing authority, and transmission providers within its balancing authority area, to use the ISO's real-time market as a superior tool to satisfy their imbalance energy obligations. As explained below in Part VII of this transmittal letter, the ISO will

charge a participating balancing authority a share of the ISO's costs of operating its expanded real-time energy market, but not the ISO's costs of fulfilling its other responsibilities.

This structure enables the Energy Imbalance Market to serve the imbalance energy needs of balancing authorities and transmission providers in a variety of circumstances. In particular, it accommodates balancing authority areas, such as the ISO, that employ centralized bid-based markets for ancillary services and day-ahead energy, as well as those that do not. As explained below in Part IV of this transmittal letter, the design of the Energy Imbalance Market incorporates a number of features to permit this flexibility.<sup>21</sup>

## **B. Participation in the Energy Imbalance Market**

A decision to participate in the Energy Imbalance Market must initially be made at the balancing authority level (the tariff defines a balancing authority that opts to participate as an "EIM Entity"). This allows the ISO to make use of available interchange information for operation of the Energy Imbalance Market, while allowing each balancing authority to remain responsible for reliability and open access tariff transmission service. Interested balancing authorities must enter into an implementation agreement with the ISO, as PacifiCorp did, establishing an implementation date and implementation fee consistent with its expected implementation costs. Each implementation agreement will be separately filed with the Commission.

The ISO will dispatch transfers between balancing authority areas participating in the Energy Imbalance Market using transmission rights specifically made available for that purpose. These transfers will not use the rights of non-participants. The ISO's market model and congestion management tools prevent such use of transmission rights of non-participants, as the Commission has recognized.<sup>22</sup> In addition, the ISO remains committed to working with adjacent and intermediary balancing authorities not participating in the Energy Imbalance Market to ensure appropriate coordination and communication procedures, and where appropriate the ISO will implement any necessary additional controls. In the case of the initial implementation of the Energy Imbalance Market, the ISO has entered into a memorandum of understanding with PacifiCorp and the Bonneville Power Administration to ensure

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<sup>21</sup> The Commission recognized the value of similar flexibility when it approved of the initial Southwest Power Pool market design. *Southwest Power Pool, Inc.*, 114 FERC ¶ 61,289, *order on reh'g*, 116 FERC ¶ 61,289 (2006); *Southwest Power Pool, Inc.*, 118 FERC ¶ 61,055 (2007).

<sup>22</sup> *Cal. Indep. Sys. Operator Corp.*, 116 FERC ¶ 61,274 (2006). See also *Cal. Indep. Sys. Operator Corp.*, 119 FERC ¶ 61,076 (2007); *Cal. Indep. Sys. Operator Corp.*, 119 FERC ¶ 61,313 (2007); *Cal. Indep. Sys. Operator Corp.*, 123 FERC ¶ 61,285 (2008); *Cal. Indep. Sys. Operator Corp.*, 126 FERC ¶ 61,148 (2009).

that transfers between the PacifiCorp balancing authority areas and the ISO, using transmission rights made available for that purpose, are managed appropriately.<sup>23</sup>

A transmission service provider, customer or rights holder within an EIM Entity's balancing authority area may make its transmission rights on interties, including transmission rights it may have outside of the EIM Entity's balancing authority area, available for use in the Energy Imbalance Market. PacifiCorp has indicated that its marketing function, PacifiCorp Energy, which holds transmission rights on facilities connecting the ISO and PacifiCorp, intends to make those rights available for Energy Imbalance Market transfers at no charge. The Energy Imbalance Market processes will allocate the transfer capacity thus made available on an economic basis.

Resources considered within or available to a balancing authority area would be eligible to participate in the market, subject to the terms and conditions in the ISO tariff and the EIM Entity's open access transmission tariff. Accordingly, the ISO would have a relationship governed by contract and tariff with the balancing authority and the associated resources that elect to participate. All other relationships affecting the Energy Imbalance Market would be outside of the Energy Imbalance Market rules presented by the ISO, and would be accounted for under the applicable open access transmission tariffs.

The proposed market structure and design allows EIM Entities to retain their autonomy and to address issues unique to their circumstances, subject to their implementation of changes to their transmission providers' open access tariffs. The ISO believes this flexibility will increase the prospect that other balancing authorities will elect to participate in the Energy Imbalance Market. The ISO understands that, after consultation with stakeholders, PacifiCorp plans to file necessary changes to its open access tariff with the Commission approximately one month from the date of this filing. The ISO expects a similar process would occur with each new balancing authority that elects to participate in the Energy Imbalance Market.

Termination of participation in the Energy Imbalance Market will not be subject to an exit fee. Under the standard implementation agreement, the balancing authority would have paid its startup costs and, under the tariff and associated agreements, its ongoing costs. Accordingly, an EIM Entity that wishes to terminate participation in the Energy Imbalance Market need only provide the

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<sup>23</sup> The Memorandum of Understanding among Bonneville Power Administration ("BPA"), PacifiCorp, and the ISO, dated February 14, 2014, identifies coordination and facilitation principles that may lead to the development of operational procedures for the Energy Imbalance Market. It is provided in Attachment I to this filing and is available on the BPA website at [http://www.bpa.gov/transmission/CustomerInvolvement/Energy-Imbalance-Market/Documents/BPA\\_PAC-CAISO\\_MOU.pdf](http://www.bpa.gov/transmission/CustomerInvolvement/Energy-Imbalance-Market/Documents/BPA_PAC-CAISO_MOU.pdf).

ISO with at least six months' advance written notice. Although there is no exit fee, the EIM Entity will remain responsible for charges and financial obligations incurred during the term of its participation. The ISO will discontinue participation of an EIM Entity upon notice of termination, as well as under other circumstances as may be specified in the EIM Entity's tariff, to minimize its exposure to real-time market charges.<sup>24</sup> These principles and the supporting market rules allow for easy entry and exit from the Energy Imbalance Market with minimal risk if the expected benefits do not materialize for participants.

#### **IV. Market Design and Operation**

##### **A. Introduction**

As previously explained, the Energy Imbalance Market is not a new or distinct market. Rather, it is a set of modifications to the rules applicable to the ISO's real-time market, as enhanced by the ISO's recently proposed fifteen-minute market,<sup>25</sup> that will enable entities outside the ISO balancing authority area to participate in that market to satisfy their needs for imbalance energy. The proposed tariff amendment does not change the actual operation of the real-time market; it expands the market to cover a broader geographical scope and to involve a larger number of participants than is currently the case.

The Energy Imbalance Market design takes into account differences between the ISO balancing authority area and other participating balancing authority areas. For example, certain inputs to the real-time market for the energy needs of the ISO balancing authority area, such as day-ahead schedules from the day-ahead market, ancillary services awards, and capacity procurement mechanism designations, do not apply to entities outside the ISO balancing authority area.<sup>26</sup> In addition, the ISO balancing authority responsibilities and emergency dispatch authority are limited to the ISO balancing authority area. As a result, it is necessary to provide a supplemental set of rules and procedures to allow entities outside the ISO's balancing authority area to serve their imbalance needs through participation in the ISO's real-time market. These rules and procedures are included in proposed section 29 of the ISO tariff.<sup>27</sup>

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<sup>24</sup> See proposed section 29.4(b)(4).

<sup>25</sup> See *supra* note 3.

<sup>26</sup> The Energy Imbalance Market does not include ancillary services procurement or dispatch, which remain the responsibility of each participating balancing authority. Compare *Midwest Indep. Transmission Sys. Operator*, 126 FERC ¶ 61,139, at PP 59-75 (2009) (rejecting provisions of proposal to include ancillary services as part of western states market initiative).

<sup>27</sup> The ISO is in the process of developing a new business practice manual for the Energy Imbalance Market that will supplement these tariff provisions to address unique technical matters and serve as a single point of entry to the ISO's other business

The ISO has structured proposed section 29 such that the numbering of each subdivision corresponds with the section of the remainder of the ISO tariff that addresses the same subject matter (e.g., proposed tariff section 29.1 corresponds with existing tariff section 1). If the matters addressed in the corresponding section of the ISO tariff have no bearing on the Energy Imbalance Market, the subdivision of section 29 is marked “[Not Used].” Material that is unique to the Energy Imbalance Market is included in subdivisions employing numbers corresponding to a section number in the ISO tariff section that is currently identified as “[Not Used]”. Materials common to real-time market participation are incorporated by reference.

As with the 2009 market revisions implementing locational marginal pricing,<sup>28</sup> the ISO has proposed in section 29.1 to include short-term authority to suspend certain operations in the event of unforeseen circumstances. With each addition of an EIM Entity to the Energy Imbalance Market, there will be a 60-day period during which the ISO may temporarily discontinue the participation of the application of the new balancing authority in the real-time market if system operational issues adversely affect any portion of the market's operation in the combined balancing authority areas. If the ISO identifies a solution to the issues within 60 days of the temporary discontinuation, it may reinstate the normal operations upon five days' notice. If it does not identify the solution in this period, the ISO will terminate the participation of the new EIM Entity. The participating balancing authority can only be reinstated by a Commission order.

Some stakeholders expressed concern about the ISO's intention to implement the Energy Imbalance Market fully on October 1, 2014. The ISO believes that the planned market simulation should identify any potential problems, so that the ISO, if necessary, can initiate any corrective actions prior to implementation. In addition, the provisions for suspending operations will ensure that both current ISO market participants and the additional participants in the EIM Entity balancing authority area are protected in the event implementation does not proceed as expected.

## B. EIM Market Participants

The Energy Imbalance Market introduces four new types of participants in the real-time market, which are collectively known as EIM Market Participants. The ISO is proposing to amend the current definition of “Market Participant” to include EIM Market Participants, and thus EIM Market Participants must comply with the ISO tariff to the extent that its provisions are relevant to participation in the ISO's real-time market. Specifically, section 29.1 provides that EIM Market

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practice manuals. The new business practice manual will be issued prior to market simulation.

<sup>28</sup> See *Cal. Indep. Sys. Operator Corp.*, 125 FERC ¶ 61,262, at PP 80-83 (2008).

Participants must comply with section 29 and other portions of the tariff that refer to section 29 or EIM Market Participants, are cross-referenced in section 29, or are not limited in applicability to the ISO controlled grid, the ISO balancing authority area, or ISO markets other than the real-time market.<sup>29</sup> This integrates market rules unique to the Energy Imbalance Market with the remainder of the ISO tariff and ensures comparable treatment with other ISO market participants.

There are four types of EIM Market Participants, the roles and obligations of which are described in section 29.4:

- **EIM Entity:** The EIM Entity is a balancing authority that elects to participate in the Energy Imbalance Market. Proposed section 29.2 sets forth the process for becoming an EIM Entity, with the pre-market operation particulars and initial fee to cover the costs associated with including its balancing authority area in the Energy Imbalance Market to be included in an implementation agreement.<sup>30</sup> As an EIM Market Participant, the EIM Entity is responsible (1) for identifying available transmission intertie capacity in its balancing authority area for use in the ISO's real-time market and, (2) through its EIM Entity Scheduling Coordinator, for scheduling all load and resources in its balancing authority area that do not participate in the real-time market (known as non-participating load and non-participating resources) and for settling charges and payments related to non-participating load and non-participating resources.<sup>31</sup>
- **EIM Entity Scheduling Coordinator:** The EIM Entity Scheduling Coordinator is the entity through which the EIM Entity participates in the real-time market. In order to prevent the inappropriate sharing of information regarding transmission and generation, an EIM Entity Scheduling Coordinator cannot be a scheduling coordinator for a supply resource unless it is a transmission provider subject to the Commission's standards of conduct set forth in 18 C.F.R. § 358.
- **EIM Participating Resources:** The EIM Participating Resources are the owners or operators of EIM resources that wish to bid supply into the real-time market. EIM resources can be generating units, participating load, demand resource providers, or other resources qualified to deliver energy or similar services, such as non-generation

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<sup>29</sup> The ISO modified section 29.1 to address concerns expressed by some stakeholders that more clarity was needed regarding the interaction of section 29 and the balance of the ISO tariff.

<sup>30</sup> See proposed section 29.11(h).

<sup>31</sup> The EIM Entity would be responsible for recovering its costs associated with payments to the ISO through its open access transmission tariff.

resources.<sup>32</sup> Each type of resource that is eligible to participate in the current ISO real-time market is eligible to participate through the Energy Imbalance Market, but only if the EIM Entity supports participation by that type of resource and the resource meets the technical requirements for such participation pursuant to the terms and conditions of the ISO tariff and the EIM Entity's open access transmission tariff.

- **EIM Participating Resource Scheduling Coordinator:** The EIM Participating Resource Scheduling Coordinator is the entity through which the EIM Participating Resource participates in the real-time market. To prevent the inappropriate sharing of information regarding transmission and generation, an EIM Participating Resource Scheduling Coordinator cannot be an EIM Entity Scheduling Coordinator unless it is a transmission provider subject to the Commission's standards of conduct set forth in 18 C.F.R. § 358.

To participate in the real-time market through the Energy Imbalance Market, an entity must enter into a *pro forma* agreement with the ISO that sets out the parties' respective obligations with respect to the entity's role. These agreements are further described below in Part IX of this transmittal letter.

### C. Communications

Under proposed section 29.6, the EIM Entity must meet the technical requirements enabling communications with the ISO to support market operations. Generally, the ISO will base these requirements on the Inter-Control Center Communication Protocol and Reliability Standards and publish supporting details in its business practice manuals.<sup>33</sup> This requirement reflects the EIM Entity's access to this information as a balancing authority. The section also provides for the development of procedures to address loss of communications and affirms that in such a circumstance, the EIM Entity remains responsible for managing its imbalance energy without the ISO's real-time market.

The ISO's ability to operate its markets reliably and efficiently necessitates a uniform communications system. Proposed section 29.6 accordingly requires

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<sup>32</sup> The ISO is proposing to revise the definitions of the various types of resources, which generally require that each resource be a party to an ISO *pro forma* agreement (e.g., Participating Generator Agreement), in order to enable resources that participate in the Energy Imbalance Market area to meet the definition if they meet the applicable technical requirements.

<sup>33</sup> As discussed below in connection with section 29.10, these requirements will not include direct telemetry from individual resources. Instead, the ISO will allow an EIM Entity to aggregate the data and communicate it to the ISO according to the procedures outlined in the business practice manual.

EIM Market Participants to comply with the communications requirements of tariff section 6 in connection with their participation in the real-time market. Thus, requirements in section 6 applicable only to communications regarding such matters as ancillary services and the day-ahead market do not apply to EIM Market Participants because the Energy Imbalance Market does not include those features.

Some of the section 6 requirements applicable to the real-time market do not apply by their own terms to EIM Market Participants because they refer to internal resources or the ISO controlled grid. Section 29.6 therefore specifies that references to internal resources will also apply to Energy Imbalance Market resources. Similarly, references in section 6 to the ISO controlled grid will apply to all balancing authority areas in the Energy Imbalance Market, an area that the proposed tariff revisions define as the EIM Area.

One stakeholder was concerned that certain provisions of section 6 addressing the ISO's issuance of dispatch orders to generating units outside of the markets might be interpreted to provide the ISO with such authority with regard to EIM Participating Resources. The ISO does not consider this a reasonable interpretation, but nonetheless, as added assurance, has provided in proposed section 29.6 specific limits on the ISO's dispatch authority over such resources.

The provisions of section 6 regarding publication of market results will apply to results from the expanded real-time market under section 29.6. Consequently, for the expanded market, the ISO will publish the same results it currently publishes for the existing real-time market. The ISO will make non-public information that it specifically makes available to individual market participants under section 6 available to EIM Market Participants in a similar manner.

Finally, section 29.6 establishes a requirement for variable energy resources that use an independent forecasting service to make data transfer arrangements for the ISO to receive the forecast in a format and on a schedule set forth in the business practice manual for the Energy Imbalance Market. This allows EIM Entities to continue with current arrangements while providing the ISO with the forecasting information it requires.

#### **D. Normal and Emergency Operations**

Section 7 of the ISO tariff governs operations of the ISO controlled grid. Under the Energy Imbalance Market, the ISO will not be assuming operational responsibility for the transmission systems in EIM Entities' balancing authority areas. Proposed section 29.7 accordingly provides that section 7 does not apply to EIM Market Participants. Proposed section 29.7 provides that the ISO will administer the transmission made available to the real-time market to manage

energy imbalances in the Energy Imbalance Market area under normal conditions. In response to stakeholder concerns that certain tariff provisions could be interpreted to give the ISO curtailment authority over load outside the ISO balancing authority area, this section also provides that the ISO will not issue dispatch instructions to load that has not been bid into the market.

The participation of EIM Entities in the ISO's real-time market will, of course, involve transfers from one EIM Entity balancing authority area to another through the real-time market. The proposed tariff revisions define these as EIM Transfers. Because it would not be feasible to treat the five-minute dispatches through which EIM Transfers will take place according to all protocols for transfers between balancing authority areas, proposed section 29.7 provides special procedures for the management of EIM Transfers.

Specifically, EIM Transfers (1) will not require individual resource e-tags; (2) will not constitute inadvertent energy; (3) will reflect intra-hour incremental EIM Transfers between the ISO and each EIM Entity balancing authority area; (4) will be updated within 60 minutes after the end of each operating hour to include the sum of all EIM Transfers within each balancing authority area for purposes of inadvertent energy accounting; and (5) will subsequently be updated as necessary consistent with the requirements of WECC, North American Electric Reliability Corporation ("NERC"), and North American Energy Standards Board standards and business practices. The ISO will model changes in the net scheduled EIM Transfers that result from real-time dispatch as dynamic schedules between the ISO and the relevant EIM Entity for the accuracy of automatic generation control and derive from the dynamic net scheduled EIM Transfers the dynamic schedules on interties between the ISO and the EIM Entity for tagging purposes. These provisions separate EIM Transfers from normal interchange accounting among balancing authorities.

There are a number of circumstances under which reliability or operational issues require the ISO to dispatch resources outside of the market. The ISO tariff provides the ISO with the authority to issue "exceptional dispatch" instructions to address these circumstances. The ISO does not propose to exercise similar authority to dispatch EIM Participating Resources outside the market. Instead, section 29.7 recognizes the authority of the EIM Entity to issue such dispatch instructions, which the proposed tariff revisions define as EIM Manual Dispatches, when necessary to address reliability or operational issues in its balancing authority area. The EIM Entity must immediately inform the ISO of such dispatches and identify the resources that have been manually dispatched. The EIM Entity remains responsible for communications to the reliability coordinator (currently Peak Reliability) with respect to its balancing authority area.

When an EIM Entity informs the ISO that it has issued an EIM Manual Dispatch, the ISO will reflect the change in the fifteen-minute schedules and five-

minute dispatch. The ISO will not include the EIM Manual Dispatch in the determination of locational marginal prices, but it will settle the EIM Manual Dispatch at that price for instructed imbalance energy in the appropriate real-time market.

Proposed section 29.7 also provides that the ISO may declare an interruption of the Energy Imbalance Market in circumstances that are analogous to a system emergency in the ISO balancing authority area<sup>34</sup> or when a disruption of communications prevents EIM Market Participants from receiving information from, or submitting information to, the ISO. In response, the ISO may isolate the affected area, curtail EIM Transfers, transfer dispatch responsibility for the affected area to another balancing authority, or establish an administrative price or remove bids in accordance with its existing real-time market authority. During the interruption, balancing authorities in the EIM Area must follow applicable NERC standards, and their scheduling coordinators must keep the ISO informed of actions taken by the balancing authority. The ISO will reinstate normal operations once it determines that the disruption has been resolved.

Finally, section 29.7 addresses congestion management and unscheduled flows. Ordinarily, the ISO will manage congestion through the real-time market. Certain factors, however, such as the amount of transfer capacity available to the market, may limit the ISO's ability to fully manage congestion throughout the EIM Area. The ISO will inform other balancing authorities in the EIM Area when it is unable to resolve congestion in their areas. In addition, the ISO or another balancing authority in the EIM Area may initiate the WECC's unscheduled flow procedure when appropriate.<sup>35</sup> The balancing authority must adjust its schedules

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<sup>34</sup> I.e., when "operational circumstances (including a failure of the Real-Time Market operation to produce feasible results in the EIM Area or other CAISO Market Disruption) in the EIM Area have caused or are in danger of causing an abnormal system condition in the CAISO Balancing Authority Area or an EIM Balancing Authority Area that requires immediate action to prevent loss of Load, equipment damage, or tripping system elements that might result in cascading Outages, or to restore system operation to meet Applicable Reliability Criteria." Proposed section 29.7(j)(1)(A).

<sup>35</sup> The Energy Imbalance Market is not intended, nor should it be used, to resolve issues associated with unscheduled flows and other matters. The ISO, like other balancing authorities, must manage unscheduled flows in coordination with the WECC, and the ISO has proposed an initiative to expand its full network model to more effectively balance the grid with external balancing authority areas and manage the impacts of unscheduled flows on its system, thereby improving reliability and market solution accuracy. This proposal was approved by the ISO Board of Governors at its meeting on February 6, 2014, and the initiative leading up to the decision is described on the ISO website at

<http://www.caiso.com/informed/Pages/StakeholderProcesses/FullNetworkModelExpansion.aspx>. These issues are not created by the proposed Energy Imbalance Market and the ongoing efforts to address them are beyond the scope of this filing.

according to the procedure and inform the ISO, which will incorporate the schedules in the real-time market.

### **E. Outages and Critical Contingencies**

Because the ISO will not be assuming operational responsibility for the transmission systems in an EIM Entity's balancing authority area, the ISO does not propose to assume authority to control the scheduling of generation and transmission outages in other balancing authority areas participating in the Energy Imbalance Market. Section 29.9 therefore provides that section 9 of the ISO tariff, governing outages, does not apply to EIM Market Participants except as referenced in section 29.9.

Even though the ISO is not controlling outages, it is important that it have information about outages in order to operate the real-time market efficiently. Section 29.9 therefore requires the EIM Entity Scheduling Coordinators to provide the ISO the same type of information regarding generator and transmission maintenance outages that participating transmission owners and participating generators provide the ISO when seeking approval of outages. It also requires EIM Entity Scheduling Coordinators to comply with the provisions of section 9 regarding forced outages (which are communications and information requirements), and allows updates to outage information consistent with section 9 and 29.9. Some stakeholders questioned the need for compliance with the schedule in section 9, suggesting that the ISO require only seven days' notice of outages. The ISO considered these comments, and has agreed that 7 days' advance notice of outage information is sufficient to operate the real-time market efficiently. The ISO does not believe that asking EIM Entities to give the ISO this limited advance notice of planned outages will impose an undue burden.

It is also important that the ISO know of matters affecting transmission limits. Section 29.9 therefore requires the EIM Entity Scheduling Coordinator to inform the ISO of physical limits under the base case and contingencies, scheduling limits for intertie transactions based on e-tags, and any contractual limits on interfaces where the EIM Entity has transmission rights.

### **F. Metering**

Metering data are critical to the operation and settlement of the real-time market. Proposed section 29.10 therefore requires the EIM Entity to ensure that all EIM Participating Resources and non-participating resources in the EIM Entity balancing authority area become either an ISO metered entity or a scheduling coordinator metered entity. As such, they will be subject to all ISO metering

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requirements in section 10 applicable to such entities.<sup>36</sup> In addition, under proposed section 29.10, each EIM Participating Resource and non-participating resource in an EIM Entity's balancing authority area that is not a generating unit or is a generating unit with a rated capacity of 10 MW or greater (including each aggregated resource with such capacity) and each EIM intertie must have telemetry meeting the requirements of the business practice manual for the Energy Imbalance Market. This is consistent with the current tariff requirements. As noted above, the revised tariff will not require direct telemetry because the ISO does not rely on EIM Participating Resources for ancillary services or to meet its balancing authority obligations.

Proposed section 29.10 also requires metering for all interties between EIM Entities and other balancing authority areas for purposes of calculating unaccounted for energy. EIM Entity Scheduling Coordinators must also submit to the ISO, for each bid for an intertie with a balancing authority area outside the Energy Imbalance Market that clears the fifteen-minute market, the corresponding hourly transmission profile and 15-minute energy profiles from the respective e-tags at least 20 minutes before the start of the operating hour. This information determines the net interchange for operation and settlement of the Energy Imbalance Market.

## **G. Creditworthiness, Dispute Resolution, and Legal Matters**

EIM Entity Scheduling Coordinators and EIM Entity Participating Resource Scheduling Coordinators will be subject to the requirements of tariff sections 12 (creditworthiness), 13 (disputes), 14 (force majeure, indemnity, liabilities, and penalties), 20 (confidentiality), and 22 (miscellaneous provisions) with respect to their participation in the real-time market.<sup>37</sup> This ensures that these administrative requirements are applied equally by the ISO to all market participants, including EIM Market Participants.

Proposed section 29.22 provides additional miscellaneous provisions that parallel those applicable to market participants for transactions within the ISO balancing authority area. First, if the ISO incurs any tax liability as a result of the participation of EIM Market Participants in the real-time market, for example as market operator or as central counterparty to transactions by EIM Market Participants, the ISO will pass those taxes on to the EIM Entity Scheduling

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<sup>36</sup> There is one exception: in the absence of metering standards set by a local regulatory authority, EIM Participating Resources and non-participating resources in an EIM Entity balancing authority area may qualify as scheduling coordinator metered entities without the third-party certification required by section 10 if the ISO determines that the applicable metering standards meet or exceed the standards for ISO metered entities. This exception recognizes that EIM Entities may be subject to the jurisdiction of multiple local regulatory authorities.

<sup>37</sup> Proposed sections 29.12, 29.13, 29.14, 29.20, 29.22.

Coordinator for the area where the transactions triggered the tax liability. Second, neither the ISO nor the EIM Entity will be a “Purchasing Selling Entity” for purposes of e-tagging of EIM Transfers. Finally, title for energy in the real-time market passes directly from the entity that holds title when the energy enters the ISO controlled grid or the transmission system of an EIM transmission services provider, whichever is first following dispatch, to the entity that removes the energy from the ISO controlled grid or the transmission system of an EIM transmission services provider, whichever last precedes delivery to load. Again, these provisions ensure equivalent treatment of the ISO and EIM Entities with respect to participation of EIM Market Participants in the real-time market.

## **H. Transmission System**

To operate the real-time market the ISO requires detailed and updated information on the transmission facilities available for real-time market transactions. Therefore, proposed section 29.17 requires that the EIM Entity provide the ISO with EIM transmission service information regarding the network topology associated with its transmission capacity and that of EIM transmission service providers in its balancing authority area that is available for use in the real-time market. It must update the information at least as frequently as the update schedule for the ISO’s full network model. The EIM Entity must also ensure that the information is accurate and that the capacity is made available, and must inform the ISO of any changes in availability. Further, the EIM Entity must establish a maximum EIM Transfer limit at least 90 days before the first day in which it trades in the real-time market and provide the ISO with the available EIM Transfer limit prior to the start of each dispatch interval in accordance with the business practice manual for the Energy Imbalance Market.

## **I. Market Operation**

### **1. Introduction**

The ISO proposes to incorporate the Energy Imbalance Market into the operation of the real-time market in accordance with section 34 of the ISO tariff. The ISO also proposes that the provisions of tariff sections 27 (entitled “CAISO Markets and Process”)<sup>38</sup> and section 30 (entitled “Bid and Self-Schedule Submission for All CAISO Markets”)<sup>39</sup> applicable to the real-time market apply as well to EIM Market Participants. Certain variations from the requirements of these sections are necessary to permit seamless real-time market participation by EIM Market Participants, particularly because they do not participate in other

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<sup>38</sup> Proposed section 29.27.

<sup>39</sup> Proposed section 29.30.

ISO markets and are located outside the ISO balancing authority area.<sup>40</sup> These accommodations are included in proposed section 29.34.

## 2. Timeline and Other Components of Process

The Energy Imbalance Market participation process begins with preparation of demand forecasts. The ISO will prepare mid-term (seven-day) and short-term (four-and-one-half hour) demand forecasts.<sup>41</sup>

Currently, the ISO's day-ahead operations provide the baseline for the operation of the real-time market. The EIM resource plan will serve that purpose with regard to other balancing authority areas participating in the Energy Imbalance Market. The EIM resource plan will present the complete picture of each EIM Entity's circumstances prior to real-time operations and comprises EIM base schedules; energy bids (applicable to EIM Participating Resources only); reserve capacity meeting the WECC requirements for regulating reserves, in incremental MW (applicable to resources only); reserve capacity meeting the WECC requirements for regulating reserves, in decremental MW (applicable to resources only); spinning reserves in MW; non-spinning reserves in MW; and, if the EIM Entity Scheduling Coordinator is not relying on the ISO's demand forecast, a demand forecast.<sup>42</sup> This resource plan establishes the base schedules that allow the ISO to run a power flow analysis in parallel with the ISO's day-ahead market, putting EIM Market Participants on an equal footing with day-ahead market participants going into the real-time. It also allows the EIM Entity to review the results and consider what base schedule changes may be appropriate to meet its balancing authority area needs.<sup>43</sup>

The EIM base schedule represents the financially binding starting point in the real-time market and must balance the demand forecast for the EIM Entity balancing authority area. Each EIM Participating Resource must also submit a base schedule, which must be within the bid range included in the EIM resource plan.<sup>44</sup> To determine if supply is sufficient, the ISO will use the EIM Entity base

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<sup>40</sup> For example, EIM Market Participants cannot submit inter-scheduling coordinator trades under section 28 (proposed section 29.28) and may not participate as such in the day-ahead market (proposed section 29.31) unless they are otherwise eligible to participate in those markets under the current ISO tariff.

<sup>41</sup> Proposed section 29.34(d). The EIM Entity has the option of using the ISO's demand forecast or one of its own, but in the latter case it may be subject to under-scheduling or over-scheduling charges as discussed below in Part V of this transmittal letter.

<sup>42</sup> Proposed section 29.34(e)(3).

<sup>43</sup> Declaration of Donald G. Tretheway at PP 18-20. Mr. Tretheway's declaration is provided in Attachment C to this filing.

<sup>44</sup> Proposed section 29.34(f)(2).

schedule for non-participating generators and the bid ranges of EIM Participating Resources. The ISO will use the sum of the highest quantity offers from the bid range in determining whether there is insufficient supply and the lowest quantity bids in determining whether there is excess supply.<sup>45</sup>

All EIM scheduling coordinators must provide EIM base schedules for real-time operations at least 75 minutes before the start of the operating hour and will have two opportunities to revise the schedule.<sup>46</sup> In addition, EIM Entity Scheduling Coordinators must submit EIM interchange schedules with other balancing authority areas at the relevant EIM interties and must update these EIM intertie schedules with any adjustments, when applicable, as part of the hourly resource plan revision.<sup>47</sup> The ISO will derive an initial EIM base schedule for each EIM Entity's load from the ISO demand forecast for the EIM Entity balancing authority area, estimated transmission losses, and an assumed load distribution.<sup>48</sup>

The ISO will validate the EIM resource plan on the day before the operating day, and following the submission of EIM base schedules or adjustments to EIM base schedules. The ISO will notify the EIM Entity Scheduling Coordinator if (1) the EIM resource plan is not balanced; (2) the EIM resource plan provides insufficient flexible ramping capacity to meet requirements; and (3) the ISO anticipates congestion based on the submitted EIM resource plans.<sup>49</sup> If supply in the EIM base schedules is insufficient to meet the demand forecast, the ISO will reduce the demand in the EIM base schedule, which will result in the shortfall being settled through the real-time market unless adjusted by the EIM Entity Scheduling Coordinator through this iterative process.<sup>50</sup>

EIM Participating Resource Scheduling Coordinators must submit energy bids in accordance with the same schedule that applies to other supply resources

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<sup>45</sup> Proposed section 29.34(l).

<sup>46</sup> Proposed section 29.34(f). EIM Entity base schedules must disaggregate day-ahead import/export schedules between the EIM Entity balancing authority area and the ISO balancing authority area, disaggregate the forward export schedules to other balancing authority areas, and provide specified data regarding those schedules. Proposed section 29.34(f)(3). An EIM Entity Scheduling Coordinator may allow non-participating resources, loads, and other customers to submit EIM base schedule information through an interface hosted by the ISO. Proposed section 29.34(f)(4).

<sup>47</sup> Proposed section 29.34(i)(1).

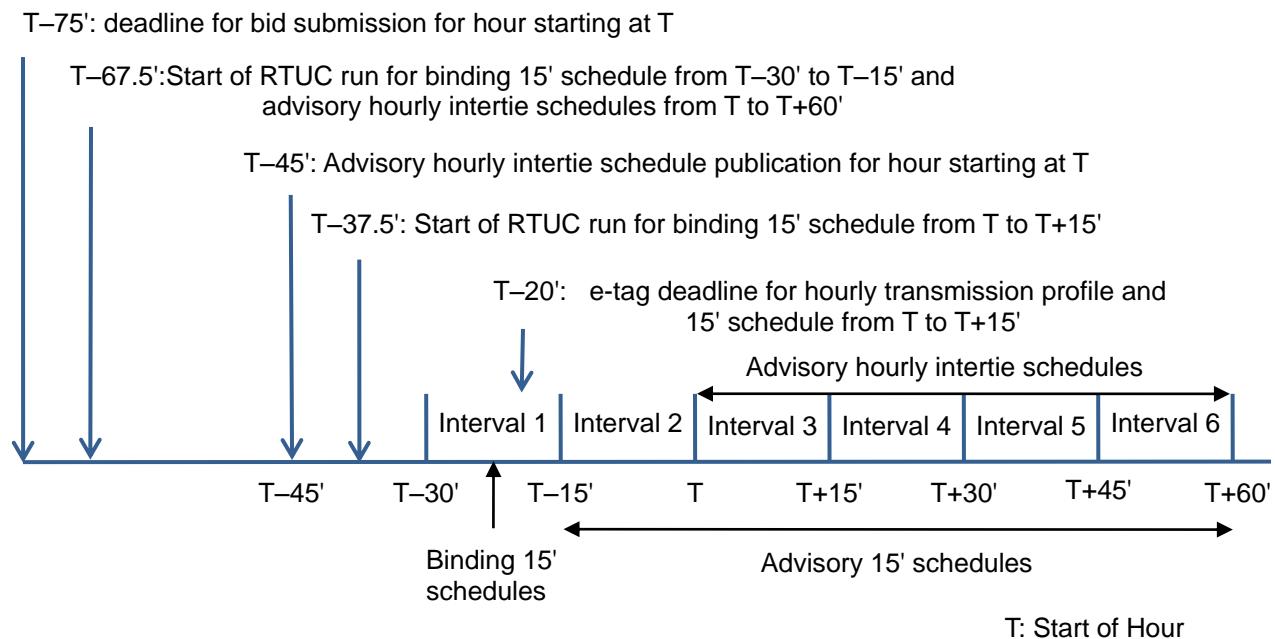
<sup>48</sup> Proposed section 29.34(g).

<sup>49</sup> Proposed section 29.34(j).

<sup>50</sup> Proposed section 29.34(k). See also declaration of Donald G. Trettheway at PP 21-31.

in the real-time market.<sup>51</sup> An EIM Participating Resource Scheduling Coordinator may also bid an EIM intertie schedule between the EIM Entity and a neighboring balancing authority area into the fifteen-minute market if both balancing authority areas support economic bidding of 15-minute schedules.<sup>52</sup>

The following timeline summarizes the schedule for the participation of EIM Market Participants in the real-time market:



### 3. Greenhouse Gas Regulation

The proposed market rules recognize that EIM Participating Resources may incur costs to comply with California Air Resources Board greenhouse gas regulations if their resources are deemed to have been imported into the ISO balancing authority area or other balancing authority areas in California. Proposed section 29.32 permits each EIM Participating Resource to submit a separate bid component to cover such costs. The ISO will take these bid components into account when selecting energy produced by EIM Participating Resources for imports into the ISO balancing authority area or other balancing authority areas in California, and in calculating locational marginal prices.

The ISO will apply its \$1,000/MWh bid cap to the sum of the energy portion of a bid and the portion associated with greenhouse gas compliance costs, which is the same approach it applies currently to bids in the ISO's real-

<sup>51</sup> Proposed section 29.34(h).

<sup>52</sup> Proposed section 29.34(i)(2).

time market. The ISO believes it is not necessary to establish separate caps for each bid component.

The ISO has worked closely with the California Air Resources Board while developing the greenhouse gas proposal for the Energy Imbalance Market. The Energy Imbalance Market design accounts for greenhouse gas emission costs for power dispatched to serve ISO load directly in the objective function of the real-time economic dispatch and directly in real-time prices.

One stakeholder commented that the ISO should not condition participation on subjecting out-of-state resources and activities to the jurisdiction of the California Air Resources Board. A federal power authority noted that it is prohibited from purchasing carbon credits. As a practical matter, EIM Participating Resources that prefer not to be dispatched to serve demand in California but are still available to deliver supply in the EIM Entity balancing authority area able to do so. By submitting a high greenhouse gas compliance bid adder and an economic energy bid component, these resources can achieve this objective. Although it is theoretically possible that the ISO could dispatch a resource with a high bid adder and low energy bid component to serve ISO demand if energy costs in the ISO were sufficiently high to dispatch similarly priced resources, that outcome is unlikely. The ISO probably would have already dispatched the resource to serve non-ISO demand because (1) only the low energy bid component would have been considered for that purpose and (2) the proximity to load would minimize congestion and losses.

Nonetheless, the ISO has included in its 2013 stakeholder initiatives catalog a potential market design enhancement that would allow a resource to select a flag to prevent it from being dispatched to meet ISO load.<sup>53</sup> The ISO recognizes that as additional balancing authorities seek to join the Energy Imbalance Market there may be limited circumstances where a resource is not allowed, or does not wish, to provide energy consumed in the ISO balancing authority area. The possibility that this hypothetical circumstance may arise in the future does not preclude the implementation of the market at this time.

One stakeholder requested that the cost of compliance with California Air Resources Board regulations be excluded from the locational marginal price of energy exported from the ISO. The ISO concluded that there is no justification for such an adjustment of the locational marginal price. Greenhouse gas compliance is a legitimate cost of generators in California. There is no basis for reducing the clearing price to deny them the ability to reflect this cost element in their bids. Payment of a price that includes such costs does not constitute purchase of carbon credits or otherwise implicate the buyer in compliance with the regulations.

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<sup>53</sup> See <http://www.caiso.com/Documents/Final2013StakeholderInitiativesCatalog.pdf>.

Another stakeholder argued that the ISO's proposal would foster "resource shuffling," a prohibited practice under California Air Resources Board regulations. This contention is erroneous. Transactions in the ISO's real-time market are not subject to that agency's prohibition against resource shuffling.<sup>54</sup>

Finally, one party expressed concern that the bid adder mechanism would allow non-cost based strategic bidding and price discrimination toward California. In order to address these concerns, the ISO has provided that resources may submit only a daily adder, rather than an hourly adder. In addition, the ISO's Department of Market Monitoring will be monitoring the markets to identify any inappropriate bidding strategies. In the event it detects such strategies, the ISO or its Department of Market Monitoring will take appropriate action.

#### 4. Market Actions

Consistent with the fact that the Energy Imbalance Market is simply an expansion of the ISO real-time market, proposed section 29.34 provides that section 34 of the ISO tariff (entitled "Real-Time Market") will govern operation of the real-time market in the EIM Area. Section 29.34 supplements section 34 with matters specific to the expansion of the real-time market to other balancing authority areas that participate in the Energy Imbalance Market.

*Unresolved Congestion.* Under proposed section 29.34, if an EIM Entity Scheduling Coordinator's approved EIM resource plan does not have sufficient bids to resolve congestion, the ISO will relax the relevant transmission constraints when clearing the market. If the ISO cannot resolve congestion through that process, the EIM Entity will become responsible for managing its congestion through other means, such as EIM Manual Dispatch. The ISO will determine prices for congestion consistent with transmission constraint relaxation parameters established in the business practice manual for the Energy Imbalance Market until the constraint is no longer binding in the real-time market.<sup>55</sup>

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<sup>54</sup> Section 95802(a)(252) of the Cap and Trade regulations states that "Resource Shuffling" means any plan, scheme, or artifice to receive credit based on emissions reductions that have not occurred, involving the delivery of electricity to the California grid." See <http://www.arb.ca.gov/cc/capandtrade/ctlinkqc.pdf> at 43. In November 2012, the California Air Resources Board provided instructional guidance that resource shuffling does not include "[s]hort-term transactions and contracts for delivery of electricity . . . resulting from an economic bid or self-schedule that clears the [ISO] day-ahead or real-time market, for either specified or unspecified power." Cap and Trade Instructional Guidance, Appendix A at 4 (Nov. 2012), which is available on that agency's website at [http://www.arb.ca.gov/cc/capandtrade/guidance/appendix\\_a.pdf](http://www.arb.ca.gov/cc/capandtrade/guidance/appendix_a.pdf).

<sup>55</sup> Proposed section 29.34(o).

*Flexible Ramping Requirement.* Proposed section 29.34 also establishes procedures for addressing flexible ramping constraints.<sup>56</sup> The ISO will establish a flexible ramping constraint capacity requirement for each EIM Entity balancing authority area using the ISO demand forecast and the ISO variable energy resource forecast for each balancing authority area in the EIM Area and each combination of balancing authorities. The ISO will review EIM resource plans to determine if there are sufficient bids to meet those requirements, in each case according to procedures in the business practice manual for the Energy Imbalance Market. The ISO will reduce the requirement for each participating balancing authority by its pro rata share of a calculated “diversity benefit,” which may be limited by the available net import EIM Transfer capability into the balancing authority area.

If a balancing authority area has a net outgoing EIM Transfer before the operating hour, it will have partially fulfilled its flexible ramping constraint capacity requirement for that hour because it can retract that EIM Transfer during the hour as needed. The ISO will provide a credit in determining the sufficiency of the flexible ramping constraint capacity equal to the net outgoing EIM Transfer before the operating hour. If a balancing authority area has a net incoming EIM Transfer before the operating hour (net import with reference to the EIM base schedule), then the ISO will consider its flexible ramping constraint capacity sufficient if it meets its own flexible ramping constraint capacity requirement, irrespective of the incoming EIM Transfer that results from real-time dispatch.

If the ISO’s review determines that the EIM resource plan includes insufficient flexible ramping constraint capacity, the ISO will not include the EIM Entity balancing authority area in any flexible ramping constraints for combinations of balancing authority areas. Instead, the ISO will formulate only individual constraints for the EIM Entity balancing authority area and will hold the EIM Transfer limit into the EIM Entity balancing authority area at the value for the last fifteen-minute interval. This prevents balancing authorities with insufficient ramping capacity from “leaning” on those balancing authorities that have sufficient ramping capacity.

One stakeholder recommended that the ISO include a downward ramping requirement. The ISO does not disagree with this recommendation in concept, but notes that it is not directed to the Energy Imbalance Market revisions as such inasmuch as the ISO real-time market does not currently use a downward ramping constraint. The ISO has an ongoing stakeholder process for the development of a flexible ramping product, which includes consideration of a downward ramping constraint.<sup>57</sup> The ISO hopes to address this matter in a

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<sup>56</sup> Proposed section 29.34(m); declaration of Donald G. Trettheway at PP 24-27.

<sup>57</sup> The ISO temporarily suspended this process during development of the Order No. 764 and Energy Imbalance Market tariff amendments.

subsequent market enhancement, which would apply to the expanded real-time market within EIM Entity balancing authority areas as well as in the ISO balancing authority area.

Another stakeholder expressed concern that this is the only capacity test in the Energy Imbalance Market and that it occurs too late to protect reliability. The Energy Imbalance Market, however, only involves the ISO's real-time market and is not the appropriate vehicle for considering long-term capacity issues. The ISO believes this is more appropriately an issue for individual utilities to address with their balancing authorities and regulators, particularly because each EIM Entity remains responsible for reliability in its balancing authority area.

Finally, one stakeholder expressed concern that the limits on EIM Transfers not be overly restrictive. The ISO does not believe that they are. As explained above, if the ISO determines that flexible ramping capacity is insufficient, it will hold the EIM Transfer limit into the EIM Entity balancing authority area at the value for the last fifteen-minute interval; it will not reduce the limit below that amount.

*Operating Reserves.* Each EIM Entity is responsible for its operating reserves (or its share of required operating reserves under the terms of a reserve-sharing group agreement), and it (and the reserve-sharing group, if applicable) is responsible for deploying operating reserves. The EIM Entity must immediately inform the ISO of any contingency that causes changes in the EIM base schedule or the dispatch of reserves. The EIM Entity Scheduling Coordinator must include any deployed reserves in the EIM base schedule if time permits (in which case they will be settled as self-scheduled transactions) or otherwise in EIM Manual Dispatch instructions. The EIM Entity must also adjust the EIM base schedule to reflect any changes in the response to the contingency.<sup>58</sup>

The ISO will continue to send dispatch instructions based upon pre-contingency conditions until the ISO receives resource operating limit updates. After the ISO receives the updates and reflects them in real-time dispatches, the ISO will account for the dispatches in providing net scheduled interchange data to the EIM Entity Scheduling Coordinators.<sup>59</sup>

Immediately following a reserve-sharing event affecting an EIM Entity balancing authority area, the EIM Entity must submit information to the ISO regarding the assistance provided, including impacts to load schedules. In addition, the EIM Entity Scheduling Coordinator must submit manual dispatch instructions for resources in the EIM Entity balancing authority area deployed in

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<sup>58</sup> Proposed section 29.34(p)(1)(B).

<sup>59</sup> *Id.*

response to the reserve-sharing event, pursuant to the reserve-sharing group's criteria. The EIM Entity may offset the load schedules created by the reserve-sharing event by entering resource-to-load schedules to reflect the resources actually used in the event until 1:00 a.m. seven days after the reserve-sharing event.<sup>60</sup>

*Variable Energy Resources.* The ISO will treat variable energy resources in accordance with section 34 of the ISO tariff.<sup>61</sup>

## 5. Price Correction

Under proposed section 29.35, the ISO will use the market validation and price correction rules and procedures in section 35 in connection with EIM Market Participants' participation in the real-time market. The ISO has also proposed to extend the five-day window to ten days for the first 90 days after implementation of a new EIM Entity. This will allow the ISO additional time to consider whether a price correction may be appropriate during the critical implementation period, reducing the risk of request for waiver or other Commission action. This authority also works in concert with the ability to suspend application of the real-time market with respect to an EIM Entity within 60 days of implementation.

## V. Cost Allocation, Settlements, and Billing

The ISO proposes to use the settlements procedures and timelines set forth in section 11 and section 29.11 for settling and billing EIM Market Participants.<sup>62</sup> At the request of stakeholders, the ISO has included all charges that it will bill to EIM Market Participants in section 29.11. Because, as explained above, the Energy Imbalance Market is not a separate market, but part of the expanded real-time energy market, the procedures for the calculation of many of these charges appear in section 11 of the ISO tariff, to which section 29.11 provides a cross-reference. Rules applicable only to EIM Market Participants are in section 29.11. Some stakeholders have expressed concern that the ISO has not specifically identified the individual charge codes that correspond to the charges identified in section 29.11. However, such an approach is not currently represented in section 11 and, by extension, it could not be accomplished in section 29.11 without first engaging in a broader reconsideration of the relationship between ISO tariff settlement provisions and the charge codes that result. The structure described in this Part V of the transmittal letter appropriately

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<sup>60</sup> Proposed section 29.34(p)(2).

<sup>61</sup> Proposed section 29.34(q).

<sup>62</sup> Proposed section 29.11(l). This will include charges and fees related to the settlement process itself, such as default interest, that are set forth in section 11.

balances the interests of EIM Market Participants and current market participants with respect to settlement of the Energy Imbalance Market.

Generally, the charges described in section 29.11 are associated with the participation of EIM Entity Participating Resources in the real-time market. The ISO will allocate charges attributable to non-participating load and non-participant resources to the EIM Entity Scheduling Coordinator for allocation to such load and resources. Some of these charges affect cost allocation with ISO market participants and accordingly they are included in section 11.

As explained below, the charges associated with the real-time market are designed to allocate the costs of participation in the Energy Imbalance Market in a manner that tracks the ISO's cost allocation principles approved by stakeholders in 2012. Other charges are discussed elsewhere: the initial fee due from an EIM entity is discussed above; the administrative charge<sup>63</sup> and charges for transmission service<sup>64</sup> are discussed in subsequent sections of this transmittal letter.

*Imbalance Energy.* EIM Market Participants will purchase and sell imbalance energy in both the fifteen-minute and five-minute markets as operated under the tariff enhancements in response to Order No. 764. Fifteen-minute market instructed imbalance energy derives from dispatches in the fifteen-minute market and is calculated according to section 11 of the ISO tariff, except that EIM base schedules, instead of day-ahead schedules, will provide the baseline.<sup>65</sup> Real-time dispatch instructed imbalance energy,<sup>66</sup> which derives from dispatches in the five-minute market, and uninstructed imbalance energy,<sup>67</sup> which reflects uninstructed deviations from fifteen-minute schedules, is also calculated according to section 11.<sup>68</sup>

*Unaccounted For Energy.* The ISO will determine 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. The ISO will charge the EIM Entity Scheduling Coordinator for unaccounted for energy at the hourly real-time load aggregation point price.<sup>69</sup>

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<sup>63</sup> Proposed section 29.11(i).

<sup>64</sup> Proposed section 29.26.

<sup>65</sup> Proposed section 29.11(b)(1).

<sup>66</sup> Proposed section 29.11(b)(2).

<sup>67</sup> Proposed section 29.11(b)(3).

<sup>68</sup> Declaration of Donald G. Tretheway at PP 33-36.

<sup>69</sup> Proposed section 29.11(c).

*Under-Scheduling and Over-Scheduling Charges.* As discussed above, the ISO will assess under-scheduling and over-scheduling charges to EIM Market Participants to encourage resource sufficiency.<sup>70</sup> As proposed, the ISO will assess the charges in two levels, according to the deviations from the EIM base schedule: if metered demand deviates from the schedule by between five to ten percent (level 1), and if metered demand deviates from the schedule by more than ten percent (level 2). If the deviation within either range is at least two megawatts, the following charges apply: the level 1 charge will be a 25% increase (under-scheduling) or decrease (over-scheduling) of the hourly real-time load aggregation point price for the entire deviation; the level 2 charge will be a 100% increase or 50% decrease. This threshold approach encourages the submission of valid and accurate base schedules and recognizes that greater deviations from a base schedule impose greater costs and burden on the ISO and EIM Market Participants. The ISO will distribute the revenues from these charges pro rata to load in the EIM Area that was not subject to penalties. EIM Entities that use the ISO's demand forecast and approve EIM base schedules for their resources within one percent of the ISO's demand forecast will be exempt from these charges because such EIM Entities have taken steps to ensure the availability of sufficient resources to meet the ISO's demand forecast.<sup>71</sup>

Some stakeholders recommended a similar structure for generation scheduling. The ISO concluded that a separate structure is not appropriate. It is irrelevant for EIM Participating Resources, which the ISO dispatches and pays according to bids, not schedules. For non-participating resources, the demand-based penalties will also address generation over-scheduling because, as discussed above, the EIM Entity Scheduling Coordinator is responsible for scheduling non-participating resources as well as demand and the EIM resource plan must be balanced. If the EIM Entity Scheduling Coordinator over-schedules demand—*i.e.*, if it schedules non-participating generation such that the sum of that generation and the low quantities of the bid ranges of EIM Participating Resources exceeds demand—the ISO will notify it of the unbalanced schedule. If the EIM Entity Scheduling Coordinator does not thereafter adjust the generation, the ISO will increase the scheduled demand accordingly. This will result in over-scheduling charges based on the demand, which the ISO will allocate to the EIM Entity Scheduling Coordinator.

*Neutrality Charges.* The ISO will collect two types of neutrality charges from EIM Market Participants to recover the difference between receipts from load and payments to supply for energy in the real-time market: a real-time

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<sup>70</sup> Proposed section 29.11(d).

<sup>71</sup> Declaration of Donald G. Tretheway at PP 37-41.

imbalance energy offset charge and a real-time congestion offset charge.<sup>72</sup> These charges are described in proposed new sections 11.5.4.1 and 11.5.4.1.1.

The real-time imbalance energy offset has two components. The first is based on the sum of the net value of EIM Transfers and the settlements of imbalance energy, less the real-time congestion offset.<sup>73</sup> The ISO will adjust this initial calculation of the EIM Entity balancing authority area charge to reflect flows between EIM Entity balancing authority areas in order to align the allocation more closely with causation.<sup>74</sup> The ISO will assess the amounts allocated to EIM Entity balancing authority areas to the applicable EIM Entity Scheduling Coordinator and will assess the amounts allocated to scheduling coordinators for load in the ISO balancing authority area.<sup>75</sup> The second component distributes any residual neutrality amount among EIM Market Participants based on measured demand.<sup>76</sup> The purpose of the allocation and details of the calculations for the real-time imbalance energy offset are described in the declaration of Mr. Tretheway.<sup>77</sup>

The real-time congestion offset charge is the application of the existing provision for a real-time congestion offset to the broader EIM.<sup>78</sup> The proposed charge determines the contribution of each EIM Entity balancing authority area to the congestion component of locational marginal prices. Because virtual bids are applicable only in the ISO balancing authority area, the calculation includes an adjustment for the impact of virtual bids.<sup>79</sup> The purpose of the allocation and details of the calculations are described in the declaration of Mr. Tretheway.<sup>80</sup> Each EIM Entity balancing authority area's share of the costs is assessed to its EIM Entity Scheduling Coordinator and the share allocated to the ISO balancing

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<sup>72</sup> Proposed section 29.11(e).

<sup>73</sup> Proposed section 11.5.4.1(b).

<sup>74</sup> Proposed section 11.5.4.1(c).

<sup>75</sup> Proposed section 11.5.4.1(d).

<sup>76</sup> Proposed section 11.4.5.1(e).

<sup>77</sup> Declaration of Donald G. Tretheway at PP 43-48.

<sup>78</sup> Section 11.5.4.2.

<sup>79</sup> Proposed section 11.5.4.1.1. Virtual or convergence bidding involves the submission of purely financial bids in the day-ahead market. Because the Energy Imbalance Market only involves the extension of the ISO's real-time market, and not its day-ahead market, to new balancing authority areas, the proposed tariff revisions do not provide for virtual bids in EIM Entity balancing authority areas.

<sup>80</sup> Declaration of Donald G. Tretheway at PP 49-54.

authority area is assessed as provided in section 11.5.4.2. The virtual bid adjustment is assessed to scheduling coordinators that submit virtual bids.<sup>81</sup>

Some stakeholders have raised concerns that the participation of virtual bids in the ISO's day-ahead market after implementation of the Energy Imbalance Market could increase the amount of the real-time congestion offset charged to market participants in the ISO balancing authority area. The ISO believes that these concerns have little, if anything, to do with the Energy Imbalance Market proposal and are accordingly misdirected. These concerns really go to the potential for virtual bidders to take advantage of differences in the approaches employed to model the day-ahead market and the real-time market in a way that increases the uplift associated with real-time congestion. The ISO is addressing these concerns primarily through a separate initiative to enhance and expand the modeling of the full network model.<sup>82</sup> The introduction of the Energy Imbalance Market does not materially affect the real-time congestion offset charged to market participants because the allocation approach described above allocates the cost of each EIM Entity's contribution to the offset to that EIM Entity.

Another stakeholder expressed the belief that if ISO convergence bidders are allocated charges on EIM Entity constraints, they should also receive credits. The ISO concluded that because EIM Entity constraints are not modeled in the ISO day-ahead market, it would be inappropriate for the real-time settlement of convergence bids to result in additions to an EIM Entity's real-time congestion offset charge. It would create a disincentive to EIM Entities' resolving congestion prior to the real-time market if out-of-market payments were made to ISO convergence bidders.

Finally, one stakeholder suggested that if EIM base schedules affect the ISO's real-time congestion, the ISO should allocate the cost to the EIM Entity. The concern here is the impact of loop flows. The ISO believes this is a matter that requires additional investigation as part of the general consideration of unscheduled flow issues in the context of the expanded full network model.<sup>83</sup> If necessary, the ISO can include market functionality to account for flow entitlements of the ISO on EIM Entity constraints and vice versa. Based upon market simulation results and experience in the market expansion, the ISO may seek tariff authority to activate this market functionality if it observes material impacts on each balancing authority area's real-time congestion offset charges, prior to or after the implementation date.

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<sup>81</sup> Proposed section 11.5.4.1.1(c).

<sup>82</sup> See *supra* note 35.

<sup>83</sup> See *supra* note 35.

*Real-Time Bid Cost Recovery.* EIM Participating Resources will be available for short start unit commitment and will receive the same real-time bid cost recovery as other real-time market resources, which is calculated under section 11.<sup>84</sup> Energy included in an EIM base schedule will be treated the same as a self-schedule and will not be eligible for start-up or minimum load bid cost recovery. The net real-time market uplift charge for each balancing authority area in the Energy Imbalance Market is calculated according to the methodology in section 11.8.6. This approach assesses the uplift to the load served by the resource that is paid the bid cost recovery. Bid cost recovery is tracked by resource, however, not by the location where the energy sinks. The ISO has therefore added an adjustment to account for EIM Transfers. The calculations are described in the declaration of Mr. Tretheway.<sup>85</sup> The net real-time market uplift charge will be assessed to the applicable EIM Entity Scheduling Coordinator.

*Flexible Ramping Constraint Allocation.* The ISO will calculate payments for flexible ramping constraint capacity according to section 11, except that the real-time ancillary services market price for spinning reserve, a component of that calculation, will be deemed to be zero, because EIM Participating Resources cannot provide ancillary services in the real-time markets in their capacity as EIM Participating Resources. The ISO will charge the costs of these payments to the applicable EIM Entity Scheduling Coordinator according to the ratio of the product of the flexible ramping constraint capacity in that EIM Entity's balancing authority area and the flexible ramping constraint derived price in that balancing authority area.<sup>86</sup>

*Forecast Charge.* EIM Entities and variable energy resources will pay the ISO a forecast fee, calculated under existing Appendix F, Schedule 4, if they use the ISO's forecasting service. Alternatively, they may arrange for an independent forecast to be provided to the ISO at their own expense.<sup>87</sup>

*Charges Related to Participating at Interties.* In the event that an EIM Entity enables participation in the real-time market on interties with balancing authority areas that do not participate in the real-time market, the EIM Entity Scheduling Coordinator will also be subject to any applicable charges under Sections 11.31 and 11.32.<sup>88</sup>

## VI. Transmission Charges

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<sup>84</sup> Proposed section 29.11(f).

<sup>85</sup> Declaration of Donald G. Tretheway at PP 59-69.

<sup>86</sup> Proposed sections 29.11(g), 11.25.4.

<sup>87</sup> Proposed section 29.11(j).

<sup>88</sup> Proposed section 29.11(m).

One of the issues that arose in the development of the Energy Imbalance Market was the charge to be assessed for transmission service associated with transfers between participating balancing authority areas. After discussions with stakeholders, the ISO concluded that avoidance of pancaked rates for EIM Transfers between balancing authority areas participating in the Energy Imbalance Market was critical to the creation of a real-time market that spans the service territories of multiple transmission providers. Consequently, the ISO is proposing “reciprocity” whereby each EIM Market Participant will pay the transmission rate of the transmission provider in whose service territory it is located – *i.e.*, a license plate rate.<sup>89</sup> The ISO assesses the transmission charge to internal load and a wheeling access charge to exports. Under the Energy Imbalance Market, internal load will continue to pay the access charge. In order to avoid rate pancaking and in recognition of load’s payment of transmission charges in the receiving balancing authority area, EIM Transfers will be exempt from wheeling charges that might otherwise be imposed by the participating balancing authority area from which the energy is exported.

This approach is just and reasonable. The transmission rates both of the ISO and of transmission providers in an EIM Entity balancing authority area (such as PacifiCorp) have previously been approved by the Commission as just and reasonable and not unduly discriminatory. The ISO accordingly believes that its approach avoids rate-pancaking and is also just and reasonable and not unduly discriminatory or preferential. The elimination of pancaked rates for transfers between transmission service areas for the Energy Imbalance Market is fully consistent with the Federal Power Act. The impact of the elimination of pancaked rates in the Energy Imbalance Market is similar to the impact of removing pancaked rates within an Independent System Operator (“ISO”) or Regional Transmission Organization (“RTO”), which the Commission has consistently approved.<sup>90</sup> The Commission has also directed the elimination of pancaked rates between RTOs, such as between the Midcontinent Independent System Operator (formerly called the Midwest Independent Transmission System Operator) (“MISO”) and PJM Interconnection<sup>91</sup> and has approved the elimination of pancaked rates between MISO and its Seams Services customers and between ISO New England and the New York ISO.<sup>92</sup>

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<sup>89</sup> Proposed section 29.26.

<sup>90</sup> See *Regional Transmission Organizations*, Order No. 2000, FERC Stats. & Regs. ¶ 31,089 (1999), *order on reh’g*, Order No. 2000-A, FERC Stats. & Regs. ¶ 31,092 (2000), *aff’d sub nom. Pub. Util. Dist. No. 1 Snohomish Cnty., Wash., et al., v. FERC*, 272 F.3d 607 (D.C. Cir. 2002); see also *Midwest Indep. Transmission Sys. Operator, Inc.*, 104 FERC ¶ 61,105, at P 35 (2003), *order on reh’g*, 105 FERC ¶ 61,212 (2003).

<sup>91</sup> *Midwest Indep. Transmission Sys. Operator, Inc.*, 104 FERC 61,105, at P 35.

<sup>92</sup> *ISO New England Inc. v. New England Power Pool*, 106 FERC ¶ 61,280, at P 95 (2004) (directing the parties to include a proposal for eliminating through and out

Nonetheless, one stakeholder expressed the belief that rate reciprocity is discriminatory as an impermissible discount not available to all transmission customers. The ISO disagrees. The proposed rate is not equivalent to selective transmission service discounting, which distinguishes among customers receiving the same service. Customers transmitting energy for forward transactions receive a different service than customers transmitting energy in the real-time Energy Imbalance Market. All customers purchasing energy in the latter market enjoy the benefit of the non-pancaked rate. Any balancing authority in the Western Interconnection will be eligible to join the Energy Imbalance Market. There is accordingly no undue discrimination.

Some stakeholders objected to this proposal based on speculation about how it may affect market behavior or the distribution of revenues. Such objections, however, are premature and unfounded. For example, some stakeholders speculated the shifting of EIM Entities' existing day-ahead and real-time trading and scheduling activities into the Energy Imbalance Market to take advantage of the reciprocal waiver of wheeling charges. This contention ignores the countervailing benefits that market participants can receive through day-ahead and forward trading or in other real-time markets.

Similarly, there were unsupported predictions of reduced "wheel-through" revenues, particularly for large intermediary transmission providers such as the ISO and PacifiCorp. The proposed reciprocity, however, should have no impact on wheel-through revenues for any entities other than those that elect to participate in the Energy Imbalance Market. The ISO and the first EIM Entity, PacifiCorp, have concluded that the greater efficiency of an energy imbalance market easily outweighs any lost transmission revenues. Although the stakeholders argued that the lost revenues will increase because the transmission savings will induce others to join the Energy Imbalance Market, the ISO considers this a desirable outcome, because efficiency and the benefits to consumers will increase correspondingly.

As another example, one stakeholder predicted distortions to both the static and dynamic efficiency of western wholesale energy and transmission markets through preferential transmission pricing in the narrow temporal Energy Imbalance Market, but did not explain this concern beyond its discussion of the previous two concerns. Contrary to this contention, the ISO expects that a broad energy imbalance market will improve, not distort, the efficiency of western markets.

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service charges between ISO New England and the New York ISO by December 2004); see also *ISO New England Inc. v. New England Power Pool*, 109 FERC ¶ 61,147 (2004) (accepting the proposals for elimination of through and out service charges between ISO New England and the New York ISO).

The ISO believes that the only way to assess the accuracy of these predictions and to determine whether any impact is problematic, is to implement and monitor the Energy Imbalance Market. The ISO has made a commitment to stakeholders to commence review of the transmission rate issue within the first year of operation and to propose a new rate if circumstances suggest a different approach would be preferable and supported by stakeholders.<sup>93</sup>

Finally, one stakeholder argued that reciprocity will not in fact exist because of an aspect of PacifiCorp's proposed implementation of the Energy Imbalance Market. PacifiCorp has stated that it will require EIM participating resources to be associated with transmission service arrangements under PacifiCorp's tariff. PacifiCorp states that its requirement prevents free-ridership, while providing options for participation and avoiding pancaked rates for EIM Transfers. The stakeholder argues that, as a result of this requirement, California load served by EIM Transfers will pay both ISO transmission charges and those of an EIM Entity. It posits that an EIM Participating Resource required to pay a transmission charge to PacifiCorp will embed that cost in its real-time bids.

The ISO disagrees with the premise of this concern. Under the proposed reciprocity arrangement, California load will not pay additional transmission service charges to PacifiCorp, directly or indirectly. If a resource complies with PacifiCorp's requirement through long-term firm transmission service from PacifiCorp, the cost of that service will represent a fixed cost to the generator. In a short-term auction market such as the Energy Imbalance Market, a rational supplier should bid its marginal costs, which will not reflect its fixed costs, including fixed transmission costs. If the resource takes the short-term option for service, its treatment of that cost in determining its bids will be no different than under a *pro forma* open access tariff, which requires additional payments for transmission associated with off-system sales.<sup>94</sup>

## VII. Administrative Fee

The ISO currently recovers the costs of operating its markets through the grid management charge ("GMC"). The GMC is a formula rate, and the current GMC is subject to a rate cap through fiscal year 2014. The ISO tariff requires the ISO to file a tariff amendment to establish a new rate cap for subsequent years.

The GMC comprises three components, each of which recovers the costs of a different category of services: (1) market services, (2) system operations,

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<sup>93</sup> The ISO may conclude, based on this review, that the reciprocity approach should be retained. If it reaches that conclusion, it will explain the basis for its conclusion in a filing with the Commission.

<sup>94</sup> Order No. 888, *supra* note 4, at 31,751.

and (3) congestion revenue rights services. The market services category encompasses all activities in scheduling both the day-ahead market and real-time market. The system operations category includes all activities in dispatching energy on the grid and balancing authority area activities such as transmission planning. The third component, congestion revenue rights services, are the activities involved in administering congestion revenue rights. The ISO uses activity-based accounting to identify and capture costs based on significant activities, and then allocates the costs of those activities to the appropriate service category.

Consistent with the ISO's cost causation principles, the ISO is proposing that EIM Market Participants share in the cost of operating the real-time market. As explained in greater depth in the attached declaration of Michael K. Epstein, in order to determine the appropriate rate, the ISO first analyzed the components of the GMC to determine the amounts attributable to the real-time market.<sup>95</sup> The results were as follows: 63% of market services costs were attributable to the real-time market and 37% to the day-ahead market; and 48% of system operations costs were attributable to real-time dispatch and 52% to balancing authority area services. The ISO did not include congestion revenue rights in the analysis because EIM Market Participants are not included in the allocation of congestion revenue rights.

Next, the ISO used the 2012 rates and allocation from the ISO's 2010 cost of service study that supported the most recent grid management charge to derive a rate for operation of the real-time market. The 2012 market services rate was \$0.09/MWh. The share attributable to real-time is thus \$0.06/MWh. The 2012 system operations rate was \$0.27/MWh. The share attributable to real-time is thus \$0.13/MWh. Combining these amounts, the ISO calculated a real-time market charge of \$0.19/MWh. The supporting data for the allocation and the rate are provided in the exhibit to Mr. Epstein's declaration.

As explained by Mr. Epstein, the ISO proposes to charge this amount as a fixed rate administrative fee to EIM Market Participants based on their gross supply and load imbalance energy, with a minimum volume of five percent of gross generation and five percent of gross load.<sup>96</sup> Although the administrative fee is a fixed rate, the ISO has made a commitment to propose a revised administrative fee when it prepares a new cost of service study for the 2015 grid

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<sup>95</sup> Declaration of Michael K. Epstein at PP 6-7 and Exhibit 1. Mr. Epstein's declaration is provided in Attachment D to this filing.

<sup>96</sup> Declaration of Michael K. Epstein at PP 8-9.

management charge.<sup>97</sup> The ISO will use the revenues from the administrative fee to reduce the grid management charge so as to remain revenue neutral.

In addition to the grid management charge, ISO market participants pay a bid segment fee of \$0.005 per bid segment submitted to the market and a scheduling coordinator ID fee of \$1,000/month for each scheduling coordinator ID. The ISO proposes to assess the same charge to EIM Market Participants.

## **VIII. Market Monitoring and Mitigation**

The ISO proposes under section 29.37 that EIM Market Participants be subject to the rules of conduct in section 37, except for Section 37.2, which requires compliance with operating orders issued by the ISO. The exclusion of this section is consistent with the ISO's lack of authority to issue dispatch instructions to EIM Market Participants except through the real-time market.

Under proposed section 29.38, the ISO's Department of Market Monitoring will provide market monitoring services for the participation of EIM Market Participants in the real-time market. The services will include monitoring the markets for actual or potential ineffective market rules, market abuses, market power, or violations of Commission or ISO market rules; coordinating with ISO business units that review and monitor the performance and quality of the ISO markets; providing recommendations about potential market design flaws or ineffective market rules; and referring a matter to the Commission if there is sufficient credible evidence that a violation of Commission or ISO market rules has occurred.

The ISO will also apply market power mitigation to the participation of EIM Market Participants in the real-time market. The procedures will be essentially the same as those applicable in section 39.7, but the ISO will apply them separately to transmission constraints within each EIM Entity balancing authority area. The procedures for locational marginal price decomposition will likewise be the same as in section 31.2.1, but the ISO will also apply them separately within each EIM Entity balancing authority area. In addition, as discussed below, the ISO may apply market power mitigation to transmission constraints limiting EIM Transfers into an EIM Entity balancing authority area if it determines that one or more entities have market power at the level of the EIM Entity balancing authority area and if such action is authorized by the ISO Board of Governors.

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<sup>97</sup> Materials related to the grid management charge can be found on the ISO website at <http://www.caiso.com/informed/Pages/StakeholderProcesses/Budget-GridManagementCharge.aspx>. See also 2014 Budget and Grid Management Charge Rates, at 46 (Dec. 11, 2013), which states that “[a]ctivity in the energy imbalance market could generate fees of \$350,000”; that document is available on the ISO website at [http://www.caiso.com/Documents/2014Budget-GMC\\_RatesBook.pdf](http://www.caiso.com/Documents/2014Budget-GMC_RatesBook.pdf).

When market power mitigation procedures are applied, either due to projected congestion on a constraint within an EIM Entity balancing authority area or on a transfer constraint into an EIM Entity balancing authority area, the ISO will use the methods set forth in section 39.7 for determining default energy bids.

One stakeholder argued that market power mitigation is inappropriate because the Energy Imbalance Market is voluntary.<sup>98</sup> The ISO disagrees. A resource's voluntary choice to participate in the Energy Imbalance Market is no different than its voluntary choice to participate in any other market, and is no reason to provide it free rein to exercise market power. Neither is an EIM Entity's voluntary choice to participate an argument against mitigation. Allowing an entity to purchase energy in a market only if it is willing to subject itself to suppliers' unmitigated exercise of market power is most assuredly inconsistent with Commission policy and the Federal Power Act.

Other stakeholders, as well as the Department of Market Monitoring and Market Surveillance Committee, have expressed concern about the existence of balancing authority area-wide market power in an EIM Entity balancing authority area, as when all or most of the generation in the balancing authority area is owned by a single entity. In response to these concerns, the ISO has committed to further study this issue and apply additional mitigation if necessary to ensure mitigation of balancing authority area-wide market power.

The Department of Market Monitoring is currently performing further analysis to determine whether such balancing authority area-wide market power may exist based on potential supply and demand conditions in the PacifiCorp EIM Entity balancing authority areas. This analysis will assess the structural competitiveness of these EIM Entity balancing authority areas based on available supply and demand information, such as the historical hourly demand for imbalance energy from other entities within these balancing authority areas relative to the potential supply of imbalance energy from the ISO or entities other than PacifiCorp within the EIM Entity balancing authority area. This study will provide an assessment of the frequency and degree to which PacifiCorp may be individually pivotal with respect to the supply of imbalance energy needed to meet other entities' imbalance energy needs.

Such balancing authority area-wide market power can be effectively mitigated by extending the proposed market power mitigation procedures so that these procedures would be triggered when congestion is projected to occur on transfer limits into an EIM Entity balancing authority area. The Energy Imbalance Market software will include functionality that allows the application of market power mitigation rules on an EIM Entity balancing authority area-wide basis when

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<sup>98</sup> Conversely, another stakeholder cited the voluntary nature of the market as a reason for broader application of market power mitigation.

congestion is projected to occur in the import direction on the constraints enforcing the EIM Transfer limits. As noted above, the ISO may activate this software functionality to apply market power mitigation to transmission constraints limiting EIM Transfers into an EIM Entity balancing authority area if it determines that one or more entities have market power at the level of the EIM Entity balancing authority area, and if such action is authorized by the ISO Board of Governors.

## **IX. Pro Forma Service Agreements**

The ISO proposes four new service agreements to govern the relationship between the ISO and EIM Market Participants. As with most ISO service agreements, the primary purpose of each new agreement is to bind the market participant to the applicable provisions of the ISO tariff. The service agreements proposed for the Energy Imbalance Market follow this approach and are modeled on existing parallel ISO service agreements to the extent possible.

The first is the EIM Entity Agreement, which establishes a foundational relationship that enables operation of the real-time market in the balancing authority area. This agreement confirms that there is no change in the obligations of either party with respect to the reliability standards. It also requires the EIM Entity to make available the transmission it has registered for use in the real-time market. The second agreement is the companion scheduling coordinator agreement, which establishes the financial relationship with the ISO on behalf of the EIM Entity.

The third agreement facilitates resource participation in the Energy Imbalance Market. This single agreement covers all resource types. The fourth and final agreement is the companion scheduling coordinator agreement, which establishes the financial relationship with the ISO on behalf of the EIM Participating Resource.

## **X. Effective Date**

The ISO requests an effective date of September 23, 2014, for a first trading date of October 1, 2014 for the proposed tariff changes. The effective date must be seven days before the first trading date because data submissions, such as demand forecasts, begin seven days before the related trading date. An effective date of July 1, 2014 is requested for the various agreements to be executed by EIM Market Participants. This will allow the ISO to begin market simulation on July 8, 2014.

A Commission order by June 20, 2014 is requested because, to conduct an effective simulation of the Energy Imbalance Market, scheduled for July 8, 2014, the ISO and market participants must know the rules that will apply. Knowing sooner rather than later of any action ordered by the Commission will

allow for a meaningful simulation and facilitate timely implementation of the Energy Imbalance Market.

## **XI. Requests for Waiver**

The ISO respectfully requests waiver of the Commission's notice requirement to permit the tariff changes contained in this filing to go into effect on September 23, 2014, for a first trading date of October 1, 2014, as requested above. Specifically, pursuant to section 35.11 of the Commission's regulations (18 C.F.R. § 35.11), the ISO requests waiver of the notice requirement contained in section 35.3 of the Commission's regulations (18 C.F.R. § 35.3) to allow the requested effective date.

Also, the ISO submits that this filing substantially complies with the requirements of section 35.13 of the Commission's regulations, 18 C.F.R. § 35.13, applicable to filings of this type. The ISO respectfully requests waiver of any such requirement to the extent this filing does not satisfy that requirement. In particular, the ISO requests waiver of the requirement to submit Period 1 and Period 2 schedules, because the administrative fee is based on accepted components of the grid management charge included in the ISO tariff and is not based on historical data in Period 1 schedules or on the projections in Period 2 schedules. Moreover, there is good cause to waive filing requirements that are not material to the Commission's consideration of the filing, including the proposed administrative fee.

## **XII. Service**

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

## **XIII. Contents of this Filing**

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

Attachment A      Clean ISO tariff sheets incorporating this tariff amendment<sup>99</sup>

Attachment B      Red-lined document showing the revisions contained in this tariff amendment

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<sup>99</sup> The clean ISO tariff sheets in Attachment A and the red-lined document in Attachment B incorporate the tariff revisions to implement the fifteen-minute market and comply with Order No. 764. See *supra* note 3.

Attachment C	Declaration of Donald G. Tretheway
Attachment D	Declaration of Michael K. Epstein
Attachment E	PacifiCorp-ISO EIM Benefits Study
Attachment F	March 2013 Board Memorandum
Attachment G	November 2013 Board Materials
Attachment H	December 2013 Board Memorandum
Attachment I	BPA-PacifiCorp-ISO Memorandum of Understanding

#### **XIV. Correspondence**

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

Roger E. Collanton General Counsel  *John C. Anders Lead Counsel  250 Outcropping Way Folsom, CA 95630 Tel: (916) 351-4400 Fax: (916) 608-7296	Kenneth G. Jaffe *Michael E. Ward Alston & Bird LLP The Atlantic Building 950 F Street, NW Washington, DC 20004 Tel: (202) 239-3300 Fax: (202) 654-4875
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\* Individuals designated for service pursuant to Rule 203(b)(3),  
18 C.F.R. § 203(b)(3).

**XV. Conclusion**

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

Respectfully submitted,

/s/ John C. Anders

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**Attachment A – Clean**

**Tariff Amendments to Implement Energy Imbalance Market**

**California Independent System Operator Corporation**

**February 28, 2014**

#### **11.5.4 Imbalance Energy Pricing; Non-Zero Offset Amount Allocation**

##### **11.5.4.1 Real-Time Imbalance Energy Offset**

- (a) **Financial Value of EIM Transfers.** The CAISO will calculate the Real-Time Market financial value of EIM Transfers as the product of the MWh, either positive or negative, and the Locational Marginal Price of the pricing node at the corresponding EIM Internal Intertie.
- (b) **Initial Calculation.** The CAISO will initially calculate the Real-Time Imbalance Energy Offset to be recovered on a 5-minute basis for each Balancing Authority Area in the EIM Area as the sum of the financial value of EIM Transfers and the Settlement amounts for FMM Instructed Imbalance Energy and RTD Instructed Imbalance Energy, Uninstructed Imbalance Energy, EIM Bid Adders, and Unaccounted For Energy, and for the CAISO, Real-Time Virtual Bid Settlement, less the Balancing Authority Area Real-Time Congestion Offset determined under Section 11.5.4.1.1, and for the CAISO, plus the Real-Time Ancillary Services Congestion revenues and Virtual Awards settlements in the Real-Time Market in accordance with Section 11.3, less the Real-Time Congestion Offset and less the Real-Time Marginal Cost of Losses Offset.
- (c) **Adjustment.** The CAISO will adjust the initial calculation of the Real-Time Imbalance Energy Offset by—
  - (1) dividing the sum of net EIM Transfers out of an EIM Entity Balancing Authority Area by the sum of the absolute value of Uninstructed Imbalance Energy due to Demand, the absolute value of Uninstructed Imbalance Energy due to Supply, the absolute value of Unaccounted For Energy, and the net EIM Transfers out of the Balancing Authority Area;
  - (2) multiplying the initial calculation of the Real-Time Imbalance Energy Offset by the ratio calculated in Section 11.5.4.1(c)(1); and
  - (3) reducing the Real-Time Imbalance Energy Offset of the EIM Entity Balancing Authority Area with the net transfer out by the amount calculated in Section

11.5.4.1(c)(2) and adding that amount to the EIM Entity Balancing Authority Area with the net transfer in to determine the final Real-Time Imbalance Energy Offset.

- (d) **Allocation.** The CAISO will allocate the adjusted Real-Time Imbalance Energy Offset—
  - (1) for the CAISO Balancing Authority Area, to Scheduling Coordinators in the CAISO Balancing Authority Area according to Measured Demand; and
  - (2) for EIM Entity Balancing Authority Areas, to the applicable EIM Entity Scheduling Coordinator.
- (e) **Residual Neutrality Amounts.** The CAISO will allocate any residual Real-Time Imbalance Energy Offset amount to Scheduling Coordinators in the EIM Area based upon EIM Measured Demand.

#### **11.5.4.1.1 Real-Time Congestion Offset.**

- (a) **Real-Time Congestion Offset.** For each Settlement Period of the RTM, the CAISO shall calculate the Real-Time Congestion Offset as—
  - (1) the sum for each Balancing Authority Area in the EIM Area of the product of the contribution of that Balancing Authority Area's Transmission Constraints to the marginal Congestion component of the Locational Marginal Price at each resource location in the EIM Area and the imbalance energy, including Virtual Bids, at that resource location;
  - (2) minus any Virtual Bid adjustment.
- (b) **Treatment of EIM Internal Interties.** In performing the calculation in subsection (a)(1) of this section, the CAISO shall determine a Balancing Authority Area's contribution at EIM Internal Interties based on the number of Balancing Authority Areas that share the EIM Internal Intertie as provided in the Business Practice Manual for the Energy Imbalance Market.
- (c) **Virtual Bid Adjustment.**
  - (1) **Individual Constraint Calculation.** For each Transmission Constraint in an EIM Entity Balancing Authority Area, the CAISO will calculate a Virtual Bid adjustment as the product of that Transmission Constraint's FMM Shadow Price and the

lesser of—

- (A) the Flow Impact of Virtual Bids and
- (B) the Flow Impacts of all Day-Ahead Scheduled Energy and EIM Base

Schedules less the Flow Impacts of FMM Schedules,

but not less than zero.

- (2) **EIM Entity Balancing Authority Area Calculation.** Each EIM Entity Balancing Authority Area's Virtual Bid adjustment shall be the sum of the individual Transmission Constraint calculation for all Transmission Constraints within that EIM Entity Balancing Authority Area.

- (d) **Allocation.** The CAISO will allocate—

- (1) the Real-Time Congestion Offset for each EIM Entity Balancing Authority Area to the applicable EIM Entity Scheduling Coordinator;
  - (2) the Real-time Congestion Offset for the CAISO Balancing Authority Area in accordance with Section 11.5.4.2; and
  - (3) the Virtual Bid adjustment from each individual constraint calculation to each Scheduling Coordinator who submitted Virtual Bids based on that Scheduling Coordinator's Virtual Award's pro rata share of the gross positive Congestion revenues received by all Virtual Awards from that Transmission Constraint.

#### **11.5.4.1.2 Real-Time Marginal Cost of Losses Offset**

- (a) **Calculation.** The CAISO will calculate the Real-Time Marginal Cost of Losses Offset for each Balancing Authority Area as the sum of the product of the Marginal Loss component of the LMP and all positive or negative FMM Instructed Imbalance Energy, RTD Instructed Imbalance Energy, Uninstructed Imbalance Energy, and Unaccounted For Energy in the Balancing Authority Area.
- (b) **Allocation.** The CAISO will allocate the amounts determined according to section 11.5.4.1.2(a)—
  - (1) for the CAISO Balancing Authority Area, according to section 11.5.4.2; and

- (2) for EIM Entity Balancing Authority Areas, to the applicable EIM Entity Scheduling Coordinator.

\* \* \*

#### **11.8.6.3.2 Net RUC Bid Cost Uplift and RTM Bid Cost Uplift**

The CAISO will determine the Net RUC Bid Cost Uplift and the Net RTM Bid Cost Uplift to be allocated to each Balancing Authority Area in the EIM Area as follows:

- (i) For each Balancing Authority Area separately, the CAISO will calculate a combined RUC Bid Cost Uplift and RTM Bid Cost Uplift amount based on the RUC Bid Cost Shortfall, RUC Bid Cost Surplus, RTM Bid Cost Shortfall, and RTM Bid Cost Surplus of each supply resource located within the Balancing Authority Area for each Settlement Interval.
- (ii) For each Balancing Authority Area separately, for each Trading Day, the CAISO will calculate a daily combined total RUC Bid Cost Uplift and RTM Bid Cost Uplift amount as the sum of all the Settlement Interval values calculated according to Section 11.8.6.3.2(i).
- (iii) For each Balancing Authority Area separately, for each Trading Day, the CAISO will calculate a combined total positive RUC Bid Cost Uplift and RTM Bid Cost Uplift amount as the sum of the positive Settlement Interval values calculated according to Section 11.8.6.3.2(i).
- (iv) The CAISO will calculate the daily uplift ratio for the RUC and RTM, for each Balancing Authority Area in the EIM Area, as the daily combined total RUC Bid Cost Uplift and RTM Bid Cost Uplift amount, calculated according to Section 11.8.6.2(ii), divided by the daily combined total positive RUC Bid Cost Uplift and RTM Bid Cost Uplift, calculated according to Section 11.8.6.2(iii).
- (v) For each Settlement Interval and each Balancing Authority Area in the EIM Area, the CAISO will multiply the applicable daily uplift ratio with each combined total positive RUC Bid Cost Uplift and each combined total RTM Bid Cost Uplift to

determine the Net RUC Bid Cost Uplift and the preliminary Net RTM Bid Cost Uplift, respectively, for each Balancing Authority Area.

- (vi) The CAISO shall adjust the preliminary Net RTM Bid Cost Uplift amounts calculated in Section 11.8.6.3.2(v) by—
  - (a) dividing the sum of net EIM Transfers out of a Balancing Authority Area by the sum of the absolute value of Uninstructed Imbalance Energy due to Demand, the absolute value of Uninstructed Imbalance Energy due to Supply, the absolute value of Unaccounted For Energy, and the net EIM Transfer out of the Balancing Authority Area;
  - (b) multiplying the preliminary Net RTM Bid Cost Uplift amounts by the ratio calculated in Section 11.8.6.3.2(vi)(a); and
  - (c) reducing the preliminary Net RTM Bid Cost Uplift amounts of the EIM Entity Balancing Authority Area with the net transfer out by the amount calculated in Section 11.8.6.3.2(vi)(b) and adding that amount to the EIM Entity Balancing Authority Area with the net transfer in to determine the final preliminary Net RTM Bid Cost Uplift amounts.
- (vii) For each Settlement Interval, the Net RUC Bid Cost Uplift and final Net RTM Bid Cost Uplift apportionment by Settlement Interval for each Balancing Authority Area in the EIM Area will be the sum of the amounts calculated in Sections 11.8.6.3.2(v) and, for Net RTM Bid Cost Uplift only, 11.8.6.3.2(vi) for each Balancing Authority Area in the EIM Area.

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#### **11.8.6.6 Allocation of Net RTM Bid Cost Uplift**

- (i) For the CAISO Balancing Authority Area, the CAISO will determine the hourly Net RTM Bid Cost Uplift as the sum over all of the Settlement Intervals of the Trading Hour of any positive Net RTM Bid Cost Uplift determined in Section 11.8.6.3.2. The hourly RTM Bid Cost Uplift in the CAISO Balancing Authority Area is allocated to Scheduling Coordinators, including Scheduling Coordinators for MSS Operators that have elected (a)

not to follow their Load, and (b) gross Settlement, in proportion to their Measured Demand plus any FMM reductions not associated with valid and balanced ETCs, TORs or Converted Rights Self-Schedules in the Day-Ahead Market for the Trading Hour. For Scheduling Coordinators for MSS Operators that have elected (a) not to follow their Load, and (b) net Settlement, the hourly RTM Bid Cost Uplift is allocated in proportion to their MSS Aggregation Net Measured Demand plus any FMM reductions not associated with valid and balanced ETCs, TORs or Converted Rights Self-Schedules in the Day-Ahead Market. For Scheduling Coordinators of MSS Operators that have elected to follow their Load, the RTM Bid Cost Uplift shall be allocated in proportion to their MSS Net Negative Uninstructed Deviation plus any FMM reductions not associated with valid and balanced ETCs, TORs or Converted Rights Self-Schedules in the Day-Ahead Market. Accordingly, each Scheduling Coordinator shall be charged an amount equal to its Measured Demand plus any FMM reductions not associated with valid and balanced ETCs, TORs or Converted Rights Self-Schedules in the Day-Ahead Market times the RTM Bid Cost Uplift rate, where the RTM Bid Cost Uplift rate is computed as the Net RTM Bid Cost Uplift amount divided by the sum of Measured Demand plus any FMM reductions not associated with valid and balanced ETCs, TORs or Converted Rights Self- Schedules in the Day-Ahead Market across all Scheduling Coordinators for the Trading Hour. Any real-time reductions after HASP results are published to HASP Block Intertie Schedules in response to Dispatch Instructions or real-time scheduling curtailments are not allocated any Net RTM Bid Cost Uplift.

- (ii) For EIM Entity Balancing Authority Areas, the CAISO will allocate the amounts determined according to Section 11.8.6.3.2 to the applicable EIM Entity Scheduling Coordinator.

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#### **11.14        Neutrality**

The CAISO shall be authorized to levy additional charges or make additional payments as special adjustments in regard to:

- (a) amounts required to reach an accounting trial balance of zero in the course of the Settlement process in the event that the charges calculated as due from CAISO Debtors are lower than payments calculated as due to the CAISO Creditors for the same Trading Day, which includes any amounts required to round up any invoice amount expressed in dollars and cents to the nearest whole dollar amount. These charges will be allocated amongst the Scheduling Coordinators who traded on that Trading Day pro rata to their Measured Demand in MWh of Energy for that Trading Day on a monthly basis. In the event that the charges due from CAISO Debtors are higher than the payments due to CAISO Creditors, the CAISO shall allocate a payment to the Scheduling Coordinators who traded on that Trading Day pro rata to their Measured Demand in MWh of Energy for that Trading Day on a monthly basis; and
- (b) awards payable by or to the CAISO pursuant to good faith negotiations or CAISO ADR Procedures that the CAISO is not able to allocate to or to collect from a Market Participant or Market Participants in accordance with Section 13.5.3. These charges will be allocated among Scheduling Coordinators over an interval determined by the CAISO and pro rata based on EIM Measured Demand during that interval, if the dispute concerned the Real-Time Market, or otherwise Measured Demand during that interval.

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**11.25      Flexible Ramping Constraint Compensation**

### **11.25.1 Determination of Flexible Ramping Constraint Shadow Price**

The CAISO will determine a Flexible Ramping Constraint Shadow Price as the reduction of the total Energy and Ancillary Services procurement cost associated with a marginal change at each constraint for the individual Balancing Authority Areas in the EIM Area and applicable groupings of those areas in which the constraint is enforced, which will be equal to zero (0) if the Flexible Ramping Constraint is not binding.

### **11.25.2 Compensation of Resources**

- (a) The CAISO will award Flexible Ramping Constraint capacity to all resources identified as resolving the Flexible Ramping Constraint in the applicable RTUC interval and will pay the resource's Scheduling Coordinator, for each RTUC interval, whether or not the Flexible Ramping Constraint is binding, limited by the quantity of Flexible Ramping Constraint requirements.
- (b) The CAISO will calculate the payment as the product of
  - (1) the upward MW of capacity identified to satisfy the constraint(s) in the groupings and individual Balancing Authority Areas in the EIM Area in which it participates to relieve the constraints in the groupings and individual Balancing Authority Areas in the EIM Area in which it participates to relieve the constraint(s), multiplied by 0.25 hours, and
  - (2) the Flexible Ramping Constraint Derived Price calculated for each applicable fifteen-minute FMM interval.

#### **11.25.2.1 Flexible Ramping Constraint Derived Price**

- (a) For each applicable fifteen-minute FMM interval, the Flexible Ramping Constraint Derived Price is equal to the lesser of—
  - (1) \$800/MWh; or
  - (2) the greater of
    - (i) the Real-Time ASMP for Spinning Reserves for the applicable fifteen-minute FMM interval; or
    - (ii) the total Flexible Ramping Constraint Shadow Price, but not less than zero.

- (b) The CAISO will determine the total Flexible Ramping Constraint Shadow Price as the sum of the Flexible Ramping Constraint Shadow Prices for the groupings and individual Balancing Authority Areas in the EIM Area in which the resource is deemed to have contributed to the constraint, minus seventy-five (75) percent of the greater of
- (1) zero (0), or
  - (2) the Real-Time System Marginal Energy Cost, calculated as the simple average of the System Marginal Energy Cost for each of the three five-minute RTD intervals in the applicable fifteen-minute FMM interval.

#### **11.25.3 Rescission of Payment for Non-Performance**

- (a) The CAISO will rescind payments to Scheduling Coordinators for the quantity of MW of undelivered Flexible Ramping Constraint capacity determined as the 15-minute sum of the Settlement Interval amounts calculated as the minimum of—
  - (1) the Flexible Ramping Constraint capacity identified as having contributed to the relief of the Flexible Ramping Constraint, or
  - (2) the difference between
    - (i) the absolute value of the negative UIE and
    - (ii) the upward MW identified as Undelivered Ancillary Services Capacity as required in Section 11.10.9.3 but not less than zero.
- (b) The CAISO will determine rescinded amounts as the product of—
  - (1) the MW quantities to be rescinded determined as described in this Section 11.25.3; and
  - (2) the Flexible Ramping Constraint Derived Price as described in Section 11.25.2.

#### **11.25.4 Apportionment of Flexible Ramping Constraint Costs**

- (a) The CAISO will determine the Flexible Ramping Constraint costs for each constraint as the product of—
  - (1) the resource-specific total Flexible Ramping Constraint costs, calculated

- as the total compensation in Section 11.25.2(b), net of rescission of payments, and
- (2) the ratio of the Flexible Ramping Constraint Shadow Price to the total Flexible Ramping Constraint Shadow Price, determined as described in Section 11.25.2.1(b).
- (b) For each constraint and each Balancing Authority Area in the EIM Area, the CAISO will determine the Flexible Ramping Constraint costs attributable to that Balancing Authority Area for which the applicable constraint(s) were binding in the applicable interval, based on the ratio of the Balancing Authority Area's requirement to its contribution to the individual constraint or group of constraints to which that Balancing Authority Area contributes.
- (c) The CAISO will determine each Balancing Authority Area's apportionment of Flexible Ramping Constraint costs as the sum for that Balancing Authority Area of the amounts determined in Section 11.25.4(b).

#### **11.25.5 Allocation of Flexible Ramping Constraint Costs**

- (a) For the CAISO Balancing Authority Area, the CAISO will allocate total Flexible Ramping Constraint costs described in Sections 11.25.5.1 and 11.25.5.2.
- (b) The CAISO will allocate total Flexible Ramping Constraint costs for each EIM Entity Balancing Authority Area to the applicable EIM Entity Scheduling Coordinator.

##### **11.25.5.1 Allocation to Measured Demand**

Seventy five (75) percent of the total Flexible Ramping Constraint costs apportioned to the CAISO Balancing Authority Area and netted as described in Section 11.25.4, are allocated to Scheduling Coordinators based on their Measured Demand for each applicable Trading Hour. Each Scheduling Coordinator is assessed a portion of seventy-five (75) percent share of the total costs equal to the Scheduling Coordinator's Measured Demand for the applicable Trading Hour divided by total market Measured Demand for the applicable Trading Hour.

##### **11.25.5.2 Allocation to Supply Deviations**

Twenty-five (25) percent of the total Flexible Ramping Constraint costs apportioned to the CAISO Balancing Authority Area and netted as described in Section 11.25.4, are allocated to Scheduling Coordinators based on their gross negative Supply deviations as follows, using a two-step process. First, on a daily basis, the CAISO determines a daily rate equal to twenty-five (25) percent of the total daily Flexible Ramping Constraint costs divided by total daily gross Supply negative deviations for the applicable Trading Day. Each Scheduling Coordinator is assessed its share of these daily costs based on its daily gross negative deviations calculated by resource as described below. Second, at the end of each Trading Month, the CAISO reverses the daily amounts assessed to Scheduling Coordinators and calculates a monthly rate equal to twenty-five (25) percent of the total monthly Flexible Ramping Constraint costs divided by the total monthly gross Supply negative deviations. Each Scheduling Coordinator is assessed its share of these monthly costs based on its monthly gross negative deviations calculated by resource as described below. The gross Supply negative deviations are determined by resource based on the sum of: (1) the resource's total negative Settlement Interval UIE deviations, which are determined as specified in Section 11.5.2, and (2) any negative import Operational Adjustments. Gross Supply negative deviations determined for this purpose are not netted across Settlement Intervals. The CAISO will provide the ability for Scheduling Coordinators to see daily or monthly Flexible Ramping Constraint cost allocation by resource for their resources in their regularly released Settlement Statements.

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## **29. Energy Imbalance Market**

### **29.1 General Provisions.**

- (a) **Operation of EIM.** Pursuant to Section 29, the CAISO shall expand operation and settlement of the Real-Time Market to provide for the purchase and sale of balancing Energy in any Balancing Authority Area for which the Balancing Authority executes an EIM Entity Agreement with the CAISO.
- (b) **EIM Tariff Obligations.** EIM Market Participants shall comply with—
  - (1) the provisions of Section 29; and
  - (2) other provisions of the CAISO Tariff that apply to the extent such provisions—

- (A) expressly refer to Section 29 or EIM Market Participants;
  - (B) are cross referenced in Section 29; or
  - (C) are not limited in applicability to the CAISO Controlled Grid, the CAISO Balancing Authority Area, or CAISO Markets other than the Real-Time Market.
- (c) **Inconsistency Between Provisions.** If there is an inconsistency between a provision in Section 29 and another provision of the CAISO Tariff regarding the rights or obligations of EIM Market Participants, the provision in Section 29 shall prevail to the extent of the inconsistency.
- (d) **Suspension of EIM Entity Participation.**
- (1) **Temporary Suspension.** The CAISO may, within 60 days following an EIM Entity Implementation Date for an EIM Entity, and pursuant to the terms of a Market Notice, temporarily suspend the participation of that EIM Entity in the Real-Time Market for a period not to exceed 60 days if market or system operational issues adversely impact any portion of the EIM Area, provided that the ISO may continue operation of the Real-Time Market without the participation of the EIM Entity for a reasonable additional period of time in order to implement a resolution of the market or system operational issues.
  - (2) **CAISO Termination.** If the CAISO is not able to identify a resolution of the EIM-related market or system operational issues within 60 days after issuance of the Market Notice of temporary suspension of EIM participation by an EIM Entity, the CAISO may, upon issuance of a subsequent Market Notice, terminate participation by the EIM Entity in the Real-Time Market and may extend the suspension of EIM participation by the EIM Entity for a time sufficient to process the termination of the EIM Entity Agreement.
  - (3) **Reinstatement.**
    - (A) **After Temporary Suspension.** The CAISO may reinstate EIM operations after a temporary suspension of EIM participation by an EIM

Entity by issuing a Market Notice announcing the intended reinstatement no less than 5 days in advance of the reinstatement date.

- (B) **After CAISO Termination.** The CAISO may only reinstate EIM operations with respect to an EIM Entity after termination of EIM participation by an EIM Entity pursuant to a filing accepted by FERC.

- (4) **EIM Entity Action.** In the event the CAISO issues a Market Notice of the temporary suspension of EIM participation by an EIM Entity, the EIM Entity shall continue to submit EIM Base Schedules and the associated meter data to enable continued operation of the Real-Time Market until the CAISO issues a subsequent Market Notice either that—

- (i) the cause of the temporary suspension has been resolved and the EIM Entity has been reinstated, in which case EIM participation by the EIM Entity shall return to normal; or
- (ii) EIM participation by the EIM Entity has been terminated.

- (5) **CAISO Action.** In the event the CAISO issues a Market Notice of the temporary suspension of EIM participation by an EIM Entity, the CAISO shall—

- (i) prevent EIM Transfers and separate the EIM Entity Balancing Authority Area from operation of the Real-Time Market in the EIM Area in accordance with the provisions of the Business Practice Manual for the Energy Imbalance Market;
- (ii) suspend Settlement of Real-Time Market charges with respect to the EIM Entity in accordance with the provisions of the Business Practice Manual for the Energy Imbalance Market; and
- (iii) issue a subsequent Market Notice either that (i) the cause of the temporary suspension has been resolved and the EIM Entity has been reinstated, in which case EIM participation by the EIM Entity shall return to normal, or (ii) EIM participation by the EIM Entity has been terminated.

## **29.2 EIM Access To The Real-Time Market.**

- (a) **In general.** The CAISO shall—
  - (1) provide open and non-discriminatory access to the Real-Time Market, including the Energy Imbalance Market, in accordance with the provisions of the CAISO Tariff; and
  - (2) make available for use in the Real-Time Market the transmission capacity that is available in Real-Time—
    - (A) on the CAISO Controlled Grid; and
    - (B) for which an EIM Entity provides EIM Transmission Service Information pursuant to Section 29.17.
- (b) **Implementation of Access as an EIM Entity.**
  - (1) **EIM Implementation Agreement.** A Balancing Authority that wishes to become an EIM Entity must first execute an EIM Implementation Agreement with the CAISO that establishes—
    - (A) the activities the parties must undertake to enable the Balancing Authority to participate in the Real-Time Market;
    - (B) the EIM Entity Implementation Date;
    - (C) the implementation fee the Balancing Authority must pay to the CAISO for the start-up costs the CAISO incurs to accommodate the participation of the Balancing Authority in the Real-Time Market as provided in the agreement; and
    - (D) the obligation of the Balancing Authority to enter into an EIM Entity Agreement governing its participation in the Real-Time Market.
  - (2) **FERC Approval.** The EIM Entity Implementation Date must be not less than six months and not more than twenty-four months after the date that the EIM Implementation Agreement between the CAISO and the Balancing Authority is accepted by FERC.
  - (3) **Implementation Period.** The CAISO shall in its discretion determine the EIM Entity Implementation Date based on the complexity and compatibility of the

Balancing Authority's transmission and technology systems with the CAISO systems and the planned timing of the CAISO's implementation of software enhancements.

**29.3 [Not Used]**

**29.4 Roles And Responsibilities.**

(a) **CAISO Balancing Authority Obligations.**

- (1) **Reliability Responsibilities.** Nothing in Section 29 shall alter the CAISO's responsibilities under the other sections of the CAISO Tariff, under any agreement not required by Section 29, or under NERC Reliability Standards or any other Applicable Reliability Criteria as the Balancing Authority for the CAISO Balancing Authority Area and the transmission operator for the CAISO Controlled Grid.
- (2) **Operating Responsibilities.** During any interruption of the normal operation of the Real-Time Market, the CAISO as Balancing Authority shall remain responsible for managing the resources in its Balancing Authority Area and the flows on transmission lines internal to the CAISO Balancing Authority Area, including imports and exports, for the duration of the interruption.

(b) **EIM Entity.**

(1) **Balancing Authority Obligations.**

- (A) **EIM Entity as Balancing Authority.** An EIM Entity must be a Balancing Authority registered and certified as such under the applicable authorities.

- (B) **Reliability Responsibilities.** Nothing in Section 29 shall alter an EIM Entity's responsibilities under NERC Reliability Standards as the Balancing Authority for the EIM Entity Balancing Authority Area and, to the extent applicable, as the transmission operator for transmission facilities within its Balancing Authority Area.

- (C) **Operating Responsibilities.** During any interruption of the normal operation of the Real-Time Market, the EIM Entity as Balancing Authority

- shall remain responsible in accordance with Section 29.7 for managing the resources in its Balancing Authority Area and the flows on internal transmission lines, including imports into and exports out of its Balancing Authority Area, for the duration of the interruption.
- (D) **Inadvertent Energy.** An EIM Entity remains responsible for tracking inadvertent Energy and administering the payback of inadvertent Energy for its Balancing Authority Area through processes established by WECC.
- (2) **EIM Entity Agreement.** An EIM Entity must execute an EIM Entity Agreement no later than ninety (90) days before the EIM Entity Implementation Date.
- (3) **EIM Entity Obligations.** An EIM Entity shall—
- (A) perform the obligations of an EIM Entity in accordance with the EIM Entity Agreement, Section 29, and other provisions of the CAISO Tariff that by their terms apply to EIM Entities, subject to the limitations specified in Section 29.1(b)(2)(C);
- (B) ensure that each EIM Transmission Service Provider in its Balancing Authority Area has provisions in effect in the EIM Transmission Service Provider's transmission tariff, as necessary or applicable, to enable operation of the Real-Time Market in its Balancing Authority Area;
- (C) qualify as or secure representation by no more than one EIM Entity Scheduling Coordinator;
- (D) review and validate information about available transmission capacity submitted to it by an EIM Transmission Service Provider and transmit such validated information to its EIM Entity Scheduling Coordinator;
- (E) provide the CAISO and its EIM Entity Scheduling Coordinator with information regarding the transmission capacity available to the Real-Time Market, including any information regarding Transmission Constraints of which it is aware;
- (F) define Load Aggregation Points in its Balancing Authority Area;

- (G) determine and inform the CAISO which resource types are eligible to participate in the Real-Time Market as resources and which transmission service providers or holders of transmission rights are EIM Transmission Service Providers; and
  - (H) inform the CAISO whether or not the EIM Entity intends to utilize the CAISO's Demand Forecast consistent with Section 29.34(d).
- (4) **EIM Entity Termination of EIM Participation.**
- (A) **EIM Entity Agreement.** An EIM Entity that wishes to terminate participation in the Real-Time Market must terminate the EIM Entity Agreement pursuant to its terms.
  - (B) **Notice.** Delivery to the CAISO of a written notice of termination pursuant to the terms of the EIM Entity Agreement shall represent the commitment by the EIM Entity to undertake all necessary preparations to disable the Real-Time Market within the EIM Entity Balancing Authority Area.
  - (C) **Actions Following Notice.** Upon receipt of such notice, the CAISO shall undertake all necessary preparations to disable the Real-Time Market within the EIM Entity Balancing Authority Area, as outlined in the Business Practice Manual for the Energy Imbalance Market, including issuance of a Market Notice within five Business Days after receipt of such notice.
- (5) **EIM Entity Corrective Actions.** If the EIM Entity takes corrective action, subject to the provisions of an open access transmission tariff, to address an issue with EIM implementation or EIM operation, or the EIM Entity issues a notice of termination—
- (A) the EIM Entity shall take those actions provided in Section 29.1(d)(4) during the implementation of its corrective action; and
  - (B) the CAISO shall issue a Market Notice in accordance with Section 29.1(d)(1) and take those actions provided in Section 29.1(d)(5) during the implementation of the EIM Entity corrective action.

(c) **EIM Entity Scheduling Coordinator.**

- (1) **Certification.** An EIM Entity Scheduling Coordinator must meet or have met the certification requirements in Section 4.5.1 for a Scheduling Coordinator.
- (2) **EIM Entity Scheduling Coordinator Agreement.** An EIM Entity Scheduling Coordinator must enter an EIM Entity Scheduling Coordinator Agreement with the CAISO, which shall satisfy the obligation to enter a Scheduling Coordinator Agreement under Section 4.5.1 with regard to its representation of the EIM Entity.
- (3) **Representation.** An EIM Entity Scheduling Coordinator—
  - (A) may represent a Market Participant other than an EIM Entity, but only if it enters a Scheduling Coordinator Agreement under Section 4.5.1 with regard to such Market Participant;
  - (B) may not also be an EIM Participating Resource Scheduling Coordinator or a Scheduling Coordinator for a Participating Generator, Participating Load, or Demand Resource Provider, unless the EIM Entity Scheduling Coordinator is a transmission provider subject to the standards of conduct set forth in 18 C.F.R. § 358; and
  - (C) may represent more than one EIM Entity if it has certified to the CAISO in the manner described in the Business Practice Manual for the Energy Imbalance Market that it has informed each EIM Entity of the multiple representation.
- (4) **Obligations.** An EIM Entity Scheduling Coordinator shall—
  - (A) perform the obligations of an EIM Entity Scheduling Coordinator under the EIM Entity Scheduling Coordinator Agreement and Section 29;
  - (B) perform the obligations of a Scheduling Coordinator under provisions of the CAISO Tariff described in Section 29.1(b);
  - (C) register in the manner set forth in the Business Practice Manual for the Energy Imbalance Market all non-participating resources in the Balancing Authority Area of each EIM Entity that it represents and update such

- information in a timely manner;
- (D) verify in the manner set forth in the Business Practice Manual for the Energy Imbalance Market that all EIM Resources within the Balancing Authority Area of each EIM Entity represented by the EIM Entity Scheduling Coordinator have been registered with the CAISO;
- (E) submit the Interchange schedules with other Balancing Authorities at the defined Interchange scheduling locations, including creating and processing E-Tags in accordance with NERC, North American Energy Standards Board, and WECC standards and business practices for bilateral schedules between Balancing Authority Areas that are arranged no less than 20 minutes in advance of the Dispatch Interval of the Real-Time Market in which the Interchange will occur and that are included in an EIM Resource Plan;
- (F) match E-Tags and manage schedule curtailments at the defined Interchange scheduling locations with other Balancing Authorities;
- (G) provide EIM Transmission Service Information in accordance with Section 29.17;
- (H) settle all financial obligations arising out of the Real-Time Market for the EIM Entity, including financial settlement with non-participating resources and non-participating load within the EIM Entity Balancing Authority Area; and
- (I) submit EIM Base Schedules, EIM Resource Plans and other required information on behalf of the EIM Entity.

(d) **EIM Participating Resources.**

- (1) **Eligibility.** The owner or operator of an EIM Resource is eligible to become an EIM Participating Resource if the EIM Resource—
- (A) meets the eligibility requirements established by the EIM Entity in whose Balancing Authority Area the resource is located or scheduled or to which

- it may be dynamically transferred; and
- (B) is capable of delivering Energy, Curtailable Demand, Demand Response Services, or similar services within the time specified by Section 29 for the Real-Time Market in which its EIM Participating Resource Scheduling Coordinator will submit Bids.
- (2) **EIM Participating Resource Agreement.** An EIM Participating Resource must execute an EIM Participating Resource Agreement.
- (3) **Obligations.** An EIM Participating Resource shall–
- (A) perform the obligations of an EIM Participating Resource under the EIM Participating Resource Agreement and Section 29;
- (B) perform the obligations applicable to Market Participants and resources under the provisions of the CAISO Tariff described in Section 29.1(b); and
- (C) if it represents a Generating Unit, Load of a Participating Load, Proxy Demand Resource, or other qualified resource, perform the obligations required for the resource under the provisions of the CAISO Tariff described in section 29.1(b).
- (e) **EIM Participating Resource Scheduling Coordinator.**
- (1) **Certification.** An EIM Participating Resource Scheduling Coordinator must be either an existing Scheduling Coordinator or must meet or have met the certification requirements in Section 4.5.1 for a Scheduling Coordinator.
- (2) **EIM Participating Resource Scheduling Coordinator Agreement.** An EIM Participating Resource Scheduling Coordinator must enter an EIM Participating Resource Scheduling Coordinator Agreement with the CAISO, which shall satisfy the obligation to enter a Scheduling Coordinator Agreement under Section 4.5.1 with regard to its representation of the EIM Participating Resource.
- (3) **Representation.** An EIM Participating Resource Scheduling Coordinator–
- (A) may represent a Market Participant other than an EIM Participating Resource, but only if it enters a Scheduling Coordinator Agreement

- under Section 4.5.1 with regard to such Market Participant;
- (B) may not also be an EIM Entity Scheduling Coordinator unless the EIM Participating Resource Scheduling Coordinator is a transmission provider subject to the standards of conduct set forth in 18 C.F.R. § 358; and
- (C) may represent more than one EIM Participating Resource.
- (4) **Obligations.** An EIM Participating Resource Scheduling Coordinator must–
- (A) perform the obligations of an EIM Participating Resource Scheduling Coordinator under the EIM Participating Resource Scheduling Coordinator Agreement and Section 29;
- (B) perform the obligations of a Scheduling Coordinator under the provisions of the CAISO Tariff described in Section 29.1(b);
- (C) ensure that the entity it represents has obtained any transmission service necessary to participate in the Energy Imbalance Market under the terms of the CAISO Tariff or the tariff of another transmission service provider, as applicable;
- (D) register in the manner set forth in the Business Practice Manual for the Energy Imbalance Market all EIM Participating Resources that it represents, provide such information to the EIM Entity Scheduling Coordinator, and update such information in a timely manner.

**29.5. [Not Used]**

## **29.6 Communications.**

- (a) **EIM Entity.** The EIM Entity shall meet the technical and communication requirements specified in the Business Practice Manual for the Energy Imbalance Market, which shall be based on the Inter-Control Center Communication Protocol and Reliability Standards.
- (b) **EIM Communications and OASIS.** Section 6 shall govern communications and information availability regarding the participation of EIM Market Participants in the Real-Time Market except that–
  - (1) references to internal resources shall be deemed to include EIM Resources;
  - (2) references in Sections 6.2.2.1 and 6.5.2.1 to the CAISO Controlled Grid and references in Sections 6.5.4.2.2(a) and 6.5.5.1.1 to CAISO Balancing Authority Area shall be deemed references to the EIM Area; and
  - (3) the provisions of Section 6.3.1 that authorize the CAISO to communicate directly with Generators and Demand Response Providers to ensure System Reliability shall not apply to Generators and Demand Response Providers in the EIM Entity's Balancing Authority Area or pseudo-tied from an external Balancing Authority Area to the EIM Entity Balancing Authority Area.
- (c) **Loss of Communications.**
  - (1) **Procedures.** The CAISO and each EIM Entity and EIM Entity Scheduling Coordinator shall establish procedures to address an interruption of Real-Time Market communications, which shall include steps to be taken to restore communications and address any impact on system or market operations as provided in Section 29.
  - (2) **Responsibilities.** An EIM Entity that loses communication with the CAISO remains responsible for managing its Balancing Authority Area imbalance needs without balancing Energy from the Real-Time Market.
- (d) **Variable Energy Resource Forecast Communications.** If the EIM Participating Resource Scheduling Coordinator for a Variable Energy Resource elects to use an independent forecasting service, it must make data transfer arrangements with the

CAISO for the CAISO to receive the forecast in a format and on a schedule set forth in the Business Practice Manual for the Energy Imbalance Market.

## **29.7 EIM Operations Under Normal And Emergency Conditions.**

- (a) **CAISO Controlled Grid Operations.** Section 7 shall not apply to EIM Market Participants in their capacities as such.
- (b) **Normal EIM Operations.** The CAISO shall administer the transmission capacity made available to the Real-Time Market to manage Energy imbalances in the EIM Area under normal operations.
- (c) **Load Curtailment.** The CAISO will not issue Dispatch Instructions to an EIM Entity Scheduling Coordinator with respect to Load or Demand that has not been bid into the Real-Time Market.
- (d) **Dispatch Instructions for EIM Participating Resources.** The CAISO will not issue Dispatch Instructions to an EIM Participating Resource Scheduling Coordinator with respect to Supply that has not been bid into the Real-Time Market.
- (e) **EIM Transfers.** The CAISO shall manage EIM Transfers as aggregate Dynamic Schedules with each EIM Entity Balancing Authority Area, which—
  - (1) shall not require individual resource E-Tags;
  - (2) shall not constitute inadvertent Energy;
  - (3) shall reflect intra-hour incremental EIM Transfers between the CAISO Balancing Authority Area and each EIM Entity Balancing Authority Area;
  - (4) shall be updated by the CAISO within 60 minutes after the end of each Operating Hour to include the integrated Energy during the hour for the sum of all EIM Transfers between each Balancing Authority Area in the EIM Area in accordance with WECC business practices for purposes of inadvertent Energy accounting; and
  - (5) shall be subsequently updated as necessary consistent with the requirements of WECC, NERC, and North American Energy Standards Board standards and business practices.

- (f) **Dynamic Imbalance Schedule to Net EIM Transfers.** The CAISO will—
  - (1) model changes in the net five-minute scheduled EIM Transfers that result from Real-Time Dispatch as a Dynamic Schedule between the CAISO and EIM Entity for AGC control accuracy; and
  - (2) calculate the dynamic net scheduled EIM Transfers for the CAISO and each EIM Entity Balancing Authority Area and derive from these dynamic net scheduled EIM Transfers the Dynamic Schedules on EIM Internal Interties for E-Tag purposes.
- (g) **EIM Manual Dispatch.** The EIM Entity may issue an EIM Manual Dispatch to an EIM Participating Resource or a non-participating resource in its Balancing Authority Area, outside of the Market Clearing of the Real-Time Market, when necessary to address reliability or operational issues in the EIM Entity Balancing Authority Area that the CAISO is not able to address through normal economic Dispatch and Congestion Management.
- (h) **EIM Entity Actions in Response to an EIM Manual Dispatch.** If the EIM Entity issues an EIM Manual Dispatch to address circumstances on its system—
  - (1) the EIM Entity shall immediately inform the CAISO, as specified in the Business Practice Manual for the Energy Imbalance Market, if the EIM Entity Balancing Authority Area is under manual operation;
  - (2) the EIM Entity shall immediately inform the CAISO of the EIM Manual Dispatch to any EIM Participating Resource or non-participating resource by submitting the EIM Manual Dispatch instruction for the affected resource to the CAISO as specified in the Business Practice Manual for the Energy Imbalance Market; and
  - (3) the EIM Entity remains responsible for informing the Reliability Coordinator of the circumstances creating the need for the EIM Manual Dispatch and may enforce Transmission Constraints, as may be required.
- (i) **CAISO Actions in Response to Notification of EIM Manual Dispatch.** Upon receipt of notice of an EIM Manual Dispatch, the CAISO shall—
  - (1) reflect the EIM Manual Dispatch in the Real-Time Market;

- (2) disregard an EIM Manual Dispatch in the determination of the Locational Marginal Price; and
  - (3) treat an EIM Manual Dispatch to an EIM Participating Resource or non-participating resource as FMM or RTD Instructed Imbalance Energy for Settlement.
- (j) **EIM Disruption.**
- (1) **Declaration.** The CAISO may declare an interruption of EIM Entity participation in the Real-Time Market when in its judgment—
    - (A) operational circumstances (including a failure of the Real-Time Market operation to produce feasible results in the EIM Area or other CAISO Market Disruption) in the EIM Area have caused or are in danger of causing an abnormal system condition in the CAISO Balancing Authority Area or an EIM Balancing Authority Area that requires immediate action to prevent loss of Load, equipment damage, or tripping system elements that might result in cascading Outages, or to restore system operation to meet Applicable Reliability Criteria; or
    - (B) communications between the CAISO and EIM Market Participants are disrupted and prevent an EIM Entity, EIM Entity Scheduling Coordinator, or EIM Participating Resource Scheduling Coordinator from accessing CAISO systems to submit or receive information.
  - (2) **CAISO Response to EIM Disruption.** If the CAISO declares an interruption of EIM Entity participation in the Real-Time Market, the CAISO may in its judgment, among other things—
    - (A) separate the affected EIM Entity Balancing Authority Area from the EIM Area and maintain the Real-Time Market for other Balancing Authority Areas in the EIM Area by enforcing a net transfer constraint for the affected Balancing Authority Area to separate it from the remainder of the EIM Area;

- (B) reduce or suspend EIM Transfers between one or more Balancing Authority Areas in the EIM Area;
  - (C) instruct one or more EIM Entities to maintain system balance within their Balancing Authority Area without RTM Dispatch; or
  - (D) in addition or as an alternative, establish an Administrative Price in the Real-Time Market in accordance with Section 7.7.4 or take any of the actions specified in Section 7.7.15 with respect to the Real-Time Market.
- (3) **EIM Entity Responsibility.** In response to an interruption of EIM Entity participation in the Real-Time Market by the CAISO, all EIM Entities shall follow NERC Reliability Standards applicable to their roles as Balancing Authorities in an effort to alleviate operational and system conditions and restore routine operations.
- (4) **EIM Entity Scheduling Coordinator Responsibility.** All EIM Entity Scheduling Coordinators shall promptly inform the CAISO of actions taken by the EIM Entities they represent in response to an interruption of EIM Entity participation in the Real-Time Market by the CAISO through updates to their EIM Base Schedules, Interchange E-Tags, transmission limit adjustments, or Outage and derate information, as applicable.
- (5) **System Restoration.** The CAISO shall reinstate normal operation of the Real-Time Market in the EIM Area at such time as it determines that the conditions that caused the interruption of EIM Entity participation in the Real-Time Market have been resolved.
- (k) **Congestion Management and Unscheduled Flow.**
- (1) **Inability to Resolve Congestion.** The CAISO will provide information to EIM Entities about Congestion that the Real-Time Market cannot resolve.
- (2) **Initiation of Unscheduled Flow Procedures.** The CAISO or an EIM Entity may initiate WECC's unscheduled flow mitigation procedure if applicable for conditions in its Balancing Authority Area.

- (3) **EIM Entity Action.** When the WECC unscheduled flow mitigation procedure is initiated, each EIM Entity shall adjust its schedules as determined by the WECC procedure and immediately inform the CAISO of the changes.
- (4) **CAISO Action.** When WECC's unscheduled flow mitigation procedure is initiated, the CAISO shall reflect the affected EIM Market Participant schedules in the Real-Time Market as determined by the WECC procedure, EIM Entity, CAISO Operating Procedures, and Business Practice Manuals for the CAISO Balancing Authority Area and EIM Entity Balancing Authority Areas.

**29.8 [Not Used]**

**29.9 Outages and Critical Contingencies.**

- (a) **Applicability of Section 9.** Section 9 shall not apply to EIM Market Participants except as referenced in Section 29.9.
- (b) **Transmission Scheduled Outages.**
  - (1) **Responsibility.** The EIM Entity shall be responsible for performing engineering studies with regard to, and modeling and approving, Outages on transmission facilities for maintenance purposes within the EIM Entity Balancing Authority Area, including making any necessary arrangements for this purpose regarding the transmission capacity made available by an EIM Transmission Service Provider to the Real-Time Market.
  - (2) **Notice.** The EIM Entity Scheduling Coordinator shall submit notice of transmission Outages approved by the EIM Entity to the CAISO by the means set forth in the Business Practice Manual for the Energy Imbalance Market and at least seven Business Days prior the planned Outage.
  - (3) **Notice of Modification.** The EIM Entity Scheduling Coordinator may submit a notice of modification of an approved transmission Outage and any resulting updates to EIM Intertie limits to the CAISO by the means set forth in the Business Practice Manual for the Energy Imbalance Market and in accordance with the deadlines set forth in Section 9 and Section 29.9.

- (4) **Contents of Notice.** The EIM Entity Scheduling Coordinator notices of approved transmission Outages shall include—
- (A) the start and finish date for each Outage for maintenance purposes; and
  - (B) such information other than start and finish date as is required in Section 9.3.6 for transmission Operators seeking approval of Outages.
- (c) **Generation Maintenance Outages.**
- (1) **Responsibility.** The EIM Entity shall be responsible for performing engineering studies with regard to, and modeling and approving, Outages of EIM Resources and non-participating resources for maintenance purposes within the EIM Entity Balancing Authority Area.
  - (2) **Notice.** The EIM Entity Scheduling Coordinator shall submit notice of Outages of EIM Resources and non-participating resources approved by the EIM Entity to the CAISO by the means set forth in the Business Practice Manual for the Energy Imbalance Market and at least seven Business Days prior to the planned Outage.
  - (3) **Contents of Notice.** The EIM Entity Scheduling Coordinator notices of approved Outages of EIM Resources and non-participating resources shall include—
    - (A) the start and finish date for each Outage for maintenance purposes; and
    - (B) such information other than start and finish date as is required in Section 9.3.6 for Operators seeking approval of Generating Unit Outages.
- (d) **Actions Regarding Scheduled Outages.**
- (1) **CAISO Evaluation of Scheduled Outages.** The CAISO will implement the transmission and Generation Outages approved by the EIM Entity through the Day-Ahead Market process and will inform the EIM Entity Scheduling Coordinator of any anticipated overloads.
  - (2) **EIM Entity Action.** Based on the information provided by the CAISO to the EIM Entity Scheduling Coordinator, the EIM Entity shall take such action to adjust or cancel Outages as it determines to be necessary and inform the Reliability

Coordinator.

- (e) **Forced Outages.** An EIM Entity Scheduling Coordinator shall comply with the reporting provisions of Section 9 with regard to Forced Outages of transmission facilities within the Balancing Authority Area of the EIM Entity it represents and an EIM Participating Resource Scheduling Coordinator shall comply with the reporting provisions of Section 9 with regard to Forced Outages of Generating Units it represents as EIM Resources.
- (f) **Transmission Limits.** An EIM Entity Scheduling Coordinator must notify the CAISO by the means specified in the Business Practice Manual for the Energy Imbalance Market with respect to transmission limits on the transmission capacity made available to the Real-Time Market within the EIM Entity Balancing Authority Area that need to be enforced in the Real-Time Market, including—
  - (1) physical MVA or MW limits under base case and contingencies;
  - (2) scheduling limits for EIM Intertie transactions based on E-Tags; and
  - (3) contractual limits on Transmission Interfaces where the EIM Transmission Service Provider has transmission rights.

#### **29.10. Metering and Settlement Data.**

- (a) **Telemetry Requirements.** The EIM Entity shall ensure that each EIM Resource and non-participating resource in an EIM Entity Balancing Authority Area that is not a Generating Unit or is a Generating Unit with a rated capacity of 10 MW or greater (including each aggregated resource with a total rated capacity of 10 MW or greater) and each EIM Intertie has telemetry meeting the requirements of the Business Practice Manual for the Energy Imbalance Market.
- (b) **Metering for Settlement Purposes.** The EIM Entity shall ensure that each EIM Participating Resource and non-participating resource in an EIM Entity Balancing Authority Area becomes either a CAISO Metered Entity or a Scheduling Coordinator Metered Entity and complies with the requirements of Section 10 except as provided in Section 29.10(c).
- (c) **Exception to Requirements of Section 10.3.9.** In the absence of metering standards

set by a Local Regulatory Authority, EIM Participating Resources and non-participating resources in an EIM Entity Balancing Authority Area may qualify as Scheduling Coordinator Metered Entities without the need for third party certification if the CAISO determines that the applicable metering standards meet or exceed the standards for CAISO Metered Entities.

- (d) **Interchange Meter Data.** Metering for Settlement purposes is required for all EIM Interties.
- (e) **EIM Energy Imbalance with an External Balancing Authority Area.** For each EIM External Intertie Bid that clears the FMM resulting in a 15-minute EIM External Intertie schedule, the EIM Entity Scheduling Coordinator must submit to the CAISO the corresponding hourly transmission profile and 15-minute Energy profiles from the respective E-Tags, which must reflect the Point of Receipt and Point of Delivery that was declared in the FMM Bid submittal, at least 20 minutes before the start of the Operating Hour.

#### **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 rate of \$0.19/MWh, applied as specified in Section 29.11(i)(2) and (3).
  - (2) **Calculation.** The CAISO will calculate MWh subject to the EIM Administrative Charge rate for each EIM Market Participant as—
    - (i) the greater of (a) the sum of the gross absolute value of FMM Instructed Imbalance Energy, gross absolute value of RTD Instructed Imbalance Energy, and gross absolute value of Uninstructed Imbalance Energy of the EIM Market Participant's Supply, or (b) five percent of the total gross absolute value of Supply of all EIM Market Participants; plus
    - (ii) the greater of (a) the absolute value of the gross Uninstructed Imbalance

Energy of the EIM Market Participant's Demand, or (b) five percent of the total gross absolute value of Demand of all EIM Market Participants.

- (3) **Allocation.** The CAISO will calculate the total of the amount of the EIM Administrative Charge for each EIM Market Participant by multiplying the rate specified in Section 29.11(i)(1) by the MWh calculated pursuant to Section 29.11(i)(2) and will allocate that charge—
- (i) to the sum of (a) the total gross absolute value of FMM Instructed Imbalance Energy, gross absolute value of RTD Instructed 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, and
  - (ii) to the extent not all EIM Administrative Charges are allocated pursuant to Section 29.11(i)(3)(i), the remaining amounts to the applicable 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 of charges to EIM Market

Participants pursuant to Sections 11 and 29.11, the CAISO shall assess such charges, address disputed invoices, assess 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 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.

## **29.12 Creditworthiness.**

- (a) **Requirements.** EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators shall comply with the credit and other requirements of Section 12.
- (b) **Credit Default.** In the event of a failure to satisfy the credit or other requirements in Section 12, the consequences specified in Section 12 shall apply to EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators.

## **29.13 Dispute Resolution.**

- (a) **Invoices.** Confirmation and validation of any dispute associated with the participation of EIM Market Participants in the Real Time Market is subject to Section 11.29.8 and shall be managed through the CAISO's customer inquiry, dispute, and information system and as provided in the Business Practice Manual for the Energy Imbalance Market.
- (b) **Other Disputes.** EIM Market Participants shall be subject to dispute resolution pursuant to Section 13.

**29.14 Uncontrollable Forces, Indemnity, Liabilities, and Penalties.** The provisions of Section 14 regarding Uncontrollable Forces, indemnity, liability, and penalties shall apply to the participation of EIM Market Participants in the Real-Time Market.

## **29.15 [Not Used]**

## **29.16 [Not Used]**

**29.17 EIM Transmission System.**

- (a) **Information.** Each EIM Entity shall–
- (1) deliver EIM Transmission Service Information to the CAISO regarding the network topology information associated with transmission capacity that it owns, controls, or has a contractual entitlement to that may be used in the Real-Time Market;
  - (2) deliver EIM Transmission Service Information to the CAISO regarding the network topology information associated with transmission capacity that each other EIM Transmission Service Provider owns, controls, or has a contractual entitlement to within the EIM Entity Balancing Authority Area that may be used in the Real-Time Market;
  - (3) update the EIM Transmission Service Information no less frequently than the timelines for updates to the Full Network Model as provided in the CAISO Tariff and Business Practice Manual for the Energy Imbalance Market; and
  - (4) ensure that the EIM Transmission Service Information is accurate and complete.
- (b) **Effectiveness.** The EIM Transmission Service Information shall only be used for operation of the CAISO Markets in accordance with the procedures set forth in the Business Practice Manual for the Energy Imbalance Market.
- (c) **Availability.** Each EIM Entity shall ensure that all EIM Transmission Service Providers in its Balancing Authority Area make available for use in the Real-Time Market transmission capacity that is included in the EIM Transmission Service Information and that is not otherwise encumbered, reserved, scheduled, or being used by its transmission customers or by others.
- (d) **Information on Availability.** Each EIM Entity Scheduling Coordinator shall inform the CAISO in the manner and by the deadlines specified in the Business Practice Manual for the Energy Imbalance Market regarding the availability of the transmission capacity identified in the EIM Transmission Service Information for use in the Real-Time Market.
- (e) **EIM Transfer Limit.** A Balancing Authority that has entered into an EIM Implementation

Agreement to become an EIM Entity shall establish and inform the CAISO of the maximum EIM Transfer limit at least ninety days prior to the EIM Entity Implementation Date in accordance with the Business Practice Manual for the Energy Imbalance Market.

- (f) **EIM Transfer Availability.** The EIM Transfer limit available for use in the Real-Time Market shall be determined by the EIM Entity Scheduling Coordinator and communicated to the CAISO prior to the start of the next Dispatch Interval in accordance with the procedures and timelines for submission and acceptance in the Business Practice Manual for the Energy Imbalance Market.

**29.18 [Not Used]**

**29.19 [Not Used]**

**29.20 Confidentiality.** The confidentiality provisions of Section 20 shall apply to participation of EIM Market Participants in the Real-Time Market.

**29.21 [Not Used]**

**29.22 Miscellaneous Provisions in Addition to Section 22.** Section 22 and the additional miscellaneous provisions of Section 29.22 shall apply to the Energy Imbalance Market.

- (a) **Tax Liability.** To the extent that the CAISO would incur any tax liability as a result of the participation of EIM Market Participants in the Real-Time Market, as market operator or as central counterparty to Energy Imbalance Market transactions, for example, the CAISO will pass those taxes on to the EIM Entity Scheduling Coordinator for the EIM Entity area where the transactions triggered the tax liability.
- (b) **Purchasing Selling Agent.** Neither the CAISO nor the EIM Entity is a “Purchasing Selling Entity” for purposes of E-Tagging or EIM Transfers, nor shall either be listed as a “Purchasing Selling Entity” for purposes of E-Tagging or EIM Transfers.
- (c) **Title to Energy.** Title to Energy in the Real-Time Market passes directly from the entity that holds title when the Energy enters the CAISO Controlled Grid or the transmission system of an EIM Transmission Service Provider, whichever is first following Dispatch, to the entity that removes the Energy from the CAISO Controlled Grid or the transmission system of a EIM Transmission Service Provider, whichever last precedes delivery to

Load.

**29.23 [Not Used]**

**29.24 [Not Used]**

**29.25 [Not Used]**

**29.26 Transmission Rates And Charges.**

(a) **Transmission Charges for CAISO Facilities.**

(1) **Access Charge.** Transmission service charges for Real-Time Market transactions serving Load within the CAISO Balancing Authority Area that use the CAISO Controlled Grid are governed by Section 26.

(2) **Wheeling Access Charge.** EIM Transfers from the CAISO Controlled Grid to another EIM Entity Balancing Authority Area using the contractual or ownership rights of an EIM Entity shall not constitute Wheeling Out and shall not be subject to the Wheeling Access Charge under Section 26.

(b) **Non-CAISO Facilities.** The determination and charges for transmission service for Real-Time Market transactions on facilities that are part of the contractual or ownership rights made available to the Real-Time Market by an EIM Transmission Service Provider through an EIM Entity will be the responsibility of the EIM Entity that made the facilities available, except that the EIM Entity shall ensure that no EIM Transmission Service Provider imposes a separate charge for EIM Transfers that use its facilities, provided that charges for transmission service in excess of contractual limits shall not be considered a separate charge.

**29.27 CAISO Markets And Processes.** The provisions of Section 27 that are applicable to the Real-Time Market shall apply to EIM Market Participants.

**29.28 Inter-SC Trades.** EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators may not submit Inter-SC Trades.

**29.29 [Not Used]**

- 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.
- 29.31 Day-Ahead.** EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators may not submit Bids in the CAISO's Day-Ahead Market on behalf of EIM Market Participants that they represent in their capacity as an EIM Entity Scheduling Coordinator or EIM Participating Resource Scheduling Coordinator.
- 29.32 Greenhouse Gas Regulation and EIM Bid Adders.**
- (a) **EIM Bid Adders.**
- (1) **In General.** EIM Participating Resources will have an opportunity to recover costs of compliance with California Air Resources Board greenhouse gas regulations, which may include the cost of allowances, uncertainty on the final resource specific emission factor, and other costs of greenhouse gas regulation compliance.
  - (2) **Bid Submission.** EIM Participating Resource Scheduling Coordinators may submit an EIM Bid Adder as a separate Bid component to recover costs of compliance with California Air Resources Board greenhouse gas regulations.
  - (3) **Cap on Bid Adder.** The sum of the EIM Bid Adder and the Energy cost portion of the Bid cannot exceed \$1000/MWh.
  - (4) **Minimum Bid Adder.** The EIM Bid Adder shall not be less than \$0/MWh.
  - (5) **Limit on Use of Bid Adders.** An EIM Participating Resource Scheduling Coordinator may submit no more than one Bid Adder per day for an EIM Resource.
- (b) **Consideration of EIM Bid Adders in Market Clearing.** The CAISO shall modify its Security Constrained Economic Dispatch in the Real-Time Unit Commitment and Real-Time Dispatch to take into account EIM Bid Adders in selecting Energy produced by EIM Resources outside the CAISO Balancing Authority Area for import into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California, but not when selecting EIM Resources to serve Load outside of the CAISO Balancing

Authority Area or other EIM Entity Balancing Authority Areas in California.

- (c) **Effect on Locational Marginal Price.** The marginal EIM Bid Adder shall be included as a negative component in the Locational Marginal Prices for EIM Entity Balancing Authority Areas in addition to those specified in Appendix C and Section 27.
- (d) **Notice to EIM Participating Resource.** The CAISO will notify the EIM Participating Resource Scheduling Coordinator through the Dispatch Instruction of the megawatt quantity of any Energy of an EIM Resource that is deemed to have been imported into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California as a result of the Market Clearing of the Real-Time Market.
- (e) **Compensation.** The CAISO will compensate the EIM Participating Resource Scheduling Coordinator for any Energy that is deemed to have been imported into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California at the marginal EIM Bid Adder price.
- (f) **Reporting Requirements.** The CAISO will report to each EIM Participating Resource Scheduling Coordinator the portion of the FMM Energy Schedule and the portion of RTD Energy Dispatch that is associated with Energy deemed to have been imported to the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California from all EIM Resources as part of the Real-Time Market results publication from each of its EIM Resources.

### **29.33 [Not Used]**

### **29.34 EIM Operations**

- (a) **In General.** Section 34, as supplemented by provisions in Section 29.34, will govern the operation of the Real-Time Market within the EIM Area.
- (b) **Applicability.** EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators will submit EIM Base Schedules and other necessary information to the CAISO for use in the Real-Time Market pursuant to Section 29.34 and not pursuant to Section 34.
- (c) **Submission Deadlines.** If an EIM Entity Scheduling Coordinator or EIM Participating

Resource Scheduling Coordinator fails to submit an EIM Base Schedule according to the timelines established in this Section 29.34, the CAISO will not accept the EIM Base Schedule or use it in the Real-Time Market.

(d) **Demand Forecast.**

- (1) **In General.** In accordance with procedures set forth in the Business Practice Manual for the Energy Imbalance Market, the CAISO shall develop short-term and mid-term Demand Forecasts by Demand Forecast zone within each EIM Entity Balancing Authority Area, separately from the CAISO Balancing Authority Area.
- (2) **Short Term Forecast.** The CAISO's short-term Demand Forecast for an EIM Entity Balancing Authority Area shall produce a value every five minutes for the duration of the CAISO's Dispatch horizon, which has five-minute granularity and extends several Dispatch Intervals.
- (3) **Mid-Term Forecast.** The CAISO's mid-term Demand Forecast for an EIM Entity Balancing Authority Area shall produce hourly values for the next hour through the next 7 days.
- (4) **EIM Entity Scheduling Coordinator Demand Forecast.**
  - (A) **In General.** An EIM Entity Scheduling Coordinator may opt to provide a non-binding EIM Entity Demand Forecast, net of behind-the-meter Generation that is not registered as an EIM Resource, as part of the hourly EIM Base Schedules.
  - (B) **Timing and Scope.** The EIM Entity Scheduling Coordinator must provide any such Demand Forecasts by 10:00 a.m. for the next 7 days.
  - (C) **Updates.** The EIM Entity Scheduling Coordinator must update any such Demand Forecast for each Operating Hour and the following 6 to 10 hours and submit the update to the CAISO no later than 75 minutes prior to the start of that Operating Hour, as part of its hourly EIM Base Schedule submission.

- (D) **Effect on Bid Requirement.** If the EIM Entity Demand Forecast is less than the CAISO Demand Forecast, then the EIM Entity's EIM Resource Plan must include sufficient Bids to cover the difference in Demand Forecasts.
- (5) **Posting.** Between 6:00 p.m. of the seventh day prior to the start of the Operating Day and 6:00 p.m. of the day prior to the Operating Day, the CAISO shall post and update hourly Demand Forecasts by Demand Forecast zone.
- (e) **EIM Resource Plan.**
- (1) **In General.** By 10:00 a.m. of the day preceding the Operating Day, the EIM Entity Scheduling Coordinators on behalf of non-participating resources and EIM Participating Resource Scheduling Coordinators on behalf of EIM Participating Resources, must submit all applicable components of the EIM Resource Plan as set forth in Section 29.34(e)(3).
- (2) **Scope.** The EIM Resource Plan components must cover a seven day horizon (with hourly detail for each resource) beginning with the Operating Day.
- (3) **Contents.** The EIM Resource Plan shall comprise—
- (A) EIM Base Schedules of EIM Entities and EIM Participating Resources;
  - (B) Energy Bids (applicable to EIM Participating Resources only);
  - (C) Reserve capacity meeting the WECC requirements for regulating reserves, in incremental MW (applicable to resources only);
  - (D) Reserve capacity meeting the WECC requirements for regulating reserves, in decremental MW (applicable to resources only);
  - (E) Spinning Reserves in MW;
  - (F) Non-Spinning Reserves in MW; and
  - (G) if the EIM Entity Scheduling Coordinator is not relying on the CAISO's Demand Forecast, a Demand Forecast.
- (4) **Contents of EIM Base Schedules.** EIM Base Schedules of EIM Entities must include hourly-level Demand Forecasts for EIM Demand, hourly-level schedules

for resources, and hourly-level scheduled Interchanges.

- (5) **Adjustment Prior to Submission of Real-Time EIM Base Schedules.** The EIM Entity Scheduling Coordinator may adjust the components of the EIM Resource Plan prior to the submission of Real-Time EIM Base Schedules up to 75 minutes before the Operating Hour.

(f) **Real-Time EIM Base Schedules.**

(1) **In General.**

(A) **Initial Submission.** EIM Entity Scheduling Coordinators, EIM Participating Resource Scheduling Coordinators, and non-participating resources in the EIM Entity Balancing Authority Area that wish to submit real-time hourly EIM Base Schedules, or, with regard to non-participating resources, wish to submit EIM Base Schedule information pursuant to Section 29.34(f)(4), must submit such schedules or other information consistent with the requirements of the Business Practice Manual for the Energy Imbalance Market and at least 75 minutes before the start of the Operating Hour.

(B) **Interim Revisions.** EIM Entity Scheduling Coordinators, EIM Participating Resource Scheduling Coordinators, and non-participating resources in the EIM Entity Balancing Authority Area may revise hourly Real-Time EIM Base Schedules, or, with regard to non-participating resources, revise EIM Base Schedule information submitted pursuant to Section 29.34(f)(4), meeting the requirements of the Business Practice Manual for the Energy Imbalance Market at or before 55 minutes before the start of the Operating Hour.

(C) **Final Revision.** EIM Entity Scheduling Coordinators may further revise hourly Real-Time EIM Base Schedules, including EIM Base Schedules for EIM Participating Resources, at or before 40 minutes before the start of the Operating Hour.

- (2) **EIM Base Schedule for EIM Participating Resources.** The EIM Base Schedule for each EIM Participating Resource must be within the Economic Bid range of the submitted Energy Bids for each Operating Hour for EIM Resources, which the CAISO will make available to the EIM Entity without price information.
- (3) **EIM Base Schedule for Imports and Exports.** EIM Base Schedules must disaggregate Day-Ahead import/export schedules between the EIM Entity Balancing Authority Area and the CAISO Balancing Authority Area, disaggregate the forward export schedules to other Balancing Authority Areas, and identify the relevant EIM Interties for imports and exports to an EIM Entity Balancing Authority Area from Balancing Authority Areas other than the CAISO Balancing Authority Area.
- (4) **EIM Base Schedule Aggregation.** In response to a request by an EIM Entity Scheduling Coordinator, the CAISO will establish an electronic interface by which non-participating resources, Loads, and other customers of the EIM Entity may submit EIM Base Schedule information to the EIM Scheduling Coordinator and the CAISO.
- (g) **Initial EIM Base Load Schedule.** The CAISO will derive an initial EIM Base Load Schedule for each EIM Entity from the Demand Forecast used for the EIM Entity Balancing Authority Area, estimated Transmission Losses, and an assumed Load distribution, pursuant to the methodology set forth in the Business Practice Manual for the Energy Imbalance Market.
- (h) **Energy Bids.** EIM Participating Resource Scheduling Coordinators may submit Energy Bids in accordance with the timelines, processes, and requirements applicable to other resources submitting Energy Bids under Section 34.
- (i) **Interchange Schedules with Other Balancing Authorities.**
- (1) **In General.** EIM Entity Scheduling Coordinators must submit Interchange Schedules with other Balancing Authority Areas at the relevant EIM Interties and must update these Interchange Schedules with any adjustments, when

applicable, as part of the hourly EIM Resource Plan revision.

- (2) **Bidding EIM Intertie Transactions.** An EIM Participating Resource Scheduling Coordinator may bid a transaction at an EIM External Intertie into the FMM if both Balancing Authority Areas support 15-minute scheduling at the EIM External Intertie under FERC Order No. 764.
- (j) **CAISO Validation.** The CAISO Markets systems will validate the initial EIM Resource Plan by 1:00 p.m. on the day before the Operating Day, and within 15 minutes of the submission of EIM Base Schedules or adjustments to EIM Base Schedules, the CAISO will validate the EIM Resource Plan and notify the EIM Entity Scheduling Coordinator—
  - (1) if the EIM Resource Plan is not balanced;
  - (2) if the EIM Resource Plan provides insufficient Flexible Ramping Constraint capacity to meet requirements determined pursuant to Section 29.34(m); and
  - (3) if the CAISO anticipates Congestion based on the submitted EIM Resource Plans.
- (k) **EIM Resource Plan Balance.** If, after the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules according to Section 29.34(f)(1)(c), Supply in the EIM Base Schedules does not balance the Demand Forecast, the CAISO will adjust the Demand in the EIM Base Schedule to equal Supply.
- (l) **EIM Resource Plan Evaluation.**
  - (1) **Requirement.** The EIM Base Schedules for resources included in the EIM Resource Plan must balance the Demand Forecast for each EIM Entity Balancing Authority Area.
  - (2) **Insufficient Supply.** An EIM Resource Plan shall be deemed to have insufficient Supply if the sum of EIM Base Schedules from non-participating resources and the sum of the highest quantity offers in the Energy Bid range from EIM Participating Resources, including Interchange with other Balancing Authority Areas, is less than the total Demand Forecast that the EIM Entity Scheduling Coordinator has decided to use for the associated EIM Entity Balancing Authority

Area.

- (3) **Excess Supply.** An EIM Resource Plan shall be deemed to have excessive Supply if the sum of EIM Base Schedules from non-participating resources and the sum of the lowest quantity Bids in the Energy Bid range from EIM Participating Resources is greater than the total Demand Forecast that the EIM Entity Scheduling Coordinator has decided to use for the associated EIM Entity Balancing Authority Area.
- (m) **Flexible Ramping Constraint Requirement.**
- (1) **Responsibility.** Each EIM Entity Balancing Authority Area and the CAISO Balancing Authority Area will be responsible for meeting its own portion of the combined Flexible Ramping Constraint capacity requirements for the next hour as determined by Section 29.34(m).
- (2) **Nature.** The Flexible Ramping Constraint capacity requirement is a minimum requirement for each Balancing Authority Area in the EIM Area and each combination thereof based upon the EIM Transfer limit between Balancing Authority Areas.
- (3) **Determination.** Under the provisions of Section 29.34(m) and the procedures set forth in the Business Practice Manual for the Energy Imbalance Market, the CAISO will determine the Flexible Ramping Constraint capacity requirement using the CAISO Demand Forecast and CAISO Variable Energy Resource forecast for each Balancing Authority Area in the EIM Area and each combination thereof.
- (4) **Sufficiency Determination.**
- (A) **Review.** The CAISO will review the EIM Resource Plan pursuant to the process set forth in the Business Practice Manual for the Energy Imbalance Market and verify that it has sufficient Bids for Ramping capability to meet the EIM Entity Balancing Authority Area Flexible Ramping Constraint capacity requirement, as adjusted pursuant to

Sections 29.34(m)(4)(B) and (C).

- (B) **Pro Rata Reduction and Diversity Limit.** Each EIM Entity Balancing Authority Area Flexible Ramping Constraint capacity requirement shall be reduced by its pro rata share of the diversity benefit in the EIM Area as may be limited by the available net import EIM Transfer capability into that EIM Entity Balancing Authority Area.
  - (C) **Sufficiency of an EIM Entity Balancing Authority Area with a Net Outgoing EIM Transfer.** If an EIM Entity Balancing Authority Area has a net outgoing EIM Transfer (net export with reference to the EIM Base Schedule) before the Operating Hour, then the CAISO will apply a Flexible Ramping Constraint capacity requirement credit in determining the sufficiency of the Flexible Ramping Constraint capacity for that EIM Entity Balancing Authority Area equal to the net outgoing EIM Transfer before the Operating Hour.
  - (D) **Sufficiency of an EIM Entity Balancing Authority Area with a Net Ingoing EIM Transfer.** If an EIM Entity Balancing Authority Area has a net incoming EIM Transfer (net import with reference to the EIM Base Schedule) before the Operating Hour; then the Flexible Ramping Constraint capacity for that EIM Entity Balancing Authority Area will be considered sufficient if it meets its own Flexible Ramping Constraint capacity requirement, irrespective of the incoming EIM Transfer that results from Real-Time Dispatch in the EIM Area.
- (5) **Combinations of Constraints.** The CAISO shall determine the Flexible Ramping Constraint capacity requirement for all possible combinations of sufficient Balancing Authority Areas in the EIM Area, including requirements for individual Balancing Authority Areas in each combination, by reducing the total Flexible Ramping Constraint capacity requirement for each group of Balancing Authority Areas by the total amount of EIM Internal Intertie import capability to

that group from each Balancing Authority Area outside the group.

(n) **Effect of Resource Plan Insufficiency.**

- (1) **Resource Plan Balance.** If, after the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules as provided in Section 29.34(f)(1)(c), the EIM Resource Plan has insufficient supply as determined according to Section 29.34(l)—
  - (A) the CAISO will not include the EIM Entity Balancing Authority Area in any Flexible Ramping Constraints for any combination of Balancing Authority Areas;
  - (B) the CAISO will formulate only individual constraints for the EIM Entity Balancing Authority Area's individual Flexible Ramping Constraint capacity requirements; and
  - (C) the CAISO will hold the EIM Transfer limit into the EIM Entity Balancing Authority Area at the value for the last 15-minute interval.
- (2) **Flexible Ramping Insufficiency.** If, after the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules as provided in Section 29.34(f)(1)(c), the CAISO determines that an EIM Entity Balancing Authority Area has insufficient Flexible Ramping Constraint capacity according to Section 29.34(m), the CAISO will take the actions described in Section 29.34(n)(1).

- (o) **Transmission Constraint Relaxation.** If an EIM Entity Scheduling Coordinator's approved EIM Resource Plan does not have sufficient Bids to resolve Congestion, the CAISO will relax the relevant Transmission Constraints in the Market Clearing and the EIM Entity will become responsible for managing its congested Transmission Constraints through other means, and the CAISO will determine prices for Congestion consistent with Transmission Constraint relaxation parameters established in the Business Practice Manual for the Energy Imbalance Market until the Transmission Constraint is no longer binding in the Real-Time Market.

(p) **Operating Reserves.**

(1) **Schedules.**

- (A) **EIM Entity Responsibility.** Each EIM Entity is responsible for its contingency reserves, or share of such contingency reserves under the terms of a reserve sharing group agreement, and it and the reserve sharing group are responsible for deploying operating reserves, including regulating reserves, in conformance with NERC and WECC requirements.
- (B) **EIM Entity Scheduling Coordinator Responsibility.** The EIM Entity Scheduling Coordinator shall—
- (i) include any Energy deployed from reserves in the hourly EIM Base Schedules, if time permits, in which case they will be settled in the Real-Time Market;
  - (ii) otherwise include the Energy deployed from reserves as EIM Manual Dispatches, if time does not permit;
  - (iii) immediately inform the CAISO of events requiring Dispatch of operating reserves and resource EIM Base Schedule adjustments in response to contingencies;
  - (iv) if a resource's actual response differs from the resource EIM Base Schedule adjustment, provide a resource EIM Base Schedule update showing the actual resources dispatched during the event by no later than 1:00 a.m. seven days after the Operating Day in which the event occurred; and
  - (v) inform the CAISO of the amount of resource capacity that is reserved for contingency reserve responsibility by either ensuring that an Energy Bid for the resource is below the maximum operating limit of the resource or reducing the maximum operating limit of the resource.

(C) **CAISO Actions.**

- (i) **Prior to Update.** Until the CAISO receives resource operating limit updates from an EIM Entity Scheduling Coordinator, the CAISO will continue to send Dispatch Instructions based upon pre-event operating limits.
  - (ii) **After Update.** After EIM Base Schedule updates are received and Dispatches in the Real-Time Market reflect the updated Self-Schedules and operating limits, the CAISO shall account for the Dispatches in the net scheduled Interchange values that it provides to EIM Entity Scheduling Coordinators.
- (2) **Updates to Data for Reserve Sharing Event.**
- (A) **Responsibilities.** Immediately following a reserve sharing event impacting the EIM Entity Balancing Authority Area—
    - (i) the EIM Entity must submit information regarding the assistance provided, including impacts to Balancing Authority Area Load schedules for each participant involved in the reserve sharing event; and
    - (ii) the EIM Entity Scheduling Coordinator must submit to the CAISO EIM Manual Dispatch instructions for resources in the EIM Entity Balancing Authority Area deployed in response to the reserve sharing event, pursuant to the reserve sharing group's criteria.
  - (B) **Offsets.** Until 1:00 a.m. seven days following the reserve sharing event impacting the EIM Entity Balancing Authority Area, the EIM Entity may offset the Load schedules created by the reserve sharing event by entering resource to Load schedules, reflecting generation resources actually utilized to assist in the event.
- (q) **Variable Energy Resource Production Forecast.** The CAISO shall treat Variable Energy Resources in accordance with Section 34.

**29.35 Market Validation And Price Correction.** Market validation and price correction for the Energy Imbalance Market shall be governed by Section 35, except that, for a period not to exceed 90 days after an EIM Entity Implementation Date, the time allowed for the CAISO's correction of Real-Time Market prices shall be 10 Business Days.

**29.36 [Not Used]**

**29.37 Rules Of Conduct.** All EIM Market Participants shall be subject to the provisions of Section 37 except for Section 37.2.

**29.38 Market Monitoring.** The CAISO Department of Market Monitoring shall provide market monitoring services for the participation of EIM Market Participants in the Real-Time Market, including—

- (a) monitoring markets administered by the CAISO for actual or potential ineffective market rules, market abuses, market power, violations of FERC or CAISO Market rules prohibiting provision of false information, or market manipulation;
- (b) coordinating with CAISO business units that review and monitor the performance and quality of the CAISO Markets;
- (c) providing recommendations about potential market design flaws or ineffective market rules to the CAISO and FERC; and
- (d) referring a matter to FERC if the Department of Market Monitoring determines there is sufficient credible evidence that a violation of FERC or CAISO Market rules has occurred.

**29.39 EIM Market Power Mitigation.**

- (a) **EIM Market Power Mitigation Procedure.** The CAISO shall apply the Real-Time Local Market Power Mitigation procedure in Section 39.7 to the Energy Imbalance Market, except as provided in Section 29.39.
- (b) **Competitive Path Assessment.** The CAISO shall conduct the competitive path assessment to determine for each EIM Entity Balancing Authority Area whether a path is competitive or non-competitive, consistent with Section 39.7.2, except that—
  - (1) EIM Participating Resource Scheduling Coordinators shall submit information required by the CAISO to perform the competitive path assessment;

- (2) the competitive path assessment shall not exclude EIM Participating Resources from the test used to determine the competitiveness of Transmission Constraints on the basis that they may be net buyers of Energy in the Real-Time Market; and
  - (3) the CAISO may establish different Reference Buses for each Balancing Authority Area, which need not be within the Balancing Authority Area, for calculating the LMP decomposition which is used to trigger Bid mitigation, based on the topology of each Balancing Authority Area and consideration of the bus at which the Marginal Cost of Congestion component of Locational Marginal Prices is least influenced by market power.
- (c) **Locational Marginal Price Decomposition.** The CAISO shall perform the Locational Marginal Price decomposition for each EIM Entity Balancing Authority Area using the results of the competitive path assessment and the Congestion pricing results of the pre-market run to determine which resources may have local market power due to Congestion on a non-competitive Transmission Constraint, consistent with Section 34.2.3 and 39.7, except that—
- (1) the CAISO will not mitigate resource Bids for scheduling limit constraints with Balancing Authority Areas that do not participate in the Real-Time Market;
  - (2) the Locational Marginal Price decomposition shall only be triggered if the resource is effective at relieving an uncompetitive constraint within the same Balancing Authority Area in which the resource is located except as described in Section 29.39(c)(4);
  - (3) EIM Resources shall be mitigated to relieve congestion on uncompetitive constraints within the same Balancing Authority Area in which the EIM Resources are located except as described in Section 29.39(c)(4); and
- (d) **Market Power Mitigation of EIM Transfer Constraints.**
- (1) **Structural Competitiveness Assessment.** The Department of Market Monitoring may conduct a structural competitiveness assessment of an individual or group of entities within an EIM Entity Balancing Authority Area prior to or subsequent to

the EIM Implementation Date for the EIM Entity to evaluate market power based on factors which may include—

- (A) the Demand for Real-Time Imbalance Energy within the EIM Entity Balancing Authority Area;
- (B) the Supply owned or controlled by different entities with the EIM Entity Balancing Authority Area; and
- (C) the potential Supply available to the EIM Entity Balancing Authority Area from EIM Transfers.

(2) **Application of Market Power Mitigation.** The Department of Market Monitoring may include EIM Transfer constraints into an EIM Entity Balancing Authority Area on an EIM Internal Intertie in the Local Market Power Mitigation procedures under Section 39.7 if the CAISO determines that market power may exist based on a structural competitiveness assessment pursuant to Section 29.39(d)(1) and the CAISO Governing Board authorizes such inclusion, and the Department of Market Monitoring may exclude the EIM Transfer constraints into an EIM Entity Balancing Authority Area on an EIM Internal Intertie from Local Market Power Mitigation if it determines that market power no longer exists based on a structural competitiveness assessment pursuant to Section 29.39(d)(1) and the CAISO Governing Board authorizes the exclusion.

(e) **Default Energy Bids.** The CAISO shall use the methods and standards set forth in Section 39.7 to determine Default Energy Bids for EIM Participating Resources.

**29.40 [Not Used]**

**29.41 [Not Used]**

**29.42 [Not Used]**

**29.43 [Not Used]**

**29.44 [Not Used]**

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## Appendix A Master Definition Supplement

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### **- Bid Cost Recovery (BCR) Eligible Resources**

Those resources eligible to participate in the Bid Cost Recovery as specified in Section 11.8, which include Generating Units, System Units, System Resources with RTM Economic bids, Participating Loads, Reliability Demand Response Resources, and Proxy Demand Resources and, for purposes of scheduling and operating the Real-Time Market only, EIM Resources. A System Resource that has a Schedule that results from Bids submitted in violation of Section 30.5.5 shall not be a Bid Cost Recovery Eligible Resource for any Settlement Interval that occurs during the time period covered by the Schedule that results from Bids submitted in violation of Section 30.5.5. Accepted Self-Schedule Hourly Blocks, cleared Economic Hourly Block Bids, and cleared Economic Hourly Block Bids with Intra-Hour Option are not eligible to participate in Bid Cost Recovery in the Real-Time Market.

\* \* \*

### **- CAISO Metered Entity**

- (a) any one of the following entities that is directly connected to the CAISO Controlled Grid:
  - i. a Generator other than a Generator that sells all of its Energy (excluding any Station Power that is netted pursuant to Section 10.1.3) and Ancillary Services to the Utility Distribution Company or Small Utility Distribution Company in whose Service Area it is located;
  - ii. an MSS Operator; or
  - iii. a Utility Distribution Company or Small Utility Distribution Company; and
- (b) any one of the following entities:
  - i. a Participating Generator;
  - ii. a Participating TO in relation to its Tie Point Meters with other TOs or Balancing Authority Areas;
  - iii. a Participating Load;
  - iv. a Participating Intermittent Resource;

- v. an EIM Participating Resource that has elected not to be a Scheduling Coordinator Metered Entity, with regard to the EIM Resources it specifies that it represents as a CAISO Metered Entity; or
- vi. a utility that requests that Unaccounted For Energy for its Service Area be calculated separately, in relation to its meters at points of connection of its Service Area with the systems of other utilities.

\* \* \*

**- Connected Entity**

A Participating TO or any party that owns or operates facilities that are electrically interconnected with the CAISO Controlled Grid or, for purposes of scheduling and operating the Real-Time Market only, electrically connected with the transmission system of an EIM Transmission Service Provider.

\* \* \*

**- Curtailable Demand**

Demand from a Participating Load or Aggregated Participating Load that can be curtailed at the direction of the CAISO in the Real-Time Dispatch of the CAISO Controlled Grid or, for purposes of scheduling and operating the Real-Time Market only, in the EIM Area.

\* \* \*

**- Demand**

The instantaneous amount of Energy that is delivered to Loads and Scheduling Points by Generation, transmission or distribution facilities. It is the product of voltage and the in-phase component of alternating current measured in units of watts or standard multiples thereof, e.g., 1,000W=1kW, 1,000kW=1MW, etc.

\* \* \*

**- EIM Area**

The combined CAISO Balancing Authority Area and all EIM Entity Balancing Authority Areas.

**- EIM Base Load Schedule**

A forward Energy Schedule prepared by the CAISO that provides hourly Demand Forecasts for EIM Demand, as adjusted for transmission losses and any unbalanced EIM Base Schedule.

**- EIM Base Schedule**

An hourly forward Energy Schedule that does not take into account Dispatches from the Real-Time Market and is submitted by an EIM Entity Scheduling Coordinator or EIM Participating Resource Scheduling Coordinator for use in the Real-Time Market.

**- EIM Bid Adder**

A Bid component that provides EIM Participating Resources an opportunity to recover costs of compliance with California Air Resources Board greenhouse gas regulations.

**- EIM Demand**

Energy delivered to Load internal to an EIM Balancing Authority Area.

**- EIM Entity**

A Balancing Authority that represents one or more EIM Transmission Service Providers and that enters into an EIM Entity Agreement with the CAISO to enable the operation of the Real-Time Market in its Balancing Authority Area.

**- EIM Entity Agreement**

An agreement between an EIM Entity and the CAISO, a pro forma version of which is set forth in Appendix B.

**- EIM Entity Implementation Date**

The first Trading Day for an EIM Entity in the Real-Time Market.

**- EIM Entity Scheduling Coordinator**

The EIM Entity, or a third party designated by the EIM Entity, that is certified by the CAISO and that enters into an EIM Entity Scheduling Coordinator Agreement under which it is a Scheduling Coordinator and a Market Participant and is responsible for meeting the requirements specified in Section 29 on behalf of the EIM Entity.

**- EIM Entity Scheduling Coordinator Agreement**

An agreement between an EIM Entity Scheduling Coordinator and the CAISO, a pro forma version of which is set forth in Appendix B.

**- EIM External Intertie**

A point of interconnection between an EIM Entity Balancing Authority Area and an interconnected Balancing Authority Area other than a Balancing Authority Area in the EIM Area.

**- EIM Implementation Agreement**

An agreement between a Balancing Authority seeking to become an EIM Entity and the CAISO, the primary terms of which are set forth in Section 29.2(b).

**- EIM Internal Intertie**

A point of interconnection between an EIM Entity Balancing Authority Area and another Balancing Authority Area in the EIM Area.

**- EIM Intertie**

An EIM External Intertie or EIM Internal Intertie.

**- EIM Manual Dispatch**

A Dispatch by an EIM Entity to an EIM Participating Resource or a non-participating resource in its Balancing Authority Area, outside of Market Clearing of the Real-Time Market.

**- EIM Market Participant**

An EIM Entity, EIM Entity Scheduling Coordinator, EIM Participating Resource, or EIM Participating Resource Scheduling Coordinator.

**- EIM Measured Demand**

The metered CAISO Demand and metered EIM Demand plus Real-Time Interchange Export Schedules, excluding that portion of Demand of Non-Generator Resources dispatched as Regulation through Regulation Energy Management and EIM Transfers out of an EIM Entity Balancing Authority Area.

**- EIM Participating Resource**

An owner of, operator of, or seller of Energy from an EIM Resource that elects to participate in the Real-Time Market and enters into the EIM Participating Resource Agreement under which it is responsible for meeting the requirements specified in Section 29.

**- EIM Participating Resource Agreement**

An agreement between an EIM Participating Resource and the CAISO, a pro forma version of which is set forth in Appendix B.

**- EIM Participating Resource Scheduling Coordinator**

The EIM Participating Resource, or a third party designated by the EIM Participating Resource, that is certified by the CAISO and enters into an EIM Participating Resource Scheduling Coordinator Agreement under which it is a Scheduling Coordinator and Market Participant and is responsible for meeting the requirements specified in Section 29 on behalf of the resource.

**- EIM Participating Resource Scheduling Coordinator Agreement**

An agreement between the EIM Participating Resource Scheduling Coordinator and the CAISO, a pro forma version of which is set forth in Appendix B.

**- EIM Resource**

A resource that (1) can deliver Energy, Curtailable Demand, Demand Response Services, or similar services; (2) is a Generating Unit, a Load of a Participating Load, or a Demand Response Resource or other CAISO qualified resource; and (3) is located within an EIM Entity Balancing Authority Area, and that is listed in and subject to an EIM Participating Resource Agreement.

**- EIM Resource Plan**

The combination of EIM Base Schedules for Demand, Generation, and Interchange, the ancillary services plans of the EIM Entity, and the Bid ranges of EIM Participating Resources, as specified in more detail in Section 29.34(e)(4).

**- EIM Transfer**

The transfer of Energy in Real-Time between an EIM Entity Balancing Authority Area and the CAISO Balancing Authority Area, or between EIM Entity Balancing Authority Areas, using transmission capacity made available to the Real-Time Market through the Energy Imbalance Market. The EIM Transfer is not a Real-Time Interchange Export Schedule or a Real-Time Interchange Import Schedule.

**- EIM Transmission Service Information**

Information provided by an EIM Entity to the CAISO about transmission capacity available for use in the Real-Time Market through the Energy Imbalance Market.

**- EIM Transmission Service Provider**

An EIM Entity or third party that owns transmission or has transmission service rights on an EIM Intertie that makes transmission service available for use in the Real-Time Market through an EIM Entity.

\* \* \*

**- End-Use Customer Or End-User**

A consumer of electric power who consumes such power to satisfy a Load directly connected to the CAISO Controlled Grid, a Distribution System, or, for purposes of scheduling and operating the Real-Time Market only, the transmission system of an EIM Transmission Service Provider and who does not resell the power.

\* \* \*

**- Energy Imbalance Market (EIM)**

The rules and procedures in Section 29 governing the CAISO's operation of the Real-Time Market in Balancing Authority Areas outside of the CAISO Balancing Authority Area and the participation of EIM Market Participants in the Real-Time Market.

\* \* \*

**- FMM Instructed Imbalance Energy (FMM IIE)**

The portion of Imbalance Energy resulting from Day-Ahead Schedules or EIM Base Schedules and FMM Schedules determined pursuant to Section 11.5.1.

\* \* \*

**- Generating Unit**

An individual electric generator and its associated plant and apparatus whose electrical output is capable of being separately identified and metered or a Physical Scheduling Plant that, in either case, is: (a) located within the CAISO Balancing Authority Area (which includes a Pseudo-Tie of a generating unit to the CAISO Balancing Authority Area) or, for purposes of scheduling and operating the Real-Time Market only, an EIM Entity Balancing Authority Area; (b) connected to the CAISO Controlled Grid, either directly or via interconnected transmission, or distribution facilities or via a Pseudo-Tie; and (c) capable of producing and delivering net Energy (Energy in excess of a generating station's internal power requirements).

\* \* \*

**- Interchange**

Imports and exports between the CAISO Balancing Authority Area and other Balancing Authority Areas and, for purposes of scheduling and operating the Real-Time Market only, between an EIM Entity Balancing Authority Area and another Balancing Authority Area.

**- Interchange Schedule**

A final agreed-upon schedule of Energy to be transferred between the CAISO Balancing Authority Area and another Balancing Authority Area and, for purposes of scheduling and operating the Real-Time Market only, between an EIM Entity Balancing Authority Area and another Balancing Authority Area.

\* \* \*

**- Market Participant**

An entity, including a Scheduling Coordinator, who (1) participates in the CAISO Markets through the buying, selling, transmission, or distribution of Energy, capacity, or Ancillary Services into, out of, or through the CAISO Controlled Grid; (2) is a CRR Holder or Candidate CRR Holder; (3) is a Convergence Bidding Entity; or (4), for purposes of scheduling and operating the Real-Time Market only, is an EIM Market Participant.

\* \* \*

**- Node**

A point in the Full Network Model representing a physical location within the CAISO Balancing Authority Area, the CAISO Controlled Grid, or the EIM Area, which includes the Load and Generating Unit busses in the EIM Area (which includes a Pseudo-Tie of a Generating Unit to a Balancing Authority Area in the EIM Area), and at the Intertie busses between (i) the CAISO Balancing Authority Area or an EIM Entity Balancing Authority Area and (ii) an interconnected Balancing Authority Area.

\* \* \*

**- Point(s) Of Delivery (POD) Or Withdrawal**

Point(s) within the CAISO Balancing Authority Area or, for purposes of scheduling and operating the Real-Time Market only, the EIM Area where Energy and Ancillary Services are made available to a receiving party under this CAISO Tariff.

**- Point(s) Of Receipt (POR) Or Injection**

Point(s) within the CAISO Balancing Authority Area or, for purposes of scheduling and operating the Real-Time Market only, the EIM Area where Energy and Ancillary Services are made

available by a delivering party under this CAISO Tariff.

\* \* \*

**- Real-Time Congestion Offset**

The amount calculated pursuant to Section 11.5.4.1.1 for purposes of determining the non-zero offset amount allocation.

\* \* \*

**- Real-Time Imbalance Energy Offset**

The amount calculated pursuant to Section 11.5.4.1 for purposes of determining the non-zero offset amount allocation.

\* \* \*

**- Real-Time Unit Commitment (RTUC)**

An application of the RTM that runs every 15 minutes and commits Fast Start Units and Medium Start Units using the SCUC to adjust from Day-Ahead Schedules, EIM Base Schedules, and HASP Advisory Schedules.

\* \* \*

**- Reference Bus**

The Location(s) in the EIM Area relative to which mathematical quantities relating to powerflow solution will be calculated.

\* \* \*

**-Scheduling Coordinator**

An entity certified by the CAISO for the purposes of undertaking the functions specified in Section 4.5.3, including any entity certified by the CAISO as an EIM Entity Scheduling Coordinator or an EIM Participating Resource Scheduling Coordinator for the purposes of undertaking the functions specified in Section 29.

\* \* \*

**- Scheduling Coordinator Metered Entity**

A Generator, Eligible Customer, End-User, Reliability Demand Response Resource, or Proxy Demand Resource that is not a CAISO Metered Entity, an EIM Entity, or an EIM Participating

Resource that elects to be a Scheduling Coordinator Metered Entity with regard to some or all of the EIM Resources it represents.

\* \* \*

**- Settlement**

Process of financial settlement for products and services purchased and sold undertaken by the CAISO under Section 11 as supplemented by Section 29. Each Settlement will involve a price and a quantity.

\* \* \*

**- System Resource**

A group of resources, single resource, or a portion of a resource located outside of the CAISO Balancing Authority Area, or, for purposes of scheduling and operating the Real-Time Market only, outside of an EIM Entity Balancing Authority Area, or an allocated portion of a Balancing Authority Area's portfolio of generating resources that are either a static Interchange Schedule or directly responsive to that Balancing Authority Area's Automatic Generation Control (AGC) capable of providing Energy and/or Ancillary Services to the CAISO Balancing Authority Area or, for purposes of scheduling and operating the Real-Time Market only, to an EIM Entity Balancing Authority Area, provided that if the System Resource is providing Regulation to the CAISO it is directly responsive to AGC.

\* \* \*

**- Transmission Losses**

Energy that is lost as a natural part of the process of transmitting Energy from Generation to a Point Of Delivery Or Withdrawal.

\* \* \*

**- Unaccounted For Energy (UFE)**

The difference in Energy, for each utility Service Area and Settlement Period, between the net Energy delivered into the utility Service Area, adjusted for utility Service Area Transmission Losses, and the total Measured Demand within the utility Service Area adjusted for distribution losses using Distribution System loss factors approved by the Local Regulatory Authority. This

difference is attributable to meter measurement errors, power flow modeling errors, energy theft, statistical Load profile errors, and distribution loss deviations. For EIM Market Participants, the CAISO will calculate Unaccounted For Energy based on the EIM Entity Balancing Authority Area instead of the utility Service Area.

\* \* \*

**Appendix B.17**  
**EIM Entity Agreement (EIMEA)**

**THIS ENERGY IMBALANCE MARKET ENTITY AGREEMENT (“AGREEMENT”)** is established this \_\_\_\_ day of \_\_\_\_\_, \_\_\_\_ and is accepted by and between:

[Full legal name] (“EIM Entity”), having its registered and principal executive office at [address],  
and

**California Independent System Operator Corporation** (“CAISO”), a California nonprofit public benefit corporation having a principal executive office located at such place in the State of California as the CAISO Governing Board may from time to time designate.

The EIM Entity and the CAISO are hereinafter referred to as the “Parties.”

**Whereas:**

- A.** The Parties named above operate Balancing Authority Areas.
- B.** The EIM Entity provides transmission service in accordance with an open access transmission tariff (“OATT”), including balancing Energy services.
- C.** The CAISO operates the Real-Time Market pursuant to the CAISO Tariff.
- D.** There [are/are not] third party transmission service providers within the EIM Entity Balancing Authority Area that intend to enable Energy Imbalance Market services on their transmission systems.
- E.** The Parties are entering into this Agreement to enable the EIM Entity to participate in the CAISO’s Real-Time Market and to provide Energy Imbalance Market services within the EIM Entity Balancing Authority Area, including Real-Time transfers of Energy among the CAISO Balancing Authority Area and other EIM Entity Balancing Authority Areas.

NOW THEREFORE, in consideration of the mutual covenants set forth herein, **THE PARTIES AGREE** as follows:

**ARTICLE I**  
**DEFINITIONS AND INTERPRETATION**

- 1.1 Master Definitions Supplement.** All terms and expressions used in this Agreement shall have the same meaning as those contained in the Master Definitions Supplement to the CAISO Tariff.
- 1.2 Rules of Interpretation.** The following rules of interpretation and conventions shall apply to this Agreement:

- (a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;
- (b) the singular shall include the plural and vice versa;
- (c) the masculine shall include the feminine and neutral and vice versa;
- (d) “includes” or “including” shall mean “including without limitation”;
- (e) references to a Section, Article or Schedule shall mean a Section, Article or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;
- (f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented or restated through the date as of which such reference is made;
- (g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced or restated from time to time;
- (h) unless the context otherwise requires, any reference to a “person” includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having separate legal personality;
- (i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;
- (j) any reference to a day, week, month or year is to a calendar day, week, month or year;
- (k) unless the context requires otherwise, “or” is used in the conjunctive sense; and
- (l) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

## ARTICLE II

### RESPONSIBILITIES OF EIM ENTITY AND CAISO

- 2.1 Scope of Responsibilities.** The Parties are individually responsible for the efficient use and reliable operation of their Balancing Authority Areas consistent with the Reliability Standards established by the Western Electricity Coordinating Council (“WECC”) and the North American Electric Reliability Corporation (“NERC”), and in accordance with their respective tariffs on file with the Federal Energy Regulatory Commission (“FERC”). Nothing in this Agreement is intended to change, supersede, or alter either Party’s obligations to abide by NERC and WECC Reliability Standards or to provide open and

non-discriminatory transmission access in accordance with the terms of their respective FERC tariffs.

- 2.2 **Tariff Provisions.** The CAISO shall provide open access to the Real-Time Market in accordance with the terms of the CAISO Tariff. The EIM Entity shall have in effect provisions in its OATT to enable operation of the Real-Time Market in its Balancing Authority Area in accordance with the CAISO Tariff.
- 2.3 **EIM Entity Scheduling Coordinator.** The EIM Entity shall be represented by an EIM Entity Scheduling Coordinator, which may be the EIM Entity or another entity certified by the CAISO to perform the functions of an EIM Entity Scheduling Coordinator.
- 2.4 **EIM Transmission Service and Resource Information.** The EIM Entity shall provide information to the CAISO for Energy Imbalance Market purposes regarding the network topology of its Balancing Authority Area, non-participating resources, and loads in accordance with the CAISO Tariff and the Business Practice Manual for the Energy Imbalance Market. The EIM Entity is responsible for the accuracy and completeness of this information.
- 2.5 **EIM Transmission Availability.** The EIM Entity shall make available for use in the Real-Time Market transmission capacity on its system that is not otherwise encumbered, reserved, scheduled, or being used by its transmission customers or by others and shall make arrangements with third party transmission service providers within its Balancing Authority Area that intend to enable Energy Imbalance Market services on their transmission systems to provide such transmission capacity on their systems for use in the Real-Time Market. The EIM Entity shall provide the CAISO with real time information regarding the availability of transmission capacity for use in the Energy Imbalance Market as provided in the CAISO Tariff and Business Practice Manual for the Energy Imbalance Market.
- 2.6 **EIM Entity Corrective Actions.** The EIM Entity may take corrective action, subject to the provision of its OATT, to address an issue with Energy Imbalance Market implementation or operation consistent with Section 29 of the CAISO Tariff.

## ARTICLE III

### TERM AND TERMINATION

- 3.1 **Effective Date.** This Agreement shall be effective as of the later of the date it is executed by the Parties or the date it is accepted for filing and made effective by FERC and shall remain in full force and effect until terminated pursuant to Section 3.2 of this Agreement.
- 3.2 **Termination**
  - 3.2.1 **Termination by CAISO.** The CAISO may terminate this Agreement by giving written notice of termination pursuant to Section 29.1(d) of the CAISO Tariff or in the event that the EIM Entity commits any material default under this Agreement or Section 29 of the CAISO Tariff that, if capable of being remedied, is not remedied within thirty (30) days after the CAISO has given the EIM Entity written notice of the default, unless the default

is excused by reason of Uncontrollable Forces in accordance with Article IX of this Agreement. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if (1) the filing of the notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within sixty (60) days after issuance of the notice of default; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination or thirty (30) days after the date of the CAISO's notice of default, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

- 3.2.2 Termination by EIM Entity.** In the event that the EIM Entity no longer wishes to enable Energy Imbalance Market services within its Balancing Authority Area pursuant to the CAISO Tariff, it may terminate this Agreement on giving the CAISO not less than one-hundred and eighty (180) days written notice. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if (1) the request to file a notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within thirty (120) days of receipt of such request; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination or upon the next production date of the Full-Network Model release following the one-hundred and eighty (180) days after the CAISO's receipt of the EIM Entity's notice of termination, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.
- 3.3 No Termination Charge.** The CAISO shall not levy an exit fee or other charge associated with CAISO systems, procedures, or other changes required by the termination of the EIM Entity's participation in the Energy Imbalance Market as of the effective date of such notice, provided that EIM Entity obligations incurred under this Agreement prior to the effective date of such notice shall survive termination until satisfied.

## ARTICLE IV

### CAISO TARIFF

- 4.1 Agreement Subject to CAISO Tariff.** This Agreement shall be subject to Section 29 of the CAISO Tariff, which shall be deemed to be incorporated herein. The EIM Entity shall abide by, and shall perform, all of the obligations of EIM Entities under the CAISO Tariff.

## ARTICLE V

## COSTS

- 5.1 **Operating and Maintenance Costs.** The EIM Entity shall be responsible for all its costs incurred in connection with meeting its obligations under this Agreement.

## ARTICLE VI

### DISPUTE RESOLUTION

- 6.1 **Dispute Resolution.** The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Entity and references to the CAISO Tariff shall be read as references to this Agreement.

## ARTICLE VII

### REPRESENTATIONS AND WARRANTIES

- 7.1 **Representation and Warranties.** Each Party represents and warrants that the execution, delivery and performance of this Agreement by it has been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.
- 7.2 **Necessary Approvals.** The EIM Entity represents that all necessary rights, leases, approvals, permits, licenses, easements, access to operate in compliance with this Agreement have been or will be obtained by the EIM Entity prior to the effective date of this Agreement, including any arrangement with third party Balancing Authorities.

## ARTICLE VIII

### LIABILITY

- 8.1 **Liability.** The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to the EIM Entity and references to the CAISO Tariff shall be read as references to this Agreement.

## ARTICLE IX

### UNCONTROLLABLE FORCES

- 9.1 **Uncontrollable Forces Tariff Provisions.** Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Entity and references to the CAISO Tariff shall be read as references to this Agreement.

## ARTICLE X

## MISCELLANEOUS

- 10.1 Assignments.** Either Party may assign or transfer any or all of its rights or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the CAISO Tariff and no Party may assign or transfer any or all of its rights or obligations under this Agreement without such consent. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights or obligations under this Agreement as if said successor in interest were an original Party to this Agreement.
- 10.2 Notices.** Any notice, demand or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff, provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Entity and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 1. A Party must update the information in Schedule 1 of this Agreement as information changes. Such changes shall not constitute an amendment to this Agreement.
- 10.3 Waivers.** Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.
- 10.4 Governing Law and Forum.** This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply shall be brought in any of the following forums, as appropriate: any court of the State of California, any federal court of the United States of America located in the State of California, or, where subject to its jurisdiction, before the Federal Energy Regulatory Commission.
- 10.5 Consistency with Federal Laws and Regulations.** This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.
- 10.6 Merger.** This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.
- 10.7 Severability.** If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this

Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.

- 10.8 Amendments.** This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments for filing and made them effective. Nothing contained herein shall be construed as affecting in any way the right of the CAISO to unilaterally make application to FERC for a change in the rates, terms and conditions of this Agreement under Section 205 of the FPA and pursuant to FERC's rules and regulations promulgated thereunder, and the EIM Entity shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein.
- 10.9 Counterparts.** This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

**IN WITNESS WHEREOF**, the Parties hereto have caused this Agreement to be duly executed on behalf of each by and through their authorized representatives as of the date hereinabove written.

**California Independent System Operator Corporation**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**[NAME OF EIM ENTITY]**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

## **SCHEDULE 1**

### **NOTICES**

#### **[Section 10.2]**

##### **EIM Entity**

Name of Primary

Representative: \_\_\_\_\_

Title: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Email Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax No: \_\_\_\_\_

Name of Alternative

Representative: \_\_\_\_\_

Title: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Email Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax No: \_\_\_\_\_

**CAISO**

Name of Primary

Representative: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Email Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax No: \_\_\_\_\_

Name of Alternative

Representative: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Email Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax No: \_\_\_\_\_

## Appendix B.18

### **EIM Entity Scheduling Coordinator Agreement (EIMESCA)**

**THIS AGREEMENT** is made this \_\_\_\_ day of \_\_\_\_\_, \_\_\_\_ and is entered into, by and between:

- (1) **[Full legal name]** having a registered or principal executive office at **[address]** (the “EIM Entity Scheduling Coordinator”)

and

- (2) **CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION**, a California nonprofit public benefit corporation having a principal executive office located at such place in the State of California as the CAISO Governing Board may from time to time designate (the “CAISO”).

The EIM Entity Scheduling Coordinator and the CAISO are hereinafter referred to as the “Parties.”

Whereas:

- A. The EIM Entity Scheduling Coordinator has applied for certification or has been certified by the CAISO under the certification procedure referred to in Section 29 of the CAISO Tariff.
- B. The EIM Entity Scheduling Coordinator wishes to represent an EIM Entity under the terms and conditions set forth in Section 29 of the CAISO Tariff.

**NOW IT IS HEREBY AGREED as follows:**

**1. Definitions and Interpretation.**

- 1.1 Master Definitions Supplement.** Terms and expressions used in this Agreement shall have the same meanings as those contained in the Master Definitions Supplement to the CAISO Tariff.
- 1.2 Rules of Interpretation.** The following rules of interpretation and conventions shall apply to this Agreement:

- (a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;
- (b) the singular shall include the plural and vice versa;
- (c) the masculine shall include the feminine and neutral and vice versa;
- (d) “includes” or “including” shall mean “including without limitation”;

- (e) references to a Section, Article or Schedule shall mean a Section, Article or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;
- (f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented or restated through the date as of which such reference is made;
- (g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced or restated from time to time;
- (h) unless the context otherwise requires, any reference to a “person” includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having separate legal personality;
- (i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;
- (j) unless the context otherwise requires, “or” is used in the conjunctive sense;
- (k) any reference to a day, week, month or year is to a calendar day, week, month or year; and
- (l) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

## **2. Covenant of the EIM Entity Scheduling Coordinator.**

### **2.1 The EIM Entity Scheduling Coordinator agrees that:**

- 2.1.1** CAISO Tariff Section 29 governs all aspects of Energy Imbalance Market information submission, including the financial and technical criteria for EIM Entity Scheduling Coordinator EIM Base Schedule submissions, Settlement, information reporting requirements, and confidentiality restrictions;
- 2.1.2** It will abide by and will perform all of the obligations under Section 29 of the CAISO Tariff placed on EIM Entity Scheduling Coordinators in respect of all matters set forth therein, including ongoing obligations in respect of scheduling, Settlement, system security policy and procedures to be developed by the CAISO from time to time, billing and payments, confidentiality and dispute resolution;
- 2.1.3** It shall ensure that each EIM Entity that it represents enters into an EIM Entity Agreement in accordance with Section 29 of the CAISO Tariff;

**2.1.4** It shall have the primary responsibility to the CAISO, as principal, for all EIM Entity Scheduling Coordinator payment obligations under Section 29 of the CAISO Tariff; and

**2.1.5** Its status as an EIM Entity Scheduling Coordinator is at all times subject to Section 29 of the CAISO Tariff.

**3. Term and Termination.**

**3.1** This Agreement shall commence on the later of (a) \_\_\_\_\_ or (b) the date the EIM Entity Scheduling Coordinator is certified by the CAISO as an EIM Entity Scheduling Coordinator.

**3.2** This Agreement may be terminated in accordance with the provisions of Section 4.5.4.4 and 4.5.4.5 of the CAISO Tariff; provided, however, that any outstanding financial right or obligation or any other right or obligation under the CAISO Tariff of the EIM Entity Scheduling Coordinator that may have arisen under this Agreement, and any provision of this Agreement necessary to give effect to such right or obligation, shall survive such termination until satisfied. The CAISO shall timely file any notice of termination with FERC, if this Agreement has been filed with FERC, or must otherwise comply with the requirements of FERC rules regarding termination.

**4. Settlement Account.**

**4.1** The EIM Entity Scheduling Coordinator shall maintain at all times an account with a bank capable of Fedwire transfer and, at its option, may also maintain an account capable of ACH transfers, to which credits or debits that arise under Section 29 of the CAISO Tariff shall be made in accordance with the billing and Settlement provisions of Section 11 of the CAISO Tariff. Such account shall be the account as notified by the EIM Entity Scheduling Coordinator to the CAISO from time to time by giving at least 20 days written notice before the new account becomes operational, together with all information necessary for the CAISO's processing of a change in that account.

**5. Agreement to be bound by CAISO Tariff.**

**5.1** Section 29 of the CAISO Tariff is incorporated herein and made a part hereof. In the event of a conflict between the terms and conditions of this Agreement and any other terms and conditions set forth in the CAISO Tariff that may apply to EIM Entity Scheduling Coordinators, the terms and conditions of the CAISO Tariff shall prevail.

**6. Electronic Contracting.**

**6.1** All submitted information, applications, schedules, Bids, confirmations, changes to information on file with the CAISO and other communications conducted via electronic transfer (e.g. direct computer link, FTP file transfer, bulletin board, e-mail, facsimile or any other means established by the CAISO) shall have the same legal rights, responsibilities, obligations and other implications as set forth in the terms and conditions of Section 29 of the CAISO Tariff as if executed in written format.

- 7. Penalties and Sanctions.**
  - 7.1** The EIM Entity Scheduling Coordinator shall be subject to all penalties made applicable to EIM Entity Scheduling Coordinators set forth in Section 29 of the CAISO Tariff.
- 8. Costs.**
  - 8.1** The EIM Entity Scheduling Coordinator shall be responsible for all its costs incurred for the purpose of meeting its obligations under this Agreement.
- 9. Dispute Resolution.**
  - 9.1** The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Entity Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement.
- 10. Representation and Warranties.**
  - 10.1** Each Party represents and warrants that the execution, delivery and performance of this Agreement by it has been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.
- 11. Liability.**
  - 11.1** The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to the EIM Entity Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement.
- 12. Uncontrollable Forces.**
  - 12.1** Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Entity Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement.
- 13. Miscellaneous.**
  - 13.1** **Assignments.** Either Party may assign or transfer any or all of its rights and/or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the CAISO Tariff and no Party may assign or transfer any or all of its rights or obligations under this Agreement without such consent. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights and/or obligations under this Agreement as if said successor in interest was an original Party to this Agreement.

- 13.2 Notices.** Any notice, demand or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff, provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Entity Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 1. A Party must update the information in Schedule 1 of this Agreement as information changes. Such changes shall not constitute an amendment to this Agreement.
- 13.3 Waivers.** Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.
- 13.4 Governing Law and Forum.** This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply, shall be brought in any of the following forums, as appropriate: any court of the State of California, any federal court of the United States of America located in the State of California, or, where subject to its jurisdiction, before the Federal Energy Regulatory Commission.
- 13.5 Consistency with Federal Laws and Regulations.** This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.
- 13.6 Merger.** This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.
- 13.7 Severability.** If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.
- 13.8 Amendments.** This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments

for filing and made them effective. Nothing contained herein shall be construed as affecting in any way the right of the CAISO to unilaterally make application to FERC for a change in the rates, terms and conditions of this Agreement under Section 205 of the FPA and pursuant to FERC's rules and regulations promulgated thereunder, and the EIM Entity Scheduling Coordinator shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein.

- 13.9 Counterparts.** This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their respective authorized officials.

**California Independent System Operator Corporation**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**[Name of EIM Entity Scheduling Coordinator]**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

## SCHEDULE 1

### NOTICES

[Section 13.2]

#### EIM Entity Scheduling Coordinator

Name of Primary

Representative:

Title:

Company:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

Name of Alternative

Representative:

Title:

Company:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

#### CAISO

Name of Primary

Representative:

Title:

Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Email address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

Name of Alternative

Representative: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Email address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

## Appendix B.19

### **EIM Participating Resource Agreement (EIMPRA)**

**THIS ENERGY IMBALANCE MARKET PARTICIPATING RESOURCE AGREEMENT (“AGREEMENT”)** is established this \_\_\_\_ day of \_\_\_\_\_, \_\_\_\_ and is accepted by and between:

**[Full legal name]** (“EIM Participating Resource”), having its registered and principal executive office at [address],

and

**California Independent System Operator Corporation** (“CAISO”), a California nonprofit public benefit corporation having a principal executive office located at such place in the State of California as the CAISO Governing Board may from time to time designate.

The EIM Participating Resource and the CAISO are hereinafter referred to as the “Parties.”

**Whereas:**

- A.** The CAISO operates a Real-Time Market for Energy pursuant to the CAISO Tariff.
- B.** The EIM Participating Resource receives balancing Energy service from an EIM Entity in accordance with the EIM Entity’s open access transmission tariff or from another transmission service provider within the EIM Entity Balancing Authority Area.
- C.** The Parties wish to enter into this Agreement to establish the terms and conditions for participation in the CAISO’s Real-Time Market by the EIM Participating Resource in accordance with Section 29 of the CAISO Tariff.

NOW THEREFORE, in consideration of the mutual covenants set forth herein, **THE PARTIES AGREE** as follows:

#### **ARTICLE I**

##### **DEFINITIONS AND INTERPRETATION**

- 1.1 Master Definitions Supplement.** All terms and expressions used in this Agreement shall have the same meaning as those contained in the Master Definitions Supplement to the CAISO Tariff.
- 1.2 Rules of Interpretation.** The following rules of interpretation and conventions shall apply to this Agreement:

- (a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;
- (b) the singular shall include the plural and vice versa;
- (c) the masculine shall include the feminine and neutral and vice versa;
- (d) “includes” or “including” shall mean “including without limitation”;
- (e) references to a Section, Article or Schedule shall mean a Section, Article or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;
- (f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented or restated through the date as of which such reference is made;
- (g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced or restated from time to time;
- (h) unless the context otherwise requires, any reference to a “person” includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having separate legal personality;
- (i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;
- (j) unless the context otherwise requires, “or” is used in the conjunctive sense;
- (k) any reference to a day, week, month or year is to a calendar day, week, month or year; and
- (l) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

## ARTICLE II

### RESPONSIBILITIES OF EIM PARTICIPATING RESOURCE

- 2.1 EIM Participating Resource Scheduling Coordinator.** The EIM Participating Resource shall be represented by an EIM Participating Resource Scheduling Coordinator, which may be the EIM Participating Resource or another entity certified by the ISO to perform the functions of an EIM Participating Resource Scheduling Coordinator.
- 2.2 EIM Resources.** The EIM Participating Resource has identified on Schedule 1 all EIM Resources that it owns, operates, has a contractual entitlement to, or that otherwise will be included in the Master File.

- 2.2.1 Technical Characteristics.** The EIM Participating Resource has provided to the CAISO in Schedule 1 the required information regarding the operating characteristics of each EIM Resource listed in Schedule 1, in addition to any further level of detail that may be required by Section 29 of the CAISO Tariff.
- 2.2.2 Notification of Changes.** Sixty (60) days prior to changing any technical information in Schedule 1, the EIM Participating Resource shall notify the CAISO of the proposed changes. The CAISO shall post on the CAISO Website a schedule showing, for at least one year in advance, (i) the proposed dates on which the CAISO's Master File will be updated, which dates shall occur at least every three months; (ii) the dates on which the information contained in the revised Master File will become effective; and (iii) the deadlines by which changed technical information must be submitted to the CAISO in order to be tested and included in the next scheduled update of the CAISO's Master File. Unless the EIM Resource fails to test at the values in the proposed change(s), the change will become effective upon the effective date for the next scheduled update of the Master File, provided the EIM Participating Resource submits the changed information by the applicable deadline and is tested by the deadline. Subject to such notification this Agreement shall not apply to any EIM Resource identified in Schedule 1 which the EIM Participating Resource no longer owns or no longer has contractual entitlement to.

## ARTICLE III

### TERM AND TERMINATION

- 3.1 Effective Date.** This Agreement shall be effective as of the later of the date it is executed by the Parties or the date it is accepted for filing and made effective by FERC, if such FERC filing is required, and shall remain in full force and effect until terminated pursuant to Section 3.2 of this Agreement.
- 3.2 Termination**
- 3.2.1 Termination by CAISO.** Subject to Section 5.2, the CAISO may terminate this Agreement by giving written notice of termination in the event that the EIM Participating Resource commits any material default under this Agreement and/or the CAISO Tariff which, if capable of being remedied, is not remedied within thirty (30) days after the CAISO has given, to the EIM Participating Resource, written notice of the default, unless excused by reason of Uncontrollable Forces in accordance with Article X of this Agreement. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement was filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the filing of the notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within sixty (60) days after issuance of the notice of default; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if filed with FERC, or thirty (30) days after the date of the CAISO's notice of default, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

**3.2.2 Termination by EIM Participating Resource.** In the event that the EIM Participating Resource no longer wishes to submit Bids and transmit Energy over the CAISO Controlled Grid, it may terminate this Agreement, on giving the CAISO not less than ninety (90) days written notice, provided, however, that in accordance with Section 3.3, the EIM Participating Resource may modify Schedule 1 to remove EIM Resources which it no longer owns or no longer has contractual entitlement to and such modification shall be effective upon receipt by the CAISO. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement has been filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the request to file a notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within thirty (30) days of receipt of such request; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if such notice is required to be filed with FERC, or upon ninety (90) days after the CAISO's receipt of the EIM Participating Resource's notice of termination, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

## ARTICLE IV

### CAISO TARIFF

**4.1 Agreement Subject to CAISO Tariff.** This Agreement shall be subject to Section 29 of the CAISO Tariff, which shall be deemed to be incorporated herein. The EIM Participating Resource shall abide by, and shall perform all of the obligations under the CAISO Tariff placed on EIM Participating Resources in respect of all matters set forth therein.

**4.1.1 Additional EIM Participating Resource Requirements.** The EIM Participating Resource shall comply with all CAISO Tariff requirements associated with resource registration and the measurement and verification of the associated services to be provided for EIM Resources other than Generating Units or CAISO qualified resources delivering Energy.

## ARTICLE V

### PENALTIES AND SANCTIONS

**5.1 Penalties.** If the EIM Participating Resource fails to comply with any provisions of this Agreement, the CAISO shall be entitled to impose penalties and sanctions on the EIM Participating Resource. No penalties or sanctions may be imposed under this Agreement unless a CAISO Tariff provision providing for such penalties or sanctions has first been filed with and made effective by FERC. Nothing in the Agreement, with the exception of the provisions relating to the CAISO ADR Procedures, shall be construed as waiving the rights of the EIM Participating Resource to oppose or protest any penalty proposed by the CAISO to the FERC or the specific imposition by the CAISO of any FERC-approved penalty on the EIM Participating Resource.

- 5.2 Corrective Measures.** If the EIM Participating Resource fails to meet or maintain the requirements set forth in this Agreement or Section 29 of the CAISO Tariff, the CAISO shall be permitted to take any of the measures, contained or referenced in Section 29 of the CAISO Tariff, which the CAISO deems to be necessary to correct the situation.

## ARTICLE VI

### COSTS

- 6.1 Operating and Maintenance Costs.** The EIM Participating Resource shall be responsible for all its costs incurred in connection with meeting its obligations under this Agreement.

## ARTICLE VII

### DISPUTE RESOLUTION

- 7.1 Dispute Resolution.** The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Participating Resource and references to the CAISO Tariff shall be read as references to this Agreement.

## ARTICLE VIII

### REPRESENTATIONS AND WARRANTIES

- 8.1 Representation and Warranties.** Each Party represents and warrants that the execution, delivery and performance of this Agreement by it has been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.
- 8.2 Necessary Approvals.** The EIM Participating Resource represents that all necessary rights, leases, approvals, permits, licenses, easements, access to operate in compliance with this Agreement have been or will be obtained by the EIM Participating Resource prior to the effective date of this Agreement, including any arrangement with third party Balancing Authorities.

## ARTICLE IX

### LIABILITY

- 9.1 Liability.** The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to the EIM Participating Resource and references to the CAISO Tariff shall be read as references to this Agreement.

## ARTICLE X

### UNCONTROLLABLE FORCES

- 10.1 Uncontrollable Forces Tariff Provisions.** Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Participating Resource and references to the CAISO Tariff shall be read as references to this Agreement.

## ARTICLE XI

### MISCELLANEOUS

- 11.1 Assignments.** Either Party may assign or transfer any or all of its rights or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the CAISO Tariff and no Party may assign or transfer any or all of its rights or obligations under this Agreement without such consent. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights and/or obligations under this Agreement as if said successor in interest were an original Party to this Agreement.
- 11.2 Notices.** Any notice, demand or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff, provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Participating Resource and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 2. A Party must update the information in Schedule 2 of this Agreement as information changes. Such changes shall not constitute an amendment to this Agreement.
- 11.3 Waivers.** Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.
- 11.4 Governing Law and Forum.** This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the

laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply shall be brought in any of the following forums, as appropriate: any court of the State of California, any federal court of the United States of America located in the State of California, or, where subject to its jurisdiction, before the Federal Energy Regulatory Commission.

- 11.5 Consistency with Federal Laws and Regulations.** This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.
- 11.6 Merger.** This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.
- 11.7 Severability.** If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.
- 11.8 Amendments.** This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments for filing and made them effective. Nothing contained herein shall be construed as affecting in any way the right of the CAISO to unilaterally make application to FERC for a change in the rates, terms and conditions of this Agreement under Section 205 of the FPA and pursuant to FERC's rules and regulations promulgated thereunder, and the EIM Participating Resource shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein.
- 11.9 Counterparts.** This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

**IN WITNESS WHEREOF**, the Parties hereto have caused this Agreement to be duly executed on behalf of each by and through their authorized representatives as of the date hereinabove written.

**California Independent System Operator Corporation**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**[NAME OF EIM PARTICIPATING RESOURCE]**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

## **SCHEDULE 1**

### **EIM Resources**

**[Section 2.4]**

## **SCHEDULE 2**

### **NOTICES**

#### **[Section 11.2]**

##### **EIM Participating Resource**

Name of Primary

Representative: \_\_\_\_\_

Title: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Email Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax No: \_\_\_\_\_

Name of Alternative

Representative: \_\_\_\_\_

Title: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Email Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax No: \_\_\_\_\_

**CAISO**

Name of Primary

Representative: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Email Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax No: \_\_\_\_\_

Name of Alternative

Representative: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Email Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax No: \_\_\_\_\_

## Appendix B.20

### **EIM Participating Resource Scheduling Coordinator Agreement (EIMPRSCA)**

**THIS AGREEMENT** is made this \_\_\_\_ day of \_\_\_\_\_, \_\_\_\_ and is entered into, by and between:

- (1) **[Full legal name]** having a registered or principal executive office at **[address]** (the "EIM Participating Resource Scheduling Coordinator")  
and  
(2) **CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION**, a California nonprofit public benefit corporation having a principal executive office located at such place in the State of California as the CAISO Governing Board may from time to time designate (the "CAISO").

The EIM Participating Resource Scheduling Coordinator and the CAISO are hereinafter referred to as the "Parties."

Whereas:

- A. The EIM Participating Resource Scheduling Coordinator has applied for or has been certified by the CAISO under the certification procedure referred to in Section 29 of the CAISO Tariff.
- B. The EIM Participating Resource Scheduling Coordinator wishes to represent EIM Participating Resources under the terms and conditions set forth in Section 29 of the CAISO Tariff.

**NOW IT IS HEREBY AGREED as follows:**

1. **Definitions and Interpretation.**
  - 1.1 **Master Definitions Supplement.** Terms and expressions used in this Agreement shall have the same meanings as those contained in the Master Definitions Supplement to the CAISO Tariff.
  - 1.2 **Rules of Interpretation.** The following rules of interpretation and conventions shall apply to this Agreement:
    - (a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;
    - (b) the singular shall include the plural and vice versa;
    - (c) the masculine shall include the feminine and neutral and vice versa;
    - (d) "includes" or "including" shall mean "including without limitation";
    - (e) references to a Section, Article or Schedule shall mean a Section, Article or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;

- (f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented or restated through the date as of which such reference is made;
- (g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced or restated from time to time;
- (h) unless the context otherwise requires, any reference to a “person” includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having separate legal personality;
- (i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;
- (j) unless the context otherwise requires, “or” is used in the conjunctive sense;
- (k) any reference to a day, week, month or year is to a calendar day, week, month or year; and
- (l) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

## **2. Covenant of the EIM Participating Resource Scheduling Coordinator.**

### **2.1 The EIM Participating Resource Scheduling Coordinator agrees that:**

- 2.1.1** CAISO Tariff Section 29 governs all aspects of bidding and scheduling of Energy in the Real-Time Market, including (without limitation), the financial and technical criteria applicable to EIM Participating Resource Scheduling Coordinators, and other bidding, Settlement, information reporting requirements, and confidentiality restrictions applicable to EIM Participating Resource Scheduling Coordinators;
- 2.1.2** It shall abide by, and shall perform all of the obligations under Section 29 of the CAISO Tariff placed on EIM Participating Resource Scheduling Coordinators in respect of all matters set forth therein, including, without limitation, ongoing obligations in respect of scheduling, Settlement, system security policy and procedures to be developed by the CAISO from time to time, billing and payments, confidentiality, and dispute resolution;
- 2.1.3** It shall ensure that each EIM Participating Resource for which it submits Bids enters into an EIM Participating Resource Agreement in accordance with Section 29 of the CAISO Tariff;
- 2.1.4** It shall have the primary responsibility to the CAISO, as principal, for all EIM Participating Resource Scheduling Coordinator payment obligations pursuant to Section 29 of the CAISO Tariff; and

**2.1.5** Its status as an EIM Participating Resource Scheduling Coordinator is at all times subject to Section 29 of the CAISO Tariff.

**3. Term and Termination.**

**3.1** This Agreement shall commence on the later of (a) \_\_\_\_\_ or (b) the date the EIM Participating Resource Scheduling Coordinator is certified by the CAISO as an EIM Participating Resource Scheduling Coordinator.

**3.2** This Agreement may be terminated in accordance with the provisions of Section 4.5.4.4 and 4.5.4.5 of the CAISO Tariff; provided, however, that any outstanding financial right or obligation or any other right or obligation under the CAISO Tariff of the EIM Participating Resource Scheduling Coordinator that may have arisen under this Agreement, and any provision of this Agreement necessary to give effect to such right or obligation, shall survive such termination until satisfied. The CAISO shall timely file any notice of termination with FERC, if this Agreement has been filed with FERC, or must otherwise comply with the requirements of FERC rules regarding termination.

**4. Settlement Account.**

**4.1** The EIM Participating Resource Scheduling Coordinator shall maintain at all times an account with a bank capable of Fedwire transfer and, at its option, may also maintain an account capable of ACH transfers, to which credits or debits that arise under Section 29 of the CAISO Tariff shall be made in accordance with the billing and Settlement provisions of Section 11 of the CAISO Tariff. Such account shall be the account as notified by the EIM Participating Resource Scheduling Coordinator to the CAISO from time to time by giving at least 20 days written notice before the new account becomes operational, together with all information necessary for the CAISO's processing of a change in that account.

**5. Agreement to be bound by CAISO Tariff.**

**5.1** CAISO Tariff Section 29 is incorporated herein and made a part hereof. In the event of a conflict between the terms and conditions of this Agreement and any other terms and conditions set forth in the CAISO Tariff, the terms and conditions of the CAISO Tariff shall prevail.

**6. Electronic Contracting.**

**6.1** All submitted information, applications, schedules, Bids, confirmations, changes to information on file with the CAISO and other communications conducted via electronic transfer (e.g. direct computer link, FTP file transfer, bulletin board, e-mail, facsimile or any other means established by the CAISO) shall have the same legal rights, responsibilities, obligations and other implications as set forth in the terms and conditions of Section 29 of the CAISO Tariff as if executed in written format.

**7. Penalties and Sanctions.**

**7.1** The EIM Participating Resource Scheduling Coordinator shall be subject to all penalties made applicable to EIM Participating Resource Scheduling Coordinators set forth in Section 29 of the CAISO Tariff.

- 8. Costs.**
  - 8.1** The EIM Participating Resource Scheduling Coordinator shall be responsible for all its costs incurred for the purpose of meeting its obligations under this Agreement.
- 9. Dispute Resolution.**
  - 9.1** The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Participating Resource Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement.
- 10. Representation and Warranties.**
  - 10.1** Each Party represents and warrants that the execution, delivery and performance of this Agreement by it has been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.
- 11. Liability.**
  - 11.1** The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to the EIM Participating Resource Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement.
- 12. Uncontrollable Forces.**
  - 12.1** Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Participating Resource Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement.
- 13. Miscellaneous.**
  - 13.1** **Assignments.** Either Party may assign or transfer any or all of its rights and/or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the CAISO Tariff and no Party may assign or transfer any or all of its rights or obligations under this Agreement without such consent. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights and/or obligations under this Agreement as if said successor in interest was an original Party to this Agreement.
  - 13.2** **Notices.** Any notice, demand or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff, provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Participating Resource Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 1. A Party must update the information in Schedule 1 of this Agreement as information changes. Such changes shall not constitute an amendment to this Agreement.

- 13.3 Waivers.** Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.
- 13.4 Governing Law and Forum.** This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply, shall be brought in any of the following forums, as appropriate: any court of the State of California, any federal court of the United States of America located in the State of California, or, where subject to its jurisdiction, before the Federal Energy Regulatory Commission.
- 13.5 Consistency with Federal Laws and Regulations.** This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.
- 13.6 Merger.** This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.
- 13.7 Severability.** If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.
- 13.8 Amendments.** This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments for filing and made them effective. Nothing contained herein shall be construed as affecting in any way the right of the CAISO to unilaterally make application to FERC for a change in the rates, terms and conditions of this Agreement under Section 205 of the FPA and pursuant to FERC's rules and regulations promulgated thereunder, and the EIM Participating Resource Scheduling Coordinator shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein.
- 13.9 Counterparts.** This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their respective authorized officials.

**California Independent System Operator Corporation**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**[Name of EIM Participating Resource Scheduling Coordinator]**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

## SCHEDULE 1

### NOTICES

[Section 13.2]

#### EIM Participating Resource Scheduling Coordinator

Name of Primary

Representative:

Title:

Company:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

Name of Alternative

Representative:

Title:

Company:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

#### CAISO

Name of Primary

Representative:

Title:

Address:

City/State/Zip Code:

Email address:

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

Name of Alternative

Representative: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Email address: \_\_\_\_\_

Phone: \_\_\_\_\_

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**Attachment B – Marked**

**Tariff Amendments to Implement Energy Imbalance Market**

**California Independent System Operator Corporation**

**February 28, 2014**

## **11.5.4 Imbalance Energy Pricing; Non-Zero Offset Amount Allocation**

### **11.5.4.1 Real-Time Imbalance Energy Offset**

- (a) **Financial Value of EIM Transfers.** The CAISO will calculate the Real-Time Market financial value of EIM Transfers as the product of the MWh, either positive or negative, and the Locational Marginal Price of the pricing node at the corresponding EIM Internal Intertie.
- (b) **Initial Calculation.** The CAISO will initially calculate the Real-Time Imbalance Energy Offset to be recovered on a 5-minute basis for each Balancing Authority Area in the EIM Area as the sum of the financial value of EIM Transfers and the Settlement amounts for FMM Instructed Imbalance Energy and RTD Instructed Imbalance Energy, Uninstructed Imbalance Energy, EIM Bid Adders, and Unaccounted For Energy, and for the CAISO, Real-Time Virtual Bid Settlement, less the Balancing Authority Area Real-Time Congestion Offset determined under Section 11.5.4.1.1, and for the CAISO, plus the Real-Time Ancillary Services Congestion revenues and Virtual Awards settlements in the Real-Time Market in accordance with Section 11.3, less the Real-Time Congestion Offset and less the Real-Time Marginal Cost of Losses Offset.
- (c) **Adjustment.** The CAISO will adjust the initial calculation of the Real-Time Imbalance Energy Offset by—
- (1) dividing the sum of net EIM Transfers out of an EIM Entity Balancing Authority Area by the sum of the absolute value of Uninstructed Imbalance Energy due to Demand, the absolute value of Uninstructed Imbalance Energy due to Supply, the absolute value of Unaccounted For Energy, and the net EIM Transfers out of the Balancing Authority Area;
  - (2) multiplying the initial calculation of the Real-Time Imbalance Energy Offset by the ratio calculated in Section 11.5.4.1(c)(1); and
  - (3) reducing the Real-Time Imbalance Energy Offset of the EIM Entity Balancing Authority Area with the net transfer out by the amount calculated in Section

11.5.4.1(c)(2) and adding that amount to the EIM Entity Balancing Authority Area with the net transfer in to determine the final Real-Time Imbalance Energy Offset.

- (d) **Allocation.** The CAISO will allocate the adjusted Real-Time Imbalance Energy Offset—
- (1) for the CAISO Balancing Authority Area, to Scheduling Coordinators in the CAISO Balancing Authority Area according to Measured Demand; and
  - (2) for EIM Entity Balancing Authority Areas, to the applicable EIM Entity Scheduling Coordinator.
- (e) **Residual Neutrality Amounts.** The CAISO will allocate any residual Real-Time Imbalance Energy Offset amount to Scheduling Coordinators in the EIM Area based upon EIM Measured Demand.

**11.5.4.1.1 [Not Used] Real-Time Congestion Offset.**

- (a) **Real-Time Congestion Offset.** For each Settlement Period of the RTM, the CAISO shall calculate the Real-Time Congestion Offset as—
- (1) the sum for each Balancing Authority Area in the EIM Area of the product of the contribution of that Balancing Authority Area's Transmission Constraints to the marginal Congestion component of the Locational Marginal Price at each resource location in the EIM Area and the imbalance energy, including Virtual Bids, at that resource location;
  - (2) minus any Virtual Bid adjustment.
- (b) **Treatment of EIM Internal Interties.** In performing the calculation in subsection (a)(1) of this section, the CAISO shall determine a Balancing Authority Area's contribution at EIM Internal Interties based on the number of Balancing Authority Areas that share the EIM Internal Intertie as provided in the Business Practice Manual for the Energy Imbalance Market.
- (c) **Virtual Bid Adjustment.**
- (1) **Individual Constraint Calculation.** For each Transmission Constraint in an EIM Entity Balancing Authority Area, the CAISO will calculate a Virtual Bid adjustment as the product of that Transmission Constraint's FMM Shadow Price and the

lesser of—

- (A) the Flow Impact of Virtual Bids and
  - (B) the Flow Impacts of all Day-Ahead Scheduled Energy and EIM Base Schedules less the Flow Impacts of FMM Schedules,
- but not less than zero.

(2) **EIM Entity Balancing Authority Area Calculation.** Each EIM Entity Balancing Authority Area's Virtual Bid adjustment shall be the sum of the individual Transmission Constraint calculation for all Transmission Constraints within that EIM Entity Balancing Authority Area.

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

- (1) the Real-Time Congestion Offset for each EIM Entity Balancing Authority Area to the applicable EIM Entity Scheduling Coordinator;
- (2) the Real-time Congestion Offset for the CAISO Balancing Authority Area in accordance with Section 11.5.4.2; and
- (3) the Virtual Bid adjustment from each individual constraint calculation to each Scheduling Coordinator who submitted Virtual Bids based on that Scheduling Coordinator's Virtual Award's pro rata share of the gross positive Congestion revenues received by all Virtual Awards from that Transmission Constraint.

#### **11.5.4.1.2 Real-Time Marginal Cost of Losses Offset**

(a) **Calculation.** The CAISO will calculate the Real-Time Marginal Cost of Losses Offset for each Balancing Authority Area as the sum of the product of the Marginal Loss component of the LMP and all positive or negative FMM Instructed Imbalance Energy, RTD Instructed Imbalance Energy, Uninstructed Imbalance Energy, and Unaccounted For Energy in the Balancing Authority Area.

(b) **Allocation.** The CAISO will allocate the amounts determined according to section 11.5.4.1.2(a)—

- (1) for the CAISO Balancing Authority Area, according to section 11.5.4.2; and

(2) for EIM Entity Balancing Authority Areas, to the applicable EIM Entity Scheduling Coordinator.

\* \* \*

#### 11.8.6.3.2 Total Positive Net RUC Bid Cost Uplift and RTM Bid Cost Uplift

~~Any negative RUC and Real-Time Market Bid Cost Uplifts are set to \$0 and any positive The CAISO will determine the Net RUC Bid Cost Uplifts and Real-Time Market the Net RTM Bid Cost Uplifts are further reduced by the uplift ratio in Section 11.8.6.3.2(iii) to determine the Total RUC and RTM Uplift to be allocated to each Balancing Authority Area in the EIM Area as follows:~~

- (i) ~~For each Balancing Authority Area separately, the CAISO will calculate a combined RUC Bid Cost Uplift and RTM Bid Cost Uplift amount based on the RUC Bid Cost Shortfall, RUC Bid Cost Surplus, RTM Bid Cost Shortfall, and RTM Bid Cost Surplus of each supply resource located within the Balancing Authority Area for each Settlement Interval.~~
- (ii) ~~For each Balancing Authority Area separately, for each Trading Day, the CAISO will calculate a daily combined The Total RUC Bid Cost Uplift and RTM Bid Cost Uplift is determined amount as the sum of the Net RUC Bid Cost Uplift and the Net Real-Time Market Bid Cost Uplift for all the Settlement Intervals values calculated according to Section 11.8.6.3.2(i) in the RUC and Real-Time Market.~~
- (iii) ~~For each Balancing Authority Area separately, for each Trading Day, the CAISO will calculate a combined The Total Positive RUC Bid Cost Uplift and RTM Bid Cost Uplift is determined amount as the sum of the positive RUC Bid Cost Uplift and positive Real-Time Market Bid Cost Uplift, for all Settlement Intervals values calculated according to Section 11.8.6.3.2(i) in the RUC and Real-Time Market.~~
- (iv) ~~The CAISO will calculate the daily uplift ratio for the RUC and RTM, for each Balancing Authority Area in the EIM Area, is equal to as the daily combined Total RUC Bid Cost Uplift and RTM Bid Cost Uplift amount, calculated according to Section 11.8.6.2(ii), divided by the daily combined Total Positive RUC Bid Cost Uplift and RTM Bid Cost Uplift, calculated according to Section 11.8.6.2(iii).~~

- (v) For each Settlement Interval and each Balancing Authority Area in the EIM Area, the CAISO will multiply the applicable daily uplift ratio with each combined total positive RUC Bid Cost Uplift and each combined total RTM Bid Cost Uplift to determine the Net RUC Bid Cost Uplift and the preliminary Net RTM Bid Cost Uplift, respectively, for each Balancing Authority Area.
- (vi) The CAISO shall adjust the preliminary Net RTM Bid Cost Uplift amounts calculated in Section 11.8.6.3.2(v) by—
- dividing the sum of net EIM Transfers out of a Balancing Authority Area by the sum of the absolute value of Uninstructed Imbalance Energy due to Demand, the absolute value of Uninstructed Imbalance Energy due to Supply, the absolute value of Unaccounted For Energy, and the net EIM Transfer out of the Balancing Authority Area;
  - multiplying the preliminary Net RTM Bid Cost Uplift amounts by the ratio calculated in Section 11.8.6.3.2(vi)(a); and
  - reducing the preliminary Net RTM Bid Cost Uplift amounts of the EIM Entity Balancing Authority Area with the net transfer out by the amount calculated in Section 11.8.6.3.2(vi)(b) and adding that amount to the EIM Entity Balancing Authority Area with the net transfer in to determine the final preliminary Net RTM Bid Cost Uplift amounts.
- (vii) For each Settlement Interval, the Net RUC Bid Cost Uplift and final Net RTM Bid Cost Uplift apportionment by Settlement Interval for each Balancing Authority Area in the EIM Area will be the sum of the amounts calculated in Sections 11.8.6.3.2(v) and, for Net RTM Bid Cost Uplift only, 11.8.6.3.2(vi) for each Balancing Authority Area in the EIM Area.

\* \* \*

#### 11.8.6.6 Allocation of Net RTM Bid Cost Uplift

- (i) For the CAISO Balancing Authority Area, the CAISO will determine ~~T~~the hourly Net RTM Bid Cost Uplift ~~is computed for the Trading Hour as the product of the uplift ratio in~~

~~Section 11.8.6.3 and the sum over all of the Settlement Intervals of the Trading Hour of any positive Net RTM Bid Cost Uplift after the sequential netting determined~~ in Section 11.8.6.3.2. The hourly RTM Bid Cost Uplift in the CAISO Balancing Authority Area is allocated to Scheduling Coordinators, including Scheduling Coordinators for MSS Operators that have elected (a) not to follow their Load, and (b) gross Settlement, in proportion to their Measured Demand plus any FMM reductions not associated with valid and balanced ETCs, TORs or Converted Rights Self-Schedules in the Day-Ahead Market for the Trading Hour. For Scheduling Coordinators for MSS Operators that have elected (a) not to follow their Load, and (b) net Settlement, the hourly RTM Bid Cost Uplift is allocated in proportion to their MSS Aggregation Net Measured Demand plus any FMM reductions not associated with valid and balanced ETCs, TORs or Converted Rights Self-Schedules in the Day-Ahead Market. For Scheduling Coordinators of MSS Operators that have elected to follow their Load, the RTM Bid Cost Uplift shall be allocated in proportion to their MSS Net Negative Uninstructed Deviation plus any FMM reductions not associated with valid and balanced ETCs, TORs or Converted Rights Self-Schedules in the Day-Ahead Market. Accordingly, each Scheduling Coordinator shall be charged an amount equal to its Measured Demand plus any FMM reductions not associated with valid and balanced ETCs, TORs or Converted Rights Self-Schedules in the Day-Ahead Market times the RTM Bid Cost Uplift rate, where the RTM Bid Cost Uplift rate is computed as the Net RTM Bid Cost Uplift amount divided by the sum of Measured Demand plus any FMM reductions not associated with valid and balanced ETCs, TORs or Converted Rights Self- Schedules in the Day-Ahead Market across all Scheduling Coordinators for the Trading Hour. Any real-time reductions after HASP results are published to HASP Block Intertie Schedules in response to Dispatch Instructions or real-time scheduling curtailments are not allocated any Net RTM Bid Cost Uplift.

- (ii) For EIM Entity Balancing Authority Areas, the CAISO will allocate the amounts determined according to Section 11.8.6.3.2 to the applicable EIM Entity Scheduling Coordinator.

\* \* \*

#### **11.14            Neutrality Adjustments**

The CAISO shall be authorized to levy additional charges or make additional payments as special adjustments in regard to:

- (a) amounts required to reach an accounting trial balance of zero in the course of the Settlement process in the event that the charges calculated as due from CAISO Debtors are lower than payments calculated as due to the CAISO Creditors for the same Trading Day, which includes any amounts required to round up any invoice amount expressed in dollars and cents to the nearest whole dollar amount. These charges will be allocated amongst the Scheduling Coordinators who traded on that Trading Day pro rata to their Measured Demand in MWh of Energy for that Trading Day on a monthly basis. In the event that the charges due from CAISO Debtors are higher than the payments due to CAISO Creditors, the CAISO shall allocate a payment to the Scheduling Coordinators who traded on that Trading Day pro rata to their Measured Demand in MWh of Energy for that Trading Day on a monthly basis; and
- (b) awards payable by or to the CAISO pursuant to good faith negotiations or CAISO ADR Procedures that the CAISO is not able to allocate to or to collect from a Market Participant or Market Participants in accordance with Section 13.5.3. These charges will be allocated among Scheduling Coordinators over an interval determined by the CAISO and pro rata based on EIM Measured Demand during that interval, if the dispute concerned the Real-Time Market, or otherwise Measured Demand during that interval.

\* \* \*

#### **11.25            Flexible Ramping Constraint Compensation**

### **11.25.1 Determination of Flexible Ramping Constraint Shadow Price**

The CAISO will determine a Flexible Ramping Constraint Shadow Price as the reduction of the total Energy and Ancillary Services procurement cost associated with a marginal change at each constraint for the individual Balancing Authority Areas in the EIM Area and applicable groupings of those areas in which the constraint is enforced, which will be equal to zero (0) if the Flexible Ramping Constraint is not binding.

### **11.25.2 Compensation of Resources**

- (a) The CAISO will award Flexible Ramping Constraint capacity to all All resources identified as resolving the Flexible Ramping Constraint in the applicable RTUC interval are awarded Flexible Ramping Constraint capacity and will be compensated for such capacity and will pay the resource's Scheduling Coordinator, for each RTUC interval, whether or not the Flexible Ramping Constraint is binding, limited by the quantity of Flexible Ramping Constraint requirements set by the CAISO operators as follows: The Scheduling Coordinator is paid
- (b) The CAISO will calculate the payment as the product of the
- (1) the upward MW of capacity identified to satisfy the constraint(s) in the groupings and individual Balancing Authority Areas in the EIM Area in which it participates to relieve the constraints in the groupings and individual Balancing Authority Areas in the EIM Area in which it participates to relieve the constraint(s), multiplied by 0.25 hours, and
- (2) the Flexible Ramping Constraint Derived Price calculated for each applicable fifteen-minute FMM interval as described further in this Section 11.25.1. Payment to resources will be rescinded as set forth in Section 11.25.2.

#### **11.25.2.1 Flexible Ramping Constraint Derived Price**

- (a) For each applicable fifteen-minute FMM interval, the Flexible Ramping Constraint Derived Price is equal to the lesser of:
- (1) \$800/MWh; or

(2) \_\_\_\_ the greater of: (a) zero (0), or

(bi) \_\_\_\_ the Real-Time ASMP for Spinning Reserves for the applicable fifteen-minute FMM interval; or

(eii) \_\_\_\_ the total Flexible Ramping Constraint Shadow Price, but not less than zero.

(b) The CAISO will determine the total Flexible Ramping Constraint Shadow Price as the sum of the Flexible Ramping Constraint Shadow Prices for the groupings and individual Balancing Authority Areas in the EIM Area in which the resource is deemed to have contributed to the constraint, minus seventy-five (75) percent of the maximum greater of

(i1) \_\_\_\_ zero (0), or

(i2) \_\_\_\_ the Real-Time System Marginal Energy Cost, calculated as the simple average of the System Marginal Energy Cost for each of the three five-minute RTD intervals in the applicable fifteen-minute FMM interval. The Shadow Price of the binding Flexible Ramping Constraint represents the reduction of the total Energy and Ancillary Services procurement cost associated with a marginal change of that constraint for the applicable groupings and individual EIM Area Balancing Authority Areas in which the constraint is enforced, which is equal to zero (0) if the Flexible Ramping Constraint is not binding. All costs associated with payments made pursuant to this Section 11.25 are allocated to all Scheduling Coordinators pursuant to the requirements set forth in Section 11.25.3.

#### **11.25.32 Rescission of Payment for Non-Performance**

(a) The CAISO will rescind Payments to Scheduling Coordinators are rescinded for the quantity of MWs of undelivered Flexible Ramping Constraint capacity determined as the 15-minute hourly sum of the Settlement Interval amounts calculated as the minimum of:

(1) \_\_\_\_ the Flexible Ramping Constraint capacity identified as having contributed

to the relief of the Flexible Ramping Constraint, or

(2) ~~the maximum of (a) zero (0), or (b)~~ the difference between

(i) ~~the absolute value of - the negative UIE and~~

(ii) ~~the upward MWs identified as Undelivered Ancillary Services~~

Capacity as required in Section 11.10.9.3 but not less than zero.

(b) The CAISO will determine rescinded amounts ~~will be based on as~~ the product of ~~the~~:

(1) ~~the~~ MWs quantities to be rescinded determined as described in this Section 11.25.~~32~~; and

(2) ~~the hourly~~ Flexible Ramping Constraint ~~Derived Price price determined as the weighted average of the four fifteen-minute Flexible Ramping Constraint Derived Prices derived~~ as described in Section 11.25.~~24~~.

#### **11.25.~~43~~**

#### **Allocation Apportionment of Flexible Ramping Constraint Costs**

(a) The CAISO determines ~~will determine~~ the ~~total~~ Flexible Ramping Constraint costs ~~for each constraint as the product of~~ ~~incurred as described in Section 11.25.1,~~ ~~net of the rescission of payments as described in Section 11.25.2.~~

(1) the resource-specific total Flexible Ramping Constraint costs, calculated as the total compensation in Section 11.25.2(b), net of rescission of payments, and

(2) the ratio of the Flexible Ramping Constraint Shadow Price to the total Flexible Ramping Constraint Shadow Price, determined as described in Section 11.25.2.1(b).

(b) For each constraint and each Balancing Authority Area in the EIM Area, the CAISO will determine the Flexible Ramping Constraint costs attributable to that Balancing Authority Area for which the applicable constraint(s) were binding in the applicable interval, based on the ratio of the Balancing Authority Area's requirement to its contribution to the individual constraint or group of constraints to which that Balancing Authority Area contributes.

(c) The CAISO will determine each Balancing Authority Area's apportionment of Flexible Ramping Constraint costs as the sum for that Balancing Authority Area of the amounts determined in Section 11.25.4(b).

#### **11.25.5 Allocation of Flexible Ramping Constraint Costs**

- (a) For the CAISO Balancing Authority Area, the CAISO divides the will allocate total Flexible Ramping Constraint costs incurred in two portions and allocates each portion as follows: described in Sections 11.25.5.1 and 11.25.5.2.
- (b) The CAISO will allocate total Flexible Ramping Constraint costs for each EIM Entity Balancing Authority Area to the applicable EIM Entity Scheduling Coordinator.

#### **11.25.35.1 Allocation to Measured Demand**

Seventy five (75) percent of the total Flexible Ramping Constraint costs apportioned to the CAISO Balancing Authority Area and netted as described above in the Section 11.25.34, are allocated to Scheduling Coordinators based on their Measured Demand for each applicable Trading Hour. Each Scheduling Coordinator is assessed a portion of seventy-five (75) percent share of the total costs equal to the Scheduling Coordinator's Measured Demand for the applicable Trading Hour divided by total market Measured Demand for the applicable Trading Hour.

#### **11.25.35.2 Allocation to Supply Deviations**

Twenty-five (25) percent of the total Flexible Ramping Constraint costs apportioned to the CAISO Balancing Authority Area and netted as described above in this Section 11.25.34, are allocated to Scheduling Coordinators based on their gross negative supply deviations as follows, using a two-step process.

First, on a daily basis, the CAISO determines a daily rate equal to twenty-five (25) percent of the total daily Flexible Ramping Constraint costs divided by total daily gross supply negative deviations for the applicable Trading Day. Each Scheduling Coordinator is assessed its share of these daily costs based on its daily gross negative deviations calculated by resource as described below. Second, at the end of each Trading Month, the CAISO reverses the daily amounts assessed to Scheduling Coordinators and calculates a monthly rate equal to twenty-five (25) percent of the total monthly Flexible Ramping

Constraint costs divided by the total monthly gross ~~s~~upply negative deviations. Each Scheduling Coordinator is assessed its share of these monthly costs ~~per-based on~~ its monthly gross negative deviations calculated by resource as described below. The gross ~~s~~upply negative deviations are determined by resource based on the sum of: (1) the resource's total negative Settlement Interval ~~Tier-1 UIE and Tier-2~~UIE deviations, which are determined as ~~defined-specified~~ in Section 11.5.2, and (2) any negative import Operational Adjustments. Gross ~~s~~upply negative deviations determined for this purpose are not netted across Settlement Intervals. The CAISO will provide the ability for Scheduling Coordinators to see daily or monthly Flexible Ramping Constraint cost allocation by resource for their resources in their regularly released ~~s~~ettlement ~~s~~tatements.

\* \* \*

**29. [NOT USED]Energy Imbalance Market**

**29.1 General Provisions.**

- (a) **Operation of EIM.** Pursuant to Section 29, the CAISO shall expand operation and settlement of the Real-Time Market to provide for the purchase and sale of balancing Energy in any Balancing Authority Area for which the Balancing Authority executes an EIM Entity Agreement with the CAISO.
- (b) **EIM Tariff Obligations.** EIM Market Participants shall comply with—
  - (1) the provisions of Section 29; and
  - (2) other provisions of the CAISO Tariff that apply to the extent such provisions—
    - (A) expressly refer to Section 29 or EIM Market Participants;
    - (B) are cross referenced in Section 29; or
    - (C) are not limited in applicability to the CAISO Controlled Grid, the CAISO Balancing Authority Area, or CAISO Markets other than the Real-Time Market.
- (c) **Inconsistency Between Provisions.** If there is an inconsistency between a provision in Section 29 and another provision of the CAISO Tariff regarding the rights or obligations of EIM Market Participants, the provision in Section 29 shall prevail to the extent of the inconsistency.

**(d) Suspension of EIM Entity Participation.**

- (1) Temporary Suspension.** The CAISO may, within 60 days following an EIM Entity Implementation Date for an EIM Entity, and pursuant to the terms of a Market Notice, temporarily suspend the participation of that EIM Entity in the Real-Time Market for a period not to exceed 60 days if market or system operational issues adversely impact any portion of the EIM Area, provided that the ISO may continue operation of the Real-Time Market without the participation of the EIM Entity for a reasonable additional period of time in order to implement a resolution of the market or system operational issues.
- (2) CAISO Termination.** If the CAISO is not able to identify a resolution of the EIM-related market or system operational issues within 60 days after issuance of the Market Notice of temporary suspension of EIM participation by an EIM Entity, the CAISO may, upon issuance of a subsequent Market Notice, terminate participation by the EIM Entity in the Real-Time Market and may extend the suspension of EIM participation by the EIM Entity for a time sufficient to process the termination of the EIM Entity Agreement.
- (3) Reinstatement.**
- (A) After Temporary Suspension.** The CAISO may reinstate EIM operations after a temporary suspension of EIM participation by an EIM Entity by issuing a Market Notice announcing the intended reinstatement no less than 5 days in advance of the reinstatement date.
- (B) After CAISO Termination.** The CAISO may only reinstate EIM operations with respect to an EIM Entity after termination of EIM participation by an EIM Entity pursuant to a filing accepted by FERC.
- (4) EIM Entity Action.** In the event the CAISO issues a Market Notice of the temporary suspension of EIM participation by an EIM Entity, the EIM Entity shall continue to submit EIM Base Schedules and the associated meter data to enable continued operation of the Real-Time Market until the CAISO issues a

subsequent Market Notice either that—

- (i) the cause of the temporary suspension has been resolved and the EIM Entity has been reinstated, in which case EIM participation by the EIM Entity shall return to normal; or
- (ii) EIM participation by the EIM Entity has been terminated.

(5) **CAISO Action.** In the event the CAISO issues a Market Notice of the temporary suspension of EIM participation by an EIM Entity, the CAISO shall—

- (i) prevent EIM Transfers and separate the EIM Entity Balancing Authority Area from operation of the Real-Time Market in the EIM Area in accordance with the provisions of the Business Practice Manual for the Energy Imbalance Market;
- (ii) suspend Settlement of Real-Time Market charges with respect to the EIM Entity in accordance with the provisions of the Business Practice Manual for the Energy Imbalance Market; and
- (iii) issue a subsequent Market Notice either that (i) the cause of the temporary suspension has been resolved and the EIM Entity has been reinstated, in which case EIM participation by the EIM Entity shall return to normal, or (ii) EIM participation by the EIM Entity has been terminated.

## **29.2 EIM Access To The Real-Time Market.**

(a) **In general.** The CAISO shall—

- (1) provide open and non-discriminatory access to the Real-Time Market, including the Energy Imbalance Market, in accordance with the provisions of the CAISO Tariff; and
- (2) make available for use in the Real-Time Market the transmission capacity that is available in Real-Time—
  - (A) on the CAISO Controlled Grid; and
  - (B) for which an EIM Entity provides EIM Transmission Service Information pursuant to Section 29.17.

**(b) Implementation of Access as an EIM Entity.**

- (1) **EIM Implementation Agreement.** A Balancing Authority that wishes to become an EIM Entity must first execute an EIM Implementation Agreement with the CAISO that establishes—
- (A) the activities the parties must undertake to enable the Balancing Authority to participate in the Real-Time Market;
- (B) the EIM Entity Implementation Date;
- (C) the implementation fee the Balancing Authority must pay to the CAISO for the start-up costs the CAISO incurs to accommodate the participation of the Balancing Authority in the Real-Time Market as provided in the agreement; and
- (D) the obligation of the Balancing Authority to enter into an EIM Entity Agreement governing its participation in the Real-Time Market.
- (2) **FERC Approval.** The EIM Entity Implementation Date must be not less than six months and not more than twenty-four months after the date that the EIM Implementation Agreement between the CAISO and the Balancing Authority is accepted by FERC.
- (3) **Implementation Period.** The CAISO shall in its discretion determine the EIM Entity Implementation Date based on the complexity and compatibility of the Balancing Authority's transmission and technology systems with the CAISO systems and the planned timing of the CAISO's implementation of software enhancements.

**29.3 [Not Used]**

**29.4 Roles And Responsibilities.**

**(a) CAISO Balancing Authority Obligations.**

- (1) **Reliability Responsibilities.** Nothing in Section 29 shall alter the CAISO's responsibilities under the other sections of the CAISO Tariff, under any agreement not required by Section 29, or under NERC Reliability Standards or

any other Applicable Reliability Criteria as the Balancing Authority for the CAISO  
Balancing Authority Area and the transmission operator for the CAISO Controlled  
Grid.

(2) **Operating Responsibilities.** During any interruption of the normal operation of the Real-Time Market, the CAISO as Balancing Authority shall remain responsible for managing the resources in its Balancing Authority Area and the flows on transmission lines internal to the CAISO Balancing Authority Area, including imports and exports, for the duration of the interruption.

(b) **EIM Entity.**

(1) **Balancing Authority Obligations.**

(A) **EIM Entity as Balancing Authority.** An EIM Entity must be a Balancing Authority registered and certified as such under the applicable authorities.

(B) **Reliability Responsibilities.** Nothing in Section 29 shall alter an EIM Entity's responsibilities under NERC Reliability Standards as the Balancing Authority for the EIM Entity Balancing Authority Area and, to the extent applicable, as the transmission operator for transmission facilities within its Balancing Authority Area.

(C) **Operating Responsibilities.** During any interruption of the normal operation of the Real-Time Market, the EIM Entity as Balancing Authority shall remain responsible in accordance with Section 29.7 for managing the resources in its Balancing Authority Area and the flows on internal transmission lines, including imports into and exports out of its Balancing Authority Area, for the duration of the interruption.

(D) **Inadvertent Energy.** An EIM Entity remains responsible for tracking inadvertent Energy and administering the payback of inadvertent Energy for its Balancing Authority Area through processes established by WECC.

(2) **EIM Entity Agreement.** An EIM Entity must execute an EIM Entity Agreement no later than ninety (90) days before the EIM Entity Implementation Date.

(3) EIM Entity Obligations. An EIM Entity shall—

- (A) perform the obligations of an EIM Entity in accordance with the EIM Entity Agreement, Section 29, and other provisions of the CAISO Tariff that by their terms apply to EIM Entities, subject to the limitations specified in Section 29.1(b)(2)(C);
- (B) ensure that each EIM Transmission Service Provider in its Balancing Authority Area has provisions in effect in the EIM Transmission Service Provider's transmission tariff, as necessary or applicable, to enable operation of the Real-Time Market in its Balancing Authority Area;
- (C) qualify as or secure representation by no more than one EIM Entity Scheduling Coordinator;
- (D) review and validate information about available transmission capacity submitted to it by an EIM Transmission Service Provider and transmit such validated information to its EIM Entity Scheduling Coordinator;
- (E) provide the CAISO and its EIM Entity Scheduling Coordinator with information regarding the transmission capacity available to the Real-Time Market, including any information regarding Transmission Constraints of which it is aware;
- (F) define Load Aggregation Points in its Balancing Authority Area;
- (G) determine and inform the CAISO which resource types are eligible to participate in the Real-Time Market as resources and which transmission service providers or holders of transmission rights are EIM Transmission Service Providers; and
- (H) inform the CAISO whether or not the EIM Entity intends to utilize the CAISO's Demand Forecast consistent with Section 29.34(d).

(4) EIM Entity Termination of EIM Participation.

- (A) EIM Entity Agreement. An EIM Entity that wishes to terminate participation in the Real-Time Market must terminate the EIM Entity

Agreement pursuant to its terms.

(B) **Notice.** Delivery to the CAISO of a written notice of termination pursuant to the terms of the EIM Entity Agreement shall represent the commitment by the EIM Entity to undertake all necessary preparations to disable the Real-Time Market within the EIM Entity Balancing Authority Area.

(C) **Actions Following Notice.** Upon receipt of such notice, the CAISO shall undertake all necessary preparations to disable the Real-Time Market within the EIM Entity Balancing Authority Area, as outlined in the Business Practice Manual for the Energy Imbalance Market, including issuance of a Market Notice within five Business Days after receipt of such notice.

(5) **EIM Entity Corrective Actions.** If the EIM Entity takes corrective action, subject to the provisions of an open access transmission tariff, to address an issue with EIM implementation or EIM operation, or the EIM Entity issues a notice of termination—

(A) the EIM Entity shall take those actions provided in Section 29.1(d)(4) during the implementation of its corrective action; and

(B) the CAISO shall issue a Market Notice in accordance with Section 29.1(d)(1) and take those actions provided in Section 29.1(d)(5) during the implementation of the EIM Entity corrective action.

**(c) EIM Entity Scheduling Coordinator.**

(1) **Certification.** An EIM Entity Scheduling Coordinator must meet or have met the certification requirements in Section 4.5.1 for a Scheduling Coordinator.

(2) **EIM Entity Scheduling Coordinator Agreement.** An EIM Entity Scheduling Coordinator must enter an EIM Entity Scheduling Coordinator Agreement with the CAISO, which shall satisfy the obligation to enter a Scheduling Coordinator Agreement under Section 4.5.1 with regard to its representation of the EIM Entity.

(3) **Representation.** An EIM Entity Scheduling Coordinator—

(A) may represent a Market Participant other than an EIM Entity, but only if it

enters a Scheduling Coordinator Agreement under Section 4.5.1 with regard to such Market Participant;

- (B) may not also be an EIM Participating Resource Scheduling Coordinator or a Scheduling Coordinator for a Participating Generator, Participating Load, or Demand Resource Provider, unless the EIM Entity Scheduling Coordinator is a transmission provider subject to the standards of conduct set forth in 18 C.F.R. § 358; and
- (C) may represent more than one EIM Entity if it has certified to the CAISO in the manner described in the Business Practice Manual for the Energy Imbalance Market that it has informed each EIM Entity of the multiple representation.

(4)     **Obligations.** An EIM Entity Scheduling Coordinator shall-

- (A) perform the obligations of an EIM Entity Scheduling Coordinator under the EIM Entity Scheduling Coordinator Agreement and Section 29;
- (B) perform the obligations of a Scheduling Coordinator under provisions of the CAISO Tariff described in Section 29.1(b);
- (C) register in the manner set forth in the Business Practice Manual for the Energy Imbalance Market all non-participating resources in the Balancing Authority Area of each EIM Entity that it represents and update such information in a timely manner;
- (D) verify in the manner set forth in the Business Practice Manual for the Energy Imbalance Market that all EIM Resources within the Balancing Authority Area of each EIM Entity represented by the EIM Entity Scheduling Coordinator have been registered with the CAISO;
- (E) submit the Interchange schedules with other Balancing Authorities at the defined Interchange scheduling locations, including creating and processing E-Tags in accordance with NERC, North American Energy Standards Board, and WECC standards and business practices for

bilateral schedules between Balancing Authority Areas that are arranged no less than 20 minutes in advance of the Dispatch Interval of the Real-Time Market in which the Interchange will occur and that are included in an EIM Resource Plan;

- (F) match E-Tags and manage schedule curtailments at the defined Interchange scheduling locations with other Balancing Authorities;
- (G) provide EIM Transmission Service Information in accordance with Section 29.17;
- (H) settle all financial obligations arising out of the Real-Time Market for the EIM Entity, including financial settlement with non-participating resources and non-participating load within the EIM Entity Balancing Authority Area; and
- (I) submit EIM Base Schedules, EIM Resource Plans and other required information on behalf of the EIM Entity.

(d) **EIM Participating Resources.**

- (1) **Eligibility.** The owner or operator of an EIM Resource is eligible to become an EIM Participating Resource if the EIM Resource—
  - (A) meets the eligibility requirements established by the EIM Entity in whose Balancing Authority Area the resource is located or scheduled or to which it may be dynamically transferred; and
  - (B) is capable of delivering Energy, Curtailable Demand, Demand Response Services, or similar services within the time specified by Section 29 for the Real-Time Market in which its EIM Participating Resource Scheduling Coordinator will submit Bids.
- (2) **EIM Participating Resource Agreement.** An EIM Participating Resource must execute an EIM Participating Resource Agreement.
- (3) **Obligations.** An EIM Participating Resource shall—
  - (A) perform the obligations of an EIM Participating Resource under the EIM

Participating Resource Agreement and Section 29;

- (B) perform the obligations applicable to Market Participants and resources under the provisions of the CAISO Tariff described in Section 29.1(b); and
- (C) if it represents a Generating Unit, Load of a Participating Load, Proxy Demand Resource, or other qualified resource, perform the obligations required for the resource under the provisions of the CAISO Tariff described in section 29.1(b).

**(e) EIM Participating Resource Scheduling Coordinator.**

- (1) **Certification.** An EIM Participating Resource Scheduling Coordinator must be either an existing Scheduling Coordinator or must meet or have met the certification requirements in Section 4.5.1 for a Scheduling Coordinator.
- (2) **EIM Participating Resource Scheduling Coordinator Agreement.** An EIM Participating Resource Scheduling Coordinator must enter an EIM Participating Resource Scheduling Coordinator Agreement with the CAISO, which shall satisfy the obligation to enter a Scheduling Coordinator Agreement under Section 4.5.1 with regard to its representation of the EIM Participating Resource.
- (3) **Representation.** An EIM Participating Resource Scheduling Coordinator
  - (A) may represent a Market Participant other than an EIM Participating Resource, but only if it enters a Scheduling Coordinator Agreement under Section 4.5.1 with regard to such Market Participant;
  - (B) may not also be an EIM Entity Scheduling Coordinator unless the EIM Participating Resource Scheduling Coordinator is a transmission provider subject to the standards of conduct set forth in 18 C.F.R. § 358; and
  - (C) may represent more than one EIM Participating Resource.
- (4) **Obligations.** An EIM Participating Resource Scheduling Coordinator must
  - (A) perform the obligations of an EIM Participating Resource Scheduling Coordinator under the EIM Participating Resource Scheduling Coordinator Agreement and Section 29;

- (B) perform the obligations of a Scheduling Coordinator under the provisions of the CAISO Tariff described in Section 29.1(b);
- (C) ensure that the entity it represents has obtained any transmission service necessary to participate in the Energy Imbalance Market under the terms of the CAISO Tariff or the tariff of another transmission service provider, as applicable;
- (D) register in the manner set forth in the Business Practice Manual for the Energy Imbalance Market all EIM Participating Resources that it represents, provide such information to the EIM Entity Scheduling Coordinator, and update such information in a timely manner.

**29.5. [Not Used]**

## **29.6 Communications.**

- (a) **EIM Entity.** The EIM Entity shall meet the technical and communication requirements specified in the Business Practice Manual for the Energy Imbalance Market, which shall be based on the Inter-Control Center Communication Protocol and Reliability Standards.
- (b) **EIM Communications and OASIS.** Section 6 shall govern communications and information availability regarding the participation of EIM Market Participants in the Real-Time Market except that–
- (1) references to internal resources shall be deemed to include EIM Resources;
  - (2) references in Sections 6.2.2.1 and 6.5.2.1 to the CAISO Controlled Grid and references in Sections 6.5.4.2.2(a) and 6.5.5.1.1 to CAISO Balancing Authority Area shall be deemed references to the EIM Area; and
  - (3) the provisions of Section 6.3.1 that authorize the CAISO to communicate directly with Generators and Demand Response Providers to ensure System Reliability shall not apply to Generators and Demand Response Providers in the EIM Entity's Balancing Authority Area or pseudo-tied from an external Balancing Authority Area to the EIM Entity Balancing Authority Area.
- (c) **Loss of Communications.**
- (1) **Procedures.** The CAISO and each EIM Entity and EIM Entity Scheduling Coordinator shall establish procedures to address an interruption of Real-Time Market communications, which shall include steps to be taken to restore communications and address any impact on system or market operations as provided in Section 29.
  - (2) **Responsibilities.** An EIM Entity that loses communication with the CAISO remains responsible for managing its Balancing Authority Area imbalance needs without balancing Energy from the Real-Time Market.
- (d) **Variable Energy Resource Forecast Communications.** If the EIM Participating Resource Scheduling Coordinator for a Variable Energy Resource elects to use an independent forecasting service, it must make data transfer arrangements with the

CAISO for the CAISO to receive the forecast in a format and on a schedule set forth in the Business Practice Manual for the Energy Imbalance Market.

**29.7 EIM Operations Under Normal And Emergency Conditions.**

- (a) **CAISO Controlled Grid Operations.** Section 7 shall not apply to EIM Market Participants in their capacities as such.
- (b) **Normal EIM Operations.** The CAISO shall administer the transmission capacity made available to the Real-Time Market to manage Energy imbalances in the EIM Area under normal operations.
- (c) **Load Curtailment.** The CAISO will not issue Dispatch Instructions to an EIM Entity Scheduling Coordinator with respect to Load or Demand that has not been bid into the Real-Time Market.
- (d) **Dispatch Instructions for EIM Participating Resources.** The CAISO will not issue Dispatch Instructions to an EIM Participating Resource Scheduling Coordinator with respect to Supply that has not been bid into the Real-Time Market.
- (e) **EIM Transfers.** The CAISO shall manage EIM Transfers as aggregate Dynamic Schedules with each EIM Entity Balancing Authority Area, which—
  - (1) shall not require individual resource E-Tags;
  - (2) shall not constitute inadvertent Energy;
  - (3) shall reflect intra-hour incremental EIM Transfers between the CAISO Balancing Authority Area and each EIM Entity Balancing Authority Area;
  - (4) shall be updated by the CAISO within 60 minutes after the end of each Operating Hour to include the integrated Energy during the hour for the sum of all EIM Transfers between each Balancing Authority Area in the EIM Area in accordance with WECC business practices for purposes of inadvertent Energy accounting; and
  - (5) shall be subsequently updated as necessary consistent with the requirements of WECC, NERC, and North American Energy Standards Board standards and business practices.

- (f) **Dynamic Imbalance Schedule to Net EIM Transfers.** The CAISO will—
- (1) model changes in the net five-minute scheduled EIM Transfers that result from Real-Time Dispatch as a Dynamic Schedule between the CAISO and EIM Entity for AGC control accuracy; and
  - (2) calculate the dynamic net scheduled EIM Transfers for the CAISO and each EIM Entity Balancing Authority Area and derive from these dynamic net scheduled EIM Transfers the Dynamic Schedules on EIM Internal Interties for E-Tag purposes.
- (g) **EIM Manual Dispatch.** The EIM Entity may issue an EIM Manual Dispatch to an EIM Participating Resource or a non-participating resource in its Balancing Authority Area, outside of the Market Clearing of the Real-Time Market, when necessary to address reliability or operational issues in the EIM Entity Balancing Authority Area that the CAISO is not able to address through normal economic Dispatch and Congestion Management.
- (h) **EIM Entity Actions in Response to an EIM Manual Dispatch.** If the EIM Entity issues an EIM Manual Dispatch to address circumstances on its system—
- (1) the EIM Entity shall immediately inform the CAISO, as specified in the Business Practice Manual for the Energy Imbalance Market, if the EIM Entity Balancing Authority Area is under manual operation;
  - (2) the EIM Entity shall immediately inform the CAISO of the EIM Manual Dispatch to any EIM Participating Resource or non-participating resource by submitting the EIM Manual Dispatch instruction for the affected resource to the CAISO as specified in the Business Practice Manual for the Energy Imbalance Market; and
  - (3) the EIM Entity remains responsible for informing the Reliability Coordinator of the circumstances creating the need for the EIM Manual Dispatch and may enforce Transmission Constraints, as may be required.
- (i) **CAISO Actions in Response to Notification of EIM Manual Dispatch.** Upon receipt of notice of an EIM Manual Dispatch, the CAISO shall—
- (1) reflect the EIM Manual Dispatch in the Real-Time Market;

(2) disregard an EIM Manual Dispatch in the determination of the Locational Marginal Price; and

(3) treat an EIM Manual Dispatch to an EIM Participating Resource or non-participating resource as FMM or RTD Instructed Imbalance Energy for Settlement.

**(i) EIM Disruption.**

(1) **Declaration.** The CAISO may declare an interruption of EIM Entity participation in the Real-Time Market when in its judgment—

(A) operational circumstances (including a failure of the Real-Time Market operation to produce feasible results in the EIM Area or other CAISO Market Disruption) in the EIM Area have caused or are in danger of causing an abnormal system condition in the CAISO Balancing Authority Area or an EIM Balancing Authority Area that requires immediate action to prevent loss of Load, equipment damage, or tripping system elements that might result in cascading Outages, or to restore system operation to meet Applicable Reliability Criteria; or

(B) communications between the CAISO and EIM Market Participants are disrupted and prevent an EIM Entity, EIM Entity Scheduling Coordinator, or EIM Participating Resource Scheduling Coordinator from accessing CAISO systems to submit or receive information.

(2) **CAISO Response to EIM Disruption.** If the CAISO declares an interruption of EIM Entity participation in the Real-Time Market, the CAISO may in its judgment, among other things—

(A) separate the affected EIM Entity Balancing Authority Area from the EIM Area and maintain the Real-Time Market for other Balancing Authority Areas in the EIM Area by enforcing a net transfer constraint for the affected Balancing Authority Area to separate it from the remainder of the EIM Area;

- (B) reduce or suspend EIM Transfers between one or more Balancing Authority Areas in the EIM Area;
- (C) instruct one or more EIM Entities to maintain system balance within their Balancing Authority Area without RTM Dispatch; or
- (D) in addition or as an alternative, establish an Administrative Price in the Real-Time Market in accordance with Section 7.7.4 or take any of the actions specified in Section 7.7.15 with respect to the Real-Time Market.
- (3) **EIM Entity Responsibility.** In response to an interruption of EIM Entity participation in the Real-Time Market by the CAISO, all EIM Entities shall follow NERC Reliability Standards applicable to their roles as Balancing Authorities in an effort to alleviate operational and system conditions and restore routine operations.
- (4) **EIM Entity Scheduling Coordinator Responsibility.** All EIM Entity Scheduling Coordinators shall promptly inform the CAISO of actions taken by the EIM Entities they represent in response to an interruption of EIM Entity participation in the Real-Time Market by the CAISO through updates to their EIM Base Schedules, Interchange E-Tags, transmission limit adjustments, or Outage and derate information, as applicable.
- (5) **System Restoration.** The CAISO shall reinstate normal operation of the Real-Time Market in the EIM Area at such time as it determines that the conditions that caused the interruption of EIM Entity participation in the Real-Time Market have been resolved.
- (k) **Congestion Management and Unscheduled Flow.**
- (1) **Inability to Resolve Congestion.** The CAISO will provide information to EIM Entities about Congestion that the Real-Time Market cannot resolve.
- (2) **Initiation of Unscheduled Flow Procedures.** The CAISO or an EIM Entity may initiate WECC's unscheduled flow mitigation procedure if applicable for conditions in its Balancing Authority Area.

- (3) **EIM Entity Action.** When the WECC unscheduled flow mitigation procedure is initiated, each EIM Entity shall adjust its schedules as determined by the WECC procedure and immediately inform the CAISO of the changes.
- (4) **CAISO Action.** When WECC's unscheduled flow mitigation procedure is initiated, the CAISO shall reflect the affected EIM Market Participant schedules in the Real-Time Market as determined by the WECC procedure, EIM Entity, CAISO Operating Procedures, and Business Practice Manuals for the CAISO Balancing Authority Area and EIM Entity Balancing Authority Areas.

**29.8 [Not Used]**

**29.9 Outages and Critical Contingencies.**

- (a) **Applicability of Section 9.** Section 9 shall not apply to EIM Market Participants except as referenced in Section 29.9.
- (b) **Transmission Scheduled Outages.**
- (1) **Responsibility.** The EIM Entity shall be responsible for performing engineering studies with regard to, and modeling and approving, Outages on transmission facilities for maintenance purposes within the EIM Entity Balancing Authority Area, including making any necessary arrangements for this purpose regarding the transmission capacity made available by an EIM Transmission Service Provider to the Real-Time Market.
- (2) **Notice.** The EIM Entity Scheduling Coordinator shall submit notice of transmission Outages approved by the EIM Entity to the CAISO by the means set forth in the Business Practice Manual for the Energy Imbalance Market and at least seven Business Days prior the planned Outage.
- (3) **Notice of Modification.** The EIM Entity Scheduling Coordinator may submit a notice of modification of an approved transmission Outage and any resulting updates to EIM Intertie limits to the CAISO by the means set forth in the Business Practice Manual for the Energy Imbalance Market and in accordance with the deadlines set forth in Section 9 and Section 29.9.

(4) **Contents of Notice.** The EIM Entity Scheduling Coordinator notices of approved transmission Outages shall include—

- (A) the start and finish date for each Outage for maintenance purposes; and
- (B) such information other than start and finish date as is required in Section 9.3.6 for transmission Operators seeking approval of Outages.

(c) **Generation Maintenance Outages.**

(1) **Responsibility.** The EIM Entity shall be responsible for performing engineering studies with regard to, and modeling and approving, Outages of EIM Resources and non-participating resources for maintenance purposes within the EIM Entity Balancing Authority Area.

(2) **Notice.** The EIM Entity Scheduling Coordinator shall submit notice of Outages of EIM Resources and non-participating resources approved by the EIM Entity to the CAISO by the means set forth in the Business Practice Manual for the Energy Imbalance Market and at least seven Business Days prior to the planned Outage.

(3) **Contents of Notice.** The EIM Entity Scheduling Coordinator notices of approved Outages of EIM Resources and non-participating resources shall include—

- (A) the start and finish date for each Outage for maintenance purposes; and
- (B) such information other than start and finish date as is required in Section 9.3.6 for Operators seeking approval of Generating Unit Outages.

(d) **Actions Regarding Scheduled Outages.**

(1) **CAISO Evaluation of Scheduled Outages.** The CAISO will implement the transmission and Generation Outages approved by the EIM Entity through the Day-Ahead Market process and will inform the EIM Entity Scheduling Coordinator of any anticipated overloads.

(2) **EIM Entity Action.** Based on the information provided by the CAISO to the EIM Entity Scheduling Coordinator, the EIM Entity shall take such action to adjust or cancel Outages as it determines to be necessary and inform the Reliability

Coordinator.

- (e) **Forced Outages.** An EIM Entity Scheduling Coordinator shall comply with the reporting provisions of Section 9 with regard to Forced Outages of transmission facilities within the Balancing Authority Area of the EIM Entity it represents and an EIM Participating Resource Scheduling Coordinator shall comply with the reporting provisions of Section 9 with regard to Forced Outages of Generating Units it represents as EIM Resources.
- (f) **Transmission Limits.** An EIM Entity Scheduling Coordinator must notify the CAISO by the means specified in the Business Practice Manual for the Energy Imbalance Market with respect to transmission limits on the transmission capacity made available to the Real-Time Market within the EIM Entity Balancing Authority Area that need to be enforced in the Real-Time Market, including—
- (1) physical MVA or MW limits under base case and contingencies;
  - (2) scheduling limits for EIM Intertie transactions based on E-Tags; and
  - (3) contractual limits on Transmission Interfaces where the EIM Transmission Service Provider has transmission rights.

#### **29.10. Metering and Settlement Data.**

- (a) **Telemetry Requirements.** The EIM Entity shall ensure that each EIM Resource and non-participating resource in an EIM Entity Balancing Authority Area that is not a Generating Unit or is a Generating Unit with a rated capacity of 10 MW or greater (including each aggregated resource with a total rated capacity of 10 MW or greater) and each EIM Intertie has telemetry meeting the requirements of the Business Practice Manual for the Energy Imbalance Market.
- (b) **Metering for Settlement Purposes.** The EIM Entity shall ensure that each EIM Participating Resource and non-participating resource in an EIM Entity Balancing Authority Area becomes either a CAISO Metered Entity or a Scheduling Coordinator Metered Entity and complies with the requirements of Section 10 except as provided in Section 29.10(c).
- (c) **Exception to Requirements of Section 10.3.9.** In the absence of metering standards

set by a Local Regulatory Authority, EIM Participating Resources and non-participating resources in an EIM Entity Balancing Authority Area may qualify as Scheduling Coordinator Metered Entities without the need for third party certification if the CAISO determines that the applicable metering standards meet or exceed the standards for CAISO Metered Entities.

- (d) **Interchange Meter Data.** Metering for Settlement purposes is required for all EIM Interties.
- (e) **EIM Energy Imbalance with an External Balancing Authority Area.** For each EIM External Intertie Bid that clears the FMM resulting in a 15-minute EIM External Intertie schedule, the EIM Entity Scheduling Coordinator must submit to the CAISO the corresponding hourly transmission profile and 15-minute Energy profiles from the respective E-Tags, which must reflect the Point of Receipt and Point of Delivery that was declared in the FMM Bid submittal, at least 20 minutes before the start of the Operating Hour.

#### **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 rate of \$0.19/MWh, applied as specified in Section 29.11(i)(2) and (3).

(2) **Calculation.** The CAISO will calculate MWh subject to the EIM Administrative Charge rate for each EIM Market Participant as—

(i) the greater of (a) the sum of the gross absolute value of FMM Instructed Imbalance Energy, gross absolute value of RTD Instructed Imbalance Energy, and gross absolute value of Uninstructed Imbalance Energy of the EIM Market Participant's Supply, or (b) five percent of the total gross absolute value of Supply of all EIM Market Participants; plus

(ii) the greater of (a) the absolute value of the gross Uninstructed Imbalance

Energy of the EIM Market Participant's Demand, or (b) five percent of the total gross absolute value of Demand of all EIM Market Participants.

- (3) **Allocation.** The CAISO will calculate the total of the amount of the EIM Administrative Charge for each EIM Market Participant by multiplying the rate specified in Section 29.11(i)(1) by the MWh calculated pursuant to Section 29.11(i)(2) and will allocate that charge—
- (i) to the sum of (a) the total gross absolute value of FMM Instructed Imbalance Energy, gross absolute value of RTD Instructed 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, and
- (ii) to the extent not all EIM Administrative Charges are allocated pursuant to Section 29.11(i)(3)(i), the remaining amounts to the applicable 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.
- (i) **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 of charges to EIM Market

Participants pursuant to Sections 11 and 29.11, the CAISO shall assess such charges, address disputed invoices, assess 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 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.

**29.12 Creditworthiness.**

- (a) **Requirements.** EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators shall comply with the credit and other requirements of Section 12.
- (b) **Credit Default.** In the event of a failure to satisfy the credit or other requirements in Section 12, the consequences specified in Section 12 shall apply to EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators.

**29.13 Dispute Resolution.**

- (a) **Invoices.** Confirmation and validation of any dispute associated with the participation of EIM Market Participants in the Real Time Market is subject to Section 11.29.8 and shall be managed through the CAISO's customer inquiry, dispute, and information system and as provided in the Business Practice Manual for the Energy Imbalance Market.
- (b) **Other Disputes.** EIM Market Participants shall be subject to dispute resolution pursuant to Section 13.

**29.14 Uncontrollable Forces, Indemnity, Liabilities, and Penalties.** The provisions of Section 14 regarding Uncontrollable Forces, indemnity, liability, and penalties shall apply to the participation of EIM Market Participants in the Real-Time Market.

**29.15 [Not Used]**

**29.16 [Not Used]**

**29.17 EIM Transmission System.**

- (a) **Information.** Each EIM Entity shall–
- (1) deliver EIM Transmission Service Information to the CAISO regarding the network topology information associated with transmission capacity that it owns, controls, or has a contractual entitlement to that may be used in the Real-Time Market;
  - (2) deliver EIM Transmission Service Information to the CAISO regarding the network topology information associated with transmission capacity that each other EIM Transmission Service Provider owns, controls, or has a contractual entitlement to within the EIM Entity Balancing Authority Area that may be used in the Real-Time Market;
  - (3) update the EIM Transmission Service Information no less frequently than the timelines for updates to the Full Network Model as provided in the CAISO Tariff and Business Practice Manual for the Energy Imbalance Market; and
  - (4) ensure that the EIM Transmission Service Information is accurate and complete.
- (b) **Effectiveness.** The EIM Transmission Service Information shall only be used for operation of the CAISO Markets in accordance with the procedures set forth in the Business Practice Manual for the Energy Imbalance Market.
- (c) **Availability.** Each EIM Entity shall ensure that all EIM Transmission Service Providers in its Balancing Authority Area make available for use in the Real-Time Market transmission capacity that is included in the EIM Transmission Service Information and that is not otherwise encumbered, reserved, scheduled, or being used by its transmission customers or by others.
- (d) **Information on Availability.** Each EIM Entity Scheduling Coordinator shall inform the CAISO in the manner and by the deadlines specified in the Business Practice Manual for the Energy Imbalance Market regarding the availability of the transmission capacity identified in the EIM Transmission Service Information for use in the Real-Time Market.
- (e) **EIM Transfer Limit.** A Balancing Authority that has entered into an EIM Implementation

Agreement to become an EIM Entity shall establish and inform the CAISO of the maximum EIM Transfer limit at least ninety days prior to the EIM Entity Implementation Date in accordance with the Business Practice Manual for the Energy Imbalance Market.

- (f) **EIM Transfer Availability.** The EIM Transfer limit available for use in the Real-Time Market shall be determined by the EIM Entity Scheduling Coordinator and communicated to the CAISO prior to the start of the next Dispatch Interval in accordance with the procedures and timelines for submission and acceptance in the Business Practice Manual for the Energy Imbalance Market.

**29.18 [Not Used]**

**29.19 [Not Used]**

**29.20 Confidentiality.** The confidentiality provisions of Section 20 shall apply to participation of EIM Market Participants in the Real-Time Market.

**29.21 [Not Used]**

**29.22 Miscellaneous Provisions in Addition to Section 22.** Section 22 and the additional miscellaneous provisions of Section 29.22 shall apply to the Energy Imbalance Market.

- (a) **Tax Liability.** To the extent that the CAISO would incur any tax liability as a result of the participation of EIM Market Participants in the Real-Time Market, as market operator or as central counterparty to Energy Imbalance Market transactions, for example, the CAISO will pass those taxes on to the EIM Entity Scheduling Coordinator for the EIM Entity area where the transactions triggered the tax liability.

- (b) **Purchasing Selling Agent.** Neither the CAISO nor the EIM Entity is a "Purchasing Selling Entity" for purposes of E-Tagging or EIM Transfers, nor shall either be listed as a "Purchasing Selling Entity" for purposes of E-Tagging or EIM Transfers.

- (c) **Title to Energy.** Title to Energy in the Real-Time Market passes directly from the entity that holds title when the Energy enters the CAISO Controlled Grid or the transmission system of an EIM Transmission Service Provider, whichever is first following Dispatch, to the entity that removes the Energy from the CAISO Controlled Grid or the transmission system of a EIM Transmission Service Provider, whichever last precedes delivery to

Load.

**29.23 [Not Used]**

**29.24 [Not Used]**

**29.25 [Not Used]**

**29.26 Transmission Rates And Charges.**

**(a) Transmission Charges for CAISO Facilities.**

**(1) Access Charge.** Transmission service charges for Real-Time Market transactions serving Load within the CAISO Balancing Authority Area that use the CAISO Controlled Grid are governed by Section 26.

**(2) Wheeling Access Charge.** EIM Transfers from the CAISO Controlled Grid to another EIM Entity Balancing Authority Area using the contractual or ownership rights of an EIM Entity shall not constitute Wheeling Out and shall not be subject to the Wheeling Access Charge under Section 26.

**(b) Non-CAISO Facilities.** The determination and charges for transmission service for Real-Time Market transactions on facilities that are part of the contractual or ownership rights made available to the Real-Time Market by an EIM Transmission Service Provider through an EIM Entity will be the responsibility of the EIM Entity that made the facilities available, except that the EIM Entity shall ensure that no EIM Transmission Service Provider imposes a separate charge for EIM Transfers that use its facilities, provided that charges for transmission service in excess of contractual limits shall not be considered a separate charge.

**29.27 CAISO Markets And Processes.** The provisions of Section 27 that are applicable to the Real-Time Market shall apply to EIM Market Participants.

**29.28 Inter-SC Trades.** EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators may not submit Inter-SC Trades.

**29.29 [Not Used]**

**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.

**29.31 Day-Ahead.** EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators may not submit Bids in the CAISO's Day-Ahead Market on behalf of EIM Market Participants that they represent in their capacity as an EIM Entity Scheduling Coordinator or EIM Participating Resource Scheduling Coordinator.

**29.32 Greenhouse Gas Regulation and EIM Bid Adders.**

(a) **EIM Bid Adders.**

(1) **In General.** EIM Participating Resources will have an opportunity to recover costs of compliance with California Air Resources Board greenhouse gas regulations, which may include the cost of allowances, uncertainty on the final resource specific emission factor, and other costs of greenhouse gas regulation compliance.

(2) **Bid Submission.** EIM Participating Resource Scheduling Coordinators may submit an EIM Bid Adder as a separate Bid component to recover costs of compliance with California Air Resources Board greenhouse gas regulations.

(3) **Cap on Bid Adder.** The sum of the EIM Bid Adder and the Energy cost portion of the Bid cannot exceed \$1000/MWh.

(4) **Minimum Bid Adder.** The EIM Bid Adder shall not be less than \$0/MWh.

(5) **Limit on Use of Bid Adders.** An EIM Participating Resource Scheduling Coordinator may submit no more than one Bid Adder per day for an EIM Resource.

(b) **Consideration of EIM Bid Adders in Market Clearing.** The CAISO shall modify its Security Constrained Economic Dispatch in the Real-Time Unit Commitment and Real-Time Dispatch to take into account EIM Bid Adders in selecting Energy produced by EIM Resources outside the CAISO Balancing Authority Area for import into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California, but not when selecting EIM Resources to serve Load outside of the CAISO Balancing

Authority Area or other EIM Entity Balancing Authority Areas in California.

- (c) **Effect on Locational Marginal Price.** The marginal EIM Bid Adder shall be included as a negative component in the Locational Marginal Prices for EIM Entity Balancing Authority Areas in addition to those specified in Appendix C and Section 27.
- (d) **Notice to EIM Participating Resource.** The CAISO will notify the EIM Participating Resource Scheduling Coordinator through the Dispatch Instruction of the megawatt quantity of any Energy of an EIM Resource that is deemed to have been imported into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California as a result of the Market Clearing of the Real-Time Market.
- (e) **Compensation.** The CAISO will compensate the EIM Participating Resource Scheduling Coordinator for any Energy that is deemed to have been imported into the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California at the marginal EIM Bid Adder price.
- (f) **Reporting Requirements.** The CAISO will report to each EIM Participating Resource Scheduling Coordinator the portion of the FMM Energy Schedule and the portion of RTD Energy Dispatch that is associated with Energy deemed to have been imported to the CAISO Balancing Authority Area or other EIM Entity Balancing Authority Areas in California from all EIM Resources as part of the Real-Time Market results publication from each of its EIM Resources.

### 29.33 [Not Used]

### 29.34 EIM Operations

- (a) **In General.** Section 34, as supplemented by provisions in Section 29.34, will govern the operation of the Real-Time Market within the EIM Area.
- (b) **Applicability.** EIM Entity Scheduling Coordinators and EIM Participating Resource Scheduling Coordinators will submit EIM Base Schedules and other necessary information to the CAISO for use in the Real-Time Market pursuant to Section 29.34 and not pursuant to Section 34.
- (c) **Submission Deadlines.** If an EIM Entity Scheduling Coordinator or EIM Participating

Resource Scheduling Coordinator fails to submit an EIM Base Schedule according to the timelines established in this Section 29.34, the CAISO will not accept the EIM Base Schedule or use it in the Real-Time Market.

(d) Demand Forecast.

- (1) In General. In accordance with procedures set forth in the Business Practice Manual for the Energy Imbalance Market, the CAISO shall develop short-term and mid-term Demand Forecasts by Demand Forecast zone within each EIM Entity Balancing Authority Area, separately from the CAISO Balancing Authority Area.
- (2) Short Term Forecast. The CAISO's short-term Demand Forecast for an EIM Entity Balancing Authority Area shall produce a value every five minutes for the duration of the CAISO's Dispatch horizon, which has five-minute granularity and extends several Dispatch Intervals.
- (3) Mid-Term Forecast. The CAISO's mid-term Demand Forecast for an EIM Entity Balancing Authority Area shall produce hourly values for the next hour through the next 7 days.
- (4) EIM Entity Scheduling Coordinator Demand Forecast.
  - (A) In General. An EIM Entity Scheduling Coordinator may opt to provide a non-binding EIM Entity Demand Forecast, net of behind-the-meter Generation that is not registered as an EIM Resource, as part of the hourly EIM Base Schedules.
  - (B) Timing and Scope. The EIM Entity Scheduling Coordinator must provide any such Demand Forecasts by 10:00 a.m. for the next 7 days.
  - (C) Updates. The EIM Entity Scheduling Coordinator must update any such Demand Forecast for each Operating Hour and the following 6 to 10 hours and submit the update to the CAISO no later than 75 minutes prior to the start of that Operating Hour, as part of its hourly EIM Base Schedule submission.

(D) **Effect on Bid Requirement.** If the EIM Entity Demand Forecast is less than the CAISO Demand Forecast, then the EIM Entity's EIM Resource Plan must include sufficient Bids to cover the difference in Demand Forecasts.

(5) **Posting.** Between 6:00 p.m. of the seventh day prior to the start of the Operating Day and 6:00 p.m. of the day prior to the Operating Day, the CAISO shall post and update hourly Demand Forecasts by Demand Forecast zone.

**(e) EIM Resource Plan.**

(1) **In General.** By 10:00 a.m. of the day preceding the Operating Day, the EIM Entity Scheduling Coordinators on behalf of non-participating resources and EIM Participating Resource Scheduling Coordinators on behalf of EIM Participating Resources, must submit all applicable components of the EIM Resource Plan as set forth in Section 29.34(e)(3).

(2) **Scope.** The EIM Resource Plan components must cover a seven day horizon (with hourly detail for each resource) beginning with the Operating Day.

(3) **Contents.** The EIM Resource Plan shall comprise—

- (A) EIM Base Schedules of EIM Entities and EIM Participating Resources;
- (B) Energy Bids (applicable to EIM Participating Resources only);
- (C) Reserve capacity meeting the WECC requirements for regulating reserves, in incremental MW (applicable to resources only);
- (D) Reserve capacity meeting the WECC requirements for regulating reserves, in decremental MW (applicable to resources only);
- (E) Spinning Reserves in MW;
- (F) Non-Spinning Reserves in MW; and
- (G) if the EIM Entity Scheduling Coordinator is not relying on the CAISO's Demand Forecast, a Demand Forecast.

(4) **Contents of EIM Base Schedules.** EIM Base Schedules of EIM Entities must include hourly-level Demand Forecasts for EIM Demand, hourly-level schedules

for resources, and hourly-level scheduled Interchanges.

(5) Adjustment Prior to Submission of Real-Time EIM Base Schedules. The EIM Entity Scheduling Coordinator may adjust the components of the EIM Resource Plan prior to the submission of Real-Time EIM Base Schedules up to 75 minutes before the Operating Hour.

(f) Real-Time EIM Base Schedules.

(1) In General.

(A) Initial Submission. EIM Entity Scheduling Coordinators, EIM Participating Resource Scheduling Coordinators, and non-participating resources in the EIM Entity Balancing Authority Area that wish to submit real-time hourly EIM Base Schedules, or, with regard to non-participating resources, wish to submit EIM Base Schedule information pursuant to Section 29.34(f)(4), must submit such schedules or other information consistent with the requirements of the Business Practice Manual for the Energy Imbalance Market and at least 75 minutes before the start of the Operating Hour.

(B) Interim Revisions. EIM Entity Scheduling Coordinators, EIM Participating Resource Scheduling Coordinators, and non-participating resources in the EIM Entity Balancing Authority Area may revise hourly Real-Time EIM Base Schedules, or, with regard to non-participating resources, revise EIM Base Schedule information submitted pursuant to Section 29.34(f)(4), meeting the requirements of the Business Practice Manual for the Energy Imbalance Market at or before 55 minutes before the start of the Operating Hour.

(C) Final Revision. EIM Entity Scheduling Coordinators may further revise hourly Real-Time EIM Base Schedules, including EIM Base Schedules for EIM Participating Resources, at or before 40 minutes before the start of the Operating Hour.

- (2) **EIM Base Schedule for EIM Participating Resources.** The EIM Base Schedule for each EIM Participating Resource must be within the Economic Bid range of the submitted Energy Bids for each Operating Hour for EIM Resources, which the CAISO will make available to the EIM Entity without price information.
- (3) **EIM Base Schedule for Imports and Exports.** EIM Base Schedules must disaggregate Day-Ahead import/export schedules between the EIM Entity Balancing Authority Area and the CAISO Balancing Authority Area, disaggregate the forward export schedules to other Balancing Authority Areas, and identify the relevant EIM Interties for imports and exports to an EIM Entity Balancing Authority Area from Balancing Authority Areas other than the CAISO Balancing Authority Area.
- (4) **EIM Base Schedule Aggregation.** In response to a request by an EIM Entity Scheduling Coordinator, the CAISO will establish an electronic interface by which non-participating resources, Loads, and other customers of the EIM Entity may submit EIM Base Schedule information to the EIM Scheduling Coordinator and the CAISO.
- (g) **Initial EIM Base Load Schedule.** The CAISO will derive an initial EIM Base Load Schedule for each EIM Entity from the Demand Forecast used for the EIM Entity Balancing Authority Area, estimated Transmission Losses, and an assumed Load distribution, pursuant to the methodology set forth in the Business Practice Manual for the Energy Imbalance Market.
- (h) **Energy Bids.** EIM Participating Resource Scheduling Coordinators may submit Energy Bids in accordance with the timelines, processes, and requirements applicable to other resources submitting Energy Bids under Section 34.
- (i) **Interchange Schedules with Other Balancing Authorities.**
- (1) **In General.** EIM Entity Scheduling Coordinators must submit Interchange Schedules with other Balancing Authority Areas at the relevant EIM Interties and must update these Interchange Schedules with any adjustments, when

applicable, as part of the hourly EIM Resource Plan revision.

(2) **Bidding EIM Intertie Transactions.** An EIM Participating Resource Scheduling Coordinator may bid a transaction at an EIM External Intertie into the FMM if both Balancing Authority Areas support 15-minute scheduling at the EIM External Intertie under FERC Order No. 764.

(i) **CAISO Validation.** The CAISO Markets systems will validate the initial EIM Resource Plan by 1:00 p.m. on the day before the Operating Day, and within 15 minutes of the submission of EIM Base Schedules or adjustments to EIM Base Schedules, the CAISO will validate the EIM Resource Plan and notify the EIM Entity Scheduling Coordinator—  
(1) if the EIM Resource Plan is not balanced;  
(2) if the EIM Resource Plan provides insufficient Flexible Ramping Constraint capacity to meet requirements determined pursuant to Section 29.34(m); and  
(3) if the CAISO anticipates Congestion based on the submitted EIM Resource Plans.

(k) **EIM Resource Plan Balance.** If, after the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules according to Section 29.34(f)(1)(c), Supply in the EIM Base Schedules does not balance the Demand Forecast, the CAISO will adjust the Demand in the EIM Base Schedule to equal Supply.

(l) **EIM Resource Plan Evaluation.**

(1) **Requirement.** The EIM Base Schedules for resources included in the EIM Resource Plan must balance the Demand Forecast for each EIM Entity Balancing Authority Area.  
(2) **Insufficient Supply.** An EIM Resource Plan shall be deemed to have insufficient Supply if the sum of EIM Base Schedules from non-participating resources and the sum of the highest quantity offers in the Energy Bid range from EIM Participating Resources, including Interchange with other Balancing Authority Areas, is less than the total Demand Forecast that the EIM Entity Scheduling Coordinator has decided to use for the associated EIM Entity Balancing Authority

Area.

(3) **Excess Supply.** An EIM Resource Plan shall be deemed to have excessive Supply if the sum of EIM Base Schedules from non-participating resources and the sum of the lowest quantity Bids in the Energy Bid range from EIM Participating Resources is greater than the total Demand Forecast that the EIM Entity Scheduling Coordinator has decided to use for the associated EIM Entity Balancing Authority Area.

(m) **Flexible Ramping Constraint Requirement.**

(1) **Responsibility.** Each EIM Entity Balancing Authority Area and the CAISO Balancing Authority Area will be responsible for meeting its own portion of the combined Flexible Ramping Constraint capacity requirements for the next hour as determined by Section 29.34(m).

(2) **Nature.** The Flexible Ramping Constraint capacity requirement is a minimum requirement for each Balancing Authority Area in the EIM Area and each combination thereof based upon the EIM Transfer limit between Balancing Authority Areas.

(3) **Determination.** Under the provisions of Section 29.34(m) and the procedures set forth in the Business Practice Manual for the Energy Imbalance Market, the CAISO will determine the Flexible Ramping Constraint capacity requirement using the CAISO Demand Forecast and CAISO Variable Energy Resource forecast for each Balancing Authority Area in the EIM Area and each combination thereof.

(4) **Sufficiency Determination.**

(A) **Review.** The CAISO will review the EIM Resource Plan pursuant to the process set forth in the Business Practice Manual for the Energy Imbalance Market and verify that it has sufficient Bids for Ramping capability to meet the EIM Entity Balancing Authority Area Flexible Ramping Constraint capacity requirement, as adjusted pursuant to

Sections 29.34(m)(4)(B) and (C).

(B) Pro Rata Reduction and Diversity Limit. Each EIM Entity Balancing Authority Area Flexible Ramping Constraint capacity requirement shall be reduced by its pro rata share of the diversity benefit in the EIM Area as may be limited by the available net import EIM Transfer capability into that EIM Entity Balancing Authority Area.

(C) Sufficiency of an EIM Entity Balancing Authority Area with a Net Outgoing EIM Transfer. If an EIM Entity Balancing Authority Area has a net outgoing EIM Transfer (net export with reference to the EIM Base Schedule) before the Operating Hour, then the CAISO will apply a Flexible Ramping Constraint capacity requirement credit in determining the sufficiency of the Flexible Ramping Constraint capacity for that EIM Entity Balancing Authority Area equal to the net outgoing EIM Transfer before the Operating Hour.

(D) Sufficiency of an EIM Entity Balancing Authority Area with a Net Ingoing EIM Transfer. If an EIM Entity Balancing Authority Area has a net incoming EIM Transfer (net import with reference to the EIM Base Schedule) before the Operating Hour; then the Flexible Ramping Constraint capacity for that EIM Entity Balancing Authority Area will be considered sufficient if it meets its own Flexible Ramping Constraint capacity requirement, irrespective of the incoming EIM Transfer that results from Real-Time Dispatch in the EIM Area.

(5) Combinations of Constraints. The CAISO shall determine the Flexible Ramping Constraint capacity requirement for all possible combinations of sufficient Balancing Authority Areas in the EIM Area, including requirements for individual Balancing Authority Areas in each combination, by reducing the total Flexible Ramping Constraint capacity requirement for each group of Balancing Authority Areas by the total amount of EIM Internal Intertie import capability to

that group from each Balancing Authority Area outside the group.

(n) Effect of Resource Plan Insufficiency.

- (1) Resource Plan Balance. If, after the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules as provided in Section 29.34(f)(1)(c), the EIM Resource Plan has insufficient supply as determined according to Section 29.34(l)—
- (A) the CAISO will not include the EIM Entity Balancing Authority Area in any Flexible Ramping Constraints for any combination of Balancing Authority Areas;
- (B) the CAISO will formulate only individual constraints for the EIM Entity Balancing Authority Area's individual Flexible Ramping Constraint capacity requirements; and
- (C) the CAISO will hold the EIM Transfer limit into the EIM Entity Balancing Authority Area at the value for the last 15-minute interval.
- (2) Flexible Ramping Insufficiency. If, after the final opportunity for the EIM Entity to revise hourly Real-Time EIM Base Schedules as provided in Section 29.34(f)(1)(c), the CAISO determines that an EIM Entity Balancing Authority Area has insufficient Flexible Ramping Constraint capacity according to Section 29.34(m), the CAISO will take the actions described in Section 29.34(n)(1).

- (o) Transmission Constraint Relaxation. If an EIM Entity Scheduling Coordinator's approved EIM Resource Plan does not have sufficient Bids to resolve Congestion, the CAISO will relax the relevant Transmission Constraints in the Market Clearing and the EIM Entity will become responsible for managing its congested Transmission Constraints through other means, and the CAISO will determine prices for Congestion consistent with Transmission Constraint relaxation parameters established in the Business Practice Manual for the Energy Imbalance Market until the Transmission Constraint is no longer binding in the Real-Time Market.

(p) Operating Reserves.

**(1) Schedules.**

- (A) EIM Entity Responsibility.** Each EIM Entity is responsible for its contingency reserves, or share of such contingency reserves under the terms of a reserve sharing group agreement, and it and the reserve sharing group are responsible for deploying operating reserves, including regulating reserves, in conformance with NERC and WECC requirements.
- (B) EIM Entity Scheduling Coordinator Responsibility.** The EIM Entity Scheduling Coordinator shall—
- (i)** include any Energy deployed from reserves in the hourly EIM Base Schedules, if time permits, in which case they will be settled in the Real-Time Market;
  - (ii)** otherwise include the Energy deployed from reserves as EIM Manual Dispatches, if time does not permit;
  - (iii)** immediately inform the CAISO of events requiring Dispatch of operating reserves and resource EIM Base Schedule adjustments in response to contingencies;
  - (iv)** if a resource's actual response differs from the resource EIM Base Schedule adjustment, provide a resource EIM Base Schedule update showing the actual resources dispatched during the event by no later than 1:00 a.m. seven days after the Operating Day in which the event occurred; and
  - (v)** inform the CAISO of the amount of resource capacity that is reserved for contingency reserve responsibility by either ensuring that an Energy Bid for the resource is below the maximum operating limit of the resource or reducing the maximum operating limit of the resource.

**(C) CAISO Actions.**

- (i) **Prior to Update.** Until the CAISO receives resource operating limit updates from an EIM Entity Scheduling Coordinator, the CAISO will continue to send Dispatch Instructions based upon pre-event operating limits.
- (ii) **After Update.** After EIM Base Schedule updates are received and Dispatches in the Real-Time Market reflect the updated Self-Schedules and operating limits, the CAISO shall account for the Dispatches in the net scheduled Interchange values that it provides to EIM Entity Scheduling Coordinators.

**(2) Updates to Data for Reserve Sharing Event.**

- (A) **Responsibilities.** Immediately following a reserve sharing event impacting the EIM Entity Balancing Authority Area—
  - (i) the EIM Entity must submit information regarding the assistance provided, including impacts to Balancing Authority Area Load schedules for each participant involved in the reserve sharing event; and
  - (ii) the EIM Entity Scheduling Coordinator must submit to the CAISO EIM Manual Dispatch instructions for resources in the EIM Entity Balancing Authority Area deployed in response to the reserve sharing event, pursuant to the reserve sharing group's criteria.

- (B) **Offsets.** Until 1:00 a.m. seven days following the reserve sharing event impacting the EIM Entity Balancing Authority Area, the EIM Entity may offset the Load schedules created by the reserve sharing event by entering resource to Load schedules, reflecting generation resources actually utilized to assist in the event.

- (q) **Variable Energy Resource Production Forecast.** The CAISO shall treat Variable Energy Resources in accordance with Section 34.

**29.35 Market Validation And Price Correction.** Market validation and price correction for the Energy Imbalance Market shall be governed by Section 35, except that, for a period not to exceed 90 days after an EIM Entity Implementation Date, the time allowed for the CAISO's correction of Real-Time Market prices shall be 10 Business Days.

**29.36 [Not Used]**

**29.37 Rules Of Conduct.** All EIM Market Participants shall be subject to the provisions of Section 37 except for Section 37.2.

**29.38 Market Monitoring.** The CAISO Department of Market Monitoring shall provide market monitoring services for the participation of EIM Market Participants in the Real-Time Market, including—

- (a) monitoring markets administered by the CAISO for actual or potential ineffective market rules, market abuses, market power, violations of FERC or CAISO Market rules prohibiting provision of false information, or market manipulation;
- (b) coordinating with CAISO business units that review and monitor the performance and quality of the CAISO Markets;
- (c) providing recommendations about potential market design flaws or ineffective market rules to the CAISO and FERC; and
- (d) referring a matter to FERC if the Department of Market Monitoring determines there is sufficient credible evidence that a violation of FERC or CAISO Market rules has occurred.

**29.39 EIM Market Power Mitigation.**

- (a) **EIM Market Power Mitigation Procedure.** The CAISO shall apply the Real-Time Local Market Power Mitigation procedure in Section 39.7 to the Energy Imbalance Market, except as provided in Section 29.39.
- (b) **Competitive Path Assessment.** The CAISO shall conduct the competitive path assessment to determine for each EIM Entity Balancing Authority Area whether a path is competitive or non-competitive, consistent with Section 39.7.2, except that—
  - (1) EIM Participating Resource Scheduling Coordinators shall submit information required by the CAISO to perform the competitive path assessment;

- (2) the competitive path assessment shall not exclude EIM Participating Resources from the test used to determine the competitiveness of Transmission Constraints on the basis that they may be net buyers of Energy in the Real-Time Market; and
- (3) the CAISO may establish different Reference Buses for each Balancing Authority Area, which need not be within the Balancing Authority Area, for calculating the LMP decomposition which is used to trigger Bid mitigation, based on the topology of each Balancing Authority Area and consideration of the bus at which the Marginal Cost of Congestion component of Locational Marginal Prices is least influenced by market power.
- (c) **Locational Marginal Price Decomposition.** The CAISO shall perform the Locational Marginal Price decomposition for each EIM Entity Balancing Authority Area using the results of the competitive path assessment and the Congestion pricing results of the pre-market run to determine which resources may have local market power due to Congestion on a non-competitive Transmission Constraint, consistent with Section 34.2.3 and 39.7, except that—
- (1) the CAISO will not mitigate resource Bids for scheduling limit constraints with Balancing Authority Areas that do not participate in the Real-Time Market;
- (2) the Locational Marginal Price decomposition shall only be triggered if the resource is effective at relieving an uncompetitive constraint within the same Balancing Authority Area in which the resource is located except as described in Section 29.39(c)(4);
- (3) EIM Resources shall be mitigated to relieve congestion on uncompetitive constraints within the same Balancing Authority Area in which the EIM Resources are located except as described in Section 29.39(c)(4); and
- (d) **Market Power Mitigation of EIM Transfer Constraints.**
- (1) **Structural Competitiveness Assessment.** The Department of Market Monitoring may conduct a structural competitiveness assessment of an individual or group of entities within an EIM Entity Balancing Authority Area prior to or subsequent to

the EIM Implementation Date for the EIM Entity to evaluate market power based on factors which may include—

- (A) the Demand for Real-Time Imbalance Energy within the EIM Entity Balancing Authority Area;
- (B) the Supply owned or controlled by different entities with the EIM Entity Balancing Authority Area; and
- (C) the potential Supply available to the EIM Entity Balancing Authority Area from EIM Transfers.

(2) **Application of Market Power Mitigation.** The Department of Market Monitoring may include EIM Transfer constraints into an EIM Entity Balancing Authority Area on an EIM Internal Intertie in the Local Market Power Mitigation procedures under Section 39.7 if the CAISO determines that market power may exist based on a structural competitiveness assessment pursuant to Section 29.39(d)(1) and the CAISO Governing Board authorizes such inclusion, and the Department of Market Monitoring may exclude the EIM Transfer constraints into an EIM Entity Balancing Authority Area on an EIM Internal Intertie from Local Market Power Mitigation if it determines that market power no longer exists based on a structural competitiveness assessment pursuant to Section 29.39(d)(1) and the CAISO Governing Board authorizes the exclusion.

(e) **Default Energy Bids.** The CAISO shall use the methods and standards set forth in Section 39.7 to determine Default Energy Bids for EIM Participating Resources.

**29.40 [Not Used]**

**29.41 [Not Used]**

**29.42 [Not Used]**

**29.43 [Not Used]**

**29.44 [Not Used]**

## Appendix A Master Definition Supplement

\* \* \*

### **- Bid Cost Recovery (BCR) Eligible Resources**

Those resources eligible to participate in the Bid Cost Recovery as specified in Section 11.8, which include Generating Units, System Units, System Resources with RTM Economic bids, Participating Loads, Reliability Demand Response Resources, and Proxy Demand Resources and, for purposes of scheduling and operating the Real-Time Market only, EIM Resources. A System Resource that has a Schedule that results from Bids submitted in violation of Section 30.5.5 shall not be a Bid Cost Recovery Eligible Resource for any Settlement Interval that occurs during the time period covered by the Schedule that results from Bids submitted in violation of Section 30.5.5. Accepted Self-Schedule Hourly Blocks, cleared Economic Hourly Block Bids, and cleared Economic Hourly Block Bids with Intra-Hour Option are not eligible to participate in Bid Cost Recovery in the Real-Time Market.

\* \* \*

### **- CAISO Metered Entity**

- (a) any one of the following entities that is directly connected to the CAISO Controlled Grid:
  - i. a Generator other than a Generator that sells all of its Energy (excluding any Station Power that is netted pursuant to Section 10.1.3) and Ancillary Services to the Utility Distribution Company or Small Utility Distribution Company in whose Service Area it is located;
  - ii. an MSS Operator; or
  - iii. a Utility Distribution Company or Small Utility Distribution Company; and
- (b) any one of the following entities:
  - i. a Participating Generator;
  - ii. a Participating TO in relation to its Tie Point Meters with other TOs or Balancing Authority Areas;
  - iii. a Participating Load;
  - iv. a Participating Intermittent Resource; **or**

- v. an EIM Participating Resource that has elected not to be a Scheduling Coordinator Metered Entity, with regard to the EIM Resources it specifies that it represents as a CAISO Metered Entity; or
- vi. a utility that requests that Unaccounted ~~for~~For Energy for its Service Area be calculated separately, in relation to its meters at points of connection of its Service Area with the systems of other utilities.

\* \* \*

#### **- Connected Entity**

A Participating TO or any party that owns or operates facilities that are electrically interconnected with the CAISO Controlled Grid or, for purposes of scheduling and operating the Real-Time Market only, electrically connected with the transmission system of an EIM Transmission Service Provider.

\* \* \*

#### **- Curtailable Demand**

Demand from a Participating Load or Aggregated Participating Load that can be curtailed at the direction of the CAISO in the Real-Time Dispatch of the CAISO Controlled Grid or, for purposes of scheduling and operating the Real-Time Market only, in the EIM Area.

\* \* \*

#### **- Demand**

The instantaneous amount of Power-Energy that is delivered to Loads and Scheduling Points by Generation, transmission or distribution facilities. It is the product of voltage and the in-phase component of alternating current measured in units of watts or standard multiples thereof, e.g., 1,000W=1kW, 1,000kW=1MW, etc.

\* \* \*

#### **- EIM Area**

The combined CAISO Balancing Authority Area and all EIM Entity Balancing Authority Areas.

#### **- EIM Base Load Schedule**

A forward Energy Schedule prepared by the CAISO that provides hourly Demand Forecasts for EIM Demand, as adjusted for transmission losses and any unbalanced EIM Base Schedule.

**- EIM Base Schedule**

An hourly forward Energy Schedule that does not take into account Dispatches from the Real-Time Market and is submitted by an EIM Entity Scheduling Coordinator or EIM Participating Resource Scheduling Coordinator for use in the Real-Time Market.

**- EIM Bid Adder**

A Bid component that provides EIM Participating Resources an opportunity to recover costs of compliance with California Air Resources Board greenhouse gas regulations.

**- EIM Demand**

Energy delivered to Load internal to an EIM Balancing Authority Area.

**- EIM Entity**

A Balancing Authority that represents one or more EIM Transmission Service Providers and that enters into an EIM Entity Agreement with the CAISO to enable the operation of the Real-Time Market in its Balancing Authority Area.

**- EIM Entity Agreement**

An agreement between an EIM Entity and the CAISO, a pro forma version of which is set forth in Appendix B.

**- EIM Entity Implementation Date**

The first Trading Day for an EIM Entity in the Real-Time Market.

**- EIM Entity Scheduling Coordinator**

The EIM Entity, or a third party designated by the EIM Entity, that is certified by the CAISO and that enters into an EIM Entity Scheduling Coordinator Agreement under which it is a Scheduling Coordinator and a Market Participant and is responsible for meeting the requirements specified in Section 29 on behalf of the EIM Entity.

**- EIM Entity Scheduling Coordinator Agreement**

An agreement between an EIM Entity Scheduling Coordinator and the CAISO, a pro forma version of which is set forth in Appendix B.

**- EIM External Intertie**

A point of interconnection between an EIM Entity Balancing Authority Area and an interconnected Balancing Authority Area other than a Balancing Authority Area in the EIM Area.

**- EIM Implementation Agreement**

An agreement between a Balancing Authority seeking to become an EIM Entity and the CAISO, the primary terms of which are set forth in Section 29.2(b).

**- EIM Internal Intertie**

A point of interconnection between an EIM Entity Balancing Authority Area and another Balancing Authority Area in the EIM Area.

**- EIM Intertie**

An EIM External Intertie or EIM Internal Intertie.

**- EIM Manual Dispatch**

A Dispatch by an EIM Entity to an EIM Participating Resource or a non-participating resource in its Balancing Authority Area, outside of Market Clearing of the Real-Time Market.

**- EIM Market Participant**

An EIM Entity, EIM Entity Scheduling Coordinator, EIM Participating Resource, or EIM Participating Resource Scheduling Coordinator.

**- EIM Measured Demand**

The metered CAISO Demand and metered EIM Demand plus Real-Time Interchange Export Schedules, excluding that portion of Demand of Non-Generator Resources dispatched as Regulation through Regulation Energy Management and EIM Transfers out of an EIM Entity Balancing Authority Area.

**- EIM Participating Resource**

An owner of, operator of, or seller of Energy from an EIM Resource that elects to participate in the Real-Time Market and enters into the EIM Participating Resource Agreement under which it is responsible for meeting the requirements specified in Section 29.

**- EIM Participating Resource Agreement**

An agreement between an EIM Participating Resource and the CAISO, a pro forma version of which is set forth in Appendix B.

**- EIM Participating Resource Scheduling Coordinator**

The EIM Participating Resource, or a third party designated by the EIM Participating Resource, that is certified by the CAISO and enters into an EIM Participating Resource Scheduling Coordinator Agreement under which it is a Scheduling Coordinator and Market Participant and is responsible for meeting the requirements specified in Section 29 on behalf of the resource.

**- EIM Participating Resource Scheduling Coordinator Agreement**

An agreement between the EIM Participating Resource Scheduling Coordinator and the CAISO, a pro forma version of which is set forth in Appendix B.

**- EIM Resource**

A resource that (1) can deliver Energy, Curtailable Demand, Demand Response Services, or similar services; (2) is a Generating Unit, a Load of a Participating Load, or a Demand Response Resource or other CAISO qualified resource; and (3) is located within an EIM Entity Balancing Authority Area, and that is listed in and subject to an EIM Participating Resource Agreement.

**- EIM Resource Plan**

The combination of EIM Base Schedules for Demand, Generation, and Interchange, the ancillary services plans of the EIM Entity, and the Bid ranges of EIM Participating Resources, as specified in more detail in Section 29.34(e)(4).

**- EIM Transfer**

The transfer of Energy in Real-Time between an EIM Entity Balancing Authority Area and the CAISO Balancing Authority Area, or between EIM Entity Balancing Authority Areas, using transmission capacity made available to the Real-Time Market through the Energy Imbalance Market. The EIM Transfer is not a Real-Time Interchange Export Schedule or a Real-Time Interchange Import Schedule.

**- EIM Transmission Service Information**

Information provided by an EIM Entity to the CAISO about transmission capacity available for use in the Real-Time Market through the Energy Imbalance Market.

**- EIM Transmission Service Provider**

An EIM Entity or third party that owns transmission or has transmission service rights on an EIM Intertie that makes transmission service available for use in the Real-Time Market through an EIM Entity.

\* \* \*

**- End-Use Customer Or End-User**

A consumer of electric power who consumes such power to satisfy a Load directly connected to the CAISO Controlled Grid, ~~or to~~ a Distribution System, or, for purposes of scheduling and operating the Real-Time Market only, the transmission system of an EIM Transmission Service Provider and who does not resell the power.

\* \* \*

**- Energy Imbalance Market (EIM)**

The rules and procedures in Section 29 governing the CAISO's operation of the Real-Time Market in Balancing Authority Areas outside of the CAISO Balancing Authority Area and the participation of EIM Market Participants in the Real-Time Market.

\* \* \*

**- FMM Instructed Imbalance Energy (FMM IIE)**

The portion of Imbalance Energy resulting from Day-Ahead Schedules or EIM Base Schedules and FMM Schedules determined pursuant to Section 11.5.1.

\* \* \*

**- Generating Unit**

An individual electric generator and its associated plant and apparatus whose electrical output is capable of being separately identified and metered or a Physical Scheduling Plant that, in either case, is: (a) located within the CAISO Balancing Authority Area (which includes a Pseudo-Tie of a generating unit to the CAISO Balancing Authority Area) or, for purposes of scheduling and operating the Real-Time Market only, an EIM Entity Balancing Authority Area; (b) connected to the CAISO Controlled Grid, either directly or via interconnected transmission, or distribution facilities or via a Pseudo-Tie; and (c) capable of producing and delivering net Energy (Energy in excess of a generating station's internal power requirements).

\* \* \*

**- Interchange**

Imports and exports between the CAISO Balancing Authority Area and other Balancing Authority Areas and, for purposes of scheduling and operating the Real-Time Market only, between and EIM Entity Balancing Authority Area and another Balancing Authority Areas.

**- Interchange Schedule**

A final agreed-upon schedule of Energy to be transferred between the CAISO Balancing Authority Area and another Balancing Authority Area and, for purposes of scheduling and operating the Real-Time Market only, between an EIM Entity Balancing Authority Area and another Balancing Authority Area.

\* \* \*

**- Market Participant**

An entity, including a Scheduling Coordinator, who ~~either:~~ (1) participates in the CAISO Markets through the buying, selling, transmission, or distribution of Energy, capacity, or Ancillary Services into, out of, or through the CAISO Controlled Grid; (2) is a CRR Holder or Candidate CRR Holder; ~~or~~ (3) is a Convergence Bidding Entity; or (4), for purposes of scheduling and operating the Real-Time Market only, is an EIM Market Participant.

\* \* \*

**- Node**

A point in the Full Network Model representing a physical location within the CAISO Balancing Authority Area , or the CAISO Controlled Grid, or the EIM Area, which includes the Load and Generating Unit busses in the ~~CAISO Balancing Authority~~ EIM Area (which includes a Pseudo-Tie of a Generating Unit to ~~the CAISO a~~ Balancing Authority Area in the EIM Area), and at the Intertie busses between (i) the CAISO Balancing Authority Area or an EIM Entity Balancing Authority Area and (ii) an interconnected Balancing Authority Areas.

\* \* \*

**- Point(s) Of Delivery (POD) Or Withdrawal**

Point(s) within the CAISO Balancing Authority Area or, for purposes of scheduling and operating the Real-Time Market only, the EIM Area where Energy and Ancillary Services are made available to a receiving party under this CAISO Tariff.

**- Point(s) Of Receipt (POR) Or Injection**

Point(s) within the CAISO Balancing Authority Area or, for purposes of scheduling and operating the Real-Time Market only, the EIM Area where Energy and Ancillary Services are made

available by a delivering party under this CAISO Tariff.

\* \* \*

**- Real-Time Congestion Offset**

The amount calculated pursuant to Section 11.5.4.1.1 for purposes of determining the non-zero offset amount allocation. For each Settlement Period of the RTM, the CAISO shall calculate the Real-Time Congestion Offset as the difference of 1) the sum of the products of the total of the Demand Imbalance Energy and Virtual Supply liquidated as demand in the RTM and the RTM MCC at the relevant Location; and 2) the sum of the products of the total of the Supply Imbalance Energy and Virtual Demand liquidated as supply in the RTM, and the RTM MCC at the relevant Location; including also the sum of RTM Congestion Charges for Intertie Ancillary Services Awards, and excluding the RTM Congestion Credit for ETCs and TORs calculated as provided in Section 11.5.7.1. The Real-Time Congestion Offset is allocated as provided in Section 11.5.4.2..

\* \* \*

**- Real-Time Imbalance Energy Offset**

The amount calculated pursuant to Section 11.5.4.1 for purposes of determining the non-zero offset amount allocation.

\* \* \*

**- Real-Time Unit Commitment (RTUC)**

An application of the RTM that runs every 15 minutes and commits Fast Start Units and Medium Start Units using the SCUC to adjust from Day-Ahead Schedules, EIM Base Schedules, and HASP Advisory Schedules.

\* \* \*

**- Reference Bus**

The Location(s) in the EIM Area on the CAISO Controlled Grid relative to which mathematical quantities relating to powerflow solution will be calculated.

\* \* \*

**-Scheduling Coordinator**

An entity certified by the CAISO for the purposes of undertaking the functions specified in Section

4.5.3, including any entity certified by the CAISO as an EIM Entity Scheduling Coordinator or an EIM Participating Resource Scheduling Coordinator for the purposes of undertaking the functions specified in Section 29.

\* \* \*

**- Scheduling Coordinator Metered Entity**

A Generator, Eligible Customer, End-User, Reliability Demand Response Resource, or Proxy Demand Resource that is not a CAISO Metered Entity, an EIM Entity, or an EIM Participating Resource that elects to be a Scheduling Coordinator Metered Entity with regard to some or all of the EIM Resources it represents.

\* \* \*

**- Settlement**

Process of financial settlement for products and services purchased and sold undertaken by the CAISO under Section 11 as supplemented by Section 29. Each Settlement will involve a price and a quantity.

\* \* \*

**- System Resource**

A group of resources, single resource, or a portion of a resource located outside of the CAISO Balancing Authority Area, or, for purposes of scheduling and operating the Real-Time Market only, outside of an EIM Entity Balancing Authority Area, or an allocated portion of a Balancing Authority Area's portfolio of generating resources that are either a static Interchange Schedule or directly responsive to that Balancing Authority Area's Automatic Generation Control (AGC) capable of providing Energy and/or Ancillary Services to the CAISO Balancing Authority Area or, for purposes of scheduling and operating the Real-Time Market only, to an EIM Entity Balancing Authority Area, provided that if the System Resource is providing Regulation to the CAISO it is directly responsive to AGC.

\* \* \*

**- Transmission Losses**

Energy that is lost as a natural part of the process of transmitting Energy from Generation to a  
Point Of Delivery Or Withdrawal~~Load delivered at the CAISO/Utility Distribution Company~~  
~~boundary or Balancing Authority Area boundary.~~

\* \* \*

#### **- Unaccounted For Energy (UFE)**

The difference in Energy, for each utility Service Area and Settlement Period, between the net Energy delivered into the utility Service Area, adjusted for utility Service Area Transmission Losses, and the total Measured Demand within the utility Service Area adjusted for distribution losses using Distribution System loss factors approved by the Local Regulatory Authority. This difference is attributable to meter measurement errors, power flow modeling errors, energy theft, statistical Load profile errors, and distribution loss deviations. For EIM Market Participants, the CAISO will calculate Unaccounted For Energy based on the EIM Entity Balancing Authority Area instead of the utility Service Area.

\* \* \*

## Appendix B.17

### EIM Entity Agreement (EIMEA)

**THIS ENERGY IMBALANCE MARKET ENTITY AGREEMENT (“AGREEMENT”)** is established this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ and is accepted by and between:

[Full legal name] (“EIM Entity”), having its registered and principal executive office at [address].

and

California Independent System Operator Corporation (“CAISO”), a California nonprofit public benefit corporation having a principal executive office located at such place in the State of California as the CAISO Governing Board may from time to time designate.

The EIM Entity and the CAISO are hereinafter referred to as the “Parties.”

#### Whereas:

- A. The Parties named above operate Balancing Authority Areas.
- B. The EIM Entity provides transmission service in accordance with an open access transmission tariff (“OATT”), including balancing Energy services.
- C. The CAISO operates the Real-Time Market pursuant to the CAISO Tariff.
- D. There [are/are not] third party transmission service providers within the EIM Entity Balancing Authority Area that intend to enable Energy Imbalance Market services on their transmission systems.
- E. The Parties are entering into this Agreement to enable the EIM Entity to participate in the CAISO’s Real-Time Market and to provide Energy Imbalance Market services within the EIM Entity Balancing Authority Area, including Real-Time transfers of Energy among the CAISO Balancing Authority Area and other EIM Entity Balancing Authority Areas.

NOW THEREFORE, in consideration of the mutual covenants set forth herein, **THE PARTIES AGREE** as follows:

## ARTICLE I

### DEFINITIONS AND INTERPRETATION

- 1.1 **Master Definitions Supplement.** All terms and expressions used in this Agreement shall have the same meaning as those contained in the Master Definitions Supplement to the CAISO Tariff.
- 1.2 **Rules of Interpretation.** The following rules of interpretation and conventions shall apply to this Agreement:

- (a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;
- (b) the singular shall include the plural and vice versa;
- (c) the masculine shall include the feminine and neutral and vice versa;
- (d) "includes" or "including" shall mean "including without limitation";
- (e) references to a Section, Article or Schedule shall mean a Section, Article or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;
- (f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented or restated through the date as of which such reference is made;
- (g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced or restated from time to time;
- (h) unless the context otherwise requires, any reference to a "person" includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having separate legal personality;
- (i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;
- (j) any reference to a day, week, month or year is to a calendar day, week, month or year;
- (k) unless the context requires otherwise, "or" is used in the conjunctive sense; and
- (l) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

## ARTICLE II

### RESPONSIBILITIES OF EIM ENTITY AND CAISO

- 2.1 Scope of Responsibilities.** The Parties are individually responsible for the efficient use and reliable operation of their Balancing Authority Areas consistent with the Reliability Standards established by the Western Electricity Coordinating Council ("WECC") and the North American Electric Reliability Corporation ("NERC"), and in accordance with their respective tariffs on file with the Federal Energy Regulatory Commission ("FERC"). Nothing in this Agreement is intended to change, supersede, or alter either Party's obligations to abide by NERC and WECC Reliability Standards or to provide open and

non-discriminatory transmission access in accordance with the terms of their respective FERC tariffs.

- 2.2 Tariff Provisions.** The CAISO shall provide open access to the Real-Time Market in accordance with the terms of the CAISO Tariff. The EIM Entity shall have in effect provisions in its OATT to enable operation of the Real-Time Market in its Balancing Authority Area in accordance with the CAISO Tariff.
- 2.3 EIM Entity Scheduling Coordinator.** The EIM Entity shall be represented by an EIM Entity Scheduling Coordinator, which may be the EIM Entity or another entity certified by the CAISO to perform the functions of an EIM Entity Scheduling Coordinator.
- 2.4 EIM Transmission Service and Resource Information.** The EIM Entity shall provide information to the CAISO for Energy Imbalance Market purposes regarding the network topology of its Balancing Authority Area, non-participating resources, and loads in accordance with the CAISO Tariff and the Business Practice Manual for the Energy Imbalance Market. The EIM Entity is responsible for the accuracy and completeness of this information.
- 2.5 EIM Transmission Availability.** The EIM Entity shall make available for use in the Real-Time Market transmission capacity on its system that is not otherwise encumbered, reserved, scheduled, or being used by its transmission customers or by others and shall make arrangements with third party transmission service providers within its Balancing Authority Area that intend to enable Energy Imbalance Market services on their transmission systems to provide such transmission capacity on their systems for use in the Real-Time Market. The EIM Entity shall provide the CAISO with real time information regarding the availability of transmission capacity for use in the Energy Imbalance Market as provided in the CAISO Tariff and Business Practice Manual for the Energy Imbalance Market.
- 2.6 EIM Entity Corrective Actions.** The EIM Entity may take corrective action, subject to the provision of its OATT, to address an issue with Energy Imbalance Market implementation or operation consistent with Section 29 of the CAISO Tariff.

## ARTICLE III

### TERM AND TERMINATION

- 3.1 Effective Date.** This Agreement shall be effective as of the later of the date it is executed by the Parties or the date it is accepted for filing and made effective by FERC and shall remain in full force and effect until terminated pursuant to Section 3.2 of this Agreement.
- 3.2 Termination**
- 3.2.1 Termination by CAISO.** The CAISO may terminate this Agreement by giving written notice of termination pursuant to Section 29.1(d) of the CAISO Tariff or in the event that the EIM Entity commits any material default under this Agreement or Section 29 of the CAISO Tariff that, if capable of being remedied, is not remedied within thirty (30) days after the CAISO has given the EIM Entity written notice of the default, unless the default

is excused by reason of Uncontrollable Forces in accordance with Article IX of this Agreement. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if (1) the filing of the notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within sixty (60) days after issuance of the notice of default; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination or thirty (30) days after the date of the CAISO's notice of default, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

**3.2.2 Termination by EIM Entity.** In the event that the EIM Entity no longer wishes to enable Energy Imbalance Market services within its Balancing Authority Area pursuant to the CAISO Tariff, it may terminate this Agreement on giving the CAISO not less than one-hundred and eighty (180) days written notice. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if (1) the request to file a notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within thirty (120) days of receipt of such request; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination or upon the next production date of the Full-Network Model release following the one-hundred and eighty (180) days after the CAISO's receipt of the EIM Entity's notice of termination, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

**3.3 No Termination Charge.** The CAISO shall not levy an exit fee or other charge associated with CAISO systems, procedures, or other changes required by the termination of the EIM Entity's participation in the Energy Imbalance Market as of the effective date of such notice, provided that EIM Entity obligations incurred under this Agreement prior to the effective date of such notice shall survive termination until satisfied.

## ARTICLE IV

### CAISO TARIFF

**4.1 Agreement Subject to CAISO Tariff.** This Agreement shall be subject to Section 29 of the CAISO Tariff, which shall be deemed to be incorporated herein. The EIM Entity shall abide by, and shall perform, all of the obligations of EIM Entities under the CAISO Tariff.

## ARTICLE V

## COSTS

- 5.1    Operating and Maintenance Costs.** The EIM Entity shall be responsible for all its costs incurred in connection with meeting its obligations under this Agreement.

## ARTICLE VI

### DISPUTE RESOLUTION

- 6.1    Dispute Resolution.** The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Entity and references to the CAISO Tariff shall be read as references to this Agreement.

## ARTICLE VII

### REPRESENTATIONS AND WARRANTIES

- 7.1    Representation and Warranties.** Each Party represents and warrants that the execution, delivery and performance of this Agreement by it has been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.
- 7.2    Necessary Approvals.** The EIM Entity represents that all necessary rights, leases, approvals, permits, licenses, easements, access to operate in compliance with this Agreement have been or will be obtained by the EIM Entity prior to the effective date of this Agreement, including any arrangement with third party Balancing Authorities.

## ARTICLE VIII

### LIABILITY

- 8.1    Liability.** The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to the EIM Entity and references to the CAISO Tariff shall be read as references to this Agreement.

## ARTICLE IX

### UNCONTROLLABLE FORCES

- 9.1    Uncontrollable Forces Tariff Provisions.** Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Entity and references to the CAISO Tariff shall be read as references to this Agreement.

## ARTICLE X

## MISCELLANEOUS

- 10.1 Assignments.** Either Party may assign or transfer any or all of its rights or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the CAISO Tariff and no Party may assign or transfer any or all of its rights or obligations under this Agreement without such consent. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights or obligations under this Agreement as if said successor in interest were an original Party to this Agreement.
- 10.2 Notices.** Any notice, demand or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff, provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Entity and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 1. A Party must update the information in Schedule 1 of this Agreement as information changes. Such changes shall not constitute an amendment to this Agreement.
- 10.3 Waivers.** Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.
- 10.4 Governing Law and Forum.** This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply shall be brought in any of the following forums, as appropriate: any court of the State of California, any federal court of the United States of America located in the State of California, or, where subject to its jurisdiction, before the Federal Energy Regulatory Commission.
- 10.5 Consistency with Federal Laws and Regulations.** This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.
- 10.6 Merger.** This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.
- 10.7 Severability.** If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this

Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.

**10.8 Amendments.** This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments for filing and made them effective. Nothing contained herein shall be construed as affecting in any way the right of the CAISO to unilaterally make application to FERC for a change in the rates, terms and conditions of this Agreement under Section 205 of the FPA and pursuant to FERC's rules and regulations promulgated thereunder, and the EIM Entity shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein.

**10.9 Counterparts.** This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

**IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be duly executed on behalf of each by and through their authorized representatives as of the date hereinabove written.**

**California Independent System Operator Corporation**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**[NAME OF EIM ENTITY]**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**SCHEDULE 1**

**NOTICES**

**[Section 10.2]**

**EIM Entity**

Name of Primary

Representative:

Title:

Company:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

Name of Alternative

Representative:

Title:

Company:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

**CAISO**

Name of Primary

Representative:

Title:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

Name of Alternative

Representative:

Title:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

**Appendix B.18**

**EIM Entity Scheduling Coordinator Agreement (EIMESCA)**

**THIS AGREEMENT** is made this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ and is entered into, by and between:

(1) [Full legal name] having a registered or principal executive office at [address] (the "EIM Entity Scheduling Coordinator")

and

(2) CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION, a California nonprofit public benefit corporation having a principal executive office located at such place in the State of California as the CAISO Governing Board may from time to time designate (the "CAISO").

The EIM Entity Scheduling Coordinator and the CAISO are hereinafter referred to as the "Parties."

Whereas:

A. The EIM Entity Scheduling Coordinator has applied for certification or has been certified by the CAISO under the certification procedure referred to in Section 29 of the CAISO Tariff.

B. The EIM Entity Scheduling Coordinator wishes to represent an EIM Entity under the terms and conditions set forth in Section 29 of the CAISO Tariff.

**NOW IT IS HEREBY AGREED as follows:**

**1. Definitions and Interpretation.**

**1.1 Master Definitions Supplement.** Terms and expressions used in this Agreement shall have the same meanings as those contained in the Master Definitions Supplement to the CAISO Tariff.

**1.2 Rules of Interpretation.** The following rules of interpretation and conventions shall apply to this Agreement:

(a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;

(b) the singular shall include the plural and vice versa;

(c) the masculine shall include the feminine and neutral and vice versa;

(d) "includes" or "including" shall mean "including without limitation";

- (e) references to a Section, Article or Schedule shall mean a Section, Article or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;
- (f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented or restated through the date as of which such reference is made;
- (g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced or restated from time to time;
- (h) unless the context otherwise requires, any reference to a "person" includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having separate legal personality;
- (i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;
- (j) unless the context otherwise requires, "or" is used in the conjunctive sense;
- (k) any reference to a day, week, month or year is to a calendar day, week, month or year; and
- (l) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

## **2. Covenant of the EIM Entity Scheduling Coordinator.**

### **2.1 The EIM Entity Scheduling Coordinator agrees that:**

- 2.1.1 CAISO Tariff Section 29 governs all aspects of Energy Imbalance Market information submission, including the financial and technical criteria for EIM Entity Scheduling Coordinator EIM Base Schedule submissions, Settlement, information reporting requirements, and confidentiality restrictions;**
- 2.1.2 It will abide by and will perform all of the obligations under Section 29 of the CAISO Tariff placed on EIM Entity Scheduling Coordinators in respect of all matters set forth therein, including ongoing obligations in respect of scheduling, Settlement, system security policy and procedures to be developed by the CAISO from time to time, billing and payments, confidentiality and dispute resolution;**
- 2.1.3 It shall ensure that each EIM Entity that it represents enters into an EIM Entity Agreement in accordance with Section 29 of the CAISO Tariff;**

**2.1.4** It shall have the primary responsibility to the CAISO, as principal, for all EIM Entity Scheduling Coordinator payment obligations under Section 29 of the CAISO Tariff; and

**2.1.5** Its status as an EIM Entity Scheduling Coordinator is at all times subject to Section 29 of the CAISO Tariff.

**3. Term and Termination.**

**3.1** This Agreement shall commence on the later of (a) \_\_\_\_\_ or (b) the date the EIM Entity Scheduling Coordinator is certified by the CAISO as an EIM Entity Scheduling Coordinator.

**3.2** This Agreement may be terminated in accordance with the provisions of Section 4.5.4.4 and 4.5.4.5 of the CAISO Tariff; provided, however, that any outstanding financial right or obligation or any other right or obligation under the CAISO Tariff of the EIM Entity Scheduling Coordinator that may have arisen under this Agreement, and any provision of this Agreement necessary to give effect to such right or obligation, shall survive such termination until satisfied. The CAISO shall timely file any notice of termination with FERC, if this Agreement has been filed with FERC, or must otherwise comply with the requirements of FERC rules regarding termination.

**4. Settlement Account.**

**4.1** The EIM Entity Scheduling Coordinator shall maintain at all times an account with a bank capable of Fedwire transfer and, at its option, may also maintain an account capable of ACH transfers, to which credits or debits that arise under Section 29 of the CAISO Tariff shall be made in accordance with the billing and Settlement provisions of Section 11 of the CAISO Tariff. Such account shall be the account as notified by the EIM Entity Scheduling Coordinator to the CAISO from time to time by giving at least 20 days written notice before the new account becomes operational, together with all information necessary for the CAISO's processing of a change in that account.

**5. Agreement to be bound by CAISO Tariff.**

**5.1** Section 29 of the CAISO Tariff is incorporated herein and made a part hereof. In the event of a conflict between the terms and conditions of this Agreement and any other terms and conditions set forth in the CAISO Tariff that may apply to EIM Entity Scheduling Coordinators, the terms and conditions of the CAISO Tariff shall prevail.

**6. Electronic Contracting.**

**6.1** All submitted information, applications, schedules, Bids, confirmations, changes to information on file with the CAISO and other communications conducted via electronic transfer (e.g. direct computer link, FTP file transfer, bulletin board, e-mail, facsimile or any other means established by the CAISO) shall have the same legal rights, responsibilities, obligations and other implications as set forth in the terms and conditions of Section 29 of the CAISO Tariff as if executed in written format.

**7. Penalties and Sanctions.**

**7.1** The EIM Entity Scheduling Coordinator shall be subject to all penalties made applicable to EIM Entity Scheduling Coordinators set forth in Section 29 of the CAISO Tariff.

**8. Costs.**

**8.1** The EIM Entity Scheduling Coordinator shall be responsible for all its costs incurred for the purpose of meeting its obligations under this Agreement.

**9. Dispute Resolution.**

**9.1** The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Entity Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement.

**10. Representation and Warranties.**

**10.1** Each Party represents and warrants that the execution, delivery and performance of this Agreement by it has been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.

**11. Liability.**

**11.1** The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to the EIM Entity Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement.

**12. Uncontrollable Forces.**

**12.1** Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Entity Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement.

**13. Miscellaneous.**

**13.1 Assignments.** Either Party may assign or transfer any or all of its rights and/or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the CAISO Tariff and no Party may assign or transfer any or all of its rights or obligations under this Agreement without such consent. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights and/or obligations under this Agreement as if said successor in interest was an original Party to this Agreement.

- 13.2 Notices.** Any notice, demand or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff, provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Entity Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 1. A Party must update the information in Schedule 1 of this Agreement as information changes. Such changes shall not constitute an amendment to this Agreement.
- 13.3 Waivers.** Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.
- 13.4 Governing Law and Forum.** This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply, shall be brought in any of the following forums, as appropriate: any court of the State of California, any federal court of the United States of America located in the State of California, or, where subject to its jurisdiction, before the Federal Energy Regulatory Commission.
- 13.5 Consistency with Federal Laws and Regulations.** This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.
- 13.6 Merger.** This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.
- 13.7 Severability.** If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.
- 13.8 Amendments.** This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments

for filing and made them effective. Nothing contained herein shall be construed as affecting in any way the right of the CAISO to unilaterally make application to FERC for a change in the rates, terms and conditions of this Agreement under Section 205 of the FPA and pursuant to FERC's rules and regulations promulgated thereunder, and the EIM Entity Scheduling Coordinator shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein.

**13.9 Counterparts.** This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their respective authorized officials.

**California Independent System Operator Corporation**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**[Name of EIM Entity Scheduling Coordinator]**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**SCHEDULE 1**

**NOTICES**

**[Section 13.2]**

**EIM Entity Scheduling Coordinator**

Name of Primary

Representative:

Title:

Company:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

Name of Alternative

Representative:

Title:

Company:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

**CAISO**

Name of Primary

Representative:

Title:

Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Email address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

Name of Alternative

Representative: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Email address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

## Appendix B.19

### EIM Participating Resource Agreement (EIMPRA)

**THIS ENERGY IMBALANCE MARKET PARTICIPATING RESOURCE AGREEMENT**  
("AGREEMENT") is established this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ and is accepted by and  
between:

[Full legal name] ("EIM Participating Resource"), having its registered and principal executive  
office at [address],

and

California Independent System Operator Corporation ("CAISO"), a California nonprofit public  
benefit corporation having a principal executive office located at such place in the State of  
California as the CAISO Governing Board may from time to time designate.

The EIM Participating Resource and the CAISO are hereinafter referred to as the "Parties."

**Whereas:**

- A. The CAISO operates a Real-Time Market for Energy pursuant to the CAISO Tariff.
- B. The EIM Participating Resource receives balancing Energy service from an EIM Entity in accordance with the EIM Entity's open access transmission tariff or from another transmission service provider within the EIM Entity Balancing Authority Area.
- C. The Parties wish to enter into this Agreement to establish the terms and conditions for participation in the CAISO's Real-Time Market by the EIM Participating Resource in accordance with Section 29 of the CAISO Tariff.

NOW THEREFORE, in consideration of the mutual covenants set forth herein, **THE PARTIES AGREE** as follows:

#### ARTICLE I

##### DEFINITIONS AND INTERPRETATION

- 1.1 **Master Definitions Supplement.** All terms and expressions used in this Agreement shall have the same meaning as those contained in the Master Definitions Supplement to the CAISO Tariff.
- 1.2 **Rules of Interpretation.** The following rules of interpretation and conventions shall apply to this Agreement:

- (a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;
- (b) the singular shall include the plural and vice versa;
- (c) the masculine shall include the feminine and neutral and vice versa;
- (d) "includes" or "including" shall mean "including without limitation";
- (e) references to a Section, Article or Schedule shall mean a Section, Article or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;
- (f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented or restated through the date as of which such reference is made;
- (g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced or restated from time to time;
- (h) unless the context otherwise requires, any reference to a "person" includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having separate legal personality;
- (i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;
- (j) unless the context otherwise requires, "or" is used in the conjunctive sense;
- (k) any reference to a day, week, month or year is to a calendar day, week, month or year; and
- (l) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

## ARTICLE II

### RESPONSIBILITIES OF EIM PARTICIPATING RESOURCE

- 2.1 EIM Participating Resource Scheduling Coordinator.** The EIM Participating Resource shall be represented by an EIM Participating Resource Scheduling Coordinator, which may be the EIM Participating Resource or another entity certified by the ISO to perform the functions of an EIM Participating Resource Scheduling Coordinator.
- 2.2 EIM Resources.** The EIM Participating Resource has identified on Schedule 1 all EIM Resources that it owns, operates, has a contractual entitlement to, or that otherwise will be included in the Master File.

**2.2.1 Technical Characteristics.** The EIM Participating Resource has provided to the CAISO in Schedule 1 the required information regarding the operating characteristics of each EIM Resource listed in Schedule 1, in addition to any further level of detail that may be required by Section 29 of the CAISO Tariff.

**2.2.2 Notification of Changes.** Sixty (60) days prior to changing any technical information in Schedule 1, the EIM Participating Resource shall notify the CAISO of the proposed changes. The CAISO shall post on the CAISO Website a schedule showing, for at least one year in advance, (i) the proposed dates on which the CAISO's Master File will be updated, which dates shall occur at least every three months; (ii) the dates on which the information contained in the revised Master File will become effective; and (iii) the deadlines by which changed technical information must be submitted to the CAISO in order to be tested and included in the next scheduled update of the CAISO's Master File. Unless the EIM Resource fails to test at the values in the proposed change(s), the change will become effective upon the effective date for the next scheduled update of the Master File, provided the EIM Participating Resource submits the changed information by the applicable deadline and is tested by the deadline. Subject to such notification this Agreement shall not apply to any EIM Resource identified in Schedule 1 which the EIM Participating Resource no longer owns or no longer has contractual entitlement to.

## ARTICLE III

### TERM AND TERMINATION

**3.1 Effective Date.** This Agreement shall be effective as of the later of the date it is executed by the Parties or the date it is accepted for filing and made effective by FERC, if such FERC filing is required, and shall remain in full force and effect until terminated pursuant to Section 3.2 of this Agreement.

**3.2 Termination**

**3.2.1 Termination by CAISO.** Subject to Section 5.2, the CAISO may terminate this Agreement by giving written notice of termination in the event that the EIM Participating Resource commits any material default under this Agreement and/or the CAISO Tariff which, if capable of being remedied, is not remedied within thirty (30) days after the CAISO has given, to the EIM Participating Resource, written notice of the default, unless excused by reason of Uncontrollable Forces in accordance with Article X of this Agreement. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement was filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the filing of the notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within sixty (60) days after issuance of the notice of default; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if filed with FERC, or thirty (30) days after the date of the CAISO's notice of default, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

**3.2.2 Termination by EIM Participating Resource.** In the event that the EIM Participating Resource no longer wishes to submit Bids and transmit Energy over the CAISO Controlled Grid, it may terminate this Agreement, on giving the CAISO not less than ninety (90) days written notice, provided, however, that in accordance with Section 3.3, the EIM Participating Resource may modify Schedule 1 to remove EIM Resources which it no longer owns or no longer has contractual entitlement to and such modification shall be effective upon receipt by the CAISO. With respect to any notice of termination given pursuant to this Section, the CAISO must file a timely notice of termination with FERC, if this Agreement has been filed with FERC, or must otherwise comply with the requirements of FERC Order No. 2001 and related FERC orders. The filing of the notice of termination by the CAISO with FERC will be considered timely if: (1) the request to file a notice of termination is made after the preconditions for termination have been met, and the CAISO files the notice of termination within thirty (30) days of receipt of such request; or (2) the CAISO files the notice of termination in accordance with the requirements of FERC Order No. 2001. This Agreement shall terminate upon acceptance by FERC of such a notice of termination, if such notice is required to be filed with FERC, or upon ninety (90) days after the CAISO's receipt of the EIM Participating Resource's notice of termination, if terminated in accordance with the requirements of FERC Order No. 2001 and related FERC orders.

## ARTICLE IV

### CAISO TARIFF

**4.1 Agreement Subject to CAISO Tariff.** This Agreement shall be subject to Section 29 of the CAISO Tariff, which shall be deemed to be incorporated herein. The EIM Participating Resource shall abide by, and shall perform all of the obligations under the CAISO Tariff placed on EIM Participating Resources in respect of all matters set forth therein.

**4.1.1 Additional EIM Participating Resource Requirements.** The EIM Participating Resource shall comply with all CAISO Tariff requirements associated with resource registration and the measurement and verification of the associated services to be provided for EIM Resources other than Generating Units or CAISO qualified resources delivering Energy.

## ARTICLE V

### PENALTIES AND SANCTIONS

**5.1 Penalties.** If the EIM Participating Resource fails to comply with any provisions of this Agreement, the CAISO shall be entitled to impose penalties and sanctions on the EIM Participating Resource. No penalties or sanctions may be imposed under this Agreement unless a CAISO Tariff provision providing for such penalties or sanctions has first been filed with and made effective by FERC. Nothing in the Agreement, with the exception of the provisions relating to the CAISO ADR Procedures, shall be construed as waiving the rights of the EIM Participating Resource to oppose or protest any penalty proposed by the CAISO to the FERC or the specific imposition by the CAISO of any FERC-approved penalty on the EIM Participating Resource.

**5.2 Corrective Measures.** If the EIM Participating Resource fails to meet or maintain the requirements set forth in this Agreement or Section 29 of the CAISO Tariff, the CAISO shall be permitted to take any of the measures, contained or referenced in Section 29 of the CAISO Tariff, which the CAISO deems to be necessary to correct the situation.

## ARTICLE VI

### COSTS

**6.1 Operating and Maintenance Costs.** The EIM Participating Resource shall be responsible for all its costs incurred in connection with meeting its obligations under this Agreement.

## ARTICLE VII

### DISPUTE RESOLUTION

**7.1 Dispute Resolution.** The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Participating Resource and references to the CAISO Tariff shall be read as references to this Agreement.

## ARTICLE VIII

### REPRESENTATIONS AND WARRANTIES

**8.1 Representation and Warranties.** Each Party represents and warrants that the execution, delivery and performance of this Agreement by it has been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.

**8.2 Necessary Approvals.** The EIM Participating Resource represents that all necessary rights, leases, approvals, permits, licenses, easements, access to operate in compliance with this Agreement have been or will be obtained by the EIM Participating Resource prior to the effective date of this Agreement, including any arrangement with third party Balancing Authorities.

## ARTICLE IX

### LIABILITY

**9.1 Liability.** The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to the EIM Participating Resource and references to the CAISO Tariff shall be read as references to this Agreement.

## ARTICLE X

### UNCONTROLLABLE FORCES

**10.1 Uncontrollable Forces Tariff Provisions.** Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Participating Resource and references to the CAISO Tariff shall be read as references to this Agreement.

## ARTICLE XI

### MISCELLANEOUS

**11.1 Assignments.** Either Party may assign or transfer any or all of its rights or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the CAISO Tariff and no Party may assign or transfer any or all of its rights or obligations under this Agreement without such consent. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights and/or obligations under this Agreement as if said successor in interest were an original Party to this Agreement.

**11.2 Notices.** Any notice, demand or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff, provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Participating Resource and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 2. A Party must update the information in Schedule 2 of this Agreement as information changes. Such changes shall not constitute an amendment to this Agreement.

**11.3 Waivers.** Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.

**11.4 Governing Law and Forum.** This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the

laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply shall be brought in any of the following forums, as appropriate: any court of the State of California, any federal court of the United States of America located in the State of California, or, where subject to its jurisdiction, before the Federal Energy Regulatory Commission.

**11.5 Consistency with Federal Laws and Regulations.** This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.

**11.6 Merger.** This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.

**11.7 Severability.** If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.

**11.8 Amendments.** This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments for filing and made them effective. Nothing contained herein shall be construed as affecting in any way the right of the CAISO to unilaterally make application to FERC for a change in the rates, terms and conditions of this Agreement under Section 205 of the FPA and pursuant to FERC's rules and regulations promulgated thereunder, and the EIM Participating Resource shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein.

**11.9 Counterparts.** This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

**IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be duly executed on behalf of each by and through their authorized representatives as of the date hereinabove written.**

**California Independent System Operator Corporation**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**[NAME OF EIM PARTICIPATING RESOURCE]**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

SCHEDULE 1

EIM Resources

[Section 2.4]

**SCHEDULE 2**

**NOTICES**

**[Section 11.2]**

**EIM Participating Resource**

Name of Primary

Representative:

Title:

Company:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

Name of Alternative

Representative:

Title:

Company:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

**CAISO**

Name of Primary

Representative:

Title:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

Name of Alternative

Representative:

Title:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

## Appendix B.20

### EIM Participating Resource Scheduling Coordinator Agreement (EIMPRSCA)

**THIS AGREEMENT** is made this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ and is entered into, by and between:

- (1) [Full legal name] having a registered or principal executive office at [address] (the "EIM Participating Resource Scheduling Coordinator")  
and  
(2) CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION, a California nonprofit public benefit corporation having a principal executive office located at such place in the State of California as the CAISO Governing Board may from time to time designate (the "CAISO").

The EIM Participating Resource Scheduling Coordinator and the CAISO are hereinafter referred to as the "Parties."

Whereas:

- A. The EIM Participating Resource Scheduling Coordinator has applied for or has been certified by the CAISO under the certification procedure referred to in Section 29 of the CAISO Tariff.  
B. The EIM Participating Resource Scheduling Coordinator wishes to represent EIM Participating Resources under the terms and conditions set forth in Section 29 of the CAISO Tariff.

### NOW IT IS HEREBY AGREED as follows:

#### 1. Definitions and Interpretation.

**1.1 Master Definitions Supplement.** Terms and expressions used in this Agreement shall have the same meanings as those contained in the Master Definitions Supplement to the CAISO Tariff.

**1.2 Rules of Interpretation.** The following rules of interpretation and conventions shall apply to this Agreement:

- (a) if there is any inconsistency between this Agreement and the CAISO Tariff, the CAISO Tariff will prevail to the extent of the inconsistency;
- (b) the singular shall include the plural and vice versa;
- (c) the masculine shall include the feminine and neutral and vice versa;
- (d) "includes" or "including" shall mean "including without limitation";
- (e) references to a Section, Article or Schedule shall mean a Section, Article or a Schedule of this Agreement, as the case may be, unless the context otherwise requires;

- (f) a reference to a given agreement or instrument shall be a reference to that agreement or instrument as modified, amended, supplemented or restated through the date as of which such reference is made;
- (g) unless the context otherwise requires, references to any law shall be deemed references to such law as it may be amended, replaced or restated from time to time;
- (h) unless the context otherwise requires, any reference to a "person" includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having separate legal personality;
- (i) unless the context otherwise requires, any reference to a Party includes a reference to its permitted successors and assigns;
- (j) unless the context otherwise requires, "or" is used in the conjunctive sense;
- (k) any reference to a day, week, month or year is to a calendar day, week, month or year; and
- (l) the captions and headings in this Agreement are inserted solely to facilitate reference and shall have no bearing upon the interpretation of any of the terms and conditions of this Agreement.

## **2. Covenant of the EIM Participating Resource Scheduling Coordinator.**

### **2.1 The EIM Participating Resource Scheduling Coordinator agrees that:**

- 2.1.1 CAISO Tariff Section 29 governs all aspects of bidding and scheduling of Energy in the Real-Time Market, including (without limitation), the financial and technical criteria applicable to EIM Participating Resource Scheduling Coordinators, and other bidding, Settlement, information reporting requirements, and confidentiality restrictions applicable to EIM Participating Resource Scheduling Coordinators;**
- 2.1.2 It shall abide by, and shall perform all of the obligations under Section 29 of the CAISO Tariff placed on EIM Participating Resource Scheduling Coordinators in respect of all matters set forth therein, including, without limitation, ongoing obligations in respect of scheduling, Settlement, system security policy and procedures to be developed by the CAISO from time to time, billing and payments, confidentiality, and dispute resolution;**
- 2.1.3 It shall ensure that each EIM Participating Resource for which it submits Bids enters into an EIM Participating Resource Agreement in accordance with Section 29 of the CAISO Tariff;**
- 2.1.4 It shall have the primary responsibility to the CAISO, as principal, for all EIM Participating Resource Scheduling Coordinator payment obligations pursuant to Section 29 of the CAISO Tariff; and**

**2.1.5** Its status as an EIM Participating Resource Scheduling Coordinator is at all times subject to Section 29 of the CAISO Tariff.

**3. Term and Termination.**

**3.1** This Agreement shall commence on the later of (a) or (b) the date the EIM Participating Resource Scheduling Coordinator is certified by the CAISO as an EIM Participating Resource Scheduling Coordinator.

**3.2** This Agreement may be terminated in accordance with the provisions of Section 4.5.4.4 and 4.5.4.5 of the CAISO Tariff; provided, however, that any outstanding financial right or obligation or any other right or obligation under the CAISO Tariff of the EIM Participating Resource Scheduling Coordinator that may have arisen under this Agreement, and any provision of this Agreement necessary to give effect to such right or obligation, shall survive such termination until satisfied. The CAISO shall timely file any notice of termination with FERC, if this Agreement has been filed with FERC, or must otherwise comply with the requirements of FERC rules regarding termination.

**4. Settlement Account.**

**4.1** The EIM Participating Resource Scheduling Coordinator shall maintain at all times an account with a bank capable of Fedwire transfer and, at its option, may also maintain an account capable of ACH transfers, to which credits or debits that arise under Section 29 of the CAISO Tariff shall be made in accordance with the billing and Settlement provisions of Section 11 of the CAISO Tariff. Such account shall be the account as notified by the EIM Participating Resource Scheduling Coordinator to the CAISO from time to time by giving at least 20 days written notice before the new account becomes operational, together with all information necessary for the CAISO's processing of a change in that account.

**5. Agreement to be bound by CAISO Tariff.**

**5.1** CAISO Tariff Section 29 is incorporated herein and made a part hereof. In the event of a conflict between the terms and conditions of this Agreement and any other terms and conditions set forth in the CAISO Tariff, the terms and conditions of the CAISO Tariff shall prevail.

**6. Electronic Contracting.**

**6.1** All submitted information, applications, schedules, Bids, confirmations, changes to information on file with the CAISO and other communications conducted via electronic transfer (e.g. direct computer link, FTP file transfer, bulletin board, e-mail, facsimile or any other means established by the CAISO) shall have the same legal rights, responsibilities, obligations and other implications as set forth in the terms and conditions of Section 29 of the CAISO Tariff as if executed in written format.

**7. Penalties and Sanctions.**

**7.1** The EIM Participating Resource Scheduling Coordinator shall be subject to all penalties made applicable to EIM Participating Resource Scheduling Coordinators set forth in Section 29 of the CAISO Tariff.

**8. Costs.**

**8.1** The EIM Participating Resource Scheduling Coordinator shall be responsible for all its costs incurred for the purpose of meeting its obligations under this Agreement.

**9. Dispute Resolution.**

**9.1** The Parties shall make reasonable efforts to settle all disputes arising out of or in connection with this Agreement. In the event any dispute is not settled, the Parties shall adhere to the CAISO ADR Procedures set forth in Section 13 of the CAISO Tariff, which is incorporated by reference, except that any reference in Section 13 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Participating Resource Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement.

**10. Representation and Warranties.**

**10.1** Each Party represents and warrants that the execution, delivery and performance of this Agreement by it has been duly authorized by all necessary corporate and/or governmental actions, to the extent authorized by law.

**11. Liability.**

**11.1** The provisions of Section 14 of the CAISO Tariff will apply to liability arising under this Agreement, except that all references in Section 14 of the CAISO Tariff to Market Participants shall be read as references to the EIM Participating Resource Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement.

**12. Uncontrollable Forces.**

**12.1** Section 14.1 of the CAISO Tariff shall be incorporated by reference into this Agreement except that all references in Section 14.1 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Participating Resource Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement.

**13. Miscellaneous.**

**13.1 Assignments.** Either Party may assign or transfer any or all of its rights and/or obligations under this Agreement with the other Party's prior written consent in accordance with Section 22.2 of the CAISO Tariff and no Party may assign or transfer any or all of its rights or obligations under this Agreement without such consent. Such consent shall not be unreasonably withheld. Any such transfer or assignment shall be conditioned upon the successor in interest accepting the rights and/or obligations under this Agreement as if said successor in interest was an original Party to this Agreement.

**13.2 Notices.** Any notice, demand or request which may be given to or made upon either Party regarding this Agreement shall be made in accordance with Section 22.4 of the CAISO Tariff, provided that all references in Section 22.4 of the CAISO Tariff to Market Participants shall be read as a reference to the EIM Participating Resource Scheduling Coordinator and references to the CAISO Tariff shall be read as references to this Agreement, and unless otherwise stated or agreed shall be made to the representative of the other Party indicated in Schedule 1. A Party must update the information in Schedule 1 of this Agreement as information changes. Such changes shall not constitute an amendment to this Agreement.

- 13.3 Waivers.** Any waiver at any time by either Party of its rights with respect to any default under this Agreement, or with respect to any other matter arising in connection with this Agreement, shall not constitute or be deemed a waiver with respect to any subsequent default or other matter arising in connection with this Agreement. Any delay, short of the statutory period of limitations, in asserting or enforcing any right under this Agreement shall not constitute or be deemed a waiver of such right.
- 13.4 Governing Law and Forum.** This Agreement shall be deemed to be a contract made under, and for all purposes shall be governed by and construed in accordance with, the laws of the State of California, except its conflict of law provisions. The Parties irrevocably consent that any legal action or proceeding arising under or relating to this Agreement to which the CAISO ADR Procedures do not apply, shall be brought in any of the following forums, as appropriate: any court of the State of California, any federal court of the United States of America located in the State of California, or, where subject to its jurisdiction, before the Federal Energy Regulatory Commission.
- 13.5 Consistency with Federal Laws and Regulations.** This Agreement shall incorporate by reference Section 22.9 of the CAISO Tariff as if the references to the CAISO Tariff were referring to this Agreement.
- 13.6 Merger.** This Agreement constitutes the complete and final agreement of the Parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter.
- 13.7 Severability.** If any term, covenant, or condition of this Agreement or the application or effect of any such term, covenant, or condition is held invalid as to any person, entity, or circumstance, or is determined to be unjust, unreasonable, unlawful, imprudent, or otherwise not in the public interest by any court or government agency of competent jurisdiction, then such term, covenant, or condition shall remain in force and effect to the maximum extent permitted by law, and all other terms, covenants, and conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect and the Parties shall be relieved of their obligations only to the extent necessary to eliminate such regulatory or other determination unless a court or governmental agency of competent jurisdiction holds that such provisions are not separable from all other provisions of this Agreement.
- 13.8 Amendments.** This Agreement and the Schedules attached hereto may be amended from time to time by the mutual agreement of the Parties in writing. Amendments that require FERC approval shall not take effect until FERC has accepted such amendments for filing and made them effective. Nothing contained herein shall be construed as affecting in any way the right of the CAISO to unilaterally make application to FERC for a change in the rates, terms and conditions of this Agreement under Section 205 of the FPA and pursuant to FERC's rules and regulations promulgated thereunder, and the EIM Participating Resource Scheduling Coordinator shall have the right to make a unilateral filing with FERC to modify this Agreement pursuant to Section 206 or any other applicable provision of the FPA and FERC's rules and regulations thereunder; provided that each Party shall have the right to protest any such filing by the other Party and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the Parties or of FERC under Sections 205 or 206 of the FPA and FERC's rules and regulations thereunder, except to the extent that the Parties otherwise mutually agree as provided herein.
- 13.9 Counterparts.** This Agreement may be executed in one or more counterparts at different times, each of which shall be regarded as an original and all of which, taken together, shall constitute one and the same Agreement.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their respective authorized officials.

**California Independent System Operator Corporation**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**[Name of EIM Participating Resource Scheduling Coordinator]**

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**SCHEDULE 1**

**NOTICES**

**[Section 13.2]**

**EIM Participating Resource Scheduling Coordinator**

Name of Primary

Representative:

Title:

Company:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

Name of Alternative

Representative:

Title:

Company:

Address:

City/State/Zip Code:

Email Address:

Phone:

Fax No:

**CAISO**

Name of Primary

Representative:

Title:

Address:

City/State/Zip Code:

Email address:

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

Name of Alternative

Representative: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Email address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

**Attachment C – Declaration of Donald G. Tretheway**  
**Tariff Amendments to Implement Energy Imbalance Market**  
**California Independent System Operator Corporation**

**February 28, 2014**

**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

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

**DECLARATION OF  
DONALD G. TRETHEWAY  
ON BEHALF OF THE  
CALIFORNIA INDEPENDENT SYSTEM  
OPERATOR CORPORATION**

I, Donald G. Tretheway, declare as follows:

1. I am employed as Lead Market Design and Regulatory Policy Specialist for the California Independent System Operator Corporation (“ISO”). My business address is 250 Outcropping Way, Folsom, CA 95630.

**I. EXPERIENCE AND QUALIFICATIONS**

2. I have a Bachelor of Arts in Economics with a specialization in Computing from the University of California, Los Angeles, and a Masters of Business Administration, Finance & Technology Management from the University of California, Davis - Graduate School of Management.
3. I began working at the ISO in June 2009 and have worked on a number of significant market design issues. I was policy lead on the ISO’s initiative to comply with the requirements established by the Federal Energy Regulatory Commission (“FERC”) in Order No. 755 concerning procurement of frequency regulation in the organized wholesale electric markets. I also played a significant role in the ISO’s Renewable

Integration Market & Product Review initiative and the ISO's prior stakeholder initiatives addressing intertie pricing issues.

4. I am responsible for the development of enhancements to the wholesale electricity markets administered by the ISO with an objective of improving the efficiency of those markets and facilitating the realization of regulatory and public policy objectives in the region.
5. I was the policy lead on the stakeholder process used by the ISO to develop its proposal to implement fifteen-minute scheduling and settlement and related market design enhancements that will satisfy the intra-hour scheduling requirements established by the FERC in Order No. 764 and that will allow the ISO's real-time market to more efficiently integrate a large amount of renewable variable energy resources into the fleet of resources serving customers in the ISO's balancing authority area.
6. Since early 2013, I have been the policy lead on the stakeholder process used by the ISO to develop its proposal, known as the Energy Imbalance Market, to expand its real-time market to accommodate participation by balancing authority areas other than the ISO's balancing authority area, which the proposed tariff amendments refer to as "EIM Entities."

## **II. BACKGROUND**

7. This declaration accompanies the transmittal letter for the ISO's proposed Energy Imbalance Market. As explained in the transmittal letter, the Energy Imbalance Market is a set of rules and procedures under which the ISO is making its real-time market available to other balancing authority areas that choose to use that market to serve their needs for imbalance

energy. The transmittal letter describes the complete set of tariff amendments that the ISO proposes to implement the Energy Imbalance Market. The purpose of my declaration is to elaborate on certain aspects of matters discussed in the transmittal letter, in particular the settlement of real-time market charges and the ISO's balance and resource sufficiency tests. In my declaration, I use capitalized terms as those terms are defined in the ISO tariff as modified by the tariff amendments to implement the Energy Imbalance Market, and references to numbered sections are references to sections of the ISO tariff as modified by the tariff amendments, unless the context indicates otherwise.

8. As in the current market, the ISO's business relationship will be with scheduling coordinators, who will represent the resources and balancing authority areas that participate in the real-time market through the Energy Imbalance Market ("EIM Market Participants"). Scheduling coordinators for will also provide certain information about loads and resources that choose not to participate. For the sake of simplicity, I will refer in my declaration to the EIM Market Participants themselves, rather than the scheduling coordinators.
9. Because the Energy Imbalance Market builds on the ISO's recently enhanced real-time market structure, I will briefly review that structure before describing the revisions proposed to implement the Energy Imbalance Market. The Commission's Order No. 764, which required that all transmission providers make available the opportunity for fifteen-minute

schedules, created an opportunity for the ISO to implement real-time market design changes to address a number of real-time market inefficiencies in a manner that was not possible before the Commission's reforms.

10. Following an in-depth stakeholder process, the ISO proposed significant revisions to the real-time market. These reforms remain pending before the Commission with a requested effective date of April 1, 2014, prior to the start of the Energy Imbalance Market. My declaration assumes that these proposed changes will be accepted without major modification.
11. The new real-time market design will retain hourly scheduling options to facilitate transactions with the rest of the western United States. While the new market design will not change these aspects of the current real-time market, it will leverage the previously existing real-time unit commitment market process to establish fifteen-minute financially binding schedules for energy and ancillary services for all internal transactions and for all transactions on the interties. This component of the revised market design is called the fifteen-minute market or "FMM." Deviations from the hourly day-ahead schedules for all generation and interties will be settled at the fifteen-minute locational marginal price.
12. The revised hour-ahead scheduling process will serve a more limited function than the hour-ahead scheduling process served under the previous market design. It will be used only to determine scheduled quantities for intertie transactions of market participants that choose one

- of the available hourly scheduling options. In order to integrate this process with the fifteen-minute market, the market will treat the intertie hourly block schedules as price-takers over the four fifteen-minute intervals of each hour. Thus, pricing will be on a fifteen-minute basis for all real-time transactions.
13. The overall bidding timeline will remain the same. Scheduling coordinators will continue to bid and participate in the real-time market process as they do today. That is, bids will still be submitted on the same timeline, 75 minutes before the hour, except that variable energy resources will have the ability to submit updated forecasts closer to real-time market optimization runs to minimize uninstructed imbalance energy charges.
14. The ISO will continue to operate a five-minute market. Internal resources and dynamically scheduled resources will continue to be dispatched by the real-time dispatch on a five-minute basis. Deviations from the fifteen-minute market schedules will be settled at the five-minute locational marginal price.
15. The implementation of the Energy Imbalance Market will not change the operation of the enhanced real-time market. Rather, the Energy Imbalance Market tariff amendments establish certain distinct procedures for balancing authority areas other than the ISO balancing authority area to accommodate certain differences between the ISO balancing authority area and other balancing authority areas (the EIM Entities). These include

the fact that the EIM Entities are participating only in the ISO's real-time energy market; they are not also participating (as such) in the ISO's day-ahead and ancillary services markets. In addition, the EIM Entities' approach to meeting their reliability responsibilities, such as resource adequacy, which they will retain, differ from the requirements that current participants in the ISO's markets must satisfy. Two of these differences deserve mention, because they are relevant to the matters I will discuss below.

16. First, in the ISO balancing authority area, the day-ahead market assures that hourly forward schedules are balanced, and that entities serving load in the current market satisfy the requirements for resource adequacy and resources with flexible ramping capability. In order to accommodate the absence of these safeguards in other balancing authority areas, the Energy Imbalance Market establishes certain sufficiency tests and remedial action in response to failed tests. I will discuss these below.
17. The second difference arises from the need to establish a different mechanism for use as a baseline against which to measure deviations in the real-time market. Hourly day-ahead schedules provide that baseline in the exiting ISO market. In order to establish a comparable baseline, EIM Market Participants must submit hourly resource plans, which include hourly base schedules of demand and supply, in advance of the real-time market ("EIM Resource Plan"). The EIM Entity is responsible for the final

content of the base schedule included in the EIM Resource Plan. I discuss below how the base schedule is relevant to settlement matters.

### **III. BALANCE AND SUFFICIENCY**

#### **A. *Balanced Base Schedules***

18. In order to minimize differences between load and supply settlements, and to address the need to recover such costs through neutrality charges, it is important to begin the real-time market with demand and supply in balance. In the ISO balancing authority area, the clearing in the day-ahead market of supply against demand accomplishes this. To achieve this balance in other balancing authority areas, proposed tariff section 29.34 requires balanced hourly base schedules (“EIM Base Schedules”).
19. Initially both the EIM Entity and resources that will bid into the market (“EIM Participating Resources”) submit EIM Base Schedules. The ISO reviews these for balance, after which the EIM Entity and EIM Participating Resources may revise the EIM Base Schedules. After 55 minutes before the operating hour, only the EIM Entity may revise them. The ISO will do a final review after 40 minutes before the operating hour.
20. If, in the final review, the ISO determines that the supply and the demand in the EIM Base Schedule do not balance, the ISO will adjust the demand to meet supply contained in the schedule.

#### **B. *Supply Sufficiency***

21. In the final review, the ISO will review the EIM Resource Plan, which includes bid ranges for EIM Participating Resources, for supply sufficiency.

22. If the total of the generation from non-participating resources in the EIM Base Schedules and generation reflected in the highest quantity offers in the bid range from EIM Participating Resources, including interchange with other balancing authority areas, is less than the total demand forecast, the resource plan has insufficient supply.
23. If the total of the generation from non-participating resources in the EIM Base Schedules and generation reflected in the lowest quantity bids in the bid range from EIM Participating Resources, including interchange with other balancing authority areas, is greater than the total demand forecast, the resource plan has excess supply.

**C. *Flexible Ramping Sufficiency***

24. For each hour, the ISO will next evaluate the EIM Resource Plan to ensure it has enough flexible ramping capacity. First, the ISO will establish a minimum flexible ramping constraint capacity requirement for each balancing authority area. The ISO will reduce each EIM Entity balancing authority area's requirement by its pro rata share of the diversity benefit in the combined area ("EIM Area"), taking into account the available net import transfer capability into that balancing authority area when performing the flexible ramping test ("EIM Transfer"). The procedure for this determination will be set forth in a business practice manual and be based on demand forecast change across consecutive intervals, demand forecast error, and energy production variability. It will

- use the ISO's demand forecast and variable energy forecast for each EIM Entity balancing authority area as inputs.
25. The ISO will review the EIM Resource Plan to ensure that there are sufficient bids for ramping capacity to meet the individual EIM Entity balancing authority area's flexible ramping constraint capacity requirement. If an EIM Entity balancing authority area has a net outgoing transfer among balancing authorities in the EIM Area before the operating hour, then the ISO will apply a credit equal to the net outgoing transfer in determining the sufficiency of the flexible ramping capacity. This recognizes that in previous market optimizations it was economic for the balancing authority area to support the other balancing authority areas, and, in the future market optimizations, this capacity could be used to meet the real-time dispatch within the EIM Entity balancing authority area.
26. Conversely, an EIM Entity balancing authority area may have a net incoming transfer among balancing authorities in the EIM Area before the operating hour. In that event, in order for the ISO to consider the ramping capacity sufficient, the EIM Entity balancing authority area must meet its own capacity requirement without consideration of the incoming EIM Transfer. This reflects the fact that the sending balancing authority area may use the capacity to meet its real-time dispatch (and has received a corresponding credit).
27. After determining the flexible ramping sufficiency, the ISO will develop individual and group constraints to be enforced in the fifteen-minute

market. The combined requirement for the EIM Area may be less than the sum of the individual EIM Entity balancing authority area requirements, realizing potential diversity benefits. This also allows for the constraints to be resolved by the most efficient resources across the EIM Area.

The ISO will determine the flexible ramping requirement for all possible combinations of sufficient balancing authority areas in the EIM Area, including requirements for individual balancing authority areas in each combination, by reducing the total requirement for each group of balancing authority areas by the total amount of import capability on interties internal to the EIM Area to that group from each balancing authority area outside the group. This allows the requirement to be met by the most economic resources across the EIM Area and also reflects the diversity benefit, which reduces the flexibility requirement as the EIM Area expands.

**D. *Effect of Insufficiency***

28. If, after the EIM Entity's final opportunity to revise the resource plan at 40 minutes before the operating hour, the balancing authority area fails either the supply or flexible ramping sufficiency tests, the ISO will take three actions.
  29. First, the ISO will not include the EIM Entity balancing authority area in any flexible ramping constraints for any combination of balancing authority areas. This prevents the balancing authority area from "leaning" on other balancing authority areas for ramping or benefiting from others' ramping capacity.

30. Second, the ISO will formulate only individual constraints for the EIM Entity balancing authority area's individual flexible ramping constraint capacity requirements. The balancing authority area will not be able to take advantage of the diversity benefit. The ISO will continue, however, to enforce the individual requirement.
31. Finally, the ISO will limit EIM Transfers into the EIM Entity balancing authority area from other parts of the EIM Area to the value for the final fifteen-minute interval of the preceding operating hour. The EIM Entity will need to address any imbalance energy or ramping needs within its own balancing authority area.

#### **IV. SETTLEMENT**

32. At the request of stakeholders, the ISO has identified all charges that it will assess to EIM Market Participants in proposed section 29.11. In some of the cases, section 29.11 merely refers to the relevant portion of section 11 of the ISO tariff, which addresses settlements. In the case of load-based settlement, and supply settlement that was not bid into the market, the ISO will settle with the EIM Entity Scheduling Coordinator, not the load or supply resource itself. In some cases, special provisions were necessary to accommodate EIM Market Participants and in some cases modifications to section 11 were necessary because the Energy Imbalance Market will affect the way that real-time market charges are calculated for current market participants. I will discuss these modifications. Mr. Epstein discusses the administrative fee in his declaration.

**A. *Imbalance Energy***

33. Under the ISO tariff as amended by the ISO's tariff revisions related to Order No. 764, the ISO calculates instructed imbalance energy in both the fifteen-minute market and five-minute real-time dispatch. The difference between the day-ahead schedule and the fifteen-minute schedule is fifteen-minute instructed imbalance energy. The difference is settled at the fifteen-minute locational marginal price. Because EIM Market Participants do not have day-ahead schedules, section 29.11(b) provides that the ISO will use the EIM Base Schedules instead. The difference between the fifteen-minute schedule and the five-minute dispatch is instructed imbalance energy. The difference is settled at the five-minute locational marginal price. Since EIM Market Participants are using the real-time market for fifteen-minute schedule changes and five-minute dispatch, the settlement of EIM Market Participants and ISO resources are equivalent.
34. Section 29.7 allows the EIM Entity to issue manual dispatches, outside of the market, when necessary to address system contingencies or other reliability functions of its balancing authority area. To accommodate these dispatches, section 29.11(b) provides that during the settlement process, the ISO will account for this energy as instructed imbalance energy.
35. In addition, changes in the physical output of units, such as changes due to outages or the output of variable energy resources, may cause a deviation from the EIM Base Schedule. If such changes occur, the ISO will treat the related energy as fifteen-minute instructed imbalance energy

- if it receives notice prior to the run of the fifteen-minute market. This allows the fifteen-minute market to reflect the physical change in the market optimization and resulting fifteen-minute market schedule.
36. The ISO calculates instructed imbalance energy every five minutes for the real-time dispatch. The five-minute instructed imbalance energy price is based on the dispatch operating point, which is the dispatch trajectory between consecutive five-minute dispatches considering the applicable dynamic ramp rate, and is settled at the five-minute locational marginal price. The only modification necessary for the Energy Imbalance Market is the inclusion of energy from manual dispatches. The ISO will continue to calculate uninstructed imbalance energy every five minutes for generation, based on the difference between the real-time dispatch and meter value, and will continue to settle at the five-minute locational marginal price. For non-participating load, the ISO will use the hourly weighted load aggregation point price for deviations between the hourly metered amount and the hourly EIM Base Schedule similar to how non-participating load is settled within the ISO.

**B. *Under- and Over-Scheduling Charges***

37. A significant concern for existing ISO market participants and potential participants in the Energy Imbalance Market is ensuring that each EIM Entity continues to meet its obligations to manage its imbalance energy without “leaning” on other participants. Requiring each EIM Entity to have balanced and ramp-feasible EIM Base Schedules not only ensures that

- the balancing authority area as a whole has a balanced initial schedule, but is also necessary to ensure that the base schedules are realistic.
38. The Energy Imbalance Market will therefore impose a charge for under-scheduling or over-scheduling demand outside a tolerance band. The availability of virtual bidding (sometimes also called convergence bidding) in the ISO's day-ahead market and the use of a residual unit commitment process that requires resources to bid into the real-time market following the day-ahead market make such charges unnecessary within the ISO's balancing authority area.
39. In addition, an EIM Entity can avoid any liability for under- or over-scheduling by using the ISO's demand forecast. If its demand schedule is within one percent of the ISO's demand forecast, no charge will apply.
40. The ISO will assess the charges in two levels, according to the deviations from the EIM Base Schedule: if metered demand deviates from the schedule by between five to ten percent (level 1), and if metered demand deviates from the schedule by more than ten percent (level 2). If the deviation within either range is at least two megawatts, the following charges apply: the level 1 charge will be a 25% increase (under-scheduling) or decrease (over-scheduling) of the hourly real-time load aggregation point price for the entire deviation; the level 2 charge will be a 100% increase or a 50% decrease, respectively.
41. The ISO will distribute the revenues from these charges pro rata to load in the EIM Area that was not subject to these charges. In order to provide

accurate incentives, the tariff provides that a load will receive an allocation only if it has not been subject to these charges during the entire trading day.

**C. *Uplift Costs***

42. The purpose of the allocation of uplift costs is to apportion such costs by balancing authority area, taking into account transfers from one balancing authority area to another where appropriate, in order to allocate these costs consistent with cost causation, as well as other guiding principles of ISO cost allocation. There are four such uplift costs.

**1. Real-Time Energy Imbalance Offset**

43. The first such cost is real-time imbalance energy offset, which is the difference between receipts and payments for imbalance energy. The ISO will settle this amount pursuant to section 11.5.4.1.
44. The ISO does not explicitly settle EIM Transfers (transfers from one balancing authority area to another as an import from the receiving balancing authority area and an export from the sending balancing authority area). The first step in the process for settling uplift costs is therefore to assign a financial value to the EIM Transfers as the product of the megawatts of transferred energy and the locational marginal price at the EIM Transfer point.
45. The ISO will next sum all payments to generation and receipts from load within each balancing authority area and deduct the amounts attributable to congestion and losses, which the ISO will settle separately. This is the

- initial real-time imbalance energy offset for the balancing authority area without accounting for congestion and losses.
46. Because the real-time imbalance energy offset is primarily the result of re-dispatch to efficiently serve real-time uninstructed deviations of load, the ISO will assign the costs to the deviating load to the extent reasonably possible. To the extent the ISO has dispatched generation in one balancing authority area to serve load in another balancing authority area, the calculations I have just described will attribute the costs to the balancing authority area where the generation is located. Therefore, the next step in the process is to adjust the apportionment of the real-time imbalance energy offset to reflect EIM Transfers between balancing authority areas in the EIM Area. The ISO will shift costs from a balancing authority area that has provided energy through an EIM Transfer into another balancing authority area to the balancing authority area receiving the energy from the EIM Transfer. Using the ratio of the amount of energy transferred out of a balancing authority area to the gross uninstructed imbalance energy in that balancing authority area, the ISO will shift an appropriate portion of this neutrality account to the receiving balancing authority area.
47. The ISO will then allocate the ISO's adjusted real-time imbalance energy offset to measured demand. It will allocate each other EIM Entity balancing authority area's adjusted real-time imbalance energy offset to

the EIM Entity Scheduling Coordinator for further allocation under the relevant tariffs.

48. To the extent any amount of real-time imbalance energy offset remains unallocated following these calculations, the ISO will distribute it to all market participants according to their measured demand.

## **2. Real-Time Congestion Offset**

49. The second uplift cost I will discuss is the real-time congestion offset, which represents the difference between payments and receipts from the congestion portion of the locational marginal price in the real-time market. The ISO will collect this amount under section 11.5.4.1.1.
50. The purpose of this allocation is to apportion the real-time congestion offset based upon the congestion that arose on the constraints located within a balancing authority area, regardless of where the resource that affected the constraint is located. This is consistent with existing Western Electricity Coordinating Council (“WECC”) practice of making each balancing authority area responsible for managing congestion in its system.
51. The ISO will first sum, for each balancing authority area, the product of the contribution of that balancing authority area’s transmission constraints to the marginal congestion component of the locational marginal price at each resource or intertie location within the EIM Area and the imbalance energy, including virtual bids, at that resource location.

52. In this calculation, the ISO will determine a balancing authority area's contribution to congestion at the intertie locations based on the number of balancing authority areas sharing the intertie. The ISO will include the procedure for this determination in the business practice manual for the Energy Imbalance Market.
53. Because EIM Entities do not participate in the day-ahead market and as a result do not take part in convergence bidding, the ISO will adjust the real-time congestion offset attributable to EIM Entity balancing authority areas to account for ISO convergence bids. The ISO will calculate the adjustment as the product of the marginal price of relieving congestion in the fifteen-minute market for each transmission constraint (the shadow price) and the lesser of (1) the impact of virtual bids on flows on the constraint and (2) the impact of all day-ahead schedules and EIM Base Schedules less the impacts of FMM schedules on flows on the constraint, but not less than zero. This calculates the congestion charges and excludes congestion credits that are incurred on EIM Entity balancing authority area constraints from ISO convergence bids. The congestion charges are then allocated to ISO convergence bids, which reduces the real-time congestion offset of the EIM Entity balancing authority area.
54. The ISO will then allocate the ISO's real-time congestion offset to measured demand. It will allocate each other EIM Entity balancing authority area's real-time congestion offset to the respective EIM Entity scheduling coordinator for further allocation under the relevant tariffs.

### **3. Real-Time Marginal Cost of Losses Offset**

55. Although the use of marginal-cost pricing of losses instead of average-cost pricing sends a superior price signal, it results in receipts for losses that exceed the actual payments for the lost energy.
56. The difference between real-time payments and receipts for losses is the real-time marginal cost of losses offset. The ISO will settle this offset pursuant to section 11.5.4.1.2. First, the ISO will calculate each balancing authority area's offset by summing for each balancing authority area the product of the marginal cost of losses portion of the locational marginal price and the positive or negative imbalance energy charged to market participants in the balancing authority area.
57. The ISO will allocate the real-time marginal cost of losses offset according to measured demand in the ISO balancing authority area. In addition, the allocation of the cost of losses within the ISO balancing authority area reflects the fact that the ISO does not assess the marginal cost of losses to self-schedules on transmission ownership rights, *i.e.*, transmission that the ISO schedules that is not under the ISO's operational control.
58. The ISO will allocate the real-time marginal cost of losses offset of other EIM Entity balancing authority areas to the EIM Entity scheduling coordinators for the respective EIM Entities for further allocation under the relevant tariffs.

#### **4. Net Residual Unit Commitment Bid Cost Uplift and Real-Time Market Bid Cost Uplift**

59. The fourth type of uplift is the net residual unit commitment bid cost uplift and real-time market bid cost uplift, which is uplift associated with bid cost recovery that will be settled pursuant to section 11.8.6.3.2. The ISO will calculate the bid cost recovery for resources in the same manner as under the current tariff.
60. As with the other uplift calculations, the ISO's goal in allocating the costs of bid cost recovery includes assigning costs consistent with cost causation, as well as other guiding principles of ISO cost allocation. Here, this means calculating a cost based upon the resources within each balancing authority area and, if appropriate, transferring costs based upon the direction of the EIM Transfers between the balancing authority areas. The ISO will shift costs from a balancing authority area that has provided energy through an EIM Transfer into another balancing authority area to the balancing authority area receiving the energy from the EIM Transfer.
61. The first step in calculating this uplift is to determine the real-time and residual unit commitment bid cost recovery amount of all resources in a balancing authority area for each settlement interval during a trading day. Although some resources may be short in an interval, profits in other intervals can offset the losses.

62. The ISO then sums these interval costs for each balancing authority area to derive a combined total real-time and residual unit commitment bid cost uplift for the trading day.
63. Then, for each balancing authority area, the ISO will sum the costs of those settlement intervals where there was a positive cost to derive the combined total positive bid cost uplift for the residual unit commitment process and the real-time market.
64. The ISO will use this sum and the previously calculated sum to create the “uplift ratio.” This ratio allows the ISO to calculate for each settlement interval where there was a shortfall in the total bid cost recovery cost amount that it paid to resources, taking in to consideration the revenues earned in other settlement intervals.
65. The ISO will apply this ratio to the positive bid cost recovery uplift for the residual unit commitment process to determine the net bid cost recovery uplift for the residual unit commitment process. Because balancing authority areas outside the ISO do not participate in the residual unit commitment process, the ISO will not transfer these costs to those other balancing authority areas. The ISO allocates the net bid cost recovery uplift for the residual unit commitment process to market participants in the ISO balancing authority area pursuant to section 11.8.6.5.2.
66. For the real-time market, because the real-time bid cost recovery, like the real-time imbalance energy offset, is the result of re-dispatch of resources

- to efficiently address primarily uninstructed deviations of load, the ISO will similarly adjust it.
67. Thus, the ISO will first apply the uplift ratio to the positive bid cost recovery uplift for the real-time market to determine the preliminary net bid cost recovery uplift for the real-time market. This will attribute the costs to the balancing authority area where the generation is located by settlement interval.
68. The ISO will then perform the same adjustment I described for the real-time imbalance energy offset to reflect EIM Transfers between balancing authority areas in the EIM Area.
69. The ISO will allocate the net real-time market bid cost recovery uplift for the ISO balancing authority area under the procedures set forth in section 11.8.6.6. The ISO will allocate that net real-time market bid cost recovery uplift for the other EIM Entity balancing authority areas to the EIM Entity scheduling coordinators for the respective EIM Entities for further allocation under the relevant tariffs.
- D. *Flexible Ramping Constraint***
70. The ISO will compensate resources for flexible ramping constraint capacity awards in the same manner as under the current tariff, which is the result of a settlement. The ISO is only modifying sections 11.25.1 through 11.25.3 to include resources in other balancing authority areas that are participating in the Energy Imbalance Market.

71. The ISO apportions the cost of these payments to those balancing authority areas that contributed to each constraint causing the need for the flexible ramping constraint capacity in proportion to the balancing authority areas' respective contributions to the need for the constraint.
72. In order to apportion the flexible ramping constraint costs among balancing authority areas under section 11.25.4, the ISO will convert the net payment (payment minus rescissions) made to a resource to the constraints the resource addresses by multiplying the net payment to the resource by the ratio of its shadow price on the constraint to the total of the shadow prices of the constraint.
73. Because there are shared constraints, the ISO apportions those costs based upon each individual balancing authority area's contribution to the requirement. For each constraint, the ISO will then determine the costs attributable to that balancing authority area based on the ratio of the balancing authority area's flexible ramping requirement to its contribution to the constraints (or group of constraints) to which that balancing authority area contributed.
74. The ISO will allocate those costs attributable to the ISO balancing authority area to measured demand and supply under the existing tariff sections. The ISO will allocate the costs attributable to other EIM Entity balancing authority areas to the relevant EIM Entity scheduling coordinator for further allocation under the relevant tariffs.

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 28<sup>th</sup> day of February, 2014.

A handwritten signature in blue ink, appearing to read "Donald G. Treteway". The signature is fluid and cursive, with "Donald G." stacked above "Treteway".

Donald G. Treteway

**Attachment D – Declaration of Michael K. Epstein**  
**Tariff Amendments to Implement Energy Imbalance Market**  
**California Independent System Operator Corporation**

**February 28, 2014**

**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

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

**DECLARATION OF MICHAEL K. EPSTEIN  
ON BEHALF OF THE  
CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION**

I, Michael K. Epstein, state as follows:

1. I am employed as Director of Financial Planning for the California Independent System Operator Corporation (“ISO”). My business address is 250 Outcropping Way, Folsom, California 95630. I am responsible for the ISO’s budget preparation and management; long-term planning; accounting for the Federal Energy Regulatory Commission (“FERC”) refund case; market cash settlements; and audit coordination for all the ISO’s settlement and operations activities. As part of my duties at the ISO, I oversee the development of the ISO’s grid management charge (“GMC”).
2. I received both a BA with a major in accounting and an MBA from the University of Southern California in Los Angeles, California. Prior to my current position, I was the Controller of the ISO from 1997 - 2009. From 1994 - 1997, I was Vice President (Finance) of Siskon Gold Corporation, a publicly traded mining company located in Grass Valley, California. From 1989 -1994, I was Controller of the Grupe Company, a privately held

diversified real estate company located in Stockton, California. From 1985-1989, I was Controller of Brush Creek Mining and Development Company located in Auburn, California. Prior to that, I was a Certified Public Accountant in the practice of public accounting with both local and international accounting firms.

3. In this declaration, I will describe the calculation of and provide cost support for the administrative fee that the ISO proposes to charge to market participants in the Energy Imbalance Market when the services go into effect on October 1, 2014. As I will discuss, the administrative fee is a fixed-rate fee that will be calculated based on the percentages of the cost components of the GMC relevant to the Energy Imbalance Market.
4. The GMC is a formula rate that the ISO uses to recover the costs of operating its markets. The current GMC is subject to a rate cap through fiscal year 2014. The ISO tariff requires the ISO to file a tariff amendment to establish a new GMC rate cap for subsequent years.
5. The GMC comprises three components, each of which recovers the costs of a different category of services: (1) market services, (2) system operations, and (3) congestion revenue rights services. The market services category encompasses all activities involved in scheduling both the day-ahead market and the real-time market. The system operations category includes all activities involved in dispatching energy on the grid and balancing authority area activities, as well as other related functions such as transmission planning. The congestion revenue rights services

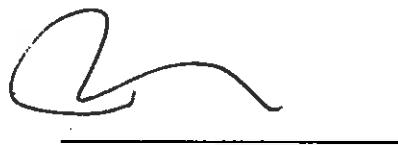
- category encompasses all activities involved in administering congestion revenue rights. The ISO uses activity-based accounting to identify and capture costs based on significant activities, and then allocates the costs of those activities to the appropriate service category.
6. The ISO is proposing that Energy Imbalance Market participants share in the costs of operating the real-time market. Only the market services and system operations categories of the GMC included in such costs are relevant to the calculation of the administrative fee for the Energy Imbalance Market. The congestion revenue rights services category is not relevant to the administrative fee calculation because Energy Imbalance Market participants will not be included in the allocation of congestion revenue rights.
  7. To calculate the appropriate rate for the Energy Imbalance Market administrative fee, the ISO first analyzed the market services and system operations categories to determine the amounts under those categories that are attributable to the real-time market. To do this, the ISO used the 2012 rates and allocation from the ISO's 2010 cost of service study that were used to determine the GMC rates that are currently in effect. This documentation is provided in Exhibit 1 to my declaration. As shown in Exhibit 1, the ISO determined that 63% of market services costs were attributable to the real-time market and that 48% of system operations costs were attributable to real-time dispatch and thus were attributable to the real-time market.

8. The ISO then derived the total real-time market charge based on these percentages and the currently effective market services and system operations rates as accepted by FERC. The 2012 market services rate was \$0.09/MWh. Therefore, the share of market services rate attributable to the real-time market is \$0.06/MWh (*i.e.*, \$0.09/MWh x 63%). The 2012 system operations rate was \$0.27/MWh. Therefore, the share of the system operations rate attributable to the real-time market is \$0.13/MWh (*i.e.*, \$0.27/MWh x 48%). Combining these \$0.06/MWh and \$0.13/MWh amounts, the ISO calculated a total real-time market charge of \$0.19/MWh as the administrative fee for Energy Imbalance Market participants.
9. Consistent with cost causation principles, the ISO has designed the fee the recover costs in proportion to the amount of services a market participant uses. The total gross volume of real-time market transactions, both purchases and sales, most closely reflects that use. Therefore the ISO will charge the \$0.19/MWh to each Energy Imbalance Market participant based on the greater of (1) the gross absolute value of the Energy Imbalance Market participant's imbalance energy for supply and load or (2) 5% of the total gross absolute value of supply and 5% of the total gross absolute value of demand of all Energy Imbalance Market participants. The 5% minimums reflect the fact that the ISO's calculations assumed 10% market participation by the Energy Imbalance Market participants, and, if their participation is below that level, the ISO may not recover the portion of its costs allocable to the Energy Imbalance Market.

The minimum provides protection against such an occurrence and is consistent with study assumptions made in assessing the overall benefits of the Energy Imbalance Market.

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

Executed on: February 28, 2014

A handwritten signature in black ink, appearing to read "Michael K. Epstein", is written over a horizontal line.

Michael K. Epstein

**Exhibit 1**

**Pro Forma GMC Cost for ongoing EIM rate**  
**Using 2010 Revenue requirement filed with FERC (\$ in thousands)**

2010 Revenue Requirement	2010 Budget	Mkt Svcs	Sys Ops	CRR Svcs	Indirect
Direct O&M	\$ 72,809	\$ 12,675	\$ 44,722	\$ 1,500	\$ 13,912
Support O&M	56,866	-	-	-	56,866
Non-ABC support O&M	33,020	450	450	100	32,020
<b>Total O&amp;M</b>	<b>162,695</b>	<b>13,125</b>	<b>45,172</b>	<b>1,600</b>	<b>102,798</b>
Debt Service	76,000	21,300	36,031	2,962	15,707
Other revenue	(8,100)	-	-	-	(8,100)
Operating reserve	(35,500)	(3,295)	(5,856)	(488)	(25,861)
<b>Total before allocation of indirect</b>	<b>195,095</b>	<b>31,130</b>	<b>75,347</b>	<b>4,074</b>	<b>84,544</b>
<b>Direct Costs %</b>		<b>28%</b>	<b>68%</b>	<b>4%</b>	
Allocate indirect	-	23,672	57,490	3,382	(84,544)
<b>Total New Revenue Requirement \$</b>	<b>\$ 195,095</b>	<b>\$ 54,802</b>	<b>\$ 132,837</b>	<b>\$ 7,456</b>	<b>\$ -</b>
<b>Total New Revenue Requirement %</b>	<b>100%</b>	<b>28%</b>	<b>68%</b>	<b>4%</b>	

Split of Mkt Svcs		
Total	RT Mkt	DA Mkt
\$ 12,675	\$ 11,288	\$ 1,387
-	-	-
450	-	450
<b>13,125</b>	<b>11,288</b>	<b>1,837</b>
21,300	10,009	11,291
-	-	-
(3,295)	(1,548)	(1,747)
<b>31,130</b>	<b>19,749</b>	<b>11,381</b>
100%	63%	37%
23,672	15,018	8,654
<b>\$ 54,802</b>	<b>\$ 34,768</b>	<b>\$ 20,034</b>
100%	63%	37%

Split of Sys Ops		
Total	RT Dispatch	BA Svcs
\$ 44,722	\$ 14,211	\$ 30,511
-	-	-
450	450	-
<b>45,172</b>	<b>14,661</b>	<b>30,511</b>
36,031	25,625	10,406
-	-	-
(5,856)	(4,392)	(1,464)
<b>75,347</b>	<b>35,894</b>	<b>39,453</b>
100%	48%	52%
57,490	27,387	30,103
<b>\$ 132,837</b>	<b>\$ 63,281</b>	<b>\$ 69,556</b>
100%	48%	52%

**Using 2012 Revenue Requirement for Rates (\$ in thousands)**

2012 Revenue Requirement	2012 Budget	Mkt Svcs	Sys Ops	CRR Svcs
O&M	\$ 163,048			
Debt Service and cash funded capital	63,254			
Other income	(8,400)			
Operating reserve	(23,081)			
2012 Revenue Requirement	194,821			
<b>Revenue Requirement %</b>	<b>100%</b>	<b>28%</b>	<b>68%</b>	<b>4%</b>
<b>Revenue Requirement for rates</b>	<b>194,821</b>	<b>\$ 54,550</b>	<b>\$ 132,478</b>	<b>\$ 7,793</b>
Less estimated fees				
Bid segment fees - \$0.005 per bid	(134)	(134)	-	-
Inter SC Trades - \$1.00 per trade	(3,038)	(3,038)	-	-
SCID fees - \$1,000 per SC per month	(1,987)	(1,987)	-	-
TOR charges - \$0.27 per specified MWH	(960)	-	(960)	-
CRR auction bid fees - \$1.00 per bid	(213)	-	-	(213)
Total fees	(6,332)	(5,159)	(960)	(213)
<b>Net revenue requirement for rates</b>	<b>\$ 188,489</b>	<b>\$ 49,391</b>	<b>\$ 131,518</b>	<b>\$ 7,580</b>

Split of Mkt Svcs		
Total	RT Mkt	DA Mkt
\$ 54,550		
100%	63%	37%
<b>54,550</b>	<b>\$ 34,367</b>	<b>\$ 20,184</b>
(134)	(84)	(50)
(3,038)	-	(3,038)
(1,987)	(1,252)	(735)
-	-	-
(5,159)	(1,336)	(3,823)
<b>\$ 49,391</b>	<b>\$ 33,031</b>	<b>\$ 16,361</b>

Split of Sys Ops		
Total	RT Dispatch	BA Svcs
\$ 132,478		
100%	48%	52%
<b>132,478</b>	<b>\$ 63,590</b>	<b>\$ 68,889</b>
-	-	-
(3,038)	-	-
(1,987)	(1,252)	(735)
-	-	-
(5,159)	(1,336)	(3,823)
<b>\$ 131,518</b>	<b>\$ 62,630</b>	<b>\$ 68,889</b>

2012 Rate Calculation				
Estimated volumes MWh (in thousands)		557,462	469,179	446,489
Net revenue requirement for rates		\$ 49,391	\$ 131,518	\$ 7,580
<b>GMC bucket Rates in \$/MWh</b>		<b>\$ 0.0886</b>	<b>\$ 0.2803</b>	<b>\$ 0.0170</b>

**Pro Forma GMC Cost for ongoing EIM rate**

Using 2010 Revenue requirement filed with FERC (\$ in thousands)

EIM Rate	Combined	RT Mkt	RT Dispatch
Net revenue requirement for rates	\$ 95,661	\$ 33,031	\$ 62,630
Percentage of costs	100%	35%	65%
<b>EIM Rate in \$/MWh</b>	<b>\$ 0.19</b>	<b>\$ 0.06</b>	<b>\$ 0.13</b>

Total	RT Mkt
\$ 49,391	\$ 33,031
100%	67%
<b>\$ 0.09</b>	<b>\$ 0.06</b>

Total	RT Dispatch
\$ 131,518	\$ 62,630
100%	48%
<b>\$ 0.28</b>	<b>\$ 0.13</b>

**Attachment E – PacifiCorp-ISO EIM Benefits Study**  
**Tariff Amendments to Implement Energy Imbalance Market**  
**California Independent System Operator Corporation**

**February 28, 2014**



# PacifiCorp-ISO Energy Imbalance Market Benefits

March 13, 2013



Energy+Environmental Economics

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# Table of Contents

<b>Executive Summary.....</b>	<b>4</b>
<b>1    Introduction .....</b>	<b>10</b>
1.1    Background and Goals.....	10
1.2    Structure of this Report.....	11
<b>2    EIM Analysis .....</b>	<b>12</b>
2.1    Key Assumptions .....	12
2.1.1    What is an EIM and what would it do?.....	12
2.1.2    EIM costs.....	13
2.1.3    Key modeling assumptions.....	15
2.2    Methods.....	22
2.2.1    Interregional dispatch savings.....	22
2.2.2    Intraregional dispatch savings.....	23
2.2.3    Reduced flexibility reserves .....	25
2.2.4    Reduced renewable energy curtailment.....	27
2.3    EIM Scenarios.....	29
2.4    EIM Benefits .....	31
2.5    Attribution of EIM Benefits.....	33
<b>3    Interpreting the Results.....</b>	<b>36</b>
3.1    Conservative Nature of the Results.....	36
3.2    Comparison to other Studies .....	38

## Attachment: Technical Appendix

## Executive Summary

This report examines the benefits of an energy imbalance market (EIM) between PacifiCorp and the California Independent System Operator (ISO). This report focuses on estimated potential EIM benefits with the low range reflecting a scenario in which assumptions were chosen to be conservative. The full range of estimated EIM benefits in this report for the year 2017 is \$21 million to \$129 million (2012\$). Preliminary cost estimates (based on previous studies) of setting up the EIM range from \$3 million to \$6 million, with an estimated annual cost of \$2 million to \$5 million.

The report supports the conclusion that the two-party EIM provides a low-cost, low-risk means of achieving operational savings for both PacifiCorp and ISO and enabling greater penetration of variable energy resources. The report further supports that the benefits of the EIM would increase to the extent that: (1) operational changes can be made to support the EIM, such as increased transmission transfer capabilities between PacifiCorp and ISO; and (2) additional entities join the EIM, thus bringing incremental load and resource diversity, transfer capability, and flexible generation resources that would further reduce costs for customers.

Changes in the electricity industry in the Western U.S. are making the need for greater coordination among balancing authorities (BAs),<sup>1</sup> such as through an EIM, increasingly apparent. Renewable portfolio standards already enacted in Western states are expected to result in some 60,000 MW of wind, solar, geothermal, and other renewable generation in the Western Interconnection by 2022, comprising approximately 15% of total electric energy.<sup>2</sup>

Recent studies have suggested that it will be possible to reliably operate the current western electric grid with high levels of variable generation, but doing so may require supplementing the hourly bilateral markets used in the West toward shorter scheduling timescales and greater coordination among western BAs. Greater coordination would allow BAs to pool load, wind, and solar variability and reduce flexibility reserve requirements, and would increase flexibility and reduce renewable curtailment.

In response, several regional initiatives, studies, and groups have emerged to explore innovations for scheduling and coordination. These include reforms being assessed as part of the Western Electric Coordinating Council's Efficient Dispatch Toolkit (EDT) initiative, an effort by a group of public utility commissions to explore an EIM for the West, and an ongoing Northwest Power Pool initiative to analyze the benefits of an EIM or other forms of regional coordination for the Pacific Northwest region.

As an extension of these efforts, in February 2013 PacifiCorp and ISO signed a memorandum of understanding to pursue an EIM. Energy and Environmental Economics,

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<sup>1</sup> A balancing authority (BA) is a responsible entity that integrates resource plans ahead of time, maintains load-interchange-generation balance within a balancing authority area, and supports Interconnection frequency in real time. A balancing authority area (BAA) is the collection of generation, transmission, and loads within the metered boundaries of a balancing authority, which maintains load-resource balance within this area.

<sup>2</sup> These renewable capacity and energy projections are from the Western Electricity Coordinating Council's Transmission Expansion Planning Policy Committee (TEPPC) 2022 Common Case; see <http://www.wecc.biz/Lists/Calendar/Attachments/4057/2022 20Common%20Case%20-%20Webinar%205.pdf>.

Inc. (E3), a consulting firm, was retained by ISO to assess the EIM's potential benefits. This report documents E3's findings.

The EIM under consideration is a balancing market that optimizes generator dispatch within and between balance authority areas (BAA)<sup>3</sup> every five minutes by leveraging the existing ISO real-time dispatch market functionality. It does not replace the day-ahead or hourly markets and scheduling procedures that exist today. The ISO outlined the structure of such an EIM in a recent proposal to the Western Governors Association and the Public Utilities Commissions Energy Imbalance Market (PUC-EIM) Task Force.<sup>4</sup>

An EIM covering PaciCorp and ISO would allow both parties to improve dispatch efficiency and take advantage of the diversity in loads and generation resources between the two systems, reducing production costs, operating reserve requirements, and renewable generation curtailment. Specifically, the creation of a PaciCorp-ISO EIM would yield the following four principal benefits:

- + *Interregional dispatch savings*, by realizing the efficiency of combined 5-minute dispatch, which would reduce “transactional friction” (e.g., transmission charges) and alleviate structural impediments currently preventing trade between the two systems;
- + *Intraregional dispatch savings*, by enabling PaciCorp generators to be dispatched more efficiently through the ISO’s automated system (nodal dispatch software), including benefits from more efficient transmission utilization;

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<sup>3</sup> See footnote #1

<sup>4</sup> See CAISO, “CAISO Response to Request from PUC-EIM Task Force,” March 29, 2012, <http://www.westgov.org/PUCeim/documents/CAISOCewa.pdf>; CAISO, “Energy Imbalance Protocols (Revised to Support CAISO Cost Estimate for PUC-EIM)”, January 24, 2013, <http://www.westgov.org/PUCeim/documents/CAISOrcp.pdf>.

- + *Reduced flexibility reserves*, by aggregating the two systems' load, wind, and solar variability and forecast errors; and
- + *Reduced renewable energy curtailment*, by allowing BAs to export or reduce imports of renewable generation when it would otherwise need to be curtailed.

These benefits are indicative but not exhaustive. A recent report by staff to the Federal Energy Regulatory Commission identifies non-quantified reliability benefits that will also arise. These include enhanced situational awareness, security constrained dispatch, faster delivery of replacement generation after the end of contingency reserve sharing assistance, and enhanced integration of renewable resources.<sup>5</sup>

E3 estimated benefits from a PacifiCorp-ISO EIM using the GridView<sup>6</sup> production simulation software to simulate operations of the Western Interconnection with and without the EIM in the year 2017. This year was selected to represent likely system conditions within the first several years after the EIM becomes operational. E3's analysis incorporated California's greenhouse gas regulations, and the associated dispatch costs.

The GridView results are sensitive to several key assumptions and modeling parameters. These include: limits on the transmission transfer capabilities between PacifiCorp and ISO, and the extent to which unloaded hydroelectric capacity is allowed to contribute toward contingency and flexibility reserve requirements. E3's analysis of EIM benefits is also sensitive to the assumed level of savings from moving to nodal dispatch in PacifiCorp and the amount of renewable energy curtailment that could be reduced through the EIM.

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<sup>5</sup> Staff of the Federal Energy Regulatory Commission, 2013, "Qualitative Assessment of Potential Reliability Benefits from a Western Energy Imbalance Market," February 26.

<sup>6</sup> GridView is ABB's production simulation software.

E3 developed several scenarios to address key uncertainties in the modeling of EIM benefits. These scenarios explore a wide range of potential benefit levels to reflect both the limitations of existing tools to characterize all of the changes to system operations that would occur under an EIM, particularly in the modeling of hydropower, reserves, and renewable curtailment, greenhouse gas regulation, and uncertainties about the extent to which future industry developments would allow cost savings to occur both with and without an EIM. The scenarios were developed around three assumptions of transfer capability between Pacificorp and ISO: low (100 MW), medium (400 MW), and high (800 MW). Within each scenario, E3 modeled a low and high range of benefits. The assumptions for the low and high range estimates are shown in Table 1.

**Table 1. Low and high range assumptions under low (100 MW), medium (400 MW), and high (800 MW) Pacificorp-ISO transfer capability scenarios**

Assumption	Low transfer capability		Medium transfer capability		High transfer capability	
	Low range	High range	Low range	High range	Low range	High range
Maximum hydropower contribution to contingency and flexibility reserves*	25%	12%	25%	12%	25%	12%
Share of intraregional dispatch savings achieved	10%	100%	10%	100%	10%	100%
Share of identified renewable energy curtailment avoided	10%	100%	10%	100%	10%	100%

\* Percent of nameplate capacity for each project

Across these scenarios, E3 estimated that a Pacificorp-ISO EIM would generate total annual cost savings (in 2012 \$) of \$21-129 million in 2017, with Pacificorp and ISO both benefitting. Table 2 shows the range of benefits by category for each scenario.

**Table 2. Low and high range annual benefits under low (100 MW), medium (400 MW), and high (800 MW) PacifiCorp-ISO transfer capability scenarios (million 2012\$)**

Benefit Category	Low transfer capability		Medium transfer capability		High transfer capability	
	Low range	High range	Low range	High range	Low range	High range
Interregional dispatch	\$14.1	\$11.0	\$22.3	\$17.7	\$22.4	\$17.8
Intraregional dispatch	\$2.3	\$23.0	\$2.3	\$23.0	\$2.3	\$23.0
Flexibility reserves	\$4.0	\$20.8	\$11.0	\$51.3	\$13.4	\$77.1
Renewable curtailment	\$1.1	\$10.8	\$1.1	\$10.8	\$1.1	\$10.8
<b>Total benefits</b>	<b>\$21.4</b>	<b>\$65.6</b>	<b>\$36.7</b>	<b>\$102.8</b>	<b>\$39.2</b>	<b>\$128.7</b>

*Notes: Individual estimates may not sum to total benefits due to rounding. Section 2.4 describes why interregional dispatch savings are lower in the high range than the low range.*

The benefit estimates described in this report are gross benefits and are not net of estimated costs. Because the EIM would make use of ISO's existing dispatch software, the initial cost is expected to be low when compared to these benefits. E3 did not conduct an independent analysis of the cost of establishing and operating an EIM. Based on ISO's estimates of market operator costs, PacifiCorp would incur a one-time fixed charge of approximately \$2.1 million.<sup>7</sup> A separate study of a WECC-wide EIM estimated that each EIM market participant would also incur one-time capital costs of \$1-4 million for software, hardware, and other related investments.<sup>8</sup> Annual costs to operate the PacifiCorp-ISO EIM are estimated to be on the order of \$2-5 million.<sup>9</sup>

<sup>7</sup> Based on estimates from CAISO staff.

<sup>8</sup> WECC, 2011, "WECC Efficient Dispatch Toolkit Cost-Benefit Analysis (Revised)," WECC White Paper, p. 62, <http://www.wecc.biz/committees/EDT/EDT%20Results/EDT%20Cost%20Benefit%20Analysis%20Report%20-%20REVISED.pdf>.

<sup>9</sup> This estimate is comprised of CAISO estimate of \$1.35 million per year in administrative charges to PacifiCorp plus additional PacifiCorp costs of \$1-4 million per year in staffing and other operating costs for an EIM market participant.

# 1 Introduction

## 1.1 Background and Goals

PacifiCorp and ISO have been active participants in an ongoing regional effort to enhance bulk power operations to achieve cost savings for customers and facilitate the integration of higher levels of renewable generation. In response, PacifiCorp and ISO have been funding, participating in, and observing a number of regional and national initiatives, studies, and groups aimed at enhancing access to needed flexible resources, application of automated tools to manage resources and products that balance variable generation, and more effective utilization of existing and new transmission facilities.

These efforts include:

- + The 2008 Western Executive Industry Leaders (WEIL) study, which identified economic opportunities to lower renewable procurement costs across the Western Interconnection;<sup>10</sup>
- + Two recent (2011 and 2012) studies of an EIM covering all of the Western Interconnection except for ISO and the Alberta Electric System Operator, one coordinated by WECC and another by the PUC-EIM Group (see Section 3.2);
- + Two studies examining intra-hour scheduling in the Western Interconnection, one for the WECC's Variable Generation Subcommittee and another for the Northwest Power Pool (see Section 3.2);

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<sup>10</sup> See [http://www.weilgroup.org/E3\\_WEIL\\_Complete\\_Study\\_2008\\_082508.pdf](http://www.weilgroup.org/E3_WEIL_Complete_Study_2008_082508.pdf) for the full report.

- + A Joint Initiative among Columbia Grid, Northern Tier Transmission Group, and WestConnect on a dynamic scheduling system, an intra-hour transaction accelerator platform, and intra-hour transmission scheduling;<sup>11</sup> and
- + The North American Electric Reliability Corporation's (NERC's) ongoing Integration of Variable Generation Task Force (IVGTF).<sup>12</sup>

Building on their involvement in these efforts, PacifiCorp and ISO undertook a joint study to evaluate the potential benefits of an EIM covering their service areas. E3 was retained to identify and quantify the benefits of this potential EIM, and to examine the allocation of benefits between PacifiCorp and ISO.

This report describes E3's methods and findings. Throughout the study process, E3 worked closely with both PacifiCorp and ISO to develop scenario assumptions, validate the approach, and estimate benefits consistent with how each party believes its system operates today and would operate in the future under each of the defined scenarios.

## 1.2 Structure of this Report

The remainder of the report is organized as follows. Section 2 identifies key assumptions (2.1), specifies methods (2.2) and scenarios (2.3), and presents benefits (2.4) and benefit attribution (2.5) for the analysis. Section 3 provides context for interpreting the results, describing where the assumptions lie along a conservative-moderate-aggressive spectrum (3.1) and how the results compare against other EIM studies (3.2). The report also contains a technical appendix that describes modeling assumptions and methods in more detail.

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<sup>11</sup> For documents related to this process, see <http://www.columbiagrid.org/ji-nttg-wc-documents.cfm>.

<sup>12</sup> For task force materials, see <http://www.nerc.com/filez/ivgtf.html>.

## 2 EIM Analysis

### 2.1 Key Assumptions

#### 2.1.1 WHAT IS AN EIM AND WHAT WOULD IT DO?

The EIM considered in this study would consist of a voluntary, sub-hourly market covering the PacifiCorp West, PacifiCorp East, and ISO BAAs. EIM software would automatically dispatch imbalance energy from generators voluntarily offering their resource for dispatch across these BAAs every five minutes using a security-constrained least-cost dispatch algorithm. By providing an interregional market for intra-hour imbalance energy, the EIM would complement PacifiCorp's existing procedures for transacting in the ISO's hour-ahead and day-ahead markets. This study assumes that the ISO hour-ahead and day-ahead markets will remain unchanged and that PacifiCorp will continue its existing operational plans to serve its load, arrangements for unit commitment, contingency reserves, regulation, regional reserve sharing agreements, and other BA responsibilities.

The EIM is expected to lead to four principal changes in system operations for PacifiCorp and ISO:

- + **More efficient interregional dispatch.** The EIM would allow more efficient use of generators and the transmission systems in PacifiCorp and ISO by removing transmission rate and structural impediments between BAAs, eliminating

within-hour limitations, and enabling more efficient dispatch between the two systems relative to hourly scheduling.

- + **More efficient intraregional dispatch in PacifiCorp.** The EIM's nodal dispatch software would improve the efficiency of PacifiCorp's system dispatch by better reflecting transmission constraints and congestion within PacifiCorp.
- + **Reduced flexibility reserve requirements in PacifiCorp and ISO.** By pooling variability in load and wind and solar output, PacifiCorp and ISO would each reduce the quantity of reserves required to meet flexibility needs.
- + **Reduced renewable energy curtailment in ISO.** By allowing generators in PacifiCorp's BAAs to reduce output when ISO faces an "over-generation" situation, an EIM would reduce the amount of renewable energy ISO would otherwise need to curtail.

This study calculates the benefits associated with these changes by comparing the total cost of operating the combined ISO and PacifiCorp systems under two cases: (1) a Benchmark Case, representing continuation of current scheduling and operating practices under "business-as-usual," and (2) an EIM Case, in which an EIM is established encompassing the PacifiCorp and ISO BAAs. The cost difference between the Benchmark Case and the EIM Case represents the total benefits of an EIM. The study also provides a high-level estimate of how these benefits might be apportioned among the ISO and PacifiCorp systems.

### 2.1.2 EIM COSTS

The costs of an EIM include those borne by the market operator to set up and operate the EIM, and those borne by market participants to participate in the EIM. The EIM requires some expansion of ISO's modeling and software capabilities, but by using ISO's

existing software, initial costs are significantly reduced relative to what they would be if new software development were needed.

Additional hardware and organizational costs may also be required. For instance, PacifiCorp may need to purchase some new metering or communications hardware to enable effective communication between parties. PacifiCorp may also seek some amount of staff training and organizational development to more fully take advantage of the market opportunities offered by the EIM.

ISO has estimated the costs of setting up and operating an EIM, as part of its engagement with ongoing regional EIM initiatives. ISO's proposed operator charges for the EIM use a "pay-as-you-go" approach, which allows the EIM to expand as new market participants join. The one-time upfront charge covers the cost of making the modeling, systems, and other preparations to include an entity in the EIM, and depends on the size of the BAA. Ongoing administrative charges cover costs to operate the EIM, and are based on the same cost structure as ISO's existing grid management charge and the EIM participant's level of usage. For a PacifiCorp-ISO EIM, ISO estimates that PacifiCorp would incur a one-time fixed charge of approximately \$2.1 million and \$1.35 million per year in administrative charges.<sup>13</sup>

Independent estimates of market participant costs were not developed for this study. A WECC-sponsored study of EIM costs estimated that each market participant would incur total capital startup costs of \$1-4 million and operating costs of \$1-4 million per year.<sup>14</sup>

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<sup>13</sup> Based on estimates from CAISO staff. Administrative charges per participant will likely fall as the number of participants grows. Other cost and risk allocation issues associated with the EIM, and the rules to address these issues, will be considered in a 2013 stakeholder process.

<sup>14</sup> WECC, 2011, "WECC Efficient Dispatch Toolkit Cost-Benefit Analysis (Revised)," WECC White Paper, p. 62, <http://www.wecc.biz/committees/EDT/EDT%20Results/EDT%20Cost%20Benefit%20Analysis%20Report%20-%20REVISED.pdf>.

In this case, PacifiCorp is assumed to be the only incremental market participant and no incremental costs would be required for existing ISO market participants.

Using these preliminary estimates of market operator and market participant costs, total fixed and operating costs for the PacifiCorp-ISO EIM would be on the order of \$3-6 million (one-time startup costs) and \$2-5 million per year (annual operating costs), respectively. PacifiCorp and ISO are actively working to develop specific start up and operating costs as part of initial efforts under the memorandum of understanding.

### **2.1.3 KEY MODELING ASSUMPTIONS**

Five key modeling assumptions are important for understanding the results in this study: 1) the use of hurdle rates, (2) hourly dispatch, (3) the treatment of flexibility reserves, (4) transfer capability limits between PacifiCorp and ISO, and (5) limits on hydropower contributions to reserves. This section provides a brief overview of the rationale for these assumptions.

#### **2.1.3.1 *Hurdle rates***

Within the Western Interconnection's bilateral markets, there are a number of impediments to efficient trade of energy across BAA boundaries. These include:

- + The need, in some cases, for market participants to acquire point-to-point transmission service in order to schedule transactions from one BAA to another;
- + The current practice of some transmission providers requiring short-term transactions to provide real power losses for each transmission provider system that is utilized, resulting, in some cases, in multiple or "pancaked" losses requirements; and

- + Inefficiencies due to illiquid markets and imperfect information, such as the standard 16-hour “Heavy-Load Hour” and 8-hour “Light-Load Hour” day-ahead trading products defined by the Western Systems Power Pool, minimum transaction quantities of 25 MW, and the bilateral nature of transaction origination and clearing, among others.

In production simulation modeling, these impediments to trade are typically represented by “hurdle rates,” \$/MWh price adders that inhibit power flow over transmission paths that cross BAA boundaries. In this analysis, E3 used hurdle rates that were benchmarked to historical data, so that hourly power flows on major WECC paths in the simulation approximate the historical flow levels on those paths during a historical test year.<sup>15</sup>

An EIM would perform a security-constrained, least-cost dispatch across the entire EIM footprint for each 5-minute settlement period, eliminating the barriers listed above at the 5-minute timestep. This is represented in production simulation modeling by the removal of hurdle rates, which allows for more efficient (i.e., lower cost) dispatch.

#### **2.1.3.2   Hourly dispatch**

While a PacificCorp-ISO EIM would likely operate on a 5-minute timestep, E3 used GridView simulation runs with an hourly timestep to estimate the change in operating costs associated with an EIM. This was done in order to simplify the computational process and reduce model runtime, and because of the limited quantity of high-temporal resolution data available for the Western Interconnection.

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<sup>15</sup> This analysis used benchmarked hurdle rates from the WECC EIM study. See [http://www.wecc.biz/committees/EDT/Documents/E3\\_EIM\\_Benefits\\_Study-Phase\\_2\\_Report\\_RevisedOct2011\\_CLEAN2\[1\].pdf](http://www.wecc.biz/committees/EDT/Documents/E3_EIM_Benefits_Study-Phase_2_Report_RevisedOct2011_CLEAN2[1].pdf), pp 41-43.

This assumption introduces two potentially offsetting modeling inaccuracies. On the one hand, since hourly operations would continue to be performed using today's operating practices, the use of an hourly timestep might overestimate the potential benefits of an EIM, because changes in dispatch that are feasible on an hourly timestep might not be feasible on a 5-minute timestep due to ramping limitations. On the other hand, this method excludes: (1) savings due to more efficient dispatch of resources to meet net load variations inside the operating hour; and (2) savings from reductions in costs to meet potential intra-hour ramping shortages. Other studies have indicated that sub-hourly dispatch benefits may be substantial. Those benefits would be additive to the benefits reported here.

#### **2.1.3.3 *Flexibility reserves***

BAs hold reserves to balance discrepancies between forecasted and actual load within the operating hour. These “flexibility” reserves are in addition to the spinning and supplemental reserves carried against generation or transmission system contingencies.<sup>16</sup> Flexibility reserves generally fall into two categories: *regulation* reserves automatically respond to control signals or changes in system frequency on a time scale of a few cycles up to five minutes, while *load following* reserves provide ramping capability to meet changes in net loads between a 5-minute and hourly timescale.

Higher penetration of wind and solar energy increases the amount of both regulation and load following reserves needed to accommodate the uncertainty and variability inherent in these resources while maintaining acceptable balancing area control

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<sup>16</sup> This study assumes that contingency reserves would be unaffected by an EIM and that PacifiCorp would continue to participate in its existing regional reserve sharing agreement for contingency reserves in all scenarios.

performance. By pooling load and resource variability across space and time, total variability can be reduced, decreasing the amount of flexibility reserves required to ensure reliable operations. This reduces operating costs by requiring fewer thermal generators to be committed and operated at less efficient set points.

For this study, E3 performed statistical calculations of the quantity of flexibility reserves that would be required in both the Benchmark Case and the EIM Case. The reserve quantities are a function of the variability and uncertainty of the within-hour net load signal. These requirements decline when the calculations are performed for a larger geographic area and a more diverse portfolio of wind and solar resources. In keeping with the 5-minute operational timestep of a potential EIM, E3 assumed that the diversity benefit from an EIM results in savings from reduced load following reserves, but not regulation reserves. Other contingency reserves (spin and non-spinning reserves) were assumed not to change under the EIM operation.

There are two implicit assumptions embedded in this approach: (1) that PacifiCorp and ISO would carry the calculated levels of flexibility reserves in the Benchmark Case, and (2) the EIM would include a mechanism to take advantage of increased net load diversity by reducing the quantities of flexibility reserves that would need to be carried. With regard to the first assumption, while there is currently no defined requirement for BAs to carry load following reserves, all BAs must carry load following reserves in order to maintain control performance standards within acceptable bounds, and reserve requirements will grow under higher renewable penetration scenarios. ISO is in the process of introducing a “flexi-ramp” product for this purpose.

With regard to the second assumption, while the specific design of a potential PacifiCorp-ISO EIM has not been finalized, it is logical to assume that ISO’s flexi-ramp

requirements would be calculated in such a way as to maximize diversity benefits across the entire EIM footprint, within the context of its 5-minute operational timestep. However, it should be noted that this mechanism may not be in place at the time EIM becomes operational, and the ISO and PacifiCorp may require a period of operational experience before the full benefits of flexibility reserve savings can be achieved.

#### **2.1.3.4 *Transmission transfer capability***

PacifiCorp has several interconnections and contract transmission rights between the ISO and both the PacifiCorp East and PacifiCorp West BAAs that can potentially be utilized for EIM activity. Each interconnection has unique capabilities to facilitate beneficial interchange based upon existing facilities, path operators, legacy agreements, and incremental costs. Initiatives are underway to maximize the potential at each interconnection for the EIM.

Transmission transfer capability limits between PacifiCorp and ISO will constrain EIM benefits. These limits can be physical or contractual. If the transmission paths connecting PacifiCorp and ISO are congested, generators in PacifiCorp will not be able to provide additional imbalance energy to ISO, and vice versa. PacifiCorp and ISO anticipate initially relying on PacifiCorp transmission contract rights to the ISO to facilitate EIM transactions, as opposed to a “flow-based” transmission optimization, similar to those in use in the ISO and other organized markets, that would be unconstrained by contract limitations.

While reliance on existing contract path scheduling mechanisms will prevent achievement of full benefits at EIM startup, transmission transfer capability and associated EIM benefits would increase through potential contractual changes, new transmission construction, operational changes such as WECC-wide 15-minute

scheduling, and the addition of other EIM participants. In particular, as additional market participants join the EIM and a larger contiguous EIM area is formed, flow-based transmission usage will be explored, along with methods to limit impact to non-participating transmission systems. Flow-based transmission usage is expected to increase benefits to EIM market participants. In addition, a mechanism to increase the flexibility of existing transmission for intra-hour use could be pursued to increase the transfer capabilities and increase the value of EIM.

This report provides a range of benefits based, in part, on three different potential interchange capabilities between PacifiCorp and ISO, specifically 100, 400, and 800 MW.<sup>17</sup> The two parties have agreed in the memorandum of understanding to conduct an initial review of contracts. The findings from the ongoing review, collaboration with neighboring transmission path operators, and additional certainty on market design will inform total interconnection capabilities in the short-term as well as specific opportunities to add to those capabilities over time. The model also incorporates a 200 MW limit on east to west transfers between the PacifiCorp East and PacifiCorp West BAAs. For reduced renewable curtailment, E3 assumed that this transfer capability would not pose a constraint, given the relatively small quantity of curtailed energy in question.

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<sup>17</sup> For simplicity of modeling, transmission transfer capabilities are modeled at the California-Oregon Intertie (COI). This is a proxy used to demonstrate a general level of increased benefit with increasing interconnection capabilities, which may occur on other paths.

### **2.1.3.5 *Limits on hydropower contributions to flexibility reserves***

Cost savings from reduced flexibility reserves are sensitive to assumptions about the availability of hydropower to provide reserves. Dispatchable hydroelectric resources only rarely generate at levels that approach maximum nameplate capacity due to limitations on water available for power generation. On many facilities, a portion of the “unloaded” capacity — the difference between the nameplate capacity and the actual generation — can be used to provide contingency and flexibility reserves. However, this unloaded capacity varies by facility and with continually-fluctuating river conditions, making it challenging to generalize for modeling purposes. This leads to uncertainty in the calculation of operating costs using production simulation models.

In order to address this uncertainty, E3 developed a range regarding the ability of hydro to provide flexibility reserves, which affect a significant component of potential EIM savings. In the high range, E3 assumed that up to 12% of the total nameplate capacity of hydropower generation is available to provide flexibility reserves, while in the low range, E3 assumed that up to 25% of hydropower nameplate capacity is available to provide flexibility reserves.<sup>18</sup> EIM benefits are higher in the case where hydro’s ability to provide flexibility reserves is restricted, because a higher proportion of reserves are being provided by thermal resources that can be optimized using the EIM dispatch software. Conversely, there are fewer cost savings available in the case where hydro provides a larger quantity of flexibility reserves with little, if any, variable cost.

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<sup>18</sup>The two scenarios used here reflect the low and high ends of a plausible range of values based on CAISO and PacifiCorp experience.

## 2.2 Methods

### 2.2.1 INTERREGIONAL DISPATCH SAVINGS

An EIM would reduce transactional friction between PacifiCorp and ISO and thus enable improved resource dispatch efficiency and reduced cost to serve load in both systems. E3 estimated these interregional dispatch savings by running parallel production cost simulations using GridView: one with a PacifiCorp-ISO EIM (EIM Dispatch Case) and one without the EIM (Benchmark Case).

The Benchmark Case simulates status quo operational arrangements, and includes hurdle rates to represent economic and non-economic barriers to trade, such as transmission tariff rates, losses, and lack of market liquidity. The EIM Dispatch Case simulates operations with an EIM in place by eliminating these hurdle rates between PacifiCorp and ISO, resulting in more efficient energy dispatch and lower production costs.<sup>19</sup> Interregional dispatch savings from an EIM are measured as the difference in production costs between the Benchmark and EIM Dispatch Cases. In eliminating hurdle rates, E3 implicitly assumed that no variable transmission costs are incurred for EIM transactions.

To calculate the interregional dispatch savings, E3 developed GridView production cost estimates for two cases. The first, a Benchmark Case, assumes hurdle rates are in place. The second, an EIM Dispatch Case, assumes alternately that there is 100, 400, and 800 MW of transmission transfer capability between the PacifiCorp and ISO systems, and that EIM transactions using this capability pay no hurdle rates. E3 scaled the

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<sup>19</sup> Only hurdle rates between PacifiCorp –West and ISO have been adjusted from the benchmark case. Hurdle rates were also used to simulate the need for market participants to acquire CO<sub>2</sub> allowances when delivering “unspecified” electric energy into California. These CO<sub>2</sub>-related hurdle rates were kept in place for both the Benchmark and the EIM Dispatch Cases.

interregional dispatch savings for lower levels of transmission transfer capability (100 MW and 400 MW) by assuming that the benefits are proportional to the change in intertie flows resulting from the EIM at each level of transfer capability.<sup>20</sup>

### **2.2.2 INTRAREGIONAL DISPATCH SAVINGS**

In bilateral markets, load serving entities (LSEs) like PacifiCorp seek to minimize the cost of serving their loads through a combination of dispatching their own resources and trading energy subject to the physical limitations of the transmission system. This can result in significant additional dispatch costs to manage transmission congestion within the LSE's own service territories. In a nodal market, all transmission constraints are considered when determining optimal commitment<sup>21</sup> and dispatch of generators, and the efficient use of the transmission system.

While ISO currently uses nodal dispatch, PacifiCorp's unit commitment and dispatch do not take full advantage of all sub-hourly cost saving opportunities. A PacifiCorp-ISO EIM would provide 5-minute nodal price signals to generation resources throughout the EIM area, thus enabling more optimal generation and transmission dispatch in the PacifiCorp area. These efficiency improvements cannot be captured using the GridView software, which assumes perfectly efficient operations within each area.

To quantify the cost savings from using ISO's nodal dispatch software within PacifiCorp's BAAs, E3 assumed these savings would be proportional to the estimated savings from

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<sup>20</sup> Scaling factors of 0.617 (12% hydropower reserve cap) and 0.628 (25% hydropower reserve cap), applied to the 800 MW results, were used for the 100 MW transfer capability scenario, based on estimated changes in intertie flows. A 0.997 scaling factor, applied to the 800 MW results, was used in the 400 MW case for both hydropower assumptions.

<sup>21</sup> Under an EIM, commitment would remain the responsibility of the BA. An EIM would provide optimal real-time dispatch, but would not address commitment.

ISO's own transition to nodal pricing that occurred in 2009.<sup>22</sup> By assuming estimated cost savings scale with peak load, the benefits from nodal dispatch in PacificCorp for 2017 would be:

$$\text{PacificCorp 2017 savings} = \text{CAISO 2009 savings} * \frac{\text{PAC 2017 peak load}}{\text{CAISO 2009 peak load}}$$

or

$$\text{PacificCorp 2017 savings} = \frac{\$105 \text{ MM}}{\text{yr}} * \frac{10,079 \text{ MW}}{45,486 \text{ MW}} = \frac{\$23 \text{ MM}}{\text{yr}}$$

Because there is some uncertainty about the extent to which ISO's nodal dispatch software will produce dispatch cost savings from PacificCorp's generation, this study examines alternative low and high scenarios. In the low range scenario, the EIM is assumed to achieve 10% of the total \$23 million of available cost savings, which were calculated based on an hourly analysis. This assumption stems from the ISO's experience that its balancing market clears transactions totaling approximately 10% of total load. In the high range scenario, the EIM is assumed to achieve 100% of the total \$23 million of available cost savings. This scenario implicitly assumes that 5-minute EIM prices will inform market transactions that occur on an hourly basis, allowing more savings than would occur based only on the amount of imbalance energy clearing in the 5-minute market. As the non-EIM forward market becomes better informed by the EIM market, E3 would expect that the real-time nodal market applied to PacificCorp would result in more than 10% savings.

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<sup>22</sup> See Frank A. Wolak, 2011, "Measuring the Benefits of Greater Spatial Granularity in Short-Term Pricing in Wholesale Electricity Markets, *American Economic Review* 101: 247-252. The estimates in this study are estimated annual cost reductions that resulted from the introduction of nodal pricing in California.

### **2.2.3 REDUCED FLEXIBILITY RESERVES**

Currently, PacifiCorp and ISO meet their operating reserve requirements by procuring and utilizing existing generating capacity within their respective BAAs. An EIM would lower the total cost of procuring and utilizing flexibility reserves for both entities in two ways: (1) reducing flexibility reserve requirement quantities by combining PacifiCorp and ISO's forecast error for load and variable generation; and (2) enabling flexibility reserves to be procured from thermal or hydro resources anywhere in the EIM footprint, subject to transmission constraints. The result is that the combined cost of procuring flexibility reserves with an EIM is less than it would be if each entity procured them independently.

E3 estimated the cost savings from reduced flexibility reserves using the following three steps. First, flexibility reserve requirements were calculated for PacifiCorp and ISO as separate areas (Benchmark Case) and then again as a combined area (EIM Flexibility Reserve Case).<sup>23</sup> Flexibility reserve requirements were calculated separately for each hour using three years of 10-minute load, wind, and solar data for PacifiCorp and ISO. Calculations in the EIM Flexibility Reserve Case were constrained so that reductions in flexibility reserve requirements were less than or equal to the assumed transfer capability between PacifiCorp and ISO.

Next, E3 applied the flexibility reserve requirement calculations from above to production cost simulation runs for each case, using GridView. In the Benchmark Case and EIM Dispatch Cases, PacifiCorp and ISO must procure flexibility reserves from capacity located in their respective BAs to meet the requirements calculated for each

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<sup>23</sup> These results, when scaled back from 2017, are similar in size to the levels of reserves procured in each jurisdiction today for regulation and load following.

entity. In the EIM Flexibility Reserve Case, all Pacificorp and ISO generation is eligible to meet the single flexibility reserve requirement for the EIM footprint, subject to transfer constraints.

Table 3 shows E3's estimates of the combined minimum reserve requirements for Pacificorp and ISO under the EIM. The standalone case represents no transfer capability between Pacificorp and ISO, and is comprised of 608 MW of required reserves in Pacificorp and 1,403 MW in ISO. As the Table shows, increasing transfer capability allows for greater diversity benefits, reducing minimum reserve holdings.

**Table 3. Estimated Total Minimum Reserve Holdings under the EIM in 2017**

Pacificorp-ISO Transfer Capability	Minimum Reserve Holdings (MW)
Standalone (no EIM)	2,011
100 MW	1,932
400 MW	1,687
800 MW	1,583

As a final step, E3 calculated the difference in production costs between the EIM Dispatch Case and EIM Flexibility Reserve Case to estimate the annual benefit of reduced flexibility reserves, over and above the dispatch benefits. This yields the incremental savings associated with flexibility reserve reductions between the two cases. E3 benchmarked the cost savings using market prices for ancillary services in ISO, to ensure that these estimates were reasonable (See Technical Appendix).

Since the Pacificorp-ISO EIM would be a 5-minute energy market, only the portion of savings associated with reductions in load following reserves (5-minute to hourly timescale) would accrue under an EIM. Each area would continue to procure and deploy regulation reserves independently. Since load following accounts for approximately 80%

of total flexibility reserve needs (load following plus regulation) in E3's calculations, E3 assumed that a PacifiCorp-ISO EIM could achieve 80% of total savings from reduced flexibility reserve requirements.

#### **2.2.4 REDUCED RENEWABLE ENERGY CURTAILMENT**

High penetrations of variable generation increase the likelihood of over-generation conditions. In these situations, curtailment of variable generation may be necessary since the system is not flexible enough to reduce the output from other resources located exclusively within the same BAA. Based on discussions with ISO, over-generation conditions and the curtailment of renewable generation are likely to be a long-term issue as additional wind and solar resources come online.

As a standalone BA, ISO schedules imports on an hour-ahead basis and may find it difficult to back down imports on shorter timescales if local renewable generation is higher or if load is lower than expected. An EIM could potentially avoid over-generation situations since it could enable ISO to reduce imports in real time from PacifiCorp rather than curtail renewables during minimum generation or ramp-constrained intervals.

E3 calculated the benefits of reduced energy curtailment in ISO by multiplying estimates of: (1) the annual amount of renewable energy curtailed when simulating ISO operations as a standalone entity without an EIM, and (2) the value of curtailed renewable energy (in \$/MWh). The result represents the cost of renewable energy curtailment that an EIM could help to avoid, assuming that PacifiCorp has generation available to back down during these situations.

To estimate the level of renewable energy curtailment in ISO, E3 developed a methodology that uses outputs from two sequential GridView model runs. In the first

run (representing unit commitment based on forecasted needs), projected solar, wind, and load profiles were used to estimate economic imports into ISO. In the second run (representing real-time dispatch), actual solar, wind, and load profiles were used along with minimum import limits set to the level of economic imports from the first simulation. This limit prevented the model from lowering the interchange below the level determined by the unit commitment process. This reduction in system flexibility resulted in approximately 120 GWh of renewable energy curtailed by ISO in 2022.

This is likely a conservative estimate of the level of renewable energy curtailment. Production simulation models are designed to utilize normative assumptions regarding load, hydro conditions, thermal resource outages, and other variables in order to produce reasonable, mid-range estimates of resource dispatch and prevailing power flows. However, renewable curtailment occurs during extreme events such as very high output of wind, solar and hydro resources combined with very low load conditions. These conditions are not well-represented in production simulation modeling inputs. Hence, renewable curtailment is likely to be understated in production simulation model outputs.

E3 used a \$90/MWh value of avoided renewable energy curtailment as the sum of three components: (1) renewable energy certificate (REC) value, assumed to be \$50/MWh; (2) production tax credit (PTC) value of \$20/MWh; and (3) the avoided production cost of the thermal unit that an EIM enables to dispatch down, estimated to be \$20/MWh.

E3 used the simulated renewable curtailment results to develop two scenarios for renewable energy curtailment in 2017. As a lower end estimate, E3 assumed that ISO renewable energy curtailment is 10% of the simulated value, or 12 GWh. As a higher end estimate, E3 assumed that renewable curtailment is 100% of the simulated value, or 120

GWh. This range of curtailment estimates was then multiplied by the value of avoided renewable energy curtailment to calculate lower end and higher end estimates of \$1.1 million ( $= 12 \text{ GWh} * 90/\text{MWh}$ ) to \$10.8 million ( $= 120 \text{ GWh} * \$90/\text{MWh}$ ) in benefits for reduced renewable energy curtailment in 2017.

## 2.3 EIM Scenarios

E3 estimated EIM benefits based on study year 2017. E3 chose this year, in consultation with ISO and PacifiCorp, to represent a period after the EIM was already operational but prior to any significant changes in load, generation, and transmission. In particular, E3's modeling analysis excludes: (1) a portion of the full build out of renewable resources necessary to meet California's 33% RPS; (2) expected retirements and replacements of ISO thermal generating capacity due to once-through-cooling (OTC) regulations; and (3) a number of planned and proposed transmission projects, such as Gateway West that have the potential to provide a substantial expansion of the quantity of flexible resources that would be able to participate in a 5-minute market.

E3 used scenario assumptions to inform how sensitive benefits are to: (1) the transmission transfer capability between ISO and PacifiCorp, which limits savings both from interregional dispatch and reduced flexibility reserves; (2) the amount of hydropower capacity that can provide flexibility reserves; (3) the extent to which nodal prices from an EIM would change PacifiCorp's dispatch and produce associated efficiency improvements; and (4) the extent of renewable energy curtailment that can be avoided through an EIM. These scenarios are designed to explore a wide range of potential benefit levels to reflect the limitations of existing tools to characterize all of the changes to system operations that would occur under an EIM, particularly the modeling of hydropower, reserves, and renewable curtailment. In addition, the

scenarios capture a range of uncertainties about the extent to which future industry developments would allow cost savings to occur both with and without an EIM.

**Table 4. Low and high range assumptions under low (100 MW), medium (400 MW), and high (800 MW) Pacificorp-ISO transfer capability scenarios**

Assumption	Low transfer capability		Medium transfer capability		High transfer capability	
	Low range	High range	Low range	High range	Low range	High range
Maximum hydropower contribution to contingency and flexibility reserves*	25%	12%	25%	12%	25%	12%
Share of intraregional dispatch savings achieved	10%	100%	10%	100%	10%	100%
Share of identified renewable energy curtailment avoided	10%	100%	10%	100%	10%	100%

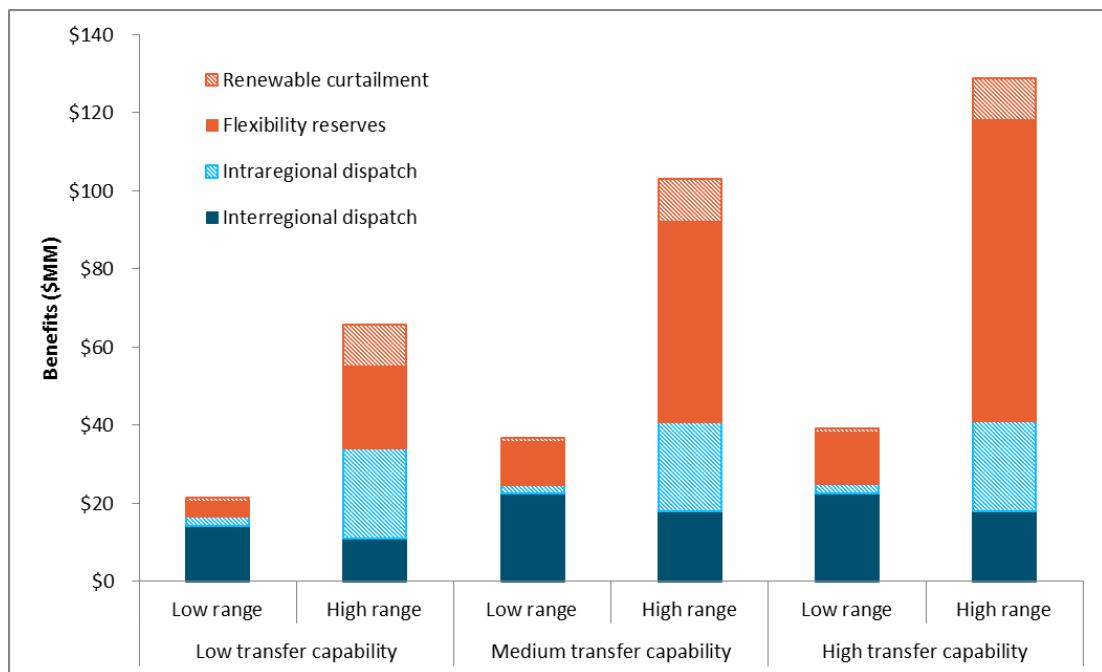
\* Percent of nameplate capacity for each project

The scenarios are organized around low, medium, and high scenarios for transmission transfer capability between Pacificorp and ISO, with 100, 400, and 800 MW, respectively, in each case. Within each scenario, E3 calculated a low and high range of benefits (Table 4). The low range assumes: hydropower can contribute up to 25% of nameplate capacity toward flexibility reserves; Pacificorp achieves 10% of estimated nodal dispatch savings; and the value of renewable energy curtailment is 10% of the full estimated value. The high range assumes: hydropower can contribute up to 12% of nameplate capacity toward contingency and flexibility reserves; Pacificorp achieves 100% of estimated nodal dispatch savings; and the value of renewable energy curtailment is 100% of the full estimated value.

## 2.4 EIM Benefits

Figure 1 and Table 5 show the low and high range of EIM benefits for the low (100 MW), medium (400 MW), and high (800 MW) transfer scenarios, and the amount attributed to each component. Total annual benefits in 2017 range from \$21 million in the low range of the 100 MW transfer capability scenario, to \$129 million in the high range of the 800 MW transfer capability scenario (2012\$).

**Figure 1. Low and high range benefits under low (100 MW), medium (400 MW), and high (800 MW) PacifiCorp-ISO transfer capability scenarios (2012\$)**



**Table 5. Low and high range annual benefits in 2017 under low, medium, and high PacificCorp-ISO transfer capability scenarios (million 2012\$)**

Benefit Category	Low transfer capability		Medium transfer capability		High transfer capability	
	Low range	High range	Low range	High range	Low range	High range
Interregional dispatch	\$14.1	\$11.0	\$22.3	\$17.7	\$22.4	\$17.8
Intraregional dispatch	\$2.3	\$23.0	\$2.3	\$23.0	\$2.3	\$23.0
Flexibility reserves	\$4.0	\$20.8	\$11.0	\$51.3	\$13.4	\$77.1
Renewable curtailment	\$1.1	\$10.8	\$1.1	\$10.8	\$1.1	\$10.8
<b>Total benefits</b>	<b>\$21.4</b>	<b>\$65.6</b>	<b>\$36.7</b>	<b>\$102.8</b>	<b>\$39.2</b>	<b>\$128.7</b>

*Notes: Individual estimates may not sum to total benefits due to rounding.*

Differences in individual benefit categories provide important insights into the impact of scenario assumptions on the results.

- + Interregional dispatch savings range from \$14 million to \$22 million per year. Increasing PacificCorp-ISO transfer capability from 100 MW in to 400 MW drives significant additional cost savings. However, the marginal benefit of additional transfer capability beyond 400 MW appears to be small.
- + Interregional dispatch savings are somewhat lower under the high range scenarios than under the low range scenarios because of interactions that occur between the hurdle rate and operating reserve aspects of the modeling. When the ability of hydropower to provide reserves is restricted, total production costs increase because more thermal generators are committed to provide reserves. These additional thermal generators tend to be higher-cost units, which may be operated at or near their minimum operating levels. This restricts the dispatch efficiency gains that are available due to the elimination of hurdle rates, because these higher-cost generators are less able to reduce their output when a lower-cost unit is available in a neighboring system.
- + Annual cost savings from reduced flexibility reserves range from \$4 million to \$77 million. These are driven largely by constraints on the ability of hydropower to provide contingency and flexibility reserves. This is a source of considerable

uncertainty, and more research is needed to understand hydro's ability to contribute toward flexibility reserve requirements under high penetrations of wind and solar. Transfer capability is also an important constraint, as benefits increase from \$4 million per year with 100 MW to \$13 million per year with 800 MW of transfer capability in the scenario where hydropower can contribute to up to 25% of flexibility reserves.

- + Annual cost savings from intraregional dispatch savings and reduced renewable energy curtailment range from \$3 million to \$34 million, suggesting that, although they are uncertain, both categories could be important contributors to EIM benefits. Because an EIM would provide an automated mechanism for facilitating wind curtailment solutions, as well as clearing any payment required in the event of curtailment, this is likely to be an important and growing EIM benefit going forward.

The results described here confirm that, even under conservative assumptions regarding the use of hydro for imbalance energy and the availability of transmission transfer capability, the incremental benefits of an EIM between PacifiCorp and ISO are likely to be larger than the preliminary estimates of the costs to implement and operate this market. The results also confirm that the benefits of an EIM can be quite substantial as participation grows, allowing more resources to participate and lowering the costs of both imbalance energy and the costs of providing adequate dynamic reserves.

## 2.5 Attribution of EIM Benefits

E3 assumed that the benefits of an EIM would be attributed to PacifiCorp and ISO as follows:

- + **Interregional dispatch savings.** Savings were split evenly between PacifiCorp and ISO to reflect: (1) the reduced cost to serve ISO load, since expensive internal generation is displaced by low-cost imports from PacifiCorp; and (2) additional revenues for PacifiCorp, since it exports additional power to ISO.
- + **Intraregional dispatch savings.** The savings were scaled to the PacifiCorp service area from a study of the ISO's nodal market, thus all benefits were attributed to PacifiCorp.
- + **Reduced flexibility reserves.** Benefits were allocated to PacifiCorp and ISO in proportion to their standalone need, resulting in a roughly 30/70 split, respectively.
- + **Reduced renewable energy curtailment.** All benefits of reduced curtailment were attributed to ISO, because the reduced curtailment would take place within the ISO footprint.

This simple approach allocates the total cost savings between the two parties and does not attempt to account for changes in market revenues relative to today's bilateral system. It is not intended to be a methodology for allocating costs and benefits. The actual net costs and benefits that would flow to the PacifiCorp and ISO systems might be different from the assumptions used here.

The attribution of benefits from a PacifiCorp-ISO EIM in 2017 is summarized in Tables 6 and 7. PacifiCorp achieves annual cost savings of \$10-54 million, with the range dependent on the extent to which PacifiCorp generators participate in the EIM and its nodal market, transfer limits, and the extent to which hydropower can provide flexibility reserves. Annual cost savings to ISO are \$11-74 million by 2017, with the range dependent on transfer limits, the extent to which hydropower can provide flexibility reserves, and the extent of renewable curtailment.

**Table 6. Attribution of EIM benefits to PacifiCorp in 2017 (million 2012\$)**

Benefit Category	Low transfer capability		Medium transfer capability		High transfer capability	
	Low Range	High Range	Low Range	High Range	Low Range	High Range
Interregional dispatch	\$7.0	\$5.5	\$11.2	\$8.9	\$11.2	\$8.9
Intraregional dispatch	\$2.3	\$23.0	\$2.3	\$23.0	\$2.3	\$23.0
Flexibility reserves	\$1.2	\$6.1	\$3.2	\$14.9	\$3.9	\$22.5
Renewable curtailment	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
<b>Total benefits</b>	<b>\$10.5</b>	<b>\$34.6</b>	<b>\$16.7</b>	<b>\$46.8</b>	<b>\$17.4</b>	<b>\$54.4</b>

*Note: Attributed values may not match totals due to independent rounding.*

**Table 7. Attribution of EIM benefits to ISO in 2017 (million 2012\$)**

Benefit Category	Low transfer capability		Medium transfer capability		High transfer capability	
	Low Range	High Range	Low Range	High Range	Low Range	High Range
Interregional dispatch	\$7.0	\$5.5	\$11.2	\$8.9	\$11.2	\$8.9
Intraregional dispatch	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Flexibility reserves	\$2.8	\$14.7	\$7.8	\$36.4	\$9.5	\$54.6
Renewable curtailment	\$1.1	\$10.8	\$1.1	\$10.8	\$1.1	\$10.8
<b>Total benefits</b>	<b>\$10.9</b>	<b>\$31.0</b>	<b>\$20.0</b>	<b>\$56.0</b>	<b>\$21.8</b>	<b>\$74.3</b>

*Note: Attributed values may not match totals due to independent rounding.*

## 3 Interpreting the Results

### 3.1 Conservative Nature of the Results

Because of the difficulties in modeling the operational complexities of an EIM, E3's approach was intended to use conservative to moderate assumptions to generate credible results, both as a standalone analysis and relative to other studies. Table 8 provides a high-level overview of the nature of assumptions (conservative, moderate, aggressive) used for each of the five identified categories of benefits, and an explanation of why the assumptions were considered to be conservative or moderate.

**Table 8. Categorization of assumptions used in this study**

Benefit Category	Assumptions (conservative, moderate, aggressive)	Rationale
Interregional dispatch	Conservative-Moderate	<ul style="list-style-type: none"> <li>E3 limited PacifiCorp-ISO transmission transfer capability in the low transfer capability scenario to 100 MW, which limited EIM benefits</li> <li>E3 used hurdle rates to inhibit interregional trade in Benchmark Case (moderate assumption)</li> <li>Hourly cost differences between natural gas-fired generators are understated in production simulation models due to the use of uniform heat rates assumptions and normalized system conditions; these models understated EIM benefits</li> </ul>
Intraregional dispatch	Conservative-Moderate	<ul style="list-style-type: none"> <li>E3 calculated nodal dispatch savings by scaling estimated ISO peak load-normalized savings by PacifiCorp peak load (moderate assumption); E3 assumed only 10% of these savings materialize for low range (conservative assumption)</li> </ul>
Flexibility reserves	Conservative	<ul style="list-style-type: none"> <li>E3 limited PacifiCorp-ISO transmission transfer capability in the low transfer capability scenario to 100 MW, which limited EIM benefits</li> <li>E3 included operating cost only; no capacity cost savings are included, which limited EIM benefits</li> <li>E3 allowed 25% of total hydropower capacity to contribute to flexibility reserves in the low range estimates, which limited EIM benefits</li> <li>E3 did not require lock-down of dispatch 45 minutes prior to the operating hour, as done in other studies, which would have raised the quantity of reserves required and increased EIM benefits</li> </ul>
Renewable curtailment	Conservative	<ul style="list-style-type: none"> <li>E3 did not evaluate renewable curtailment for PacifiCorp, which limited EIM benefits</li> <li>In low range estimate, E3 assumed wind and solar not producing significant over-generation (conservative assumption)</li> <li>Production simulation models underestimate the frequency with which low net load/high generation events occur due to their use of idealized operating assumptions; these models limit EIM benefits</li> </ul>
Within-hour dispatch	Conservative	<ul style="list-style-type: none"> <li>Production simulation analysis modeled at hourly level, omitting potential benefits of sub-hourly dispatch (other studies indicate that these benefits could be substantial)</li> </ul>

## 3.2 Comparison to other Studies

Several recent studies have examined the potential benefits of greater balancing area coordination in the Western Interconnection. These include:

- + **WECC EIM Analysis (completed in 2011)** — examined the benefits of an hourly EIM in parts of the WI region; undertaken by E3 for WECC;<sup>24</sup>
- + **PUC EIM Group Analysis (completed in 2012)** — examined the benefits of a 10-minute EIM in parts of the WI region; undertaken by the National Renewable Energy Laboratory (NREL) for the PUC-EIM Group;<sup>25</sup>
- + **WECC VGS (draft completed in 2012)** — examined the benefits of 10-minute bilateral scheduling for the entire WECC region; undertaken by the Pacific Northwest National Laboratory (PNNL) for WECC as part of the WECC Variable Generation Subcommittee (VGS);<sup>26</sup>
- + **NWPP EIM (ongoing)** — examining the benefits of 5-minute security constrained economic dispatch for the Northwest Power Pool (NWPP) footprint, undertaken by PNNL for the NWPP Market Assessment and Coordination (MC) Initiative using a 10-minute dispatch model.

The above studies can be broadly categorized into two different approaches. The first two studies, the WECC EIM and PUC Group EIM analyses, use hurdle rates to capture transactional friction between BAAs in the base case, which are removed in the EIM case. They also assume that an EIM will enable BAs to reduce the quantity of flexibility reserves that they would need to carry for wind and solar integration. The last two

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<sup>24</sup> See [http://www.wecc.biz/committees/EDT/EDT%20Results/E3\\_EIM\\_Benefits\\_Study-Phase\\_2\\_Report\\_RevisedOct2011\\_CLEAN2%5B1%5D.pdf](http://www.wecc.biz/committees/EDT/EDT%20Results/E3_EIM_Benefits_Study-Phase_2_Report_RevisedOct2011_CLEAN2%5B1%5D.pdf) for the final report.

<sup>25</sup> See <http://www.westgov.org/PUceim/> for the PUC EIM website and link to the NREL final report.

<sup>26</sup> The draft final report, “Balancing Authority Cooperation Concepts to Reduce Variable Generation Integration Costs in the Western Interconnection,” is not yet publicly available.

studies assume transactional friction between balancing areas is not alleviated by an EIM on an hourly timestep, and that an EIM will not reduce the quantity of regulation and flexibility reserves required for wind and solar integration. Instead, they conduct detailed analysis of dispatch changes that would occur on a 10-minute timestep compared to a fixed hourly interchange schedule between BAAs.

The approach used in this study is consistent with the WECC EIM and PUC Group EIM analyses. It does benefit, however, from the NWPP EIM study assumption used to limit the amount of hydropower that would qualify and be available to provide contingency and flexible reserves. Table 9 (next page) provides a high-level comparison between the benefit estimates in this study and the four aforementioned studies, describing key drivers of differences.

The estimated annual benefits in this study are smaller than in other studies because of:

- + The smaller geographic footprint of this study, which covered only the PacifiCorp and ISO areas and not the larger Western Interconnection region;
- + The modeling scope in this study, which did not include sub-hourly dispatch; and
- + The modeling assumptions used in this study, which resulted in a smaller base case operating reserve requirement, and hence a smaller change in reserves in the EIM case, than the PUC EIM Group analysis.

The results in this study should thus be viewed as conservative relative to other studies.

**Table 9. Comparison of annual benefits and geographic scope between this study and other EIM studies**

<b>Study (Organization)</b>	<b>Annual Benefits (\$MM)</b>	<b>Geographic Scope</b>	<b>Key Drivers of Differences with this Study</b>
PacificCorp-ISO EIM study	\$21-\$129 in 2017	PacificCorp and ISO	
WECC EIM (E3)	\$141 in 2020	WECC excluding ISO and AESO	<ul style="list-style-type: none"> <li>• WECC EIM study had similar approach to this study</li> <li>• WECC EIM study had larger EIM footprint than this study</li> <li>• WECC study excluded intraregional dispatch savings; this study includes intraregional dispatch savings</li> <li>• No assessment of renewable curtailment reduction in WECC study; this study includes benefits of renewable curtailment reduction</li> </ul>
PUC EIM Group (NREL)	\$349 in 2020	WECC excluding ISO and AESO	<ul style="list-style-type: none"> <li>• PUC EIM study had larger EIM footprint than this study</li> <li>• PUC EIM study modeled 10-minute dispatch; this study models hourly dispatch</li> <li>• PUC EIM study required more reserve in base case due to earlier schedule lockdown, increasing EIM benefits; this study assumed later lockdown</li> <li>• PUC EIM study included regulation reserve savings for EIM; this study assumes no regulation reserve savings</li> </ul>
WECC VGS (PNNL)	Pending	Entire WECC	<ul style="list-style-type: none"> <li>• WECC VGS study had larger EIM footprint than this study</li> <li>• VGS study modeled 10-minute bilateral scheduling, not EIM</li> <li>• In VGS study, no savings due to reduced reserves or reduced transactional friction, which means all savings due to within-hour efficiency gains; this study includes savings from reduced reserves or transactional friction</li> </ul>
NWPP EIM (PNNL)	Pending	NWPP	<ul style="list-style-type: none"> <li>• Similar approach to WECC VGS study</li> <li>• Detailed results pending</li> </ul>

# Technical Appendix

## Technical Appendix

### Overview

This technical appendix provides a detailed description of the methods and assumptions used in calculating the benefits of more efficient interregional dispatch and reduced flexibility reserves from a PacifiCorp-ISO EIM. Following this overview, this appendix includes three sections. The first describes methods for calculating inputs to the Benchmark Case, including hurdle rates and statistical calculations used to estimate flexibility reserve requirements in the Benchmark Case. The second section describes the change in hurdle rates used in an EIM Dispatch Case. The third section describes the statistical calculations used to estimate a comparative benchmark for reserves in an EIM Flexibility Reserves Case and how transmission constraints were addressed in these calculations.

E3 estimated the benefits of more efficient interregional dispatch and reduced flexibility reserves using a combination of statistical analysis and production simulation modeling. All production simulation modeling was conducted using ABB's GridView model.<sup>1</sup>

E3 modeled three cases:

- **Benchmark Case**, reflecting a business as usual scenario that includes continued obstacles to interregional dispatch between PacifiCorp and ISO and separate procurement of flexibility reserves;
- **EIM Dispatch Case**, in which obstacles to more efficient interregional dispatch are removed but flexibility reserves are still procured separately; and
- **EIM Flexibility Reserve Case**, in which obstacles to more efficient interregional dispatch are removed and PacifiCorp and ISO pool flexibility reserves.

The Benchmark Case was developed using the Western Electricity Coordinating Council's (WECC's) Transmission Expansion Planning Policy Committee (TEPPC) 2022 Common Case as a starting point, with updates developed for ISO's Transmission Planning Process (TPP) GridView simulation to improve accuracy inside of California. Load forecasts, fuel price forecasts, generators, and transmission were also adjusted to reflect anticipated values and availability in 2017. The EIM Dispatch Case and EIM Flexibility Reserve Case were used to isolate the benefits of more efficient interregional dispatch and reduced flexibility reserves, respectively, relative to the Benchmark Case.

In the EIM Dispatch Case, E3 modeled the incremental benefits of more efficient interregional dispatch by eliminating the hurdle rates between PacifiCorp and ISO that are used to reflect impediments to regional electricity trades in the Benchmark Case.<sup>2</sup> In the EIM Flexibility Reserve Case, E3 modeled the

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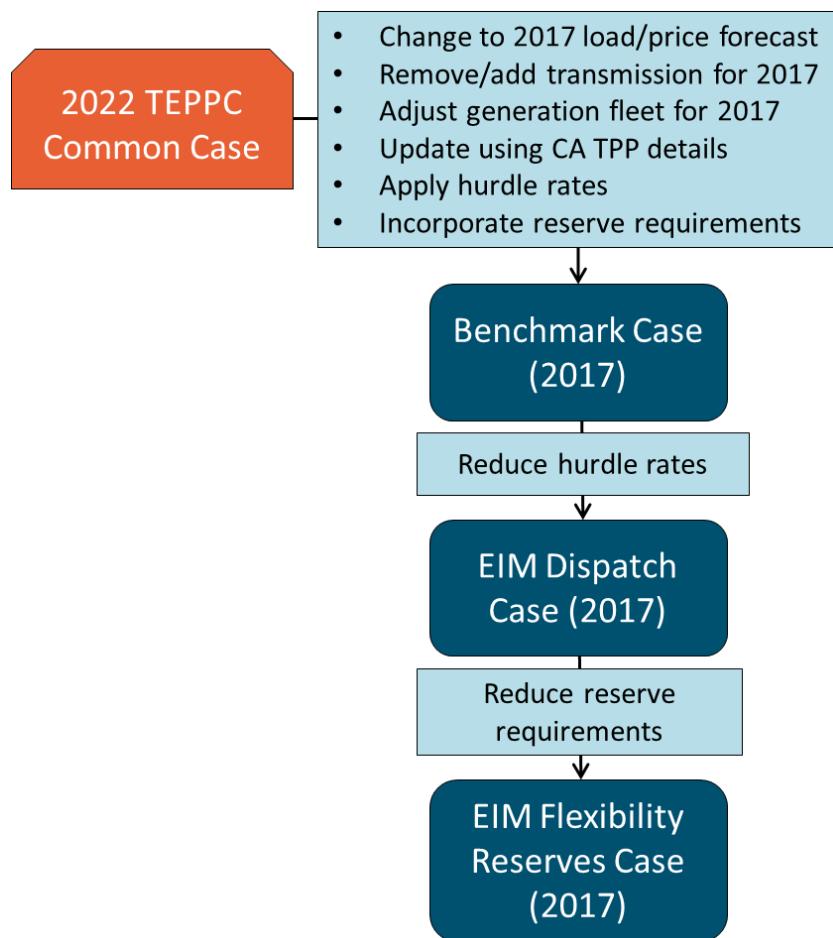
<sup>1</sup> For more on GridView, see <http://www.abb.com/industries/db0003db004333/c12573e7003305cbc12570060069fe77.aspx>.

<sup>2</sup> A component of hurdle rates that reflects the need to acquire CO<sub>2</sub> allowances when delivering electricity from neighboring states into California, as required by California's greenhouse gas "cap-and-trade" program developed in compliance with AB32, was retained in all cases.

incremental benefits of reduced flexibility reserves by calculating the reduction in flexibility reserves that results from pooling load, wind, and solar variability between PacifiCorp and ISO, and then by reducing the amount of required reserves in GridView runs.

As described in the main report, within the EIM Dispatch Case and EIM Flexibility Reserve Case, E3 modeled the year 2017, to provide an estimate of near-term benefits from an EIM. Figure 1A illustrates E3's modeling approach.

**Figure 1A. Modeling approach for calculating interregional dispatch and reduced flexibility reserve benefits**



The modeling was organized around three scenarios of interchange transfer capability between PacifiCorp and ISO: 100, 400, and 800 MW. Within each transfer capability scenario, E3 modeled low and high benefit ranges. In the low range scenario, E3 limited hydropower's ability to contribute to contingency and flexibility reserves to 25% of nameplate capacity. In the high range scenario, E3 assumed that 12% of hydropower nameplate capacity can contribute to contingency and flexibility reserves. Production cost results for the interaction of all of these scenarios are described in this Appendix.

## Benchmark Case

The Benchmark Case used WECC's TEPPC 2022 Common Case as a starting database. Inputs to the TEPPC database are developed from a collaborative stakeholder process, and are used in studies to assess regional economic transmission in the Western Interconnection. In addition, the TEPPC database has been used in ISO's TPP, and in other studies of the benefits of an EIM throughout the Western Interconnection.<sup>3</sup>

## Adjustments to the TEPPC Common Case

In developing its 2017 TPP Case, ISO staff made adjustments to the TEPPC 2022 Common Case to improve transmission and generation modeling accuracy within California. E3 incorporated those adjustments and made further modifications to the TEPPC 2022 Common Case in three primary areas: (1) fuel price forecast, (2) load forecast, and (3) generation and transmission.

### Fuel price forecast

Natural gas prices were based on the ISO's long-term procurement plan (LTPP), adjusted to match annual average Henry Hub fuel prices from NYMEX.<sup>4</sup> Table 1A shows fuel prices by region, for the TEPPC regions within the ISO and PacifiCorp BAAs.

**Table 1A. Average annual burnertip gas price (2012\$/MMBtu)**

Area	2017
PACE_ID	\$ 3.99
PACE_UT	\$ 3.81
PACE_WY	\$ 3.95
PACW	\$ 3.91
PG&E_BAY	\$ 4.09
PG&E_VLY	\$ 4.09
SCE	\$ 4.18
SDGE	\$ 3.86

### Load forecast

A load forecast for 2017 was provided directly by PacifiCorp for the PacifiCorp East and PacifiCorp West BAAs. For all other load areas, monthly peak and energy values were interpolated between 2006 historical data (provided by TEPPC by BA) and the 2022 forecasted value from TEPPC's Data Working Group (DWG) based on the most recently available WECC Load-Resource Subcommittee (LRS) data submittals.

<sup>3</sup> ISO, 2013, *Draft 2012-2013 Transmission Plan*, <http://www.caiso.com/Documents/Draft2012-2013TransmissionPlan.pdf>; E3, 2011, WECC EDT Phase 2 EIM Benefits Analysis & Results (October 2011 Revision), [http://www.wecc.biz/committees/EDT/EDT%20Results/E3\\_EIM\\_Benefits\\_Study-Phase\\_2\\_Report\\_RevisedOct2011\\_CLEAN2%5B1%5D.pdf](http://www.wecc.biz/committees/EDT/EDT%20Results/E3_EIM_Benefits_Study-Phase_2_Report_RevisedOct2011_CLEAN2%5B1%5D.pdf).

<sup>4</sup> A small adjustment was also implemented to use the same fuel prices for PG&E Bay and PG&E Valley load areas.

### ***Generation and transmission***

Some generation and transmission projects were removed from the TEPPC 2022 Common Case, because they were not expected to be online by 2017, based on input from ISO and PacifiCorp. For modeling purposes, generation in 2017 was assumed to precede the majority of expected OTC-related retirements and replacements in California.

### **Hurdle rates**

The Benchmark Case utilized hurdle rates from the WECC EDT Phase 2 EIM Benefits Analysis, which were developed by calibrating simulation output to historical flow levels on WECC paths.<sup>5</sup> These historically-calibrated hurdle rates are adjusted to reflect the impact of anticipated CO<sub>2</sub> allowance cost on unspecified power imports into California in 2017. For power flows from PacifiCorp-West (PACW) to ISO, E3 used a value of \$21.07/MWh, which included a \$10.76/MWh cost for CO<sub>2</sub> allowances on PacifiCorp exports to ISO (Table 2A). This \$10.76/MWh adder was based on a default CO<sub>2</sub> emissions factor for a CCGT from the California Air Resources Board and a CO<sub>2</sub> price of \$24.66 (2012\$) per short ton of CO<sub>2</sub>. For power flows from ISO to PACW, E3 used a hurdle rate of \$3.97/MWh. E3 assumed no direct interties between ISO and PACE.

**Table 2A. Hurdle rates used in the Benchmark Case**

Case	Hurdle Rate (\$/MWh)				
	PACW → ISO				
	CO <sub>2</sub> -related	Non-CO <sub>2</sub> related	Total		
Benchmark Case	\$10.76	\$10.31	\$21.07	\$3.97*	

\*No CO<sub>2</sub>-related hurdle rate is applied to ISO exports to PACW because CO<sub>2</sub> permit cost under AB32 is directly modeled in the dispatch for generators located inside California.

### **Flexibility reserves**

To determine the production costs associated with flexibility reserve levels in the Benchmark Case, E3 calculated load following and regulation reserve requirements, summed the two, and then set the total as a constraint in GridView. Load following here is defined as the capacity needed to manage the difference between the hourly unit commitment schedule and 10-minute forecasted net load. Regulation is defined as the capacity needed to manage the difference between 10-minute forecasted net load and 10-minute actual net load.

Load following and regulation reserves were calculated using a common methodology based on the North American Electricity Reliability Corporation (NERC) Control Performance Standard 2 (CPS2).<sup>6</sup> CPS2 is designed to ensure that a BA maintains its area control error (ACE) – the difference between actual and scheduled power flows across interties to neighboring BAs – within reasonable bounds. Spinning

<sup>5</sup> See [http://www.wecc.biz/committees/EDT/EDT%20Results/E3\\_EIM\\_Benefits\\_Study-Phase\\_2\\_Report\\_RevisedOct2011\\_CLEAN2%5B1%5D.pdf](http://www.wecc.biz/committees/EDT/EDT%20Results/E3_EIM_Benefits_Study-Phase_2_Report_RevisedOct2011_CLEAN2%5B1%5D.pdf). The WECC Analysis reported hurdle rates in 2010\$, and those rates were adjusted to 2012\$ for this analysis.

<sup>6</sup> For more on NERC CPS, see <http://www.nerc.com/docs/oc/ps/tutorcps.pdf>.

reserve requirements) were set to equal 3% of load, which represents one-half of total operating reserves requirements (spinning plus non-spinning). Non-spinning reserve needs were not explicitly modeled because the simulation addresses reserve needs by increasing the level of generator commitment required, but is assumed for modeling that non-spinning reserve needs would typically be met with resources that do not require day-ahead unit commitment.

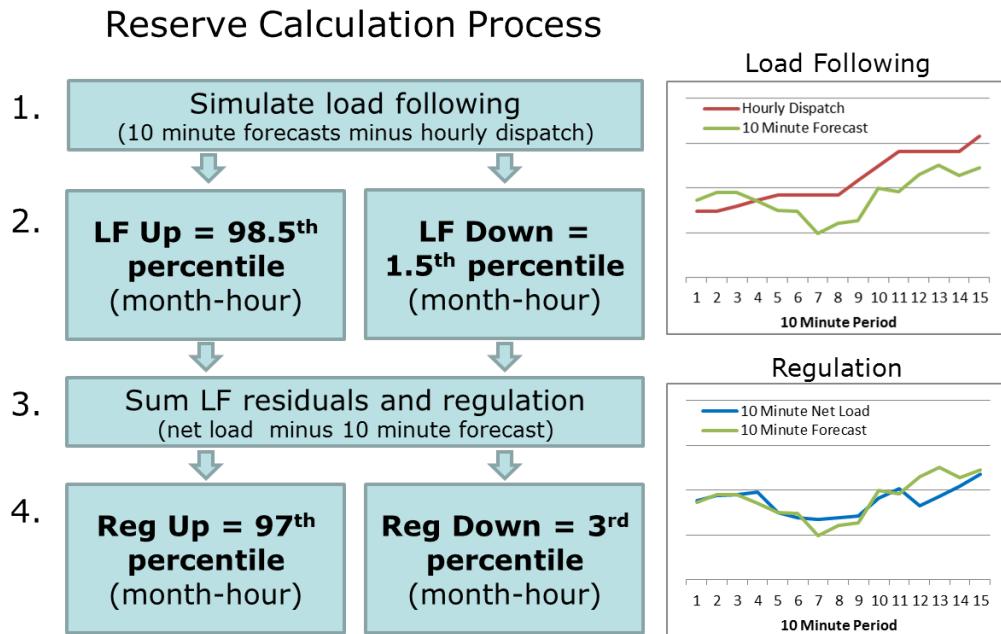
By benchmarking against ISO's current regulation procurement, wind integration studies performed by PacifiCorp, and in consultation with ISO and PacifiCorp, E3 chose to model a CPS2 compliance target which requires BAAs to secure load following reserves to meet 97% of forecasted load following demand, equivalent to 1.5% of the left-hand and right-hand tails of a distribution of load following needs (i.e., 10-minute forecasted net load minus hourly unit commitment). For regulation under this target, BAAs also secure regulation reserves to meet 94% of forecasted regulation demand, equivalent to 3% of the left-hand and right-hand tails of a distribution of regulation needs (i.e., 10-minute actual load minus 10-minute forecasted net load). This approach allows regulation reserves to meet load following needs, but not vice versa.

The regulation requirement percentage is lower than load following because regulation can be used to meet load following requirements. In the 3% of time periods with an unmet load following requirement, the residual load following error is added to the time-series regulation requirement. During these hours, if the system had unutilized regulation capacity or if regulation needs were in the opposite direction of the load following residual error, generator flexibility procured for regulation may be able to still satisfy the CPS2 requirement for that time period even though the system were short on load following resources.

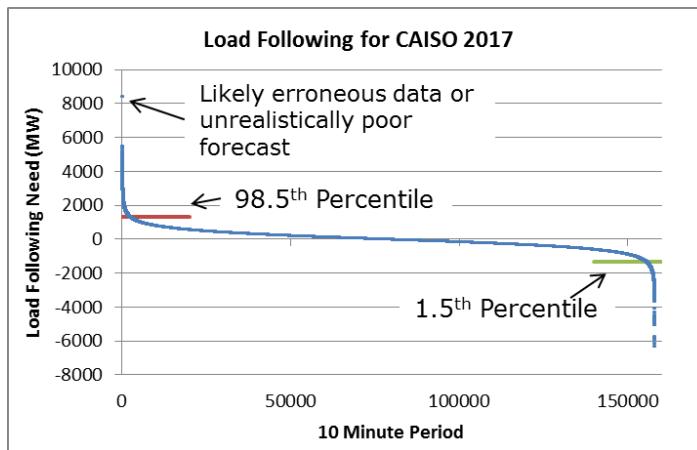
Key steps in this analysis are shown graphically in Figure 2A.

- Step 1: Calculate a distribution of load following requirements. E3 used historical 10-minute wind, solar, and load data to forecast 10-minute net load and hourly unit commitment based on hourly net load. Forecasted hourly net load was then calculated for each 10-minute time period, using a linear 20-minute ramp across the top of the hour (see upper rightmost part of Figure 2A). A distribution of load following requirements was calculated as the difference between the 10-minute and hourly net load forecasts in each 10-minute period.
- Step 2: Calculate load following up and down needs. These were calculated using the 1.5 and 98.5 percentiles of these distributions, respectively, consistent with the chosen CPS2 compliance target. Figure 3A shows an example of the distribution for load following requirements and the points associated with the 1.5 and 98.5 percentiles.
- Step 3: Calculate a distribution of regulation requirements. A distribution of regulation requirements was calculated as the difference between the 10-minute net load forecast and 10-minute actual net load values. Residual load following errors were added to the regulation distributions to allow for the fact that regulation reserves can also be used for load following.
- Step 4: Calculate final regulation requirements as the 3<sup>rd</sup> and 97<sup>th</sup> percentiles of this distribution, representing regulation down and up needs, respectively.

**Figure 2A. Flexibility reserve calculation steps**



**Figure 3A. Load following needs associated with the 1.5 and 98.5 percentiles**



To calculate net load, E3 used three years of 10-minute load and modeled renewable production data. Years 2004 to 2006 were used in the analysis because of data availability in the Western Wind Integration Dataset. Solar PV was modeled using data from Solar Anywhere and 10-minute load data was provided by PacifiCorp and ISO. The load data provided was scaled to 2017 by both annual energy and peak load to account for load growth. Forecasts for 10-minute wind, solar, and load were created using linear regression and were extensively benchmarked. The following table shows renewable assumptions used for 2017.

**Table 3A. Renewable assumptions for 2017 reserve calculations<sup>7</sup>**

Area	Wind Installed (MW)	Solar Installed (MW)
PacifiCorp East	1,638	-
PacifiCorp West	635	-
PacifiCorp Combined	2,272	-
ISO	6,228	5,483
PacifiCorp and ISO (pooled)	8,501	5,483

In the Benchmark Case, regulation and load following were calculated separately for PacifiCorp East, PacifiCorp West, and ISO, and were implemented in GridView as separate constraints for each BAA. Table 4A shows the resulting load following up and regulation up reserve requirements for PacifiCorp East, PacifiCorp West, and ISO. The GridView modeling configuration used does not have the ability to model load following down and regulation down.

**Table 4A. Estimated load following up and regulation up reserve requirements for PacifiCorp East, PacifiCorp West, and ISO in 2017**

Area	Average Regulation Up (MW)	Average Load Following Up (MW)
PacifiCorp East	103	313
PacifiCorp West <sup>8</sup>	45	146
PacifiCorp Combined	115	357
ISO <sup>9</sup>	276	1,128

<sup>7</sup> The study did not incorporate the most current renewable resource capacity in PacifiCorp, which results in understating total installed wind capacity in PacifiCorp's BAAs by 280 MW. As of 2013 PacifiCorp will have 1,758 MW of installed wind capacity in PacifiCorp East and 795 MW of installed wind capacity in PacifiCorp West.

<sup>8</sup> In the Benchmark and EIM Cases, E3 assumed that PacifiCorp East is able to transfer 200 MW to PacifiCorp West within the hour but with no transfer capability in the reverse direction for EIM transactions. The hourly load following requirement applied to PacifiCorp West is reduced for this transfer capability, and a separate reserve requirement is applied to the Combined PacifiCorp area which reflects diversity of wind and load variability across the two PacifiCorp BAAs.

<sup>9</sup> The applied common methodology for determining regulation and load following results in conservative lower amount of regulation requirements used in ISO production and lower regulation and load following 20 minute requirements then has been calculated using other methodologies.

## EIM Dispatch Case

In the EIM Dispatch Case, E3 modeled reduced transactional friction between PacifiCorp and ISO from the EIM by removing the non-CO<sub>2</sub> hurdle rates in the Benchmark Case. In this case, the PACW → ISO hurdle rate still includes the \$10.76/MWh cost for CO<sub>2</sub> allowances on PacifiCorp flows to ISO (Table 5A).

**Table 5A. Hurdle rates for the Benchmark and EIM Dispatch Cases**

Case	Hurdle Rate (\$/MWh)			
	PACW → ISO			ISO → PACW
	CO <sub>2</sub> -related	Non-CO <sub>2</sub> related	Total	
Benchmark Case	\$10.76	\$10.31	\$21.07	\$3.97
EIM Dispatch Case	\$10.76	\$0.00	\$10.76	\$0.00*

\*No CO<sub>2</sub>-related hurdle rate is applied to ISO exports to PACW because CO<sub>2</sub> permit cost under AB32 is directly modeled in the dispatch for generators located inside California.

Eliminating hurdle rates enables GridView to dispatch more generation in the PacifiCorp BAAs to serve needs in the ISO BAA when more efficient units are available, and vice-versa. Reduced transactional friction lowers total production costs. As described in the main text, for the EIM Dispatch Case E3 used an 800 MW static transfer limit on the California-Oregon Intertie (COI) as a proxy for transfer capability between the PacifiCorp and ISO systems.

Table 6A shows production costs in the Benchmark Case, the EIM Dispatch Case, and cost savings (Benchmark Case – EIM Dispatch Case production costs), for the 100, 400, and 800 MW transfer capability scenarios under both hydro assumptions. As described in the main body, production cost savings from the 800 MW scenario were scaled to 100 and 400 MW based on relative changes in intertie flows. Most of the savings stemming from increased flows between the Benchmark Case and the EIM Dispatch Case were captured with 400 MW of transfer capability.

**Table 6A. Production cost savings in the EIM Dispatch Case for different hydropower flexibility scenarios and assumptions about transfer capability between PacifiCorp and ISO (Million 2012\$)**

Transfer Capability (MW)	25% Hydro Reserve Cap			12% Hydro Reserve Cap		
	100	400	800	100	400	800
EIM Dispatch Case	\$14.1	\$22.3	\$22.4	\$11.0	\$17.7	\$17.8

As described in this report, GridView assumes perfect, security-constrained, least-cost dispatch within both the ISO and PacifiCorp footprints. The EIM Dispatch Case thus captures the incremental benefits from more efficient dispatch between PacifiCorp and ISO assuming that PacifiCorp already uses nodal dispatch. The savings from moving to nodal dispatch in PacifiCorp are estimated separately under “intraregional dispatch savings” and described in Section 2.2.2 of this report.

## EIM Flexibility Reserves Case

E3 calculated within-hour regulation and load following reserves for the EIM Flexibility Reserves Case using the same approach as in the Benchmark and EIM Dispatch Cases, except that net load profiles for each BA were summed before the calculation and transmission constraints were enforced to ensure realistic reserve sharing. By summing the net load profiles for PacifiCorp and ISO, diversity in forecast errors and net load ramps reduces the reserves that each BAA is required to hold, relative to the Benchmark Case.

Table 7A shows the pooled load following up and regulation up reserve requirements for PacifiCorp and ISO in 2017, prior to enforcing transmission constraints between BAs.

**Table 7A. Pooled load following and regulation up reserve requirements for PacifiCorp and ISO in 2017**

Area	Average Regulation Up (MW) <sup>10</sup>	Average Load Following Up (MW)
PacifiCorp and ISO (pooled)	310	1,255

Transmission limits were enforced on the results in the above table as a set of five separate constraints in the GridView cases, shown below for the scenario where 100 MW of transfer capability exists between PacifiCorp and ISO. These five constraints ensure that each BA holds the necessary reserves given transfer limits. The constraints also reflect the assumption that PacifiCorp East is able to transfer 200 MW to PacifiCorp West within the hour but with no transfer capability in the reverse direction.

1.  $PACW_{pooled\ reserves} \geq \max(PACW_{benchmark\ case} - 200\ MW, 0)$
2.  $PACE_{pooled\ reserves} \geq PACE_{benchmark\ case}$
3.  $CAISO_{pooled\ reserves} \geq \max(CAISO_{benchmark\ case} - 100\ MW, 0)$
4.  $PacifiCorp_{pooled\ reserves} \geq \max(x - 100\ MW, 0)$
5.  $PAC\&CAISO_{pooled\ reserves} \geq \max(x + CAISO_{benchmark\ case} - 100\ MW, PAC\&CAISO_{no\ transfer\ limit})$

where:  $x = \max(PACW_{benchmark\ case} + PACE_{benchmark\ case}, PacifiCorp_{benchmark\ case})$

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<sup>10</sup> Reductions to both regulation and load following requirements were modeled in the EIM Flexibility Reserves Case, but resulting cost savings were multiplied by the share that load following reserves (80%) represent relative to total flexibility reserves (load following plus regulation), to account for the fact that the EIM will only affect reserves above a 5-minute timestep.

Table 8A shows production cost savings for the four transfer capability scenarios and two hydropower flexibility scenarios. As described in the main text, cost savings were multiplied by the share that load following reserves (80%) represent relative to total flexibility reserves (load following plus regulation), to account for the fact that the EIM will only affect reserves above a 5-minute timestep.

**Table 8A. Production cost savings in the EIM Dispatch and EIM Flexibility Reserve Cases for different hydropower flexibility scenarios and assumptions about transfer capability between PacifiCorp and ISO (Million 2012\$)**

Transfer Capability (MW)	25% Hydro Reserve Cap			12% Hydro Reserve Cap		
	100	400	800	100	400	800
EIM Dispatch Case	\$14.1	\$22.3	\$22.4	\$11.0	\$17.7	\$17.8
EIM Flexibility Reserve Case	\$4.0	\$11.0	\$13.4	\$20.8	\$51.3	\$77.1
Total Both Cases	\$18.1	\$33.3	\$35.8	\$31.8	\$69.0	\$94.9

E3 benchmarked the results from the EIM Flexibility Reserve Case by multiplying reductions in hourly load following component of flexibility reserve quantities by ISO regulation prices. Annual savings from reduced flexibility reserves were calculated as the difference between reserve costs with no transfer capability (i.e., 0 MW) and reserve costs with transfer capability (i.e., 100, 400, or 800 MW) between PacifiCorp and ISO. Consistent with the approach taken for the GridView modeling, only savings in load following up reserve costs were assumed to be achievable through an EIM.

The results of this benchmarking exercise (AS price-based results) are shown in Table 9A, using ISO AS market prices from 2010, 2011, and an average of the two years. Given that PacifiCorp is more dependent than ISO on thermal resources to provide flexibility reserves, the benchmarking results in the below table are conservatively low (i.e., ISO AS prices are likely to be lower than implied AS prices in PacifiCorp because hydropower provides a significant amount of AS in ISO). With this in mind, the EIM Flexibility Reserve Case results (Table 8A) appear reasonable compared to the benchmarking results below.

**Table 9A. Results from flexibility reserve benefits benchmarking analysis (Million 2012\$)**

Transfer Capability	2010 AS Prices	2011 AS Prices	Average 2010/2011 AS Prices	EIM Flex. Reserve Case (25% Hydro Reserve Cap)	EIM Flex. Reserve Case (12% Hydro Reserve Cap)
100 MW	\$7.3	\$4.5	\$5.7	\$4.0	\$20.8
400 MW	\$24.3	\$14.8	\$18.8	\$11.0	\$51.3
800 MW	\$29.6	\$17.6	\$22.7	\$13.4	\$77.1

**Attachment F – March 2013 Board Memorandum**  
**Tariff Amendments to Implement Energy Imbalance Market**  
**California Independent System Operator Corporation**

**February 28, 2014**

# Memorandum

**To:** ISO Board of Governors

**From:** Karen Edson, Vice President Policy & Client Services

**Date:** March 19, 2013

**Re: Decision on PacifiCorp Energy Imbalance Market Implementation Agreement**

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***This memorandum requires Board action.***

## EXECUTIVE SUMMARY

On February 12, 2013, the California Independent System Operator Corporation and PacifiCorp executed a memorandum of understanding to establish an energy imbalance market (EIM) within PacifiCorp and between the two interconnected systems. Implementation will provide economic, reliability, and renewable integration benefits to both balancing authorities. This is an important step supporting one of the ISO's strategic goals to expand collaboration across the West. The ISO's approach for the EIM provides better value for consumers and also provides the platform to better integrate renewable resources. The MOU is included as **Attachment 1**.

Successful implementation of the EIM depends on two Board decisions.

- The first decision involves the specific action requested by this memo, which would authorize Management to enter into an EIM implementation agreement with PacifiCorp consistent with the memorandum of understanding. The executed implementation agreement will require FERC acceptance and will bind the parties to a specific work plan that builds on the memorandum of understanding and governs the preparations and payments from PacifiCorp to support the EIM implementation in October 2014.
- The second decision will arise at the conclusion of an upcoming stakeholder process to develop the detailed EIM design, address the necessary tariff changes, and consider other related policy issues, such as the process for additional parties to enter the EIM. We expect to present the results of this effort for your approval at the November Board meeting, followed by a filing with FERC in January 2014. When EIM is implemented in October 2014, the implementation agreement with

PacifiCorp will terminate and ongoing EIM operation will be governed by the FERC-approved tariff changes.

This matter is before you as a direct result of the hard work of the Western Governors' Association PUC-EIM sub-team, which began work in late 2011. The ISO submitted a conceptual proposal on March 29, 2012, which became the basis of subsequent discussions between the ISO and PacifiCorp.

The ISO's proposal has several key characteristics:

- 1) **Low cost entry:** The ISO is building on its existing ISO real-time market and related systems. This enables the ISO to base entrance charges on the cost of incorporating a participant's resources into ISO systems, on a "pay-as-you-go" basis. In the case of PacifiCorp's 10,000 MW system, this is approximately \$2.1 million;
- 2) **Scalability:** The EIM service is readily scalable to accommodate additional participants, once a minimum threshold is reached. PacifiCorp alone exceeds the threshold established in the ISO proposal;
- 3) **Low cost services:** Ongoing service charges, which are based on the level of participation, are aligned with the ISO's administrative fee structure or grid management charge. Participants would pay those ISO service charges according to their level of participation in the EIM; and
- 4) **Ease of exit:** Exit charges are zero.

The energy imbalance market provides economic benefit for customers in both PacifiCorp and ISO territories that range from \$21 million per year to \$129 million per year, depending on the level of transfers available on the transmission system. These benefits are discussed later in this memo and are available in a separate report entitled, "*PacifiCorp-CAISO Energy Imbalance Market Benefits*," dated March 13, 2013. The report is included as **Attachment 2**.

The EIM also provides reliability benefits not quantified in the study. A recent report by staff of the Federal Energy Regulatory Commission identifies reliability benefits that will also arise. These include enhanced situational awareness, security constrained dispatch, faster delivery of replacement generation after the end of contingency reserve sharing assistance, and enhanced integration of renewable resources.<sup>1</sup>

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<sup>1</sup> Staff Report of the Federal Energy Regulatory Commission, 2013, "Qualitative Assessment of Potential Reliability Benefits from a Western Energy Imbalance Market," dated February 26, 2013 is located at: [FERC Energy Imbalance Market Reliability Benefits Qualitative Analysis - Mar 8,2013](#) .

Management seeks the approval from the Board on the following motion:

***Whereas, the ISO Board of Governors recognizes the potential benefits of an energy imbalance market, and consistent with the Memorandum of Understanding dated February 12, 2013, supports Management's proposal to carry out a stakeholder process to determine the tariff modifications necessary to implement the energy imbalance market.***

***Moved, that the ISO Board of Governors authorizes Management to enter into an implementation agreement with PacifiCorp consistent with the parties' Memorandum of Understanding dated February 12, 2013, and to make all necessary and appropriate filings with the Federal Energy Regulatory Commission; and***

***Moved, that the ISO Board of Governors authorizes Management to increase the 2013 capital budget by \$2.1 million to account for anticipated costs associated with the implementation agreement, for a total 2013 capital project budget of \$21.6 million.***

## **DISCUSSION AND ANALYSIS**

### ***Background of energy imbalance market development in the West***

The subject of an energy imbalance market has been a theme in many forums in the west over the last several years, including a major initiative and study by WECC and the appointment of the PUC-EIM group in late 2011 by the Western Governors' Association. Parties initially expected the effort to involve a majority of WECC balancing authorities (other than the ISO) in the formation of a new organization, market platform, and tariff.

When the ISO became involved in the PUC-EIM efforts in early 2012, we sought a design that was less risky and more economical for customers in the West. The ISO's proposal submitted to the PUC-EIM task force in March 2012 uses the existing real-time market, saving the lengthy process of developing a new market platform. It is more economical and highly scalable, which simplifies entry into the EIM.

### ***EIM basics***

The concept of the energy imbalance market starts with balanced schedules entering real-time. Resources with the flexibility to ramp quickly and the ability to respond to 5-minute dispatch instructions may bid into the real-time market. The real-time market will create locational marginal prices in the EIM region and based on those prices will dispatch the least cost resources on a 5-minute basis to resolve changes in load or generation (imbalances), in a way that does not cause congestion.

The EIM can operate across multiple balancing authorities, but it is important to note that each balancing authority retains all of its individual roles and responsibilities identified by WECC and NERC. The EIM does not procure operating reserves such as spin, non-spin, or regulation for the balancing authority area participating in the EIM – the responsibility to procure necessary reserves remains with each balancing authority – nor does it involve operational control of transmission facilities. However, the EIM does provide an opportunity for the combined EIM and ISO area to benefit from both the reduced flexibility reserve needs resulting from the wider diversity of loads and variable resources, as well as the sharing of flexibility reserves (i.e. load following) during optimal real-time dispatch.

### ***Key points of ISO EIM conceptual proposal***

#### **Builds on already-operating market platform**

In developing its EIM proposal, ISO Management determined that the best approach for existing ISO customers and the best value for participants would be to offer the services of the real-time portion of the existing ISO market, including 5-minute dispatch.

#### **Low cost and low risk**

When compared to the alternative of an entirely new west-wide organization and market platform, the ISO proposal provides a lower risk and lower cost alternative. It provides a functioning market platform that precludes the need for a new market design and development that can be lengthy and risky. It provides ease of entry with a low up-front cost and is easily scalable to the level of participation of other balancing authorities. In 2012, the PUC-EIM group prepared a cost comparison of the ISO proposal together with a proposal based on the straw proposal, assuming broad west-wide participation. It annualized the up-front costs over a 5-year basis and added them to the expected annual costs. This analysis showed a total annual cost for the ISO proposal of \$15 million to the western participants, compared to \$41 million annually for the alternative development of a new market and organizational structure.

#### **Scalability**

The major feature of the ISO approach that has changed the discussions in the West is its scalability. Because the ISO does not need to build a new market platform, participants can join when they are ready. To support this approach, the ISO proposes a “pay-as-you-go” approach.

Participants pay a one-time, up-front fee to cover the cost of ISO modeling, licensing and other preparatory work. Once operational, they pay ongoing fees based on their level of participation. The ongoing fee is estimated at 19 cents/MWh imbalance, and will be consistent with the ISO’s grid management charge structure. We expect that over time the increased

volumes of EIM transactions will put downward pressure on the ongoing EIM and grid management charge rates.

### ***PacifiCorp-ISO MOU Principles***

The PacifiCorp-ISO memorandum of understanding is an exciting step toward broader collaboration in the West. With Board approval to move forward, it paves the way for the implementation agreement to be filed at FERC at the end of April. The memorandum of understanding itself contains twelve principles and high level project and stakeholder milestone schedules. The principles were carefully considered by the ISO and PacifiCorp to meet the parties' needs and the anticipated needs of stakeholders. The principles include:

***1) EIM will be compatible with existing and emerging market features.***

PacifiCorp is a participant in a reserve sharing group administered by the Northwest Power Pool. The MOU recognizes the importance of PacifiCorp's continued participation in this effort to meet their balancing authority responsibilities and continue a critical partnership in the west. In addition, the ISO is currently developing changes to its market that would allow intra-hour scheduling changes in compliance with FERC Order 764. These changes will be factored into the EIM to ensure an efficient and coordinated outcome.

***2) EIM market rules will be developed through an ISO stakeholder process and will support additional EIM participants.***

It is essential that the process is open and transparent so that other interested participants have an opportunity to shape the EIM and participate when they are ready.

***3) Interested EIM participants will fund their share of the upfront costs through an implementation agreement, and ongoing costs will be recovered through an EIM rate and charged to participants in accordance with their participation level.***

This will ensure that each new entrant is treated similarly to PacifiCorp and that all EIM participants will take service on a comparable basis.

***4) A formal role for EIM participants in market design and/or oversight will be addressed in the upcoming stakeholder process.***

Some entities in the West have raised concerns about participants' ability to shape the EIM and administration of its market rules. The ISO is open to input on EIM oversight and alternative ways for EIM participants to engage with the

ISO Board, consistent with the framework within which the ISO is currently governed.

**5) The EIM will not modify the functional responsibilities of the ISO, PacifiCorp, or any other entity.**

The ISO and PacifiCorp will continue to operate as separate balancing authorities and maintain responsibilities associated with reliability standard compliance.

***Implementation Agreement***

With Board approval to move forward, Management intends to negotiate an implementation agreement with PacifiCorp that would be filed with FERC no later than April 30, 2013. This agreement details the work scope, pricing, and contractual terms to facilitate PacifiCorp's operation and participation in the EIM. The implementation agreement includes key milestones and will be effective until PacifiCorp goes operational in the EIM on October 2014. At that time, the implementation agreement will terminate and PacifiCorp's involvement in the EIM will be governed by the market rules, service agreements and other business practices applicable to the EIM.

***Stakeholder Process***

Management intends to start a stakeholder process in early April to finalize the design and operational details of the EIM. These provisions will apply not only to PacifiCorp but also to other entities in the West that choose to join. Management expects to finish the process with a recommendation to the Board in November 2013. Following Board approval, Management would file applicable tariff provisions with FERC in January 2014. We expect the stakeholder process to:

- 1) Establish a timeframe and process for new participants to join the EIM.
- 2) Determine more precisely what real-time functionality would be included in the EIM and how this fits into the evolving ISO real-time energy imbalance market.
- 3) Coordinate EIM and ISO implementation of FERC Order 764 regarding 15-minute scheduling in support of variable energy resources.
- 4) Define the participant requirements necessary to support the EIM including for example, metering, telemetry, and other communication and coordination requirements.
- 5) Develop provisions to preclude the ability of EIM participants to "lean" on the EIM market when they do not have sufficient resources to meet their load.

- 6) Ensure compliance with NERC/WECC and state requirements even though all balancing authority responsibilities remain unchanged with EIM. Moreover, the EIM also must operate consistently with all state requirements.
- 7) Establish EIM service agreements that will apply to the balancing authorities joining the EIM, including participating generator and metering agreements.
- 8) Consider a formal role for EIM participants in EIM design and market rule oversight, which would be consistent with the existing ISO board structure and presented to the Board for approval.
- 9) Other items based on stakeholder input and regional dialogue during the stakeholder process.

Because the EIM is relevant to all entities in the West, we expect entities to engage in this stakeholder process that are distant and not familiar with the ISO and its stakeholder process. As a result, we plan to hold some stakeholder meetings in other parts of the region to provide easier access to our process.

### ***Summary of Joint PacifiCorp/ISO Cost/Benefit Study***

As part of the discussions with PacifiCorp, we commissioned a production cost study to analyze the EIM benefits specific to the PacifiCorp/ISO partnership. The supporting analysis was conducted by Energy + Environmental Economics (E3). The study, included at **Attachment 2**, is summarized below.

The report estimates combined financial benefits of the EIM will range from \$21 million to \$129 million per year. The study shows both the combined savings and also how these savings can be attributed to PacifiCorp customers and to ISO customers. The report supports the conclusion that the two-party EIM provides a low-cost, low risk means of achieving operational savings for both PacifiCorp and the ISO while enabling greater penetration of variable energy resources. A key assumption in the study is the transfer capability between PacifiCorp and the ISO. Three different transfer capability scenarios were studied: 100 MW, 400 MW, and 800 MW. The study analyzed a low range and high range of benefits for each scenario. The results appear below:

Benefit Category	Low transfer capability 100 MW		Medium transfer capability 400 MW		High transfer capability 800 MW	
	Low Range	High Range	Low Range	High Range	Low Range	High Range
Interregional dispatch	\$14.1	\$11.0	\$22.3	\$17.7	\$22.4	\$17.8
Intraregional dispatch	\$2.3	\$23.0	\$2.3	\$23.0	\$2.3	\$23.0
Flexibility reserves	\$4.0	\$20.8	\$11.0	\$51.3	\$13.4	\$77.1
Renewable curtailment	\$1.1	\$10.8	\$1.1	\$10.8	\$1.1	\$10.8
<b>Total benefits</b>	<b>\$21.4</b>	<b>\$65.6</b>	<b>\$36.7</b>	<b>\$102.8</b>	<b>\$39.2</b>	<b>\$128.7</b>

## **POSITIONS OF THE PARTIES**

Following the announcement and posting of the MOU on February 12, 2013, the ISO hosted a conference call for participants on February 27. There were 187 connections to the webinar. Parties raised two especially important questions during the call that will be addressed during the stakeholder process.

PG&E expressed concern that they had not been provided sufficient time to analyze the impact and potential risks to their customers, especially since the full cost/benefit study would not be released until March 13, 2013. Their concerns encompass all possible risks and costs, such as potential uplifts, or exposure to EIM cost overruns to their customers. This is an important topic and will be addressed in the stakeholder process and Board deliberations, thus providing PG&E and others with multiple opportunities over an extended period of time for further collaboration.

Entities owning transmission facilities interconnected with PacifiCorp raised concerns about the EIM's possible impact on the transmission rights of other entities. The ISO is confident that the EIM can be managed to protect these existing rights and will work with EIM participants and others to correctly describe the rights so that everyone's interests are protected. This too will be addressed in the stakeholder process.

We also have established a mailbox, [eim@caiso.com](mailto:eim@caiso.com), for stakeholders to submit any comments and questions regarding the EIM.

## **MANAGEMENT RECOMMENDATION**

Management requests Board authorization to enter into an implementation agreement with PacifiCorp and to file the implementation agreement with FERC. Management also requests Board support for the stakeholder process to finalize EIM design and operational details that will return to the Board for consideration in November.



Board of Governors

March 20-21, 2013

Decision on PacifiCorp Energy Imbalance Market  
Implementation Agreement

**Motion**

Whereas, the ISO Board of Governors recognizes the potential benefits of an energy imbalance market, and consistent with the Memorandum of Understanding dated February 12, 2013, supports Management's proposal to carry out a stakeholder process to determine the tariff modifications necessary to implement the energy imbalance market.

Moved, that the ISO Board of Governors authorizes Management to enter into an implementation agreement with PacifiCorp consistent with the parties' Memorandum of Understanding dated February 12, 2013, and to make all necessary and appropriate filings with the Federal Energy Regulatory Commission; and

Moved, that the ISO Board of Governors authorizes Management to increase the 2013 capital budget by \$2.1 million to account for anticipated costs associated with the implementation agreement, for a total 2013 capital project budget of \$21.6 million.

Moved: Galiteva      Second: Olsen

Board Action:	Passed	Vote Count:
Bhagwat	Y	
Foster	Y	
Galiteva	Y	
Maullin	Y	
Olsen	Y	

Motion Number: 2013-03-G3

**Attachment G – November 2013 Board Memorandum**  
**Tariff Amendments to Implement Energy Imbalance Market**  
**California Independent System Operator Corporation**

**February 28, 2014**

# Memorandum

**To:** ISO Board of Governors  
**From:** Petar Ristanovic, Vice President, Technology  
**Date:** October 31, 2013  
**Re:** Decision on energy imbalance market design

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***This memorandum requires Board action.***

## EXECUTIVE SUMMARY

This memorandum describes Management's proposed energy imbalance market (EIM) design. The EIM will allow balancing authorities throughout the West to voluntarily participate in a real-time imbalance energy market operated by the ISO. The EIM will optimally dispatch resources within the ISO and EIM balancing authority areas' footprint to meet the combined real-time imbalance needs of both regions in the most cost effective manner. The EIM will provide substantial benefits:

**Cost savings:** All EIM participants, including existing ISO market participants, will benefit from meeting their real-time imbalances from a larger pool of diverse resources.

**Improved renewable integration:** The EIM will help integrate renewable resources by capturing the benefits of geographical diverse load and resources, which enables the output variation in one region to counterbalance variation in another.

**Increased reliability:** The EIM will improve reliability by providing information that enhances operational awareness and responsiveness to grid conditions across its large footprint.

Management proposes the following motion:

***Moved, that the ISO Board of Governors approves the proposed energy imbalance market design, as described in the memorandum dated October 31, 2013; and***

***Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposed tariff change.***

## **DISCUSSION AND ANALYSIS**

The EIM is a real-time market to dispatch economic bids voluntarily offered by participating resources to efficiently balance supply, transfers between balancing authority areas, and load across its footprint. The EIM will be part of the ISO's real-time market and leverage the FERC Order No. 764 market design changes approved by the Board in May 2013. As such, the EIM will include a 15-minute market and 5-minute dispatch across the combined network of the ISO and EIM balancing authorities. In addition, the EIM design has isolated, where appropriate, market neutrality and cost allocations to each individual balancing authority. Allocation to the EIM balancing authority will allow flexibility in how EIM balancing authorities design their tariffs and rules for participating in the EIM.

### ***History***

Industry leaders in the West have explored and promoted the EIM concept for several years. The Western Electricity Coordinating Council launched a major initiative and study effort in 2010. Late in 2011, the State-Provincial Steering Committee of the Western Interstate Energy Board created the PUC-EIM group to advance the concept and understanding of an EIM. Several other groups and individual balancing areas are currently exploring implementation options. Many of these efforts have centered on creating a new organization, new systems and tariff to operate an EIM.

The ISO took the initiative to develop and present a conceptual EIM design proposal to the PUC-EIM group in March 2012. The conceptual proposal provided the EIM services through the ISO's existing real-time market platform. PacifiCorp expressed interest in the ISO proposal. A joint benefits study was performed leading to a memorandum of understanding with PacifiCorp in early 2013. In March 2013, the Board approved moving forward with the PacifiCorp implementation in parallel with this stakeholder process that will allow PacifiCorp and other balancing authorities in the West to take advantage of this important service in the future. The PacifiCorp implementation agreement was approved by FERC on June 28, 2013.

### ***Leveraging ISO's existing market processes***

EIM processes will be similar and integrated with the ISO's existing market processes. The primary difference is that the EIM only includes the ISO's real-time market and not the ISO's day-ahead market. The EIM will have some unique characteristics to reflect this difference and to ensure EIM balancing authorities have sufficient generation resources available in the real-time market, that costs between balancing authorities are allocated according to ISO guiding principles, and protections are in place so convergence bidding does not cause cost uplifts in EIM balancing authorities. In addition, an EIM balancing authority maintains all the responsibilities of a balancing authority.

The basic elements of the proposed EIM design align with the ISO's market processes. In the day-ahead timeframe, EIM balancing authorities will submit load forecasts and

anticipated resource base schedules to the ISO. This information will allow the ISO to identify infeasible schedules, such as those that might cause transmission overloads in the EIM footprint, and provide advisory information to EIM balancing authorities so they can revise the base schedules to resolve any infeasibilities. These EIM base schedules will help to improve the accuracy of the ISO's day-ahead market model.

The ISO has based the EIM on the real-time market design the ISO plans to implement in the spring of 2014.<sup>1</sup> This design, which was developed in part to comply with FERC Order No. 764, consists of a 15-minute market and a 5-minute dispatch. Each of these market runs will produce schedules and locational marginal prices for resources. The EIM will also commit short-start generation units in the 15-minute market. Like the ISO's current real-time market, the EIM will enforce a flexible ramping constraint to commit and position resources to meet future load and supply variability and uncertainty. Finally, the EIM design includes provisions to mitigate local market power that mirrors local market power mitigation currently applied in the ISO's real-time market. In addition, over the next six months, the ISO will determine if EIM transfer limits between balancing authorities are competitive. If EIM transfer limits are not competitive, the constraints will be included in the market power mitigation process. This will address stakeholder concerns that system market power may exist between balancing authorities participating in the EIM.

The following describes specific elements included in the EIM design:

#### ***Establishment of hourly base schedules and hourly resource plan***

The ISO will receive hourly base schedules from all resources within the EIM balancing authority area and interchange transactions 75 minutes prior to the operating hour. These hourly base schedules will balance against the load forecast and serve as the baseline for settling imbalance energy in the EIM. The combination of load forecasts, base schedules and the bid range from participating resources will become the hourly resource plan for the EIM balancing authority. The EIM balancing authority scheduling coordinator will have visibility to all elements of the resource plan and the results of the various checks in the resource sufficiency evaluation described below and will be able to make changes to hourly base schedules to resolve unbalanced supply and demand, transmission flow overloads, insufficient participating resource bid range and ramping capability. This provides the EIM balancing authority scheduling coordinator with the opportunity to resolve any identified issues prior to the start of the EIM. At 40 minutes prior to the operating hour, the hourly resource plan is approved by the EIM balancing authority scheduling coordinator. In addition to hourly base schedules, participating resources will have the opportunity to submit bid offers for EIM dispatch by 75 minutes prior to the operating hour.

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<sup>1</sup> *Integration of Variable Energy Resources* (Order No. 764), 139 FERC ¶ 61,246 (2012). Implementation of EIM in the fall of 2014 is dependent on FERC's approval of the ISO's real-time market design to implement Order No. 764.

## **Resource sufficiency evaluation**

The EIM does not include forward resource adequacy requirements or obligations for resources to submit bids, but instead includes several elements to ensure each EIM balancing authority has sufficient resources to serve its load while still realizing the benefits of increased resource diversity. The EIM design elements that ensure resource sufficiency include:

- **Load base schedule adjustments.** If base schedules from generation resources in a resource plan are insufficient to meet the load forecast, the ISO will lower the load base schedule to equal the scheduled generation. The resulting shortfall will be settled through EIM along with any applicable under-scheduling penalties (see next bullet) as will be reflected in the flexible ramping requirements;
- **Under-scheduling and over-scheduling penalties and resource balancing provisions.** If an EIM balancing authority does not use the ISO's forecast, or uses the ISO forecast but does not schedule resources within 1 percent of actual demand, then it will be subject to penalties if its actual load is 5 percent more than scheduled. The penalties collected will be allocated to the other balancing authorities who have not incurred a scheduling penalty for the operating day;
- **Flexible ramping sufficiency test.** Prior to commencing the EIM, the ISO will calculate a flexible ramping requirement. The requirement is based upon the ISO load forecast, ISO variable energy resource forecast, and the ISO's historical assessment of the ramping capability needed to meet forecast uncertainty and variability. If there are differences between submitted base schedules and ISO forecasts, the difference will increase the required bid range from EIM participating resources. An EIM balancing authority will be determined to have insufficient energy bids if (1) the bid range from participating resources cannot meet the ISO forecast of demand plus flexible ramping capacity, or (2) the ramping capability of participating resources cannot meet the EIM balancing authority's flexible ramping constraint. In such cases, the transfers between the deficient EIM balancing authority and other EIM balancing authorities will be frozen at previous levels; and
- **Real-time congestion balancing accounts.** These accounts provide a strong incentive for each EIM balancing authority to resolve congestion with its own resources prior to real-time. If the hourly resource plan provided by an EIM balancing authority has unresolved congestion, the cost of managing that congestion in the EIM will accrue in the real-time congestion balancing account. Each EIM balancing authority will have a separate account attributable to the transmission constraints located within each balancing authority area.

### ***Settlement of imbalances***

For purposes of settlements, the ISO will financially settle EIM schedules relative to hourly base schedules approved by each EIM balancing authority as follows:

- The ISO will settle differences between hourly base schedules and 15-minute schedules at 15-minute locational marginal prices. EIM balancing authorities will settle any adjustments to base schedules made prior to an operating hour as specified in their open access transmission tariffs.
- The ISO will settle differences between 15-minute schedules and actual real-time output or flow at the 5-minute locational marginal price.
- Participating resources will receive bid cost recovery in the event real-time market revenues over a day do not cover their real-time commitment and dispatched bid costs. Each EIM balancing authority will have an account based upon the bid cost recovery payments made to resources located in its area.
- The ISO will settle EIM load differences with the EIM balancing authority from hourly base schedules based on a weighted-average of the 15-minute and 5-minute prices within each load area.
- EIM settlement will include neutrality accounts that track differences between payments received from load and payments to generation. The ISO will calculate neutrality accounts for each balancing authority and where appropriate consider transfers between balancing authorities in calculating the final amounts.
- Resources having economic energy dispatch held back to meet the flexible ramping constraint will be compensated for opportunity costs. Each balancing authority will be allocated its portion of the compensation to resources for meeting the constraint for its area.
- For bid cost recovery, neutrality accounts, and the flexible ramping constraint, each EIM balancing authority will allocate these amounts according to its respective open access transmission tariffs.

### ***Convergence bidding settlement in EIM constraints***

Convergence bids settled in the ISO market can add to the real-time congestion balancing account in the event of reduced transmission limits from the day-ahead market to the real-time market. As described above, the ISO will allocate the costs of congestion attributable to constraints located within an EIM balancing authority to its congestion balancing account. But since the EIM will not include a day-ahead market, there will not be convergence bidding within EIM balancing authorities, and consequently it would not be appropriate to allocate uplift charges attributable to convergence bids to an EIM balancing authority's account. Therefore, the ISO will allocate any increased congestion charges that are attributable to a convergence bid's

impact on a constraint within an EIM balancing authority area back to the convergence bidder.

### ***California greenhouse gas regulation***

Imports of energy into California and generation of energy within California from greenhouse gas emitting resources are subject to the California Cap on Greenhouse Gas Emissions regulated by the California Air Resources Board. Energy generated outside of California that is not imported into California is not subject to this regulation.

The EIM design accounts for this regulation through the following, which has been accepted by California Air Resources Board management and staff:

- For generation within an EIM balancing authority, the cost of the greenhouse gas compliance obligation will be included in dispatching energy from these resources to serve ISO load, but will otherwise be excluded.
- The energy produced by each generator within an EIM balancing authority that serves ISO load will be calculated by the ISO. EIM participating resources' scheduling coordinators will be provided with summary reports listing these amounts which will be the basis of their greenhouse gas regulation compliance obligation with the California Air Resources Board.
- EIM participating resource scheduling coordinators can include the costs of their greenhouse gas regulation compliance obligation as an adder to their energy bids.

The EIM has been designed so that the greenhouse gas compliance costs will not affect the locational marginal price in an EIM balancing authority area. Rather, the market optimization will calculate the marginal cost difference between EIM generation serving load in the ISO and serving load outside of the ISO. This difference will be the marginal greenhouse gas regulation compliance cost and will be the rate the ISO will use to calculate a payment to each generator in an EIM balancing authority for its output that served ISO imbalances. This payment will be funded through the price paid within the ISO for imbalance energy.

### ***Transmission service***

Management proposes for the first year of EIM operation that there be no charge between the ISO and EIM balancing authorities for use of transmission to support EIM transfers. During this time, as stakeholders gain operational experience and additional balancing authorities consider joining the EIM, the ISO will coordinate with stakeholders to consider various alternatives for a long-term transmission rate design.

## **Governance**

Concurrent with this stakeholder process, the ISO is conducting a separate stakeholder engagement to design an EIM governance structure that will provide stakeholders an opportunity to provide input on EIM matters and lead to a long-term independent EIM governance structure. The ISO will seek Board decision on the governance proposal in December 2013.

### ***Additional Board activities prior to implementation***

Implementation of EIM is planned for October 2014. Prior to implementation, the ISO will perform market simulations and perform extensive testing. Management will brief the Board on the results the simulations prior to go-live. In addition, Management during this time will assess whether local market power mitigation needs to be expanded to be applied at the system level for each EIM balancing authority area. Once the actual transfer capability between PacifiCorp and the ISO has been established, Management can better determine whether these constraints need to be evaluated for competitiveness to be used as a basis of market power mitigation in the market software.

## **POSITIONS OF THE PARTIES**

The EIM stakeholder initiative was extensive. The ISO held five stakeholder meetings including meetings in Phoenix and Portland. In addition, the ISO held five technical workshops to discuss specific design elements in more technical detail.

Stakeholder input has generally supported the goal of establishing an EIM. PacifiCorp supports the proposed EIM design and believes it is consistent with the implementation agreement approved by FERC on June 28, 2013. The following addresses the stakeholder positions raised during the stakeholder process. A detailed stakeholder comment matrix is attached for reference.

**Position 1:** A few stakeholders disagree with the proposed transmission service reciprocity approach

**Response:** In the initial implementation, PacifiCorp will be using transmission rights it currently owns to support transfers between the ISO and PacifiCorp. In addition, PacifiCorp is requiring long term transmission within its two balancing authority areas, PACW and PACE, for resources to participate. As a result, all transmission utilized in the EIM will have been purchased prior to its use in the EIM. Finally, the ISO will commence a stakeholder initiative to evaluate other transmission service alternatives. This initiative will be informed by operational experience gained over the first year of EIM operation.

**Position 2:** Some stakeholders believe the design should include a transition period in which transfer capability between the ISO and other balancing authorities in the EIM is phased in.

**Response:** Some stakeholders have argued that limiting EIM transfers to zero would allow more time to discuss market design elements such as greenhouse gas, cost allocation, and transmission service. Others have advocated that the ISO should gradually increase EIM transfer capability up to a maximum amount determined prior to implementation. Management believes it is premature to define a transition period prior to market simulation. In addition, the initial implementation will already be limited to PacifiCorp's two balancing authorities and the transmission rights made available by PacifiCorp. However, the ISO will seek tariff authority to establish limits on EIM transfer capability under certain limited circumstances. Any phase-in approach would be determined in the EIM implementation plan and will be discussed in an open session of the ISO Board prior to EIM go-live.

**Position 3:** Some stakeholders assert that the resource sufficiency evaluation is insufficient to prevent resource "leaning."

**Response:** The discussion of capacity "leaning" has been debated throughout the stakeholder initiative. The debate centers on what time period of resource sufficiency should be within the scope of EIM. Management believes that long term resource adequacy is under the purview of local regulatory authorities and day-ahead resource sufficiency should be addressed at a WECC level. The EIM's proposed resource sufficiency evaluation provides measures to address real-time market leaning within the EIM. The checks outlined above ensure that each EIM balancing authority provides sufficient resources to independently meet its load forecast, variable energy uncertainty and ramping requirement before leveraging the balance of the EIM footprint to efficiently meet its imbalance needs.

**Position 4:** Because some resources may not want to be subject to California's greenhouse gas regulations, greenhouse gas compliance cost bidding rules should include a "flag" indicating resources that are not available for import into California.

**Response:** The proposed rule allows participating resources to set very high greenhouse gas cost adders that will likely result in a resource not being dispatched to serve California load, but does not guarantee it. While this approach may result in very high greenhouse gas payments if a bid close to the bid cap is dispatched to serve California load, the same potential exists under the current market where energy that is imported into California includes greenhouse gas component that, along with the energy price, can be up to the bid cap. In addition, providing a "flag" that allows a participating resource to elect that its energy cannot support California load is inconsistent with the fundamental purpose of EIM, which is to share resources across the entire EIM footprint to serve load most economically. The greenhouse gas proposal is supported by PacifiCorp; therefore, the initial implementation of EIM can move forward without the need for such a greenhouse gas flag. However, the ISO plans to consider this for future

implementation and will list this issue in the ISO 2013 stakeholder initiatives catalog for further stakeholder review. As other balancing authorities consider joining the EIM, there may be justification for the flag, such as legal restrictions that prevent complying with CARB's program. If a flag is implemented, the bidding rules would also be reassessed.

**Position 5:** Some California stakeholders feel convergence bidding is inconsistent with EIM and the proposed allocation of EIM real-time congestion balancing account charges to convergence bidders is not symmetrical.

**Response:** Since the ISO's day-ahead market does not include the EIM, Management believes it is inappropriate for the real-time settlement of convergence bids to result in charges to the EIM balancing authority's congestion balancing account. The proposed allocation of congestion uplift charges on an EIM balancing authority's constraints to convergence bidders is appropriate because the convergence bids are not exposed to day-ahead congestion on EIM balancing authority constraints. The proposed allocation does not allocate congestion credits on an EIM balancing authority's constraints to convergence bidders. If credits were allocated to convergence bidders, an EIM balancing authority could make out-of-market payments to convergence bidders when the hourly resource plan includes base schedules below the transmission limits and congestion materializes in the EIM. As discussed in the resource sufficiency evaluation section above, EIM balancing authorities should be incentivized to approve base schedules free of congestion. This incentive would be reduced if this behavior resulted in out-of-market payments to ISO convergence bidders.

**Position 6:** Stakeholders, the Market Surveillance Committee and Department of Market Monitoring have expressed the potential need for the EIM transfer limits to be subject to market power mitigation. The Market Surveillance Committee's Final Opinion as well as the memo by the Department of Market Monitoring are attached for reference.

**Response:** Over the next six months, the ISO will determine if EIM transfer limits are competitive. The competitiveness of EIM transfer limits is dependent upon the actual transfer capability made available. If EIM transfer limits are not competitive, a mechanism is needed to address potential system market power of an EIM balancing authority area. The EIM software will include functionality that allows the application of market power mitigation rules on the constraints enforcing the EIM transfer limits.

**Position 7:** Some stakeholders have expressed the need for exit provisions including an exit timeline and potential exit fees.

**Response:** The voluntary nature of EIM participation has been a fundamental tenet of the EIM and has always included the ability to leave the EIM if benefits are not realized. Currently, the ISO has no exit costs for existing PTOs, but does have a two-year exit notification timeline. An EIM balancing authority that wishes to exit the EIM will be required to provide approximately a six-month notification. The actual exit date will be

aligned with the network model release that removes the EIM balancing authority from the real-time market. The implementation agreement and EIM administrative rate reduce the potential for stranded costs. Prior to joining the EIM, an implementation agreement for each new balancing authority will need to be approved by FERC. The implementation agreement will include payments to the ISO to cover startup costs of adding the new EIM balancing authority. The EIM administrative rate covers the ongoing costs of participating in the EIM and will continue to be recovered until the outgoing EIM balancing authority is removed from the network model.

## **CONCLUSION**

Management respectfully requests Board approval of the energy imbalance market design as described in this memorandum. Through the stakeholder initiative, the EIM has moved from concept to a design, which can be realized in October 2014. The proposed design is consistent with the PacifiCorp implementation agreement and will continue to evolve based upon operational experience and stakeholder requested enhancements. Finally, the design is robust and will allow other balancing authorities to join the EIM expanding the benefits for all in the West.

## **Stakeholder process: Energy imbalance market design**

### **Summary of submitted comments**

**Stakeholders submitted five rounds of written comments to the ISO on the following dates:**

- Round One, 04/19/13
- Round Two, 06/14/13
- Round Three, 07/26/13
- Round Four, 09/06/13
- Round Five, 10/08/13

**Stakeholder comments were received from:** Arizona Public Service Company, Balancing Authority of Northern California, Bonneville Power Administration, California Department of Water Resources, California Public Utilities Commission, Calpine Corporation, Grant County PUD, Morgan Stanley Capital Group, Inc., PacifiCorp, Pacific Gas & Electric, Portland General Electric Company, Powerex Corp., PUC EIM Group, Southern California Edison, Six Cities, Salt River Project, Silicon Valley Power, Sacramento Municipal Utility District, TransAlta Corporation, Transmission Agency of Northern California, Tri-State Generation and Transmission Association, Inc., Turlock Irrigation District, Utah Associated Municipal Power Systems, Western Area Power Administration, Western Electricity Coordinating Council, Western Power Trading Forum, Western Resource Advocates, Xcel Energy.

**Stakeholder comments are posted at:**

<http://www.caiso.com/Documents/Energy%20imbalance%20market%20-%20papers%20and%20proposals%7CStakeholder%20comments>

**Other stakeholder efforts include:**

- Stakeholder meeting, 04/11/13
- Stakeholder meeting, 06/06/13
- Stakeholder meeting (Phoenix), 07/09/13
- Technical workshop conference call, 08/12/13
- Technical workshop conference call, 08/13/13
- Stakeholder meeting (Portland), 08/20/13
- Technical workshop conference call, 09/03/13
- Technical workshop conference call, 09/16/13
- Technical workshop conference call, 09/17/13
- Stakeholder meeting, 09/30/13

## Attachment A

	Management Proposal: No charge for transmission service for EIM transfers until alternatives can be informed by operational experience				Management response
	Reciprocal "no charge" for initial EIM transfers	EIM entity defines internal transmission rules	Address operational procedures with neighboring BAAs	Stakeholder initiative using actual operational data	
BPA	Oppose  EIM transfers from the ISO will not include TAC charges; however, other real-time interchange schedules will be charged the TAC.	No comment	Support  BPA has initiated its own stakeholder process to address EIM operational issues and will continue to work with the ISO and PacifiCorp to resolve issues.	No comment	The initial implementation of EIM will utilize PacifiCorp Energy's rights it owns to enable EIM transfers between the ISO, PACW and PACE balancing authorities. The reciprocity on no transmission charge for EIM transfers recognizes that transmission customer in all balancing authorities have already paid transmission charges. Thus the initial implementation of EIM does not propose "free" transmission service for EIM transfers. The initial reciprocity approach also recognizes that there are shared benefits of optimized economic transfers that should be shared by parties paying for the transmission.
PacifiCorp	Support	Support	Support	Support  Data gathered in the first year will inform future options regarding a potential transmission charge.	The ISO has committed to commence a stakeholder initiative in Q2 2015 to evaluate other long-term transmission services alternatives.
PG&E	No comment	No comment	No comment	No comment	Potential alternatives are discussed in detail in the EIM draft final proposal. The stakeholder initiative will benefit from six months of operation experience of EIM. Actual data on EIM transfers between the ISO, PACW, and PACE balancing authorities will allow stakeholders to
PGE	Oppose  Concerned with free riders abusing access to the California Oregon Intertie (COI)	No comment	No comment	Support  Should explore a structure that includes an access charge or charge on top of energy.	

## Attachment A

	Management Proposal: No charge for transmission service for EIM transfers until alternatives can be informed by operational experience				Management response
	Reciprocal "no charge" for initial EIM transfers	EIM entity defines internal transmission rules	Address operational procedures with neighboring BAAs	Stakeholder initiative using actual operational data	
Powerex	Oppose  Pacificorp will be charging for all uses of its transmission while the ISO will not.	Support  Pacificorp's requirement for firm transmission rights for generation and load in the Pacificorp footprint, including remote network resources	No comment	No comment	better assess alternative transmission service designs. No charge for transmission service for EIM transfers is included as a potential long-term transmission service design.
SCE	Support  As an interim implementation of the EIM.	No comment	No comment	Support  Transmission pricing is needed to align incentives between day-ahead and EIM participation.	
Six Cities	Conditional  ISO must be alert for market distortions and be prepared to act promptly.	No comment	No comment	No comment	
SMUD	Oppose	No comment	No comment	Conditional  Proposed schedule would result in two years without transmission charges. Reciprocal transmission service should only apply for first year.	

## Attachment A

	Management Proposal: No charge for transmission service for EIM transfers until alternatives can be informed by operational experience				Management response
	Reciprocal “no charge” for initial EIM transfers	EIM entity defines internal transmission rules	Address operational procedures with neighboring BAAs	Stakeholder initiative using actual operational data	
WPTF	Conditional  Concerned about extended period where EIM is not charged TAC fees.	Oppose  ISO should encourage PacifiCorp to adopt alternatives to the need for long-term firm transmission.	No comment	No comment	
Xcel Energy	Support	No comment	No comment	No comment	

	Management proposal: Fully deploy EIM in October 2014	Management response
PacifiCorp	Support  During testing phase, if any type of phase implementation becomes warranted, it should appropriately be considered at that time. Also mechanisms to address unintended results should be included.	The initial implementation of EIM is naturally limited since only PacifiCorp will be participating in October 2014 and the EIM transfer capability is limited by the transmission rights owned by PacifiCorp energy.
PG&E	Conditional  For the first year of operation, the EIM transfer capability between the ISO and PacifiCorp should be limited to 100MW.	Management believes it is premature to limit EIM transfers at this time. The EIM will go through extensive testing and market simulation prior to go-live. What, if any, phasing approach should be developed after testing and market simulation. If a phased approach is warranted, the ISO will bring the proposal to the
PGE	Conditional  Initial implementation should be confined to PacifiCorp footprint. This will allow for more time to review resource	

## Attachment A

	<b>Management proposal: Fully deploy EIM in October 2014</b>	<b>Management response</b>
	sufficiency, transmission charges, greenhouse gas compliance and potential opportunities to “lean” on the EIM and to plan for the gradual expansion of the EIM footprint.	Board as part of the briefing to the Board on the results of testing and market simulation prior to the start of the EIM. Any ultimate consideration of phasing must be balanced by the benefits of optimized transfers for both ISO and PacifiCorp customers.
Powerex	Oppose  EIM should be initially confined to the footprint of PacifiCorp. This will afford additional time for stakeholders to work through the myriad unresolved issues related to governance, carbon, transmission, seams and implementation – issues that largely arise only under an EIM implementation that includes inter-BA transfers.	In addition, the ISO, as the market operator, will seek tariff authority from FERC to limit EIM transfers if unintended results are observed.
SCE	Oppose  Initially EIM transfers between the ISO and PacifiCorp should be set to zero. This will allow additional time to resolve complex issues with greenhouse gas proposal and convergence bidding. Then after FERC approves rules needed to support joint optimization would the transfer limit be increased.	

	<b>Management proposal: Resource sufficiency evaluation</b>			<b>Management response</b>
	<b>Approval of hourly resource plan</b>	<b>Load scheduling penalties</b>	<b>Flexible ramping constraint</b>	
PacifiCorp	Support	Support	Support	The resource sufficiency evaluation is designed to address the potential for EIM balancing authorities to lean on other balancing authorities in the real-time market. This is distinct from long-term capacity sufficiency which is under the purview of local regulatory agencies and day-ahead schedule feasibility which is under the purview of WECC.
PG&E	No comment	Support	Support  A downward test should also be considered.	
PGE	No comment	Support  Should consider a similar structure for generation	No comment	For example, independent of the EIM, under the 15-minute market

## Attachment A

	Management proposal: Resource sufficiency evaluation			<b>Management response</b>
	<b>Approval of hourly resource plan</b>	<b>Load scheduling penalties</b>	<b>Flexible ramping constraint</b>	
		schedules.		(FERC Order No. 764), any load serving entity in the WECC is free to submit bids to buy or sell energy with the ISO. The proposed resource sufficiency evaluation ensures that each EIM balancing authority can independently meet its 5-minute load forecast with the resources within its hourly resource plan.
Powerex	No comment	Conditional  Generation over-scheduling must be addressed.	Oppose  This is the only capacity test and occurs too late to protect reliability.	The ISO will apply the hourly flexible ramping test on the hourly resource plan of each EIM balancing authority prior to the joint optimization across the EIM footprint. The flexible ramping requirement will be based upon the ISO load forecast and ISO variable energy resource forecasts for the operating hour and be informed by the historical variability and uncertainty of these forecasts. In addition, the requirement can incorporate persistent reductions in non-firm imports in evaluating the uncertainty of these base schedules. If an EIM balancing authority does not have sufficient ramping capability from its resources that have economically bid for that operating hour, the ISO will prevent additional EIM transfers to the insufficient balancing authority from other EIM balancing authorities. Also, the flexible ramping constraint will be enforced independently for the deficient EIM balancing authority.
Six Cities	No comment	Conditional  No mechanism to ensure sufficient energy bids and that base resources will perform as represented.	Support	
Xcel Energy	No comment	Support	Conditional  Prohibiting EIM transfers should not be overly restrictive.	

## Attachment A

	Management proposal: Resource sufficiency evaluation			<b>Management response</b>
	<b>Approval of hourly resource plan</b>	<b>Load scheduling penalties</b>	<b>Flexible ramping constraint</b>	
				<p>This will allow the ISO to continue to position available resources to meet future ramping requirements; however, the constraint will be relaxed at penalty prices if ramping capability of participating resources is insufficient. This ensures that the insufficient balancing authority is not relying on other EIM balancing authorities to meet its 5-minute dispatch.</p> <p>The concern about long term capacity is appropriately addressed via the EIM entity's integrated resource planning process. The resource sufficiency mechanisms in the EIM are carefully designed to ensure each EIM Entity has sufficient resources scheduled and offered to meet demand, uncertainties, and differences between market operator forecast and EIM entities base schedules.</p>

## Attachment A

	Management Proposal: Market power mitigation by balancing authority area		<b>Management response</b>
	Apply local market power mitigation within each BAA	Include functionality to include scheduling constraints between EIM entities to support EIM transfers	
PaciCorp	Support	<p>Support</p> <p>EIM transfer constraints could be subject to mitigation if EIM entity BAA market power needs to be addressed.</p>	Deviations by load and generation in the balancing authority areas that participate in EIM will be settled based on the energy imbalance service provided by the transmission provider responsible for providing this service in that BAA. Therefore, settlement of non-participating entities uninstructed deviations will rely on this energy imbalance service. Therefore, it is appropriate to have mitigation rules in place to ensure reasonable prices for the energy imbalance service being provided to all entities in the EIM.
Powerex	<p>Oppose</p> <p>Since EIM is voluntary, it is inappropriate to apply market power mitigation.</p>	No comment	In addition, over the next six months, the ISO will coordinate with the Department of Market Monitoring in a structural assessment of market power potential in the EIM footprint and if it is determined additional market power mitigation tariff authority is needed, the ISO will seek Board and FERC approval of this authority prior to go-live. The EIM software will include functionality that allows the application of market power mitigation rules on the constraints enforcing the EIM transfer limits.
SCE	Support	<p>Conditional</p> <p>Prior to implementation, a structural test for "EIM Market Power". If the EIM footprint is not competitive, market power mitigation must be applied to all resources in the EIM entity.</p>	
Six Cities	Support	<p>Conditional</p> <p>Bids with market power relative to any constraint, wherever located, should be mitigated.</p>	
Xcel Energy	Support	<p>Conditional</p> <p>The BAA boundary should not serve as a limitation on the market power evaluation.</p>	

## Attachment A

	Management Proposal: Include greenhouse gas compliance obligation for EIM transfers to ISO				Management response
	Allow participating resource to submit bid adder	Deemed EIM transfers to ISO paid marginal greenhouse gas cost	Energy + GHG adder <= \$1000 bid cap	Greenhouse gas cost reflected in ISO load LMP and EIM transfers out of ISO	
BPA	No comment	No comment	Oppose  BPA is legally prohibited from purchasing carbon allowances.	Oppose  Requests that LMP outside of California not include greenhouse gas costs if ISO resource is the marginal unit.	Management has worked closely with CARB management and staff while developing the greenhouse gas proposal for EIM. It is important to note that the real-time market falls within the safe harbor provisions regarding resource shuffling. The EIM design accounts for greenhouse gas emission costs for power dispatched to serve California ISO load directly in the objective function of the real-time economic dispatch and directly in real-time prices. The design provides efficient real-time price signals while honoring the intent of the CARB greenhouse gas emissions pricing program within California and not exporting the California pricing program to EIM balancing authorities outside California, except to the extent that generation in those balancing authorities that is voluntarily participating in the EIM and whose energy is dispatched to support EIM transfers to meet California load.
PacifiCorp	Support	Support	Support	Support	
PG&E	Support	Support	Support	Support	
PGE	No comment	Conditional  Concerned proposal may result in emissions leakage.	Conditional  No mechanism exists to ensure energy cannot be dispatched to support EIM transfer to California.	No comment	
Powerex	No comment	Oppose  The proposed algorithm results in efficient resource shuffling which is inconsistent with the original intent of the CARB program.	Oppose  Conditioning EIM participation on an ability and willingness to subject out-of-state resources and activities to CARB's jurisdiction will curtail EIM	No comment	The proposed design provides comparable rules between offers from EIM entities and offers from non-EIM areas because the cost of greenhouse gas compliance can be

## Attachment A

	Management Proposal: Include greenhouse gas compliance obligation for EIM transfers to ISO				Management response
	Allow participating resource to submit bid adder	Deemed EIM transfers to ISO paid marginal greenhouse gas cost	Energy + GHG adder <= \$1000 bid cap	Greenhouse gas cost reflected in ISO load LMP and EIM transfers out of ISO	
			liquidity.		incorporated into the bid. In addition to address concerns about inappropriate greenhouse gas bidding flexibility the greenhouse bid component is a daily component instead of hourly.
SCE	Oppose  Allows non-cost based strategic bidding and price discrimination toward California.	No comment	Oppose  Additional safeguards and restrictions on bid adder needed.	Oppose  Additional safeguards and restriction that link bid adders needed.	The ISO will include in the 2013 stakeholder initiatives catalog the potential EIM design enhancement that would allow a resource to select a flag to prevent it from being dispatched to meet ISO load. This option is not needed in the initial implementation of EIM with PacifiCorp; however, as additional balancing authorities seek to join the EIM there may be limited circumstances where a resource is not allowed to participate in California that would justify implementation of the flag. These limited circumstances should not reduce the benefits of the EIM in meeting load with the most efficient resources across the entire EIM footprint.
Six Cities	Support	Support  Proposal generally appears reasonable.	Support	Support	
WPTF	Support  Significant enhancement to previous design proposals	Support	Support	Support	
Xcel Energy	Support  Does not eliminate potential new compliance obligations, but bid provides more flexibility than the previous straw proposals.	Support	Support	Support	

## Attachment A

	Management Proposal: BAA congestion balancing account based upon constraints in BAA				Management response
	Calculated for constraints in each BAA	No transfers of account to other BAAs based on EIM transfers	ISO convergence bidders allocated charges on EIM entity constraints	No change to convergence bidding settlement on ISO constraints	
PaciCorp	Support	Support	Support	No comment	
PG&E	Support	Support	Support	Oppose  ISO should immediately commence a stakeholder initiative to allocate real-time congestion costs to convergence bidders.	Management believes that the proposed settlement of real-time congestion uplifts appropriately allocates costs and manages seams issues between EIM balancing authorities.  The ISO's full network model expansion stakeholder initiative, which will be presented to the Board in December, improves modeling consistency between the day-ahead and real-time market which will reduce real-time loop flow. This initiative addresses ISO load serving entities' concerns that convergence bidding positions can systematically increase the real-time congestion uplift due to modeling inconsistencies.
SCE	Conditional  By design, the EIM will introduce modeling differences between day-ahead and real-time. If predictable, day-ahead and real-time differences can be exploited by convergence bids to increase real-time congestion uplifts.	No comment	Conditional  Request MSC opinion if this approach is sufficient.	Oppose  ISO should immediately commence a stakeholder initiative to allocate real-time congestion costs to convergence bidders.	In the ISO day-ahead market, the ISO will include estimates of external balancing authority areas' real-time base schedules, including EIM and non-EIM entities. For EIM entities, the estimated base schedules used may be those submitted by the EIM entity balancing or those derived from the load forecast and historical distribution of generation.
Six Cities	Support	Oppose  If EIM base schedules impact ISO real-time congestion, the cost should be allocated to the EIM entity.	Support	Oppose  EIM will result in modeling differences between day-ahead and real-time. Convergence bidders should be allocated costs due to	

## Attachment A

	Management Proposal: BAA congestion balancing account based upon constraints in BAA				<b>Management response</b>
	<b>Calculated for constraints in each BAA</b>	<b>No transfers of account to other BAAs based on EIM transfers</b>	<b>ISO convergence bidders allocated charges on EIM entity constraints</b>	<b>No change to convergence bidding settlement on ISO constraints</b>	
				modeling differences	Since EIM balancing authority constraints are not modeled in the ISO day-ahead market it is inappropriate for the real-time settlement of convergence bid to result in charges to an EIM balancing authority's real-time congestion balancing account. While ISO convergence bidders can create credits to an EIM balancing authority's, it would create a disincentive to EIM balancing authorities resolving congestion prior to the EIM if out-of-market payments are made to ISO convergence bidders.
WPTF	Support	Support	Oppose Allocation should be symmetrical and included both charges and credits.	Support	In addition, the ISO can include market functionality to account for flow entitlements of the ISO on EIM balancing authority constraints and the EIM balancing authority on ISO constraints. Based upon market simulation results, the ISO will seek tariff authority to activate this market functionality if material impacts are observed on each balancing authority area's real-time congestion balancing account prior to or after October 2014 go-live.
Xcel Energy	Conditional  Concerned that proposal does not assure or properly identify curtailment obligations associated with external impacts.	No comment	No comment	No comment	

# Memorandum

**To:** ISO Board of Governors

**From:** Eric Hildebrandt, Director, Department of Market Monitoring

**Date:** October 31, 2013

**Re:** **Market Monitoring report**

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***This memorandum does not require Board action.***

## EXECUTIVE SUMMARY

This memo provides comments on Management's energy imbalance market (EIM) design proposal being presented to the Board for decision. The Department of Market Monitoring (DMM) has worked closely with the ISO and members of its Market Surveillance Committee (MSC) to ensure that this new market will offer benefits for current participants within the ISO, as well as entities outside the ISO that will be participating in this new market as sellers or relying on it to meet their imbalance energy needs. DMM supports the general design outline in Management's current proposal, which includes numerous features made to protect current ISO market participants from potential uplift costs associated with the EIM. We believe additional issues concerning the potential need for market power mitigation or other refinements can be addressed based on pre-implementation testing and actual market experience after the initial phase of implementation in the PacifiCorp balancing authority areas. DMM will continue to work closely with the ISO as the EIM design proceeds through the process of implementation and testing, and will closely monitor EIM performance following implementation in October 2014.

## DISCUSSION AND ANALYSIS

The remainder of this memo provides discussion and recommendations on several key issues of concern to stakeholders, which DMM has worked closely with the ISO to address as part of the EIM design and plan for future implementation.

### Market power mitigation

Under Management's proposal, local market power mitigation procedures would be applied when congestion is projected to occur on uncompetitive constraints within each EIM balancing area. In addition, as noted in Management's memo, prior to implementation of the EIM in October 2014, the ISO will perform market simulations and

extensive testing. During this time, the ISO and DMM will assess whether local market power mitigation needs to be expanded to be applied at the system level for each EIM balancing authority area. This approach reflects discussions between the ISO, DMM and members of the MSC. DMM supports this approach since the potential for market power in the EIM cannot be accurately assessed until additional information about the EIM becomes available.

DMM notes that this approach does not indicate an expectation that PacifiCorp or any other supplier would exercise market power within the EIM. However, DMM believes that it is important to approach the issue of market power mitigation in an objective manner consistent with currently available information on the structural competitiveness of these EIM balancing areas, and which ensures that other load serving entities and intermittent generators in the PacifiCorp balancing areas continue to have access to imbalance energy service at just and reasonable prices.

Prior to the establishment of any new market, the potential competitiveness of this market can only be assessed based on structural criteria, rather than market conduct or performance. The degree of structural market power in the two PacifiCorp EIM balancing authority areas will depend on a number of factors that are uncertain at this point. These include the following three major factors:

- **Ownership of generation participating in EIM.** Although there may be a substantial amount of generation within the PacifiCorp balancing authority areas 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. DMM understands that to some extent this may depend on requirements for participating in the EIM set by PacifiCorp, and that it is possible that most or all of the generation participating in the EIM may be owned or controlled by PacifiCorp.
- **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. However, the ISO does not have information on the demand for imbalance energy associated with these entities at this time.
- **Transfer capability 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 imports from the ISO. In addition, transfer capacity that can be used to export energy when low cost supplies are available can also deter the exercise of market power by creating an opportunity cost (from lost export sales) in the event market power is exercised within an EIM balancing authority area. However, the amount of transfer capacity available in the EIM between the ISO and the two PacifiCorp balancing authority areas also

remains uncertain at this time. It also appears the volume of this transfer capacity may be more limited initially and be somewhat dynamic from hour to hour.

In addition to these basic structural factors, the ability and incentive to exercise market power will depend on a variety of other market conditions which may be highly dynamic and difficult to assess in advance. These include the operating cost of available capacity in the EIM relative to ISO market prices, the level and predictability of ISO market prices, and the predictability of demand for imbalance energy by other non-PacifiCorp load serving entities and intermittent resources.

Given the lack of information on these factors at this point, DMM and the ISO are proposing the following approach to this issue.

- The ISO will also develop the software capability to apply market power mitigation on an EIM balancing authority area level. This would be done by extending the same local market power mitigation procedures that are applied to constraints within each EIM area to the interconnections between EIM areas and the ISO during hours when congestion is projected to occur in the import direction into any of the EIM areas.
- As information on the various structural factors described above becomes available, DMM and the ISO will continue to assess the potential for market power on an EIM BAA-wide basis. After the ISO's initial EIM tariff filing in November 2013, DMM and the ISO will continue to assess the potential for market power on an EIM BAA-wide basis as information becomes available. If this analysis determines market power mitigation is appropriate, DMM understands that the ISO would file a tariff amendment to add this provision to the EIM market design in mid-2014, so that this may be in place by the time EIM is implemented in October 2014.
- If this analysis indicates it may not be necessary to implement these EIM level market power mitigation provisions initially, this capability will be established in the EIM software so that these rules could be implemented to address any persistent uncompetitive behavior or performance observed once EIM is in operation.

## **Resource and Load Scheduling**

As noted in Management's memo, the EIM does not include forward resource adequacy requirements or must offer obligations, but includes several elements to ensure each EIM balancing authority has sufficient resources on-line and available to serve its own load and ramping needs. This reflects the ISO's expectation that the EIM will serve to facilitate economic exchanges and re-dispatch of resources, rather than being a real-time market which participants should rely on to meet a significant portion of their projected load. DMM believes it is important that EIM functions in this manner to ensure

that it can provide reliability benefits and does not facilitate capacity leaning by any entity.

In response to concerns expressed by DMM on this issue, the ISO clarified that the resource sufficiency evaluation will include a test to determine that each EIM balancing authority has sufficient capacity bid into the EIM to meet the ISO's forecast of EIM demand plus the needed additional flexible ramping capacity. Thus, this evaluation will explicitly assess the degree to which an EIM balancing authority's supply resources are insufficient to meet its actual forecasted load.

### **Convergence Bidding**

Management's proposal includes several features to ensure that the EIM does not exacerbate any congestion revenue imbalances (or uplifts) associated with convergence bids. First, all congestion uplift charges resulting from constraints in EIM balancing authority areas will be allocated to the balancing authority area in which the constraint is located. This ensures that no uplifts associated with convergence bids that might be profitable due to congestion on constraints within the EIM would be borne by ISO participants.

In addition, Management's proposal includes a second provision that allocates any congestion uplift due to convergence bidding that is associated with constraints within the EIM back to convergence bidders. This second provision ensures that EIM participants do not bear any of these congestion uplift costs. This provision is appropriate since constraints within the EIM are not enforced in the ISO's day-ahead market but are enforced in the real-time market. Without this provision, convergence bidders could profit when congestion occurs on these constraints in real-time, without providing any potential benefits in terms of converging day-ahead and real-time prices.

### **Greenhouse gas bidding**

#### *Preventing dispatch of EIM resources to serve load in California*

Numerous stakeholders have expressed concern that choosing to participate in an EIM can ultimately subject them to compliance obligations in California's cap and trade program for greenhouse gases. The proposed EIM design allows EIM resources to submit very high bids for greenhouse gas emission costs as a way of avoiding being dispatched to serve load in California. Since this mechanism cannot guarantee that a resource will not be dispatched for import into the ISO when prices are very high, some stakeholders have requested the EIM design include a "flag" that could be used to ensure that specific resources would never be dispatched to serve load in California.

As noted in Management's memo, it appears that the primary participant in the initial EIM phases (PacificCorp) would not utilize this feature, so this feature is unlikely to have any immediate impact in terms of deterring participation by more suppliers in the EIM.

The ISO has also indicated this market feature will be considered as part of the 2013 stakeholder initiatives catalog. DMM believes this could be an important mechanism to encourage participation by some suppliers in EIM, especially if EIM becomes a broader regional imbalance market. Thus, DMM supports consideration of this mechanism on a timeframe that corresponds with any expansion of the EIM to other balancing authority areas with suppliers whose participation may be increased by this market feature.

#### *High greenhouse gas bids*

Some other participants have voiced concerns that high priced greenhouse gas bids could somehow be used to game or manipulate the market. DMM believes these concerns are unfounded, since the ability for bids with high greenhouse gas adders to be dispatched for import into California will be limited by competition from the total supply of all resources within the ISO system. Unless the total bid price of these imports (for energy plus the greenhouse gas adder) is less than the marginal price of energy in the ISO system, these bids will not be dispatched for import into the ISO and will therefore not be eligible for payment of a greenhouse gas adder.

However, if rules are modified to include a flag that can be used to prevent EIM resources from being dispatched to serve load in California, DMM believes that stakeholder concerns about very high greenhouse gas bids could be addressed by placing a cap on this bid component. For instance, greenhouse gas bids could be limited to not more than 200 percent of the estimated cost of the emission obligation for each resource. Like the flag to prevent units from being dispatched to serve load in California, DMM believes this is a future refinement that could be made to address stakeholders' concerns without having any detrimental impacts on market performance.

## **Conclusions**

DMM supports the general EIM design in Management's current proposal. As described above, the proposal includes numerous features made to protect current ISO market participants from potential uplift costs associated with the EIM. The proposal also includes provisions to ensure that EIM will benefit entities outside the ISO that will be participating in this new market or relying on it to meet their imbalance energy needs.

We believe additional issues concerning the potential need for market power mitigation or other refinements can be addressed based on pre-implementation testing that the ISO has committed to perform. DMM will work closely with the ISO prior to implementation to identify and develop appropriate solutions for any additional issues that may be identified. DMM will provide its findings and recommendations concerning this implementation and testing process to the Board.

DMM will also collaborate with the ISO to develop appropriate monitoring capabilities and identify action that may be taken to mitigate any issues that arise following implementation of the EIM in October 2014.

**Opinion on  
Initial Implementation of  
the Energy Imbalance Market and Related Market Design Changes**

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**

Final as of October 30, 2013

**Executive Summary**

The Market Surveillance Committee (MSC) of the California Independent System Operator (ISO) has been asked to provide an opinion on the California ISO's proposal for initial implementation of an Energy Imbalance Market (EIM) with the PacifiCorp balancing authority areas (BAAs).<sup>1</sup> The EIM design would allow implementation of a coordinated real-time dispatch encompassing both the California ISO BAA and the PacifiCorp BAAs. This coordinated market has the potential to benefit California ISO market participants as well as power consumers and generators within the PacifiCorp balancing authority areas. Realizing these benefits will require effective and efficient market and dispatch designs, as well as a cost-effective implementation.

The EIM design described in the Draft Final Proposal is also intended to provide a general blueprint for the market and operating design that would be applied to other BAAs that choose to participate in the EIM. However, it is recognized that there are some elements of the design in the draft final proposal that only represent a starting point, and that the ISO intended that these design elements could evolve over time with the accumulation of operating experience and expansion of the EIM.

While the implementation of the EIM is a complex and challenging effort, it is difficult to overstate the potential benefits of success. Wholesale electricity markets in the western U.S. have for decades been challenged by multiple jurisdictions, complicated and antiquated transmission rights, and other barriers to integration, such as the relatively small size of many balancing authority areas from the standpoint of load and generation. Although we provide extensive discussion of *potential* problems that could arise, we also want to emphasize that the CAISO has taken important steps to prepare the system to deal with these problems if they arise, and that there will be important benefits from a successful EIM implementation. If successful,

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<sup>1</sup> California ISO, [Energy Imbalance Market](#), Draft Final Proposal, September 23, 2013, [www.caiso.com/Documents/EnergyImbalanceMarket-DraftFinalProposal092313.pdf](http://www.caiso.com/Documents/EnergyImbalanceMarket-DraftFinalProposal092313.pdf) .

the EIM can represent the first step toward much more efficient use of the western grid, allowing customers throughout the west to benefit from the vast potential of a diverse resource mix. We therefore strongly support the goals of this initiative, and recommend that the Board of Governors approve the proposed EIM design.

Expanding the geographic scope of the real-time dispatch has the potential to improve market efficiency and lower costs to consumers, in part because the real-time dispatch will be better able to take advantage of the spatial diversity of variable renewable production. This is particularly important in the WECC, with the planned rapid expansion of solar and wind resources in the next decade. Expanding the balancing market increases the pool of energy resources that can be dispatched to balance the inherent variability and uncertainty of renewable resources output. The larger the geographic region that can be successfully integrated, the greater these benefits are likely to be. Indeed, in principle, the benefits of market enlargement from the standpoint of accommodating variations in renewable output may rise sharply with the geographic scope of the integrated region. This is because correlations of both renewable output and load are likely to be lower between geographically distant areas.

However, it is important to remember that this market design is not being drawn upon a blank slate. The establishment of a geographically expanded balancing market involves many steps, and is made more complicated by the need to accommodate and respect existing rights and practices on the western grid. It will not immediately resolve all of the integration problems and pricing inconsistencies created at the “seams” between market regions. Further, there are some risks associated with the implementation of the EIM changes that will need to be carefully monitored and analyzed by the California ISO as this design moves toward implementation, and addressed as necessary.

For example, some efficiency benefits can be lost because, according to the current proposal, the CAISO and PacifiCorps BAAs will develop forward schedules separately using distinct procedures that may be inconsistent in important ways from the procedures to be used in their combined imbalance market. If there are significant interactions in congestion impacts between the BAAs in real-time, it will be important that constraints that are likely to be significant in the balancing market be visible and considered in day-ahead scheduling, to the extent possible. If such constraints are not considered in the day-ahead market or base schedules, but are accounted for in the integrated real-time balancing market, then discrepancies between day-ahead market/base schedules and real-time dispatch may result in congestion revenue shortfalls and uplift costs, as well as potential cost shifts between transmission customers and energy consumers or producers.<sup>2</sup> In the body of this opinion, we describe in detail the ways in which these may occur.

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<sup>2</sup>Note that these interactions can occur today without an EIM since flow effects of external transactions are not considered in the California day-ahead market and flow effects of the ISO schedules are not limited by external constraints. Therefore the EIM provides an opportunity to improve the modeled flows and their effects.

Further, the current California ISO approach to local market power mitigation assumes that markets are fully competitive at the balancing area level. That approach also relies upon being able to mitigate bids to a level that reasonably represents the marginal costs of output from a particular resource. As the EIM market region expands to include more traditional vertically-integrated systems as well as hydro systems with more complex opportunity costs, the appropriate marginal cost assumptions to apply to other regions will need to be considered on a case-by-case basis.

Fortunately, the task being undertaken by the CAISO is not unprecedented. Several other regional ISOs and RTOs, such as the Southwest Power Pool and the Mid-continent ISO, have implemented similar designs and grappled with similar issues. The experiences of those ISOs as they expanded their footprints indicate that the CAISO and its EIM partners should be able to manage these challenges.

In the body of this opinion we provide a detailed discussion of a subset of four issues:

1. rules for managing schedules,
2. rules for accounting for Greenhouse Gas emissions,
3. options for phasing in the implementation of EIM, and
4. market power mitigation.

We briefly summarize the basic conclusions from these discussions below.

1. **Schedule Management Rules.** First, if there are significant congestion interactions between the California ISO and PacifiCorp transmission systems, then there is potential for significant shortfalls in real-time congestion rents arising from the independent determination of market-based day-ahead schedules on the California ISO transmission grid and the base schedules on the EIM BAA grids. This can occur if market participants are able to structure day-ahead schedules (either physical or virtual market-based on the CAISO side, or base schedules on the PacifiCorp side) that exceed the actual historical use of the transmission system in the neighboring BAAs. There is also a related potential for a shift of costs and benefits between the transmission customers that pay the embedded costs of the grid and other market participants that is not associated with congestion rent shortfalls (i.e., there can be cost shifts even if there are no congestion rent shortfalls). If there appears to be a potential for unacceptably high congestion rent shortfalls or cost shifts due to the interactions from schedules at particular locations, this potential should be addressed prior to the go-live date. While we discuss several options for mitigating this problem in the opinion, we do not recommend a specific approach to resolve these situations because the best way to resolve these kinds of issues in the short-run will depend on the individual circumstances. We recommend that the California ISO have the functionality in its systems that will enable it to address these issues promptly, if it becomes apparent in testing that there exist these kinds of significant congestion interactions between the California ISO and PacifiCorp transmission systems at some locations for particular constraints.

The California ISO proposes to address these possible impacts in part by allocating specific congestion rent shortfalls to virtual transactions that contribute to them. In addition, as discussed by the Department of Market Monitoring,<sup>3</sup> the California ISO will have the ability in the CAISO day-ahead market to impose flow limits on specific transmission constraints on the PacifiCorp transmission system. The ISO will be able to take measures to activate this functionality, if it identifies constraints that could be impacted by inflated schedules in the California ISO day-ahead market. These steps can prevent day-ahead market schedules on the California ISO system from being used to shift costs onto transmission customers of the PacifiCorp BAAs. Conversely, when clearing the day-ahead market, the California ISO will also have the ability to use the historical impact that transactions on the PacifiCorp BAAs have had on the California ISO system, rather than market participants' base schedules, if the ISO identifies constraints on the ISO system that are being impacted by inflated or displaced base schedules. In this manner, the ISO can prevent the shifting of costs to ISO transmission customers by PacifiCorp BAA base schedules. Further, the market system functionality that the ISO could activate will also have provisions to allocate congestion costs to the PacifiCorp BAAs in the event that their flows exceed their entitlement over California ISO constraints.

We believe that, particularly if the EIM expands, the California ISO will eventually need to develop a workable general framework that will account for these interactions in establishing forward schedules. This is not a new problem; the MISO, PJM and New York ISO are all using various methods to account for similar interactions and avoid both congestion rent shortfalls and unintended cost shifts.

2. **Greenhouse Gas Emissions Accounting Rules.** Second, we believe that the system that the CAISO proposes for accounting for Greenhouse Gas Emissions is appropriate and consistent with the spirit of the rules adopted by the California Air Resources Board. Some stakeholders have expressed concern that the new rules would enable EIM participants to specify a separate GHG cost component without bounds. However, we conclude that, in effect, this capability already exists under the present market rules in which the offer price of imports to CAISO can reflect whatever emission cost the out-of-state supplier chooses to include.
3. **Phase-In Options.** Third, we note that the ability to limit the capacity of intertie transactions can be a potentially useful tool for diagnosing the source of any pricing or uplift issues that may arise. We, therefore, support having such a functionality in the California ISO system. Hence, we believe that testing will reveal much about the potential for uplifts or software issues and enable the California ISO to assess whether limiting the EIM transfer capability to a low value (such as zero) for an initial period would be potentially helpful in verifying that the real-time dispatch is operating as

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<sup>3</sup> CAISO Department of Market Monitoring, "Comments on Energy Imbalance Market Draft Final Proposal," October, 25, 2013, [www.caiso.com/Documents/DMMComments\\_EnergyImbalanceMarket-DraftFinalProposal.pdf](http://www.caiso.com/Documents/DMMComments_EnergyImbalanceMarket-DraftFinalProposal.pdf), p. 6.

intended. The expectation is that if such a step were taken, the limitation would be imposed for no more than a period of days, not months or longer.

4. **Market Power Mitigation.** Last, we note that taken by itself, expansion of the EIM would very likely enhance competition by expanding the contestability of regional markets. However, some questions remain about the implementation of balancing and transmission pricing within the non-CAISO EIM BAAs. We describe some conditions in which local market power could be an issue in these regions. We support the CAISO's plans to include the market system functionality that will allow for mitigation to be potentially triggered by congestion on interties between EIM areas, as well as on internal constraints.

To conclude, we believe that implementation of the EIM between the California ISO and PacifiCorp will yield large cost savings, while facilitating the integration of renewable power sources. We anticipate that realization of these benefits would motivate other control areas to join the EIM, and furthermore encourage consideration of expansion and integration of day ahead as well as imbalance markets.

However, to fully realize these benefits, attention needs to be paid to the important but manageable details of market power mitigation and schedule management alignment. Testing is needed ahead of time to determine whether market power and schedule management issues might indeed be significant and what measures would then be appropriate to expeditiously implement.

## 1. Introduction

The Market Surveillance Committee (MSC) of the California Independent System Operator (ISO) has been asked to provide an opinion on the ISO's proposal for initial implementation of an Energy Imbalance Market (EIM) with the PacifiCorp balancing authority areas (BAAs).<sup>4</sup> The EIM design would allow implementation of a coordinated real-time dispatch encompassing both the California ISO BAA and the PacifiCorp BAAs. This coordinated market has the potential to benefit California ISO market participants as well as power consumers and generators within the PacifiCorp balancing authority areas. Realizing these benefits will require effective and efficient market and dispatch designs, as well as cost-effective implementation.

The EIM design described in the Draft Final Proposal is also intended to provide a general blueprint for the market and operating design that would be applied to other BAAs that choose to participate in the EIM. However, it is recognized that there are some elements of the design in the draft final proposal that only represent a starting point, and it is intended that these design elements could evolve over time with the accumulation of operating experience and expansion of the EIM.

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<sup>4</sup> California ISO, "Energy Imbalance Market," Draft Final Proposal, *op. cit.*, Footnote 1.

Implementation of the EIM involves a number of market, operational and governance design elements. Some of these have aspects of concern to particular market participants. We discuss four of these elements, including the following:

- 1) The rules that the California ISO proposes to apply to:
  - a. schedules in the ISO day-ahead market that materially impact transmission constraints in the EIM BAA transmission system and
  - b. base schedules of the EIM BAA that materially impact transmission constraints in the ISO transmission system;
- 2) The rules the California ISO proposes to use to account for California Greenhouse Gas (GHG) emission costs in the EIM real-time dispatch;
- 3) The transition path for implementing the EIM; and
- 4) The potential exercise of market power in the supply of imbalance energy within EIM BAAs, and the mitigation of that market power.

These issues have been discussed in MSC meetings in Folsom on July 2 and September 6, 2013. In addition, MSC members have participated in stakeholder calls discussing the EIM design and implementation on April 11, June 6, July 9, and August 20, 2013.

While the implementation of the EIM is a complex and challenging effort, it is difficult to overstate the potential benefits of success. Wholesale electricity markets in the western U.S. have for decades been challenged by multiple jurisdictions, complicated and antiquated transmission rights, and other barriers to integration, such as the relatively small size of many balancing authority areas from the standpoint of load and generation. If successful, the EIM can represent the first step toward much more efficient use of the western grid, allowing customers throughout the west to benefit from the vast potential of a diverse resource mix. We therefore strongly support the goals of this initiative, and recommend that the Governing Board of the California ISO approve the proposed EIM design.

There are some risks associated with the implementation of the EIM changes that will need to be analyzed by the California ISO as this design moves toward implementation, as well as monitored following implementation.

*First, there is a potential for significant congestion rent shortfalls in real time arising from the independent determination of market-based day-ahead schedules on the California ISO transmission grid and the base schedules on the EIM BAA grids.* However, it is also possible that the congestion interactions between schedules on the California ISO and EIM BAA grids would be so small and/or the potential to create forward schedules that would contribute to congestion rent shortfalls so limited that the resulting real-time congestion shortfalls will be insignificant. The potential magnitudes of these shortfalls can be evaluated during testing prior to EIM go-live. This would be done by using the full network model to assess whether there are locations at which injections or withdrawals produce significant interactions between the CAISO and PacifiCorp BAA transmission grids. The testing will also assess the ability of market participants to submit inflated physical or virtual schedules at those locations in the California ISO day-ahead market or to submit inflated base schedules at those locations in the PacifiCorp BAAs that can adversely exploit such interactions.

If there appears to be a potential for unacceptably high congestion rent shortfalls due to schedules at particular locations, this potential should be addressed prior to go-live. We do not recommend a particular way to resolve these situations because the best way to resolve a particular situation in the short-run will likely depend on the individual circumstances of these interactions, which we cannot foresee. As discussed above, the California ISO will have a number of features built into the EIM software which could be used to address these issues if they are identified during testing or arise during EIM operation. We understand that the California ISO will incorporate functionality for one potential solution in its market systems that it could potentially activate if it identifies the potential for unacceptably high congestion rent shortfalls. This will include the ability to impose flow limits in the CAISO day-ahead market on specific transmission constraints in both the PacifiCorp and CAISO transmission systems. This functionality will enforce a flow limit for CAISO flows over EIM BAA constraints. This functionality will also include flow limit for EIM BAA flows over ISO constraints. Since the day-ahead market will model EIM BAA base schedules but will not adjust them, we understand this functionality will also include provisions to allocate congestion costs to EIM BAAs for flows on CAISO constraints that exceeds the entitlements.

*Second, there is a related potential for cost and benefit shifts between the transmission customers that pay the embedded costs of the grid and other market participants that are not reflected in congestion rent shortfalls.* As with the potential for congestion rent shortfalls, it is possible that the congestion interactions would be so small and the potential to create forward schedules that would contribute to these cost shifts so limited that the resulting real-time cost shifts will be insignificant. As above, if there appears to be a potential for unacceptably high cost shifts due to schedules at particular locations, this potential should also be addressed prior to go-live.

It may be that testing will confirm that there is little potential for either congestion rent shortfalls or other sources of cost shifts as a result of interactions between schedules on the California ISO and PacifiCorp BAA grids. As additional BAAs join the EIM, this may not always be the case and the California ISO will eventually need to develop a workable general framework to account for these interactions in establishing forward schedules. This is not a new problem. The MISO, PJM and New York ISO are all using various methods to account for similar interactions.<sup>5</sup> We do not recommend at this time that the California ISO develop and apply such a general framework for the implementation of the EIM with PacifiCorp because it is not clear that there will be material interactions. If the interactions are indeed small, then the California ISO and PacifiCorp have other implementation issues that should receive higher priority.

While the implementation of the EIM will pose some operational challenges for the California ISO and adjacent control areas, experience at other ISOs and RTOs that have implemented similar designs indicates that the California ISO should be able to manage these challenges.

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<sup>5</sup> Further, these interactions can occur today without an EIM since the ISO's day-ahead market do not consider the flow effects of external transactions, while flow effects of the ISO schedules are not limited by external constraints. Thus the EIM provides an opportunity to improve the modeled flows and their effects.

This experience includes the Southwest Power Pool, with its real-time imbalance market since 2007, and the Mid-continent ISO, with its initial implementation of a multi-BAA real-time dispatch during 2005-2009.

The remainder of this opinion is organized as follows. Section 2 reviews four particular features of the most recent CAISO proposal, and offers some observations on those features. Our recommendations are summarized in Section 3.

## **2. The CAISO Proposal**

Four aspects of the California ISO's draft final proposal of September 23, 2013 are summarized below, along with issues raised by each. Much of our discussion is rather detailed in order to make clear the ways in which problems can occur, and also to point out how the ways in which the ISO's proposal and possible subsequent adaptations which might become necessary are likely to be effective in dealing with them.

The first aspect is a set of rules concerning the settlement of forward schedules: those of California ISO market participants that impact EIM constraints, and, reciprocally, those of EIM participants that impact California ISO constraints. We focus on several issues that may arise if the forward schedules on the California ISO and PacifiCorp BAAs transmission systems create material flows and settlement entitlements on each other's transmission systems.

The second aspect we summarize is the set of rules that implement the California Greenhouse Gas emission cost pricing system within the EIM real-time economic dispatch.

The third aspect addressed is the general topic of the transition from the current California ISO single BAA operational design to a real-time market that encompasses both the California ISO and the PacifiCorp BAAs, and ultimately to a real-time market that encompasses additional BAAs that are either interconnected directly with the California ISO, or interconnected with PacifiCorp.

The fourth and final aspect concerns the potential for the exercise of market power in the supply of imbalance energy within the PacifiCorp BAAs. Three issues are raised in that discussion of market power. The first concerns the allocation of congestion costs under PacifiCorp's OATT and the potential for these charges to be inflated through the exercise of locational market power on constraints within the PacifiCorp BAAs. The other two issues arise from the potential exercise of locational market power either on constraints within or connecting into the PacifiCorp BAAs. The second issue concerns the pricing of energy for energy imbalance and generator imbalance services under the PacifiCorp OATT, while the third issue concerns the potential for inflation of the prices used to settle economic redispatch of resources that support base schedules.

Although we provide extensive discussion of *potential* problems that could arise in the following sections, we also want to emphasize that the CAISO has taken important steps to prepare the

system to deal with these problems if they arise. Hence, to some extent, our elaboration on potential problems provides justification for the preventive measures included in the design.

#### **A. Settlement of Forward Schedules**

**Summary of The Proposal.** An important element of the EIM design is the settlement of forward schedules against real-time injections and withdrawals. Real-time injections and withdrawals on the California ISO transmission grid would be settled against day-ahead market schedules, similar to what is in place today and proposed for implementation under FERC Order 764.<sup>6</sup> Meanwhile, real-time injections and withdrawals on the EIM BAA grid (which initially would only include the PacifiCorp BAAs) would be settled against so-called “base” schedules.<sup>7</sup> Settlement against base schedules rather than day-ahead schedules in the EIM BAA is necessary because there will be no day-ahead market for the EIM area. This element of the proposed EIM design is very similar to the design that the Southwest Power Pool (SPP) has used since 2007 to settle its real-time imbalance market.

As we describe below, there is a well known incentive issue inherent to this design that could lead stakeholders to submit misleading or strategically designed forward schedules. Without testing, it is not possible at this time to determine how significant this problem might be. Fortunately, the CAISO has committed to both extensive testing of this and other issues, and to including software functionality, described below, that should be able to limit the monetary transfers caused by these incentives.

This design, in which forward schedules provide the basis for financial settlement of real-time deviations rather than being treated as physical entitlements, is necessary in order to avoid the “use it or lose it” incentives created by physical entitlements and to provide efficient incentives for participation in real-time dispatch. This is particularly important for the EIM proposal because broad participation in the real-time dispatch would maximize the regional economic benefits from EIM implementation and would also contribute to the California ISO’s ability to efficiently and reliably accommodate high levels of intermittent resource output in the coming years.

The SPP design upon which this element of the EIM is based has one well-known limitation. This limitation is that market participants have an incentive to structure their base schedules to maximize the economic value of those schedules, rather than strictly match these schedules to their anticipated real-time use of the transmission system. In particular, by submitting base schedules that create greater flows on binding transmission constraints than would their actual real-time use of the transmission system, a market participant can earn extra revenues. This is accomplished by selling back in real-time, at real-time prices, the unused transmission capacity that was reserved by the excess base schedules. Conversely, by not submitting forward base schedules covering the output of generation resources that would provide counterflow over

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<sup>6</sup> [www.caiso.com/informed/Pages/StakeholderProcesses/FERCOOrderNo764MarketChanges.aspx](http://www.caiso.com/informed/Pages/StakeholderProcesses/FERCOOrderNo764MarketChanges.aspx) .

<sup>7</sup> Base schedules will be hourly balanced schedules for generation and forecast load (including losses) submitted to the California ISO by the EIM entity (the balancing authority), see “Energy Imbalance Market,” Draft Final Proposal, *op. cit.*, Section 2.1, p. 11; Section 3.2, p. 18; and Section 3.3.2, pp. 31-34.

constraints likely to bind in real-time, a market participant would be paid real-time prices for those counterflows when they are settled as real-time deviations to its base schedules.<sup>8</sup> While this kind of scheduling behavior does not directly lead to any economic inefficiency, it can potentially result in significant unintended cost shifts which could deprive some market participants of the economic benefits of participating in the expanded real-time dispatch.

The SPP limits, but does not eliminate, this kind of scheduling behavior and cost shifting by imposing charges for base schedules that materially overstate or understate real-time load. These penalties only apply outside a deadband range and do not address schedules that accurately reflect real-time load but do not accurately reflect the resources that will be used to meet that load in real-time. Thus, it is still possible to cleverly define base schedules for resource outputs that provide the same total megawatt output as the real-time dispatch, but that are geographically distributed in order to inflate real-time payments for relieving congestion.

Like the SPP market, the EIM design will also have charges for base schedules that materially overstate or understate real-time load in their base schedules, with deadbands for schedules within 5% of real-time load and higher charges for schedules differing from real-time load by more than 10%.<sup>9</sup> But as in the SPP, there is no provision for penalizing differences between generation sources that are used for base schedules versus those used in real-time. Although, as noted, such a strategy could be used to systematically increase payments for reducing congestion in real-time, no penalties are proposed because they would also undermine the incentive to participate in the real-time dispatch.<sup>10</sup>

The SPP real-time settlement design also limits the impact of this strategic scheduling behavior on congestion rent shortfalls and cost shifting by using a mechanism for prorating forward schedules that are infeasible, whether because of a lack of counterflow, because of overstated load, or because of real-time transmission outages.<sup>11</sup> The current EIM design does not require the California ISO to apply any proration to infeasible base schedules. However, the California ISO will take account of the flows associated with day-ahead base schedules within the EIM, as well as its modeling of other WECC loop flows, in running its day-ahead market. This should limit the extent to which EIM base schedules give rise to congestion rent shortfalls on the California ISO transmission system. The EIM design allocates congestion rent shortfalls due to infeasible EIM base schedules on constraints within the EIM BAAs to the customers in those BAAs. Therefore, the issues relative to the settlement of infeasible base schedules on constraints

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<sup>8</sup> These incentives exist because there is neither a cost to creating congestion, nor a benefit from relieving it, through the submission of base schedules. In the California ISO day-ahead market, by contrast, those who would congest scarce transmission capacity in this manner would have to pay for it in the Integrated Forward Market (IFM). Such a strategy is possible, for instance using virtual bids, but its profitability depends on the difference between forward and real-time prices. In contrast, in the SPP, no day-ahead prices are paid, so this strategy is much less risky, but it has to be implemented through transmission schedules associated with physical generation and load and for which transmission charges have been paid.

<sup>9</sup> “Energy Imbalance Market,” Draft Final Proposal, *op. cit.*, p. 39.

<sup>10</sup> *Ibid.*, pp. 37-40.

<sup>11</sup> Southwest Power Pool, EIS Market Protocols, Revision 35.0, Section 6.8.6.

within the PacifiCorp BAAs are left for PacifiCorp to resolve. PacifiCorp may be able to manage these incentives, and perhaps apply rules to limit strategic submission of base schedules, under the terms of its Open Access Transmission Tariff.

There is, however, one feature of the proposed initial CAISO design relating to base schedules that differs materially from the SPP design. This is the use of two independent processes for awarding forward schedules on the California ISO grid and the EIM BAA grid. This design will work well if day-ahead market schedules on the California ISO grid have little if any impact on binding transmission constraints within the EIM BAAs and, reciprocally, if base schedules on the EIM BAAs have negligible effect on binding constraints in the California ISO grid. This may not be the case, however, which gives rise to the potential for real-time congestion rent shortfalls from two sources.

**Sources of Potential Rent Shortfalls of Real-Time Congestion Rent.** The first source of potential shortfalls is as follows. If injections and withdrawals on the California ISO grid affect EIM balancing authority transmission constraints that are likely to bind at a material shadow price in real-time, California ISO market participants will likely find it profitable to submit physical and virtual schedules in the day-ahead market that create flows on these EIM BAA transmission constraints. This behavior would potentially be profitable because the market participant would settle its deviations against these day-ahead market schedules at real-time prices that would reflect the shadow price of the binding EIM BAA constraint, obtaining a profit that equals the flow deviation on the constrained line times the shadow price (net of any other cost due to the deviation). Under the current EIM design, transmission constraints within the EIM BAA would not be enforced in the California ISO day-ahead market, and the charges for submitting such physical and virtual transactions are small. Hence, if material interactions exist between schedules on the California ISO grid and the EIM BAA transmission constraints, there could be large aggregate flows created by transactions that (a) would not flow in real-time but (b) would be designed to receive real-time congestion payments. This would give rise to significant costs shifts and congestion rent shortfalls if they were to be settled at real-time prices.<sup>12</sup>

The potential for large cost shifts and/or congestion rent shortfalls is a particular concern with respect to virtual transactions. Virtual bidders may, in at least some instances, be able to identify a combination of virtual demand and supply bids on the California ISO grid that create material flows on the targeted transmission constraint within the EIM BAA, while creating little if any flows on constraints within the California ISO that would be enforced in the day-ahead market.

California ISO market participants would also have an incentive to submit physical generation schedules in the day-ahead market that would not flow in real-time but would be dispatched

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<sup>12</sup> This behavior and its economic impact can be viewed as a generalization of the “dec” game that is played in zonal energy markets (such as the former California design), where constraints that bind in real-time are not recognized in the forward market. As a result, market players can schedule transactions that congest those constraints, and then be paid to relieve them; in the classic dec game, a generator is dispatched against the (high) zonal day-ahead price, and then can buy back the power at the (low) price at its location in real-time when the constraint is enforced. This is not an exercise of market power (and hence cannot be mitigated as such), but rather an exploitation of a market inconsistency that players of any size can profit from.

down at a profit in real-time because of their impact on binding transmission constraints within the EIM BAA.<sup>13</sup> It is likely that the magnitude of this behavior by physical generation resources will generally be limited by the capacity of the physical generation having such impacts, and could also be limited by the impact of these schedules on constraints within the California ISO grid that would be enforced in the day-ahead market. However, it is important to understand that the existence of these interactions and potential cost shifts and congestion rent shortfalls is a possibility, whether there could be material impacts from this type of bidding strategy by physical generation resources is an empirical question.

The actual outcome will depend both on (a) the magnitude of the impacts of California ISO schedules on PacifiCorp BAA transmission constraints and (b) the extent to which California ISO market participants have the ability to structure additional day-ahead market schedules that do not flow in real-time. It may be very unlikely that such schedules can be constructed and have a high impact. There would be no cost shift under EIM operation from physical transactions on the California ISO grid that impact transmission constraints in the PacifiCorp BAAs, as those flow impacts occur today and are simply part of the loop flows on the PacifiCorp system. There is only a potential cost shift to the extent that additional physical schedules would clear in the day-ahead market that do not flow today but will earn real-time congestion payments under the EIM. Conversely, there is a potential for offsetting benefits if some of the California physical schedules that flow in the current market and create loop flows on the PacifiCorp system would be dispatched down in the EIM, providing economic benefits to both the California ISO market participant (who would settle its forward schedule at a profit) and PacifiCorp transmission customers (who would be able to reduce flows on the constraint at lower cost than relying only on redispatch within the PacifiCorp BAA).

Hence, the point of our comments is *not* that the circumstances giving rise to cost shifts and or congestion rent shortfalls are particularly likely. Rather, our conclusion is that it is possible that those circumstances will exist at some locations and if they do, market participants will have an incentive to take advantage of those circumstances. Thus, we conclude that there is a potential for substantial cost shifts or congestion rent shortfalls that arise from physical schedules that impact binding constraints on the EIM BAA transmission grid, but that there is also a likelihood of the reverse: no material cost shifts or congestion rent shortfalls.

The second of the two sources of real-time congestion rent shortfalls is the possibility that the final base schedules within the EIM BAA would create greater flows on binding California ISO transmission constraints than were accounted for when running the California ISO day-ahead market. If these flows resulting from EIM BAA schedules are larger than those modeled in clearing the California day-ahead market, then there is a potential for the combination of the final base schedules and day-ahead market schedules to yield flows in excess of the transfer limit. This will give rise to congestion rent shortfalls on the California ISO transmission system if the transmission constraint binds in real-time.

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<sup>13</sup> As indicated in the previous footnote, this is a version of the familiar “dec” game from zonal day-ahead market designs, such as the pre-MRTU California design.

### **Elements of the EIM Design That Address Potential Real-Time Congestion Rent Shortfalls.**

Two elements of the EIM design address the potential for congestion rent shortfalls arising from the interregional congestion impacts just discussed. First, the EIM market rules would address the first potential source of congestion rent shortfalls by allocating to the California ISO all congestion rent shortfalls on the EIM transmission system that are due to the net impact of virtual demand and supply schedules in the California ISO day-ahead market on transmission constraints within the EIM BAAs. The ISO would in turn allocate these shortfalls to the virtual traders whose transactions accounted for the flows that contributed to the infeasibility. Under the proposed design, payments to virtual bidders would be reduced dollar for dollar to the extent that net payments to virtual traders contributed to a congestion rent shortfall on a given transmission constraint.<sup>14</sup> Hence, no congestion rent shortfalls due to virtual bids in the California market impacting transmission constraints in the EIM BAAs will be borne by transmission customers within the EIM BAAs. Any such congestion rent shortfalls will be made up by those California ISO transmission customers whose virtual bids impacted the transmission constraints within the EIM BAA.

The second element addressing the potential shortfalls is that the California ISO will model its best assessment of EIM BAA base schedules in running the day-ahead market. This will not avoid all congestion rent shortfalls because the final schedules can differ from those modeled day-ahead, but this will allow the California ISO to avoid consistent large congestion rent shortfalls. However, it will not be sufficient to avoid costs shifts if EIM BAA market participants are able to submit adjusted base schedules that overstate their actual use of the California ISO transmission systems.

In addition, the EIM market rules will allocate all remaining congestion rent shortfalls on constraints within the EIM BAA (i.e., congestion rent shortfalls not due to virtual bids in the California ISO day-ahead market) to the real-time congestion balancing account for the EIM BAA, with those costs borne by transmission customers of that BAA. Hence, California ISO transmission customers will not be exposed to congestion rent shortfalls arising from a combination of base schedules and California ISO day-ahead market physical schedules that cause infeasible flows on transmission constraints within the EIM BAA.

These two elements of the EIM design should limit the overall magnitude of congestion rent shortfalls due to infeasible forward schedules and should also limit the impact of congestion rent shortfalls on California ISO transmission customers. Unfortunately, these elements of the design cannot address the fundamental source of the congestion rent shortfalls (the failure to model constraints in the EIM BAAs in the day-ahead market together with the incentive of EIM BAA transmission customers to submit base schedules with larger impacts on binding transmission constraints in the California ISO system). Nor will the design completely eliminate congestion rent shortfalls due to a combination of infeasible day-ahead market and base schedules. In addition, while some elements of the design that avoid congestion rent shortfalls will also reduce cost shifting, there is a potential for cost shifting among transmission customers that is not associated with congestion rent shortfalls, as discussed below.

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<sup>14</sup> “Energy Imbalance Market,” Draft Final Proposal, *op. cit.*, pp. 68-72.

**Limitations of the EIM Design in Addressing Congestion Rent Shortfalls.** We now highlight four specific limitations of the current EIM design as it relates to cost shifts and congestion rent shortfalls due to forward schedules impacting binding constraints within the California ISO or EIM BAA. These limitations are recognized by the California ISO and are the motivation for the ISO having the ability to take additional steps to address them if they appear likely to be relevant in actual EIM operation.

First, the design does not address possible congestion rent shortfalls due to physical schedules in the California ISO day-ahead market that impact EIM BAA constraints.<sup>15</sup> On one hand, physical schedules associated with typical real-time use of the California ISO transmission system should not produce any material congestion rent shortfalls because this usage occurs today and PacifiCorp is able to manage its impact. However, as explained above, the potential for congestion rent shortfalls and cost shifts will instead arise to the extent that California market participants are able to design physical schedules in the California ISO day-ahead market schedules that do not reflect actual real-time use of the California ISO transmission system but are instead designed to cause material flows on transmission constraints within the EIM BAA that will bind at significant shadow prices in real-time. These costs would be assigned to the real-time congestion balancing account for the EIM BAA, and they would be borne by transmission customers of that BAA, not California ISO transmission customers. However, the EIM will not work if EIM BAA participants have to bear undue uplift costs and associated cost shifts.

It is possible that this limitation will turn out to be inconsequential in practice, because physical schedules in the California ISO day-ahead market might have little if any impact on transmission constraints in the EIM BAAs. Although it is anticipated that this will likely be the general situation, it will not necessarily always be the case. In addition, individual instances in which physical schedules in the California day-ahead market create flows on transmission constraints within the EIM BAA will not give rise to material congestion rent shortfalls or cost shifts if there is little ability to inflate day-ahead schedules above the actual typical real-time physical flows, but this also will not necessarily always be the case.

Even if this turns out to generally be true for generation resources located within the California ISO, it is possible that there will be physical schedules at selected California ISO proxy buses for interchange schedules can have substantial impacts on transmission constraints within the EIM BAA, so that day-ahead interchange schedules that do not flow in real-time could be combined with offsetting virtual bids on the California ISO system to take advantage of the proposed design.<sup>16</sup> However, it is also not certain that there would be such a potential. Any such

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<sup>15</sup> The EIM design does not allocate a portion of congestion rent shortfalls to physical schedules that are dispatched down because this would convert the day-ahead schedules into, effect, “use it or lose it” schedules, and thereby reduce the incentive for suppliers to participate in the EIM real-time dispatch.

<sup>16</sup> The proposed rules regarding the settlement of virtual bids would not affect the offsetting virtual transactions because the offsetting transactions would not be designed to create any material flows over the EIM balancing authority constraint relative to the reference bus. Flows over the constraint within the EIM BAA would be created by the physical bids at interchange pricing points. The purpose of the offsetting virtual transaction would not be to create profitable flows over binding transmission constraints but to cause the overall transaction to have no impact on the aggregate supply demand balance.

interchange transactions can be scheduled today and it may turn out that their impact on the PacifiCorp system is limited by contract path scheduling limits.

The second limitation is as follows. If the base schedules of the EIM BAA create material flows on California ISO transmission constraints that are binding in real-time, the intent is to account for those flows in the California ISO day-ahead market. This would avoid real-time congestion rent shortfalls that would be borne by California ISO transmission customers. However, to the extent that some base schedules are structured to create flows on the California ISO transmission constraints that exceed the actual real-time usage, the EIM congestion settlement design will entail California ISO transmission customers paying EIM BAA transmission customers for the real-time use of the California ISO transmission system. This will not cause congestion rent shortfalls but will yield a cost shift, reducing the benefits to California ISO transmission customers from participation in the EIM.

As with the first limitation, it is possible that the inter-BAA congestion impacts would be so slight or the opportunities to structure base schedules that have this effect so limited that the potential cost shifting impact will be *de minimis*.<sup>17</sup> These are empirical questions that we have not analyzed.

Turning to the third limitation, if a material proportion of the real-time flows on a binding transmission constraint within the EIM BAA was due to the EIM real-time dispatch itself, and hence would not be reflected in EIM base schedules, there might be no infeasibility of day-ahead schedules and base schedules and no congestion rent shortfalls. However, there could be cost shifts from EIM BAA rate payers to bidders in the California ISO day-ahead market. In particular, it could be profitable to submit virtual and physical bids in the California ISO day-ahead market that would create flows on EIM BAA transmission constraints in real-time. If there were no congestion rent shortfalls on the real-time constraints, virtual bidders would receive full payment.<sup>18</sup> The EIM settlement system would then entail EIM BAA transmission customers paying California ISO transmission customers for the real-time use of the EIM BAA transmission system and would shift congestion rents from EIM BAA ratepayers to virtual and physical schedules in the California ISO. As noted above, while these costs would be assigned to the real-time congestion balancing account for the EIM BAA with those costs borne by transmission customers of that BAA, and not borne by California ISO transmission customers, these kinds of cost shifts will reduce the benefits from EIM participation and undermine the long-run success of the EIM.

A fourth limitation of a design that does not account for impacts on EIM BAA constraints in the California ISO day-ahead market that is unrelated to cost shifts or congestion rent shortfalls is

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<sup>17</sup> It is possible that the cost of purchasing transmission and the rules used to maintain feasibility of transmission schedules on transmission constraints within the EIM BAA will effectively preclude material impacts from schedules designed to benefit from their impact on California ISO transmission constraints

<sup>18</sup> It could also be the case that virtual transactions could be constructed that are so large that they give rise to congestion rent shortfalls, despite physical schedules that are below the limit. In this case, the congestion rent shortfalls would be borne by virtual bidders but there would still be a cost shift.

that generators within the California ISO whose output provides counterflow over EIM BAA constraints would have an incentive to withhold their output from the day-ahead market because their output would be systematically undervalued in the day-ahead market relative to real-time. This is, of course, analogous to the problem in zonal energy pricing systems where generation in load pockets can be discouraged from bidding day-ahead because it would prefer to obtain the higher “inc” price in real-time.

As we explained above, none of these four limitations will be a significant issue unless there are locations at which injections and withdrawals on the California ISO transmission system materially impact binding constraints on the PacifiCorp system or, symmetrically, at which injections/withdrawals on the PacifiCorp system significantly affect binding constraints in the California system. And even if such interactions exist, the potential for material cost shifts and/or congestion rent shortfalls depends on the ability of market participants to inflate their forward schedules at those locations. While we do not at present know whether these conditions will be satisfied at any locations on the California ISO or PacifiCorp grids, the California ISO will be able to empirically assess these possibilities in testing once the full network model has been developed and implemented. Hence, the California ISO should know long before EIM go-live whether there is a potential for material cost shifts or congestion rent shortfalls associated with the PacifiCorp EIM and, if so, take steps to address the particular problems identified at the specific locations where they could exist.

A need to address these kind of inter-BAA congestion impacts may not arise with the initial EIM implementation as it is possible that the interregional congestion impacts will be so small between the California ISO and the PacifiCorp BAAs that the proposed design will operate with little or no congestion rent shortfalls, cost shifts or impact on generator bidding incentives arising from these types of interactions. But this may not be the case. It is possible that as the network model is developed and tested for the EIM real-time dispatch, it will become apparent that certain schedules will have material impacts on binding transmission constraints in the other region. It may be that between the constraints imposed by the proposed cost allocation rules for virtual bids that contribute to congestion rent shortfalls on EIM BAA constraints and resource specific limits on physical schedules, there may be little opportunity to take advantage of these situations, but that also may not be the case. If market participants identify such a “money pump” and have the means to take advantage of it, one should expect a rapid increase in transactions designed to exploit it as was the case with the “dec game” in California and in Texas.

We do not recommend a particular means for resolving any such situations because the best way to resolve a particular situation in the short-run will likely depend on the individual circumstances of these interactions, which we cannot foresee. The implementation of the EIM with PacifiCorp is hopefully only the first step in the development of a broader EIM in the west coordinated by the California ISO. While the interactions between transactions and constraints on the PacifiCorp and California ISO transmission systems may be small, this will likely not always be the case as the EIM expands over time to include additional BAAs.

**Possible General Solutions to the Problems of Network Interactions Leading to Congestion Rent Shortfalls and/or Cost Shifts.** Fortunately these problems have conceptually easy and

economically rational solutions, although implementation may require nontrivial software modifications. The current design is acceptable as a starting point, but the California ISO will need to eventually extend the EIM design to address the issues of external constraints and seams problems in the manner that they have, for several years, been addressed by eastern ISOs such as the Mid-continent ISO and PJM, and more recently between PJM and the New York ISO. This is to either (a) impose limits in the day-ahead market on the allowable flows on external transmission constraints<sup>19,20</sup> or (b) use estimates of shadow prices to “cost out” flows on the external constraint in the day-ahead market so as to align day-ahead market and real-time prices and flows.<sup>21</sup> Such designs can be used to avoid the cost shifts associated with payments for reducing flows from forward schedules on binding transmission constraints in real-time, and would ensure that day-ahead nodal prices and schedules within California account for the impact that intra-California day-ahead schedules have on congested transmission lines within the EIM BAA.

A design in which transmission constraints within the EIM BAA are taken into account in the California ISO day-ahead market would address several other limitations of the proposed design, contributing to (a) improving market efficiency if the congestion interactions are material and (b) achieving consistency between the day-ahead and real-time schedules and prices within California.<sup>22</sup>

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<sup>19</sup> For a discussion of the determination of these forward flow limits between PJM and MISO, see Joint Operating Agreement Between the Midwest Independent Transmission System Operator, Inc. and PJM Interconnection, L.L.C., December 11, 2008, Attachment 3, Interregional Coordination Process, Version 2.0, Section 4, Day-Ahead Market Coordination. For a discussion of the determination of M2M entitlements between PJM and the New York ISO, see New York ISO Dec. 30, 2011 filing in Docket ER08-1281 and ER12 -718-000, NYISO & PJM Market to Market Coordination Schedule, Section 6.

<sup>20</sup> There is a diversity of opinion among the MSC members as to whether such flow limits on EIM constraints should be based on allocated physical capacity on these constraints or whether such limits should also reflect expected counterflow procured from EIM resources in the real-time market. On one hand, flow limits based only on allocated physical capacity may be too conservative and prevent scheduling day-ahead transactions in the CAISO BAA that can be made feasible in real time through procurement of inexpensive counterflow provided by EIM resources. On the other hand, scheduling such transactions based on the assumed existence of inexpensive counterflow necessarily implies real-time congestion rent shortfalls if the constraint binds in real-time and the California ISO will have no assurance that the marginal counterflow will be inexpensive.

<sup>21</sup> This approach would also require a set of entitlements to govern payments between the California ISO and the EIM BAA in order to avoid cost shifts.

<sup>22</sup> It should be noted that imposing an estimated shadow price on flows over constraint lines outside California is different from what has become known as “constraint relaxation” in which the market software imposes high penalty values on flows in excess of physical constraints. In the former case, the shadow price can be interpreted as an estimate of the cost of providing counterflow and maintaining feasibility, while in the latter case, the penalty is designed to cap the cost of counterflow and hence relax the constraint to limit the use of counterflow produced by remote resources with very small shift factors on the constraint. Furthermore, it is a mathematical fact that if all flows created by transactions inside California on transmission lines outside of California are correctly priced in the California IFM using the true shadow prices (that would result from optimization of the integrated system) and added to the California total dispatch cost (i.e., the IFM objective function), then the optimization of the California

The California ISO has the ability, in theory, to eliminate the potential for excessive congestion rent shortfalls or wealth transfers due to the impact of its day-ahead market schedules on EIM BAA constraints by either enforcing a flow constraint or an estimated shadow price on flows over these constraints in its day-ahead market, with the flow constraints or shadow prices set to reflect the typical real-time impact of California ISO schedules on the EIM BAA constraint that would not require real-time redispatch to accommodate. Imposing such “external” flow constraints in the day-ahead market clearing process would cause these flow constraints to bind in the day-ahead market (thus reflecting the real-time transmission constraints) if virtual bids or excess physical schedules submitted in the California day-ahead market create substantial flows on congested transmission lines in the EIM BAA. If instead an estimated shadow price is used to penalize flows in the objective function, it would incent market participants in the California ISO system, and the day-ahead market software itself, to consider the real-time cost impacts of day-ahead schedules.

The EIM design could similarly avoid the congestion rent shortfalls or cost shifts arising from EIM BAA base schedules designed to impact binding transmission constraints on the California ISO grid by enforcing a flow constraint on California ISO transmission lines in accepting base schedules.

**Virtual Bidding Issues.** Some stakeholders have expressed concern with the potential impacts of the design for assigning congestion rent shortfalls to virtual bids in the California ISO day-ahead market. The proposed allocation is broad and could deter market participants from submitting any virtual bids at locations that significantly impact constraints in the EIM BAAs.<sup>23</sup> However, there is no way to modify or narrow the scope of the assignment without creating the opportunity for bidding strategies tailored to take account of the modified design. While these provisions will not be necessary if it turns out that schedules on the California ISO grid do not have material impacts on binding transmission constraints on the EIM BAA transmission system, these provisions will also have no impact on virtual bidders in that circumstance.

Some stakeholders have suggested that virtual bids that create counterflow on transmission constraints in the EIM BAA transmission grid also not be charged for the real-time deviation, the

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dispatch would yield the same California schedules as the integrated optimization (under certain mathematical assumptions concerning convexity). Consequently, it is reasonable to optimize the day-ahead California schedules by augmenting the California dispatch cost function with a term representing the cost of external flows priced at the real-time shadow price estimates on the respective lines. If this shadow price approach is adopted, it would require additional rules regarding the allocation of the congestion rents in the IFM to avoid cost shifting.

<sup>23</sup> The cost assignment to virtuals is not profit neutral. There can be situations in which a constraint binds on the California ISO transmission system in the day-ahead market, then a more limiting constraint on the EIM balancing authority system binds in real-time. In this kind of circumstance the design for assigning real-time congestion rent shortfalls to virtual bids can result in the virtual bid paying a congestion charge in the day-ahead market but not having any congestion reflected in its real-time revenues. This cannot be avoided by modifying the design. Modifications that avoid this outcome simply open the door to other strategies for exploiting the failure to enforce the EIM BAA constraints in the day-ahead market that could result in large congestion rent shortfalls.

reverse of not being paid for the real-time deviation for virtual bids that create flows on the transmission constraints. While there are circumstances in which such a policy would have the intended effects, there are other circumstances in which it would open the door to bidding strategies that could create large congestion rent shortfalls.

For example, with this rule virtual bidders could identify a location in the California ISO system that has two effects:

- virtual supply day-head at that location provides counterflow to a California ISO transmission constraint that binds day-ahead, raising the price paid for virtual supply at that location, but
- that same virtual supply impacts a constraint in the EIM BAA that is more restrictive than the constraint that binds on the California ISO transmission system, but binds instead in real-time.

With such a rule for not charging for real-time deviations, the virtual bid would be paid for relieving congestion in the day-ahead market and then not charged for failing to provide it in real-time when a different constraint binds. While these are special situations, virtual bidders will be able to identify locations at which these circumstances exist and take advantage of them with their bids.

Hence, there are no tweaks to the California ISO design that can narrow its impacts on virtual bids without opening the way for bidding strategies designed to exploit the failure to enforce EIM BAA constraints in some manner in the California ISO day-ahead market. The only real alternative is to address the core problem and take account of the constraints in some manner in the California ISO day-ahead market. That will be necessary in the long-run in any case as the EIM is expanded to BAAs other than PacifiCorp.

### ***B. Greenhouse Gas Pricing***

Another important element of the California ISO EIM design is the way it accounts for the AB32 California Air Resources Board (CARB) greenhouse gas emissions pricing program in EIM real-time dispatch. This element of the EIM design is unique to the California ISO because no other ISO faces similar issues. The EIM design accounts for GHG emission costs for power dispatched to serve California ISO load directly in the objective function of the real-time economic dispatch and directly in real-time prices. While this design is distinctive, it is carefully structured and provides efficient real-time price signals while honoring the intent of the CARB GHG emissions pricing program within California and not exporting the California pricing program to EIM BAAs outside California, except to the extent that generation in those BAAs is dispatched to support exports to meet California load.<sup>24</sup>

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<sup>24</sup> In addition to being reviewed by California ISO staff and the Market Surveillance Committee, the EIM GHG pricing design was reviewed by William Hogan, “CAISO Energy Imbalance Market Straw Proposal: Comments” ([www.whogan.com](http://www.whogan.com)) who concluded “The basic proposal is internally consistent and would not upset either incentives at the margin or treatment of related FTRs” (*ibid.*, p.3).

The dual pricing design for greenhouse gas allowances will set efficient and consistent prices for California and the EIM BAAs, in which generation within California and within EIM BAAs will be dispatched consistently with their bids and the prices at their location. In other words, at any given point in time, the shadow price on the GHG regulation reflects the (bid – in) emissions costs of the generation resource assigned to meet additional California consumption, as long as as-bid costs are reflective of true emissions costs, both inside and outside of California.

Moreover, by reflecting GHG costs in market prices, rather than having them manifested in uplift costs, the design sends an efficient price signal for the supply of low emission generation and avoids the potential for market participants to develop bidding strategies that exploit non-market clearing prices to receive large uplift payments. A design in which GHG costs are not reflected in market prices but instead shifted into uplift would not provide an efficient price signal in California, would not minimize the cost of meeting California load, and would likely open the door for inefficient bidding strategies that would yield inflated uplift costs for California power consumers.

There is more than one approach that could be used to determine which units (and associated emissions cost) dispatched to meet overall EIM load should be deemed delivered to California. The approach proposed for the EIM dispatch approximates the outcome if units were self-selecting to serve California load or load somewhere else in the EIM, and therefore is a practical and realistic means for determining the GHG obligations. It is important to understand that an alternative that may at first glance seem equally reasonable – allocating imports pro-rata amongst all generation that is incremented upwards in the EIM – would not in fact be workable. This is because some of the generation that would be dispatched in the EIM market to serve outside load may in fact have emissions costs well in excess of the California GHG component. If there were no incremental need outside of CAISO, such generation would not be dispatched. But when incremental needs exist both inside and outside of CAISO, the dispatch will also be “mixed” in the sense of GHG cost prioritization. The allocation of these costs needs to reflect this reality.

An important improvement in the Draft Final Proposal, relative to the initial California ISO design for GHG dispatch, is that it allows market participants to submit bid-based GHG emission cost adders that would govern the dispatch of their resources to meet California load.<sup>25</sup> Sellers external to the EIM implicitly include a bid-based GHG emission cost adder in their offers for imports into California in the day-ahead market and HASP today, and these bundled offers can set the California ISO day-ahead market and HASP prices. A design in which resources in the EIM BAA are able to submit bid-based GHG emission cost adders in their dispatch offers enables them to be dispatched consistent with bundled offers, while allowing the GHG emission cost adder to only be reflected in the price of power exported to California.

Some stakeholders have expressed a concern that resources in the EIM BAA might submit excessive GHG emission cost adders, inflating prices in California. The unusual circumstance of differing environmental regulations creates the need for plants to offer two separate prices – one reflecting their incremental cost if they are dispatched to serve California load (and hence incur GHG emission costs) and reflecting their incremental cost if they are dispatched to serve load

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<sup>25</sup> “Energy Imbalance Market,” Draft Final Proposal, *op. cit.*, pp. 84, 87, and 96.

elsewhere in the EIM. This design does in effect allow offers to vary depending upon the location of the buyer whose load they are deemed to be dispatched to meet. We have a few observations to add to this, however.

First, this ability to offer separate prices depending on whether a resource is deemed dispatched to meet California load or load elsewhere in the WECC is conceptually rooted in the fact that the *costs* of serving load in California will in fact be different, in general. The current proposal would not limit the differences in offers to a pre-determined administrative estimate of the difference in costs, however. Thus, the potential impact of this ability under the GHG regulations for suppliers to offer supply at different prices depends upon the competitiveness of supply offers into California. If the import market into CAISO were fully competitive, the *technical* ability to price-discriminate beyond the cost differences would be made irrelevant by competition. Thus, any potential impacts of the GHG emission cost regulations on the ability to price discriminate between California and other markets depends upon the competitiveness of the import market.

Second, even if the ability to price-discriminate between California and other destinations is present under the GHG regulations, the impacts do not necessarily reduce efficiency. To the extent that assets outside of California would only be willing to provide imports to California if they were able to command a premium price, the price difference will result in more imports than would otherwise be the case.

A third key point is the ability to offer separate prices for power sold into California is not an element of the EIM design but of the GHG regulations and is already the case. Currently all resources outside of California are already able to set the price at which they are willing to offer imports into California at any level they want in the day-ahead and hour-ahead time frames. In RTD, there are virtually no offers from resources external to California because of the current lack of integration of the markets.

Therefore, we conclude that the California ISO design increases the supply of resources available to California relative to the current system and will result in a lower, not higher marginal GHG emission costs. The fundamental point is that any supplier that does not want to sell power into the CAISO under the EIM design, or wants to offer supply only at an extreme price, can already do so today simply by not offering to sell power into the CAISO except at a high price.

### **C. Transition Paths**

The third aspect of the EIM design that we address concerns the best way to implement the EIM.

The California ISO proposes to stage the implementation of the EIM in two ways. First, the CAISO proposes to stagger its initial implementation of the EIM to come roughly six months after 15 minute scheduling and settlements are implemented on the California ISO system (FERC Order 764 compliance). This provides the California ISO time to address any issues that arise with the initial implementation of 15 minute scheduling and pricing.

Second, the initial EIM implementation will be limited to the PacifiCorp BAAs with what we understand will be only roughly 100 megawatts of transfer capability available between the California ISO and the PacifiCorp BAAs. This will enable the California ISO to identify and correct implementation issues that are not identified in testing, and for operators to gain experience with the EIM design on a system in which relatively little generation is being dispatched between the California ISO and the EIM BAAs.

The California ISO phase-in design avoids spending resources on throwaway software or implementation of interim designs that will require unproductive diversion of CAISO resources to build and fix problems in the interim designs.

There is a potential for the California ISO to add some additional transition steps to its current design if outcomes during testing suggest that such staging would be desirable. For example, if as a result of software testing there are uncertainties at the time EIM goes live regarding the functioning of the interregional congestion pricing embedded in the EIM pricing software, a further transition step could be added. This step would initially operate the EIM market for a short period with 0 MW transfer capability between the California ISO and the PacifiCorp BAA. This would enable the California ISO to confirm that the interregional congestion pricing is operating as intended before beginning to dispatch generation between the BAAs in real-time.

Similarly, if there are uncertainties at the time of EIM go-live regarding issues relating to the operation of the interregional dispatch that are identified during testing, an additional transition step could be provided by starting with an initial transfer capability that is even less than 100 megawatts and if no problems are observed, gradually increasing the transfer capability up to 100 megawatts over a day or so.

A potential advantage of such a staging is that running the market with zero transfer capability could make it easier to diagnose some kinds of software issue affecting congestion pricing if there are no changes in interchange. It is also possible that limiting the amount of interchange could limit the financial impact of a software issue while it is being diagnosed and corrected. However, even if we restrict the net flow between the systems to zero there can still be significant network interactions and cross impacts on congestion that can lead to the problems discussed earlier. Furthermore, these staging approaches could also cut the other way, making it harder to diagnose the existence of a particular software issue because the scheduling limit is always binding. Hence whether either of these transition stages would be desirable depends on the kind of software issues observed during development and testing, and whether their identification would be aided or hindered by either of these steps.

If there are reasons for concern with software issues identified during testing whose identification would benefit from these kind of additional transition steps, these approaches could be utilized without the cost and implementation risk of developing other software.

However, there is no need to decide upon implementing such additional transition steps until and unless issues are identified during testing that make such a course of action worthwhile. In any case, any such additional transition steps should have a duration of days, not weeks or months, unless issues are identified. Running the EIM market in such an extended transition period

would entail incurring the costs of EIM operation while foregoing most of the benefits, which will raise consumer costs. Therefore, this should not be done unless there is a need for it based on software issues observed during development or testing.

If software issues emerge during development and testing over the next year whose diagnosis could be aided by such transition steps, these options can be considered as the implementation date approaches.

Finally, the ISO intends to assess the potential for excessive congestion rent shortfalls or cost shifts during testing prior to go-live, and will incorporate functionality for one potential solution in its market systems that it could potentially activate.

#### **D. Market Power Mitigation**

**Introduction.** Under the EIM framework, load serving entities located within the PacifiCorp BAAs and the CAISO, as well as other EIM BAAs in the future, will have more options for purchasing power than they do today. As a general rule, that will mean that there will be more, not less competition, meaning that there will be less, not more, potential for the profitable exercise of market power.<sup>26</sup>

However, in evaluating the potential for the exercise of market power, we also need to take into account other changes accompanying EIM implementation that may create the potential for the exercise of market power in ways that are not relevant today. In particular, in the case of PacifiCorp, it is planned that implementation of the EIM will coincide with changes in the Open Access Transmission Tariff (OATT) under which transmission and balancing services are provided by PacifiCorp. Generally speaking, by transitioning to a real-time balancing framework based on spot markets, the cost of providing balancing services will improve by being reflected in the prices determined in the EIM real-time spot market. In general this should improve efficiency, but there are circumstances in which these changes could in theory create opportunities for the exercise of market power that did not exist under the previous OATT terms.

We focus on three issues. The first concerns the allocation of congestion costs under Sections 33.3 and 33.4 of PacifiCorp's OATT and the potential for these charges to be inflated through the exercise of locational market power on constraints within the PacifiCorp BAAs. The second concerns the pricing of energy for energy imbalance and generator imbalance services under Schedules 4 and 9 of the PacifiCorp OATT, which would be based on EIM locational marginal pricing. There is potential for these prices to be inflated by the exercise of locational market power either on constraints within or connecting into the PacifiCorp BAAs. The third issue concerns the potential for inflation of the prices used to settle economic redispatch of resources

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<sup>26</sup> In theory, it is possible that the linking of market areas will result in more effective exercise of market power and decreases in market efficiency (see the two market analysis in E. Sauma and S. Oren, "Proactive Planning and Valuation of Transmission Investments in Restructured Electricity Markets," *J. Regulatory Economics*, Vol. 30 (2006), pp. 261-290 ). However, the demand and cost conditions that lead to that result are highly unusual; under randomly selected demand and cost functions, the probability that the linking of market areas will decrease efficiency has only a very small probability in that two market model.

that support base schedules. This inflation can occur through the exercise of locational market power either on constraints within the PacifiCorp BAAs or into those BAAs.

Each of these concerns is discussed in some detail below. The EIM design will address the potential for the exercise of market power on constraints internal to the EIM BAAs by applying the California three pivotal supplier test to constraints that are binding in RTUC using the same local market power mitigation methodology that is presently applied to constraints within the California ISO.<sup>27</sup> There is no provision in the published Draft Final Proposal for the application of the three pivotal supplier test when the scheduling limit between the PacifiCorp BAAs or when the scheduling limit between PacifiCorp West and the California ISO are binding in RTUC or in RTD.<sup>28</sup> However, it is our understanding that it has been agreed that the California ISO's locational market power mitigation will also be applied when the scheduling limits between the California ISO and PacifiCorp or between the PacifiCorp BAAs are binding.<sup>29</sup>

**Issue 1: Cost of Relieving Transmission Constraints.** The first concern relates to allocation of congestion costs under the PacifiCorp OATT. Under the current OATT terms for network transmission service within the Pacific Corp BAAs, there are provisions for the transmission provider to redispatch network resources, including PacifiCorp's resources, on a least-cost basis to manage congestion. The OATT also provides for any such redispatch costs to be assigned proportionately to network customers based on hourly load at the monthly peak.<sup>30</sup>

It is not clear to us how these provisions will be applied under the EIM.<sup>31</sup> To the extent that some component of real-time redispatch costs (including congestion rent shortfalls) are based on EIM real-time prices, it will be important to make sure that those real-time prices are not unduly impacted by the exercise of market power within the PacifiCorp BAAs. For example, while EIM participants will be hedged against real-time congestion charges in meeting their load through their base schedules, they would still be exposed to excessive charges for congestion if base schedules are collectively infeasible and the redispatch costs needed to support the base schedules are inflated by potentially extreme offer prices by resources possessing locational market power.

While we need to understand more clearly what is intended, it appears that the EIM proposal will address the potential for inflated congestion costs due to the exercise of locational market power within EIM BAAs. The application of the CAISO local market power mitigation procedure will first use the three pivotal supplier test to identify situations in which there is a potential for the exercise of locational market power that could inflate these redispatch costs, followed by application of the current mitigation design to those offers.

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<sup>27</sup> See California ISO, "Energy Imbalance Market," Draft Final Proposal, *op. cit.*, pp. 27-28.

<sup>28</sup> *Ibid.*, p. 27, "Real-time LMPM procedures will be applied separately within each BAA...".

<sup>29</sup> Department of Market Monitoring Comments, *op. cit.*, Footnote 2.

<sup>30</sup> PacifiCorp Open Access Transmission Tariff, Sections 33.3 and 33.4, pp. 107-108.

<sup>31</sup> This subject does not appear to be covered in "PacifiCorp's Energy Imbalance Market Entity Proposal," September 13, 2013.

**Issue 2: Energy and Generator Imbalance Service.** PacifiCorp proposes to price Energy Imbalance Service and Generator Imbalance Service under its OATT using the EIM real-time prices.<sup>32</sup> In the case of load serving entities within the PacifiCorp BAAs, this imbalance energy is the difference between (a) their real-time load and (b) the sum of their generation output and scheduled interchange. In the case of generators located within the PacifiCorp BAAs, it is instead the difference between their schedule and their actual real-time output. For example, a wind generator located in PacifiCorp West might be selling power to a customer located in another balancing authority area using an hourly transaction. It would buy and sell imbalance energy from PacifiCorp to make up the difference between its schedule and its actual real-time output.

At present, the PacifiCorp OATT provides for monthly netting of deviations within 2 megawatts or 1.5% of schedule. The monthly total is settled financially using an hourly proxy price based on day-ahead bilateral prices at four trading points: COB, Four Corners, Mid-C and Palo Verde.<sup>33</sup> Deviations outside this band are settled at 110 or 125% of the hourly proxy for under scheduling and at 90% and 75% of the hourly proxy for over-scheduling. It is not clear whether the provisions for deviations outside the band will continue to be in effect or whether they will be replaced by the penalties under the EIM design for over- and under-scheduling. The over- and under-scheduling charges proposed by the California ISO have wider bands (5 and 10%, rather than 1.5% and 7.5%) but higher penalties (125% and 200% for under-scheduling, versus PacifiCorp's 110 and 125%, and 75% and 50% for overscheduling, versus PacifiCorp's 90% and 75%).<sup>34</sup>

As noted above, it is proposed that under the EIM, this index-based pricing would be replaced with market-based pricing, with imbalance energy priced in the California ISO EIM market at nodal prices (locational marginal prices, LMPs). In a competitive market, this change would enhance efficiency as it would much better relate the price of imbalance energy to its actual cost. While the current index-based method is not an reasonable approximation given the lack of real-time spot prices, it is based on day-ahead rather than real-time prices and on flat 16 hour average on-peak prices and 8 hour off-peak prices. However, because the current indices are based on multi-hour block transaction prices at locations external to the PacifiCorp transmission system, they are not subject to any possible exercise of locational market power by PacifiCorp. This will not necessarily be the case if these index prices are replaced by EIM LMP prices within the PacifiCorp BAAs.

While resources within the PacifiCorp BAAs will have to compete with resources located in adjacent regions that can provide supply to support base schedules through hourly interchange transactions (and perhaps 15 minute transactions under FERC Order 764), this will not be the case in the time frame of the 5 minute real-time dispatch.<sup>35</sup> Within this shorter time frame, the

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<sup>32</sup> See *ibid.*, Section X.3, pp. 27-28.

<sup>33</sup> See PacifiCorp Open Access Transmission Tariff, Schedule 4, pp. 209-210.

<sup>34</sup> See California ISO, "Energy Imbalance Market," Draft Final Proposal, *op. cit.*, pp. 38-40.

<sup>35</sup> The competitiveness of external resources in the 15 minute market depends on whether price-base offers that sink in the PacifiCorp BAAs will be considered by PacifiCorp in the 15 minute timeframe,

only resources available to meet deviations will be those located within the EIM, both those within the California ISO and those within the PacifiCorp BAAs.

The energy imbalance market can generally be presumed to be competitive in these 15 and 5 minute timeframes when the scheduling limits between the California ISO and the PacifiCorp BAAs are not binding, as imbalances within the PacifiCorp balancing authority areas could be met with generation within the California ISO as well as the local balancing authority area.<sup>36</sup> However, this presumption would not apply when the scheduling limits are binding. When the scheduling limit between the California ISO and PacifiCorp West is binding for imports into PacifiCorp West, the only resources able to meet upward load deviations (real-time load in excess of the hourly base schedule) will be resources within the PacifiCorp BAAs. Moreover, since it is our understanding that the EIM scheduling limit from PacifiCorp West into PacifiCorp East will apparently initially be zero, the only resources able to meet upward load deviations in PacifiCorp East will be resources located within that area (including those supporting export schedules into PacifiCorp West that could be dispatched down in real-time).

PacifiCorp's Triennial market power update, filed this past summer, shows 1708 megawatts of non-affiliate generating capacity in PacifiCorp East and 237 megawatts of non-affiliate generating capacity in PacifiCorp West.<sup>37</sup> While this is a substantial amount of generating capacity to cover the real-time deviations of relatively small amounts of non-native load in these BAAs,<sup>38</sup> the availability of this generation to be dispatched up in real time is unclear. For instance, we do not know how much of this generating capacity would be baseload generation that is typically fully committed to meet hour-ahead schedules, such as low-cost coal or run-of-river hydro, and how much would be typically available to incremented upwards.<sup>39</sup> It is also possible that some of this generation would be wind generation that could not be dispatched to meet imbalances.

While it is unclear whether there is enough capacity available for dispatch within the PacifiCorp BAAs to constrain the exercise of market power by PacifiCorp when the scheduling limits are binding, it is also uncertain whether it is likely that these import scheduling limits would often

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which we understand they are not intending to do. If that is the situation, resources from external regions could only compete in the hourly timeframe.

<sup>36</sup> There are two qualifications to this generalization. First, it is possible that the scheduling limit with the California ISO would be non-binding on imports but that other transmission constraints within the California ISO would limit the set of resources that could be dispatched on the margin to meet imbalances within the PacifiCorp balancing authority areas. Second, anytime that the GHG cost spread between the California ISO and the EIM balancing authority areas is large, the cost of imbalances met from generation within the California ISO would exceed the competitive price within the EIM balancing authority areas. Thus, even though imports from the California ISO would constrain the exercise of market power PacifiCorp within the PacifiCorp balancing authority areas, the GHG costs could render this a loose constraint.

<sup>37</sup> See Affidavit of Rodney Frame, Docket No. ER10-3246, Attachments 6 and 7, June 28, 2013.

<sup>38</sup> Wholesale peak load of 593 megawatts in PacifiCorp East and 721 megawatts in PacifiCorp West.

<sup>39</sup> We attempted to access the working papers to PacifiCorp's Triennial filing to see what these resources are, but could not obtain access to them as they are all non-public.

bind. PacifiCorp could in theory force the scheduling limits on imports to bind by raising its offer prices for its generation with the PacifiCorp BAAs. However, it is unclear whether it could plausibly be profitable for PacifiCorp to raise its offer prices so that these imports constraints would bind in order to sell a few megawatts of balancing energy at inflated prices. The factors that would tend to make such an attempt to exercise market power unprofitable are discussed below, first for PacifiCorp West, then for PacifiCorp East.

*PacifiCorp West.* In the case of PacifiCorp West, raising its offer prices enough to cause the scheduling limit on imports to bind would entail:

- a) Foregoing any profits from using low cost generation within PacifiCorp West to support exports into the California ISO.
- b) Replacing PacifiCorp generation within PacifiCorp West with roughly 100 megawatts of imports from the California ISO (plus paying the congestion rents, depending on who gets them, see item (d) below). This would be particularly expensive when the California ISO price spikes in real-time and PacifiCorp would buy 100 megawatts of power at that high price, with the price paid by PacifiCorp capped only by the high bids it submitted, instead of meeting 100-200 megawatts of its load with its own generation.
- c) At times purchasing power to meet PacifiCorp imbalances from load serving entities within PacifiCorp West at the inflated price.
- d) Generation of large real-time congestion rents on the scheduling limit between the CAISO and PacifiCorp, resulting from the high bidding strategy and congestion on imports into PacifiCorp. A crucial question is: who would get this money? If these congestion rents on the scheduling limit are distributed to EIM load on a load-ratio-share basis, PacifiCorp would be paying this premium to make the interface bind and most of the money would be flowing to CAISO transmission customers.<sup>40</sup> This cost would likely hugely swamp any revenues on a few megawatts of imbalance energy sold to others. It is hard to see how this could be profitable even with only 100 megawatts of scheduling capacity unless most or all of the congestion rents on the BAA scheduling limits flowed to PacifiCorp. In our opinion, the more transfer capability there is, the more hopelessly unprofitable such an attempt to exercise market power would be. However, at this point it has not been determined how real-time congestion rents on scheduling limit constraints between BAAs are intended to be allocated.

Would there be enough imbalance energy sales within the PacifiCorp BAAs for the increased profits on these sales to offset these other costs and foregone profits? One way to reduce the cost of this strategy for exercising market power would be to try to guess the CAISO price and set the PacifiCorp base schedules so that the 100 megawatt of power purchased would likely be cheaper than the PacifiCorp generation backed down. Another way to reduce the losses from this

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<sup>40</sup> It does not appear that the Draft Final Proposal addresses the allocation of congestion rent shortfalls or surpluses on the scheduling limits between balancing authority areas, versus constraints within them. The discussion of the BAA real-time congestion balancing account consistently refers to “constraints in each BAA,” see California ISO, “Energy Imbalance Market,” Draft Final Proposal, *op. cit.*, Section 3.7.8.2, pp. 68-70.

strategy would be trying to anticipate when the CAISO price would likely be higher than PacifiCorp's costs and switch the high offer strategy off. It is not clear that either would be easy.

An evaluation of the potential for the exercise of market power in the supply of energy or generator imbalance services in PacifiCorp West is made somewhat more complex by the impact of GHG compliance costs, which would act as a tariff on exports from the California ISO to PacifiCorp West, even when the scheduling constraint is not binding. The potential existence of this "tariff" would not by itself enable large uncompetitive increases in offer prices for energy, because the increase in offer prices would be capped by the GHG emission cost margin. However, the existence of this emission cost margin could enable PacifiCorp to realize small mark-ups over incremental cost of these sales, without losing potential profits on export sales to California, and without losing sales to imports from California.

This possibility is illustrated by the following example. Suppose that the cost of GHG compliance is \$20 per MWh on the margin, so that the California ISO price would exceed the competitive PacifiCorp price by \$20. PacifiCorp could in theory exercise market power in the imbalance markets within the BAAs by lowering its GHG emission cost bid to a very low value and raising its incremental energy bids of resources within the PacifiCorp BAAs by an offsetting amount. In essence, this strategy would raise the level of prices within the PacifiCorp BAAs to just under the level of prices in the California ISO market, without forgoing exports into the California ISO or attracting imports from the California ISO.

This design for the exercise of market power would not be easy to actually implement because PacifiCorp would need to guess the real-time market clearing price in the CAISO, including the GHG cost premium, and offer incremental energy at just under this price. In addition, the potential for the exercise of market power would be capped by the GHG premium. Hence this strategy would not permit PacifiCorp to charge, say, a \$500/MWh premium over the competitive price, but PacifiCorp could potentially gain around \$5-10 per MWh in extra margin on energy and generator imbalance services.

This strategy would avoid giving up profits on exports, because the cost of power delivered into California would be unchanged (the GHG cost bid would be artificially low and the energy offer price artificially high) and would also avoid losing profits on imports from the California ISO. Hence, this strategy has the potential to be profitable in circumstances in which strategies that would raise energy prices throughout the PacifiCorp BAAs by more than the GHG emission cost margin would be unprofitable. This bidding strategy would also be somewhat less obvious, as the market monitor would just observe a smaller GHG emission cost margin between PacifiCorp and the California ISO than would otherwise be the case. Incremental offers would vary from interval to interval in a manner related to California ISO prices rather than their costs, but this might not be easy to distinguish from offer prices varying with the opportunity cost of sales outside the California ISO, which might also tend to follow expected California ISO prices net of GHG emission costs.

However, this strategy for exercising market power would still be vulnerable to small amounts of generation overscheduling by load serving entities within the PacifiCorp BAAs so they could sell

their imbalances to PacifiCorp and to generators within the PacifiCorp BAAs, leaving a few megawatts unscheduled so they could sell them in the EIM market in real time.

*PacifiCorp East.* The case of PacifiCorp East is slightly different because of the lack of EIM import capability and the generally lower cost of resources there. Therefore, raising offer prices and causing the scheduling limit on exports (which we understand would be 0 MW from PacifiCorp West into PacifiCorp East and also 0 MW from the California ISO) would entail the following:

- a) Foregoing any profits from using low cost generation within PacifiCorp East to meet load within PacifiCorp West or to support exports into the California ISO,<sup>41</sup> and
- b) At times purchasing power to meet PacifiCorp imbalances from load serving entities within PacifiCorp West at the inflated price.<sup>42</sup>

Moreover, if PacifiCorp attempted to exercise market power in this manner on an ongoing basis, this would incent load serving entities within PacifiCorp East to schedule imports slightly in excess of their expected load, the increase serving to either reduce their purchases from PacifiCorp at the high price and/or to increase their sales to PacifiCorp any time its load exceeded its base schedule.<sup>43</sup>

In addition, such an ongoing effort to exercise market power in PacifiCorp East would likely induce resource owners in that BAA to set their hour-ahead schedules to leave a small amount of spare capacity available on their resources to be dispatched into the EIM in real-time.<sup>44</sup> Given the apparently huge amount of third party capacity in PacifiCorp East (1708 megawatts according to the market based rate filing), it is not clear how such an ongoing effort to exercise market power could be successful in PacifiCorp East unless there is some factor limiting the ability of these resource owners to offer their power into the EIM.

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<sup>41</sup> If power was being exported from PacifiCorp East into other regions within the EIM and all undispatched generation within PacifiCorp East was offered at very high prices, then an increase in load within PacifiCorp East would not be met by dispatching up generation within PacifiCorp East. It would instead be met by dispatching up generation elsewhere in the EIM and reducing exports from PacifiCorp East. This would cause the real-time imbalance price in the PacifiCorp West to equal the price, adjusted for losses, elsewhere in the EIM. Hence, exports into the EIM from PacifiCorp East would need to be reduced to zero in order to raise real-time imbalance prices with PacifiCorp East.

<sup>42</sup> PacifiCorp upward load deviations would normally be met with its own generation, so even if it paid a high real-time price, it would be paying the price to itself. However, if the load serving entities within the PacifiCorp balancing authority areas had a downward deviation at the same time, then PacifiCorp would purchase part of their imbalance from the load serving entity at the inflated price.

<sup>43</sup> The profitability of this strategy would be reduced if it required purchasing additional transmission service.

<sup>44</sup> The profitability of this strategy would also be dampened to the extent that it required the purchase of additional transmission service. The total exports would not increase, so additional transmission service would only be required if the transmission service used to support the exports could not be used to sell power into the EIM.

**Issue 3: Redispatch of Base Schedules.** The third concern relates to the economic redispatch of generation that supports base schedules. Under the EIM, deviations from base schedules will be settled at real-time LMPs. Hence generation would be economically redispatched between base schedules and other resources, with the settlement prices potentially reflecting the impact of transmission congestion. No load serving entity would be exposed to congestion charges for real-time imbalances if it served its load using its base schedules, as such an entity would have no real-time deviations. There would, however, be a potential for inflated bids from resources within the EIM BAAs to somewhat reduce the benefits from dispatching down high cost resources in the base schedules in real-time and replacing them with lower cost resources. However, the potential profits would be capped at the difference between the cost of the high cost resource in the base schedule and the cost of the PacifiCorp resource that could replace it.

The inflated bids could be a result of either locational market power on constraints within the BAAs or as market power within the BAAs as a result of binding scheduling limits on imports into the BAAs. This third concern is very similar to the second concern in terms of the factors potentially limiting the exercise of market power with the additional consideration that any exercise of market power could only inflate costs up to the cost of the resources included in the base schedule.

**Addressing Market Power within the PacifiCorp Balancing Authority Areas.** Given, on the one hand, the potential for the exercise of market power in the imbalance energy market within the PacifiCorp BAAs following implementation, and, on the other hand, the considerable uncertainty over whether such an exercise of market power could possibly be profitable, there are three general courses that could be taken:

- a) Use existing California ISO software to apply market power mitigation. This could be triggered either when scheduling limits on real-time imports from EIM into one or more of the PacifiCorp BAAs bind, or only when those limits bind and those interfaces fail a three pivotal supplier test.
- b) Develop customized software tailored to the PacifiCorp market structure that would mitigate offer prices of resources located within one or more PacifiCorp BAAs when the exercise of market power was potentially profitable; or
- c) Require PacifiCorp to sell imbalance power at a real-time price calculated setting the shadow price of scheduling constraints in the import direction to zero.

As explained above, it is our understanding that the California ISO proposes to apply the first approach using the three pivotal supplier test at the time of EIM start-up, with the possibility of making adjustments after there is some experience with the actual operation of the EIM market.<sup>45</sup> If PacifiCorp would fail the three pivotal supplier test any time one of the scheduling constraints is binding, there would be no difference between the three pivotal supplier trigger and the import constraint trigger. This approach might impose offer price mitigation at some times when it is not appropriate relative to other approaches. But the software implementation costs would be much lower, as the procedures could be implemented largely with existing software capability. If mitigation were triggered, both approaches require accurate measures of hydro

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<sup>45</sup> Department of Market Monitoring Comments, *op. cit.*, Footnote 2.

generation opportunity costs to avoid inefficiently shuffling the relative dispatch order between energy-limited hydro and non-hydro resources.

The second approach would perhaps minimize the unnecessary application of offer price mitigation but could entail devoting significant resources to developing software that might almost never be used.

The third approach would be similar to the first in terms of the trigger for its application, as it would be relevant only when the import constraints bind. It would not mitigate offer prices, however, just the charges of the balancing authority area operator. In this way it would avoid potentially inefficient shuffling of the dispatch order and reduce the need to develop accurate opportunity cost measures for hydro generation. On the other hand, it could impose cost shifts if conditions lead to frequently binding import constraints and high incremental costs within the EIM BAAs.

We support the first approach, given its implementation advantages, together with its consistency with local market power mitigation procedures already in place in the California ISO footprint.

**Market Power Summary.** In summary, the market power implications of the EIM are almost completely centered on the non-CAISO areas of the EIM, and are quite difficult to predict at this stage. The apparent change in the terms of PacifiCorps OATT *might* create incentives to exercise market power, and such exercise *might* be possible on a system level. However, there are several institutional and structural factors that appear to mitigate the potential profitability of any system-wide market power strategy. The potential is plausible enough that we believe it is appropriate that the EIM stand ready to impose mitigation, and that it be able to do so on interties between EIM areas as well as on constraints interior to each BAA. Our sense is that, in the absence of significant market power, such potential mitigation would rarely be triggered, and therefore be relatively innocuous. However, this should be monitored closely and if mitigation is viewed to be inefficient, other course such as suggested here should be considered.

### 3. Conclusion

This is a very important initiative. Expanding the geographic scope of real-time dispatch has the potential to improve market efficiency and lower costs to consumers, in part because the real-time dispatch will be better able to take advantage of the spatial diversity of variable renewable production. This is particularly important in the WECC, with the planned rapid expansion of solar and wind resources in the next decade. Furthermore, expanding the balancing market also increases the pool of energy resources that can be dispatched to balance the inherent variability and uncertainty of renewable resources output. The larger the geographic region that can be successfully integrated, the greater these benefits are likely to be. Indeed, in principle, the benefits of market enlargement from the standpoint of accommodating variations in renewable output may rise sharply with the geographic scope of the integrated region.

We strongly support these efforts. In this opinion, we have chosen to focus on four areas that we see as both important issues relevant to the immediate task of integration with the PacifiCorp

balancing areas as well as any further expansion that includes other balancing areas. These four areas are the rules for managing schedules, the rules for accounting for Greenhouse Gas emissions, the options for phasing in the implementation of EIM, and market power mitigation. Although we provide extensive discussion of *potential* problems that could arise, we also want to emphasize that the CAISO has taken important steps to prepare the system to deal with these problems should they arise.

With regards to the issues relating to schedules and to market power, the CAISO has committed to plans to add important functionality to the EIM software that we believe should be capable of mitigating any serious problems that may arise with the integration with PacifiCorp.

We do believe that eventually, particularly if the EIM expands beyond the California ISO and PacifiCorp, the ISO will need to develop a workable general framework that will account for these interactions in establishing forward schedules. This is not a new problem, and the MISO, PJM and New York ISO are all using various methods to account for similar interactions.

We also support the CAISO's plans to include the functionality to allow for market power mitigation to potentially be triggered by congestion on interties between EIM areas, as well as internal constraints. However, the current California ISO approach to local market power mitigation assumes that markets are fully competitive at the balancing area level. That approach also relies upon being able to mitigate bids to a level that reasonably represents the marginal costs of output from a particular resource. As the EIM market region expands to include more traditional vertically integrated systems as well as hydro systems with more complex opportunity costs, the appropriate assumptions to apply to other regions will need to be considered on a case-by-case basis.

We believe that the system that the CAISO proposes for accounting for Greenhouse Gas Emissions is appropriate and consistent with the spirit of the rules adopted by the California Air Resources Board. Some stakeholders have expressed concern that participants would be able to specify a separate GHG cost component without constraint, but we note that in effect this situation already exists.

Last, we note that the ability to limit the capacity of intertie transactions can be a potentially useful tool in helping to diagnose the source of any pricing or uplift issues that may arise. We therefore support adding such functionality to the system. However, even if we restrict the net flow between the systems to zero there can still be significant network interaction and cross impact on congestion that can lead to strategic behavior and cost-shifting problems. Hence, we believe that testing will reveal much about the potential for uplifts, and that limiting the transfer to an extreme, such as zero, capacity would be potentially helpful, but for no more than a period of days, not months or longer.



Board of Governors      November 7-8, 2013      Decision on energy imbalance market design

**Motion**

Moved, that the ISO Board of Governors approves the proposed energy imbalance market design, as described in the memorandum dated October 31, 2013; and

Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposed tariff change.

Moved: Galiteva      Second: Maullin

Board Action: <b>Passed</b>	Vote Count: <b>5-0-0</b>
Bhagwat	Y
Foster	Y
Galiteva	Y
Maullin	Y
Olsen	Y

Motion Number: 2013-11-G1

**Attachment H – December 2013 Board Memorandum**  
**Tariff Amendments to Implement Energy Imbalance Market**  
**California Independent System Operator Corporation**

**February 28, 2014**

# Memorandum

**To:** ISO Board of Governors

**From:** Karen Edson, Vice President Policy & Client Services

**Date:** December 11, 2013

**Re: Decision on energy imbalance market governance proposal**

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***This memorandum requires Board action.***

## EXECUTIVE SUMMARY

Management requests Board approval of the energy imbalance market (EIM) transitional committee and transitional committee charter. At its November 7, 2013 meeting, the Board approved the design of the energy imbalance market that will be implemented in the fall of 2014. The November decision marked a major milestone in the expansion of the ISO's real-time market outside of the ISO's balancing authority area, which was first announced in February of this year with PacifiCorp's commitment. Interest in the EIM throughout the western interconnect has necessitated the development of a structure that will give EIM participants and other regional interests a voice in EIM decision-making. Management developed, through a stakeholder process, a governance proposal to fill this need for broad regional engagement (included for reference as Attachment 1). Management now seeks Board approval of the energy imbalance market transitional committee and the transitional committee charter (Attachment 2).

This proposal outlines steps to develop meaningful changes in governance, starting with the formation of a transitional EIM advisory committee (the "transitional committee") of the ISO Board of Governors. The committee will be established a few months in advance of implementation of EIM and will be able to offer comments to the ISO Board of Governors and Management on matters related to EIM implementation. In addition, the transitional committee will be tasked over the subsequent 12-18 months with developing a recommendation for establishing an independent<sup>1</sup> EIM governance structure including defined authority over EIM matters.

The transitional committee meetings and deliberations will be subject to the notice requirements contained in the ISO's open meeting policy. Its work will result in a

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<sup>1</sup> A predicate requirement for the Board to delegate any authority over EIM tariff matters is that members of the long-term EIM governing structure must be independent from EIM market participants.

proposal (or possibly multiple proposals<sup>2</sup>) for consideration by the Board. Implementation of the proposal will require Board approval and subsequent FERC approval of any needed tariff changes.

With the Board's approval of the process outlined in this memo and in the attached charter, work will begin immediately to form the transitional committee. It begins with establishment of sector groups defined in the proposal for the purpose of nominating and ranking candidates to be considered for appointment to the transitional committee. Ranked lists, resumes, and letters of intent of each nominee will be provided to the Board for consideration, leading to a proposed slate of at least nine nominees. That slate will be considered for decision at the May 28, 2014 Board meeting for appointment to the transitional committee. Once seated, work of the transitional committee will begin immediately, with its first meeting tentatively scheduled for June 2014.

Management proposes the following motion:

***Moved, that the ISO Board of Governors approves the creation of the proposed energy imbalance market transitional committee, and the transitional committee charter, as described in, and attached as Attachment 2 to, the memorandum dated December 11, 2013.***

## **DISCUSSION AND ANALYSIS**

The proposal and charter developed in the stakeholder process define the transitional committee including its structure, member qualifications, formation process, committee operations and purpose.

### ***Transitional committee structure***

The ISO proposes a structure of nine transitional committee members at the outset, with potential members nominated by a broad cross-section of EIM stakeholders organized in sectors. The members could vary by occupation, expertise and affiliation, and would not need to be affiliated with a stakeholder to qualify.

The proposed transitional committee charter also provides for an increase in the size of the committee by up to two additional EIM entity members in the event that additional entities beyond PacifiCorp enter into energy imbalance market implementation agreements, thereby committing to be EIM entities. This provision ensures that entities that make an early commitment to EIM have a ready means for participating in this committee while maintaining an overall balance of interests.

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<sup>2</sup> The transitional committee charter allows for minority proposals to be submitted to the Board, if a consensus is not reached.

### ***Transitional committee member qualifications***

The minimum qualifications for transitional committee eligibility are directed toward establishing a diverse and sophisticated committee to advise on EIM matters and to develop a permanent governance structure. Further, based on the regional aspect of the EIM, transitional committee membership qualifications should include geographic diversity so the various regional interests are represented.

All potential nominees should possess a proven reputation for excellence in their areas of expertise, and optimally should reflect a diverse geographic background (e.g., members from multiple balancing areas) and viewpoint (e.g., no two government officials from the same administration and no two committee members from the same corporation). Qualities that sector groups have been advised to use when identifying and considering nominees include:

- Proven leadership skills with respect to diverse and complex issues;
- Understanding of regional issues;
- Ability and willingness to consider and represent a broad range of perspectives;
- General industry experience;
- Support for the success of EIM; and
- Availability to participate in the transitional committee on an ongoing basis.

These qualifications serve a dual purpose. First, they have been provided to guide the sectors in their ranking of nominees. Second, Management suggests that the Board consider these qualifications when appointing transitional committee members. By doing so, the Board will ensure that the committee has the appropriate mix of expertise, backgrounds, and geographic diversity among its members. Although the rankings resulting from the sector nomination and ranking process will provide important guidance for the Board's consideration, the Board should exercise its discretion to ensure a well-balanced and diverse committee.

### ***Formation of the transitional committee***

A successful EIM has important impacts throughout the Western Interconnection. As a result, the ISO proposes that a broad group of stakeholders across the interconnection should be involved in the nomination and selection process, with the stakeholders grouped into seven functional sectors identified below for purposes of conducting the nomination and ranking of candidates. The proposed nomination and ranking process is a two-step selection process in which sectors nominate candidates and then rank the nominees for ultimate appointment by the Board. The sectors will be used for nomination and ranking purposes and the ISO does not intend that the sectors will continue in effect once they have served that function.

The process can be summarized as follows:

- Each interested stakeholder identifies with one of the seven sectors:
  - Investor owned utilities
  - Publicly owned utilities
  - Generators and marketers
  - Alternative energy providers
  - EIM participants
  - Governmental agencies
  - Public interest entities
- Each sector conducts open nominations, including any self-nominations, and each sector nominates at least two nominees;
- The nominees from all seven sectors will be aggregated into one comprehensive nominee list for ranking by each of the sectors.
- Each sector, through meetings facilitated by sector liaisons, will rank at least the top twelve individual nominees (both self-nominated and sector nominated) with the remainder ranked either individually or in groupings or tiers, thus resulting in seven separate rankings of the list.
- These ranked listings will be collected and submitted, along with the resumes and letters of intent from each nominee, to the ISO Board. Out of respect for the nominees, the ranked lists will not be made public.
- The Board will develop a slate of nine people to bring to their May 2014 Board meeting for consideration. The Board will appoint up to eleven transitional committee members, with eight of the members coming from the list of ranked candidates, and up to three EIM Entities in the order they execute implementation agreements.<sup>3</sup>

### ***Operation of the transitional committee***

The ISO bylaws require that, as an advisory committee to the ISO Board, the transitional committee comply with the ISO Open Meeting Policy. That policy mandates, among other things, that all general session committee meetings provide an opportunity for public comment, be noticed according to the policy, and be accessible to the public.

The ISO proposes that ISO Management identify an ISO staff person who will perform a liaison function for the committee, attend committee meetings, and facilitate the provision of ISO support to the committee. This will ensure that the transitional committee has the benefit of ISO market design expertise and that it is informed

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<sup>3</sup>As the first entity to execute an implementation agreement, PacifiCorp will have a seat on the Transitional Committee.

regarding, and can accomplish its goals in conjunction with, the existing ISO governance and management structures. Finally, the ISO will provide the committee with logistical support for committee meetings, as well as legal advice and subject matter expertise, as appropriate, which will be coordinated through the committee liaison.

The members of the transitional committee will serve without compensation.

## POSITIONS OF THE PARTIES

The EIM governance stakeholder process was initiated in August 2013 with the publication of a white paper. The initial stakeholder meeting was held in Portland and comments were received from 29 entities. These stakeholder inputs helped shape a revised white paper and the draft charter. After three rounds of comments and revisions, the ISO issued a draft final proposal and a draft final charter. The ISO also conducted two stakeholder calls to discuss the proposal, stakeholder comments and subsequent revisions.

Stakeholders have generally supported this governance approach, including the formation and operation of the transitional committee. Below is a brief discussion of key issues raised during the stakeholder process. A detailed stakeholder matrix is included at Attachment 3.

**Sector representation on the transitional committee:** Some stakeholders recommended that each of the seven sectors should select its own nominees to the transitional committee and that each sector should have a representative on the committee. This proposal instead looks to criteria such as leadership and expertise, understanding of regional issues, and support for the success of EIM for appointment to the committee. The goal is to have a transitional committee that is a diverse, well-qualified group that can promote the objectives of a successful EIM, and provide meaningful input to the ISO Board on a governance structure that will suit all interested entities. The open meeting process will allow all interested parties to participate in the committee's work.

**Nature of the long-term independent EIM structure:** Some stakeholders thought that the long-term EIM structure should be more independent than proposed. Others thought the independent nature went too far and questioned the ISO's authority to delegate authority over the tariff without causing conflicts. The ISO does not contemplate two completely autonomous boards with authority over the same market, but generally leaves the details of a long-term independent EIM governance structure proposal to the committee. The committee's role is to work together to define the long-term structure that promotes EIM, and strikes a balance that works for all participants. In any case, the issues of concern will be fully aired and debated given that the

committee will hold its meetings in public and its recommendations will be vetted through the open meeting process.

**Legal authority to create the transitional committee and the long-term independent structure:** Some stakeholders questioned whether current state and federal law permit the ISO to implement the recommendations contained in this proposal to the Board. California law and the ISO's current bylaws permit the Board to create advisory committees to the Board. The transitional committee contemplated by this proposal clearly falls within this existing framework. In addition, the ISO's initial review of relevant legal authorities indicates that the ISO Board may delegate certain aspects of the ISO's Section 205 authority, subject to FERC approval. The specific legal requirements will depend upon the precise governance structure proposed. Additionally, any need for potential changes to California statutory law can be examined during the course of the committee's work. The ISO is committed to providing legal analysis and guidance as to any governance structure the committee considers.

**Short-term role of the transitional committee:** Some stakeholders have expressed concern that expertise of transitional committee members and the timing of the committee's start-up in June would not facilitate meaningful input into the EIM market implementation process. Management acknowledges that criteria for committee membership are focused more on the committee's role in developing a proposal for an independent EIM governance proposal and that the creation of the committee will not be final until EIM testing is underway. In addition, it is important to note that the committee will not supplant the on-going ISO stakeholder engagement during EIM testing and start-up but will be part of it.

**Geographic diversity and opportunity for participation:** Some stakeholders commented on the importance of geographic diversity of the transitional committee members. Some also remarked on the importance of holding meetings in a variety of locations to demonstrate a commitment to regional participation and limit hardship from excessive travel. This proposal explicitly acknowledges the importance of regional diversity and expertise. Moreover, ISO management believes the success of the transitional committee and EIM depends on having a committee that reflects the diversity of interests and organizations in the West with an interest in the issues and a commitment to the success of the effort. With regard to meeting locations, the ISO has offered the use of its facilities in Folsom, but will encourage the committee to hold meetings throughout the Western Interconnection. ISO staff can also facilitate web conferencing and conference calls to allow for participation for those who may have travel restrictions or scheduling issues.

## CONCLUSION

The energy imbalance market presents an important opportunity for improved reliability, enhanced renewable integration, and lower consumer costs by deploying technology

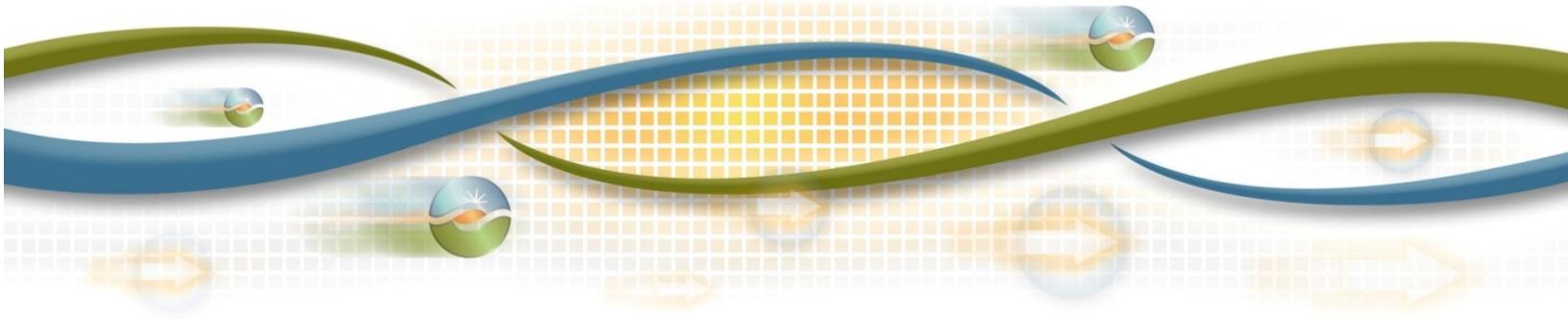
that automates system dispatch across participating balancing authorities. To succeed, participants in the ISO, balancing authorities outside of California, as well as their regulators, generators, customers, and non-profit organizations need confidence that they will have a voice in governance of the enterprise. This proposal offers a process for achieving that objective by relying on the expertise and commitment of these same parties. Management recommends Board approval of the transitional committee and the transitional committee charter that will facilitate engagement of participants across the west and expand the benefits of the energy imbalance market.

**Attachment 1**

# **Energy Imbalance Market**

## **Draft Final Governance Proposal**

**November 7, 2013**



## Table of Contents

1.	Introduction and Executive Summary .....	1
1.1.	Executive Summary .....	1
1.2.	Modifications from the Revised Governance Proposal .....	2
2.	Stakeholder Process.....	4
3.	Guiding Objectives for Governance Proposal .....	5
4.	EIM Transitional Committee .....	7
4.1.	Formation .....	7
4.2.	Committee Structure .....	7
4.2.1.	Number and Term .....	7
4.2.2.	Transitional Committee Stakeholder Process for Developing Governance Proposal .....	9
4.2.3.	Nomination and Appointment of Transitional Committee.....	9
4.2.4.	Sectors .....	11
4.2.5.	Logistics and Proposed Schedule for the Sector Nomination and Ranking Process.....	12
4.2.6.	Qualifications for Membership on the Transitional Committee.....	14
4.3.	Meetings.....	15
4.4.	Roles and Responsibilities .....	15
4.5.	Compensation, Reimbursement .....	17
5.	Independent EIM Governance Structure .....	18
5.1.	Independent Membership .....	18
5.2.	Specific Delegated Authority .....	18
6.	Conclusion.....	19



## 1. Introduction and Executive Summary

### 1.1. Executive Summary

The California ISO (ISO), as part of its proposal to offer Energy Imbalance Market (EIM) services to other balancing authorities in the west, has committed to work with EIM stakeholders through the stakeholder process to establish an EIM governance structure that encourages broad participation in EIM and ensures that all entities who participate in EIM have a meaningful role in decision-making. EIM stakeholders must play a key role in fostering a market that meets their current needs, and in influencing future changes to that market. Any EIM governance structure should have the objective of preserving for EIM participants, both at the outset and in the future, the significant and tangible benefits of the EIM. On August 13, 2013, the ISO presented its EIM governance straw proposal to build such a governance structure through a two-step process, with the first step completed before EIM becomes operational and the second step completed as soon thereafter as practicable. On October 4, 2013, the ISO presented a revised proposal that clarified and modified the initial proposal based upon stakeholder feedback. At the same time the ISO presented the draft charter for the advisory committee that the ISO proposes to establish. This paper presents a draft final proposal that makes additional clarifications and modifications based upon further stakeholder feedback in the revised proposal. Each version of the proposal has retained the fundamental two-step process for establishing an EIM governance structure.

The first step of that process is to establish a transitional EIM stakeholder advisory committee (the “Transitional Committee”) that would advise the ISO Board of Governors (“Board”) and ISO management on matters related to the pre-start-up testing phase and early operational phase of the EIM, as well as propose a path to an independent EIM governance structure, i.e. a structure that will be independent from EIM market participants, which will thus make it possible to satisfy FERC requirements for the ISO Board to potentially delegate substantial authority over EIM. The ISO proposes that the Transitional Committee have nine members at the outset and be established under existing Board authority as an advisory committee pursuant to the ISO’s bylaws.<sup>1</sup> Accordingly, the Transitional Committee will be able to begin its work quickly, without the need for FERC approval, as the market rules and processes that have been established through the current EIM stakeholder process are being tested, and can immediately begin designing a proposal for an independent EIM governance structure. The ISO is posting concurrently with this draft final governance proposal a draft final proposed charter for the Transitional Committee that reflects some modifications based on stakeholder comments. The final charter will be submitted to the Board for approval by December 2013, with the Transitional Committee scheduled to become operational in June 2014. The membership of the Transitional Committee will be established through a selection process, described in Section 4 below, that is intended to ensure a committee that is both broadly representative and capable of

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<sup>1</sup> See Amended & Restated Bylaws of California Independent System Operator Corporation, Article IV, Section 2. A copy of the ISO bylaws can be found on the ISO’s website at [http://www.caiso.com/about/Pages/OurBusiness/Publications\\_CorporateDocuments.aspx](http://www.caiso.com/about/Pages/OurBusiness/Publications_CorporateDocuments.aspx).



providing advice informed by substantial experience and expertise in relevant areas. The ISO proposes that the ISO management identify an ISO staff person who will perform a liaison function for the committee, attend committee meetings, and facilitate the provision of ISO support to the committee. This will ensure that the Transitional Committee has the benefit of ISO market design expertise and that it is informed regarding, and can accomplish its goals in conjunction with, the existing ISO governance and management structures. Finally, the ISO will provide the committee with logistical support for committee meetings, as well as legal advice and subject matter expertise, as appropriate, which will be coordinated through the committee liaison.

The second step in the process, and one of the key implementation-related responsibilities of the Transitional Committee, will be to develop a proposal for an independent EIM governance structure with specific defined authority over EIM on a going-forward basis. The ISO Board would be responsible for reviewing the proposal approving a proposed EIM governance structure, and authorizing ISO staff to seek FERC approval for any tariff revisions needed to implement the proposal. The ISO sets forth some basic parameters for the independent governance structure in Section 5 below, but does not seek to prescribe or prejudge any ultimate issues regarding the nature of the structure, its composition, or the scope or specific limits of its responsibilities because those issues are, in the ISO's view, more properly considered in the first instance by the Transitional Committee. The Transitional Committee will advise the ISO Board and management on development of a complete framework for EIM governance.

The exact schedule and process for developing the proposal for the independent EIM governance structure will be determined by the Transitional Committee through an open process that will, as discussed below, include a stakeholder process similar to that currently used by the ISO, including the iterative publication of proposals for stakeholder review and comment. While the Transitional Committee's work should be completed as soon as practicable, it could also provide important input as all parties gain experience with actual operation of the EIM market. Thus, this proposal envisions that the independent EIM governance structure will be established and begin operation within two years of the commencement of the Transitional Committee. This should allow sufficient time for experience with the EIM to inform the Transitional Committee's proposal.

This two-step proposal is designed to establish an EIM governance structure that can evolve and mature in tandem with the evolution of the EIM, meeting both immediate and longer-term governance needs. To that end, Section 3 of this paper discusses a set of guiding objectives that were used in developing this proposal and that the ISO believes should be central to the governance proposal that is ultimately implemented.

## **1.2. Modifications from the Revised Governance Proposal**

The final draft governance proposal includes the following primary changes and clarifications to the revised governance proposal:

- **Process and Schedule for Sector Formation and Deliberation:** The ISO proposes two modifications to the sector formation and deliberation process that are intended to simplify the logistics of the process and allow the sectors additional time to identify and

consider nominees. Specifically, the ISO has eliminated reliance on initial sector meeting coordinators and will instead designate ISO staff to facilitate the first sector conference call at which the sectors will organize themselves and appoint sector liaisons. The ISO has also extended the schedule for the sector nomination and ranking process to give the sectors and the ISO Board additional time to identify and finalize the Transitional Committee membership. Under the revised schedule, the Transitional Committee will be established by mid-May 2014 and will hold its first meeting in June 2014. This timing will allow the Transitional Committee to provide input on the early operational stage of EIM, and potentially on certain final pre-start up issues, in addition to developing a proposal for a long-term independent governance structure.

- **Sector Ranking of Transitional Committee Nominees:** The ISO has relaxed the requirement that sectors provide a unique ranking to every nominee identified in the sector nomination process. Sectors will still be required to rank all of the nominees identified in the sector nomination process and will be required to provide an individual ranking for at least each of the top twelve nominees. Sectors will not be required, however, to provide individual rankings for each of the nominees beyond the top twelve and instead will be permitted to rank those individuals in tiers or other groupings if the sector does not believe that it has a sufficient basis to make distinctions at the individual level. Sectors are nonetheless encouraged to provide individualized rankings to the greatest extent possible to ensure that the Board has the best and most detailed information possible from the sectors regarding their preferences among the nominees.
- **Candidate Information for Sector Nomination and Ranking:** To assist the sectors in identifying and ranking potential candidates for the Transitional Committee, the final draft proposal identifies six general qualities that should be considered in identifying and evaluating nominees. The criteria are identified in Section 4.2.6 below. The final draft proposal further requires that, in addition to submitting a resume, each candidate prepare a short narrative statement that sets forth their unique qualifications for participation on the Transitional Committee, including how those qualifications address the six general qualities identified in this proposal.



## 2. Stakeholder Process

In the April 4, 2013 Energy Imbalance Market Design Straw Proposal and Issue Paper, the ISO discussed various options for EIM market rule oversight and expressed an intent to engage stakeholders further on this issue. In response to stakeholder comments requesting a more in-depth discussion of this topic, the ISO committed in its May 30, 2013 Revised Straw Proposal to publish in August a proposal regarding EIM governance that would be considered in a parallel stakeholder process specifically dedicated to that issue. The ISO published its initial governance proposal on August 13, 2013, presented an overview of it at the August 20, 2013 EIM stakeholder meeting in Portland, and received written stakeholder comments on the proposal on September 6, 2013. The ISO published a revised governance proposal and draft charter for the Transitional Committee on October 4, 2013, held a stakeholder conference call on both documents on October 11, and received written stakeholder comments on October 25.

The EIM governance proposal set forth in this paper presents the ISO's draft final proposal for developing a structure for EIM rule oversight, based on the ISO's consideration of the stakeholder comments provided on its first two proposals and further consideration of the matter. The ISO intends to complete this process in time to allow for the formation and commencement of the Transitional Committee by June 2014.

The ISO is committed to provide ample opportunity for stakeholder input into the EIM Governance Proposal. This stakeholder process will shape the final governance structure through a series of proposals and written stakeholder comments. Stakeholders should submit written comments to [EIM@caiso.com](mailto:EIM@caiso.com).

The planned schedule for the remainder of the EIM governance stakeholder initiative is as follows:

- November 7, 2013: Draft final proposal and draft final proposed charter for Transitional Committee published for additional stakeholder comment
- November 12, 2013: Presentation materials for November 14 call posted
- November 14, 2013: Stakeholder conference call on proposal and charter
- November 25, 2013: Stakeholder comments due on draft final proposal and draft final charter
- December 18, 2013: Seek ISO Board approval of committee and charter
- May 16, 2014: Seek ISO Board decision establishing Transitional Committee membership
- June 2014: Initial meeting of EIM Transitional Committee

### 3. Guiding Objectives for Governance Proposal

In developing the EIM governance proposal, the ISO has considered the following three objectives to be of paramount importance:

- a. **Prompt and Direct Input:** The governance structure should promptly provide an effective, efficient and meaningful mechanism for stakeholder input directly to the ISO Board on EIM decision-making. This will ensure that the Board makes well-informed decisions during the early operational phase of EIM, and that stakeholders' voices are heard in this process.
- b. **Adaptable Structure:** The governance structure should be designed to be adaptable, so that it can evolve as necessary to address the changing needs of EIM as it matures and grows.
- c. **Promote Successful Implementation:** The governance structure should promote the successful implementation of EIM. To that end, the initial governance structure should be established under existing authority so as not to delay the overall implementation of the EIM initiative. The governance structure should also consider and seek to address the needs and interests of entities that have committed to participating in EIM, potential future EIM participants, existing ISO market participants, and other relevant stakeholders. The governance structure should also embrace a duty to the success of the EIM initiative as a whole.

The proposed two-step process attempts to meet each of these objectives. The first objective is met by establishing an initial advisory committee of interested stakeholders that can provide direct and ongoing input to the ISO Board and to ISO management during the final pre-start-up testing and early operational phase of EIM.

The second objective is met by including in the Transitional Committee charter the responsibility to develop a proposal for an independent EIM governance body that would meet the needs of EIM beyond the initial implementation phase. This second phase of the process will allow for an efficient and flexible EIM governance structure that can develop as conditions warrant, based on the experience and knowledge gained in the start-up and early implementation phase. For example, as discussed in Section 5 below, the ISO envisions that it would seek FERC's approval to establish an independent governance structure with certain decision-making authority regarding EIM market rules, which could include specified filing rights under the Federal Power Act. Such a structure would require that the membership of the EIM governing entity be independent of market participants, and it would thus be made up of a diverse group of individuals that are not employed by or affiliated with any EIM market participant. The individuals qualified to serve would also be prohibited from any financial interest in a market participant. Although the ISO's proposal would establish certain broad parameters with respect to such issues, the proposal intentionally avoids prescribing the specifics of this structure or of the nature or extent of any decision-making authority vested in this structure in order to allow such decisions to be informed by the deliberations and work of the Transitional Committee, the feedback and knowledge developed through the Transitional Committee's open stakeholder process, and the experience gained through EIM operation.



The third objective is met by providing a mechanism for broad and robust stakeholder involvement and engagement in the initial phase, followed by a design for a long-term independent governance structure that establishes an efficient and effective oversight mechanism that permits the ISO to continue to manage the market on a day-to-day basis in a way that is responsive to business, regulatory and stakeholder needs. Potential participants must accept, as part of their fundamental role, a responsibility to consider and promote the success of the EIM enterprise as a whole in the context of their decision-making.

## 4. EIM Transitional Committee

This section proposes the structural and substantive parameters for the formation of the Transitional Committee and its charter. It is based upon principles of “good governance” and the overall objectives of the proposal as detailed above. The overall structure of the Transitional Committee, as well as the process for establishing membership and duties of the committee, will ultimately be incorporated into the Transitional Committee charter, which will be submitted to the ISO Board for approval with the proposal to form the committee. The ISO is publishing a draft final of the proposed Transitional Committee charter concurrently with this draft final proposal for stakeholder consideration and comment.

### 4.1. Formation

The ISO proposes a Transitional Committee that would be formed by a resolution of the ISO Board, as allowed under existing ISO bylaws. This allows implementation of the resolution and work of the committee to begin quickly and in a capacity to inform the Board and management as the ISO works on the final aspects of EIM implementation in the latter half of 2014 and in the early stages of operation thereafter. In addition, this structure enables work on the design of a proposal for an independent EIM governing structure to begin quickly.

### 4.2. Committee Structure

The ISO proposes a structure of nine Transitional Committee members at the outset, with potential members nominated by a broad cross-section of EIM stakeholders. The members could vary by occupation, expertise and affiliation, and would not need to be affiliated with a stakeholder to qualify. Because the EIM potentially has important impacts throughout the Western Interconnection, the ISO proposes that a broad group of stakeholders within the interconnection should be involved in the nomination and selection process, with the stakeholders grouped into functional sectors for purposes of conducting the nomination and ranking of candidates, modeled after the process utilized for the ISO’s Board nomination process. The nomination process proposed is a two-step selection process in which all relevant stakeholder sectors nominate candidates and then rank the candidates for ultimate appointment by the ISO Board. Although the sectors would be used for nomination and ranking purposes, the ISO does not intend the sectors to continue in effect once they have served that function. The proposed selection process is discussed more fully below in Section 4.2.2.

#### 4.2.1. Number and Term

The ISO proposes a nine member committee initially because this size is large enough to provide broad representation of stakeholder interests, including significant geographic and other diversity, while still small enough to allow the members to work closely with one another to accomplish the committee’s goals. The ISO recognizes that there are many different types of stakeholders who potentially may wish to have a designee that is bound to represent the specific perceived interests of their group on the Transitional Committee. Establishing a committee that includes a defined representative charged with representing only the interests of his or her group or sector, however, would result in a committee that is potentially too large and unwieldy to move forward expeditiously in its deliberations. Although the ISO contemplates the use of sectors for establishing and ranking the pool of potential nominees, its proposal does not



contemplate that each member that is ultimately selected will come from a pre-defined sector or other interest group and will narrowly represent only the interests of that sector or group. Rather, the ISO contemplates that the members of the Transitional Committee will be a diverse group of stakeholders, whose primary charge will be to promote the success of EIM by developing a proposed long-term governance structure that will be capable of understanding and representing the diverse interests of all current and future EIM stakeholders. To ensure that the Transitional Committee, and ultimately the ISO Board, has the benefit of the input of all stakeholders in designing such a structure, the ISO's revised proposal requires the Transitional Committee to employ a public stakeholder process for vetting its governance proposal prior to bringing it to the Board. This process is discussed further below.

The ISO further proposes that the Transitional Committee charter would contain a provision permitting the ISO Board to increase the size of the committee by up to two additional members in the event that additional entities beyond the PacifiCorp corporate entities enter into energy imbalance market implementation agreements, thereby committing to be EIM Entities. This provision would ensure that entities that have an enhanced stake in EIM by virtue of such a commitment have a ready means for participating on this committee. As discussed in the draft charter, these additional committee seats would be made available to the first two additional EIM Entities that enter into implementation agreements formalizing their commitment to join. Affording these two entities an opportunity to participate directly on the Transitional Committee is intended to bring together the best thinking of those entities committed to implementing EIM in their BAA.

The ISO further proposes that the committee would be assisted by an ISO staff person, designated by ISO management, who would perform a liaison function for the committee, attend committee meetings, and facilitate the provision of administrative, legal, technical, and other subject matter expertise and support to the committee. This individual would not vote on any matters considered by the Transitional Committee, and instead would participate only in an advisory capacity. This would preserve the committee process and decision-making while ensuring that the Transitional Committee has the benefit of ISO market design expertise and insight and access to subject matter expertise on the issues the committee will be considering, which will be highly valuable for the committee as it advises the ISO Board on EIM governance and other matters.

Because the EIM Transitional Committee is designed as an interim advisory committee with one of its principal objectives to propose an independent EIM governing structure, the terms for its membership should be limited to the time necessary to accomplish its objectives. Based on the ISO's experience with its stakeholder process, the ISO believes a two-year term should be adequate time for the Transitional Committee to gain experience with the EIM, to prepare a proposal for an independent EIM governing structure for the ISO Board, and for that proposal to be implemented through appropriate tariff amendments. The charter will provide for the Transitional Committee's dissolution upon establishment and implementation of the long-term EIM governance structure, if completed in less than two years. If two years proves inadequate to complete and implement the proposal, or if other circumstances dictate that more time is needed, the charter will provide, upon ISO Board approval, for extended terms for existing Transitional Committee members or for the nomination and appointment of new members.



#### **4.2.2. Transitional Committee Stakeholder Process for Developing Governance Proposal**

To ensure that the long-term governance proposal reflects the input of all potentially interested parties, the Transitional Committee will be required to develop its proposal through an open stakeholder review and input process similar to the stakeholder initiative process currently used by ISO staff in developing proposals for the Board. Specifically, the Transitional Committee will be required to publish a series of draft proposals for stakeholder comment on an iterative basis, culminating in a final proposal for submission to the ISO Board. The Transitional Committee will also collect and consider written comments from interested stakeholders and will convene stakeholder meetings or teleconferences, as appropriate, to discuss and receive further input on iterations of the proposal. Stakeholders will also be able to communicate directly with the ISO Board at the meeting where the governance proposal is presented to the ISO Board, consistent with the process currently used for ISO staff proposals to the Board.

The ISO will make available to the Transitional Committee any administrative or logistical support that the committee may need to administer this stakeholder process. As discussed above, the ISO will also make available to the committee any legal, technical, or other subject matter expertise and support needed for the development of its governance proposal, including any legal input regarding whether a particular proposal is consistent with the ISO's existing by-laws, governing statutes, or other legal requirements. The Transitional Committee, however, will maintain sole responsibility for determining the content of the proposals that it develops and presents throughout the stakeholder process. More specifics regarding the stakeholder process are set forth in the draft final proposed Transitional Committee charter that is being published concurrently with this draft final proposal.

#### **4.2.3. Nomination and Appointment of Transitional Committee**

This proposal calls for the Transitional Committee members to be selected through a nomination and appointment process. EIM stakeholders will identify with one of the seven sectors described in Section 4.2.4 below. Each sector will provide a list of recommended nominees for the ISO Board's consideration, and the ISO Board will appoint from that list. The ranking process is generally modeled after the ISO's Board selection process, whereby a group of representatives from each stakeholder sector separately ranks the nominees, including both those nominees that are sector-nominated and those that are self-nominated. The sector rankings are then combined to constitute one list of ranked nominees. While the Board will maintain discretion as to member appointments, the Transitional Committee charter will mandate that the Board limit the selection to the stakeholder-ranked list, and give due consideration to stakeholders' rankings. This process would comport with the ISO bylaws and provide an opportunity for the Board to review the nominees' qualifications and make an informed decision as to appointments.

To ensure that EIM Entities will have a voice on the Transitional Committee, the ISO's proposed Transitional Committee charter states that at least one of the nine committee members must be an individual from an EIM Entity that will be selected by the Board outside of the sector nomination process. As noted above, if there is more than one corporation that has entered into an energy imbalance market implementation agreement and thereby has committed to be an EIM Entity, the size of the Transitional Committee will be expanded by one or two seats (depending upon the total number of such entities), so that the first three such EIM Entities in total will be able to participate on the Transitional Committee.



The first step in the committee selection process would consist of obtaining nominations for committee membership. The process would include individual self-nominations as well as at least two nominations by each stakeholder sector, as discussed below, which would be organized according to the committee charter. In order to allow for consideration of a broad pool of nominees, the charter will not provide for a maximum number of nominees per stakeholder sector. Individuals or companies who wish to self-nominate a candidate should do so within the context of the sector nomination process by placing the nominee on the sector nomination list of the individual or company's choice. Self-nominations may only be included in one sector nomination process.

Once a list of nominees is compiled, the next step would be for the sectors to rank the nominees for consideration of appointment by the ISO Board. For this step, each stakeholder sector would rank all of the nominees, including all of the nominees identified by other sectors. This approach is preferable to having each sector rank only its own nominees because it will assist the Board in understanding the overall support for the various nominees and thereby enable the Board to make a better informed decision in determining the ultimate composition of the Transitional Committee. The sectors will be required to establish individual rankings for at least the top twelve individual nominees. While sectors will be encouraged to establish individual rankings for all nominees, they will not be required to do so beyond the top twelve and instead will be permitted to rank those individuals in tiers or other groupings if the sector does not believe that it has a sufficient basis to make distinctions at the individual level. The ISO encourages the sectors to provide individualized rankings to the greatest extent possible because this information will assist the Board in making its decisions based upon the best and most detailed information available.

The nomination and ranking process will be accomplished by engaging sector liaisons who can organize relevant stakeholders within their respective sectors to nominate and rank the nominees according to preference. Although the sector liaisons in consultation with their respective sectors may each establish a unique approach to the specifics of candidate ranking, guidance on qualities that should be considered in identifying and considering the best candidates is discussed below in Section 4.2.6. The basic logistics and schedule for the nomination and ranking process are also discussed below in Section 4.2.5. This process should ultimately result in a list of ranked nominees that would be provided to the ISO Board for consideration in making appointments to the committee. To protect the privacy interests of the nominees, the ISO Board will maintain as confidential the overall rankings of the nominees, as well as the Board's deliberations regarding the merits of the nominees.

The process can be summarized as follows:

- Each interested stakeholder identifies with one of the seven sectors;
- Each stakeholder sector conducts open nominations, including any self-nominations, and each sector nominates at least two nominees;
- Each stakeholder sector, through meetings facilitated by sector liaisons, will rank at least the top twelve individual nominees (both self-nominated and sector nominated) with the remainder ranked either individually or in groupings or tiers, thus resulting in seven

separate rankings of the list. These ranked listings will be compiled and submitted to the ISO Board for ultimate appointment of the members;

- ISO Board will appoint nine Transitional Committee members, with eight of the members coming from the list of ranked candidates and one member from an EIM Entity;
- The number of members will be increased by up to two members if additional EIM Entities join, either before or after the nomination process is completed, in order to accommodate seats for the first two additional EIM Entities.

The committee, once appointed, would be empowered by its charter to select its chair by majority vote of the committee members.

#### 4.2.4. Sectors

Based on the existing EIM framework, ISO proposes the following seven stakeholder sectors, which will be used for nominating and ranking individuals to serve on the EIM Transitional Committee:

- *Investor owned utilities*: Investor owned utilities are corporations that provide electric service to retail customers and are owned by private shareholders who are distinct from the ratepayers served by the entity. All such entities may participate in this sector. Entities that meet these criteria and that provide wholesale generation or transmission services, in addition to retail service, may also participate in this sector. Entities that do not provide retail electric service to end users may not participate in this sector.
- *Publicly owned utilities*: Publicly owned utilities are governmental entities (such as municipal utilities or utilities controlled or operated by a local, state, or federal governmental entity) that provide electric service to retail customers and other ratepayer-owned entities (such as rural electric cooperatives and irrigation districts) that provide electric service to retail customers. All such entities may participate in this sector. Entities that meet these criteria and that provide wholesale generation or transmission services, in addition to retail service, may also participate in this sector. Entities that do not provide retail electric service to end users may not participate in this sector.
- *Generators and marketers*: Generators and marketers are entities that engage in the wholesale purchase or sale of electric energy or capacity. Entities may participate in this sector without regard to the fuel source of the underlying generation.
- *Alternative energy providers*: Alternative energy providers are entities that engage in the wholesale purchase or sale of electric energy or capacity using non-traditional fuel sources such as solar, wind, geothermal, or energy storage.
- *EIM participants*: EIM participants are EIM Entities (as defined in the CAISO's September 23, 2013 EIM Draft Final Proposal) as well as any entity that provides

wholesale generation, transmission service or retail electric service within the Balancing Authority of an EIM Entity.

- *Governmental agencies:* Governmental agencies are federal, state, or local governmental entities or units that are involved in the regulation, oversight, or establishment of policy with regard to electric service but who do not provide electric service.
- *Public interest entities:* Public interest entities are formally established, non-profit groups that engage in policy development or advocacy on issues that include or relate to electricity. To qualify for this category, an entity must be an ongoing group that was not established on an ad hoc basis specifically for purposes of participating in the sector nomination and ranking process.

As noted, these sectors are for nomination and ranking purposes only and will not continue in effect after those processes are completed.

To promote broad participation and ensure that the ISO Board has the input of a wide cross-section of interested parties, the ISO proposes that any entity who has a specific interest in EIM and fits within one or more of the above sector definitions and is located in (or for public interest entities is either located in or represents members located in) the Western Interconnection may participate in the sector nomination and sector ranking process.

The ISO recognizes that the first five sector definitions are sufficiently general that some companies or entities may fall within more than one sector category. In that event, the company or entity may choose which sector to participate in but any such company or entity must participate in only one sector category and is entitled to only one vote in the sector ranking process.

The ISO believes these sectors will provide a broad array of EIM stakeholders an opportunity to participate in the committee selection process, which will ensure that the ISO Board is well informed when it establishes the membership of the Transitional Committee. The ISO's proposal also seeks to logically align similar interests in each sector, which should facilitate a balanced nomination ranking process that gives due weight to the rankings of each sector.

#### **4.2.5. Logistics and Proposed Schedule for the Sector Nomination and Ranking Process**

The ISO contemplates that the sector nomination and ranking process will be coordinated primarily by liaisons for each sector with necessary logistical support supplied by the ISO. The process will begin after Board approval of the governance proposal and the Transitional Committee charter. The ISO will send out a broad market notice that invites interested parties to submit to the ISO, via a template form emailed to [EIM@caiso.com](mailto:EIM@caiso.com), the sector in which the entity will be participating, the name of the individual point of contact, that individual's contact information, and whether the individual is interested in serving as the sector liaison. The ISO will then publish on the EIM webpage the sector membership list, contact information, and a list of those interested in the liaison position, and will schedule an initial conference call for each sector.



At the initial sector conference call, the first step will be for the sector to establish a sector liaison who will serve in that capacity throughout the nomination and ranking process. The ISO suggests that the first meeting objectives also include discussion of:

- Procedures and tasks for the sector;
- Nomination and ranking process;
- Schedule of meetings to accomplish the tasks in a timely manner; and
- The need for and type of assistance the sector may wish to request of ISO staff.

The sectors will then proceed to hold one or more meetings or conference calls to continue to discuss process, identify potential nominees, and ultimately establish a list of nominees. The list will include both individuals that the sector as a group has identified as nominees and who have agreed to be nominated, as well as individuals (if any) from entities within the sector that have been “self-nominated” by the entity. Each of the nominees should provide a resume that describes the individual’s relevant background, experience, and supporting information. Each nominee should also prepare a short narrative statement that sets forth the individual’s unique qualifications for participation on the Transitional Committee, including how those qualifications address the six general qualities identified below in Section 4.2.6 of this paper.

By an established deadline, each sector will submit its complete list of nominees, together with supporting resumes and narrative statements, to the ISO assistant corporate secretary. The ISO assistant corporate secretary will then compile a master list of nominees that will be circulated to each sector for the ranking process. The sectors will then convene meetings or conference calls to establish a sector ranking for at least the top twelve nominees. While sectors will be encouraged to establish individual rankings for all nominees, they will not be required to do so beyond the top twelve and instead will be permitted to rank the remaining individuals in tiers or other groupings if the sector does not believe that it has a sufficient basis to make distinctions at the individual level. These sector rankings and any tiers or groupings will be submitted to the ISO assistant corporate secretary, who will compile the rankings and any additional information for consideration by the ISO Board.

Throughout the sector nomination and ranking process, ISO staff will be available to the sector liaisons for the purpose of administrative or logistical support as may be needed and to address any process questions that may arise.

The ISO proposes the following schedule for the sector nomination and ranking process and for establishing the membership of the Transitional Committee:

- December 18, 2013: Seek ISO Board approval of the governance proposal and charter
- December 19, 2013: ISO issues market notice requesting interest in sector participation, contact information, interest in serving as sector liaison, and establishing initial deadlines
- January 14, 2014: Deadline for entities to notify ISO of interest in sector participation, contact information, and interest in sector liaison role

- January 21, 2014: ISO hosts first sector conference calls, sectors identify their sector liaison, discuss nomination process and establish regular meeting schedule. At this point the sector should also decide if they would like the assistance of ISO staff or if they want to manage their own sector work
- January 22 – March 4, 2014: Sectors meet and discuss nomination and ranking process, solicit invitations for nominations
- March 4, 2014: Deadline for sectors to complete the nomination process and submit list of nominations and supporting candidate information to the ISO assistant corporate secretary
- March 6, 2014: ISO assistant corporate secretary creates and publishes the master list of nominations for sector ranking
- March 7 – April 15, 2014: Sectors meet and discuss ranking process
- April 15, 2014: Deadline for sectors to complete nominee rankings and submit ranked list of at least the twelve top nominees to ISO assistant corporate secretary. Also to be submitted will be any tiers or groups created above and beyond the top twelve nominees, and a summary of the rationale used in the sector ranking process. This will be added to the packet provided to the Board and will further assist the Board in selecting members of the Transitional Committee
- May 15, 2014: Board meeting in public session to vote on the proposed membership list and seat the Transitional Committee

#### **4.2.6. Qualifications for Membership on the Transitional Committee**

The minimum qualifications for Transitional Committee eligibility should be directed toward establishing a diverse and sophisticated committee to advise on EIM matters and to develop a proposed permanent governance structure. Thus, qualifications should include requirements that members have broad and relevant industry experience, as well as expertise in areas most relevant to the EIM development. Further, based on the regional aspect of the EIM, Transitional Committee membership qualifications should include geographic diversity so the various regional interests are represented.

All potential candidates should possess a proven reputation for excellence in their areas of expertise, and optimally should reflect a diverse geographic background (e.g., members from multiple balancing areas) and viewpoint (e.g., no two government officials from the same administration and no two committee members from the same corporation). Qualities that should be considered in identifying and considering potential nominees should include:

- Proven leadership skills with respect to diverse and complex issues;
- Understanding of regional issues;
- Ability and willingness to consider and represent a broad range of perspectives;
- General industry experience;
- Support for the success of EIM; and

- Availability to participate in the Transitional Committee on an ongoing basis.

These qualifications will serve a dual purpose. First, they should guide the sectors in ranking nominated candidates. Second, the ISO Board will consider these qualifications when appointing Transitional Committee members within the rankings. Thus the Board will exercise discretion, within the bounds of the qualifications, when selecting members for appointment to ensure that the committee has the appropriate mix of expertise and background among its members. Although the rankings resulting from the sector nomination and ranking process will provide important guidance and will be carefully considered by the Board, geographical and viewpoint diversity will be ensured by the Board through the exercise of its discretion in establishing a well-balanced and diverse committee.

#### **4.3. Meetings**

For the Transitional Committee to effectively advise the ISO Board, it should conduct meetings at least as frequently as the ISO Board. Also, its meetings should generally precede ISO Board meetings so that the committee may advise the ISO Board, where appropriate, in a timely manner. The charter will also provide for additional meetings, as deemed necessary by the committee.

The ISO bylaws require that, as an advisory committee to the ISO Board, the Transitional Committee comply with the ISO Open Meeting Policy. That policy mandates that all general session committee meetings provide an opportunity for public comment, be noticed according to the policy, and be accessible to the public.

Committee meetings must be held at a location where the public can attend, either in person or via telephone or some other electronic means such as the Web. Committee members are encouraged to attend in person for those meetings that are established as in-person gatherings, but may participate by telephone where necessary, including if in-person attendance would pose a logistical or financial hardship. The ISO headquarters may serve as a meeting location, however, the charter will provide for alternative meeting locations so that the committee can meet as needed while minimizing travel for the committee members and other interested parties who may wish to attend or need to present at committee meetings. The Open Meeting Policy also provides for closed executive session meetings for specific enumerated matters, which include presentation or discussion of confidential and proprietary or security-sensitive information, as relevant to the EIM matters. Further, the ISO corporate secretary will assist the committee in fulfilling its open meeting obligations.

#### **4.4. Roles and Responsibilities**

The charter will address the following matters with respect to the roles and responsibilities pertinent to the functioning of the Transitional Committee.

##### **Transitional Committee**

The Transitional Committee will serve two roles. First, it will advise the ISO Board on all matters related to the pre-start-up testing and early operational phases of the EIM. This role will include providing advice on all EIM market design initiatives, all matters pertaining to the



setting of EIM transmission access charges or rights, if any, and other EIM-related matters. ISO management will develop and present EIM-related proposals to the Board, as happens today, and the committee will advise the Board as to its position on ISO management's proposal. The committee will be allowed to request, as needed, a spot on the Board agenda for all matters it is interested in presenting. As a Board advisory committee, recommendations and advisory opinions should be presented in written memos issued in advance of a scheduled ISO Board meeting and in presentations at regularly scheduled ISO Board meetings. The charter will set forth voting requirements, for a quorum of two-thirds of the committee members and an affirmative vote of a majority of the members then appointed for a majority opinion. To ensure that the ISO Board is fully advised of all positions, if the committee develops a majority *and* a minority position on any particular EIM issue, it should advise the ISO Board of both positions in writing. It should be noted, however, that membership on the Transitional Committee does not prevent a stakeholder from presenting its own views to the Board, if it desires to do so.

Although the Transitional Committee may share its views with the Board on all matters related to the pre-start-up testing and early operational phases of EIM, this role is advisory in nature and is intended to supplement, not supplant, the ISO's existing stakeholder processes for EIM implementation. Moreover, unlike the process for developing a long-term governance proposal, the Transitional Committee is not expected to undertake its own formal stakeholder process in connection with providing input on issues relating to the start-up and early operation of EIM, as this would be duplicative of existing stakeholder processes. Rather, the Transitional Committee's advice should be developed in connection with any ongoing stakeholdering by ISO staff on such topics and should be presented to the Board within the same timeframes as are used by ISO management for bringing such issues to the Board.

Second, the committee will develop a detailed proposal for an independent EIM governance structure. The charter for the Transitional Committee will provide certain general parameters for developing this proposal, as discussed below. Although the exact timing would be established by the committee, the ISO expects that the committee will submit the proposal to the ISO Board for consideration within eighteen months after the committee is first seated. This timing is intended to allow the proposal to be fully stakeholdered (as discussed above) before its submission to the Board and implemented within approximately two years after the committee is seated.

### **Transitional Committee Members**

Transitional Committee members will have the responsibility of complying with the committee's mission, which will be detailed in the mission statement in the committee's charter. The mission will consist of working at all times in the best interest of the Transitional Committee, in the interest of facilitating an effective and efficient EIM, and for the success and potential regional growth of the EIM.

Also, from time to time, committee members may require access to confidential information of the ISO or EIM participants to fulfill their duties. Accordingly, they will be obligated, as members of an ISO advisory committee, to maintain the confidentiality of such information, and will be bound by non-disclosure requirements, in a committee membership agreement as prescribed by the charter, so that the ISO may fulfill its tariff obligations regarding the handling of confidential information.



## **ISO Board of Governors**

The ISO Board will have the responsibility of giving Transitional Committee opinions and positions serious consideration on any EIM matter. To that end, it will engage the committee on a regular basis when EIM matters are being considered, and will reserve, as needed or as requested by the committee, space on the agenda of such meeting items for the committee's input.

## **ISO Management**

ISO management will continue to develop and present all EIM market rule change proposals to the Board, though with the benefit of input received from the Transitional Committee. Specifically, management will coordinate with the Transitional Committee on the stakeholder process for EIM proposals to enable the committee to develop its advice for the Board, and will consider any EIM proposals made by the Transitional Committee. Further, as discussed above an ISO-designated staff member will attend committee meetings, perform a liaison function, and facilitate the provision of support to the committee.

Additionally, ISO management will provide administrative support for the Transitional Committee so that it may conduct its business and fulfill its obligations. This support will include advice and assistance by the corporate secretary in fulfilling the committee's Open Meeting Policy obligations, as well as general office and communications support to ensure that the committee can satisfy its objectives.

### **4.5. Compensation, Reimbursement**

The ISO proposes that Transitional Committee members serve without compensation and that members' affiliated entities should be responsible for all costs and travel expenses associated with the committee (e.g., meeting attendance and committee work).

## 5. Independent EIM Governance Structure

To achieve the second phase of the EIM governance implementation, the charter will require the Transitional Committee to develop a proposal for an independent EIM governance structure comprised of non-market participants. Moving to a structure comprised of participants who are independent of individual market participants will make it possible to satisfy FERC requirements for the ISO Board to potentially delegate substantial authority over EIM, and provide for a governance structure that will allow for efficient, meaningful and nimble EIM market oversight. The Transitional Committee charter will provide some basic guidelines and parameters for such an EIM governing structure, but only at a very general level. Major policy and design aspects of the proposal will be for the Transitional Committee to develop through its own process. The ISO has not predetermined any particular structure or composition for the long-term governance structure, or any particular outcome regarding the scope or nature of its authority, and instead leaves those issues open in the first instance to the Transitional Committee to consider in developing its proposal. The proposal developed by the committee will be submitted to the ISO Board for consideration and approval.

### 5.1. Independent Membership

To enable the ISO board to potentially delegate a level of EIM tariff authority, FERC regulations mandate that members of the EIM governing structure be independent from EIM market participants. This membership characteristic would put the EIM governance structure in a position to exercise EIM decision-making authority. Accordingly, independence is a necessary requirement for the Transitional Committee's proposal which will be included in its charter. Within the guidelines and principles in the charter, the Transitional Committee will have discretion to craft its proposal as to all other aspects of the EIM governance, such as the structure of the independent EIM body, including the qualifications for membership, the number of members, their terms, their selection process – including as relevant a nomination and election process – how they will make decisions, the scope and nature of their authority and role, and other design elements.

### 5.2. Specific Delegated Authority

A principal consideration in the design of an independent EIM governance structure is the potential to provide the relevant body with specific authorized EIM tariff authority. This authorization would occur through an amendment to the ISO tariff. While the precise details of any such authority would be for the Transitional Committee to propose, some guiding principles for any such authority are set forth in the charter, including that: 1) any such authorization must provide a meaningful and clear role for the EIM body; 2) the structure must remain nimble, to allow for efficient decision-making; and 3) the structure should encourage cooperation that will prevent dueling filings at FERC and thus would need to include a mechanism to resolve any disagreements between the EIM governance body and the ISO Board. This would include a mechanism to sort through changes to the ISO market that would have effects on the EIM market structure and vice versa. Throughout the course of developing its proposal, the Transitional Committee would have access to the ISO's legal staff for input on any legal questions or issues relating to any proposed governance structure or arrangement that the committee may be considering.



## **6. Conclusion**

In developing this draft final proposal, the ISO has reviewed the best practices of other similar organizations and considered each of the comments submitted by stakeholders on the revised version of the proposal. The ISO believes that this proposed structure and process provides for a viable and efficient means of providing meaningful stakeholder input on EIM matters. The proposal will provide a nearly immediate means for stakeholders to provide important input, as well as a path to an independent EIM governance structure with specific authority regarding EIM issues.

The governance structure discussion will likely require a varied set of stakeholder input, including both stakeholders that are already involved in EIM market design issues, as well as others who may not yet have been involved in the ISO's ongoing EIM stakeholder process. The ISO welcomes, and strongly encourages, continued broad participation in the governance discussion from all interested parties throughout the region and looks forward to productive dialogue and feedback on these issues.



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**Energy Imbalance Market Transitional Committee  
Charter**



## REVISION HISTORY

VERSION NO.	DATE	DESCRIPTION
1.0		

**TABLE OF CONTENTS**

I.	Establishment.....	3
II.	Membership.....	3
	A. Qualifications .....	3
	B. Number and Term.....	4
	C. Nomination and Appointment.....	4
	D. Chair .....	7
	E. Compensation and Reimbursement.....	8
	F. Confidentiality .....	8
	G. Removal of Members Prior to Expiration of Term .....	8
III.	Meetings of the EIM Transitional Committee.....	8
	A. Time and Place .....	8
	B. Voting.....	9
	C. Meeting Procedures.....	9
	D. Secretary.....	9
	E. Public Comment.....	9
	F. Administrative Support.....	10
IV.	Responsibilities of the EIM Transitional Committee.....	10
	A. Advise ISO Board of Governors.....	10
	B. Develop Proposal for a Long-Term EIM Governance Structure.....	10

This charter prescribes the membership, responsibilities and administration of the transitional Energy Imbalance Market (EIM) advisory committee (Transitional Committee), of the California Independent System Operator Corporation.

This charter is intended as a component of the governance framework within which the ISO Board of Governors (Board) and its committees direct the affairs of the ISO. While it should be interpreted in the context of applicable law, as well as in the context of the ISO's bylaws, it is not intended to establish any legally binding obligations.

## I. Establishment

The EIM Transitional Committee has been established by the ISO, pursuant to the ISO's bylaws and by resolution of the Board, to serve as an advisory committee to the Board that will perform two roles. First, it will advise the Board on matters related to the final testing and early operational phase of EIM. Second, it will develop a proposal for a long-term EIM governance structure with specific defined authority over EIM on a going-forward basis.

## II. Membership

### A. Qualifications

The Transitional Committee should be a diverse and sophisticated committee that can advise on EIM matters, and develop a proposed long-term EIM governance structure for the Board's consideration. Therefore, members should have broad and relevant industry experience, as well as expertise in areas most relevant to development of the EIM. These areas include experience in governance, corporate, legal and financial matters, electricity or other regulated industry management and market design.

Further, all members should possess a proven reputation for excellence in their areas of expertise, and optimally should reflect a diverse geographic background (e.g., members from multiple balancing areas) and viewpoint (e.g., no two government officials from the same administration and no two committee members from the same corporation). Finally, all members should be committed to the successful implementation and operation of the EIM, including fulfilling the Transitional Committee's duty to develop a proposal for a long-term EIM governance structure.

Qualities that should be considered in identifying and considering potential nominees should include:

- Proven leadership skills with respect to diverse and complex issues
- Understanding of regional issues

- Ability and willingness to consider and represent a broad range of perspectives
- General industry experience
- Support for the success of EIM
- Availability to participate in the Transitional Committee on an ongoing basis

## B. Number and Term

The Transitional Committee will initially consist of nine members. The Board will appoint an additional member for each of the next two entities that executes an EIM implementation agreement. Any additional member will be appointed on a first come first served basis, based on the date upon which the entity executes an EIM implementation agreement.

Each Committee member will serve a term that begins upon appointment and execution of a Transitional Committee Member Agreement and lasts until the committee's governance proposal is considered and, if applicable, approved by the Board of Governors and implemented, or is otherwise terminated according to this Charter. This period is expected to last approximately two years from initial formation of the Transitional Committee.

If a member is unable to continue serving on the committee for the duration of the term, the Board may, in its discretion, appoint a new member as a replacement. The Board shall consider the list of nominees provided to the Board by the stakeholder sectors as part of the original nomination process in determining a replacement but shall not be limited to that list and may consider, after a stakeholder process, other potential candidates, including, but not limited to any candidates recommended by the remaining Transitional Committee members.

## C. Nomination and Appointment

Members of the Transitional Committee will be selected through a nomination and appointment process.

### 1. Nomination

The nomination process will be organized through stakeholder sectors, identified and defined below.

Any entity that fits within any of the following seven stakeholder sector descriptions is eligible to participate in the sector nomination and ranking process for identifying candidates to serve on the EIM Transitional Committee:

1. **Investor owned utilities:** Corporations that provide electric service to retail customers and are owned by private shareholders who are distinct from the ratepayers served by the entity. All such entities may participate in this sector. Entities that meet these criteria and that provide wholesale generation or transmission services, in addition to retail service, may also participate in this sector. Entities that do not provide retail electric service to end users may not participate in this sector.
2. **Publicly owned utilities:** Governmental entities (such as municipal utilities or utilities controlled or operated by a local, state, or federal governmental entity) that provide electric service to retail customers and other ratepayer-owned entities (such as rural electric cooperatives and irrigation districts) that provide electric service to retail customers. All such entities may participate in this sector. Entities that meet these criteria and that provide wholesale generation or transmission services, in addition to retail service, may also participate in this sector. Entities that do not provide retail electric service to end users may not participate in this sector.
3. **Generators and marketers:** Entities that engage in the wholesale purchase or sale of electric energy or capacity, and Energy Service Providers and Community Choice Aggregators as defined in the California Public Utilities Code. Entities may participate in this sector without regard to the fuel source of the underlying generation.
4. **Alternative energy providers:** Entities that engage in the wholesale purchase or sale of electric energy or capacity using non-traditional fuel sources such as solar, wind, geothermal, or energy storage.
5. **EIM participants:** EIM Entities (as that term has been defined by the ISO in its substantive design proposals for the Energy Imbalance Market) and any entity that provides wholesale generation, transmission service or retail electric service within the Balancing Authority of an EIM Entity.
6. **Government agencies:** Federal, state, or local governmental entities or units that are involved in the regulation, oversight, or establishment of policy with regard to electric service but who do not provide electric service.
7. **Public interest entities:** Formally established, non-profit groups that engage in policy development or advocacy on issues that include or relate to electricity. To qualify for this category, an entity must be an ongoing group that was not established on an ad hoc basis for purposes of participating in the sector nomination and ranking process.

In the event that any entity may properly be classified as falling into more than one of the identified sectors, the entity must elect only one sector through which to participate in the sector nomination process and is entitled to only one vote in the sector nominee ranking process.

The ISO will facilitate the initial stages of the nomination process by inviting parties

to submit to the ISO, via a template form emailed to [EIM@caiso.com](mailto:EIM@caiso.com), the sector in which the entity will be participating, the name and contact information of the entity's individual point of contact, and whether the individual is interested in serving as the sector liaison. The ISO will then publish on the EIM webpage the sector membership list, contact information, and a list of persons interested in acting as sector liaison.

The ISO will set up an initial conference call for each sector, during which the sector will establish its liaison. That person will serve in that capacity throughout the nomination process and be responsible for coordinating the sector meetings to appoint and rank nominees. Thereafter, each stakeholder sector will proceed to compile a list of at least two nominees for consideration by all EIM stakeholder sectors. In addition, any interested person may self-nominate, into only one sector for ranking by the EIM stakeholder sectors. Sectors may nominate only individuals who have confirmed a willingness to serve on the Transitional Committee if appointed. Nominees do not need to be affiliated with an EIM stakeholder to be eligible. To receive consideration for appointment, all initial nominations must be submitted by the sector liaison to the assistant corporate secretary by no later than March 4, 2014 (or another date as may be established, if necessary, by the Board). Each nominee should submit a resume that describes the nominee's relevant background, experience and supporting information. Each nominee should also prepare a short narrative statement that sets forth the individual's unique qualifications for participation on the Transitional Committee, including how those qualifications align with the membership qualifications contained in section II.A. of this charter. Individuals or companies who wish to self-nominate a candidate should do so within the context of the sector nomination process by submitting the nomination to the sector of the individual or company's choice. Self-nominations may only be included in one sector nomination process.

Each stakeholder sector will then numerically rank at least their top twelve nominees, including nominees identified by other sectors and self-nominations, in order of preference, with number 1 being the most preferred. While sectors are encouraged to establish individual rankings for all nominees, they will not be required to do so beyond the top twelve and instead will be permitted to rank the remaining individuals in tiers or other groupings if the sector does not believe it has a sufficient basis to make distinctions at the individual level. Ultimately, seven separate rankings (one per sector) of all nominees will be created for Board consideration. Stakeholder sector liaisons will determine, by general consensus, the ranking process whereby each sector will rank the nominees. By no later than April 15, 2014 (or another date as may be established, if necessary, by the Board), each sector liaison will submit to the ISO Assistant Corporate Secretary the ranked list of nominees, including the additional rankings by tiers or other groupings, which will be compiled and submitted to the Board of Governors for consideration.

## 2. Appointment

The ISO Board of Governors will appoint all members of the Transitional Committee pursuant to a resolution, as permitted by the ISO bylaws. The Board will give careful consideration to the membership qualifications detailed within the charter and the rankings provided by the stakeholder sectors in establishing the membership of the Transitional Committee. The Board must appoint eight of the nine members from the ranked lists of nominees provided by the stakeholder sectors. The Board must also appoint to the Transitional Committee one member nominated by the first EIM Entity to sign an EIM implementation agreement. This selection will be outside of the stakeholder nomination process. The Board must also appoint to the Transitional Committee up to two additional members beyond the initial nine members in the event that additional EIM Entities sign implementation agreements with the seats allocated based on priority to the earlier of the execution of an EIM implementation agreement.

Each individual member must execute a Transitional Committee Member Agreement as a condition of membership on the committee. The agreement is a formal agreement that covers all relevant requirements pertinent to the committee and is consistent with the charter. Areas covered in the agreement include adherence to the charter, the scope of work, and the handling of confidential information.

## 3. ISO Liaison

An ISO staff person, designated by ISO Management, will serve as a liaison to the Transitional Committee, attend committee meetings, and facilitate the provision of ISO support to the committee. The ISO liaison will not vote on any matters considered by the Transitional Committee, and instead will participate only in an advisory capacity. The ISO will designate a staff person with appropriate experience and qualifications to support the Transitional Committee in its functions. The ISO may change this designation as it deems necessary.

## D. Chair

The members of the EIM Transitional Committee shall elect a Chair, subject to confirmation by the Board, who shall have the following duties:

- Preside over meetings
- Manage and facilitate the Transitional Committee's work load and schedule
- Ensure the quality and timely completion and delivery of any deliverables of the Transitional Committee, including but not limited to any majority and minority opinions
- Serve as the ISO's primary contact for the Transitional Committee, and
- Request the assistance of other Transitional Committee members, EIM

stakeholders, and ISO staff in accomplishing any of these and any other related responsibilities.

#### **E. Compensation and Reimbursement**

Members of the Transitional Committee will serve without compensation or reimbursement by the ISO. All costs associated with travel to and attendance at committee meetings, or otherwise related to committee membership is the responsibility of the members or their affiliated entities.

#### **F. Confidentiality**

Non-public information received or developed by the Transitional Committee (or its members in their capacity as committee members) may not be disclosed outside of the Transitional Committee and the ISO without authorization of the Board of Governors. The Transitional Committee will not disclose information that it has received subject to a specific disclosure restriction except after consultation with the ISO General Counsel and in accordance with applicable law.

#### **G. Removal of Members Prior to Expiration of Term**

The Board may remove, by a two-thirds vote, a member of the Transitional Committee prior to the expiration of that member's appointed term for failure to perform his or her duties or comply with the applicable provisions of this Charter.

### **III. Meetings of the EIM Transitional Committee**

#### **A. Time and Place**

The EIM Transitional Committee will fix its own time and place of meetings and will prescribe its own rules of procedure, consistent with the requirements of the ISO bylaws. The committee will meet to vote on any advice or opinion to be issued by the committee. The committee will meet at least as frequently as the ISO Board in accordance with a calendar established by the committee and will also meet at the call of the Chair. Generally, committee meetings should precede ISO Board meetings so that the committee may advise the ISO Board in a timely manner.

The committee may conduct additional meetings as it deems necessary in its sole discretion. While in-person participation is strongly encouraged, members may participate in a meeting telephonically if circumstances are such that they cannot attend in person.

The ISO will make its Folsom offices available for all committee meetings, as desired by the committee. The committee may, however, meet by phone or Web

conference, or at any other location geographically located in the Western Interconnection where there is public access to the meetings as proscribed by the ISO's Open Meeting Policy. Committee members are encouraged to attend in person for those meetings that are established as in-person gatherings, but may participate by telephone or Web conference where necessary, including if in-person attendance would pose a logistical or financial hardship.

#### **B. Voting**

A quorum is two-thirds of the members then in office, and is required for the committee to conduct its business. An affirmative vote of a majority of the members then in office is necessary for any action other than the decision to submit a minority opinion of the committee to the Board. When the committee has developed a majority and a minority opinion, or multiple opinions with an evenly split vote, on any topic for the Board's consideration, an affirmative vote of at least two committee members is necessary to require the opinions be provided to the Board for consideration.

#### **C. Meeting Procedures**

All meetings will be held pursuant to the ISO bylaws and Open Meeting Policy then in effect with regard to notice and waiver thereof, public access to the meetings and formal actions of the committee. Materials submitted to the Transitional Committee, and written minutes of each meeting, will be duly filed in ISO records and published on the Transitional Committee's dedicated Web page.

#### **D. Secretary**

Unless otherwise directed by the Transitional Committee, the Corporate Secretary of the ISO or his or her designee shall serve as secretary to the Transitional Committee. The Corporate Secretary will advise and assist the committee to help ensure it satisfies its Open Meeting Policy obligations.

#### **E. Public Comment**

With the exception of meetings held in closed executive session, opportunities for public comment will be provided at each meeting.

## F. Administrative Support

At the request of the Transitional Committee, to the extent practicable, the ISO will provide administrative support for the Transitional Committee so that it may conduct its business and fulfill its obligations, which will include general office and communications support to ensure the committee can satisfy its objectives. In addition, the ISO will make available data and other information needed by the committee, assistance in analyzing such data, and assistance to the Chair in managing the ongoing workload of the Transitional Committee. Finally, the ISO will coordinate with the committee on all stakeholder efforts the committee needs to develop the long-term independent governance structure proposal by providing necessary communications, facilities and ISO facilitators, and will provide legal advice and counsel on any issues that the committee presents related to the proposal.

## IV. Responsibilities of the EIM Transitional Committee

### A. Advise ISO Board of Governors

The EIM Transitional Committee will advise the ISO Board on all matters related to the final testing and early operational phase of EIM. The committee will advise the Board as to its position(s), if any, on ISO Management's EIM-related proposals to the Board. All recommendations and advisory opinions should be presented in written memos issued in advance of a scheduled ISO Board meeting and in presentations at regularly scheduled ISO Board meetings.

To ensure that the ISO Board is fully advised of all positions, if the committee develops a majority and a minority position on any particular EIM issue, as prescribed by Section III.C above, it will advise the ISO Board of both positions in writing. The committee's written memos to the Board must be made publicly available subject to restrictions on dissemination of confidential or commercially sensitive information.

The ISO Board will engage the Transitional Committee on a regular basis, and give the committee's opinions and positions serious consideration, on any EIM matter. Upon the committee's request, the Board will provide a place on the Board agenda for all matters the committee is interested in presenting.

### B. Develop Proposal for a Long-Term EIM Governance Structure

The EIM Transitional Committee will develop a detailed proposal for a long-term EIM governance structure comprised of individual members who are independent of individual EIM market participants. Proposal(s) will be drafted and published for public comment through the iterative stakeholder process. The committee will use

its best efforts to develop this proposal and present it to the Board within eighteen months after the establishment of the committee.

The proposed structure should be designed according to certain guidelines and parameters such that it:

- Consists of members that are independent from EIM market participants to satisfy FERC independence requirements and, thus, enable the ISO Board to potentially delegate certain authority over EIM to this body
- Provides a meaningful and clear role for the EIM body
- Remains nimble, to allow for efficient decision-making
- Avoids the potential for dueling filings at FERC, and includes a mechanism to resolve any disagreements between the EIM governance body and the ISO Board
- Allows for the efficient and meaningful EIM market oversight

Throughout the course of developing its long-term governance proposal, the Transitional Committee will have access to the ISO's legal staff for input on any legal questions or issues related to any proposed governance structure or arrangement that the committee may be considering.



Board of Governors

December 18-19, 2013 Decision on Energy Imbalance Market Governance Proposal

**Motion**

**Moved, that the ISO Board of Governors approves the creation of the proposed energy imbalance market transitional committee, and the transitional committee charter, as described in, and attached as Attachment 2 to, the memorandum dated December 11, 2013.**

**Moved: Galiteva      Second: Maullin**

Board Action:	<b>Passed</b>	Vote Count:	<b>5-0-0</b>
Bhagwat	Y		
Foster	Y		
Galiteva	Y		
Maullin	Y		
Olsen	Y		

**Motion Number: 2013-12-G1**

**Attachment I – BPA-PacifiCorp-ISO Memorandum of Understanding**

**Tariff Amendments to Implement Energy Imbalance Market**

**California Independent System Operator Corporation**

**February 28, 2014**

**NON-BINDING**  
**MEMORANDUM OF UNDERSTANDING**  
executed by the  
**UNITED STATES OF AMERICA**  
**DEPARTMENT OF ENERGY**  
acting by and through the  
**BONNEVILLE POWER ADMINISTRATION**  
and  
**PACIFICORP**  
and  
**CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION**

This NON-BINDING MEMORANDUM OF UNDERSTANDING (MOU) is executed by the UNITED STATES OF AMERICA, Department of Energy, acting by and through the BONNEVILLE POWER ADMINISTRATION (BPA), PACIFICORP, and the CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION (CAISO). BPA, PacifiCorp, and CAISO are sometimes referred to individually as "Party" and collectively as "Parties".

**RECITALS**

This document is a non-binding MOU among BPA, PacifiCorp, and CAISO to incorporate, in good faith, the discussion principles identified herein. This MOU identifies potential Energy Imbalance Market (EIM) coordination and facilitation principles, which may lead to the development of EIM operating procedures to be agreed to among BPA, PacifiCorp, and CAISO.

PacifiCorp and CAISO are implementing the EIM, scheduled to begin operation October 1, 2014. BPA has several interests and roles with respect to EIM coordination, including, but not limited to, BPA is: (1) a Transmission Provider which provides transmission and other services to PacifiCorp Energy, a marketing function division of PacifiCorp and a transmission customer of BPA; (2) an adjacent Transmission Provider to both PacifiCorp and CAISO, whose transmission facilities PacifiCorp intends to use for EIM participation; (3) the Path Operator for the northern portion of the California-Oregon Intertie (COI); and (4) an entity with obligations to deliver power to customers within PacifiCorp's Balancing Authority Areas which are served by PacifiCorp in its role as a Transmission Provider and Balancing Authority.

Similarly, PacifiCorp has several interests and roles with respect to EIM coordination, including, but not limited to, PacifiCorp is: implementing the EIM together with CAISO, as the Market Operator, pursuant to the Implementation Agreement dated April 30, 2013<sup>1</sup> (Implementation Agreement), and a BPA transmission customer, through PacifiCorp Energy, that has purchased transmission and other services on BPA's system, including rights over the COI.

CAISO's interests include, but are not limited to, CAISO is: implementing the EIM, as the Market Operator, together with PacifiCorp pursuant to the Implementation Agreement, and the Path Operator of the southern portion of the COI.

Because the EIM represents a significant regional effort, PacifiCorp, CAISO, and BPA seek to enable the EIM and to avoid potential adverse impacts to BPA and its customers.

Coordinated EIM operation provides an opportunity to improve operational effectiveness in a cost-effective manner.

The following constitutes a general summary of the understandings of the Parties for the proposed EIM:

**1. TERM**

This MOU will continue until the earlier of: (1) mutually agreed to EIM operating procedures are adopted by the Parties and the EIM has been in operation for one year; (2) two years from the date the MOU is executed by the Parties; or (3) termination upon 30-days' notice in writing by any of the Parties.

**2. PRINCIPLES FOR COORDINATION AND FACILITATION OF THE EIM**

BPA, PacifiCorp, and CAISO have developed principles intended to coordinate and enable implementation of the EIM on BPA's system among the Parties. The Parties agree to develop operating procedures as needed consistent with the following principles and with applicable statutory requirements:

- (a) This MOU does not create any rights for any Party, commit BPA to provide a specific service, or otherwise obligate the Parties to enter into any specific operational or commercial framework. The Parties will continuously evaluate the EIM to assure a long-term, balanced operational framework, informed by stakeholder feedback and actual EIM performance, that is consistent with agreed-upon principles herein to allow for market go-live on October 1, 2014;

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<sup>1</sup> *Order Accepting Implementation Agreement*, 143 FERC ¶ 61,298 (June 28, 2013).

- (b) Development of a framework that provides for use of BPA's transmission system consistent with Open Access principles, including the terms and conditions for transmission service provided pursuant to BPA's Open Access Transmission Tariff (OATT). BPA will provide reliable transmission service to its customers in a manner consistent with the quality and reliability of service required by its OATT and any other existing agreements;
- (c) Development of a framework that provides for use of PacifiCorp's transmission system consistent with Open Access principles, including the terms and conditions for transmission service provided pursuant to PacifiCorp's OATT. PacifiCorp will provide reliable transmission service to its customers in a manner consistent with the quality and reliability of service required by its OATT and any other existing agreements;
- (d) Operation of the transmission system will be consistent with NERC and WECC reliability standards and will maintain or improve system reliability; and
- (e) The Parties agree that costs will be allocated consistent with cost causation, recognizing mutual benefits.

### **3. PROJECT PLAN, KEY MILESTONES, AND DELIVERABLES**

The Parties will develop and maintain a project plan to achieve key deliverables on specific timelines (Project Plan). The Parties will support, in good faith, the following key milestones and deliverables:

- (a) Initial Project Plan developed and approved by all Parties – February 28, 2014;
- (b) Full Market Simulation – July 8, 2014 (Full Design of Operational Framework); and
- (c) Go-Live – October 1, 2014 (Completed and Delivered Operational Framework).

### **4. COORDINATION AND OUTREACH**

PacifiCorp and CAISO have developed extensive outreach plans to engage stakeholders in the process of implementing the EIM. In parallel with those efforts, BPA is engaged in an effort, including its own extensive stakeholder outreach, to facilitate coordination of the EIM, and to responsibly manage any potential short-term and long-term impacts of the EIM to BPA and its customers. Accordingly, PacifiCorp, CAISO, and BPA will continue to work together, in good faith, to identify and address operational issues of concern prior to go-live October 1, 2014. PacifiCorp, CAISO, and BPA anticipate continued involvement in each other's ongoing EIM-related stakeholder processes, including collaboration in the development or review of EIM-related documents and materials to support the operating procedures, as appropriate.

Before go-live of the EIM, and during the operation of the EIM, PacifiCorp will continue to provide BPA with information necessary for BPA's facilitation of the EIM, including, but not limited to, a list of contracts and associated generating resources that it intends to use to participate in the EIM.

## 5. DEVELOPMENT OF EIM OPERATING PROCEDURES

PacifiCorp, CAISO, and BPA anticipate developing operating procedures consistent with the following principles and with applicable statutory requirements (EIM Operating Procedures):

- (a) The EIM should not adversely affect the reliability of the bulk electric system;
- (b) BPA should have sufficient visibility and controls with respect to EIM resources' use of BPA's transmission system dynamically to maintain system reliability and quality of service for its customers;
- (c) The EIM should operate within the limits of existing transmission rights and any applicable operational constraints, as appropriate;
- (d) Review at regular intervals the actual performance of the EIM Operating Procedures in terms of system reliability;
- (e) PacifiCorp and CAISO should provide visibility over current and forecasted operations to BPA through the sharing of appropriate system data. At a minimum, the data being shared between CAISO to BPA will be the binding fifteen-minute schedules plus any pertinent advisories, as well as the five-minute market flow data;
- (f) At a minimum, BPA will share with CAISO the five-minute rate of change limits and upper/lower limits that will be enforced in five-minute markets;
- (g) EIM resources should operate within jointly developed operational controls to ensure the reliable operation of the EIM relative to all transmission flow impacts:
  - (1) While BPA may agree that PacifiCorp and CAISO may operate EIM resources within applicable limits, this operational flexibility would be reconsidered if any of these coordination or facilitation principles were violated;
  - (2) BPA has the ability to take appropriate actions at all times consistent with Open Access principles to maintain reliability of its system;
  - (3) In the future, if there are additional competing needs for use of this operational flexibility, the coordination and facilitation principles described herein will be reconsidered consistent with Open Access principles; and

- (4) An operational review of existing BPA Dynamic Transfer Capacity business practices should occur as part of a separate process.
- (h) The EIM should not affect PacifiCorp's obligation to provide service to BPA's transfer customers in accordance with the terms of its OATT and existing agreements, as they may be modified or replaced with successor agreements; nor should the EIM adversely impact service to BPA's transfer service customers;
- (i) PacifiCorp should promptly notify BPA in writing of any change in its relevant contracts or generating resources with sufficient notice to allow BPA to assess the impacts of any such changes;
- (j) The Parties agree to meet as needed to review project scope, conduct a project performance plan evaluation, and work collaboratively in good faith to resolve any issues;
- (k) The Parties will work together to develop metrics to measure performance against these standards and establish a process for making mutually agreed upon changes; and
- (l) The EIM Procedures will be consistent with the rights of COI owners and capacity holders.

## **6. NON-BINDING NATURE OF MOU**

This MOU is not a binding and enforceable contract but is intended to serve as a basis for further discussion, study, analysis, and negotiations between the Parties with respect to the EIM. This MOU does not constitute an offer, agreement or commitment.

**7. LIMITATION OF LIABILITY**

Each of the Parties acknowledges and agrees that the other Parties shall not be liable to it for any claim, loss, cost, liability, damage, or expense, whether at law or in equity, including but not limited to any direct damage or any special, indirect, exemplary, punitive, incidental, or consequential loss or damage (including any loss of revenue, income, profits, or investment opportunities or claims of third party customers), arising out of or directly or indirectly related to any other Party's performance or nonperformance under this MOU. The rights and obligations under this Section 7 shall survive the expiration and termination of this MOU.

**8. SIGNATURES**

The Parties have executed this MOU as of the last date indicated below.

PACIFICORP

By:



Name:  
(Print/Type)

PATRICK REITAN

Title:

Pres./CEO Pacific Power

Date:

2/14/14

UNITED STATES OF AMERICA

Department of Energy

Bonneville Power Administration

By:



Name:  
(Print/Type)

Ernest E. Mainer

Title:

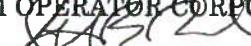
Administrator + CEO (Acting)

Date:

2/14/14

CALIFORNIA INDEPENDENT  
SYSTEM OPERATOR CORPORATION

By:



Name:  
(Print/Type)

Steve Berberich

Title:

Pres. + CEO

Date:

2/14/14

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