California Independent System Operator Corporation

August 28, 2015

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

Re: California Independent System Operator Corporation
Docket No. ER15- ___-000

Tariff Amendment to Implement Transition Period Pricing for Energy Imbalance Market

Dear Secretary Bose:

The California Independent System Operator Corporation ("CAISO") submits this tariff amendment to revise section 29.27 of the CAISO tariff to provide a six-month transition period during which the pricing of energy in the balancing authority area of a new Energy Imbalance Market ("EIM") entity is not subject to the pricing parameters that normally apply under the CAISO tariff when the market optimization relaxes a transmission constraint or the power balance constraint in clearing the real-time market.[1]

The CAISO respectfully requests an effective date of November 1, 2015, for this proposed tariff amendment so that the proposed transition period can apply to the next EIM entity, which is scheduled to commence financially binding operations in the EIM on November 1. The CAISO also requests that the Commission issue an order accepting this tariff amendment by October 28, 2015, to provide sufficient time for the CAISO and market participants to consider the implications of the Commission's order before the November 1 effective date.

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[1] The CAISO submits this filing pursuant to section 205 of the Federal Power Act ("FPA"), 16 U.S.C. § 824d. Capitalized terms not otherwise defined herein have the meanings set forth in the CAISO tariff, and references to specific sections are references to sections in the current CAISO tariff as revised or proposed in this filing, unless otherwise indicated.

I. Executive Summary

This amendment provides a necessary, prudent, and limited transition period for new entities that begin participating in the EIM for the first time. A new entity participating in, and being integrated into a centralized market framework faces a significant paradigm shift and requires a period of time to properly and effectively transition to operating its system in the context of a market environment. During this transition period, it is necessary to protect ratepayers from unwarranted price excursions caused by "learning curve" issues as the new EIM entity begins to manage its system capacity within the financially binding market environment. This process cannot be avoided through pre-implementation activities, no matter how rigorous and robust the CAISO's readiness preparations. In particular, all new EIM entities will need to adjust how they manage their system capacity after they commence actual EIM market operations when resources are actually responding to EIM dispatches and the EIM entity must respond to a range of operating situations that cannot be simulated in advance.

After the implementation of the EIM for the first EIM entity (PacifiCorp), the CAISO encountered a series of procedural and learning curve issues that compelled the CAISO to seek relief from the Commission to protect ratepayers from unwarranted pricing excursions caused by false scarcity. The Commission appropriately granted the CAISO's petition for waiver of pricing parameters to enable the CAISO to price energy based on the marginal resource's economic bid instead of the penalty prices that triggered scarcity pricing when no scarcity existed. Concerned with the recurrence of such issues during the first year of operation in the EIM, the CAISO later submitted a tariff amendment seeking a twelve-month transition period for all new EIM entities to avoid exposing ratepayers to the learning curve issues it was observing. The Commission appropriately responded to the CAISO's request by initiating an inquiry into potential market rate issues and the directing the development of robust and measurable readiness criteria. This provided the CAISO and stakeholders with the benefit of a robust process through which to investigate how best to prevent such issues occurring with future EIM entities.

This processes resulted in two important enhancements to the EIM the CAISO believes will serve to prevent many of the issues encountered after implementation of the first EIM. First, the CAISO developed the available balancing capacity market enhancement, for which it has since submitted a tariff amendment pursuant to the Commission's direction.[2] The Commission's approval of this enhancement will ensure that the EIM market systems, when faced with potential infeasibilities, do not overlook capacity available to EIM

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[2] The Commission noticed this amendment in Docket No. ER15-861-003.

entities to manage their systems reliably. This will address situations in which the EIM has applied penalty prices based on false scarcity because EIM entities could not inform the EIM market systems of the full scope of capacity available to them.

Second, the CAISO has developed robust and rigorous readiness criteria that will ensure, to the extent possible, readiness of people, processes, and systems prior to the new EIM entity's entrance into financially binding operations. The CAISO is filing these readiness criteria simultaneously with this amendment in a separate docket to comply with the Commission directives in its July 21 order in Docket Nos. ER15-861 and EL15-53. The improved readiness requirements and criteria will require the CAISO and the prospective EIM entity to undertake rigorous simulations, testing, parallel operations, training, and other readiness activities to ensure that all known issues are identified and resolved prior to the commencement of financially binding operations for the prospective EIM entity.

While these two improvements are critical to minimizing the potential for adverse and unwarranted market outcomes after EIM implementation, they do not fully protect ratepayers from the possibility of price excursions related to a new EIM entity's learning curve issues as it transitions into the new market environment. Even the most robust testing, market simulations, and parallel operations procedures cannot fully prepare the EIM entity for managing and deploying its resources in actual operational situations. The readiness testing environment, while robust, is limited by the fact that the EIM is not actually operating its system pursuant to dispatches issued by the CAISO market systems. Therefore, during testing, the EIM entity cannot evaluate fully what adjustments it must make to best balance the use of the capacity it has available. Also, although the available balancing capacity enhancement will almost certainly provide a greater margin of error in protecting against infeasibilities caused by learning curve issues, it does not address learning curve issues related to an EIM's management of contingency reserves. As observed with the first EIM, the management of contingency reserves requires careful submission of outages and manual dispatch information to the CAISO market systems.

Consistent with the Commission's guidance that any new transition proposal "must be able to demonstrate that any such proposal is commensurate with the need to address a new entrant's post-operation 'learning curve," the CAISO is now proposing a much shorter six-month transition period for all new EIM entities, based on its experience with PacifiCorp that the post implementation learning curve issues that are not sufficiently addressed by the other fixes the CAISO has proposed are much more likely to occur during this time period. During this period, the CAISO proposes to defer the application of the transmission and power balance relaxation parameters specified in section 27.3.4 of its tariff to new EIM entities and instead clear the market based on the marginal economic bid. This is the same treatment that the Commission has authorized the CAISO, through a tariff waiver, to apply to PacifiCorp. This mechanism has proven effective in addressing the price excursions experienced after implementing the EIM in PacifiCorp's balancing authority areas and has resulted in just and reasonable price outcomes.[3]

Also, in order to address concerns previously expressed by market participants that a transition period could mask fundamental market design issues or shortages of capacity, the CAISO is committing to continue to report to the Commission on a monthly on the frequency and magnitude of the infeasibilities, the root causes, and the use of available balancing capacity to address any infeasibilities. This will provide the Commission and market participants with full visibility regarding any underlying market design issues or shortages concerns.

II. Background

A. Relevant CAISO Tariff Provisions

1. Pricing Parameters

The CAISO operates its day-ahead market[4] and real-time market, and their component market processes, using a set of integrated optimization programs. These programs include security constrained unit commitment and security constrained economic dispatch.[5] In instances where effective economic bids are sufficient to allow a feasible market solution, CAISO market participants pay or receive the applicable fifteen-minute market or real-time dispatch locational marginal price ("LMP").[6]

In some cases, however, because of transmission constraints or insufficient supply/over-generation, there may be a lack of effective economic bids to allow a feasible market clearing solution. In such circumstances, the pricing run optimization software must relax non-priced constraints, such as identified transmission constraints or system energy-balance constraints, to

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[3] The CAISO is also proposing to revise the flexible ramping constraint parameter during the six-month transition period. As explained below, this revision is necessary to allow the CAISO to clear the market for new EIM entities based on the last economic bid price.

[4] The integrated forward market and the residual unit commitment, which are referenced below, are part of the day-ahead market. Tariff section 31.

[5] Tariff section 27.4.

[6] Tariff section 34.20.1. Real-time market transactions are settled at the dispatch interval LMPs in accordance with tariff section 11.5. Tariff section 34.20.2.2.

enable the market to reach a feasible solution.[7] In such cases, the market clearing prices will be based on the constraint relaxation pricing parameters set forth in the tariff, rather than submitted bids.[8]

Tariff section 27.4.3.2 states that, for the purpose of determining how the relaxation of a transmission constraint will affect the determination of prices in the real-time market,[9] the CAISO will set the pricing parameter to the maximum energy bid price specified in tariff section 39.6.1.1, which is $1,000/MWh.[10] Similarly, tariff section 27.4.3.4 states that for the real-time market, in instances where energy offers are insufficient to meet the CAISO forecast of CAISO demand, the market software will relax the system energy-balance constraint (sometimes called the power balance constraint) using the same pricing parameter that applies to relaxation of the transmission constraints (*i.e.*, $1000/MWh). When the market works as expected, these parameters appropriately reflect the cost to the market of the lack of economic energy supply bids that would have been necessary to avoid relaxing the transmission or power balance constraint

2. Flexible Ramping Constraint Relaxation Parameter

The CAISO tariff permits the CAISO to enforce a flexible ramping constraint in the optimization of the real-time market to ensure the availability of requisite capacity for unit commitment or dispatch of resources for real-time dispatch intervals beyond the applicable commitment or dispatch period. The tariff includes a flexible ramping constraint relaxation parameter, which was set at $60 effective January 15, 2015.[11]

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7 Tariff section 27.4.3.

8 *Id.* Sections 27.1.2.3, 27.4.3.2, 27.4.3.3, and 27.4.3.4 specify the pricing parameters and the Business Practice Manual for Market Operations specifies the complete set of parameters used in all CAISO markets, which in addition to the pricing parameters include the scheduling run parameters and relative parameters for enforcing differing scheduling priorities. *Id.*

9 Tariff section 27.4.3.2 specifies the parameter for the integrated forward market as well as the real-time market. However, this tariff amendment does not impact the integrated forward market**.**

10 The parameter in this section only applies to the pricing run. The parameter in the scheduling run for relaxing transmission constraints is set forth in tariff section 27.4.3 1. Also, the second sentence of tariff section 27.4.3.2 provides that the corresponding pricing parameter used in the residual unit commitment is set at the maximum residual unit commitment availability bid price specified in tariff section 39.6.1.2. This tariff amendment does not seek to revise that provision in section 27.4.3.2.

11 Tariff section 27.10; tariff appendix A, definition of "Flexible Ramping Constraint." The Commission recently approved a change in the level of the flexible ramping constraint relaxation parameter from $247 to $60, effective January 15, in *California Independent System Operator*

B. Effects of the Pricing Parameters During Implementation of the EIM and Request for Waiver

The EIM provides other balancing authority areas the opportunity to participate in the real-time market for imbalance energy that the CAISO operates in its own balancing authority area. PacifiCorp's balancing authority areas were the first two to join the EIM. To prepare for implementation of the EIM, the CAISO and PacifiCorp conducted extensive preparation and training of the personnel that would operate the systems and established operations and technology implementation teams. The EIM went into effect in the PacifiCorp balancing authority areas on October 24, 2014, for the trading day November 1, 2014.[12]

Following implementation, certain transitional conditions arose that restricted the timing and amount of capacity available through the market clearing process. These conditions caused the transmission and power balance constraints described in sections 27.4.3.2 and 27.4.3.4 of the CAISO tariff to bind more frequently than expected, producing atypically high prices in the fifteen-minute and five-minute markets in the balancing authority areas of PacifiCorp, the first participating EIM entity. The CAISO and PacifiCorp subsequently identified a combination of issues that affected market outcomes and limited or affected the timing and amount of resource capability and flexibility that PacifiCorp could provide to the EIM. These factors were particularly significant because, unlike some of the data or software concerns identified in other instances, these types of circumstances were less likely to be subject to or addressed by the CAISO's normal price correction procedures.[13]

These factors together resulted in the EIM perceiving a lack of sufficient effective bids. This unnecessarily triggered the pricing mechanisms in tariff sections 27.4.3.2 and 27.4.3.4, causing the CAISO to set the market clearing

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Corporation, 149 FERC ¶ 61,256 (2014).

[12] *See Cal. Indep. Sys. Operator Corp.*, 147 FERC ¶ 61,231 (2014) (conditionally accepting tariff revisions to implement EIM); *Cal. Indep. Sys. Operator Corp.*, 149 FERC ¶ 61,058 (2014) (order denying requests for rehearing, granting in part and denying in part requests for clarification, and conditionally accepting tariff revisions on compliance with regard to order listed above); Commission Letter Order, 149 FERC ¶ 61,005 (Oct. 2, 2014) (order granting CAISO request to extend effective date of EIM tariff revisions from September 23, 2014, to October 24, 2014, for trading day November 1, 2014).

[13] As discussed further below, on November 13, 2014, the CAISO filed a petition for limited tariff waiver and request for expedited consideration (Petition for Limited Tariff Waiver) with the Commission to address the three types of circumstances the CAISO and PacifiCorp had identified.

prices based on the bid caps/floors even though actual conditions on the system did not warrant such prices because there was no actual scarcity.

To address the anomalous effect on prices resulting from these issues, the CAISO filed a petition for a limited tariff waiver on November 13, 2014. The CAISO requested that the Commission grant a limited waiver of tariff section 27.4.3.2 and the second sentence of tariff section 27.4.3.4 so the CAISO would retain the ability to relax the constraints described in those sections, but would not apply the pricing parameter that establishes the price at the maximum energy bid price of $1,000/MWh. Instead, the CAISO proposed to use the pricing mechanism that applies when effective economic bids are sufficient to allow a feasible market solution, *i.e.*, market participants would pay or receive the applicable fifteen-minute market or real-time dispatch LMPs, consistent with tariff sections 27 and 34 and tariff appendix C. The CAISO requested that the waiver apply solely to constraints within the PacifiCorp East and PacifiCorp West balancing authority areas and to constraints that affect EIM transfers between those two EIM balancing authority areas. The CAISO asked the Commission to act expeditiously and make the limited tariff waiver effective for the 90-day period from November 14, 2014, through February 12, 2015.[14]

On December 1, 2014, the Commission granted the petition for a limited tariff waiver, effective from November 14, 2014, through February 12, 2015.[15] The Commission also directed the CAISO to file informational reports on the performance of the EIM every 30 days during the 90-day waiver period.[16] The Commission noted that, "[s]hould CAISO conclude that revisions to its tariff are necessary, we strongly encourage CAISO to file such revisions sufficiently in advance of the expiration of the waiver in order to avoid any subsequent financial impacts to market participants."[17] On February 12, 2015, the Commission granted an extension of this waiver until the earlier of March 16 or the date on which the Commission issued a subsequent order.[18]

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14 *Id.* at 12-18.

15 *Cal. Indep. Sys. Operator Corp.*, 149 FERC ¶ 61,194, at Ordering Paragraph (A) (2014) ("December 1 Order").

16 *Id.* at PP 25-26.

17 *Id.* at P 26. Subsequently, the CAISO filed a further request to extend the waiver to the period from November 1 through November 13, 2014. *See* Petition for Limited Tariff Waiver, Docket No. ER15-817-000 (Dec. 31, 2014). Commission action on that further waiver request is pending.

18 *Cal. Indep. Sys. Operator Corp.*, 150 FERC ¶ 61,086 (2015).

C. March 16 Order and Technical Conference Process

On January 15, 2015, the CAISO filed a tariff amendment to revise section 29.27 of the CAISO tariff to provide a 12-month transition period during which the pricing of energy in the balancing authority area of a new EIM (EIM) entity would not be subject to the pricing parameters, consistent with the relief provided by the Commission in its order granting the temporary waiver of Section 29.27. The CAISO explained that the amendment would apply not only to new EIM entities, but also to PacifiCorp for the remainder of its initial year of EIM operations.

In an order issued on March 16, 2015, the Commission rejected the January 15 amendment. The Commission determined that the CAISO failed to show that it would be just and reasonable to waive the pricing parameters and the flexible ramping constraint for all new EIM entrants, and that the CAISO had not demonstrated the justness and reasonableness of applying the same treatment to PacifiCorp for the remainder of the 12-month period. The Commission expressed concern that the CAISO's request suggested the CAISO had underestimated the gravity of the pricing issues facing PacifiCorp, and that granting all new EIM entities a year-long waiver of the pricing parameters would address the circumstances giving rise to these issues. In particular, the Commission concluded that:

(1) the CAISO failed to establish that the imbalance energy price spikes were continuing to occur primarily as a result of the transitional issues it identified, and therefore waiving the scarcity pricing provisions for a full year might not be remedy the issues causing the price spikes;

(2) waiving the parameters intended to send price signals to the market to increase supply during shortage conditions could have the ultimate effect of masking the effects of the issues underlying the price anomalies; and

(3) the CAISO's proposal did not contain any measures to ensure that new entrants joining the EIM are able to confirm market readiness and identify operational issues prior to full activation.[19]

The Commission also concluded that the EIM price spikes warranted further consideration, and instituted an investigation pursuant to Section 206 of the FPA to determine and address the underlying causes of the price spikes. To facilitate this process, the Commission established a technical conference and directed the CAISO to submit monthly informational reports identifying the

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[19] *Cal. Indep. Sys. Operator Corp.*, 150 FERC ¶ 61,191, at PP 30-32 (2015) ("March 16 Order").

frequency and magnitude of price spike events, as well as whether the cause of these events was due to transitional issues or insufficient supply of resources.

The Commission did not reject the CAISO's filing with prejudice. To the contrary, the Commission expressly stated that it understood that even with rigorous testing and a parallel operations period, the CAISO and a new EIM entity may not be able to identify all operational issues prior to actual operations. Because of this, the Commission stated that the CAISO could make a subsequent proposal to include in its tariff a transition period similar to the one rejected by the Commission in the March 16 Order, so long as the CAISO could demonstrate that such a proposal was "commensurate with the need to address a new entrant's post-operation 'learning curve.'"[20]

Finally, in the March 16 Order, the Commission granted the CAISO's request to extend the waiver granted in the December 1 Order effective from March 16 until the refund effective date of June 22, 2015. The Commission subsequently extended the refund effective date and, thus, the effective date of the waiver, until August 24, 2015.[21]

At the technical conference, held on April 9, 2015, representatives from the CAISO and PacifiCorp provided the Commission with additional information regarding the EIM price excursions. The CAISO and PacifiCorp explained that although PacifiCorp has, at all times, been resource sufficient and maintained reliability in its balancing authority areas, a number of issues led to the EIM perceiving an insufficient amount of effective bids to clear the fifteen-minute and five-minute markets. The CAISO explained that these issues could be grouped into two broad categories: (1) transitional issues relating to the learning curve associated with integrating the different operational paradigms of the CAISO and PacifiCorp and (2) limitations in the visibility to EIM of capacity that is available to PacifiCorp to meet load in its balancing authority areas.

With respect to the second of these categories, as discussed above, the CAISO has proposed in Docket No. ER15-861 to implement an automated enhancement by which an EIM entity would inform the EIM of the capacity it has available to reliably balance its system. The CAISO explained that adopting this proposal would address instances in which infeasibilities occurred in EIM because of the lack of visibility with respect to actions taken by EIM entities outside of the EIM to manage the reliability of their balancing authorities; it would not, however, entirely eliminate the potential for price excursions that are related to an EIM entity learning to manage its resources in concert with operating in a

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[20] *Id.* at P 35.

[21] *Cal. Indep. Sys. Operator Corp.*, 151 FERC ¶ 61,247 (2015).

new market environment. On July 20, 2015, the Commission issued an order[22] directing the CAISO to file within 30 days of the order, proposed tariff provisions to establish just and reasonableness rates, terms, and conditions of service in compliance with the March 16 Order. On August 19, 2015, the CAISO submitted its filing in compliance with that directive.

Also, pursuant to the Commission's directives in the March 16 Order and a subsequent order issued on July 21, 2015, the CAISO is also filing today an amendment to include in its tariff enhanced criteria to ensure readiness prior to new EIM entities commencing EIM operations. These enhanced criteria include a robust market simulation and period of parallel operations and a requirement that the CAISO and new EIM entity must submit a market readiness certificate at least 30 days prior to full activation of the Energy Imbalance market in the new EIM entity's balancing authority areas.

III. A Tariff Amendment is Needed to Address Transition Issues

As the CAISO explained in the January 15 filing, integrating a new EIM entity into a sophisticated centralized market such as EIM constitutes a major paradigm shift. It requires a learning period to develop new capabilities and mitigate deficiencies in market tools and procedures that may otherwise misinform the market systems and produce anomalous results. The CAISO's market systems were developed and are finely tuned to ensure that the CAISO is able to produce feasible solutions that reflect actual operational and market conditions through its security constrained economic dispatch and unit commitment processes. The systems require expert attention and management to ensure that information flows accurately and in a timely manner. Otherwise, the market systems will produce anomalous results.

In rejecting the January 15 filing, the Commission did not find that there is no need for a transition period for new EIM entities. Rather, the Commission: (1) expressed concerns regarding whether the CAISO's transition period proposal would effectively address the price excursions that have occurred in PacifiCorp's balancing authority areas, and (2) determined that the CAISO should put in place more robust readiness safeguards for subsequent new EIM entities. The Commission explicitly recognized that even with more rigorous readiness criteria, "the CAISO and the new EIM Entity may not be able to identify all operational issues prior to actual operation." The Commission concluded that if the CAISO wished to include in its tariff a transitional period similar tone proposed in the January 15 filing, it would need to "demonstrate that any such proposal is

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22 *Cal. Indep. Sys. Operator Corp.*, 152 FERC ¶ 61,060 (2015).

commensurate with the need to address a new entrant's post-operation 'learning curve.'"[23] The CAISO does so below.

A. Price Excursions in PacifiCorp's Balancing Authority Areas Have Occurred Primarily as a Result of Structural and Transitional Issues, Not Supply Scarcity

In the March 16 Order, the Commission stated that it was not persuaded that the CAISO's request to codify in its tariff the waiver of the transmission and energy-balance constraint parameters, along with the flexible ramping parameter, for all new EIM entities for a full year would appropriately address the circumstances giving rise to the transitional issues identified by the CAISO. In particular, the Commission concluded that the CAISO had not established that "the imbalance energy price spikes are continuing to occur primarily as a result of the transitional issues it identified, and therefore has not shown that waiving the scarcity pricing provisions for a full year is responsive to the issues causing the price spikes."[24] The Commission indicated that it shared the concerns of protesters of the January 15 filing that waiving the pricing parameters could have the effect of masking the effects of potential supply scarcity issues.[25]

The CAISO and PacifiCorp conducted a rigorous and intensive investigation into the source of the issues causing the EIM price excursions in PacifiCorp's balancing authority areas and determined that these events were not the product of actual capacity insufficiencies in the PacifiCorp balancing areas. The CAISO evaluated each interval in which an infeasibility occurred and compared the difference between PacifiCorp's "excess reserves"[26] and the amount of the infeasibility. In the majority of intervals, PacifiCorp's excess reserves exceeded the amount of the infeasibility.[27] However, even in intervals during which there were not excess reserves, the CAISO and PacifiCorp evaluated market and reliability conditions during all of these interval, the EIM entity was operating reliably and determined that at all times during these intervals based on the area control area and available capacity.[28]

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23 March 16 Order at P 35.

24 *Id.* at P 30.

25 *Id*.

26 The CAISO determined "excess reserves" as the difference between the total amount of reserves carried by PacifiCorp and the minimum amount of reserves required by NERC. *See* May 2015 Informational Report on EIM, Docket No. ER15-402-000, at Attachment C (July 14, 2015).

27 See Attachment C to each of the informational reports the CAISO submitted in Docket No. ER15-402-000 on April 24, June 3, July 14, and August 6, 2015.

28 See *id.* As explained in the CAISO's available balancing capacity filing, during the

As opposed to supply insufficiency, the information provided by the CAISO and PacifiCorp in informational reports and materials submitted in response to the Commission's investigation shows that the price excursions experienced after the launch had a number of other causes. These root causes have manifested as infeasibilities in the Energy Imbalance Market in two ways: (1) "learning curve" challenges associated with integrating PacifiCorp operations with the Energy Imbalance Market, which have sometimes caused the Energy Imbalance Market to operate based on imperfect information regarding actual imbalance conditions; and (2) a structural limitation in the current design of the Energy Imbalance Market, namely the lack of visibility to the market of capacity that is available to PacifiCorp to meet load in its balancing area and that is not bid into the Energy Imbalance Market.

B. A Transition Period is Necessary Because the CAISO's Available Balancing Capacity Proposal and Enhanced Readiness Criteria Will Not Resolve All Potential Infeasibilities that Can Occur During the Initial Months of EIM Entity Integration

The CAISO's proposed available balancing capacity enhancement, pursuant to which the CAISO's market optimization process will automatically recognize and account for available balancing capacity identified by the EIM entity of the balancing authority area, will address the market structure limitation discussed. The CAISO is also confident that the combination of the available balancing capacity proposal and the enhanced readiness criteria will largely address the post implementation issues that the CAISO detailed in its monthly reports submitted in Docket ER15-402. As such, the need for a transition period for subsequent EIM entities is not based primarily on these observed issues. However, after evaluating further the potential for learning curve issues in light of the lessons learned with PacifiCorp, the CAISO has concluded that even after implementing the available balancing capacity and readiness enhancements, market infeasibilities are still likely to occur as a new EIM entity learns to manage its resources and system in the new market environment.

From a mechanical perspective, the CAISO's enhanced readiness criteria will evaluate the EIM entity's ability to identify available balancing capacity and will require an EIM entity to demonstrate that it has the ability to convey outages information within the required timelines and that it can communicate effectively

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months of March 2015 through June 2015, in only 4.5 percent of the intervals in the fifteen-minute market and 3.8 percent of the intervals in the five-minute market in which the pricing parameters would have been triggered were PacifiCorp's excess reserves less than the size of the infeasibility.

with the CAISO to limit the types of issues observed during PacifiCorp's EIM integration. However, as discussed in the attached declaration of Mark Rothleder, there is no way in which a new EIM entity, even with a robust readiness process, can test fully how the EIM market systems wills react to its actions after EIM is actually implemented in its balancing authority area(s). This is because in market simulation and parallel operations the EIM entity is not operating within the EIM under actual system conditions.[29] Mr. Rothleder explains that during market simulation and parallel operations, the prospective EIM entity continues to operate its balancing authority area under its existing processes, independent of the EIM results. Thus, the resources in the EIM entity's balancing authority area will not be intentionally following the dispatches and schedules determined by the EIM. Instead, during readiness testing, the EIM entity will continue to manage its balancing authority area by dispatching all of the resources within its balancing authority area, as opposed to under EIM operations, in which participating resources will be dispatched by EIM. Consequently, the EIM market software being tested during market simulation and parallel operations may receive telemetry feedback inconsistent with its prior EIM dispatch. This creates discrepancies and inaccuracies from how the market system would have actually performed if the EIM resources were actually following the EIM dispatches, that prevent the EIM entity from fully understanding the implications of its actions.

In summary, there is no way that a pending EIM entity can fully evaluate how the EIM market systems will react to its actions until it is actually operating in the production environment. As a result, it is nearly inevitable that during the integration process, even when the EIM entity is fully resource sufficient, difficulties will occur due to divergences between expected outcomes, based on testing, and actual operational realities. The CAISO's proposal to allow EIM entities to identify capacity that they retain to ensure the reliable operation of their system will certainly help to prevent such situations from causing market infeasibilities based on the appearance of false scarcity. However, utilizing the available balancing capacity mechanism will have its own associated learning curve. Specifically, an EIM entity must learn how to balance how much capacity needs to be identified as available balancing capacity, while ensuring it does not fail the balancing and sufficiency tests conducted prior the actual trading hour.

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[29] This concept was also discussed at the April 9 technical conference, at which a PacifiCorp representative explained that EIM implementation involves:

> a lot of new complex technical inputs that produce new outputs that our operators are becoming familiar with. This process is somewhat explored during market simulation in parallel production, but those test environments are somewhat limited and it is not until you have everything on all settlement processes in place . . . that you can fully understand how the inputs affect the market processes.

April 9 Technical Conference Transcript at 25-26.

The EIM entity must also continue to manage its contingency reserves entirely outside the market systems entirely but reflecting the deployment of such capacity in the EIM. It is in the EIM entity achieving the proper balance in managing the totality of its capacity, particularly when difficulties arise that could not be tested or simulated during readiness efforts, that the CAISO believes prevents the greatest risk for learning curve issues to result in EIM infeasibilities during the first six months.

As Mr. Rothleder explains in his declaration, it will require experience with actual EIM operations for a new EIM entity to accurately evaluate the EIM resource plan that reflects the total use of system capacity, and then appropriately reflect its decisions through the available balancing capacity designations and manual dispatches and outages associated with its management of the contingency reserves. This is critically important because under the available balancing capacity proposal the EIM entity cannot rely on available balancing capacity to pass the EIM hourly resource sufficiency evaluations. Therefore, if the EIM entity erroneously identifies too much capacity from participating resources as available balancing capacity, this will reduce the amount of bid-in capacity from the participating resources, which may cause the balancing authority area to fail the resource sufficiency evaluation. This, in turn, will restrict EIM transfers with other balancing authority areas, thereby reducing the number of resources and effective economic bids available to serve the EIM entity's load to only to those located within the EIM entity's balancing authority area(s).[30] This may cause prices excursions because the pool of resources from other balancing authority areas in the EIM has been inadvertently reduced as a result of the EIM entity over-identifying available balancing capacity.

The new EIM entity also will need to consider when designating available balancing capacity the fact that such capacity may be needed to address learning curve issues, which are much more likely to arise during the initial months after EIM integration.[31] On one hand, if the EIM entity designates less available balancing capacity, the capacity could be dispatched to support an EIM transfer with another EIM balancing authority area which decreases the capacity available to meet its balancing authority obligations. On the other hand, if the EIM entity designates more available balancing capacity in order to prevent such an outcome, doing so may result in the sort of situation described in the preceding paragraph.

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[30] *See* Tariff Amendment in Compliance with July 20 Order, Attachment C (Prepared Testimony of Donald Tretheway) at 9-12, Docket No. ER15-861-003 (Aug. 19, 2015).

[31] *See* June 2015 Informational Report on EIM, Docket No. ER15-402-000, at 9, 47, and Attachment E (Aug. 6, 2015).

Moreover, the available balancing capacity enhancement will not address a new EIM entity's need to manage contingency reserves outside of the market. As explained by Mr. Rothleder, it is reasonable for the EIM entity to refrain from designating its contingency reserves as available balancing capacity because that is the type of capacity that the EIM entity must retain to ensure it can recover within NERC requirements if deployed. A new EIM entity balancing authority area's contingency reserves obligation can both increase and decrease within the operating hour. But because the EIM resource plan is submitted hourly, the new EIM entity must use outages to re-rate the resource to manage contingency reserves within the operating hour and must provide timely information on any manual dispatches it must conduct to manage its contingency reserves within the hour. Although PacifiCorp trained for such circumstances prior to integrating into the EIM, system changes during actual operations posed new challenges that required PacifiCorp to take some time to learn and modify its practices to ensure the information is conveyed in a timely and accurate manner.[32] The CAISO's proposed available balancing capacity feature will address those instances in which the EIM entity does not convey timely information regarding its manual dispatches. However, this procedure will not automatically resolve the types of infeasibilities that can arise in those circumstances when the EIM entity does not properly convey manual dispatch information because of anomalous real-time conditions. Therefore, it is very possible that this could cause infeasibilities with subsequent new EIM entities.

For these reasons, it is just and reasonable to include in the CAISO tariff provisions that protect new EIM entities from the impact of price excursions that are caused by transition issues and which cannot be adequately resolved through the adoption of enhanced readiness criteria and the available balancing capacity proposal.

IV. Adopting the Price Discovery Mechanism for the First Six Months of a New EIM Entity's Operations is a Just and Reasonable Means to Prevent Transition Issues from Causing Price Spikes for New EIM Entities

The CAISO proposes to implement the proposed transition period by amending tariff section 29.27 to state that, for a period of six months following the implementation date of a new EIM entity, the pricing parameters set forth in tariff section 27.4.3.2 and the second sentence of tariff section 27.4.3.4 will not apply to constraints that are within balancing authority areas of the new EIM entity or affect EIM transfers between the balancing authority areas of the new EIM entity

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[32] The CAISO has reported that one of the most frequent causes of the infeasibilities during those first six months was due to the EIM entity's management of its available capacity and its ability to convey that information to the CAISO. *See id.* at 7-9.

and any other EIM entity that is subject to the revised tariff provisions. Instead, the CAISO will determine prices consistent with the provisions of tariff sections 27 and 34 and tariff appendix C that would have applied in the absence of section 27.4.3.2 and the second sentence of tariff section 27.4.3.4. The CAISO also proposes to revise this tariff section to state that during the transition period, the CAISO will set the flexible ramping constraint relaxation parameter specified in tariff section 27.10 for the new EIM entity's balancing authority area between $0 and $0.01.

A. Six Months is a Reasonable Period During Which to Apply the Proposed Transition Pricing

Although the CAISO originally proposed a twelve-month transition period in the January 15 filing, the CAISO is now proposing that the transition period be six months in duration. The CAISO has shortened the proposed transition period for two reasons. First, data from PacifiCorp's implementation process suggests that the majority of learning curve issues can be identified and addressed within six months. The tables below, which are taken from the CAISO's monthly EIM report, demonstrate that the majority of instances in which the CAISO's pricing parameters triggered, or would have triggered absent the waiver, occurred during the first six months of implementation. Also, the issues that did continue to occur were of the same nature as those identified earlier. In Attachment B, Table 1 of each of the monthly reports, the CAISO has provided the frequency information by category of issues. While the instances of certain issues continued to persist, the nature of the issues did not change after the first six months.[33]

Second, as discussed above, the CAISO anticipates that the combination of its experience with PacifiCorp, the implementation of the available balancing capacity automated enhancement to address structural issues causing infeasibilities, and the enhanced readiness criteria will improve and expedite the process of the CAISO and a new EIM entity identifying and addressing transition issues. However, six months is the minimum time that would be prudent for the transition period, as any shorter period would not allow the CAISO and the new EIM entity sufficient time to identify, analyze, and address any transition issues that do arise. To the extent that the CAISO and a new EIM entity are not able to adequately address transition issues in this six-month period, the CAISO will file with the Commission a tariff amendment to extend the transition period for an additional period for that specific entity. This will allow the CAISO to present to the Commission its rationale for any additional transition period, and provide an opportunity for interested parties to comment thereon. In order to provide notice of its intent to file for an extension, if necessary, the CAISO has added

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[33] *See, e.g.*, June 2015 Informational Report on EIM, Docket No. ER15-402-000 (Aug. 6, 2015).

placeholder language to Section 29.27. Therein, the CAISO has also committed to providing market participants with at least sixty days' notice prior to the end of the transition period as to whether it plans to request an extension of the transition period.

B. The Proposed Price Discovery Mechanism is Just and Reasonable

The price discovery mechanism that the CAISO proposes to adopt during the six-month transition period is the same mechanism it has employed using the waiver the Commission originally granted in its December 1 Order and subsequently extended until the CAISO implements the market enhancement solution specified in Docket No. EL15-53. This mechanism enables the CAISO to clear the market as it normally would in initial scheduling run of the market software and establish feasible dispatch instructions to resources. In the subsequent pricing run, the price discovery mechanism allows the pricing run to ignore infeasibilities caused by a transmission constraint or a power balance constraint, and instead establishes the market clearing price based on the rules it would have applied absent the infeasibility, i.e., based on the last economic bid. All other existing tariff rules for pricing energy in the real-time market will still apply. For example, if a resource's bid is mitigated, the CAISO market clearing price would be based on the mitigated bid as required by the tariff. Similarly, if the resource is constrained by ramping capability for the interval, the resource will not be permitted to set the price for that interval.

It is just and reasonable for the CAISO to apply the price discovery mechanism employed in the currently effective wavier to new EIM entities during the transition period because it will utilize prices based on economic price signals reflected in market participants' bids, as opposed to administratively set tariff parameters intended to reflect actual supply scarcity conditions. This will prevent the market from clearing based on inappropriately high, and unjust and unreasonable, prices that do not reflect actual scarcity of energy, but instead reflect artificial market scarcity due to a new EIM entities' various learning curve issues. As explained above, even with the implementation of the available balancing capacity and readiness enhancements, there is still a significant risk that such issues will occur during the initial months of Energy Imbalance Market operations in a new balancing authority area, and that these issues will result in market infeasibilities and price excursions.

Data gathered by the CAISO's Department of Market Monitoring demonstrates that the price discovery mechanism has effectively mitigated price spikes that would have otherwise occurred in PacifiCorp due in part to learning curve issues, and that the resulting prices closely track overall electricity prices in the West.

Figures 1 through 4 below show the daily average prices for PacifiCorp East and PacifiCorp West since the implementation of the Energy Imbalance Market, for the fifteen-minute and five-minute markets, respectively. The figures show that the presence of the issues described above would, absent application of the price discovery mechanism proposed in this filing, have triggered parameter-based pricing that deviates significantly from the pricing based on the last economic signal and led to price spikes based on false scarcity conditions. These figures also show that the prices that resulted from the application of the price discovery mechanism are closely aligned with the average prices for the bilateral market in the West for most of the period.

Figure 1: Daily Average of Fifteen-Minute Market Prices in PacifiCorp East

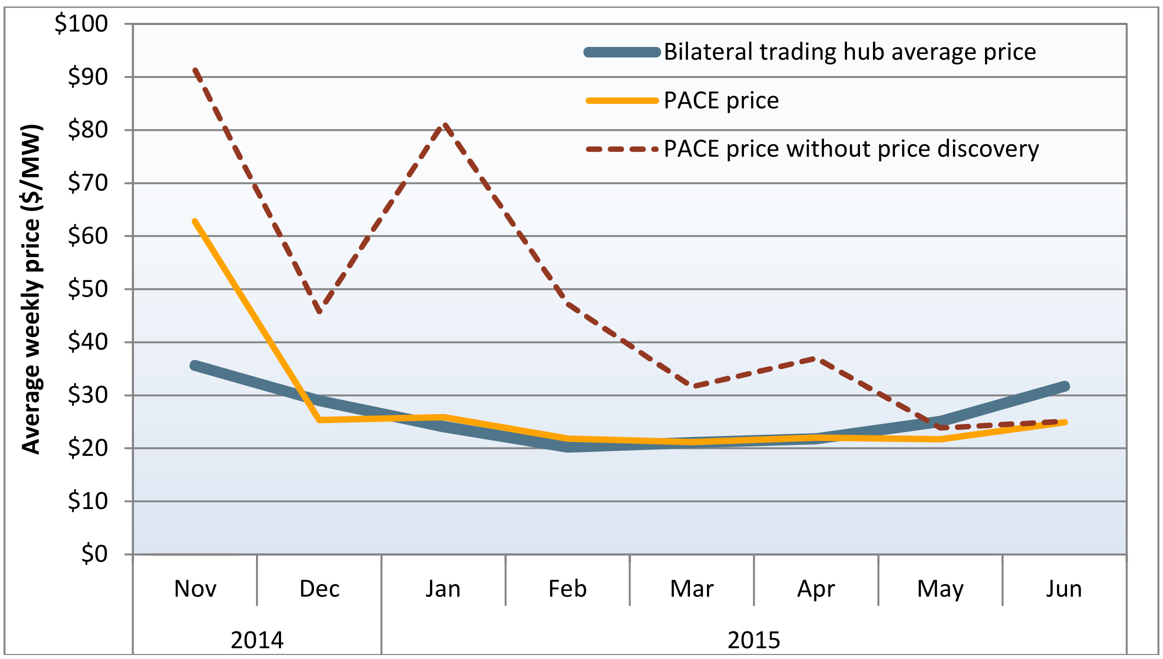


Figure 2: Daily Average of Fifteen-Minute Market Prices in PacifiCorp West

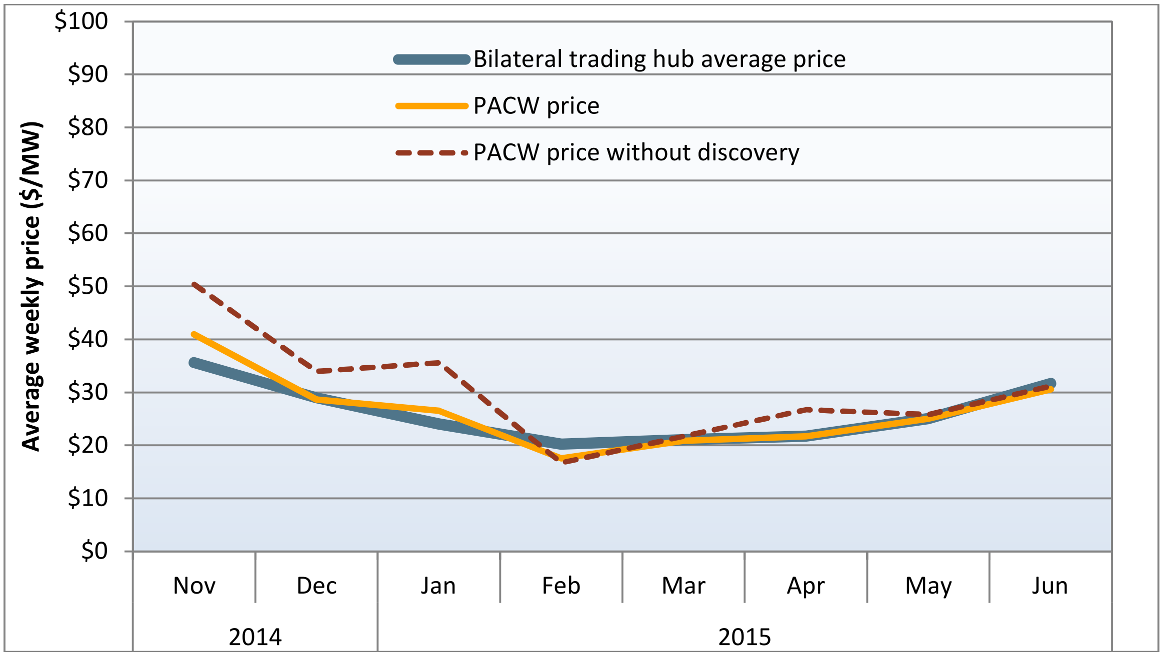


Figure 3: Daily Average of Five-Minute Market Prices in PacifiCorp East

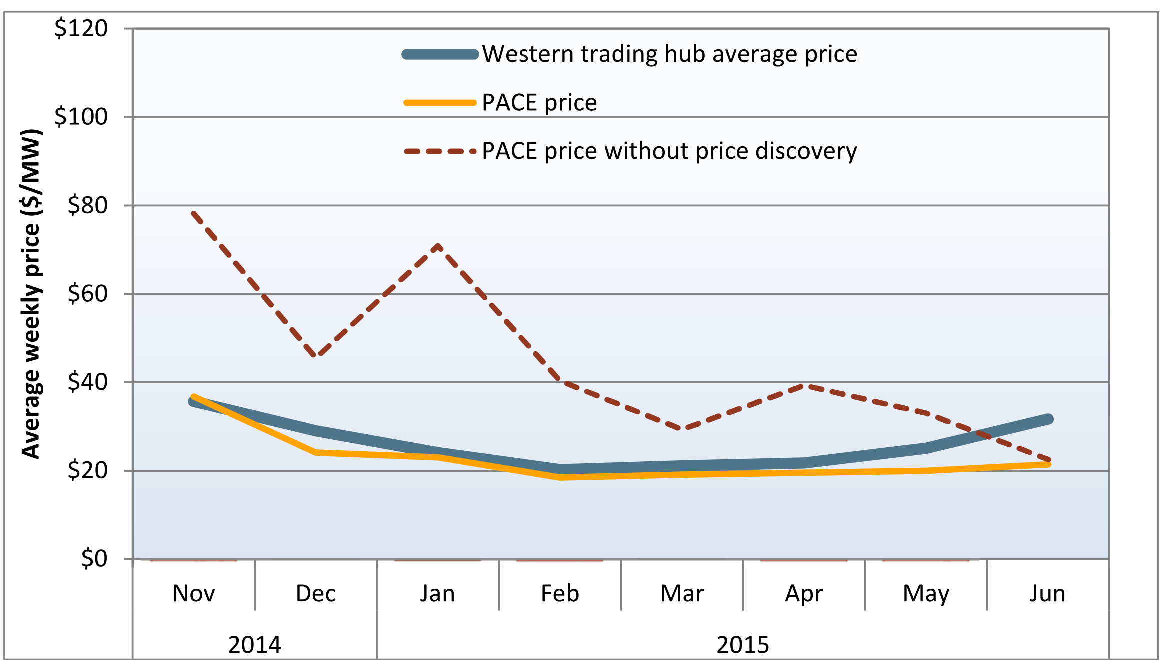
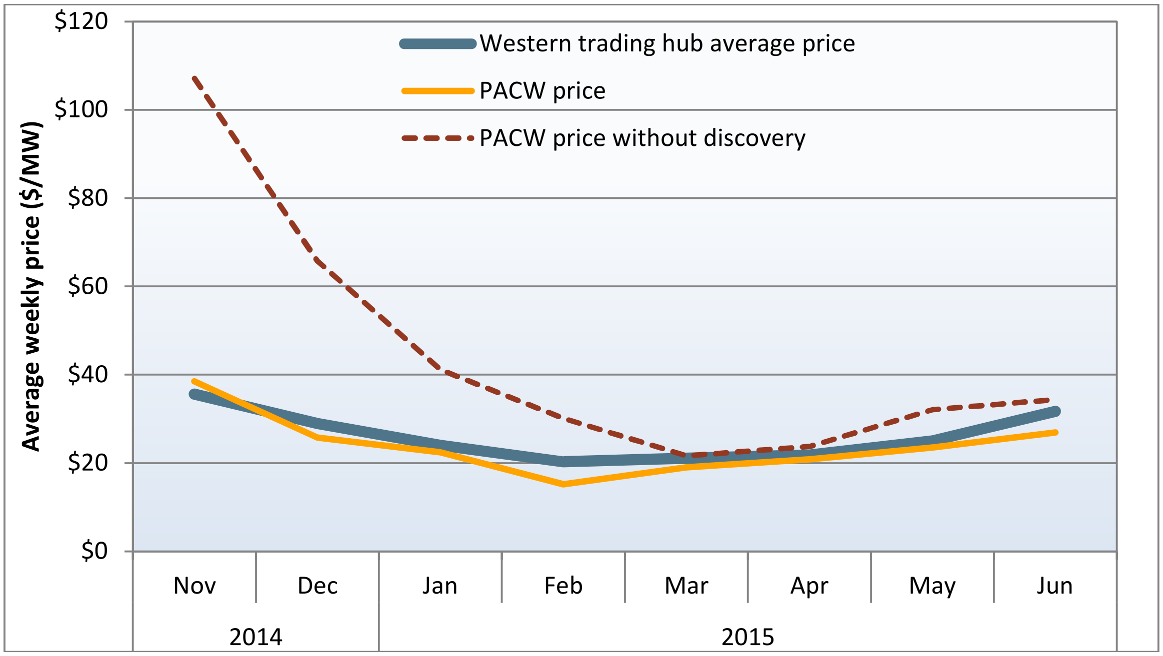


Figure 4: Daily Average of Five-Minute Market Prices in PacifiCorp West



The CAISO understands concerns expressed by stakeholders that the pricing mechanism proposed in this filing may mask more fundamental issues with the market design that require rule changes, or may mask supply insufficiency in the Energy Imbalance Market. These concerns are addressed in large part by the CAISO's proposal to limit the transition period to six months after a new EIM entity's go-live date. Also, the CAISO will be carefully monitoring the integration of new EIM entities. If the CAISO identifies a market design issue it will take the necessary steps to address that issue as soon as possible, such as it has done with respect to the available balancing capacity enhancement, rather than requesting an extension of transition pricing to avoid addressing the issue. Along these same lines, the CAISO agrees that during the transition period, it will continue to prepare and file reports similar to the monthly reports that it has filed with the Commission reporting on the types, frequency and nature of the issues experienced by PacifiCorp. These reports will provide visibility regarding the cause of any infeasibilities and the degree to which an EIM entity has sufficient available balancing capacity to address any infeasibilities. Regardless, adopting a significantly shorter six-month transition period represents a reasonable balance between the need to protect ratepayers from the impact of transition issues and the risk that scarcity price signals might be somewhat muted during this limited period.

C. It is Necessary for the CAISO to Adjust the Flexible Ramping Constraint in Order to Effectuate the Proposed Transition Pricing

The CAISO also proposes to revise tariff section 29.27 to state that, during the six-month transition period, the CAISO will set the flexible ramping constraint relaxation parameter specified in tariff section 27.10 for the new EIM entity's balancing authority area between $0 and $0.01. This revision allows the market software to determine the marginal energy bid price. Absent this revision, the market software would be unable to determine prices based on the marginal energy bid price and that price would instead be set at the flexible ramping constraint relaxation parameter level, which as of January 15, 2015 is $60. The Commission acknowledged this linkage in its June 19, 2015 order extending the effectiveness of the current parameter pricing waiver. This tariff revision is consistent with the rationale for allowing the market systems to avoid using the parameters in tariff section 27.4.3.2 and 27.4.3.4 as described above.

V. Stakeholder Process

The CAISO's proposal before the Commission in this tariff amendment does not differ significantly from the transition period previously proposed by the CAISO. The only difference is that the CAISO proposes to include a more limited transition period of six months and only request for additional months if needed for the specific EIM entity. Prior to submitting this amendment the CAISO posted the proposed tariff language on July 10, 2015. Three stakeholders submitted written comments. On July 22, 2015, the CAISO held a stakeholder conference call in which the CAISO responded to the written comments as well as questions asked during the call.[34]

One stakeholder (Powerex) contends that the CAISO's proposal is just a minimally-modified reincarnation of its earlier proposal to establish a twelve-month transition period for each EIM balancing authority area, which it asserted was developed with minimal stakeholder input and was rejected by FERC based on a concern that it would mask the effects of the issues underlying the price anomalies experienced in the EIM. Powerex expresses concern that the CAISO decided to make this filing with "no input into whether a transitional period is appropriate, or how it should be designed." Powerex argues that there is no urgency for a transitional period because the current waiver will continue to apply

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[34] Several days prior to submitting this filing, the CAISO realized that due to a communication error it had not posted the matrix responding to all stakeholder comments which it now provides in Attachment D to this filing. The CAISO apologies to stakeholders for this oversight. Nevertheless, the CAISO addresses all of the issues raised by stakeholders in this filing.

until CAISO implements an improved EIM design pursuant to the Section 206 investigation, because consumers will have the additional protection of a prospective refund effective date.

Powerex is incorrect that the transition period proposed in this amendment does not differ substantially from the transition period previously proposed, insofar as the CAISO is proposing a transition period that is half the length of the previous proposal. Moreover, although the CAISO's proposed pricing mechanism during the transition period is identical to its original filing, there is nothing untoward about this given that the Commission explicitly stated in its order rejecting the original filing that the CAISO could make a subsequent proposal to include in its tariff a similar transition period. While Powerex may not have been satisfied by the with the stakeholder process that preceded the CAISO's first transition period amendment the evidentiary record established since then, including the full scope of the Section 206 proceeding instituted by the Commission, provided the information needed to determine whether there a transition period is just and reasonable. Since it filed its first proposal for a transition periods, the CAISO, Commission and stakeholders have had the benefit of: (1) a whole day technical conference in which the CAISO and PacifiCorp described in detail the type of learning curve issues that warranted and continue to warrant a transition period; (2) eight monthly reports detailing market performance under the same pricing mechanism the CAISO proposes to apply during the transition period; (3) a stakeholder process to develop readiness criteria to address some of the issues that led to the first filing; and (4) numerous comments and a tariff amendment filed with the Commission on a proposed enhancement to the EIM to address the market structure issue addressed in the Section 206 proceeding.

In light of this robust evidentiary record, there was no compelling need for the CAISO to conduct a lengthy stakeholder process to determine whether a transition period was necessary. For all the reasons explained above, the CAISO believes that the record fully supports the justness and reasonableness of the transition period proposed herein.

Powerex also contends that the CAISO's latest proposal will do nothing to address the underlying issues triggering application of the pricing parameters and merely seeks to waive application of the standard pricing provisions contained in the CAISO tariff to accommodate the shortcomings of the resource sufficiency provisions in the EIM and limited pre-implementation testing. The CAISO disagrees that the transition period proposal does not address the underlying issues triggering the application of the pricing parameters. As discussed above, the CAISO has already submitted tariff amendments to address the structural market design issue and any readiness issues that might lead to the same issues experienced by the first implementation of the EIM. A reasonable transition period is nevertheless necessary to ensure that the learning curve issues that will almost certainly arise despite the implementation of enhanced readiness criteria, and which would create infeasibilities of a magnitude that cannot be addressed by available balancing capacity, do not result in unjust and unreasonable prices for market participants.

Calpine proposed changes to proposed section 29.27(b)(3) that would allow the CAISO to seek an extension of the transition period, not to exceed an additional six months, only if after consultation with the new EIM Entity it is determined that the continuing infeasibilities are not the result of an absence of physical capability. The stakeholder also proposed that Section 29.27(b)(3) specify that such determination shall be posted to the CAISO website no fewer than 60 days prior to the expiration of the six-month transition period. The CAISO agreed to specify in its proposed tariff language that it will post any extension determinations on its website no less than 60 days prior to the expiration of the six-month transition period. However, the CAISO does not believe it is necessary to condition the request for an extension of the transition period on a determination that the continuing infeasibilities are not the result of an absence of physical capability. As the CAISO explained during the stakeholder call, if the CAISO were to determine it was necessary to extend the transition period for a specific EIM entity, the CAISO must do so through a new tariff amendment in which the CAISO would need to demonstrate that an extension is just and reasonable. Stakeholders will have the right to submit comments on or protest any such filing.

Puget Sound recommended that the CAISO modify proposed section 29.27(b)(3) to state that the transition period may be extended if additional time is deemed necessary due to an unacceptable number of price excursions, and the CAISO and the applicable EIM entity agree such an extension is appropriate. The CAISO has not included this language in its proposed tariff changes because the purpose of the transition period is not to merely address price excursions it deems unacceptable. In addition, as stated above, because an extension will only be available pursuant to a Commission-accepted tariff amendment, there is no need to include in the tariff specific conditions that the CAISO will have to justify prior to submitting such an amendment. Moreover, although the CAISO certainly intends to consult closely with affected EIM entities prior to submitting any request for an extension, as the operator of the EIM the CAISO believes that it is inappropriate for it to include in the tariff a requirement that it obtain the endorsement of particular EIM entities in order to address matters that go to the integrity of the market.

VI. Effective Date and Request for Commission Order by October 28, 2015

The CAISO is requesting that these tariff provisions become effective as of November 1, 2015, sixty-five days after the date of this filing. This will allow these provisions to be in place as of the implementation date for NV Energy of November 1. The CAISO also requests that the Commission issue an order accepting this tariff amendment by October 28, 2015, to provide sufficient time for the CAISO and market participants to consider the implications of the Commission's order before the effective date of November 1.

VII. Communications

Correspondence and other communications regarding this filing should be directed to:

Roger E. Collanton
General Counsel
Anthony Ivancovich
Deputy General Counsel
Anna McKenna
Assistant General Counsel
John C. Anders
Lead Counsel
California Independent System
Operator Corporation
250 Outcropping Way
Folsom, CA 95630
Tel: (916) 351-4400
Fax: (916) 608-7222
E-mail: amckenna@caiso.com
janders@caiso.com

Michael Kunselman
Michael E. Ward
Alston & Bird LLP
The Atlantic Building
950 F Street, NW
Washington, DC 20004
Tel: (202) 239-3300
Fax: (202) 654-4875
E-mail:
michael.kunselman@alston.com
michael.ward@alston.com

VIII. Service

The CAISO has served copies of this filing on the California Public Utilities Commission, the California Energy Commission, and all parties with scheduling coordinator agreements under the CAISO tariff. In addition, the CAISO has posted a copy of the filing on the CAISO website.

IX. Contents of Filing

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

Attachment A	Clean CAISO tariff sheets incorporating this tariff amendment
Attachment B	Red-lined document showing the revisions contained in this tariff amendment
Attachment C	Mark Rothleder declaration
Attachment D	Matrix of responses to stakeholder comments

X. Conclusion

For the reasons set forth in this filing, the CAISO respectfully requests that the Commission issue an order by October 28, 2015, that accepts the tariff revisions proposed in the filing effective as of November 1, 2015.

Respectfully submitted,

/s/ Anna McKenna

Roger E. Collanton
General Counsel
Anthony Ivancovich
Deputy General Counsel
Anna McKenna
Assistant General Counsel
John C. Anders
Lead Counsel
California Independent System
Operator Corporation
250 Outcropping Way
Folsom, CA 95630

Michael Kunselman
Michael E. Ward
Alston & Bird LLP
The Atlantic Building
950 F Street, NW
Washington, DC 20004
Tel: (202) 239-3300
Fax: (202) 654-4875

Counsel for the California Independent System Operator Corporation

Attachment A – Clean Tariff Records

Transition Period for Energy Imbalance Market

August 28, 2015

California Independent System Operator Corporation

29.27 CAISO Markets And Processes.

(a) **In General.** Except as provided in subsection (b) of this section, the provisions of Section 27 that are applicable to the Real-Time Market shall apply to EIM Market Participants.

(b) **Transition Period for New EIM Entities.**

(1) **Transmission Constraint Relaxation.** For a period of six months following the Implementation Date of a new EIM Entity, the provisions of Section 27.4.3.2 and the second sentence of Section 27.4.3.4 shall not apply to constraints that are within Balancing Authority Areas of the new EIM Entity or affect EIM Transfers between the Balancing Authority Areas of the new EIM Entity and any other EIM Entity that is subject to this subsection (b). For those intervals that experience infeasibilities described in those provisions, the CAISO shall instead determine prices consistent with the provisions of Sections 27, 34, and Appendix C, that would apply in the absence of Section 27.4.3.2 and the second sentence of Section 27.4.3.4.

(2) **Flexible Ramping Constraint.** For a period of six months following the EIM Entity Implementation Date of a new EIM Entity, the CAISO shall set the Flexible Ramping Constraint parameter specified in Section 27.10, for pricing purposes, for the new EIM Entity Balancing Authority Area, at an amount between and including $0 and $0.01.

(3) **Extension of Transition Period Pricing.** Any extensions of the initial six-month transition period, as approved by the Federal Energy Regulatory Commission, are specified below. Sixty days prior to the expiration of the transition period, the CAISO will post on the CAISO website an assessment of whether an extension of the transition period, for up to an additional six months, is needed for the applicable EIM Entity. The CAISO will post an update to such assessment prior to the expiration of the transition period should there be any changes to its posted conclusions.

(a) [reserved]

(4) **Reports.** During the term of the transition period, the CAISO will submit monthly reports with the Commission on the infeasibilities observed in the applicable EIM Entity Balancing Authority Area, the nature of the issues causing the infeasibility and remedies adopted to address the issues identified.

Attachment B – Marked Tariff Records

Transition Period for Energy Imbalance Market

August 28, 2015

California Independent System Operator Corporation

29.27 CAISO Markets And Processes.

(a) **In General.** Except as provided in subsection (b) of this section, ~~The~~ the provisions of Section 27 that are applicable to the Real-Time Market shall apply to EIM Market Participants.

(b) **Transition Period for New EIM Entities.**

(1) **Transmission Constraint Relaxation.** For a period of six months following the Implementation Date of a new EIM Entity, the provisions of Section 27.4.3.2 and the second sentence of Section 27.4.3.4 shall not apply to constraints that are within Balancing Authority Areas of the new EIM Entity or affect EIM Transfers between the Balancing Authority Areas of the new EIM Entity and any other EIM Entity that is subject to this subsection (b). For those intervals that experience infeasibilities described in those provisions, the CAISO shall instead determine prices consistent with the provisions of Sections 27, 34, and Appendix C, that would apply in the absence of Section 27.4.3.2 and the second sentence of Section 27.4.3.4.

(2) **Flexible Ramping Constraint.** For a period of six months following the EIM Entity Implementation Date of a new EIM Entity, the CAISO shall set the Flexible Ramping Constraint parameter specified in Section 27.10, for pricing purposes, for the new EIM Entity Balancing Authority Area, at an amount between and including $0 and $0.01.

(3) **Extension of Transition Period Pricing.** Any extensions of the initial six-month transition period, as approved by the Federal Energy Regulatory Commission, are specified below. Sixty days prior to the expiration of the transition period, the CAISO will post on the CAISO website an assessment of whether an extension of the transition period, for up to an additional six months, is needed for the applicable EIM Entity. The CAISO will post an update to such assessment prior to the expiration of the transition period should there be any changes to its posted conclusions.

(a) [reserved]

(4) **Reports.** During the term of the transition period, the CAISO will submit monthly reports with the Commission on the infeasibilities observed in the applicable EIM Entity Balancing Authority Area, the nature of the issues causing the infeasibility and remedies adopted to address the issues identified.

Attachment C – Declaration of Mark Rothleder

Transition Period for Energy Imbalance Market

August 28, 2015

California Independent System Operator Corporation

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

California Independent System Operator Corp.	))	**Docket No. ER15-___**

DECLARATION OF MARK ROTHLEDER ON BEHALF OF CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

I, Mark Rothleder, hereby declare as follows:

1. I am employed as the CAISO's Vice President, Market Quality & Renewable Integration. In that capacity, I supervise, among others, a team of engineers and analysts who focus on market development and analysis and who perform analytical work in connection with this function, which includes review of data regarding the operational status of the CAISO's markets and systems. I was involved in the development of the Energy Imbalance Market (EIM) design and currently supervise the team responsible for producing the informational reports on EIM pricing performance filed with the Commission in Docket ER15-402.
2. Prior to my current position, I served as the Executive Director of Market Analysis and Development at the CAISO, in which position I played a lead role in the design and implementation of market rules and operating procedures for the CAISO. Since joining the CAISO approximately eighteen years ago, I have worked extensively on implementing and integrating the approved market rules for California's competitive energy and ancillary services markets and the rules for congestion management, real-time economic dispatch, and real-time market power mitigation into the operations of the CAISO balancing authority area.

3. I am a registered Professional Electrical Engineer in the State of California. I hold a B.S. degree in Electrical Engineering from the California State University, Sacramento. I have taken post-graduate coursework in Power System Engineering from Santa Clara University and earned an M.S. degree in Information Systems from the University of Phoenix. Prior to joining the CAISO in 1997, I worked for eight years in the Electric Transmission Department of Pacific Gas and Electric Company, where my responsibilities included Operations Engineering, Transmission Planning and Substation Design.
4. The purpose of this declaration is to explain why, even with the benefit of robust and rigorous readiness criteria and the available balancing capacity functionality, it is necessary for the CAISO to modify its tariff to protect ratepayers within the new EIM balancing authority area, for a reasonable time, from potential price excursions caused by issues related to a new EIM entity's need to adjust its operation to the new EIM market environment.

BACKGROUND ON EIM PRICE EXCURSIONS

5. The EIM provides other balancing authority areas the opportunity to participate in the real-time market for imbalance energy that the CAISO operates in its own balancing authority area. PacifiCorp's two balancing authority areas were the first two to enable participation in the EIM. To prepare for implementation of the EIM, the CAISO and PacifiCorp established operations and technology implementation teams in addition to preparing and training the personnel that would operate the systems. The CAISO's market rules went into effect on October 24, 2014, for the first trading day November 1, 2014.

6. Following implementation, certain transitional conditions arose that caused the transmission and power balance constraints described in sections 27.4.3.2 and 27.4.3.4 of the CAISO tariff to bind more frequently than expected, producing anomalous prices in the fifteen-minute and five-minute markets that did not reflect actual imbalance system conditions in the balancing authority areas of PacifiCorp.
7. After an extensive investigation of the root causes of these price excursions, the CAISO and PacifiCorp determined that they were not the product of actual capacity insufficiencies in the PacifiCorp balancing areas, but rather were due to:: (1) "learning curve" challenges associated with integrating PacifiCorp operations with the EIM, which have sometimes caused the EIM to operate based on imperfect information regarding actual imbalance conditions; and (2) a structural limitation in the current design of the EIM, namely the lack of visibility to the market of capacity that is available to PacifiCorp to meet load in its balancing area and that is not bid into the EIM. These findings have been set forth in the CAISO's monthly informational reports on EIM performance, the CAISO's and PacifiCorp's presentations at the April 9, 2015 technical conference hosted by the Commission, and in the CAISO's comments on the technical conference.

CONTINUED NEED FOR TRANSITIONAL MEASURES

8. The CAISO's proposed available balancing capacity enhancement, pursuant to which the CAISO's market optimization process will automatically recognize and account for available capacity identified by the EIM entity of the balancing

authority area, will address the market structure limitation I mentioned above. I am confident that the combination of the available balancing capacity proposal, along with the enhanced readiness criteria that the CAISO is adopting pursuant to the Commission's directive, will largely address the post implementation issues that the CAISO detailed in its monthly reports to the Commission. Nevertheless, even with these improvements in place, I believe there are two factors that still pose a significant risk that new EIM entities will experience price excursions as a result of learning curve issues.

9. First, even with a reasonable period of market simulation and parallel operations prior to implementation, it is impossible to fully test all potential scenarios and outcomes that might occur in actual operations in a sandbox environment. During market simulation and parallel operations, the prospective EIM entity continues to operate its balancing authority area independent of the EIM results and dispatches. Thus, it is unlikely that during parallel operations that participating resources will be dispatching their resources in a manner that follows the dispatches and schedules determined by the EIM. After the EIM entity is fully integrated into financially binding operations, however, resources participating in the EIM will receive their dispatch instruction from the EIM market operator. Although the EIM entity can intercede with manual dispatch instructions during EIM operations, this should not be a common practice because any difference from the optimal dispatch calculated by the EIM will create imbalance energy dispatches that are inconsistent with the optimal dispatch.

10. Because a prospective EIM entity is most likely not dispatching its resources in actual operations in a manner that follows the EIM dispatch instructions during market simulation and parallel operations, when EIM implementation occurs, the EIM market software may receive telemetry feedback inconsistent with the EIM dispatch instructions issued during testing. Therefore, the EIM entity cannot fully evaluate how the system is going to react to its actions, and make appropriate adjustments, until it is actually operating in the EIM production environment. In other words, the market simulation and parallel operations process cannot provide an EIM entity with the full operational experience prior to implementation. This is exacerbated by the significant change in operational paradigms that an EIM entity experiences when moving from a largely vertically-integrated, potentially manual dispatch-reliant model to participation in an automated market that optimizes over multiple areas every 5 minutes,. As a result, even with a robust readiness process, there will inevitably be a period of time after EIM implementation during which a new EIM entity is still learning fully how to operate in the new paradigm where EIM dispatches are financially binding.

11. Second, while as of November 1, 2015, subject to the Commission's acceptance, the EIM entity will have the benefit of the available balancing capacity mechanism, it will still need actual operational experience to best determine and adjust the level of available balancing capacity necessary to meet its balancing authority obligations beyond what the EIM dispatch is capable of addressing. Specifically, the EIM entity will need to manage and allocate its total resource

capacity as between the capacity needed to meet contingency reserves[1], the amount needed to meeting balancing authority obligations[2], and ensure it does not fail the sufficiency tests, which would preclude it from benefiting from EIM transfers.

12. Doing so effectively will require some degree of calibration and actual experience in order for the EIM entity to understand the correct balance between sufficient capacity to address reliability issues in its own balancing authority area(s) and what is voluntarily being offered by participating resource scheduling coordinators for imbalance energy dispatch in the EIM. Recall that under the available balancing capacity proposal, the EIM entity cannot rely upon available balancing capacity to pass the hourly resource sufficiency evaluations[3]. Therefore, if the EIM entity identifies too much capacity from participating resources as available balancing capacity, this will reduce bid-in capacity from those participating resources. This, in turn, may cause the balancing authority area to fail the resource sufficiency evaluation, thereby restricting EIM transfers with other balancing authority areas. This limits the available resources and effective economic bids to those located within the EIM entity's own balancing

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[1] I use the term "contingency reserves" here to mean spinning and non-spinning reserves being held for meeting an EIM entity's minimum contingency reserve obligation as defined by WECC criteria BAL-WECC-OO2.

[2] The CAISO's available balancing capacity proposal is designed to ensure that this capacity can be used to meet balancing authority obligation and not to support an EIM transfer to another balancing authority area in the EIM.

[3] As explained in the declaration of Mr. Donald Tretheway, submitted in support of the available balancing capacity tariff amendment in Docket No. EL15-53, although the CAISO does not exercise any oversight over EIM entities' maintenance of their contingency reserves, it expects that EIM entities will designate as available capacity only capacity that is available and able to meet load within the binding market interval.

authority area(s), which may cause price excursions because the pool of resources from other balancing authority areas in the EIM has been temporarily reduced.

13. In the hourly resource plan, an EIM entity identifies capacity from resources that will be used as spinning and non-spinning reserves. In the market optimization, spinning and non-spinning reserves are the highest priority capacity identified on a resource. In the event a resource's total capacity is reduced within the operating hour, any available balancing capacity and bid-in capacity will be reduced to maintain the identified contingency reserves capacity for that hour. An EIM entity balancing authority area's contingency reserves obligation can both increase and decrease within the operating hour, but since the resource plan is submitted hourly, the EIM entity must use outages to re-rate the resource to manage contingency reserves within the operating hour and must provide timely information on any manual dispatches it conducts to manage its contingency reserves within the hour.

14. The EIM entity will need to learn, in actual production, how to effectively coordinate the designation of available balancing capacity, while maintaining its minimum contingency reserve capacity within the operating hour through outages, while always meeting its actual contingency reserves obligation. For example, assume an EIM entity decides to identify, in the hourly resource plan, the maximum potential spinning and non-spinning reserves capacity that it may need within the operating hour. Since capacity identified to support contingency reserves has the highest priority, this will reduce the available balance capacity

and bid-in capacity, which increases the potential for infeasibilities because effective economic bids have been reduced. However, if the EIM entity identifies too little contingency reserves capacity in the hourly resource plan, it will need to secure additional capacity contingency reserve purposes in real-time by submitting timely outage information to the CAISO which will limit the EIM dispatch of either available balancing capacity or bid-in capacity on the resource. Again, because in market simulations and parallel operations the EIM entity is not actually following dispatch instructions or managing its contingency reserves based on actual EIM market outcomes and dynamically changing system conditions, it is not possible for it to learn more precisely how to manage these various forms of capacity to their fullest prior to actual EIM operations.

15. For these reasons, it is necessary to implement, for a reasonable period of time, a transition mechanism to mitigate the risk of price excursions that occur in the EIM entity balancing authority area based on incomplete or inaccurate information due to learning curve issues that can only be experienced in an actual operational environment.

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 day of August, 2015.

Mark Rothleder

Attachment D – Matrix of Responses to Stakeholder Comments

Transition Period for Energy Imbalance Market

August 28, 2015

California Independent System Operator Corporation

EIM Transition Period Tariff Amendment – Matrix of Response to Stakeholder Comments

Section	Party	Comment/Redline	ISO Response
General	Powerex	CAISO's proposal is a minimally-modified reincarnation of its earlier proposal to establish a 12 month transitional period for each EIM BAA. That proposal was developed with minimal stakeholder input and, in March 2015, was rejected by FERC, who shared the concerns expressed by Powerex and others that CAISO's proposal would merely mask the effects of the issues underlying the price anomalies experienced in the EIM. Rather than accept the proposal, FERC instituted an investigation under Section 206 of the Federal Power Act into the factors driving price spikes in the PacifiCorp BAA, an investigation that remains ongoing. Powerex submits these comments to express its concern regarding CAISO's decision to resurrect its previously-rejected transitional proposal and to do so with no stakeholder input into whether a transitional period is appropriate, or how it should be designed. In Powerex's view, there is no urgency for a transitional period since the current waiver will continue to apply until CAISO implements an improved EIM design pursuant to the Section 206 investigation, and consumers will have the additional protection of a prospective refund effective date. Moreover, as was the case before, CAISO's latest proposal will do nothing to address the underlying issues triggering application of the pricing parameters and merely seeks to waive application of the standard pricing provisions contained in the CAISO Tariff to accommodate the shortcomings of the resource sufficiency provisions in the EIM and limited pre-implementation testing. Rather than filing yet another request for waiver with FERC, Powerex urges CAISO to commence a stakeholder process to identify long-term and meaningful measures to ensure EIM prices are just and reasonable without resorting to suspension of longstanding pricing rules.	Lessons learned from the first EIM launch and the Commission's 206 investigation indicate that there is a need for three measures to effectively address the issues encountered with the first EIM entity: 1) ensure pre-go live readiness through meeting defined criteria; 2) address a structural market issue that limited the EIM entities ability to reflect all available capacity in the Real-time Market; and 3) implement a transition period to avoid pricing issues due to learning curve and post go live implementation issues. The CAISO is already working towards meeting criteria developed with stakeholder earlier this year to ensure that all issues that can be mitigated before implementation are identified and addressed. Pursuant to FERC order, the CAISO will be including the criteria in its tariff with the Commission in August. During. Also, following the technical conference set by FERC in Docket EL15-53, the CAISO proposed an enhancement, known as the available balancing capacity mechanism, that will address the market structure issue and has filed supportive tariff language consistent with FERC's order in that proceeding. However, despite these two significant and important efforts, there is still the possibility that the EIM entity and the CAISO are confronted with issues post go live that could not have been identified during readiness activities. For example, even if the EIM entity is able to test and evaluate the management of their resources to balance their system prior to the start, the tests are limited and cannot identify all actual possible scenarios that may occur when in actual production. Even with the ability to conduct parallel operations, the EIM entity and the CAISO cannot fully anticipate how the system will respond. During parallel operations resources are not dispatched pursuant to the EIM market outcome, which means that the CAISO and the EIM entity cannot identify the consequences of a market dispatch or outcome on actual operations. Moreover, even with the available balancing capacity proposal in place, a new EIM entity will need actual EIM production experience in order to learn how to balance how much capacity needs to be identified as available balancing capacity, as well as retained as contingency reserves, whilst ensuring it does not fail the balancing and sufficiency tests conducted prior to the actual trading hour For these reasons, the CAISO believes it is still important to have a transition period, during which market participants are not forced to bear the costs of errors and issues experienced by a new EIM entity.

			The CAISO previously stakeholdered the proposal and obtained Board approval. The Commission did not accept the CAISO's initial filing but indicated that the CAISO should come back with a new Section 205 of the FPA filing to request a transition period. This stakeholder process was conducted to vet this modified filing approach. The CAISO is not seeking a waiver. It is actually amending its tariff consistent with prior board approval. Having identified the potential for transition issues to continue to cause price excursions for new EIM entities, the CAISO believes it is appropriate to take such proactive measures.
29.27(b)(3)	Puget Sound	(3) **Extension of Transition Period Pricing.** ~~As further approved~~After notice to and acceptance by the Federal Energy Regulatory Commission, the initial six-month transition period ~~is~~may be extended for the applicable EIM Entity Balancing Authority ~~Areas as specified below:~~Area(s) (1) if additional time is deemed necessary due to an unacceptable number of price excursions, and (2) CAISO and the applicable EIM Entity Balancing Authority Area(s) agree such an extension is appropriate. ~~(a) To be determined.~~	The CAISO did not accept this change. The purpose of this filing is not to address generally an unacceptable number of price excursions. Rather it is to address price excursions that are related to learning curve types of issues that cannot be addressed through other measures already available to the ISO in its tariff or through pre-go live solutions. The CAISO does not include this or any other criteria in the tariff because it is proposing to actually submit a new tariff amendment under Section 205 of the Federal Power Act if additional time is needed. At that time the CAISO will have to demonstrate that there is still a need for a transitional period, and participants will have the opportunity to raise concerns regarding an extension of the period for that entity.

29.27(b)(3)	Calpine	(3) **Extension of Transition Period Pricing.** The CAISO may seek from the Federal Energy regulatory Committee an extension of the Transition Period, not to exceed an additional 6 months, if after consultation with the new EIM Entity it is determined that the continuing infeasibilities are not the result of an absence of physical capability. Such determination shall be posted to the CAISO website no less than 60 days prior to the expiration of the 6 month transition period. ~~further approved by the Federal Energy Regulatory Commission, the initial six month transition period is extended for the EIM Entity Balancing Authority Areas as~~	The CAISO did not accept these proposed changes in their entirety. The CAISO will be making a Section 205 filing in the event that it determines it is necessary to protect the market from pricing anomalies related to learning curve issues. Therefore, because the CAISO will need to demonstrate the justness and reasonableness of any such request, it is not necessary to condition this filing on an absence of physical capacity or any other such criteria. The CAISO accepts a form of the second requested change. The CAISO agrees it is appropriate for the CAISO to indicate sixty days prior to the expiration of the transition period whether the EIM entity will require an extended transition period. However, if there is an unknown issue that only materializes itself the after that time, the CAISO should retain its statutory right to request for a waiver of the notice period and file a tariff amendment at any time after those sixty days have elapsed. It is also necessary to recognize that given the shortness in time, the CAISO may be required to submit its tariff amendment contemporaneously with the postings. The CAISO has reflected these principles in its final proposed tariff language.