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**

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.[1]

[1] 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
Total benefits	**$21.4**	**$65.6**	**$36.7**	**$102.8**	**$39.2**	**$128.7**

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, 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.