

# Memorandum

**To:** ISO Board of Governors

**From:** Petar Ristanovic

**Date:** September 15, 2014

**Re:** **Decision on implementation of energy imbalance market and briefing on the full network model expansion**

---

***This memorandum does require Board action.***

## EXECUTIVE SUMMARY

Implementation of the energy imbalance market (EIM) and full network model (FNM) expansion involves significant tariff, business process and procedures, network model and software system changes. As committed to in the 2013 EIM Implementation Agreement, ISO and PacifiCorp teams have planned and are executing EIM changes as part of the fall 2014 release. The implementation plan includes multiple steps to design, develop, and test the system changes, including a joint market simulation.

The purpose of market simulation is to allow PacifiCorp, other market participants and the ISO to test specific market scenarios in a test environment prior to implementation to ensure that all system interfaces are functioning and producing expected results. Although ISO Management expects all processes, procedures and systems to be ready for implementation of EIM on October 1, 2014, we recommend a phase-in of binding results in EIM. FNM will be fully deployed on October 1 as planned. Under this plan, EIM will operate for one month in a parallel, non-binding production environment to allow continued analysis and training until full deployment of EIM anticipated to be on November 1, 2014. This approach will provide additional time to gain experience in new operating procedures and greater confidence in market results.

Management recommends that the Board approve the implementation of EIM as proposed herein:

***Whereas, Management and key market participants report significant progress on the energy imbalance market implementation;***

***Whereas, assuming progress on certain essential items continues as expected, Management reports that it expects all processes, procedures and systems to be ready for energy imbalance market implementation on October 1, 2014, and that the energy imbalance market will operate for one***

***month in a parallel, non-binding production environment to allow continued analysis and training until full deployment of the energy imbalance market, anticipated to be on November 1, 2014; and***

***Moved, that the ISO Board of Governors directs Management to continue to monitor the status of the energy imbalance market; and***

***Moved, that the ISO Board of Governors directs Management to implement the energy imbalance market on October 1, 2014, in a parallel, non-binding production environment with full deployment of the energy imbalance market on November 1, 2014, or as soon thereafter as Management deems appropriate.***

## **DISCUSSION AND ANALYSIS**

The eighteen month process to define and develop the EIM gained momentum when FERC approved the EIM Implementation Agreement between PacifiCorp and the ISO on June 28, 2013. A comprehensive stakeholder process involving parties from across the west culminated in a final proposal for the EIM design and related policy issues, which the Board approved at its October 2013 meeting. A tariff stakeholder process followed, resulting in an ISO tariff filing with FERC on February 28, 2014. FERC conditionally approved nearly all of the proposed tariff language in an order issued on June 19, 2014. The FNM expansion policy followed a similar process, and FERC approved the tariff changes as discussed further below.

FERC's June 19, 2014 order paved the way for EIM implementation on October 1, 2014. The order included specific directives, such as to develop a flag that allows participants to avoid dispatches that would trigger compliance with California's greenhouse gas regulations. This directive and other enhancements will be addressed in 2015, consistent with FERC's order. In addition, the ISO received Board approval to file a narrow request for approval of certain market enhancements, and the ISO also filed to correct a settlement issue that was uncovered during market simulation. None of these current or future regulatory activities represent a barrier to EIM implementation.

In parallel with regulatory review, PacifiCorp successfully exported its network model to the ISO in late 2013, and the ISO incorporated it into its energy management system. When the full network model was deployed in December 2013, the ISO and PacifiCorp completed validation for all supervisory control and data acquisition points and established the new market model for subsequent market testing.

The implementation teams further executed the project plan and allocated resources to translate the market design into detailed business and system requirements for the existing technology platform, recently updated to support the fifteen minute market. On April 1, 2014, the ISO published technical specifications for EIM application program interface, metering and settlements. Software vendors and internal development teams

implemented the requirements and technical specifications into a fully integrated end to end system.

The ISO prioritized the integration of the end to end system as the first step towards building the EIM and FNM expansion. This allowed PacifiCorp early access to the programmatic interfaces in its external test environment. Connectivity and security testing with PacifiCorp started on July 8, 2014. Functional and other testing followed as the ISO and PacifiCorp exchanged more and more data across software systems. During the last week of July 2014, the ISO opened the market simulation environment to all market participants and began executing nineteen structured scenarios to demonstrate EIM functions and FNM expansion. The ISO completed the structured scenarios during the first two weeks of September.

One of the structured scenarios demonstrated the ability for the ISO and Bonneville Power Administration (BPA) to exchange data, which is critical for system reliability and congestion management. The ISO, PacifiCorp and BPA worked cooperatively to study impacts, produce operating procedures, and build system interfaces to ensure appropriate visibility and controls for all balancing areas involved.

## **FULL NETWORK MODEL READINESS AND DEPLOYMENT**

FERC's July 31, 2014 order accepted the ISO's tariff filing to implement the full network model enhancements, including changes that authorize the ISO to model unscheduled flow in the day-ahead market. In response to certain comments to FERC, the ISO also committed to implement an accuracy metric as a transitional measure that would trigger the temporary suspension of modeling of external unscheduled flow on the interties in the day-ahead market when such modeling is not sufficiently accurate. Using the metric, which is based on a 3-week rolling average, the ISO will determine if modeling the unscheduled flows in day-ahead market is more accurate than not modeling them. So long as the metric demonstrates more accuracy with unscheduled flows modeled, the ISO will continue modeling them. If the metric fails, the ISO will disable the modeling of unscheduled flows in the day ahead market until it can be shown through off-line simulation that greater accuracy can be achieved by reinstating the modeling.

Based on the Board's direction at its February 6, 2014 meeting, the ISO also performed a pre-implementation analysis of the ISO's ability to accurately project unscheduled flow. The ISO used the analytic approach described above for a 14 day period to assess the impact of deploying the full network model. The results indicate that the modeling estimate of unscheduled flow impacts of external balancing area schedules was more accurate for 12 out of the 14 days. For 2 of the 14 days, the modeling of estimated unscheduled flow impacts was less accurate due to input data issues. Based on this analysis, the ISO has concluded that with a process in place for screening input data, the FNM will improve its modeling of estimated unscheduled flow. To ensure this on an ongoing basis, the ISO will apply input data quality checks and will monitor the accuracy metric as described above.

## **EIM READINESS AND IMPLEMENTATION**

As the EIM testing phase and market simulation concludes, the ISO and PacifiCorp are turning their attention to correcting defects, improving the quality of solutions in the simulation environment, and implementation planning activities. Both entities have detailed implementation support plans and participated in joint tabletop drills to exercise communication and business continuity protocols. The implementation support plan consists of several days of around the clock coverage across operations, technology and other support functions.

The decision to implement the EIM in parallel operation is pending a final readiness assessment by the ISO and PacifiCorp on September 28, 2014 and would likely proceed as follows:

- Full implementation of EIM and FNM on October 1, 2014, and full deployment of the FNM expansion on October 1, 2014; and
- Activation of PacifiCorp's participation as an EIM Entity on October 1, 2014 in a parallel, non-binding production environment for one month to allow for additional analysis of market results, increase confidence about the overall readiness of the software systems, processes and procedures, and conduct real-life production training for ISO and PacifiCorp's operators; and
- Full EIM deployment, including financially binding dispatch instructions, and settlements implications starting on November 1, 2014.

During the October period, PacifiCorp will participate as an active EIM balancing authority in the parallel operation environment. This means that PacifiCorp will submit balanced base schedules, bids, outages, and other input data into the parallel environment and conduct feasibility tests. PacifiCorp will also receive advisory EIM dispatch results, which will not be operationally or financially binding during this period. The environment will also be accessible for BPA to test and monitor the enforcement of the rate of change and the market flows on selected set of 13 internal BPA flowgates. Operation of all system interfaces except metering submission and settlements will be the same as planned for full deployment of EIM.

The parallel, non-binding production environment will provide all key system interfaces for PacifiCorp to interact with and submit and receive data. However, PacifiCorp will have the capability to receive but it will not be required to follow the advisory EIM dispatches. This allows PacifiCorp to manage their system using either internally generated dispatches or external dispatches coming from the EIM parallel production environment. PacifiCorp will interact with EIM by performing all typical production activities including issuing outages, manually dispatching their system, dispatching contingency reserves, and allowing or blocking dispatches as needed to maintain system reliability. PacifiCorp will also be able to run its shadow settlement using the data coming out of the parallel, non-binding production environment. During this period, the ISO will calculate and post four EIM settlement

statements for PacifiCorp to download and compare with PacifiCorp's shadow settlement results.

The parallel production operation environment resolves some of the practical limitations of testing in a simulation environment. The quality of simulation can be significantly improved by running new systems in parallel to production systems using production data and full continuous participation of all market participants. The parallel, non-binding production environment provides a ready test bed for a range of tests and analysis that cannot easily be achieved in a simulation environment. For example, it will help us identify and correct errors in data exchanges, verify quality and reasonableness of EIM results, identify and analyze any market power issues, provide extended training, and verify settlement charge codes.

The ISO will enable additional monitoring and assessments on October 1, 2014 as requested by the Department of Market Monitoring for the full network model enhancement as well as the market monitoring of market power and other performance metrics of the EIM. In addition, the ISO has already filed to initially enforce market power mitigation on the EIM internal inerties.

Although the parallel, non-binding production environment has benefits, it also requires additional work by both ISO and PacifiCorp because it must be treated similar to the production system. The ISO will provide this support by re-prioritizing daily non-production activities and leveraging existing processes and procedures. Likewise, the parallel operation environment requires PacifiCorp resources to provide 24/7 support to ensure accurate and continuous submission of production quality input data such as balanced base schedules, economic bids, interchanges, outages and derates, EIM transfer and other PacifiCorp flowgate limits. Nevertheless, both organizations are committed to this approach.

## **EIM BENEFITS MONITORING**

Once EIM is fully deployed in the production environment and starts producing binding results on November 1, 2014, the EIM will efficiently dispatch resources across multiple balancing authorities in real time. Optimized dispatch to balance supply and demand is expected to reduce system costs, while also enhancing reliability.

After the full deployment of the EIM, the ISO will quantify and publish a quarterly report of the benefits of the energy imbalance market using real market data. The ISO will calculate the benefit of participating in EIM for each balancing area. The benefits methodology will compare actual system operation under EIM to a simulation of system operation without EIM.

On, August 29, 2014, the ISO posted a technical bulletin, that explains the methodology that will be used for quantifying the benefits of participating in the EIM. The methodology was developed in consultation with Department of Market Monitoring and the Market Surveillance Committee.

## **CONCLUSION**

The ISO and PacifiCorp have prepared their systems for implementation of EIM on October 1, 2014 and jointly support a phased process to achieve full deployment on November 1, 2014. With the proposed parallel operation period, the ISO and PacifiCorp can leverage the results of these efforts and provide all interested parties the opportunity to develop confidence and experience in a production like environment. Accordingly, Management is confident in making the recommendation to implement the energy imbalance market on October 1, 2014, in a parallel, non-binding production environment with full deployment of the energy imbalance market on November 1, 2014, or as soon thereafter as Management deems appropriate.