

Memorandum

To: ISO Board of Governors

From: Keith Casey, Vice President, Market & Infrastructure Development

Date: May 21, 2014

Re: **Decision on flexible ramping constraint relaxation parameter**

This memorandum requires Board action.

EXECUTIVE SUMMARY

The flexible ramping constraint ensures the ISO market's five-minute dispatch has sufficient upward ramping capability to meet system conditions. However, under the fifteen-minute market recently established with the implementation of FERC Order No. 764 (Order 764) market design changes implemented on May 1, 2014, the current \$247 flexible ramping constraint relaxation parameter has the potential to unduly raise energy prices that are now the basis for financial settlement in the fifteen-minute market. Accordingly, Management proposes to reduce the flexible ramping constraint relaxation parameter from \$247/MW to \$60/MW.

The flexible ramping constraint relaxation parameter defines the marginal cost above which the real-time market optimization will forego procuring flexible ramping capacity. Management's analysis shows the proposed \$60/MW flexible ramping constraint relaxation parameter provides the maximum benefit from the flexible ramping constraint while not unduly increasing fifteen-minute market energy and ancillary services prices.

Management recommends the following motion:

Moved, that the ISO Board of Governors approves the proposal to reduce the flexible ramping constraint relaxation parameter, as described in the memorandum dated May 21, 2014; and

Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement the proposed tariff change.

DISCUSSION AND ANALYSIS

On December 13, 2011, the ISO implemented the flexible ramping constraint to ensure the ISO market's five-minute dispatch has sufficient upward ramping capability to meet unforeseen system conditions caused by variations in load and variable energy resources. The ISO enforces the flexible ramping constraint in the real-time market as part of the real-time unit commitment process. The real-time unit commitment process runs in fifteen-minute intervals prior to the five-minute dispatch.

During the FERC proceeding on the ISO's Order 764 market design proposal, intervenors expressed concern about price divergence between the fifteen-minute market and real-time dispatch. The ISO responded and FERC agreed that fine tuning the flexible ramping constraint relaxation parameter is appropriate to manage this price divergence.

On April 14, 2014 the ISO published a technical bulletin outlining the proposed reduction in the relaxation parameter from \$247/MW to \$60/MW to be effective with the start of the fifteen-minute market on May 1, 2014. The ISO held a stakeholder conference call on April 21, 2014 to discuss the analysis supporting this change. As a result of stakeholder comments, Management decided that it would be prudent to seek a tariff amendment to implement the lower relaxation parameter due to the relationship of the compensation to resources and the fifteen-minute market price.

Flexible ramping constraint's effect on fifteen minute market prices

Prior to the ISO's implementation of Order 764 market design changes on May 1, 2014, the real-time unit commitment process served primarily to commit or de-commit generation and to schedule and price ancillary services. Although the real-time unit commitment also calculated generation schedules and prices, they were only advisory.

Order 764 market design changes established a fifteen-minute market that now settles these generation schedules using prices determined by the real-time commitment process. Under the Order 764 market design, imbalance energy scheduled between the day-ahead market and the fifteen-minute market is settled at the fifteen-minute market price and imbalance energy between the fifteen-minute market and five-minute dispatch is settled at the five-minute dispatch price.

Management has observed that the real-time unit commitment energy prices, now used by the fifteen-minute market, tend to be driven higher than the five-minute dispatch prices by the flexible ramping constraint. The fifteen minute prices are strongly correlated with the marginal cost of meeting the flexible ramping constraint. The flexible ramping constraint's impact on the energy prices calculated by the real-time unit commitment process is now more important because, with the implementation of the fifteen-minute market, the ISO uses these prices for imbalance energy in addition to ancillary services settlement.

In light of this, Management has analyzed the flexible ramping constraint's effect on the energy prices from the real-time unit commitment process. Management has determined it is appropriate to reduce the parameter that forgoes flexible ramping procurement above a specified marginal cost for the reasons discussed below.

The flexible ramping constraint can be met by the real-time unit commitment process in two ways: (1) by committing more generating units, or (2) by dispatching generation out-of-merit so that more economic and fast generation is held back from its economic dispatch level to free up ramping capability. The additional generation committed through the flexible ramping constraint is effective in providing additional flexible ramping capability to the five-minute dispatch because the unit commitments are operationally binding.

In contrast, the out-of-merit order dispatches in the real-time unit commitment process are not operationally binding and may be partially undone in the five-minute dispatch because the flexible ramping constraint is not enforced in the binding five-minute dispatch interval. Consequently, the out-of-merit dispatches caused by the flexible ramping constraint tend to increase the fifteen-minute market energy price while not effectively providing increased flexible ramping capability to the five-minute dispatch. Therefore, Management proposes to change the value of the flexible ramping constraint relaxation parameter so that the flexible ramping constraint will continue to commit additional units to meet ramping needs in the five minute dispatch while minimizing the out-of-merit order dispatch and its undesirable effect on the fifteen-minute market energy prices.

This issue will be further addressed when the flexible ramping constraint is replaced by the planned flexible ramping product. The flexible ramping product will contain several design advantages over the flexible ramping constraint including consistent implementation and price impacts between the fifteen-minute market and five-minute dispatch. The flexible ramping product stakeholder initiative will recommence in June 2014. Management plans to seek Board approval of the design in December 2014 and is targeting implementation in Fall 2015.

Optimal flexible ramping constraint relaxation parameter value

Management analyzed the impact of the flexible ramping constraint on the fifteen-minute market prices and the effectiveness of the constraint on meeting the five-minute dispatch ramping needs. The analysis shows that the flexible ramping constraint is effective when the marginal cost is below \$60. At this level, the constraint results in additional unit commitment that can be used in the five-minute dispatch to meet ramping needs but not cause significant out-of-merit dispatch that drives up the fifteen-minute market prices.

Based on the analysis, Management proposes to reduce the flexible ramping constraint relaxation parameter from its current level of \$247 to \$60. The \$60 relaxation

parameter is expected to reduce the out-of-merit dispatches driven by flexible ramping constraint while maintaining the beneficial unit commitment decisions.

Compensation to resources for the flexible ramping constraint

Resources used to meet the flexible ramping constraint are compensated based upon the formula agreed to through the FERC settlement process, which is capped at \$800 and based upon the maximum of the resource's spinning reserve price or the marginal cost of the constraint, less seventy-five percent of real-time dispatch prices. Management is not proposing any changes to the compensation formula.

The relaxation parameter is the cost at which the market optimization will reduce the procurement requirement of the flexible ramping constraint. As a result, the relaxation parameter will make lower awards to resources by restricting additional procurement when the flexible ramping constraint marginal cost exceeds \$60. Since the flexible ramping requirement is reduced, the marginal cost of the flexible ramping constraints will also be lower. While lowering the relaxation parameter will result in lower payments to generators, it is not appropriate to maintain the current parameter level that will drive inefficient higher prices in the fifteen-minute market which is now settled under the Order 764 market design changes.

POSITIONS OF THE PARTIES

Stakeholders broadly support the fundamental goal of this initiative, which is to improve price convergence between the day-ahead market, fifteen-minute market and real-time dispatch. However, some generator owners expressed concern about the adverse impact that lowering the relaxation parameter will have on compensation to resources dispatched to resolve the flexible ramping constraint.

Some stakeholders also raised concerns that the ISO should not change the flexible ramping constraint relaxation parameter without obtaining Board approval and a subsequent FERC filing to include the parameter value in the ISO's tariff. As a result Management is bringing the proposed change to the parameter value to the Board for decision.

CONCLUSION

Management requests Board approval to reduce the flexible ramping constraint relaxation parameter to \$60/MW. The flexible ramping constraint is necessary to ensure sufficient upward ramping capability to reliably manage the grid. Setting the relaxation parameter to \$60/MW provides the reliability benefits without unduly impacting the fifteen-minute market that are now settled under the Order 764 market design.