

Memorandum

To: ISO Board of Governors

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

Date: February 9, 2012

Re: Decision on Post-Emergency Bid Cost Recovery Elements

This memorandum requires Board action.

EXECUTIVE SUMMARY

In the first half of 2011, the ISO made two emergency filings with FERC to amend the tariff to change the rules for calculating bid cost recovery uplift payments. These rule changes were designed to mitigate adverse market behavior that caused the inflation of bid cost recovery payments to certain generating units. As part of these filings, the ISO committed to conducting a stakeholder process to provide stakeholders an opportunity to comment and raise any further changes or refinements to the ISO's proposed tariff amendments. Through the ensuing stakeholder initiative, Management sought to rule-out unintended consequences of the bid cost recovery rule changes resulting from the emergency filings, and to identify and eliminate any remaining opportunities for participants to inequitably inflate bid cost recovery payments.

Five potential issues were identified and discussed throughout this process.¹ At this time, however, Management proposes a policy change related to only two of those five issues.² Stakeholder positions on these two issues and Management's response are included in the positions of the parties section below.

Specifically, Management recommends the following:

- Resources only be eligible for minimum load cost recovery if they are within or above the minimum load tolerance band of their minimum operating level, i.e., online; and

¹ A sixth potential bid cost recovery issue related to resource uninstructed deviations and the proposed separation of the day-ahead and real-time markets in the bid cost recovery calculations is being addressed in a separate stakeholder process that is a follow-up to the Renewable Integration and Product Review – Phase 1 stakeholder process.

² Policy changes are not being proposed for the three remaining issues because they will either be addressed through other upcoming stakeholder processes or can be addressed through existing policy.

- Resources that have operating characteristics that are most accurately and efficiently modeled using the multi-stage generating resource functionality be required to be registered as multi-stage generating resources by spring of 2013.

Moved, that the ISO Board of Governors approves the policy to implement modifications to the minimum load cost tolerance band and to implement required multi-stage generating unit modeling registration, as described in the memorandum dated February 9, 2012; and

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

DISCUSSION AND ANALYSIS

Minimum load cost tolerance band

Management has identified an issue with the rules for determining if a resource is eligible to recover minimum load costs through bid cost recovery in the limited instances in which a resource's metered output is zero and the resource has a low minimum operating level registered with the ISO. Specifically, the ISO determines whether a resource is eligible for recovering minimum load costs by checking whether the resource was operating within or above a tolerance band around its minimum operating level. That tolerance band is 5 MWh or 3% of the resource's maximum operating level, whichever is greater. For some resources, the entire range from zero to the resource's minimum operating level can be covered by the tolerance band. In that case, the resource can be offline, but still be eligible to receive minimum load cost recovery under the current rules.

Management proposes to make a change to the tariff to reflect the intention of the cost recovery policy in such cases, which is to deem minimum load costs eligible for cost recovery only if a resource is in fact online.

Required multi-stage generating unit modeling registration

As part of the evaluation of any remaining opportunities for market participants to strategically inflate bid cost recovery payments, Management identified a potential opportunity to inflate bid cost recovery payments associated with not utilizing the multi-stage generating resource modeling functionality. Specifically, some resources have instead been registered with the ISO using the forbidden operating region functionality. This functionality designates one or more output ranges through which the ISO must dispatch a resource without stopping, because the resource cannot stably operate while holding in the range. In addition, Management has identified that using forbidden

operating regions to reflect multiple operating regions for resources that have operating characteristics that can be most accurately and efficiently modeled using the multi-stage generating unit functionality can result in infeasible ancillary services awards. Furthermore, not using the multi-stage generating resource modeling functionality for resources with multiple operating configurations results in additional market and operational inefficiencies. To address these concerns, Management proposes that resources be required, by spring 2013, to be registered as multi-stage generating resources if those resources have multiple operating regions and meet criteria described further below in this memorandum.

Background

Prior to the launch of its locational marginal price-based market, the ISO received an order from the Federal Energy Regulatory Commission compelling it to implement functionality to accurately model combined-cycle resources within three years. About one year later, the ISO implemented forbidden operating region functionality in the real-time market that provides for designating a resource's output level ranges through which the ISO must dispatch a unit without stopping. The forbidden operating region functionality was sufficient to enable the ISO to address the operational need for dispatch accuracy while the multi-stage generating unit model – the more robust solution to the modeling of resources with multiple operating regions – was under development.

For most units with multiple operating regions, the forbidden operating region functionality was only viewed as an interim solution because the forbidden operating region functionality lacks the multi-stage generating resource functionality's advantages of modeling each of a resource's operating ranges as a "logical generator." The multi-stage generating unit model was designed to robustly model generating resources with multiple operating configurations thereby addressing the inefficiencies and inaccuracies inherent in the forbidden operating region approach. By respecting the unique operating characteristics of each configuration, the multi-stage generating resource can be feasibly and efficiently awarded ancillary service, committed and subsequently dispatched for energy. This is a significant benefit to market participants and to the ISO market and operations.

Consequently, not using the multi-stage generating resource model for many resources with multiple operating regions leads to significant gaps and inefficiencies. Importantly, the use of forbidden operating regions has always been considered, in nearly all cases, to be a temporary solution to be used only until multi-stage generating unit modeling was in place. With increasing penetration of variable energy resources, responsive commitment and dispatch, and accurate procurement of ancillary services is crucial.

Stakeholders were universally supportive of the multi-stage generating resource design that was approved by the Board in May 2009 and implemented in December 2010. Since then, the ISO market and operations, as well as stakeholders, have benefitted

from the successful, stable operation of the multi-stage generating unit functionality that has been achieved over the past year. The ISO has made numerous refinements in the multi-stage generating resource functionality by tuning the model during 2011. Further enhancements are scheduled for implementation in April 2012.

Bid cost recovery issues with forbidden operating regions

In addition to the market and operational efficiencies gained by using the multi-stage generating resource model when appropriate, Management has identified a potential strategy for market participants to artificially inflate bid cost recovery uplift payments involving deviations from dispatch in conjunction with a forbidden operating region.

This strategy would involve submission of high real-time bid prices for a resource's operating range above a forbidden operating region. In the event the real-time dispatch attempted to economically dispatch the resource down through the forbidden operating region, and the resource did not follow the downward dispatch and stayed operating above the forbidden operating region, the ISO systems would repeatedly attempt to dispatch the resource down from its current output level. Because forbidden operating regions generally have low ramp rates, the resource would be dispatched for relatively greater amounts of instructed energy than if the forbidden operating region did not exist. As instructed energy is eligible for bid cost recovery, the resource's bid cost recovery payments would be increased.

In addition to this strategy, the ISO also has observed an operational concern when a resource does not follow an ISO dispatch into its forbidden operating region for multiple intervals. In this event, the resource may continue to be uneconomically dispatched into its forbidden operating region even though it has become economic to start dispatching the resource in the opposite direction. This can further inflate the resource's costs and create dispatch inefficiencies.

Both of these two situations cannot occur for resources dispatched by the multi-stage generating resource functionality. This is because bid cost recovery for multi-stage resources is based on the costs associated with the instructed operating configuration rather than the configuration into which the resource deviated.

Infeasible awards of ancillary services

In addition to the issues noted above, there are inefficiencies related to ancillary services associated with modeling a multi-stage generating resource using only forbidden operating regions. When a resource without multiple operating regions is certified for ancillary services, it is certified for the entire output range of the plant. The certification considers physical operating characteristics of the resource such as its ramp rate. A resource with a forbidden operating region can be certified to provide ancillary services in one amount below the forbidden operating region based on the operating characteristics of that region, and for another amount above the forbidden operating region based on that range's characteristics. Such a forbidden operating

region resource is considered by the market optimization software to have the maximum of those two ancillary services capacities. Therefore, the resource can receive an ancillary services award that is not consistent with the operating characteristics of the range in which the resource is dispatched. The resulting problem is two-fold: (1) the resource receives an infeasible ancillary services award which poses a reliability concern, and (2) the resource receives a capacity payment for ancillary services when it could not have delivered the service had it been called upon to do so.

Multi-stage generating resource modeling will address this problem fully to the extent a resource has a configuration that cannot provide reserves within a certain range. The ISO developed and implemented the multi-stage generating resource modeling functionality in December 2010 precisely to address this type of reliability and financial issues. This modeling functionality does so by recognizing ranges with different operating characteristics as logical generators and certifying and awarding them ancillary services accordingly.

Definition and exceptions

Management recommends that resources that have certain characteristics be required to be registered as a multi-stage generating unit. Registration as a multi-stage generating resource would be required for (1) combined cycle resources, (2) resources with multiple operating regions with a hold- or off-times after a transition through a forbidden operating region, or (3) generating units with multiple operating ranges from which a forbidden operating region would prevent the resource from providing the amount of awarded ancillary service capacity.

Per the original tariff definition of multi-stage generating resources, metered sub-systems, pumped-storage hydro units, and pumping loads are not eligible to use the multi-stage generating resource modeling functionality. Management proposes that system resources and resources designated as “regulatory must take” not be required to register as multi-stage generating resources. The ISO is required to take any or all of the output from regulatory must take resources; thus they are not dispatchable. This obviates the need to schedule and dispatch the resources efficiently and accurately using multi-stage generating unit modeling. However, dispatchable qualifying facilities that are not under a regulatory must-take provision that meet the above definition would be required to register as multi-stage generating resources.

Management recognizes that there may be parties that have resources with physical or contractual circumstances other than those noted here such that multi-stage generating resources modeling may not be optimal or even feasible. Because currently these circumstances are not fully known, Management requests authority as part of this proposal to pursue a regulatory strategy to provide an exception from required multi-stage generating resource registration for such resources as they arise.

Forbidden operating region functionality would remain available for resources with a single simple forbidden operating region such that the resource must simply transit

through the forbidden operating region after entering it with no hold times around the forbidden operating region and the same ancillary service capability for the two regions on either side of the forbidden operating region.

Proposed implementation timeline

Management proposes that resources be required to register as multi-stage generating resources (as described above) in time for the ISO's spring software release in 2013. This extended timeline is proposed so that resources have ample time to participate in the on-going market simulations through which they can fine-tune the specification of their resource configurations and costs, and also develop expertise in bidding those configurations into the ISO market.

By spring 2013, the ISO and stakeholders will have had approximately two years and four months of experience with the multi-stage generating resource modeling functionality. Additionally, by spring 2013, the ISO will have offered a market simulation environment for multi-stage generating resource modeling on an ongoing basis for nearly three years. Finally, the suite of multi-stage generating resource modeling enhancements, approved by the Board in October 2011, will go into effect in April 2012. Those enhancements include, among other things, improvements to the accounting of costs for multi-stage generating resources which will enable those resources to recover their minimum load costs.

POSITIONS OF THE PARTIES

As noted previously, the two items herein presented for decision by the Board have been vetted with stakeholders through the stakeholder initiative process. Stakeholder feedback these two items are described briefly below.

Comments throughout this initiative have shown stakeholder support for making minimum load costs eligible for cost recovery only when the resource meets the minimum load tolerance band and is also online.

In their written comments, Stakeholders have not been supportive of Management's recommendation that resources best modeled using the multi-stage generating unit modeling functionality be required to register as multi-stage generating resources. Pacific Gas and Electric, Southern California Edison, San Diego Gas and Electric, Six Cities and Calpine expressed a lack of confidence in multi-stage generating unit real-time dispatch. Despite their acknowledgement of significant improvements in the model's performance, they expressed the need for further improvements to the current multi-stage generating resource model.

In concert with stakeholders, ISO staff has identified and pursued opportunities to further improve the multi-stage generating resource modeling functionality. The multi-stage generating unit modeling functionality is being improved through software tuning, and through efforts such as the multi-stage generating unit enhancements approved by

the Board in October 2011. As described earlier in this memorandum, that suite of enhancements will be implemented in April 2012.

In response to written stakeholder comments on the draft final proposal and subsequent discussions, Management has further clarified the definition of resources for which registration as multi-stage generating resource would be required. These clarifications appear to have alleviated some stakeholder concerns over the registration requirement that they previously submitted as written comments. Furthermore, Management has established an extended timeline for the proposed required registration to provide both the ISO and stakeholders with additional opportunities to identify and resolve issues. This timeline will enable the ISO and market participants to gain additional market experience to identify and make further refinements to the multi-stage generating resource modeling functionality.

The California Department of Water Resources – State Water Project, the Northern California Power Agency, Pacific Gas and Electric, NRG, and Calpine commented that the problems created by resources using forbidden operating region functionality instead of using multi-stage generating unit modeling can be addressed by means other than requiring resources to use the multi-stage generating resource modeling functionality. Suggestions include monitoring and enforcement, the use of penalties for non-response to dispatch instructions, and implementing improvements to the forbidden operating region functionality. Management maintains that the development and implementation of multi-stage generating unit modeling was specifically undertaken to address the types of issues identified above, and that developing other means to address such issues is duplicative and not the best means of addressing them.

CONCLUSION

Management recommends that the Board approve the motion to implement the provisions for mandatory registration of multi-stage generation resources and to clarify that resources must be on-line to receive minimum load cost compensation.