Memorandum

To: ISO Board of Governors

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

Date: March 17, 2016

Re: **Decision on commitment cost bidding improvements proposal**

This memorandum requires Board action.

EXECUTIVE SUMMARY

Resource commitment costs include the costs of starting up a resource and the costs of running a resource at its minimum operating level so that it is available for dispatch. Efficient resource commitment by the ISO market relies on the ability of market participants to submit bids that reflect accurate commitment costs which, in turn, also ensures market participants recover these costs. In 2014 and 2015, the Board approved Management proposals to improve the accuracy of commitment costs used in the ISO market.

The ISO has continued to identify enhancements to further improve market participants' ability to accurately reflect commitment costs in the ISO market and to manage the market's use of their resources. At the same time the ISO has seen a proliferation of resources registering as "use-limited," currently representing 35,000 MW. The current market rules for submitting bids into the market for use-limited resources, including for their commitment costs, are different than for other resources to reflect their use limitations.

In this proposal, Management asks the Board to approve a set of market enhancements that improve market participants' ability to more accurately reflect resources' commitment costs, better ensure recovery of actual costs, and better manage their use by the market. Specifically, the enhancements in this proposal include:

- Use-limited resources will be eligible for a calculated opportunity cost to include in their daily commitment cost bids, which will allow the market to recognize their use limitations that extend over a longer period of time than the daily markets, such as annual limitations. This will allow the ISO to eliminate the "registered cost" option for bidding resource commitment costs, which is a less efficient means of reflecting these costs in the market.

In connection with this enhancement, Management proposes to revise the definition of “use-limited” resource to align it with resources that need an opportunity cost included in their commitment costs to be efficiently dispatched throughout the year. Management also proposes corresponding changes to the resource adequacy availability incentive mechanisms to address when use-limited resources reach their use limitations, as well as revising the process for registering use-limited resources and the annual process for evaluating use limits.

- Market participants will have greater flexibility to reflect preferred operating values in the ISO’s master file, including maximum daily starts, maximum daily multi-stage generator transitions, and ramp rates. Currently, these values must reflect only physical characteristics.

- Market participants will have the ability to re-bid commitment costs in the real-time market when a resource has not been committed in the day-ahead market. Currently, resources are locked into using their day-ahead bid in the real-time market even if the resource had not received a day-ahead schedule. In addition, the ISO will no longer automatically insert bids into the real-time market’s short-term unit commitment process for non-resource adequacy resources in the event a market participant submits bids for a resource into the day-ahead market but not the real-time market.

- Market participants will have the opportunity to file with the Federal Energy Regulatory Commission to recover commitment costs that exceed the commitment cost bid cap and result in a net revenue shortfall over the day considering all market revenue.

- The ISO will make various changes to natural gas transportation rates and to the electricity price used to calculate resources’ costs used in commitment cost caps and default energy bids used by the market.

Management proposes the following motion:

Moved, that the ISO Board of Governors approves the commitment cost bidding improvements proposal, as described in the memorandum dated March 17, 2016; 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

Background

Market participants can currently select between two options for bidding a resource's start-up, multi-stage generator transition costs, and minimum operating level costs (collectively referred to as "commitment costs"):

- The "registered cost option" allows market participants to bid up to 150 percent of a projected cost calculated by the ISO and is fixed for 30 days. The ISO bases the projected price based on monthly natural gas futures prices. To mitigate market power, this relatively high 150 percent bid cap is balanced with a requirement that the bids are fixed for 30 days. The ISO market rules currently allow only use-limited resources to be under the registered cost option. As discussed in more detail below, the higher cap allows them to include opportunity costs reflecting their limited starts or run hours. However, this option does not provide the ability to reflect current daily natural gas prices in commitment cost bids which can result in the inefficient commitment of resources.

- The "proxy cost option" allows market participants to submit daily bids up to 125 percent of costs calculated by the ISO using a daily gas price index. This option results in a more efficient resource commitment, and better ensures cost recovery, because it more accurately reflects current natural gas costs.

Proposed changes

Management proposes several market enhancements to ensure both the ISO and market participants have the ability to accurately reflect costs in the market. These enhancements will improve efficient resource commitments, optimally commit use-limited resources, and provide more effective risk management tools while maintaining reliability.

Use-limited resources

Management proposes that use-limited resources will be eligible for a calculated opportunity cost to include in their daily commitment cost bids, which will allow the market to recognize their use limitations that extend over a longer period of time than the daily markets, such as annual limitations. This will allow the ISO to eliminate the "registered cost" option for bidding resource commitment costs, which is an inefficient means of reflecting these costs in the market.

Use-limited resources have start and run limitations due to environmental or other operational restrictions. These restrictions extend beyond a one-day period, and therefore cannot be explicitly recognized in the ISO market commitment decision. For example, an environmental restriction may limit a resource's run time over a single month to only 200

hours. However, the ISO's day-ahead market only considers a single day. The ISO's optimization does not currently take into account that dispatching a resource in the current day may restrict its ability to run later in the month. When the resource runs in lower-priced hours, it incurs an opportunity cost to the extent it is not available in higher priced hours.

Including opportunity costs in commitment costs, however, can allow the ISO market to optimally commit these resources by considering the limitations that extend beyond a single day, such as over a month or a year. The ISO will determine resource-specific opportunity costs for limitations of use-limited resources by modelling the market commitment of these resources based on projected locational marginal prices. The ISO will update these opportunity costs monthly throughout the year to reflect the each resource's actual commitment by the market.

In conjunction with this enhancement, Management proposes to change the definition of "use-limited resource" to specify that these are resources that need an opportunity cost to have their commitment optimized through the market. Other resource types that in the past were considered "use-limited" but are not fully available at all times, such as variable energy resources and demand response resources, will continue to be exempt from the ISO's automatic bid insertion that use-limited status previously provided them.

The Board approved similar revisions to the "use-limited resource" definition last year. At that time, Management clarified that the proposed and existing interpretation of the "non-economic" limitations that would qualify a resource to be use-limited did not include purely contractual limitations. Notwithstanding, Management also committed to exploring appropriate solutions for market participants to manage resources' contractual limitations. However, FERC rejected the ISO's proposed revised definition of "use-limited resource" primarily on the basis that there was a lack of clarity concerning the term "non-economic" as it applies to limitations, a term in the existing definition. Management worked with stakeholders to further clarify the "use-limited resource" definition for this proposal. The revised definition continues to exclude contractual limitations as the basis for a resource to be considered use limited and qualify for opportunity costs in their commitment cost bid cap. Management maintains its longstanding position that economic limits like those originating from contracts, such as power purchasing or tolling agreements, are not acceptable limitations for establishing an opportunity cost adder to a resource's commitment cost bid cap. These limitations exist not as a result of restrictions imposed by external statutes or regulations, but rather reflect economic trade-offs made by the contracting parties. If the ISO were to accept contractual limitations to deem a resource eligible for an opportunity cost, it would provide market participants the ability to both physically and economically withhold resources from the market while bypassing the market power mitigation processes in place. This in turn could lead to market inefficiencies and market power concerns that would go unmitigated.

However, Management recognizes that long-term contracts that were approved through a robust regulatory process, prior to initial discussions of the ISO allowing opportunity costs for

such limitations, would not reflect attempts to exercise market power. Management proposes a limited exception of contractual limitations that meet specified criteria for a three-year transitional period. Management proposes limitations in long-term contracts that have been approved by a local regulatory authority, such as the California Public Utilities Commission, and were entered into prior to January 1, 2015, can qualify for the temporary exemption. Given the uncertainty of the quantity of capacity that will be captured by the provision, and increasing flexibility needs of the markets, Management cannot fully assess the market impacts of extending the provision beyond three years at this time. However, Management does commit to evaluate, prior to the end of the three year period, potential market and reliability impacts if the provision were to be extended at that time. Moreover, as discussed further below, Management's proposal to allow market participants to reflect preferred operating values for certain resource characteristics, instead of mandating that they reflect physical operating limits, will allow market participants to manage contractual limitations that do not fall under this exception.

Finally, the proposed changes related to use-limited resources and demand response resources will consider these resources under the resource adequacy availability incentive mechanism starting the beginning of the subsequent month after reaching a use limitation.[1] This enhancement will help to ensure that all resources offered as resource adequacy resources are available for dispatch.

Resource characteristics

The tariff currently requires resource characteristics submitted to the ISO's master file used by the market to reflect only actual physical limitations. However, Management realizes that market participants may want the market optimizations to consider resource characteristics that are based on other considerations such as avoiding excessive wear and tear of the resource or operating within contractual limitations.

Management proposes to provide generators flexibility to reflect these preferred resource characteristic values by adding an additional market field in the master file for certain characteristics, in addition to the existing field that will continue to reflect purely physical characteristics. These resource characteristics include maximum daily starts, maximum multi-stage generator daily transitions, and ramp rates. In conjunction with this change, market participants will no longer be able to specify ramp rates in energy bids.

The preferred operating values will be used in the market under normal system conditions while the purely physical capability limits will only be accessed by operations manually under stressed system conditions for an exceptional dispatch.

Finally, to address concerns regarding potential market power and anomalous effects in the real-time market, resources will be restricted from submitting less than two starts per day as

[1] The resource adequacy availability incentive mechanism penalizes or rewards resources based on their performance in meeting their resource adequacy must offer obligations.

a preferred resource characteristic unless the resource is only physically capable of one start per day. There will be an exception process for resources nearing the end of their life for which limiting starts to once per day is reasonable. It is desirable for the real-time market to be able to start resources twice a day because the real-time market optimization only looks out four and a half hours and may start a resource for the morning peak that is also needed for the evening peak.

Recovery of commitment costs that exceed the commitment cost bid cap

Market participants have pointed out that, although very infrequent, sometimes actual natural gas prices exceed the ISO's calculated commitment cost bid cap. To address this issue, Management proposes to add tariff provisions that will allow market participants to seek after-the-fact FERC approval of actually incurred commitment costs that exceed the bid cap. The ISO would then reimburse the FERC-approved costs through its bid cost recovery mechanism. As a result, the market participant would only be reimbursed for these costs to the extent the resource had a net revenue shortfall over the day, considering its total market revenue.

FERC would apply it's just and reasonable standard to determine whether the market participant reasonably incurred commitment costs that exceeded the bid cap to meet an ISO dispatch instruction. Management proposes that FERC conduct this review because having the ISO perform this function is not practical, as it would require establishing specific, objective criteria for such a reimbursement, for which it is not reasonable to enumerate all potential situations before-the-fact. Also, determining incurred costs would require visibility to a market participant's full portfolio of natural gas transactions and hedging mechanisms that FERC has a greater ability to obtain.

Real-time market commitment cost bidding

Currently, market participants don't have the ability to reflect the most recent natural gas prices in the real-time market if they bid the resource into the day-ahead market. Resources are locked into their day-ahead commitment cost bids when bidding in the day-ahead market even if the resource had not received a day-ahead schedule. Management proposes to allow resources without a day-ahead schedule to update their commitment cost bids for use in the real-time market to better reflect current costs.

Management also proposes to clarify the tariff so the real-time market's short-term unit commitment process no longer automatically uses day-ahead commitment cost bids in the real-time market for non-resource adequacy resources or resource adequacy resources without a real-time market offer obligation.

Changes to natural gas transportation rates and auxiliary energy electricity price

Finally, Management proposes various changes to improve the accuracy of natural gas transportation rates and generator auxiliary energy electrical processes used to calculate

resources' costs used in commitment cost caps and default energy bids used by the market. This includes creating a process for market participants to request an additional fuel region to include a gas transportation rate, including costs and credits, more representative of expected resource-specific costs based on the geographic location of the resource and whether the resource has a greenhouse gas compliance obligation. These changes will also introduce a process for estimating resource-specific start-up auxiliary power costs.

POSITIONS OF THE PARTIES

Management has worked with stakeholders to develop the opportunity cost methodology over the past three years. Although most stakeholders support the opportunity cost concept, several concerns remain regarding the details of its implementation and the "use-limited resource" definition. Of particular concern is Management's position that the proposed "use-limited resource" definition does not include contractual limitations. In addition, a number of stakeholders oppose Management's proposal to require market participants to list at least two maximum daily starts for a resource in the master file preferred operating characteristics field unless the resource physically is only capable of one daily start.

Concerns regarding the opportunity cost implementation details mostly revolve around whether the modeled opportunity costs will be correct and not lead to a resource's maximum starts or run hours being used up before the end of the year. Management has responded to this concern by incorporating a "buffer" in the way the opportunity cost model will model resources. Also, Management added provisions that allow a market participant to temporarily declare a resource unavailable without incurring penalties under the resource adequacy availability incentive mechanism in the event the market is using a resource more frequently than anticipated by the opportunity cost model. Management believes that these provisions provide significant safeguards to ensure the opportunity cost is implemented in a way that will effectively manage resource use limitations.

Some stakeholders are concerned about the "use-limited resource" definition because it would not provide default use-limited status to storage, demand response, and hydro resources. Stakeholders expressed similar concerns when the Board approved changes to the definition last year. Management has explained that resources no longer deemed use limited by default can still qualify to be use limited if they meet the revised criteria. Management has also explained that the new definition for use-limited resources will not impact these resources, as they have other tools to reflect their use limitations and furthermore do not have start-up and minimum load commitment costs that could potentially need an opportunity cost adder.

Some stakeholders contend that Management's proposal to restrict resources from submitting less than two starts per day as a preferred resource characteristic conflicts with the resource adequacy flexible capacity requirements that allow a portion of the flexible

capacity requirement to be met by resources with one start per day. First, Management does not believe this is inconsistent with the flexible capacity requirements that were designed to accommodate resources with a physical start limitation of one per day. Under the current market provisions, resources are required to accurately submit their full physical start limitations regardless of the resource adequacy product they are shown to provide. Therefore, Management's proposal provides increased flexibility in reflecting start limitations. Next, the flexible resource adequacy requirements do not consider market power impacts or the potential interaction with the real-time market outlined earlier in this memorandum in which the real-time market's four and a half hour look ahead may start a resource for the morning peak that is also needed for the evening peak.

Some stakeholders are concerned that Management's proposal for a limited exception for contractual limitations does not go far enough. They would like to see the exception cover the full term of the contract. Management believes that the three year transition period, which was originally proposed by the California Public Utilities Commission, is appropriate as it providers stakeholders time to modify the contractual terms to better align with the ISO's market design and the flexibility needs of the system.

A stakeholder comment matrix is included as Attachment A. The Market Surveillance Committee provided a formal opinion on Management's proposals and is included as Attachment B. The Department of Market Monitoring provided comments in their Market Monitoring Report which is included in the informational reports of the March Board materials.

CONCLUSION

Management requests Board approval of the proposal discussed above. The proposed changes will result in more efficient resource commitments, ensure generators are adequately compensated for their commitment costs, and enable more frequent, consistent participation from resources with external limitations all while improving system reliability.