Memorandum

To: ISO Board of Governors

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

Date: March 12**,** 2014

Re: **Decision on flexible resource adequacy criteria and must-offer obligation**

This memorandum requires Board action

EXECUTIVE SUMMARY

Management is seeking Board approval of its proposal to establish (1) rules to make flexible capacity procured by load serving entities on a forward basis operationally available to the ISO market through economic bids, and (2) provisions to allow the ISO to procure backstop flexible capacity in the event load-serving entities procure insufficient flexible capacity to meet forecasted operational needs.

This proposal is an important refinement to the ISO tariff provisions designed to work in conjunction with the California Public Utility Commission's and other local regulatory agencies' resource adequacy programs. In June 2013, the CPUC established interim flexible capacity procurement obligations for load serving entities. The ISO was an active participant in the CPUC proceeding to develop these rules, and remains active in the CPUC's current proceeding to refine them further. This proposal works with the CPUC's new flexible capacity procurement requirements to ensure sufficient flexible capacity is operationally available to the ISO market. Moreover, the proposal contains specific elements to enable preferred resources such as demand response, storage, and variable energy resources (i.e. renewable resources) to provide a portion of the flexible resources needed to maintain reliable grid operations.

In summary, the proposal consists of the following elements:

1. A methodology and process for establishing the system flexible capacity need;
2. A methodology to allocate shares of the system flexible capacity need on a local regulatory authority basis;
3. Requirements for scheduling coordinators for load serving entities to inform the ISO of the flexible capacity they have procured under their local regulatory authority's resource adequacy requirements;

4. Requirements for offering flexible capacity into the ISO market including provisions to enable preferred and use limited resources to meet a portion of the flexible capacity need; and

5. Provisions for the ISO to forward procure flexible capacity using backstop procurement authority in the event of a collective deficiency in flexible capacity procured under local regulatory authorities' resource adequacy requirements

Management proposes the following motion:

> ***Moved, that the ISO Board of Governors approves the proposed flexible resources adequacy criteria and must-offer obligation proposal, as described in the memorandum dated March 12, 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

This proposal is the result of extensive stakeholder engagement through the ISO's stakeholder initiative process, over the last 15 months, as well as the through the CPUC's resource adequacy proceeding (R.11-10-023) over the last two years. To ensure system reliability, these efforts coordinate ISO rules with local regulatory authorities' resource adequacy requirements to ensure sufficient flexible resources are operationally available to the ISO market.

Background

Meeting California's aggressive environmental goals related to the electrical system – including the 33 percent renewable portfolio standard, generation compliance with once-through cooling regulations, and targets for increased distributed generation -- creates the challenge of ensuring that there is sufficient flexible capacity to address the added variability and uncertainty of variable energy resources.

To address this challenge, Management submitted a proposal to the CPUC in October 2012, in partnership with the three investor-owned utilities, to establish forward flexible capacity procurement requirements as part of the CPUC's resource adequacy program. The proposal to the CPUC consisted of a monthly flexible capacity procurement requirement based on the ISO system's projected maximum three-hour change in net load (load minus variable energy resource output) in each month. This proposal also consisted of provisions for determining how resources count towards meeting this requirement. This proposal was a simplification of an earlier ISO proposal that would have established requirements for three types of flexible capacity: ramping, load following, and regulation. This simplification was in response to concerns about the

difficulty of procuring multiple flexibility products though the bilateral resource adequacy market. This simplification acknowledged that the requirement based only on the three-hour ramping needs was also intended to provide flexible capacity that can meet dispatch interval-to-dispatch interval ramping needs.

In June 2013, the CPUC established forward flexible capacity procurement obligations for its load serving entities as part of its resource adequacy program.[1] Because of the simplified approach, the CPUC characterized these requirements as interim and stated that it would potentially consider new flexible capacity requirements after 2017. The interim requirements called for load serving entities to make best efforts to meet a flexible capacity procurement target in 2014, with a firm procurement obligation beginning in 2015.

With a flexibility requirement established in the CPUC resource adequacy process, the ISO needs to establish companion provisions in its tariff that: (1) ensure flexible capacity procured under resource adequacy requirements is operationally available to the ISO market through economic bids, and (2) allow the ISO to forward procure backstop flexible capacity in the event of a collective deficiency in load-serving entities' flexible capacity showings.

Management began the stakeholder process to develop the proposal outlined in this memorandum in late 2012. Over the course of the stakeholder process, Management has taken several important steps to advance the vision of flexible capacity provisions beyond those included in the rules established by the CPUC in June 2013. For example, while the CPUC's decision focused on conventional thermal and hydro resources, the ISO has developed additional provisions for other resources to provide flexible capacity, including use-limited resources, demand response, storage, and variable energy resources such as wind and solar.

Methodology and process for establishing flexible capacity need

Management proposes to determine the ISO system's monthly flexible capacity need based on maximum projected changes in net load. The ISO will inform the CPUC and other local regulatory authorities of their respective shares of the overall system need, and each local regulatory authority will then presumably use these values to establish procurement obligations for their jurisdictional load serving entities.

Management's proposal for determining and allocating shares of the ISO system's flexible capacity requirement adopts a process that is similar to the process the ISO uses to establish resource adequacy local capacity requirements. The ISO will collect data on the technology, location, installed capacity, and any other pertinent information about all variable energy resources under contract to load-serving entities in the ISO

[1] The CPUC's Final Decision for resource adequacy compliance year 2014 is available at http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M070/K423/70423172.PDF.

system. Once collected, the ISO will use this data, along with load data, to forecast the ISO system's hourly net load for the upcoming year. Based on this, the ISO will establish the system flexible capacity need for each month based on the system's forecasted maximum upward net load change over a three-hour period. This system flexible capacity need will include additional amounts to account for contingency reserves and for forecast error. The ISO will share the results of this study and the assumptions it made with stakeholders and receive their input before finalizing these system flexible capacity needs.

Flexible capacity need allocation

Once the ISO determines the system's overall flexible capacity need, it will provide to each local regulatory authority its share of the overall system requirement. The ISO will base this on each load-serving entity's contribution to the forecast change in net load during the system's forecast maximum upward three-hour net load ramp. This calculation will consider each load serving entity's forecasted net load changes and forecasted variable energy resource output changes, which the ISO will base on each load serving entity's contracted amounts of variable energy resources.

Although the ISO will also provide to each local regulatory authority a breakout of its jurisdictional load-serving entities' individual contribution to the system flexible capacity need, local regulatory authorities have the sole authority to establish procurement obligations for their jurisdictional entities. For example, the CPUC's current rules will allocate the CPUC's share of the flexible capacity need among its jurisdictional load serving entities based on shares of peak load.

Requirements for load serving entities to inform the ISO of the flexible capacity procured under their local regulatory authority's resource adequacy requirements

Management proposes that scheduling coordinators for load serving entities will inform the ISO of the flexible capacity they have procured under their local regulatory authority's resource adequacy requirements in two timeframes: annually and monthly. The ISO will use this information: (1) to determine the resources that have a specific must-offer obligation for flexible capacity resource, and (2) to evaluate whether sufficient flexible capacity has been procured under resource adequacy flexible capacity requirements.

Under this proposal, the ISO will use standard rules to calculate the effective flexible capacity of each resource used to provide flexible capacity. At a high level, these rules consider a resource's start-up time and ramp rate. These rules will also consider various categories of flexible capacity, as described below.

Flexible capacity resource categories and associated must-offer obligations

This proposal recognizes that the ISO system's largest ramping needs will occur during the daytime and early evening hours and that the maximum amount of ramping capability will not be needed every day. Consequently, this proposal provides for flexible capacity needs to be provided through three categories of resource obligations, which are defined by the required availability of resources for providing flexible capacity. This will allow a wide range of resources to provide flexible capacity, including preferred resources, as described previously.

The proposed categories are as follows:

- **Base flexibility:** This category addresses base flexibility needs and is intended for resources that are able to address frequent ramping needs. Resources counted in this category will be required to submit economic bids into the ISO market for the period from 5:00 a.m. to 10:00 p.m. every day. In addition, resources counted in this category must be able to provide at least six hours of energy for their flexible capacity, and must be able to ramp through their flexible range twice a day.

- **Peak flexibility:** This category addresses less frequent ramping needs than the "base flexibility" category so resources counted in this category will be required to be available less often. Resources counted in this category will be required to submit economic bids into the ISO market for a five-hour period each day. The ISO will determine this five-hour period in advance for each month using its net-load ramping forecast. In addition, resources counted in this category must be able to provide at least three hours of energy for their flexible capacity, and must be able to ramp through their flexible range once a day.

- **Super-peak flexibility:** This category addresses each month's most extreme ramping needs. Resources counted in this category would have the same five-hour period obligation to submit economic bids as the "peak flexibility" category, but would only need to be able to respond to five dispatches per month and would only be required to submit economic bids on non-holiday weekdays.

Management proposes these categories based on an assessment of the net-load ramping needs and considering the magnitude of the three-hour net load ramps, the frequency of bimodal ramping days (i.e. two significant three-hour net load ramps in a single day), and the relative size of ramps occurring on a single day. The quantity required in each category would differ from month-to-month based on the ISO's assessment of the flexible capacity needs. The must offer obligations associated with each category is designed to ensure the resources are available to the ISO for the times, durations, and frequency of flexible capacity needs.

All types of supply resources, regardless of technology, can be included in any of the categories provided they are consistent with the category definition and can be available consistent with the applicable must-offer obligation.

ISO backstop procurement authority for flexible capacity deficiencies

Management proposes to include a deficiency in flexible capacity as an additional tariff criterion for undertaking backstop procurement. This additional criterion will be based on an assessment of whether the flexible resource adequacy capacity shown to the ISO in the annual and monthly showings is collectively sufficient to meet system flexibility needs. The ISO will evaluate the resource adequacy showings by flexible capacity category to determine if there is a collective deficiency in any of the flexible capacity categories. The ISO would only procure backstop flexible capacity in the event there is a collective deficiency in meeting the ISO's operational needs. In such cases, flexible capacity would be procured using the same applicable capacity procurement mechanism price used for other types of backstop procurement.

The ISO will allocate the costs of any backstop procurement for flexibility needs by first determining the local regulatory authority that is short based on the ISO's allocation methodology. The ISO would then allocate the backstop costs to the scheduling coordinator for the local regulatory authority's jurisdictional load serving entities that are short using an allocation methodology specified by the local regulatory authority.

POSITIONS OF THE PARTIES

Stakeholders generally support the goal of ensuring the ISO has adequate flexible capacity to meet the system needs, provided the approach integrates state energy policy goals. However, some stakeholders have expressed concerns regarding specific details of Management's proposed approach for addressing these needs. The most significant of which are discussed below.

Management developed this proposal through an extensive stakeholder process and the proposed approach reflects significant changes that were made in response to stakeholder input. For example, Management originally proposed a single flexible capacity category with technology specific offer obligations for each resources type. Based on stakeholder input that this approach did not reflect operational realities, Management reassessed this position and worked with stakeholders to develop the three flexible capacity categories described above. Additionally, Management has deferred several aspects of the proposal, including availability incentives, to a subsequent stakeholder initiative based on stakeholder recommendations.

The Market Surveillance Committee and the ISO's Department of Market Monitoring generally support Management's proposal. The MSC's Final Opinion is attached for

your reference and the Department of Market Monitoring's report is included in the Board materials.

The following section addresses the major stakeholder positions raised during the stakeholder process. A detailed stakeholder comment matrix is also attached for reference.

Position 1: Some stakeholders assert that the ISO should allocate flexible capacity needs to variable energy resources, rather than to load-serving entities. Some of these stakeholders assert that such an allocation should occur for all variable energy resources and others assert that such an allocation is only needed for either variable energy resources not under contract to a load serving entity in the ISO or serving non-ISO load.

Response: Management believes that allocating a resource adequacy need to generating resources is a significant change to the current resource adequacy construct. While Management believes that this proposal likely merits additional consideration, such changes to the resource adequacy construct is beyond the scope of this stakeholder initiative.

Position 2: The CPUC staff asserts that the local regulatory authority should have the primary role of determining how a resource counts towards a load-serving entity's flexible capacity procurement requirement.

Response: A local regulatory authority may establish its own counting provisions for determining how resources count towards meeting a flexible capacity procurement requirement established by the local regulatory authority. However, the ISO will establish minimum criteria that it will use to evaluate whether the system has sufficient flexible capacity and whether backstop procurement is necessary. The ISO must be able to ensure it has sufficient flexible resources needed to maintain system stability and reliably operate the grid within NERC standards. In addition, having consistent minimum availability requirements established by the ISO will prevent a local regulatory authority from over-counting the flexibility of its resources and leaning on other local regulatory authorities' procurement.

Position 3: The CPUC staff asserts that any flexible capacity categories should be defined by the local regulatory authority and that the ISO should not have tariff provisions referring to categories with the possible exception of default provisions.

Response: The CPUC and other local regulatory authorities will maintain the ability to establish their own flexible capacity categories in relation to procurement requirements they establish for their jurisdictional load serving entities. However, the ISO must have tariff provisions referring to categories of flexible capacity in order to enforce flexible capacity must-offer obligations for various types of flexible capacity resources. Without specific reference to flexible capacity categories, the ISO would have to enforce a single must offer obligation that would prohibit resources like demand response and storage

from providing flexible capacity. While the ISO may ultimately put the method for determining the quantity of each category in the business practice manuals, it must have tariff provisions that define flexible category types.

Position 4: Some parties have asserted that the ISO should allocate flexible capacity needs based on non-coincident maximum three-hour net load ramps. These parties have asserted that such an allocation would avoid free-rider problems.

Response: Management believes that such a proposal actually encourages a free-ridership problem. For example, a load-serving entity that contributes significantly to the monthly peak three-hour net-load ramp, could free-ride on an another load-serving entity that has a much smaller contribution to the monthly peak three-hour net-load ramp or may even be helping to mitigate this ramp. Additionally, allocating the flexible capacity to local regulatory authorities based on contribution to the coincident three-hour net-load ramp provides incentives to reduce their contribution to the net-load ramp.

Position 5: Some parties have asserted that the ISO should include the charging portion of storage resources in determining the how much flexible capacity it is able to provide.

Response: Management agrees that, if storage resources are dispatched under the ISO's non-generator resource model, they can provide flexible capacity that includes both the charging and discharging capabilities of the resource. Management issued an addendum to the draft final proposal to address this issue.

Position 6: Some stakeholders have asserted that the ISO's proposed flexible capacity categories are overly restrictive and prevent flexible resources from counting as a base flexibility resource. For example, some have asserted the ISO should allow resources with significant start and energy limitations to count as base flexibility resources.

Response: Management has designed the flexible capacity categories based on flexible capacity needs and has developed flexible capacity categories that accommodates resources with a moderate level of use limitations. However, Management does not believe that resources with severe use limitations will be well suited to address flexibility needs given the persistent nature of these needs. Additionally, allowing resources with severe use-limitations to count for base flexibility could result in one local regulatory authority leaning on another local regulatory authority's flexible capacity procurement. However, to accommodate this concern Management has added a provision in the addendum to the draft final proposal to allow a load serving entity to aggregate use-limited resources to meet the base flexible capacity obligation.

Position 7: Some parties have asserted that the ISO should allow for intertie resources to provide flexible capacity, especially once the ISO can dispatch interties every 15 minutes.

Response: The flexible capacity need is intended to meet five-minute dispatch interval-to-dispatch interval ramping needs, in addition to longer period ramps. While 15-minute dispatchable intertie resources may be able to meet at least a portion of these shorter period ramping needs, the ISO does not yet have analysis to support this or experience with 15-minute dispatchable intertie resources. Management intends to address 15-minute intertie resources in a subsequent stakeholder initiative.

Position 8: CPUC Staff asserts that the ISO should include a sunset provision in the tariff under which all flexible resource adequacy criteria and must off obligation tariff provisions would expire at the end of 2017.

Response: Management has committed to conduct on-going assessments to determine how well the categories function to meet flexible capacity needs for reliable grid operations. Further, the ISO will initiate a stakeholder process in the first quarter of 2016 to discuss with stakeholders the findings of these ongoing assessments as well as any recommendations for potential modifications to the flexible capacity requirements.

CONCLUSION

Management respectfully requests Board approval of this proposal. The proposed enhancement to the existing resource adequacy tariff provisions will help improve system reliability and the reliable integration of the variable energy resources by ensuring the ISO has sufficient flexible capacity to address net-load ramping needs into the future. The proposed study and flexible capacity allocation methodologies, combined with the resource adequacy showings and counting provisions provide load-serving entities with a clear understanding of the ISO's flexible capacity needs. The proposal also defines how the ISO's operational needs will be used as the basis for backstop procurement of flexible capacity resources. The creation of flexible capacity categories allows for a diverse portfolio of resources with diverse operational capabilities, including preferred resources, to provide flexible capacity. Finally, the proposed backstop procurement provision would give the ISO the necessary procurement authority to fill shortfalls should load-serving entities not provide sufficient flexible capacity.