Reliability Services

Revised Straw Proposal

August 11, 2014

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1. Changes to June 5th straw proposal

The ISO has moved the proposal related to the replacement of the Capacity Procurement Mechanism to a separate, new initiative, Capacity Procurement Mechanism Replacement. More information can be found on the new stakeholder process page at: http://www.caiso.com/informed/Pages/StakeholderProcesses/CapacityProcurementMechanismReplacement.aspx.

Changes to minimum eligibility criteria and must-offer rules sections:

- The ISO proposes to add to the scope of the RSI MSS load-following LSE's flexible capacity requirements, specifically addressing variable energy resources that might not be included in the portfolio of resources used to balance the LSE's load. (Section 4.6)

Changes to availability incentive mechanism sections:

- The ISO has revised the mechanism to be a monthly assessment rather than a daily assessment (section 6.4) and provided additional details on how it would conduct the assessment (section 6.8).
- The ISO proposes to exempt variable energy resources (VERs) and CHP resources shown as generic RA from the availability incentive mechanism. (Sections 6.9 and 6.10)
- The ISO provides additional detail on the conditions under which the ISO will use the day-ahead or real-time market in the availability incentive mechanism in order to align must-offer requirements and the incentive mechanism. (Sections 6.5.1, 6.5.2, and 6.9)
- The ISO has added details on how the ISO will provide scheduling coordinators with enough detail so that scheduling coordinators can validate their resources' availability charges or payments. (Section 6.15)
- The ISO has proposed an availability incentive mechanism price of $3.5/kW- month ($42/kW- year). (Section 6.7)
- The ISO has added a cap of $7.0/kW ($84/kW-year) - month to the potential payments a supplier can receive, which is double the availability incentive mechanism price. All penalties will be pooled and any excess funds after payments will be put into a roll-over account for the following month. Any excess funds at the end of the year will be allocated to load. (Section 6.15)
- The ISO has added rules related to pumping load in section 6.11.
- Appendix B shows an example of the incentive mechanism using two separate prices for flexible and generic RA capacity and explains the ISO's single price proposal logic. (Section 13)

Changes to replacement and substitution sections:

- These sections have been completely rewritten and should be considered new.

2. Executive summary

The reliability services initiative is a three-phase, multi-year effort to address the ISO's rules and processes surrounding resource adequacy resources. California's resource planners are preparing for unprecedented changes to the bulk power system. Although the current reliability framework has generally provided for reliable operation of the grid, there is an acknowledged gap in future forward procurement processes. This is mostly due to significant and growing amounts of new renewable and preferred resources. This initiative will propose necessary changes to ensure sufficient resources with the right capabilities are available and offered into the ISO markets to meet local, flexible, and system capacity requirements.[1]

The existing resource adequacy framework has developed and evolved over several years in collaboration with the California Public Utilities Commission (CPUC) and the other local regulatory authorities (LRAs). The reliability services initiative will continue with this collaboration and work in conjunction with the CPUC's *Order Instituting Rulemaking to Consider Electric Procurement Policy Refinements* per the *Joint Reliability Plan* (JRP) (CPUC Docket No. R.14-02-001).

The reliability services initiative has three phases. In the first phase the initiative will focus on resource adequacy rules and processes that must be updated quickly for reliability or regulatory reasons. These mostly relate to enhancements to further integrate preferred resources into the grid, rules for the newly determined flexible resource adequacy requirement, and an update to the availability incentive mechanism, which uses the Capacity Procurement Mechanism price, which expires on February 16, 2016.

The second phase of the reliability services initiative will propose a durable construct for flexible resource adequacy. The ISO committed to "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 improvements in the flexible capacity categories or process." This phase will also consider other needed rule changes to accommodate a durable flexible resource adequacy structure as well as assess how well resources are performing under the new availability incentive mechanism, and propose flexible RA replacement rules

This paper initiates the first phase of the reliability services initiative and is broken into 3 parts.

Part I describes potential enhancements to resource adequacy criteria and must-offer requirements for preferred resources. As newer technology for producing and delivering energy onto the grid arise, the ISO will have to adapt current resource adequacy rules to a diverse set of resource types. Specifically, the ISO proposes to:

[1] The resource adequacy provisions of the ISO tariff work in conjunction with resource adequacy requirements adopted by the California Public Utilities Commission and other provisions of California law applicable to non-CPUC jurisdictional Load Serving Entities.

- Enhance the minimum eligibility criteria for system, local, and flexible resource adequacy (RA) capacity where needed, and
- Modify must-offer rules where required, in particular for use-limited resources, in order to standardize must-offer requirements, as is feasible.

The ISO has identified three areas targeted for improvement in the current tariff related to minimum eligibility criteria. These areas deal with distributed generation facilities, non-generation resources, and proxy demand resources. In summary, the ISO proposes to:

- Clarify that a distributed generation facility must be a participating generator or a system resource,
- Evaluate the costs and benefits of maintaining the current 0.5 MW minimum size threshold for eligibility to be a participating generator or a system resource,
- Establish minimum eligibility criteria for non-generator resources, and
- Modify the existing criteria for proxy demand resources in order to more closely align with CPUC criteria.

The ISO finds that the current must-offer rules can be improved by applying them in a more standardized manner, and more universally accessible, across all resource types, including use-limited resources. The ISO also has determined that must-offer obligations for distributed generation facilities and non-generating resources require additional clarification. The must-offer rules should align with the eligibility criteria.

Part 2 proposes a new incentive mechanism for RA capacity to participate in the ISO energy market. The current standard capacity product (SCP) incentive mechanism is not easily adaptable to flexible RA capacity or the increasing amount of non-traditional resource types on the grid.

In order to better accommodate preferred and use-limited resources and account for flexible must-offer requirements, the ISO proposes three main design features to the new available incentive mechanism. It should:

- Calculate availability based on the resource bids into the energy market because using a bid-based availability assessment will both account for varying flexible must-offer obligations and better calculate availability for use-limited resources,
- Assess this bid-based availability against a fixed percentage in order to reflect market conditions in the incentive payment, and
- Enhance the calculation of availability charges and incentive payments using a new availability incentive price of $3.5/kW-month, to better reflect monthly resource availability.

Part 3 addresses needed changes to the ISO's substitution and replacement rules. The ISO proposes to implement new policies in a staged approach. *For implementation by the 2016 RA year the ISO proposes to:*

- Create two criteria for a resource to be used as a replacement resource. (1) A non-use-limited resource cannot be replaced with a use-limited resource and (2) a dispatchable resource cannot be replaced with a non-dispatchable resource.
- Change the deadline for providing day-ahead substitution from 6:00 AM to 8:00 AM.
- Implement many-to-many automated substitution capabilities for generic and flexible RA resources.
- Assess the benefits of and rules under which the real-time substitution rules could be relaxed for system and flexible resources.
- Assess the benefits of and rules under which the local “like for like” rules requiring substitution to occur at the same bus could be relaxed.
- Implement substitution policy for flexible RA resources that require substitution at the same flexible category or better and allow the scheduling coordinator full control over how many flexible RA MWs are substituted during an outage.
- Change the ISO’s outage policy to remove the gap created in the OMS tariff revisions that exempted forced outages from seven to four days from the availability incentive mechanism.

For implementation by the 2017 RA year the ISO proposes to:

- Change the monthly RA process timeline to separate the monthly RA showing process from the outage impact assessment.
- Move the responsibility for planned outages onto the supplier.
- Use a consistent forecast and set of rules for all planned outages reported to the ISO.
- Penalize any non-exempt outage that occurs, including planned outages that have not provided required replacement, under the availability incentive mechanism.
- Allow replacement and substitution capacity to be “released” in the event an outage moves and the ISO therefore no longer requires the capacity.
- Create separate local and system monthly showings in order to allow system resources to provide substitute capacity for local resources that are shown as system resources in the planning process.

3. Plan for stakeholder engagement

The ISO proposes the following schedule for phase one of this initiative.

Item	Date
Paper: Issue paper posted	Tuesday, January 28, 2014
Meeting: Issue paper meeting	Tuesday, February 04, 2014
Meeting: 1st Working Group on CPM replacement	Monday, February 24, 2014
Meeting: 2nd Working Group on CPM replacement	Thursday, March 27, 2014
Meeting: 1st Working Group on RA processes	Wednesday, April 23, 2014
Paper: RSI Straw Proposal Posted	Thursday, June 05, 2014
Meeting: RSI Straw Proposal meeting	Thursday, June 12, 2014
Comments due: RSI Straw Proposal comments	Thursday, June 26, 2014
Paper: RSI Revised Straw Proposal	Monday, August 11, 2014
Meeting: RSI Revised Straw Proposal meeting	Monday, August 18, 2014
Comments due: RSI Revised Straw Proposal comments	Friday, September 5, 2014
Meeting: Working group on replacement and substitution proposal	TBD- September
Paper: RSI 2nd Revised Straw Proposal	October
Target Board of Governors Meeting	Q1 2015

PART I: MINIMUM ELIGIBILITY CRITERIA AND MUST-OFFER RULES

4. Evaluating default qualifying capacity provisions for system and local RA resources

4.1. Purpose

In order for a resource to meet the resource adequacy obligations of a load serving entity (LSE), it must obtain a net qualifying capacity (NQC) value. The ISO determines the NQC based on a resource's deliverable qualifying capacity during peak periods. The base of the NQC calculation starts with a resource's qualifying capacity value. Without a way to determine a qualifying capacity value, the ISO cannot calculate an NQC value for a resource. Usually, a local regulatory authority (LRA) establishes, and the ISO relies on, a methodology to determine the qualifying capacity value for resources procured by their jurisdictional LSEs for resource adequacy purposes. However, sometimes either an LRA chooses not to develop qualifying capacity provisions generally or has not yet developed rules for a specific resource type. Section 40.8 of the ISO tariff explains how to determine a resource's qualifying capacity if "the CPUC or Local Regulatory Authority has not established and provided to the CAISO criteria to determine the types of resources that may be eligible to provide Qualifying Capacity and for calculating Qualifying Capacity for such eligible resource types."[2] In such a case, the ISO can apply default provisions to establish a qualifying capacity value, and then calculate an NQC for the resource.

As part of the current stakeholder initiative, the ISO proposes to establish default qualifying capacity provisions, including availability and eligibility criteria requirements, for two additional resource types: distributed generation facilities[3] and non-generator resources.[4] The ISO has also reviewed the existing default qualifying capacity criteria in section 40.8.1 of the tariff to ensure the existing default provisions are still adequate. Based on this review, the ISO finds that the only existing default qualifying capacity provisions that need to be reviewed are those for proxy demand resources.

4.2. Issue statement

The ISO tariff currently provides specific default qualifying capacity provisions for thirteen different resource classifications.[5] The ISO has also undertaken several initiatives to enable distributed generation facilities and energy storage resources to provide capacity to the ISO

[2] ISO tariff section 40.8
[3] A distributed generation facility is defined as a Generating Facility connected to the Distribution System of a Utility Distribution Company, irrespective of the size of the facility or the resource type.
[4] An energy storage resource is defined as a resource that is capable of storing electricity at a given time for discharge at a later time.
[5] A resource classification, in this context refers to the different resources identified in subsections 40.8.1 of the ISO tariff. The resource classifications currently covered under section 40.8.1 include nuclear and thermal, hydro, unit specific contracts, contracts with liquidated damages, wind and solar, geothermal, qualifying facilities, participating load, jointly owned facilities, facilities under construction, system resources and pseudo-ties, and proxy demand resources.

system. Specifically, the ISO has completed or is currently conducting the following stakeholder initiatives to enable these resources to provide capacity to the ISO system:

- Deliverability for distributed generation,
- Non-generator resources in ancillary services market,
- Flexible RA criteria and must-offer obligation, and
- Energy storage interconnection.

There are no default-qualifying capacity provisions in section 40.8.1 for either distributed generation facility or non-generator resources. The ISO will look to develop such default provisions in the current stakeholder initiative. While this initiative outlines the default qualifying capacity provisions for distributed generation facility and non-generator resources, these resources are still subject to a deliverability assessment to determine the NQC ultimately used to determine how the resource can be counted towards meeting RA requirements. These deliverability assessments are beyond the scope of this stakeholder initiative.

Finally, to the extent the ISO relies on default qualifying capacity provisions, it must ensure these provisions continue to provide reasonable criteria for establishing a qualifying capacity. This helps to ensure that the resources given a qualifying capacity value under these provisions will help address resource adequacy needs. The ISO has reviewed all the existing default provisions to ensure that the criteria used for establishing a qualifying capacity value are adequate.

4.3. Establishing new default qualifying capacity provisions

The following section addresses the proposed default qualifying capacity provisions, availability, and eligibility criteria requirements for distributed generation facility and energy storage resources.

4.3.1. Distributed generation facility

As part of the deliverability for distributed generation stakeholder initiative, the ISO established the study methodology to determine that a distributed energy facility is deliverable. This would allow the resource to receive qualifying capacity and NQC values and potentially meet an LSE's resource adequacy requirement. The current stakeholder initiative will not revisit this process. Instead, it will focus on the availability and eligibility criteria requirements a distributed generation facility must meet and the method for determining the resource's default qualifying capacity.

The ISO must establish a methodology for determining the initial default qualifying capacity for distributed generation facilities. However, it is not feasible to identify a single methodology that applies to all technology types operating as distributed generation facilities. For example, a distributed generation could be a solar, gas-fired resource, or storage resource. So the ISO proposes to apply the same availability criteria for a given resource classification of distributed

generation facilities as those applied to the same resource classification interconnected to the transmission system. For example, a solar resource connected to the distribution system would have the same default availability and eligibility criteria as a solar resource connected to the transmission system. These current criteria are outlined in Appendix A.

Regardless of the technology type, the ISO must still have visibility of the resources. Therefore, as with all other resource types identified in Section 40.8, the ISO will require that a distributed generation facility must be a participating generator or a system resource. At this time, this requires the resource be at least 0.5 MW. Finally, while individual distributed generation facilities may not exceed the minimum 0.5 MW, an aggregation of smaller distributed generation facilities may possibly exceed this level. If these aggregations include resources from multiple resource classifications, then such aggregations are beyond the scope of the current stakeholder initiative.

4.3.2. Non-generator resources

Because non-generator resources currently do not have the existing default qualifying capacity availability or eligibility criteria other resource classifications have, it is necessary to develop those default criteria as part of this stakeholder initiative to ensure comparable treatment with other resource classifications.

First, as with the distributed generation facilities described above, non-generator resources must be a participating generator or a system resource. Given the flexibility of many energy storage technologies and the high degree of availability the ISO expects of these resources, the ISO does not need to apply a minimum number of hours a non-generator resource must be available. In fact, the ISO has not identified any limitation that would preclude a non-generator resource from being available comparable to conventional thermal resources. For example, because the ISO is able to optimize a non-generator resource based on the resource's charge and discharge bids, that resource could be available to the ISO at all times. So, as with conventional thermal resources, the ISO will not propose a minimum number of available hours. Instead, the ISO proposes that availability of non-generator resources should be addressed under the must-offer obligation of non-generator resources.

The ISO must also determine the maximum value of the default qualifying capacity for non-generator resources. One of the unique attributes of energy storage resources is the ability to charge and discharge. While the benefit of this attribute may be captured in the effective flexible capacity calculation, it is not relevant for meeting system peak. So the ISO proposes basing non-generator resources' default qualifying capacity calculation on nothing more than the resource's discharge capability. In other words, the ISO proposes to limit the default qualifying capacity of an energy storage resource to no more than the resource's maximum instantaneous discharge capability. For example, a distributed energy storage resource that could discharge up to 5 MW could not have a default qualifying capacity value greater than 5 MW.

It is challenging to determine a non-generator resource's default availability and eligibility criteria for default qualifying capacity because of the diverse technology types that could fit into this

classification. But while the resource capabilities may differ, the need addressed by the default qualifying capacity does not. The resource's capacity must be available for system peak needs and the provision of ancillary services and regulation. So, as the ISO did in the FRAC-MOO stakeholder initiative, the ISO will provide two different default qualifying capacity provisions for non-generator resources. One will be for resources only providing regulation energy management (REM) and one will be for resources able to provide both energy and regulation. However, a non-generator resource cannot choose the REM option for the default qualifying capacity provisions and the energy option for determining the resource's effective flexible capacity (EFC) or vice versa.

Regulation energy management non-generator resource

A non-generator resource that wants to use the REM-only option for default qualifying capacity rules must be identified as a REM-only resource in the master file. Because a resource providing REM is prohibited from submitting energy bids in the day-ahead or real-time markets, the ISO finds it unreasonable to establish criteria for receiving default qualifying capacity based on the energy capability of these resources over extended periods of time. The default qualifying capacity of REM-only non-generator resources should be based on the resource's demonstrated ability to provide regulation. So the ISO will establish the default qualifying capacity of a REM non-generator resource based on their ability to provide energy for 15 minutes. As noted above, when making this choice, a resource is also choosing to have their EFC calculated using the REM-only option as well.

Energy non-generator resources

Non-generator resources that can provide energy over more sustained periods of time may choose default qualifying capacity provisions that consider the resource's energy capabilities. The ISO proposes to assess the default qualifying capacity of an energy non-generator resource based on the amount of output the resource can sustain over a four-hour period. This is consistent with the CPUC's recently released qualifying capacity provisions, detailed in the proposed decision in the RA proceeding (R.11-10-023). At first this seems much more restrictive than the provisions applied to the REM-only non-generator resources. But there are many benefits to choosing this option. The first is the ability to provide both energy and regulation. The second is that, when calculating the EFC, the ISO will consider the full charge and discharge capabilities of the resource. This potentially allows energy non-generator resources to have higher EFCs than REM-only non-generator resources.

4.4. Modifying existing default qualifying capacity provisions for Proxy Demand Resources

Currently, in section 40.8.1.13, the ISO defines the default qualifying capacity provisions for proxy demand response. In order for a proxy demand response resource to receive a qualifying capacity under the ISO's default rules, it only needs to be available for four hours per month and 30 minutes per event. The ISO sees these requirements as inconsistent with the default

provisions used for other resource classifications. They are unlikely to ensure RA. Therefore, the ISO is proposing to replace the existing proxy demand response requirements with some more closely aligned with CPUC requirements. Specifically, the ISO proposes that the minimum availability requirements be:

- At least 24 hours per month,
- At least three consecutive days, and
- At least four hours per dispatch.

The ISO is not proposing to change the methodology currently used for determining the level at which the default qualifying capacity is set.

4.5. Default flexible qualifying capacity provisions for phase 2 consideration

The ISO expects that the issues outlined in this section will require a significant amount of time and data collection before the ISO can develop proposals to address them. As such, the ISO has identified these items for phase two completion and outlines a high level plan for addressing these issues. However, if these issues are to be resolved by the end of phase two, the study process and data collection must start during phase one of this stakeholder initiative.

4.5.1. Intertie resources

As noted throughout the FRAC MOO stakeholder initiative, the current definition of flexible capacity will simultaneously address load-following and long, steep ramps, as long as the resources providing the flexible capacity are available for five-minute dispatch. In March 2014, when the FRAC-MOO revised draft final proposal was approved by the Board, the ISO committed to an additional review of how intertie resources could provide flexible capacity while still ensuring multiple flexible capacity needs are addressed.

In the FRAC-MOO stakeholder initiative, the ISO began their review of intertie resources and their ability to provide flexible capacity. Specifically, the review forecasted net load increases over 5, 15, 60, 90, and 180 minutes for the 2014 forecasted net-load.[6] The ISO has conducted a similar assessment using the 2015 forecasted net-load.

The ISO finds that 15-minute intertie resources could provide an extra source of flexible capacity to address longer duration flexibility needs. But it may not be enough to simply look at the upward changes in the forecasted net-load to see how much 15-minute dispatchable intertie capacity we can use to address flexibility needs with longer durations. This is because we must also ensure that load-following and short-duration ramping needs are also addressed. So the

[6] See Table 2 in the Flexible Resource Adequacy Criteria and Must-Offer Obligation revised Draft Final proposal. Available at http://www.caiso.com/Documents/RevisedDraftFinalProposal-FlexibleRACriteriaMustOfferObligation-Clean.pdf

ISO is seeking stakeholder input on how the ISO might assess intertie resources for flexible capacity.

4.5.2. Block dispatchable pumping load

In FRAC-MOO, the ISO recognized the benefits that flexible hydro resources can provide. The ISO also recognized the flexibility that non-generator resources' charging capabilities offer. But not every storage resource fit perfectly within the non-generator resource model. An example of this is hydro pump storage. The ISO was not able to determine whether or how to count the pumping capabilities of a pump hydro resource. The ISO is in the initial stages of reviewing this issue and several challenges have arisen. For example, large discrete dispatches of pumping load require the ISO to plan for additional voltage support as well as congestion management. This has led the ISO to consider what "deliverability" means when addressing not just the pumping load, but any storage load. For example, even though the belly of the duck chart suggests the ISO would benefit from increasing load, it is unclear whether transmission constraints would allow this to happen. In the ISO's energy storage interconnection initiative, currently underway, the ISO is examining how the interconnection study process should assess the grid impacts of charging (or pumping) and what network upgrades may be required. To take the next step and count charging or pumping load as flexible capacity will require an examination of deliverability for charging or pumping load.

4.5.3. Assessment of ISO's dependence on CPUC maximum cumulative capacity buckets

In 2009 the ISO developed the standard capacity product in two phases. The first phase addressed the vast majority of resources, but exempted resources with a qualifying capacity determined by using historic data and demand response resources. The second phase, run in 2010, addressed resources with a qualifying capacity determined by using historic data. It deferred designing a standard capacity product for demand response resources. As discussed in section 6, the ISO's current availability incentive mechanism tracks the availability of RA capacity during five consecutive hours of each non-weekend, non-federal holiday day. The hours themselves are determined seasonally, based on historical coincident peak-load data. One of the primary goals of a standard capacity product is to make sure there are incentives in place, so that RA resources are available to meet peak load conditions. However, there are still drawbacks to this approach.

- Resources are only incentivized to be available during peak and may not ensure all off-peak needs may not be adequately addressed, and
- The risk of outage is focused over very few hours.

CPUC's maximum cumulative capacity buckets (MCC buckets) are another element of the existing RA market that has, to date, helped the ISO address system needs. For example, the MCC buckets are one of the primary tools of the CPUC's RA program preventing an over-reliance on use-limited resources. The MCC buckets are shown in Figure 1.

Figure 1: CPUC Maximum Cumulative Capacity Buckets[7]

Category	Criteria
DR	Demand response resources available for greater than or equal to 24 hours per month
1*	These ULR hours for May through September are, respectively: 30, 40, 40, 60, and 40. Sometimes referred to as the "210 hours."
2	Greater than or equal to 160 hours per month
3	Greater than or equal to 384 hours per month
4	All hours (unrestricted)
*http://www.cpuc.ca.gov/word_pdf/REPORT/37456.pdf pgs. 24 - 25	

For the past several RA cycles, the CPUC has proposed eliminating the MCC buckets. Though the ISO supports a reevaluation of the MCC buckets, simply discontinuing their use without putting a new structure in place is not advisable. It could result in an over-reliance of use-limited resources for RA capacity. So the ISO suggests that a reassessment of the MCC buckets, along with existing availability hours covered by standard capacity product, can provide guidance to LRAs, LSEs, and supply resources about the products needed to address system and local capacity needs.[8]

The first step of this reassessment will be to collect information.[9] First, the ISO must determine if the existing MCC buckets will continue to effectively meet the ISO's reliability needs. If they will not, the ISO, LRAs, and other stakeholders must determine what new products are needed. For example, in the FRAC-MOO stakeholder initiative and the CPUC's RA proceeding, the ISO identified categories of flexible capacity based on operational needs. If the assessment of the MCC buckets demonstrates a need for additional capacity products, the availability incentive mechanism developed as part of this stakeholder initiative can be easily modified to account for different or more hours.

Further, as part of this effort, the ISO proposes to collect data on *subset of hours* contracts, in which an internal resource may be under contract to provide RA capacity to the ISO only for

[7] *2014 Filing Guide for System, Local and Flexible Resource Adequacy (RA) Compliance Filings,* Available at http://www.cpuc.ca.gov/NR/rdonlyres/0C2512A4-AE6C-4BB7-BC0D-75D2F40741BA/0/Final2014RAGuide.docx

[8] The ISO is not proposing to establish procurement requirements as part of this assessment, but will continue to work with LRAs to ensure the procurement matches ISO needs identified through this assessment.

[9] The ISO is still in the processes of determining the best method for collecting this data as well as the appropriate parties to request that data from.

certain hours of the day, perhaps for a subset of the typical 24-hour must-offer requirement. Currently a subset of hours rule is only in place for imported RA capacity. However, a full assessment of generic RA needs, by hour, was not conducted. The ISO proposes to begin collecting subset of hours contract information, which will help the ISO determine how these contracts align with the ISO's needs.

4.6. Additional Flexible Capacity Needs Allocation Issue

The ISO is proposing to add to the scope of phase 1 of the RSI initiative the issue of MSS load-following LSE's flexible capacity requirements, specifically addressing variable energy resources that might not be included in the portfolio of resources used to balance the LSE's load. In the FRAC MOO initiative, the ISO established a methodology for allocating an LRA's contribution to the ISO's flexible capacity need. The ISO proposed to allocate to MSS load-following LSEs their calculable share of the flexible capacity need, but did not require a flexible capacity showing.

An MSS load following LSE is required to balance its load with resources from its identified portfolio of resources. If this portfolio includes variable energy resources, then any increase or decrease from these resources must be balanced by another resource from the portfolio. However, if an MSS load-following LSE does not include these resources in its designated portfolio, then the LSE would not be required to move another resource to balance the portfolio. This creates the potential for an MSS load-following LSE to lean on other LSEs to provide flexible capacity needed to address the variability of these resources. The ISO believes it is important to ensure MSS load-following LSE fully cover their allocable share of flexible capacity.

5. ISO Review of Must-offer Obligations

5.1. Purpose

The ISO has conducted a review of the must-offer obligations for each of the resource classifications identified in the tariff to determine if the must-offer obligations for all resource types are fully identified. As part of this review, the ISO has determined that the must-offer obligations for distributed generation facilities and non-generator resources require additional clarification.

5.2. Issues brief

While the must-offer obligation for most resource types appears appropriate at this time, the ISO notes that must-offer obligations for distributed generation facilities and non-generator resources is not well defined. The ISO considered an additional must-offer obligation for Proxy Demand Resources. However, after review, the ISO finds such a modification is not required because the proposed availability incentive mechanism should provide adequate incentive for proxy demand resources to be available to the ISO in a manner comparable to other use-limited resources.

5.3. Distributed Generation Facilities

In section 4.3.1, the ISO proposes that the default qualifying capacity provisions for distributed generation facilities should mirror the default provisions for similar resource classifications that are connected to the transmission system. As such, the ISO proposes that the must-offer obligation of distributed generation facilities should mirror resources connected to the transmission system. For example, if a distributed generation facility applies for and is approved for use-limited status, then that resource would be subject to the must-offer obligations of a use-limited resource.

5.4. Non-Generator Resources

In section 4.3.2, the ISO proposes not to include a minimum number of hours when non-generator resources must be available. The ISO can send dispatch instructions for a non-generator resource to charge or discharge based on ISO system needs. A non-generator resource that is fully discharged (charged) and unable to provide upward (downward) regulation because of ISO dispatch instructions is no different than a conventional resource that is unable to provide downward regulation because the ISO has dispatched the resource to Pmin. In short, the resource is available to the ISO but has hit an operational constraint. Further, because the ISO can optimize the dispatch of the non-generator resource through both the charge and discharge ranges, no operational or environmental limits appear to justify the ISO classifying a non-generator resource as a use-limited resource. Therefore, the ISO proposes that a non-generator resource be classified as non-use-limited, unless it submits an application for use-limited resource status and the application is approved by the ISO. As with any other non-use-limited resource, a non-generator resource would be subject to bid insertion rules. Current bid insertion rules include energy bids at the resource's default energy bid and zero for all certified ancillary service prices. The ancillary service price provisions will hold. But it is not clear how a non-generator resource could earn a default energy bid. For a non-generator resource, the incremental fuel cost is based on the price it pays for energy to charge the resource. Therefore, the ISO requests stakeholder input as to how to calculate default energy bids for storage resources and what costs should be included.

PART 2: AVAILABILITY INCENTIVE MECHANISM

6. Resource availability incentive mechanism

6.1. Purpose

Because reliability and market economics are inexorably linked, a reliable grid will have the right incentives in place to ensure the market has access to the right resources at the right time, in the right location. The ISO market currently provides incentives beyond energy market revenues for RA resources to participate in the energy market, through payments for availability and charges for non-availability. This recognizes that RA resources have a higher call to serve and are essential to maintain grid reliability. The availability incentive mechanism was set up to increase reliability through rewarding high performing resources and penalizing low performing resources, reduce potential gaming, and increase the standardization of RA contracts. The mechanism will increase reliability by incenting suppliers to maintain their resources to limit forced outages that will expose the supplier to unavailability penalties and prevent them from earning availability payments.

6.2. Issues brief

Although the current SCP availability mechanism is functioning for some resources, about half of the RA capacity in the ISO market is not subject to the mechanism or is unequally subject to the mechanism. The ISO discussed this in detail in the ISO working group presentation on April 23, 2014.[10] In addition to certain use-limited resources being unequally subject to the mechanism, flexible RA resources are not subject to the current mechanism. In March 2014, the Board adopted a flexible RA requirement, compliance categories, and associated must-offers for the 2015 RA compliance year. The ISO recently filed these rules at FERC. The initiative process will address development of a flexible RA availability mechanism and price and conduct a holistic review of the incentive mechanism. The current availability price for RA resources is the CPM price, which expires February 16, 2016.

In order to integrate the flexible capacity requirement, the ISO proposes a new availability incentive mechanism that will address the following issues[11]:

- The significant number and capacity of RA resources that are not subject to the current availability incentive mechanism due to exemptions in the tariff (40.9.2),

[10] Working group presentation beginning on slide 37: http://www.caiso.com/Documents/Presentation-ReliabilityServices-WorkingGroupApr23_2014.pdf
[11] For additional information on the issues please read the issue paper: http://www.caiso.com/Documents/IssuePaper-ReliabilityServices.pdf and working group presentation beginning on slide 37: http://www.caiso.com/Documents/Presentation-ReliabilityServices-WorkingGroupApr23_2014.pdf

- The significant number and capacity of RA resources that are use-limited and therefore not equally subject to the current forced outage method of calculating availability due to less restrictive outage requirements and exemption from the bid insertion rules that apply exclusively to use-limited resources,
- Enhancement of the availability incentive mechanism in order to cover flexible RA resources (also covering the associated, varying must-offer requirement obligations by flexible capacity category and capturing the economic bidding requirement), and
- A price for the charge and payment of the availability CPM Procurement Mechanism price that expires on February 16th, 2016.

6.3. Current SCP availability incentive mechanism

The ISO's current SCP incentive mechanism tracks the availability of RA capacity during five consecutive hours of each non-weekend, non-federal holiday day. The hours themselves vary seasonally based on historical coincident peak-load data. The availability during these hours is translated into a resource-specific monthly availability percentage. Availability is defined as capacity not on forced outage or affected by an ambient derate. Detailed rules describe how outages and derates count toward determining a resource's compliance in tariff section 40.

Resource availability during the five peak hours is compared against the historical availability average during that month for the past three years. A resource with an availability percentage more than 2.5% above the average is eligible for an availability incentive payment, while a resource with availability less than 2.5% below the average is subject to a non-availability charge. The availability price is the current CPM price of $70.88 per KW-year, which expires February 16, 2016.

More information on the current availability standard can be found in tariff section 40.9. Historical percentages and an assessment of the current availability standard can also be found in the ISO's April 23rd working group presentation.[12]

6.4. Summary of proposed design

The ISO proposes to use a portion of the current SCP incentive mechanism design in the creation of a new availability incentive mechanism. Resources will be paid or charged based on their availability relative to an ISO-determined, acceptable reliability range. Availability will be assessed monthly. The new availability incentive mechanism will assess availability based on whether a resource is bid into the ISO energy markets consistent with their RA must-offer obligation.

[12] ibid

The ISO proposes to assess flexible and generic RA capacity under a single availability assessment and not to double count any capacity if it is shown as both generic and flexible RA capacity. Any hours or capacity covered within the flexible or generic must-offer obligations will go into the resource's single availability assessment. When flexible must-offer requirements overlap with generic must-offer requirements, the ISO will hold the capacity to the higher flexible obligation. The ISO will only count a MW once in the assessment and there will only be one availability price.

The ISO will calculate a MW availability range specific for the resource, based on the standard availability incentive percentage range. Any capacity that falls below the standard availability incentive percentage range is charged the incentive price. The incentive mechanism will be self-funding so that available capacity above the standard percentage range is paid using the pool of money from the unavailable capacity. As a result, payments per MW of availability can be higher or lower than the unavailability charge and will depend entirely on the amount of unavailable capacity. When no capacity meets the criteria for an availability payment, the funds will be allocated to load.

Additionally, the new availability incentive mechanism will not count capacity on planned outage as available. Instead the mechanism will pull any capacity on a planned outage completely out of the assessment calculation.

In summary, the ISO proposes three fundamental features to include in the availability incentive mechanism.

- First, the availability assessment will determine a resource's availability based on whether the capacity is bid into the ISO market. The bid must be consistent with the RA capacity type's must-offer requirement. For example, flexible RA capacity must be economically bid into the ISO's energy markets. Using such an availability assessment rather than an outage-based assessment will account for varying flexible must-offer obligations. It will also better calculate availability for use-limited resources.
- Second, a the ISO will assess a resource's availability w against a fixed percentage rather than a moving average. Initially the ISO had no data on the average availability of the fleet and did not want to devise a range that might unduly penalize resources. Now data is available to assess how a pre-determined fixed availability band could allow availability incentive payments to reflect market conditions without unduly penalizing resources.
- Finally, the ISO will calculate availability charges and payments using a single price and assessment methodology for all RA capacity. This recognizes that the ISO needs a range of resources and capabilities to bid into the ISO energy markets in order to reliably operate the grid.

6.5. Bid-based availability assessment methodology

The availability assessment is how the ISO determines whether a resource is making itself available to the ISO per the tariff's must-offer rules. The ISO will calculate a resource's availability by comparing the MWs the ISO expected to be available to the MWs that were economically bid or self-scheduled into the ISO market. The ISO will translate this into a resource specific availability percentage and compare it to the standard availability range. Any MW amount that falls outside this range will be subject to an incentive payment or charge. If a resource's availability is less than the standard range, then the ISO will charge the resource. If the availability is greater than the standard range, then the ISO will pay the resource. Therefore the availability assessment methodology is central to the availability incentive mechanism.

Ideally, availability should be measured using the relevant must-offer requirement, MW amount shown on a resource's monthly supply plan, and the quantity economically bid or self-scheduled into the market for hours the capacity is listed as a RA capacity. If, because of the must-offer requirement, the RA capacity must be bid into the ISO market for certain hours, the resource's availability should be based on whether they made available their full RA value during those specific hours. This redefines the concept of availability. Where before it meant *not on forced outage,* it instead means offering into the ISO market during the resource's must-offer requirement hours.

The ISO finds two significant benefits from moving toward a bid-based, rather than outage-based, assessment. First, a bid-based availability metric will allow use-limited resources to be treated more like non-use-limited resources under the availability metric. Use-limited resources have the must-offer requirement to bid when available. However, availability is difficult to measure for use-limited resources using outage data. A bid-based metric will allow the ISO to calculate availability for these resources in the same process as non-use-limited resources.

Second, a bid-based methodology will allow the ISO to evaluate flexible resource availability. The flexible must-offer requirement mandates that scheduling coordinators bid in flexible RA capacity using an economic bid rather than a self-schedule. The current outage availability metric cannot monitor whether resources have an economic- or self-schedule. Therefore if the ISO does not move to a bidding metric of some type, the ISO will not be able to verify that flexible resources are in fact providing flexibility to the energy markets.

The following sub-sections describe the proposed bid-based assessment methodology.

6.5.1. Generic resource adequacy capacity

Generic RA capacity in this section refers to capacity shown as either system or local capacity in the ISO's monthly showing requirement. At this time the ISO does not propose to differentiate between local and system capacity in the availability assessment. This section describes how a

bid-based availability assessment would apply to generic capacity that does not overlap[13] with flexible capacity.

Must-offer requirements

The ISO has specific must-offer requirements for each hour a resource's capacity is shown as generic RA capacity. For most generic capacity the must-offer requirement is to bid or self-schedule capacity into the ISO market all hours of the day.

Specifically, tariff section 40.6.1 requires suppliers to make available to the day-ahead market all operationally available RA capacity. Scheduling coordinators must submit economic bids or self-schedules for all RA capacity and qualified ancillary services. Resources must also participate in RUC by submitting any additional capacity not procured in the day-ahead market. Tariff section 40.6.2 outlines additional resource bidding requirements.

RA resources that fulfill their must-offer requirement in *either* the day-ahead or real-time market will only be assessed under the availability incentive mechanism rules in that market.

Proposed availability assessment hours options

The ISO proposes a two-phase path forward for establishing assessment hours for generic RA capacity. Currently defined must-offer requirements are not in place to clearly delineate assessment hours for generic RA resource availability. The ISO is aware that certain resources are not in fact available or under contract 24 hours each day and it would be a significant change to hold all generic resources accountable to a 24-hour bidding availability check.

The ISO therefore proposes in phase one of this initiative to maintain the five-hour methodology used in the current SCP assessment hours. In phase two of this initiative the ISO can evaluate the benefits assessing resources every hour they are contracted as RA capacity.

In either phase, in some hours, the generic RA assessment hours will overlap with the flexible assessment hours. This is addressed in section 6.5.3.

Proposed availability assessment methodology

For generic RA capacity that does not overlap with flexible capacity, the ISO proposes to assess availability hourly, based on bids into the day-ahead and real-time market. In both markets, scheduling coordinators must provide the ISO with hourly bids or self-schedules subject to requirements in tariff section 40.6.2.

The ISO will use the availability assessment in a resource's average monthly availability calculation. The monthly evaluation will use the minimum of the day-ahead and real-time market

[13] "Overlap" refers to the event where a single MW is both counted as flexible and generic resource adequacy capacity.

availability assessment in the monthly availability assessment percentage calculation. This would mean that, in any individual hour or day, a resource could be above or below the standard percentage without incurring a charge or payment. Only if the monthly MW-weighted average percentage fell above or below the standard percentage would a charge or payment be incurred.

The monthly assessment methodology is illustrated in a separate spreadsheet, *Incentive Calculation Model*.

6.5.2. Flexible resource adequacy capacity

Flexible RA capacity refers to capacity shown as flexible capacity in the ISO's monthly showing requirement. Currently, as proposed in the Flexible RA Criteria and Must-Offer Obligation (FRAC MOO), there are three flexible categories. Resources under any category are considered flexible resource adequacy capacity. This section describes how a bid-based availability metric would apply to flexible RA capacity in the associated categories. This methodology also applies to flexible capacity that overlaps with generic capacity.

Must-offer requirements

For flexible RA resources, the FRAC MOO stakeholder initiative specified that flexible RA must-offer requirements would mirror the generic must-offer requirements with three exceptions:

- Resources would not have the option to self-schedule any portion of the resource shown as flexible RA capacity into the energy market,
- Resources must offer their full operationally available flexible RA capacity into both the day-ahead and real-time market, and
- Resources only have to offer into the ISO market during periods specified by their relevant flexible category.

In the FRAC MOO stakeholder initiative, the ISO determined that flexible RA capacity could fall into three categories with varying eligibility criteria and must-offer requirements. The categories of must-offer requirements are:

- Category one (base flexibility) capacity must offer into the energy market daily from 5:00 a.m. to 10:00 p.m. each day,
- Category two (peak flexibility) capacity must bid into the energy market daily for a pre-determined 5-hour window, and
- Category three (super-peak flexibility) capacity must bid into the energy market on all non-holiday weekdays during a pre-determined five-hour window.
- RA resources that fulfill their must-offer requirement in *either* the day-ahead or real-time market will only be assessed under the availability incentive mechanism rules in that market.

Proposed availability assessment hours

Flexible capacity will be assessed during the hours determined by the resource's flexible category.

Proposed availability assessment methodology

The flexible assessment methodology will be the same as the methodology for generic capacity, as described in section 6.5.1. The ISO will use the availability assessment in a resource's minimum daily availability calculation in both the day-ahead and real-time markets to determine the resource's monthly availability average. This would mean that in any individual hour or day a resource could be above or below the standard percentage without incurring a charge or payment. Only if the monthly MW-weighted average percentage fell above or below the standard percentage would a charge or payment be incurred.

The specific assessment of the flexible requirement involves more variables than for generic capacity. For generic capacity the ISO must only look at whether a resource has a total offer into the ISO market for at least its shown RA capacity. For flexible capacity, the ISO must check that the capacity has been economically bid into the ISO market. In some cases, this is not as simple as checking that a resource's economic bid into the ISO energy markets is at least the shown flexible RA capacity.

In the ISO's FRAC MOO initiative, a resource's maximum amount of flexible RA was defined as a resource's effective flexible capacity (EFC). For most resources, the EFC is calculated using either of the following formulas, depending on the resource's start-up time. (In the formulas below, *SUT* means longest (cold) start-up time in minutes. *RRavg* means the average MW/min ramp rate between Pmin and NQC.)

- If start-up time greater than 90 minutes: EFC = minimum of (NQC-Pmin) or (180 min * RRavg)

- If start-up time is less than or equal to 90 minutes: EFC = minimum of (NQC) or (Pmin + (180 min – SUT) * RRavg)

When a resource's start-up time is greater than 90 minutes, a resource's availability is assessed entirely between Pmin and NQC. The ISO will therefore check whether the scheduling coordinator has economically bid in the resource up to the amount shown as flexible RA capacity.

When a resource's start-up time is less than 90 minutes, the assessment is more complicated. This is because the resource's Pmin capacity will count toward the EFC. Recall that the flexible must-offer rule is that flexible capacity must be economically bid into the market. The energy market does not allow scheduling coordinators to explicitly bid in Pmin capacity and resources' capacity is made available to the market by the submission of energy bids. Energy market bids are *incremental* to Pmin capacity.

This means that a resource's economic bid may not reflect their full EFC value if their EFC includes Pmin capacity. Therefore, in some cases in order to evaluate whether a resource has met its bidding obligation, the ISO must account for the resource's Pmin capacity that counts toward their EFC.

The ISO proposes that for resources with a start-up time of less than 90 minutes, as long as a scheduling coordinator does not self-schedule their Pmin capacity or any portion of their energy schedule, the Pmin capacity will count toward a resource's flexible must-offer requirement. The ISO must impose this requirement because if any portion of a resources schedule above Pmin is self-scheduled, the ISO must also treat the Pmin capacity as a self-schedule and will not freely optimize the capacity in the market.

Practically, the ISO may not be able to freely dispatch Pmin capacity even without a self-schedule due to minimum run-time constraints; however, this was not addressed in the initial development of the EFC and will not be addressed in phase 1 of this initiative.

6.5.3. Overlap of flexible and system RA capacity

The relationship between generic and flexible RA is intricate due to the different must-offer requirements and counting conventions for each capacity type. This relationship is important to understand when determining how the availability incentive mechanism should evaluate a MW if it is counted toward both the flexible and generic RA requirement. The RA requirement comes with different obligations for flexible and generic capacity. In order to calculate whether a MW has met their obligations and is therefore considered available, clear criteria in the circumstance of overlapping obligations are needed.

A flexible and generic MW within a single resource can have overlapping obligations if two conditions are met. First, the obligation on the capacity must overlap in time. That is, the capacity must have both a flexible and system must-offer requirement in an individual hour. This is an *overlapping hour*.

Second, the obligation must overlap in capacity. That is, a single MW within a resource must count as both flexible and generic capacity. This feature, a single MW within a resource only sometimes counting toward a RA requirement, is unique to flexibility. For example, a local resource has every MW up to NQC count as local capacity. There is no equivalent for flexibility. A resource may have a portion of their capacity that is flexible, a portion that is only generic, and a portion that is both generic and flexible. This is because under the ISO's counting rules flexibility is a capability of a resource's capacity, not an inherent attribute of a resource. When a single MW is counted as both generic and flexible capacity, this is *overlapping capacity*.

Therefore, if both the overlapping hour and overlapping capacity conditions are met, the ISO must determine how to measure a single MW's availability.[14] The ISO proposes to assess

[14] When there is no overlap, the ISO will assess the MW under the applicable flexible or generic must-offer rules depending on how the MW was shown in the month-ahead resource adequacy process.

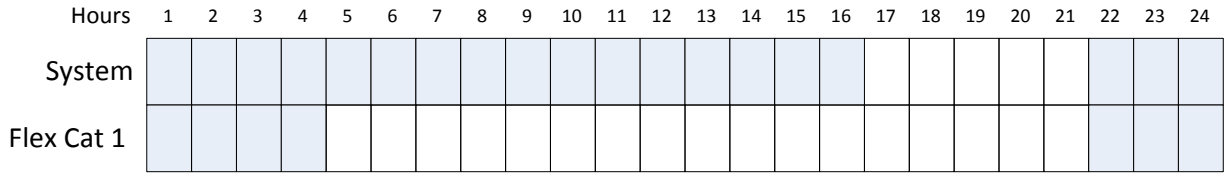
availability all within a single assessment and price. The overlapping concepts and assessment proposal are discussed in the following subsections.

Overlapping hours

In order for a flexible and generic MW to overlap in the availability assessment, the first condition that must be met is that the capacity must-offer hours overlap. The generic and flexible must-offer hours may or may not overlap depending on the seasonal determination of availability hours for generic capacity and annual determination of category-specific must-offer hours for flexible capacity. Currently the system and flexible must-offer hour determinations are not done concurrently and within the same study processes. However, in the future the ISO will seek to align the timing of these assessments in order to simplify implementation and compliance.

Figure 2 illustrates a simple example of system and flexible must-offer requirements overlapping. Because the system must-offer hours are seasonal, these hours are simply illustrative. In this example a single resource, Resource A, has capacity shown to meet both system and flexible RA requirements. A least a portion of the resource's capacity is shown as system capacity. Therefore the system capacity has an assessment period of five hours on non-holiday weekdays. Some of the resource's capacity is also shown as flexible capacity in the base flexibility category and so it has an assessment period of seventeen hours, seven days a week. Figure 2 illustrates that on non-holiday weekdays the resource has overlapping must-offer requirement during hours seventeen through 21.

Figure 2: Theoretical generic and flexible category 1 availability assessment hours



Overlapping capacity

The second condition for a flexible and generic MW to overlap in the availability assessment is that a MW within the resource must be counted as both a flexible and generic MW. The ISO allows a single MW to count toward an LSEs showing as only flexible RA, only generic RA, or as both flexible and generic RA. This is a function of the effective flexible capacity (EFC) methodology and unbundling of flexible and system capacity in the ISO's RA showing.

Figure 3 illustrates a simple example of overlapping capacity. The resource has a minimum load equal to zero and has a NQC and EFC both equal to 100 MW. In this example, the resource is

shown for flexible and system resource adequacy for 100 MW each and therefore the capacity completely overlaps.

Figure 3: Overlapping capacity example one

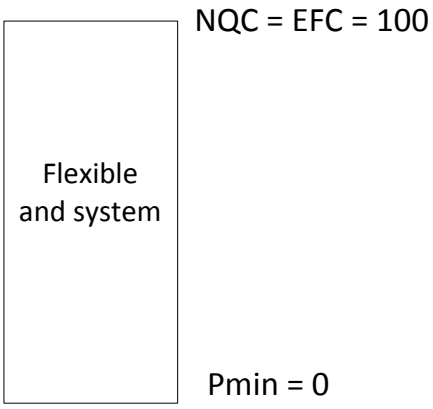
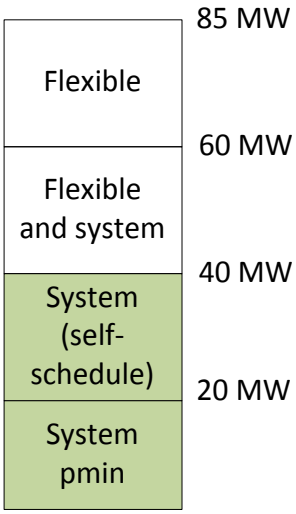


Figure 4 illustrates a more complicated example of overlapping capacity. The resource has a minimum load equal to 20 MW and because the start-up time is greater than 90 minutes, none of the Pmin capacity counts as flexible RA capacity. Therefore the NQC is equal to 85 MW, but the EFC is equal to 65 MW. The resource is shown for 60 MW of system RA capacity and 45 MW of flexible RA capacity. In this example the resource self-schedules a portion of its capacity, which means the resource must economically bid in the remainder of its capacity to meet the flexible obligation. The amount of overlapped capacity is therefore 20 MW.

Figure 4: Overlapping capacity example two



Overlapping assessment

When a resource has capacity shown as both flexible and generic resource adequacy capacity, the ISO must determine how to assess its availability. If the total generic plus flexible resource

adequacy capacity is greater than the maximum of the EFC and NQC, then a portion of the resource's capacity must simultaneously satisfy the flexible and generic resource adequacy requirement. When this occurs the ISO must decide how to assess availability given that flexible and generic resource adequacy capacity has different must-offer obligations that obligate the resource to fulfill different bidding criteria in different hours.

In general there are two possible methods of assessment. First, the ISO could determine availability separately for flexible and generic capacity. The ISO could assess the flexible availability of a resource and then completely separately assess the generic availability of a resource. These assessments could be combined under one price or evaluated completely separately using two prices. The primary detriment to doing this is that for the majority of capacity that is shown as flexible, the flexible capacity will entirely or almost entirely overlap with system capacity. This would cause a scenario where a flexible resource would essentially take on double the availability incentive risk compared to a generic resource.

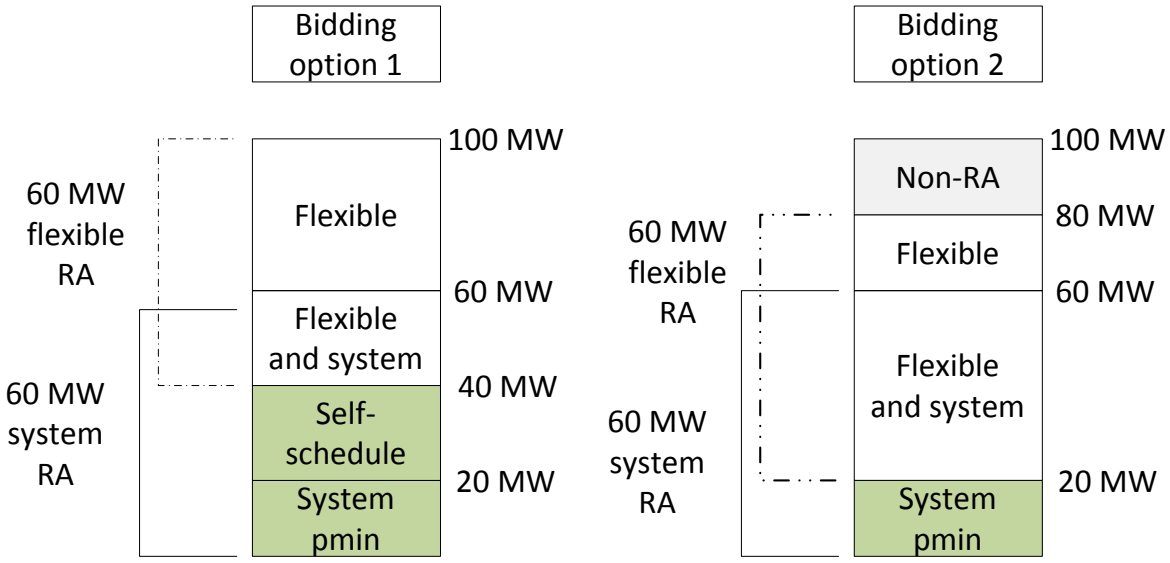
Second, the ISO could have a single assessment and hold the capacity to the highest must-offer obligation. This would only assess each MW one time and would not lead to double counting.

The ISO considered a design where the ISO had two assessments, but that the overlapping capacity was only considered in the flexible "bucket." The concerns with this are twofold. First, in the event a resource meets its resource adequacy showing requirements, the ISO cannot determine the amount of overlapped capacity until the resource has been bid into the energy market. Second, if the resource does not meet its showing requirements, it may be impossible for the ISO to determine the overlapping capacity amount without making a fixed up front assumption. The following examples illustrate these concepts.

Figure 8 shows two examples where a resource meets its showing requirements, but has different overlapping capacity amounts. The resource has the following characteristics:

- An NQC equal to 100 MW, but due to the start-up time being greater than 90 minutes cannot count any of its Pmin as flexible capacity,
- An EFC of 80 MW, and
- 60 MW of flexible capacity and 60 MW of system capacity shown on the monthly RA plan.

Figure 5: Complicated overlapping capacity example



Based on how the resource bids into the energy market, the overlapping flexible and system portions can increase or decrease. Figure 8 illustrates how a single resource can bid into the energy market in different ways to meet their system and flexible capacity requirement. In bidding option one the resource has self-schedule for 20 MW. The total amount self-scheduled into the market is therefore 40 MW. The resource then economically bids in their remaining capacity to meet their 60 MW flexible requirement. The minimum overlapping portion therefore is 20 MW. This is because once the resource has bids made up of self-schedules and economic bids of at least 60 MW, the resource has met their system requirement. The resource still though must have another 40 MW of economic bids to meet their flexible requirement.

In bidding option two, the resource does not self-schedule any capacity. The Pmin does not count toward the flexible requirement so the overlapping capacity is 40 MW. This example demonstrates that it is impossible for the ISO to determine the overlapping flexible and generic MWs of a resource prior to the resource bidding into the energy market and that it can vary even in the circumstance a resource meets their must-offer requirements.

This example also illustrates that if the resource did not economically bid, the ISO would not be able to determine the overlapping portion whatsoever as it could range from 20 MW to 40 MW. For example, if the resource were self-scheduled up to 100 MW, the ISO would have to decide how “available” the resource was since on the surface the resource appeared to meet 100% of their system showing and 0% of their flexible. If the ISO were to assess availability in this manner, the overlapping MWs would be double counted. A single MW would be both considered “available” and “unavailable.” While this might be beneficial to suppliers in the event a flexible MW was self-scheduled, in the event a resource was on forced outage, this would also double count a MW as “unavailable” and the resource would be double penalized.

The difference in must-offer requirements between flexible and generic capacity is mainly whether a MW was economically bid into the energy market (required under flexible must-offer requirement) or self-scheduled into the energy market (allowed under generic must-offer requirement). Therefore, the ISO must determine whether a resource should be considered available if it is shown as both generic and flexible resource adequacy capacity and is self-scheduled into the market. If, under the two outlined overlapping conditions, the ISO considers a self-scheduled MW available, the ISO must then break out availability into two buckets and have two availability assessments- one for flexible and one for system. This is because the MW would be considered available under system must-offer rules and unavailable under flexible must-offer rules. Under this methodology, in the event of an outage or non-bidding, a MW would be double counted as unavailable. It is not possible to have a *single* availability assessment and give a scheduling coordinator credit for self-scheduling a MW that is also shown as flexible capacity without undermining the flexible must-offer requirement.

First, in the interest of not introducing further complexity into an already complex system, the ISO proposes not to move toward a double-counting assessment method. Instead, the ISO proposes to have a single assessment and price for availability based on a MWs highest obligation. Therefore, in the event of an overlap, the ISO would not give credit to a scheduling coordinator for self-scheduling a MW.

This proposal also reflects the fact that the ISO created the flexible requirement in part due to difficulties with energy oversupply caused by self-scheduling during periods of high renewable output. Appendix B illustrates an example of why the ISO does not propose to move toward an availability incentive metric that evaluates flexible and system capacity separately.

Therefore, rather than proposing a double counting assessment, the ISO proposes a single availability metric. In the event generic and flexible capacity overlaps the ISO will hold the resource accountable to the full flexible must-offer obligation and not credit the resource for any self-schedules in this overlapped capacity. The ISO proposes that the total resource adequacy capacity of a resource is the maximum of the flexible and generic resource adequacy showings.

For example, a resource has an NQC = EFC = 100 MW and a system requirement of 100 MW and a flexible requirement of 70 MW. The resource has a self-schedule of 90 MW and an economic bid of 10 MW. The ISO will do the following calculation:

- Total RA = Maximum (flexible requirement, generic requirement) = 100 MW,
- Required flexible RA = 70 MW,
- Remaining generic RA = 30 MW,
- Economic bid of 10 MW, all 10 MW can count toward the flexible requirement, and
- Self-schedule of 90 MW, only 30 MW of which can count toward the generic requirement.

In this hour, therefore, the resource's total availability is 40 MW / 100 MW or 40%. Availability in an overlapping hour will therefore be calculated as whether the resource met the relevant must-offer requirements for the overlapping and non-overlapping capacity amount during the resource's must-offer hours. The total availability percentage will be capped at 100% available.

6.6. Availability incentive standard percentage

The ISO proposes to create an availability incentive standard percentage band to assess individual resource availability against. In order to limit small amount of money exchanges between resources, the ISO proposes a 4% band around a target availability percentage. The ISO currently calculates the monthly availability incentive standard, using the historical forced outage rates of RA resources over the range of assessment hours for each month over the prior three years. The ISO proposes to continue the current mechanism construct of comparing resources to a percentage with a bandwidth. However, the ISO proposes to change how the availability incentive standard percentage is calculated.

The monthly RA construct implies that resource availability in non-peak months is equally important to reliability as resource availability in peak months. The system requirement in non-peak months is already less than peak months so the ISO does not need to reflect this in availability standard. The ISO proposes to move from an availability incentive standard percentage that is based on an expected forced outage rate included in the 115% planning reserve margin and the historical outage average for the previous four years. This proposal is based on the following considerations:

The availability incentive mechanism is a self-funding mechanism. Therefore, while each MW below the standard band is charged the availability incentive price, each MW above the standard band is only paid from the total charges on a per MW basis. Using historic availability has removed the possibility of any payments to generators that perform above the band in three of the months. (See *Figure 6*, Jan, Feb, and Dec.) The ISO has still charged resources in these months and instead has allocated these payments to load. A fixed standard percentage will allow resources to receive payments in months of average high availability.

Fixing the percentage will allow the payments made to resources to clearly reflect current market conditions. In months with an average high availability, less capacity will be charged and therefore resources will receive less of an incentive payment to perform. In months with low availability, more capacity will be charged and higher performing resources will be paid a higher amount per MW to perform. Therefore although the unavailability charge per MW is always the same, the availability payment per MW will directly reflect monthly market conditions. The payment will be capped at double the availability incentive mechanism price.

Fundamentally, fixing the availability standard percentage will allow the mechanism always to charge resources if they are not meeting the minimum amount relied on by the ISO to operate the grid. Therefore it will additionally motivate resources to perform when they are most needed, by paying resources that meet the requirements for availability payments

more when average availability is lowest. This creates the correct incentives to perform and over-perform during the periods when the ISO will need availability the most.

Figure 6: Average historical availability incentive standard percentage bounds compared to proposed bounds

	Current band (average)			**Proposed band**	
	Lower bound	*Upper bound*		*Lower bound*	*Upper bound*
Jan	95.1%	100.0%		94.5%	98.5%
Feb	95.1%	100.0%		94.5%	98.5%
Mar	93.9%	98.9%		94.5%	98.5%
Apr	93.1%	98.1%		94.5%	98.5%
May	92.3%	97.3%		94.5%	98.5%
Jun	94.1%	99.1%		94.5%	98.5%
Jul	93.8%	98.8%		94.5%	98.5%
Aug	93.3%	98.3%		94.5%	98.5%
Sep	93.3%	98.3%		94.5%	98.5%
Oct	94.2%	99.2%		94.5%	98.5%
Nov	93.8%	98.8%		94.5%	98.5%
Dec	95.2%	100.0%		94.5%	98.5%

The ISO proposes to put a 2% upper and lower bound on 96.5%. This number is supported by the average historical availability for the prior 4 years, which on average for all years and months, shows 96.4% availability from applicable resources. (See *Figure 7.)*

Figure 7: Average historical availability incentive standard percentage bounds by year

Trade Month	Availability Standard Percentage				Average
	2014	*2013*	*2012*	*2011*	
Jan	97.7%	97.5%	97.2%	98.0%	**97.6%**
Feb	97.0%	97.7%	97.8%	98.0%	**97.6%**
Mar	96.8%	97.0%	95.7%	96.0%	**96.4%**
Apr	96.2%	95.8%	95.4%	95.0%	**95.6%**
May	95.3%	94.9%	94.0%	95.0%	**94.8%**
Jun	96.3%	96.3%	96.6%	97.0%	**96.6%**
Jul	96.9%	96.6%	96.0%	96.0%	**96.3%**
Aug	95.1%	95.3%	96.8%	96.0%	**95.8%**
Sep	95.9%	95.5%	95.8%	96.0%	**95.8%**
Oct	95.3%	96.3%	97.2%	98.0%	**96.7%**
Nov	95.9%	96.1%	97.1%	96.0%	**96.3%**
Dec	97.4%	97.8%	97.7%	98.0%	**97.7%**
Average	**96.3%**	**96.4%**	**96.4%**	**96.6%**	**96.4%**

The reason the ISO proposes to continue using the band and not a single target is to prevent large amounts of payment shifting for relative small differences in availability. The width of the band must balance needless payment shifting for small availability differences and under- or over- subjecting resources to the mechanism.

6.7. Availability incentive price

The ISO proposes to use only a single price and not have multiple prices for local, system, or flexible availability. This proposal is based on the premise that all RA capacity is needed to run the grid and that a particular type should not be more or less encouraged to participate in the energy markets to maintain their resources to prevent forced outages. The ISO acknowledges that certain resources may receive higher per MW RA compensation based on their location or resource capabilities. Theoretically, perhaps these resources should be subject to a higher availability price. However, the ISO does not anticipate having sufficient, easily accessible information to calculate these values. This information would be necessary to decide which resources it would make sense to hold to a relatively higher or lower availability price.

Previously the ISO has thought that there will be a premium on flexible resource adequacy capacity. While this may be the case, certain market participants have pointed out that, in the future, flexible resources are expected to receive additional revenue in the energy and ancillary service markets. Under these circumstances, flexible resources may not require a premium when compared to system or local resources. It may be that certain flexible resources require a contracting premium, while other flexible resources do not. Also, at this point in time, the CAISO has no evidence to indicate that flexible resources are receiving a premium. Given this

uncertainty, the ISO proposes to maintain the current structure of a single availability price for all RA types.[15] A single price has the additional benefit of simplifying availability incentive mechanism overall.

The availability incentive charge and payment should ideally have the following attributes:

- Incent resources to perform routine maintenance in order to prevent unexpected outages
- Be a low enough not to be overly punitive to resources,
- Reflective of the approximate value of replacement capacity, and
- Reflective of market conditions, as possible.

The ISO proposes to use $3.5/kW-month as the availability incentive mechanism price. This price is more reflective of current RA bilateral market contract prices as illustrated in the CPUC 2012 RA Report.[16] Given the diverse set of resources under RA contract there is no single price that will accurately reflect the contract price for all resources subject to the availability incentive mechanism. Furthermore, it has been noted on multiple occasions that bilateral RA contracts have different resource obligations and therefore there is no true average price that reflects a standard contractual agreement. Given the information provided to the ISO by the CPUC and market participants the ISO believes the current price of $5.90/ kW- month ($70.88 /kW- year) is higher than the value needed to incent resource performance. The ISO therefore proposes a $3.5/kW-month ($42/kW-month) price to reduce the risk of overly punitive charges being imposed on resource adequacy suppliers, but still incent required maintenance or resource substitution in the event of long, unexpected forced outages.

In order to make this price durable, the ISO seeks stakeholder input on whether it should be adjusted annually through tying it to a cost index or through a review of bilateral market transactions to ensure the price stays current.

The ISO proposes to cap the availability incentive mechanism payment at double the availability incentive mechanism price. The ISO believes this will be high enough to incent generator performance without the potential of a single generator receiving windfall of profits because of a monthly irregularity.

6.8. Availability incentive assessment

The ISO will assess availability monthly only during availability incentive hours. For non-exempt capacity, the ISO will compare all applicable bids during availability assessment hours against the expected RA incentive value. This value will be based on a resource-specific capacity

[15] Currently the ISO has a single price for both local and system availability, despite an established capacity price premium for certain local areas.
[16] http://www.cpuc.ca.gov/NR/rdonlyres/94E0D083-C122-4C43-A2D2-B122D7D48DDD/0/2012RAReportFinal.pdf

eligibility calculation that takes in account shown RA quantities, resource-specific rules, and exempt outages. The ISO will total all hourly RA expected incentive capacity across the month and divide this by the total number of assessment hours. The ISO will total all incentive available capacity across the month and divide this by the total number of assessment hours.

The average monthly expected capacity MWs will be multiplied by 94.5% and 98.5% in order to get the resource specific availability incentive threshold amounts.

- If the average monthly availability MW is less than the threshold value, the ISO will subtract the average monthly available MW from the threshold value and charge the scheduling coordinator for the resource the difference multiplied by $3.5.
- If the average monthly availability MW is greater than the threshold value, the ISO will take the minimum of the difference between total possible average availability and the threshold, and the actual average availability in the threshold. This MW amount will be eligible to receive a pro-rata share of any penalties assessed in the month.

The ISO demonstrates how the hourly availability assessment will work in a separate spreadsheet, *Incentive Calculation Model.* This model was updated on June 23rd, 2014 and an additional spreadsheet showing how the monthly evaluation will work was posted on August 11, 2014. The ISO will provide market participants with enough resource specific data to validate all availability charges and payments.

6.9. Wind and solar resources

The ISO proposes different requirements for wind and solar resources based on whether they are shown as flexible RA or system RA. If wind or solar resource is shown as system RA, the ISO proposes to exempt the resource from the availability incentive mechanism for two reasons. First, wind and solar resources' output influences their QC. Therefore, wind and solar resources are already incented to perform during their must-offer hours. Second, the only way to assess wind and solar under the proposed methodology is to use the resources forecast as a baseline for comparison. The ISO acknowledges the potential concern that in the event the resources perform up to a forecasted amount that is less than their RA amount; they could be taking away payments from resources that are in fact performing up to their RA amount.

For wind and solar resources that are shown as flexible RA, the ISO will not exempt the resources because their EFC and NQC is not inherently tied to the whether the resources economically bid as opposed to self-schedule.

The energy market optimization has functionality for VERs that allows these resources to bid up to a specified forecast and be dispatched downward. This allows VERs, primarily wind and solar resources, to be utilized by the ISO market optimization as flexible resources. For resources that have output dependent on a dynamic forecast, the ISO proposes to measure flexible RA availability using economic bids at ISO- or the scheduling coordinator- provided forecast to assess availability.

Under the condition that the resource is shown on the RA monthly supply plan up to the EFC for flexible RA the ISO will use economic bids to the forecast to assess availability rather than the amount shown the supply plan.

- If the forecast is below the amount shown on the resource's monthly RA supply plan, the resource will be considered 100% available in the event the resource is bid in up to the forecast amount.
- In the event the forecast is above the amount shown for RA, the resource must bid in up to the forecast. If the resource bids or generates above the forecast, the ISO will limit availability calculated to the forecast amount, i.e. any amount provided over the forecast amount will be considered only 100% available. Bids will automatically be limited by the VERs forecast. If the resource generates above its forecast, the ISO will treat this as uninstructed imbalance energy and will assign the resource costs associated with maintaining reliability through resource deviations.[17] It would not make sense to both penalize and reward a resource for deviating above its forecast.

If a resource is shown on the RA monthly supply plan for an amount less than the EFC for flexible RA, the ISO will assess availability using the ratio of the amount shown on the supply plan to the relevant EFC. The ISO does not expect this to be a common occurrence, but the ISO must have rules in place in the event it occurs. For example, if the resource has a Pmax of 200 MW, an EFC of 100 MW, and is only shown for 25 MW on the flexible RA plan, the resource will not be held to the forecast, but rather 25% of the forecast amount. This is because the resource's forecast is based on the actual ability of the plant and not the amount shown on the RA plan. In this example if the forecast was 200 MW, then the resource's availability would be assessed against 50 MW rather than the full 200 MW. Likewise, if the forecast was for 20 MW, the resource's availability would be assessed against 5 MW, rather than the full 20 MW.

Incentive payments to a solar or wind resource will be based on the amount shown as flexible RA and not on the forecast. The forecast will only be used to determine the availability percentage. The quantity paid under the incentive mechanism will be the difference between the monthly threshold level and 100% of the flexible shown RA level.

VER resource adequacy resources that do not have an obligation to bid into the day-ahead will only have their real-time availability be assessed through the availability incentive mechanism.

6.10. Combined Heat and Power

Similar to wind and solar resources, combined heat and power (CHP) resources will be exempt from the generic availability incentive mechanism. The amount a CHP resource can sell as RA from year to year is dependent on the output from the plant. Therefore these resources already have an incentive to perform and would be double penalized under the availability incentive mechanism.

[17] For example, 25% of the flexible ramping constraint is allocated to uninstructed imbalance energy.

6.11. Pumping Load

Unlike traditional capacity, pumping load must have a DA AS schedule in order to produce energy in the real-time. The ISO will only assess pumping load under the availability incentive mechanism if there is pumping load available. During the periods when there is no available load in the real-time, the ISO will exempt the capacity from the incentive mechanism in that interval.

6.12. Exempt capacity due to outages and derates

When RA capacity is unavailable due to certain types of outages, the period of the outage will be pulled out from the assessment calculation. The capacity is not counted as available or unavailable. Instead it is simply not part of the availability assessment. The recently completed outage management system (OMS) stakeholder initiative has proposed revised tariff language changing the definition of forced and planned outages, creating newly defined types of outages, clarifying the rules under which RA resources request outages, and creating new *nature of work* categories for outages. More information can be found in the draft tariff for the OMS stakeholder initiative. Planned outages come in four categories. When the category requires replacement, the availability incentive will apply to the replacement resource. If the nature of work category requires replacement and no replacement is provided, the ISO will penalize the resource under the availability incentive mechanism. When the planned outage does not require replacement, no obligation will transfer and the capacity on outage will not be considered in the availability assessment. The four planned outage categories are:

- Maintenance outage with replacement,
- Maintenance outage without replacement,
- Off-peak opportunity outage without replacement, and
- Short notice opportunity outage without replacement.

The new OMS system also contains a nature of work description to describe other outages. The nature of work codes indicate why the resource is on outage. The basic policy is that resource outages will be excluded from the availability incentive process if an outage is beyond the resource's control. The ISO proposes to exclude the following nature of work codes from the availability incentives:

- Unit testing,
- Unit cycling,
- Unit supporting startup,
- Transitional limitation,
- Ambient not due to temperature,
- Transmission induced outage, and

- Environmental restrictions use-limit reached.

When RA capacity has provided substitute capacity to the ISO, the ISO will transfer the must-offer obligation and assessment to the substitute capacity and not assess the original resource's capacity under the availability incentive mechanism. Capacity that is on an outage is not eligible as substitute (or replacement) capacity.

6.13. Use-limited resources and the availability incentive mechanism

Use-limited resources can have daily or monthly limitations. Daily limitations, MWh or other limitations, can be accounted for in the optimization and should not lead to the need for special treatment under the availability incentive mechanism. On the other hand, the ISO's market optimization cannot account for monthly limitations. To address this deficiency, the ISO will allow resources to include opportunity cost in their minimum load and start-up costs. (Resources can already include opportunity costs in default energy bids.) This functionality was initially included in the commitment cost enhancements initiative and will be completed in a separate initiative.[18] The opportunity cost functionality will be implemented prior to or at the same time the availability incentive mechanism becomes effective.

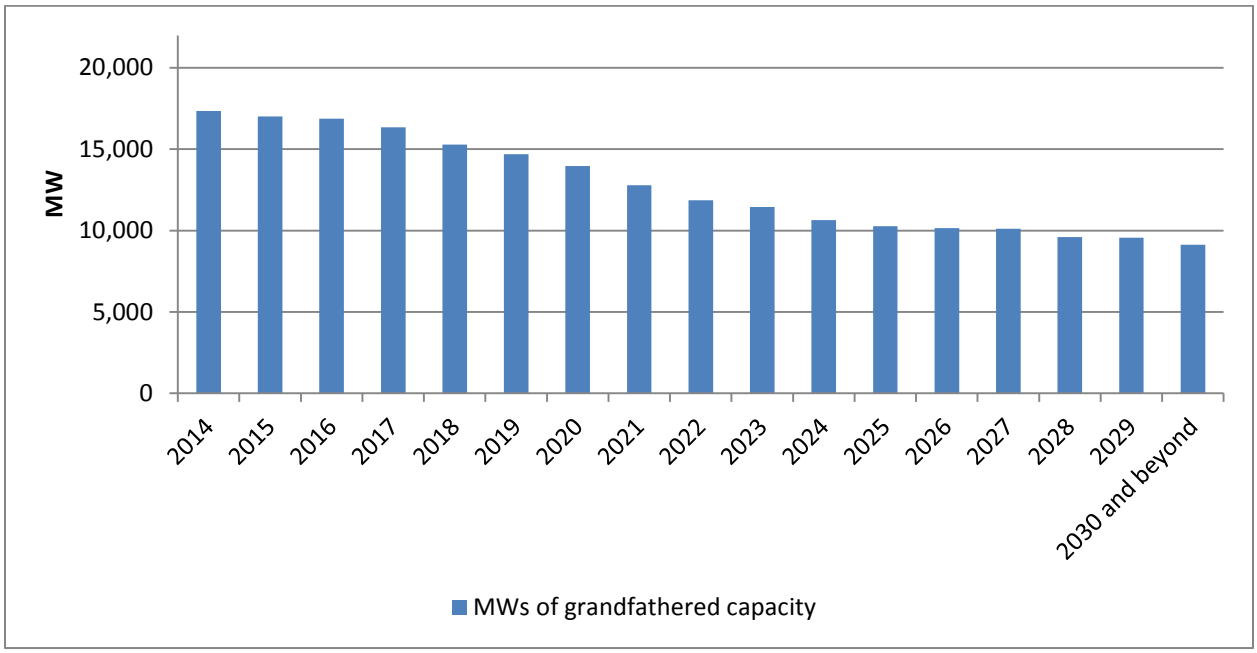
Some use-limited resources that do not have calculable opportunity costs may be exempted from the availability incentive mechanism. Any exceptions will be determined through a review of use plans. The ISO seeks stakeholder feedback on the types of use-limitations that may require an exemption from the availability incentive mechanism.

6.14. Exempt resources

Currently, resources that fall under tariff section 40.9.2 are exempt from the SCP availability incentive mechanism. The new availability mechanism will likely need to include similar exemptions for certain resources. The ISO does not propose to automatically apply the same exemptions to the new availability incentive mechanism. This is partly due to the significant amount of capacity exempt from the current incentive mechanism. Figure 8 shows the grandfathered contract capacity and contract year the RA capacity will expire. The ISO will not implement the new availability incentive mechanism until 2016. Additionally, many contracts will have to be renegotiated due to the new flexible RA requirement. Given these two points and the rapidly changing energy landscape, the ISO does not think it is in the best interest of reliability to expose only a portion of resources to new rules needed to reliably integrate renewable and preferred resources. The ISO will therefore seek to exempt only a select set of resources that are physically or uniquely unable to fully comply with their must-offer requirement as described below.

[18] http://www.caiso.com/informed/Pages/StakeholderProcesses/CommitmentCostEnhancements.aspx

Figure 8: Grandfathered capacity exempt from current Standard Capacity Product availability mechanism by year



The ISO proposes to specifically exempt the following resources from the availability incentive mechanism:

- Pmax < 1.0 MW as currently described in ISO tariff
- Contracts for Energy from non-specified resources as currently described in ISO tariff
- Modified Reserve Sharing LSE and Load following MSS resources as currently described in ISO tariff
- Most Qualified Facilities (QFs) as currently described in ISO tariff
- CHP resources for generic RA only
- Solar and wind resources for generic RA only
- Some use-limited resources if the monthly use-limitation cannot be controlled except through the resource not bidding into the ISO energy markets as determined by the ISO in the use-limitation template process

6.15. Availability incentive mechanism payments

The ISO will pay or penalize scheduling coordinators of RA capacity monthly. If the pool of penalties exceeds the total pool needed for payments up to twice availability incentive price (initially proposed at $3.5/kW-month), the ISO will create a roll-over account to be used in payments to high-performers for the following month. This roll-over account will continue until the end of the year, at which time any excess funds will be paid to load serving entities based on load ratio share.

PART III: REPLACEMENT AND SUBSTITUTION

7. Replacement and substitution proposal roadmap

Replacement and substitution are often discussed together as they are both related to the ISO potentially receiving resource adequacy (RA) capacity in the place of RA capacity on outage. Currently; however, these are two very different mechanisms. The replacement mechanism is meant to ensure that additional capacity is provided during planned outages, which are not accounted for in the planning reserve margin (PRM). The substitution mechanism is meant to ensure that additional capacity can be provided during forced outages, which are accounted for to a certain extent in the PRM. The ISO has therefore previously made a bright line distinction between these two mechanisms in order to differentiate between the ISO's presumed need for additional capacity. In reality; however, not all planned outages cause the ISO to need additional capacity and at a certain point, forced outages can no longer be accommodated within the PRM without affecting reliability. Therefore the ISO is considering provisions to simplify and increase the transparency of replacement and substitution rules.

The ISO is aware that certain aspects of the replacement and substitution rules cause significant confusion and/or dissatisfaction among stakeholders. Some of these issues stem from when replacement or substitution is required, the distinction between whether the supplier or the LSE must provide the additional capacity, and which entity ultimately takes on the availability and procurement risk. Furthermore, the ISO expects that the integration of flexible RA into the replacement and substitution rules will increase this complexity, potentially to the point that the rules are unworkable from an internal processing standpoint.

If the ISO were to create new replacement and substitution rules to integrate the flexible RA requirements filed at FERC in August 2014, it would necessitate significant changes that would likely not be implemented until Fall 2016. Meanwhile, the ISO has committed to reevaluating the flexible RA requirements in order to propose an updated flexible RA requirement in Spring 2016. Therefore if the ISO were to propose flexible replacement requirements within this initiative, the market design would likely need to change just after being implemented to account for flexible RA requirement market design changes.

The ISO proposes to delay until phase two of the RSI any major market design related to flexible RA planned outages and instead consider in phase one any changes to the replacement and substitution rules that would simplify the future integration of flexible RA planned outage rules. The policy changes to the ISO's planned outage rules are proposed to have a sunrise date for the 2017 RA year in order to give market participants time to adjust to what could be significant changes to the ISO's current replacement and substitution rules.

A 2017 sunrise date has the additional benefit of supporting CPUC coordination. The ISO's proposed changes to the replacement rule may necessitate changing the ISO's monthly RA process. Proposing rules in phase one, but waiting to implement the rules until the 2017 RA year will give the CPUC time to update the timing of any of their processes that are affected by the ISO's monthly RA process timeline change. The ISO will work with the CPUC in their RA proceeding to ensure timeline alignment.

Figure 9 summarizes the planned policy topics for phase one and phase two of the RSI, organized by target implementation timeframe. The ISO expects that all policy proposed in phase one will be implemented by the 2017 RA year. For policy proposed in phase two, given that any updates proposed to the flexible RA rules will also have to go through a CPUC proceeding, the ISO does not expect to implement any changes specifically related to these requirements until the 2018 RA year. If there are some small incremental changes that are entirely within the ISO processes and do not require CPUC coordination, it is possible the ISO will make these changes by the 2017 RA year, as indicated in the following table.

Figure 9: Expected implementation date of outage rules by RSI Phase

Expected implementation date		2016 RA year	2017 RA year	2018 RA year
Proposed in RSI Phase 1	*Planned outages*	Small changes to replacement rule to ensure flexibility of fleet in real-time	Redesign of replacement rule for system RA and monthly RA process	N/A
	Forced outages	Enhancements to current rules and new flexible RA forced outage rules	Any policy unable to be implemented by 2016	N/A
Proposed in RSI Phase 2	*Planned outages*	N/A	Any additional changes in advance of implementing updated flexible RA requirements and associated outage rules	Rules related to flexible RA planned outages
	Forced outages	N/A		Updated rules related to flexible RA forced outages, if necessary

The following sections describe the ISO's planned and forced outages market policy proposal. Section 8 describes the ISO's proposal to address the reliability risk associated with flexible planned outages that will be implemented by the 2016 RA year. Section 9 describes the ISO's proposal to address the reliability risk associated with forced outages of flexible RA as well as other enhancements to the substitution rule. This proposal is also expected to be implemented by the 2016 RA year. Section 10 describes the ISO's simplified replacement requirement proposal that will sunrise in 2017. This proposal does not include rules for planned outages of flexible RA resources. It is intended as a platform for phase two of the RSI, which will develop updated flexible RA requirements and rules related to planned outages of flexible RA resources.

8. Planned outage proposal for implementation for 2016 RA year

8.1. Purpose and background

The ISO developed the replacement rule in recognition that while the ISO depends on the monthly RA showings to ensure reliability, there needs to be appropriate opportunities for RA

resources to take maintenance outages. The rule mandates that capacity on a scheduled maintenance outage may need to be "replaced" with sufficient capacity in order to maintain a sufficient planning reserve margin for grid reliability.

The current replacement rule for RA arises because of the monthly nature of the existing RA construct. Currently, RA requirements are determined monthly and vary according to the load requirements for each month. The planning reserve margin incorporated into each monthly requirement accounts for an anticipated amount of forced outages of RA capacity during the month, but is not designed to account for resources on planned outages for scheduled maintenance.

Therefore, when an LSE submits its monthly RA showing, the resources are expected to be available every day. The ISO has a process that requires LSE's or suppliers under certain circumstances to provide the ISO additional capacity in order for the resource's planned outage to be approved.[19] The replacement rule ensures that 115% of *system* capacity is available to the ISO every day of the RA month. Under the new proposed flexible RA rules the ISO will require that 100% of the flexible RA requirement is met in the monthly showing; however, there are no rules surrounding the replacement of flexible RA outages.

8.2. Issues brief

As described in section 7, the ISO intends to develop rules related to flexible RA planned outages in phase two of this initiative. There is therefore a gap between when the ISO needs flexible RA resources in order to ensure reliability and a rule to ensure adequate daily flexible capacity during planned outages of flexible RA resources.

The ISO has found that certain system planned outages are being replaced with capacity that had significantly different resource characteristics than the original resource shown on the monthly plan. While this inherently is not an issue, it potentially could increase the amount of RA use-limited resources beyond the allowable point under the CPUC MCC buckets and ISO reliability needs. This becomes a bigger issue once the ISO explicitly relies on flexible RA.

8.3. Proposed rule changes

8.3.1. Planned outage replacement characteristic rules

In order to address the time gap between flexible RA requirements and the implementation of rules related to flexible RA planned outages, the ISO proposes to impose minor limitations on system replacement for planned outages. Resources on planned outages must be replaced under the following conditions:

[19] If a resource on an LSE's monthly RA showing has an outage already scheduled when the submissions are due 45 days before the month, the LSE may be required to provide replacement resource adequacy capacity to make up for resource adequacy capacity on outage. For outages requested after the monthly LSE showings, the responsibility for replacing resource adequacy capacity switches to the scheduling coordinator for the resource.

- Non-use-limited resources cannot be replaced by a use-limited resource.
- Dispatchable resources cannot be replaced by a non-dispatchable resource.

Both “use-limited” and “dispatchable” are terms that are used frequently, but are not well defined. The ISO proposes to define these within this initiative.

Use-limited resources

At this time the ISO believes there should be a distinction and more clear rules surrounding how a resource qualifies for use-limitation status. The ISO will propose such rules in the next draft, and the ISO seeks stakeholder feedback from market participants.

Dispatchable resources

Dispatchable indicates whether the resource has the ability to provide economic bids to the day-ahead and/or real-time energy market and also have the ability to follow the energy market optimization dispatch instructions. The ISO will consider a resource dispatchable under two conditions:

- If a resource is a new resource, for the first year of participation, the scheduling coordinator may indicate to the ISO whether the resource is dispatchable or non-dispatchable.
- For existing resources, if a resource submits at least 10 economic hourly bids within the year, the resource is considered dispatchable in the following year.

9. Forced outage proposal for implementation for 2016 RA year

9.1. Purpose and background

RA resources are expected to be available during the entire month. The replacement rule provides opportunities for RA resources to take maintenance outages under specific conditions when there is advance notice of the outage. Resources also experience forced outages, when advance notice is not possible. The availability incentive mechanism is designed to provide resources with incentives to undertake actions to reduce the occurrences of forced outages in a month. In order to allow resources to manage their availability incentive risk, the ISO has developed substitution rules that allow capacity from resources to “substitute” for RA capacity which has experienced a forced outage. When a resource has a forced outage, for which they were not able to request an outage be approved as an outage with or without replacement, or as an opportunity outage, the resource has the option, under the existing SCP rules and anticipated OMS implementation, to provide substitute RA capacity to mitigate any potential impact to the original RA resource’s availability incentive calculation. Requests for substitution must be a “like for like” resource, and must be made before the close of the IFM the day before the substitution takes effect. The ISO approves these substitution requests at its discretion if the resources are similar and in the determination of the ISO the substitution won’t impact reliability.

An additional accommodation is allowed in the case of local resources because of their unique situation. Local resources may pre-qualify a substitute resource on an annual basis, and a pre-qualified resource may be substituted in real time. This accommodation is provided to local resources because local resources are often required to provide RA every month; they may not have the option of not providing RA for a month in order to perform maintenance or when they suspect that the resource may not be dependable. The option to pre-qualify a substitute resource for a local RA resource and thus be able to substitute in real time is restricted to a similar resource delivering power to the same bus. These requirements are important in allowing real time substitution because the operators are assured that the substitution won't impact the reliability of grid and therefore should get substitution "credit" the availability incentive mechanism.

9.2. Issues and proposed rule changes

9.2.1. Deadline for providing day-ahead substitution

Some stakeholders have commented that the deadline for providing substitute capacity is unnecessarily early given the ISO's automated processes. The deadline for providing day-ahead substitution is currently 6:00 AM. The ISO proposes to move this deadline two hours forward to 8:00 AM. This would provide additional time for suppliers to submit substitute capacity while still providing the ISO enough time to evaluate the capacity prior to the day-ahead market run.

9.2.2. Many-to-Many Substitution resources

The initial implementation of substitution rules by the ISO required that when a resource was being used as a substitute RA resource it could not be used as a substitute for another RA resource. This was true even if the initial substitution used only a small fraction of the non-RA NQC of the resource. This was an implementation aspect due to restrictions in the ISO's systems for accepting substitutions. Several stakeholders raised concerns over this limitation. Recently, the ISO has implemented a manual procedure which allows a resource to substitute for a second RA resource on outage, subject to certain restrictions. The ISO is developing the capabilities required in its various systems to allow for automated many-to-many substitutions without the limits currently imposed with the manual procedure. The ISO proposes to extend the many-to-many substitution rules to flexible RA resources. Therefore any amount of capacity from a resource may be used to substitute for multiple other resources.

The ISO is assessing whether the functionality could be developed for a single resource to substitute for two separate resource outages, one that requires flexible capacity and one that requires generic capacity. The ISO looks for stakeholder feedback on whether this functionality is desired.

9.2.3. Real-time substitution for system and flexible resources

Current substitution rules allow for the real-time substitution of pre-qualified local RA resources, but limit which resources may be pre-qualified as substitutes, and does not provide this option for system resources. Stakeholders have suggested that because real-time substitution can reduce the impacts of forced outages on a RA resource's availably by reducing the hours the resource is unavailable without a substitute, they would like to have a similar option for real-time substitution for system RA resources. The ISO is assessing how this expansion of substitution can be implemented without creating potential reliability issues. Additionally, the existing replacement and substitution rules already provide resources with several methods to minimize any potential availability penalties resulting from forced outages on system RA resources. Therefore, ISO is also considering the incremental benefits of offering real-time substitution for system and flexible resources.

In order for local RA resources to be eligible for real-time substitution, the potential substitution must meet very specific conditions and be pre-qualified. The ISO allows resources to pre-qualify a substitution on an annual basis when the resources are at the same node and have similar operating characteristics. These restrictions allow the ISO to be certain that there will be minimal reliability impacts in real time due to the substitution.

The existing substitution rules require requests for non-pre-qualified local RA resources substitutions, and all non-local substitutions to be submitted before the close of the IFM. This provides at least a minimal amount of time for the ISO to analyze the substitution and determine that it does not cause any reliability issues, and to potentially make any adjustments required to ensure that reliability is not reduced.

9.2.4. Local substitution rules

The ISO currently requires that local resources be substituted with local resources located at the same bus. There are times when local capacity is available under the planning definition of "local," but is not located at the same bus. The ISO is assessing whether there would be benefits to clearly defining local substitution criteria and creating rules surrounding the relaxation of the bus requirement. One possibility is that the ISO could prequalify in the year-ahead timeframe local resources that can substitute for other local resources that are not at the same bus, but are located across a likely unconstrained path and therefore could still address any local issues even in a constrained situation.

9.2.5. Flexible forced outage substitution proposal

The ISO proposes to create rules to address forced outages of flexible RA. Flexible RA is proposed in this initiative to be covered under the ISO's RA availability incentive mechanism, and therefore, the ISO will also propose rules to mitigate this risk by allowing flexible capacity substitution. In the event of an outage causing flexible RA capacity to be subject to the availability incentive mechanism, the ISO will allow the scheduling coordinator for the capacity to provide forced outage substitute capacity. This capacity must be of the same flexible category

or better and comply with the relevant generic RA substitute rules in regards to timing, and comply with relevant flexible category must-offer requirements. If the capacity substituted in is at a higher quality that the original capacity on outage, the substitute capacity must still comply with the higher category must-offer requirements. The only "like for like" requirement for forced substitute RA is the 'flexible category or better' requirement.

The ISO will allow a scheduling coordinator to provide flexible substitute capacity beyond the amount on outage and will not limit the amount provided to an assumed needed quantity. This is because ultimately it is up to the scheduling coordinator how they will run the resource and the ISO will make no presumptions as to how much substitute capacity a scheduling coordinator will need to provide to the ISO in order to meet their flexible RA obligations. In the event of an outage, it is up to the scheduling coordinator to tell the ISO how much RA capacity it wants assigned to the substitute resource. The ISO will hold the substitute resource accountable up to the provided substitute capacity value and hold the initial resource on outage accountable up to the remainder between the quantity shown on the resource's supply plan as RA capacity and the quantity told to the ISO that the substitute resource will provide.

For example, assume resource A was shown for 100 MW of flexible RA and has an EFC of 150 MW and goes on outage for 50 MW. Although it may seem like the resource can still meet its flexible RA requirement, there may be other constraints on the resource that the ISO is not aware of and cannot account for in the tracking process. Therefore, the ISO will allow the scheduling coordinator to indicate a substitute value. For example, resource A can indicate resource B has a substitute capacity quantity of 20 MW. The ISO would then assess resource A under the flexible availability incentive mechanism for 80 MW (100 MW – 20 MW) and the assess resource B under the flexible availability incentive mechanism for 20 MW.

9.2.6. Changes to outage policy

Proposed tariff language to implement the new OMS system[20] in the fall of 2014 clarifies the rules under which RA resources may request outages without the outage impacting the resource's availability incentive calculation. During this initiative the ISO exempted forced outage capacity that was reported to the ISO between seven and four days from the availability incentive mechanism. This was because the scope of the OMS system tariff changes was not meant to address changes to the SCP incentive mechanism. This initiative addresses both outage and the availability incentive mechanism policy and thus it is appropriate with this initiative to remove the tariff exemption for forced outages reported from seven to four days.

[20] http://www.caiso.com/informed/Pages/StakeholderProcesses/OutageManagementSystemProject.aspx

10. Outage rule proposal for implementation for 2017 RA year

10.1. Purpose and background

The ISO developed the replacement and substitution rules in recognition that there needs to be both (1) appropriate opportunities for RA resources to take maintenance outages and (2) limits on the amount of forced outages that can occur without resource substitution. Both of these rules are intended to ensure there is sufficient capacity available in order to maintain grid reliability.

The current outage rules for RA resources arise because of the monthly nature of the existing RA construct. RA requirements are determined monthly and vary according to the load requirements for each month. The planning reserve margin incorporated into each monthly requirement accounts for an anticipated amount of forced outages of RA capacity during the month, but is not designed to account for resources on planned outages for scheduled maintenance. Thus, the ISO created replacement and substitution mechanisms to ensure grid reliability.

There are numerous issues that have been identified with the current replacement and substitution rules. Figure 13 in Appendix C illustrates the ISO's current monthly RA process. There are two different processes in place today for providing replacement capacity for a planned outage. This is illustrated by the two horizontal lines in Figure 13 showing different process paths for LSEs and suppliers. These paths map out the different rules that relate to LSEs and suppliers' obligations under the replacement rule. The reason for the two separate paths is the approval procedure, obligation, requirement, and penalties related to providing additional RA capacity during a planned outage changes based on whether the outage capacity was reported before or after T-45.

For planned outages reported to the ISO prior to T-45:

- **Outages will be approved, denied, or pending by T-25.** The ISO's outage management office will consider all outage requests prior to the ISO running the outage impact assessment.
- **The obligation to replace is on the LSE**. Outages are stacked in first in, last out order and on any day that the system is short and an LSE that showed the capacity on their supply plan is also short compared to their LSE system requirement, the LSE then is required to replace the planned outage capacity.
- **Replacement is required up to the monthly RA system requirement.** The ISO requires replacement of outages until the system is back at the CEC 1 in 10 forecast plus 15%.
- **Non-replaced outages may trigger a monthly CPM event.** In the event an LSE does not provide replacement, the ISO may designate capacity under the monthly CPM event and allocate the costs to deficient LSEs.

For planned outages initially reported to the ISO, increased in severity, or increased in length after T-45:

- **Outages will be approved, denied, or pending tentatively by T-11**. The ISO's outage management office will look at outages on a case-by-case basis and may wait until T-11 or later to make a final decision on planned outage.
- **The obligation to replace is on the supplier**. As additional outage capacity is made known to the ISO, the supplier may have to replace some or all of the planned outage capacity.
- **Replacement is required at the ISOs discretion.** The ISO may or may not require replacement based on updated system conditions at the ISO's discretion.
- **Non-replaced outages may be cancelled.** In the event a supplier does not provide replacement, the ISO may cancel an outage. If the planned outage turns into a forced outage, the supplier would face SCP incentive mechanism penalties.

10.2. Issues brief

Figure 14 in Appendix C shows the same monthly process, but highlights where stakeholders, both internal to the ISO and external market participants, have indicated there are issues with the current process. The numbers within Figure 14's issue boxes correspond to the numbered issues below, with 10.2.1 corresponding to issue (1), 10.2.2 corresponding to issue (2), and so on.

10.2.1. Process complexity

The current monthly RA evaluation process is complex from the perspectives of both the ISO and market participants. This complexity leads to data transparency issues, additional administrative and coordination costs for the market, customer frustration, and overall customer dissatisfaction.

Overlapping cure periods for traditional LSE RA requirements and LSE replacement requirements

One reason that the process is complex is that the cure period for traditional RA requirements overlaps the cure period for the replacement requirement. The LSE must meet two types of requirements: (1) the traditional RA requirements (peak demand & local) and (2) replacement requirements. The ISO evaluates the traditional RA requirements concurrently with the replacement requirements and where the ISO finds an LSE deficient for either requirement, the cure period overlaps all the way up until the concurrent due date of 11 days prior to the operating month (T-11).

Any traditional RA deficiencies directly influence the outage impact assessment performed by the ISO to determine which LSEs must replace outages. When one LSE is short of its traditional monthly RA requirement, it causes system shortages potentially driving the ISO to assign

another LSE a replacement requirement if it finds an outage that overlaps those system short days. Also, when one LSE is short of its traditional RA requirement, the ISO sees the LSE as net short all month and will assign replacement requirements to the LSE on any day where one of the resources on its RA Plan is on an outage. Once assigned, the LSE must provide the replacement capacity required as well as the capacity to cure the traditional RA deficiency on each day of the month.

Overlapping cure periods for LSE requirements and supplier replacement requirements

Another reason that the process is complex is that the cure period for all of the LSE requirements (both traditional monthly RA requirements and replacement requirements) overlaps the cure period for the supplier replacement requirement. As discussed above, between T-45 and T-11 the LSEs are given the opportunity to cure their deficiencies. During this time ISO cannot assume that the LSEs will meet their requirements when evaluating new outage requests; the ISO must compare the new outage requests to the known operationally available RA level on each day of the requested outage at the time that it evaluates the request. LSEs will provide additional capacity on any day between T-45 and T-11, necessitating a different analysis of new outages each day up to T-11. The LSE deficiencies skew the determination of whether a supplier must replace an outage on a given day, and the extent of this skew is different depending on the day the evaluation occurs.

In addition to the issues involved in evaluating new outages submitted by suppliers during the overlapping LSE cure period, there is the issue of not having the final picture of the committed RA fleet for the operating month until T-11. All capacity associated with the LSE (traditional monthly or replacement) is not due to the ISO until T-11; however, in the T-45 to T-11 timeframe, the ISO can only require replacement capacity on committed RA resources that are requesting outages. The fact that the LSE cure period overlaps the supplier replacement evaluation period to such a large extent allows a scenario where the supplier for resources that were not included in an initial submittal of a supply plan, but are being used by the LSE to cure a monthly deficiency, to submit outages to the ISO in the T-45 to T-11 timeframe and potentially take those outages without supplying replacement capacity.

The ISO, for its part, verifies the operational availability of replacement capacity upon submittal of the replacement capacity, but the scenario is complicated because multiple contacts within the same supplier entity must coordinate to ensure that this scenario does not occur; and when it does, they must re-coordinate to figure out the appropriate way to provide replacement capacity to the ISO. As for the cures related to traditional monthly RA capacity, the ISO cannot deny the resubmittal of the RA plan or supply plan that adds additional capacity to cure the LSE traditional RA requirements and instead must engage in a manual process to make sure all parties agree on the capacity quantity provided to the ISO for each day of the RA month and which entity has the replacement responsibility.

Tracking of outage replacement responsibility across multiple functional entities

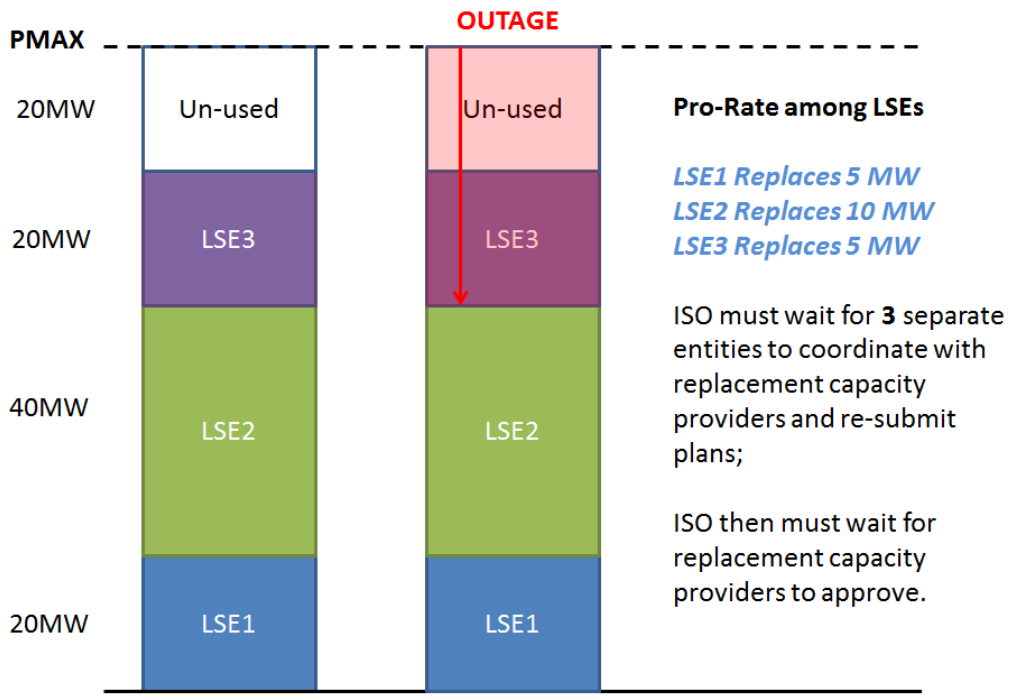
Another reason that the process is complex is that the outage replacement responsibility is split between the LSEs and the suppliers requiring the tracking of outage replacement responsibility across these two different functional entities. The ISO analyzes a snapshot of outages taken 45 days prior to the operating month when assigning replacement requirements to LSEs. Suppliers cancel or move outages frequently between the planning horizon and operating horizon. If a supplier moves or cancels an outage at any point in time after the snapshot is taken, the ISO must implement and track a complex process. The ISO must manage which entities are responsible for replacement, crediting LSEs on days where the outage either increased availability or move away from the original outage period. And the ISO must require suppliers to provide capacity where the outage decreased availability or moved to days where the original outage was not planned. This is a constant iterative process that must be tracked by both the ISO and market participants.

Multiple LSE replacement responsibility for a single outage

Adding to the complexity, the LSE outage replacement responsibility is split between multiple LSEs that share a single outage on a single resource increasing the number of dependencies and contact transactions that must occur before the ISO can receive final approved RA replacement capacity.

The capacity on a single RA resource is often shared by multiple LSEs. When the resource has scheduled a planned outage prior to T-45, all LSEs may share in the replacement responsibility in the ratio of their RA Plan capacity compared to each other and compared to the outage curtailment MW. Consider the example below in Figure 10 of an RA resource shared by three LSEs with a single outage.

Figure 10: Outage on a single resource shared by multiple LSEs



In this example, the ISO stresses the complexity from a process standpoint: any process that requires inputs from several parties is prone to instabilities. In this example, there is one outage on a single RA resource, yet the ISO must assign replacement responsibility to three other parties. Each of those three other parties must coordinate replacement capacity purchases, submit them back to the ISO, and wait for the suppliers providing the replacement capacity to approve. This example requires at least a four party coordination (ISO, LSE1, LSE2, and LSE3) and up to any number of party coordination depending on how many suppliers an LSE will rely on to replace its portion of the unavailable capacity. The larger the number of coordinating parties, the longer it takes to secure the capacity and the higher the likelihood of mistakes.

There are other complexities that arise related to proper treatment of replacement assignment that reduces transparency to market participants. First, in the example above, the ISO will often find that perhaps one of those LSEs is not short of operationally available capacity and therefore does not have to replace its pro-rated portion of the outage. In these scenarios, the ISO seeks out only the pro-rated capacity from those LSEs that are short.

Second, further related to complexities resulting in reduced transparency, this scenario is often extended even further. RA resources have multiple overlapping outages and each outage is considered for LSE assignment of replacement requirement in last-in, first-out order. In these cases, the ISO pro-rates both outages among the LSEs at an outage level, but only seeks the replacement capacity related to each if it reaches that point in the outage priority queue before fulfilling the total system RA requirement. Due to confidentiality issues, it is impossible for the ISO to share all of this information with every market participant to allow independent verification of the replacement decisions.

10.2.2. ISO dual processes and associated incentives

The ISO manages dual processes that depend on when outages are received. In one process, it manages and assesses outages that increase in severity or duration and newly requested outages to determine the supplier replacement responsibility. In another process, it manages and assesses outages that decrease in severity or duration and outages requested prior to T-45 to determine the LSE replacement responsibility. In both of these processes, the goal is to determine which organizations are responsible for providing replacement capacity.

As noted above the ISO has separate processes for evaluating the replacement requirement before and after T – 45. This is indicated by the two separate lines in Figure 14 in Appendix C. Outages that are received by the ISO prior to T – 45 follow the blue line in the LSE replacement process, whereas outages received after T – 45 follow the orange line and supplier replacement process. Outages that follow the LSE replacement process are always asked to be replaced up to the CEC 1 in 10 forecast amount. Outages that come in after T – 45 may or may not be asked to have additional capacity provided at the ISO's discretion. Potentially, the ISO could be giving incentives for suppliers to delay reporting planned outages until after T – 45 to receive more favorable treatment under ISO rules. There are no rules that force a supplier to inform the ISO of a planned outage during a specific timeframe and the ISO does see the majority of outages (approximately 3 out of 4 or 4 out of 5 depending on the month) each month come in after T-45.

The ISO is concerned about getting such a significant number of planned outages reported after T – 45. The later outages come in, the less time the ISO has to evaluate how outages impact the ISO system and the more the ISO will move around outages to try and accommodate necessary work. Additionally, in a capacity scarce environment last minute planned outages make the outage coordination task for the ISO as well as market participants even more difficult.

10.2.3. Contract complexity

The timing of outage submission drives the obligation of replacement and potential penalties associated with failing to replace. If an outage is reported prior to T-45 it will go through the LSE replacement process and if replacement is required, but not provided, the LSE may incur CPM costs. If an outage is reported after T-45 it will go through the supplier replacement process and if replacement is required, but not provided the supplier may have the outage cancelled, moved, or else will risk availability incentive mechanism penalties in the event the planned outage is restated as a forced outage.

When suppliers and LSEs contract for RA neither party will be fully sure if planned outages will be reported before or after T-45 and therefore are unaware of the potential risks related to ISO policies. This increases contract complexity and, presumably, costs for market participants.

10.2.4. Inefficient RA commitment and over-procurement

The ISO requires RA capacity where and when needed in the planning horizon in order to reliably operate the system in the operating horizon. It endeavors to achieve this goal by creating policies that allow for the efficient and proper procurement of capacity understanding that this will lead to fewer costs to the market. The ISO is aware that the current RA rules might not be as efficient as possible.

Use of load forecasts in both planning and operating horizons

As described in section 10.2.1 the ISO assesses monthly RA shortages both before and after the outage impact assessment is complete. This process can potentially lead to over-procurement if an LSE does not fully comply with its monthly RA obligation until after the replacement requirement has been assigned.

Additionally, it is possible that energy grid conditions will significantly change after the CEC 1 in 10 forecast was developed. Under the current rules for outages reported prior to T-45, even if the ISO noted radically different weather conditions than expected, the ISO still requires LSEs to provide replacement capacity up to the CEC forecast. Likewise, under the current rules for outages reported after T-45, the ISO may require suppliers to replace the outage capacity that causes the ISO system to drop below its CEC forecast. The use of the CEC 1 in 10 forecast in both the planning and operating horizons potentially forces more procurement than is needed for reliability on individual days. This has been addressed to some extent in the OMS tariff changes, which created rules to allow very short planned outages during low load periods.

Overlapping cure periods

One reason that inefficient RA commitment and over-procurement occurs is that the cure period for traditional RA requirements overlaps the cure period for the replacement requirement. The LSE must meet two types of requirements: (1) the traditional monthly RA requirements (peak demand & local) and (2) replacement requirements. The ISO evaluates the traditional RA requirements concurrently with the replacement requirements and where the ISO finds an LSE deficient for either requirement, the cure period overlaps all the way up until the concurrent due date of 11 days prior to the operating month (T-11).

One LSE's traditional RA capacity deficiencies could make the difference between the overall system shortage or excess on certain days. If any other LSE is deficient and the system is short, then outages are assigned for replacement under the replacement rule. Because other LSEs may be short or long, there is no guarantee that the one LSE which intends to provide additional capacity during the formal cure period will not cause a different LSE entirely to have to provide unneeded replacement capacity during these days. Because the ISO stacks outages in last in, first out order, oftentimes different LSEs must fill the shortage with replacement capacity even though the first LSE intends to fill the shortage for all days during the formal cure period. The LSE is likely to provide this capacity rather than risk a penalty as they have no insight that the shortage will be cured by the LSE that was deficient of its traditional RA capacity requirements

prior to the month. The traditional monthly RA deficiency cures often times would have reduced the overall replacement requirement placed on other LSEs.

Similarly, the short LSE could potentially then have to replace on days when there is a system deficiency. It is entirely possible that the LSE will be responsible for providing replacement capacity in addition to providing capacity to fulfill their monthly requirement. RA capacity used for replacement does not count toward the LSE's traditional RA requirement because replacement capacity that is not provided for every day of the compliance month cannot count toward the monthly requirement, so the LSE may end up having to provide twice the actually required RA. The LSE first provides additional RA on certain days to comply with the replacement rule, and second provides even more RA capacity for all days of the month on the RA plan to comply with the traditional RA requirements.

Immobile RA commitment established in the planning horizon

The immobility of committed RA for replacement requirement purposes in RA Plans (i.e. "Specified Replacement Capacity" and "Non-Specified Replacement Capacity") contributes to inefficient RA commitment and potentially over-procurement. Suppliers cancel or move outages frequently between the planning horizon and operating horizon. Where LSEs provide replacement capacity for outages reported prior to T-45, this replacement capacity is committed as RA capacity for the duration indicated in the LSE RA Plan and does not change. In the operating horizon, when the outages associated with the replacement capacity are cancelled or moved, there is no change made to the associated replacement capacity; this leaves the ISO with more RA capacity on the original dates of the outage.

The same phenomenon occurs when suppliers are responsible for outage replacement because the supplier responsibility timeframe overlaps the planning horizon as well.

Timing of outage assessment

The timing of the ISO outage assessment contributes to inefficient RA commitment and potentially over-procurement. The ISO analyzes a snapshot of outages taken 45 days prior to the operating month when assigning replacement requirements to LSEs. As discussed above, suppliers cancel or move outages frequently between the planning horizon and operating horizon. If outages are moved or cancelled at any point in time after replacement capacity has been committed, the ISO may have more RA capacity on the original dates of the outage.

10.2.5. Risks related to cancelling or moving planned outages

One concern from several suppliers is that the ISO will ask or tell a resource to move their planned outage relatively close to the RA month causing additional cost to the resource if they had already lined up maintenance or replacement capacity.

ISO asks suppliers to move planned outages after T-45

To meet its reliability objectives, the ISO reviews many different aspects of outages. One aspect related to the issue at hand is its comparison of the outage curtailment MW to the operationally

available RA capacity on the days of the outage. If the total system operationally available RA capacity falls shorts of reliability needs on days where the scheduling coordinator requests an outage, the ISO works with the scheduling coordinator to find an appropriate time to take the outage or receive replacement capacity. Both of these options place additional burden on suppliers.

Suppliers cancel or move planned outages

Suppliers cancel or move outages frequently between the planning horizon and operating horizon. In order to secure certain outage dates, a supplier may have provided the ISO replacement capacity. This replacement capacity, once approved, is committed to the ISO as RA capacity and cannot be moved. Even if the outage is subsequently cancelled or moved, the supplier has already procured the capacity and committed it to the ISO placing an additional burden on suppliers.

10.2.6. Unnecessary standard capacity product incentive mechanism risk

The ISO endeavors to promote the efficient and proper procurement of resources needed to reliably operate the system. Certain issues expose suppliers to unnecessary standard capacity product incentive mechanism risk, thereby complicating supplier risk assessment and increasing associated costs to the market.

Local area capacity commitment

In the monthly showing process LSEs provide their RA plans without distinguishing between system and local capacity. The ISO automatically counts all local resources on an LSE's RA plan as being shown to meet local requirements. This can result in LSEs "leaning" on other LSEs showings because the ISO will only determine there is a local shortage if the entire system is short local and not just an individual LSE. Therefore, in real-time if a local resource goes out on forced outage, the ISO requires local capacity to be replaced with other local capacity even if the LSE can fully meet its local requirement without this capacity. If there is no local capacity available, the ISO will penalize the resource out on forced outage under the SCP incentive mechanism. This was listed as a top 5 issue in the ISO's Stakeholder Initiative Catalog.[21]

Suppliers cancel or move planned outages

Suppliers cancel or move outages frequently between the planning horizon and operating horizon. In order to secure certain outage dates, a supplier may have provided the ISO replacement capacity. This replacement capacity, once approved, is committed to the ISO as RA capacity and cannot be released or moved. If the outage is subsequently cancelled or

21 http://www.caiso.com/informed/Pages/StakeholderProcesses/StakeholderInitiativesCatalogProcess.aspx

moved, the supplier retains the standard capacity product risk associated with the replacement capacity. In other words, even though the outage creating the need for the RA has moved, the ISO still relies on the replacement as RA capacity and the capacity is subject to standard capacity product incentive mechanism risk.

10.2.7. Outage information sharing

Market participants are concerned that the ISO practice of sharing certain outage information to aid in the replacement requirement process amounts to sharing confidential information with competing entities in circumstances where the LSE is not also the supplier.

ISO shares information to aid in cure process

ISO shares supplier outage information (Curtailment MW, dates, and Outage Ids) with LSEs that rely on the resources to meet their RA obligations to allow LSEs to verify the ISO's proper assignment of replacement requirements as well as to aid in the LSE's coordination with their supplier to cure the deficiencies.

10.3. Proposed rule changes

The ISO intends to address these issues by proposing a redesign of the current replacement and substitution rules. The ISO proposes a process where the terms "replacement" and "substitution" are no longer used. Instead there would be outages with nature of work categories and depending on the outage the ISO will require or allow: forced outage substitute capacity, planned outage substitute capacity, or no substitute capacity. Ideally, all outage substitute capacity will run through the same processing system. The following subsections describe the ISO's proposed policy related to planned outage substitute capacity. This proposal is intended as a base to eventually accommodate flexible RA outages in phase two's market design to be implemented in the 2018 RA year.

As noted in the previous sections, there are two main goals of the ISO's monthly planning process, (1) to ensure that there is adequate monthly RA capacity in LSEs monthly RA plans, and (2) to ensure that there is adequate daily RA capacity given that certain resources on the monthly plan may have scheduled outage maintenance during the RA month. Sections 10.1 and 10.2 describe the ISO's current procedure for ensuring monthly and daily reliability and the associated issues with the current design. The ISO proposes to revise the current monthly planning process in order to address the identified problems described in the issues brief and create a simplified platform for the incorporation of flexible RA planned outages to be developed in RSI phase two.

Figure 15 in Appendix C outlines the ISO's proposed new RA process and rules to achieve reliability going into the RA month. The green bars and flags describe the process for LSEs and the ISO. The light purple bars comment on additional rules related to the associated process.

Beginning at the green flag at T- 45, just as today, the ISO will validate LSE and supply RA plans for discrepancies (differences between LSE and supply plan) and for shortages

(difference between LSE's monthly requirement and amount on RA plan). The ISO will ask for specific local, system, and flexible showings. These results will be given to the LRA, LSE, and supplier. The ISO will then allow a cure period for LSEs to cure any shortages until T-25. At this point, according to tariff section 43, the ISO has authority to backstop for deficiencies using the CPM, the ISO may do so. The only change from today is the addition of the ISO asking for LSEs to specifically indicate the RA type (flexible, system, local) and the timeline the RA process occurs. The ISO proposes no other changes to the traditional monthly RA process.[22] Currently this process begins at T-45 and is finalized at T-7. The ISO proposes that the monthly RA process now run from T-45 to T-25. The new timeline is described fully in section 10.3.1.

The revised monthly RA timeline allows the ISO to fully separate the monthly RA process from the planned outage process. Therefore, the second purpose of the ISO's monthly planning process- to ensure planned outages do not affect real-time reliability- will be conducted entirely after the monthly RA plan process is completed at T-25. The ISO will then run the outage impact assessment and allocate any responsibility to provide planned outage substitute capacity on the supplier in "first in, last out" order. Suppliers will then provide additional capacity or risk having their planned outage cancelled or denied, and risk availability incentive mechanism penalties if the outage is denied and the resource still goes on outage. The availability incentive mechanism penalty is proposed to initially be $3.5/kW-month.

If after the supplier provides planned outage substitute capacity, the planned outage moves for any reason, the ISO will allow the supplier to release any provided RA capacity up to the outage amount that moved. If a forced outage on a local resource occurs within the RA month and this resource was shown on the LSE's plan as a system resource, then it may have a system resource provide forced outage substitute capacity.

Figure 11 below summarizes the ISO's proposed changes and their associated benefits. The proposal is further described in detail in sections 10.3.1 through 10.3.6.

[22] The impact on the CPUC RA program is that the ISO's timeline for being able to provide supplier data and LSE shortages has moved 15 days earlier than the current timeline and the amount of time between notifying the CPUC of a shortage and doing the CPM assessment has decreased from 14 to 10 days.

Figure 11: Summary of ISO proposed changes and benefits of the proposed changes

ISO proposed changes	Proposal benefits and issues addressed
Change in timeline to separate monthly RA process from planned outage assessment and replacement process	Eliminates overlapping cure periods for LSE monthly RA requirements and planned outage responsibility. This reduces over-procurement and simplifies the process.
	Allows the ISO to do an outage impact assessment closer to the RA month which should decrease the number of outages moving around after approval and therefore reduce over procurement and availability incentive mechanism risk.
Separation of LSE and supplier responsibility where LSEs are responsible for the monthly RA plan and suppliers are responsible for planned outage replacement	Eliminates the dual replacement processes. This provides incentives for suppliers to report planned outages to the ISO as soon as possible.
	Eliminates the issue with multiple LSEs having replacement responsibility for a single outage and therefore simplifies the process.
	Eliminates the stakeholder concerns regarding confidentiality of the supplier having to notify the LSE when the resource is taking a planned outage.
Forecast used to assign any needed planned outage substitute capacity consistent throughout month	Reduces incentives for suppliers to work separately with the outage management office to determine replacement obligations
Penalties for planned and forced outages aligned at $3.5/kW-month	Reduces risks related to outages moving around and reduces contract complexity as all outages that needed to have substitute capacity provided and didn't, whether forced or planned, will be treated the same.
Release RA capacity associated with an outage if the outage moves	Reduces additional RA capacity during periods when the ISO no longer needs the capacity for reliability, which reduces the suppliers' availability incentive mechanism risk.
Separation of system and local showing in order to allow system resources to provide forced outage substitute capacity for local resources not specifically shown as local	Reduces the potential that a local resource not needed to fulfill local requirement is penalized under the availability incentive mechanism due to inability for supplier to find a local substitute.

The ISO proposes a new timeline and rules for the planned outage replacement and these are described in section 10.3.2 through section 10.2.7. The ISO believes that these rule changes as a package will enable the ISO and market participants to simplify and enhance the planning process without risking grid reliability.

10.3.1. Monthly RA timeline changes

The ISO proposes to change the ISO's monthly RA process timeline. Figure 15 in Appendix C illustrates the ISO's proposed new monthly RA process and associated rule changes. This proposal attempts to streamline the monthly process by removing any complexity that was unnecessary to maintain the safety and reliability of the grid in real-time.

The proposed monthly RA process would begin at T-45, which is the same timeframe as the current monthly RA process. However, because the ISO is proposing to separate the daily outage assessment from the monthly RA validation and CPM process, the ISO proposes to decrease the time between when monthly LSE plans and supply plans are due, and the cure period and the CPM process. As shown in Figure 15 this process will now entirely take place between T-45 and T-25. Because most of the ISO's monthly processes are automated and market participants will not long have to address outages during this time period, the ISO believes the somewhat reduced cure and CPM period are feasible. The timeline reflects a balance between giving market participants enough time during the monthly cure period and not extending the process so long in time it reduces the time allowed to cure daily replacement deficiencies during the outage assessment process.

10.3.2. Separation of LSE and supplier responsibility

The ISO proposes that from T-45 to T-25 the ISO solely conducts the monthly RA and supply plan validation and CPM process. LSEs will be fully responsible for their monthly RA plan, and suppliers will be responsible for all necessary replacement. This should reduce the general complexity both the ISO and market participants face each month, reduce contract complexity, and reduce the potential for over-procurement.

Complexity will be reduced for the ISO and market participants because this will allow the ISO to have one streamlined process for monthly RA and outage replacement. Figure 15 in Appendix C illustrates this new process where the obligation for replacement is solely on the supplier. This change allows the ISO to first to work with LSEs on monthly RA plans and complete this process before working with suppliers. The ISO is then completely done with the LSE by T – 25 and only has to work with the supplier on any replacement, rather than having to work with both LSEs and suppliers throughout the month on replacement.

Contract complexity is also reduced by separating the LSE and suppliers roles. The ISO will now have the same penalties, provisions, and obligations no matter when the planned outage is reported. If the ISO asks for planned outage substitute capacity, it will always ask the supplier and the penalty will always be either cancelling the planned outage or the availability incentive mechanism penalty.

Finally, over-procurement is reduced in this rule because the ISO will no longer have the potential to ask for replacement capacity on a single day and then ask for more capacity in the monthly timeframe. Recall this was a result of the replacement requirement being assigned prior to the monthly RA process being completed. Separating the roles allows the monthly RA

process to be fully completed prior to the outage impact assessment and assignment of planned substitute (replacement) capacity.

In order to implement separation of LSE and supplier responsibility the ISO proposes the following:

- Change the monthly RA process timeline where the formal cure period and CPM event procedure is moved up to occur prior to T-25.
- Create a rule that prohibits an LSE from showing a resource if it has reported a planned outage for the entire month reported to the ISO prior to T-45 (ISO will validate during RA plan submittal).
- Change the responsibility for outages prior to T-45. Previously LSEs were responsible for these outages, but now the ISO proposes to make the supplier responsible for all outages, even ones reported prior to T-45.
- Change outage report and assignment process. The ISO proposes to run the outage impact report and assign planned substitute capacity to suppliers without taking LSEs into account. Outages will be stacked first in, last out and be required to replace until the system is no longer short. There will be no consideration for whether the LSE that contracted or owns the resource is individually short or long. This is because all LSE RA plans will be finalized prior to the outage impact report and there is no possibility to being short on the monthly plan.

10.3.3. Consistent forecast used to assign any needed planned outage substitute capacity

The ISO proposes to move the outage impact assessment up to T-25 and determine at that point which planned outages can only move forward if the ISO receives planned substitute capacity. Because the ISO has moved this timeline and assessment from T-45 to T-25, it may make sense for the ISO to evaluate the possibility of using its own more current forecast of the RA month using recent market conditions, rather than continue to reply on the CEC 1 in 10 forecast. This would potentially reduce the amount of planned outage substitute capacity assigned to suppliers. This also has the advantage of removing the incentive for resources to wait until the last minute to report their planned outages as all outages would be assessed against a consistent system condition outlook. All planned outages that come into the ISO will be assessed using this forecast and therefore be consistently asked to provide planned outage substitute capacity regardless of the reporting time. The ISO therefore proposes:

- Explore the possibility of developing a transparent month-ahead peak load forecast and create rules surrounding its use.
- A rule allowing the ISO to only ask for planned outage substitute capacity up to requirement for planned outage substitute capacity using the CEC forecast used to create the monthly requirement. This is because the ISO will not request more planned

substitute capacity than needed to fulfill the monthly RA requirement on any individual day based on the transparent peak load forecast.

10.3.4. Penalties for planned and forced outages aligned

Currently planned outages may or may not risk triggering a CPM event depending whether they were reported to the ISO before or after T – 45. The ISO proposes to remove the language allowing the monthly CPM to be used in the event the ISO requires additional capacity for a planned outage.[23] Instead the ISO will rely on the ability to cancel or deny planned outages and subject planned outages that were supposed to provide planned substitute capacity, but did not, to the availability incentive mechanism. The ISO specifically proposes:

- To remove the tariff language allowing the ISO to use the monthly CPM for planned outage deficiencies.
- To add to the availability incentive mechanism that any capacity on planned outage that that did not have the required planned outage substitute capacity will be fully subject to the availability incentive mechanism.

The ISO already has the ability to cancel or deny planned outages for reliability reasons and so the ISO does not propose any additional rules at this time.

10.3.5. Release of planned outage substitute capacity as RA capacity in the event an outage moves

The ISO proposes that planned outage substitute capacity can be released from RA capacity obligations in the event an outage moves. Scheduling coordinators can move up to quantity of outage that moved. This will allow suppliers to reduce their availability incentive mechanism risk when their capacity is no longer needed as planned outage substitute capacity on a day.

10.3.6. Separation of system and local showing in order to allow system resources to provide forced outage substitute capacity for local resources not specifically shown as local

The ISO proposes for LSEs to specifically indicate on their month-ahead showing whether a resource is being shown to satisfy a local or system requirement. The ISO will then track the status of resource through the month and in the event it goes on outage, the ISO will allow the capacity to be substituted under the rules governing the shown resource type, and not the actual resource type. This will allow suppliers to substitute local capacity with system capacity if the capacity was not shown as local under the monthly RA plan. This also reduces leaning between LSEs in the initial monthly RA process.

[23] The ISO will still be able to use the significant event and exceptional dispatch CPM as needed.

11. Next Steps

The ISO will discuss this paper at an in-person meeting at the ISO on Monday, August 18th. Comments are due to RSA@caiso.com on Friday, September 5th.

12. Appendix A

Figure 12: Summary of Bidding Requirements for Resources Providing RA Capacity[24]

Resource Type	Bidding Requirements			
	IFM	**RUC**	**RTM**	**ISO Inserts Required Bids**
Generating Units Including Pseudo Ties (other than Use-Limited Resources)	Economic Bids or Self-Schedules are to be submitted for all RA Capacity for all hours of the month the resource is physically available (ISO Tariff 40.6.1).	$0/MW RUC Availability Bids are to be submitted for all RA Capacity for all hours of the month the resource is physically available (ISO Tariff 40.6.1).	Economic Bids or Self-Schedules are to be submitted for any remaining RA Capacity from resources scheduled in IFM or RUC. Economic Bids or Self-Schedules are to be submitted for all RA Capacity from Short-Start Units not scheduled in IFM (ISO Tariff 40.6.2, 40.6.3).	Yes (1)
Dynamic, Resource-Specific System Resources (other than Use-Limited Resources)	Same bidding requirement as above (ISO Tariff 40.6.1).	Same bidding requirement as above (ISO Tariff 40.6.1).	Same bidding requirement as above (ISO Tariff 40.6.2, 40.6.3, 40.6.5.1).	Yes (1)
Dynamic, Non-Resource-Specific System Resources	Same bidding requirement as above (ISO Tariff 40.6.1).	Same bidding requirement as above (ISO Tariff 40.6.1).	Same bidding requirement as above (ISO Tariff 40.6.2, 40.6.3, 40.6.5.1).	Yes (1)

[24] Available in the ISO's Reliability Requirements Business Practice Manuals at http://bpmcm.caiso.com/Pages/BPMDetails.aspx?BPM=Reliability%20Requirements.

Resource Type	Bidding Requirements			
	IFM	**RUC**	**RTM**	**ISO Inserts Required Bids**
Non-Dynamic, Resource-Specific System Resources (i.e. unit-specific imports)	Same bidding requirement as above (ISO Tariff 40.6.1).	Same bidding requirement as above (ISO Tariff 40.6.1, 40.6.5).	Economic Bids or Self-Schedules are to be submitted for any remaining RA Capacity from resources scheduled in IFM or RUC. No RTM Bids or Self-Schedules are required for resources not scheduled in IFM or RUC (ISO Tariff 40.6.2, 40.6.3).	Yes (1)
Non-Dynamic , Non-Resource-Specific System Resources (i.e. non-unit-specific imports)	Economic Bids or Self-Schedules are to be submitted for all RA Capacity consistent with inter-temporal constraints such as multi-hour run blocks or contractual limitations (e.g. 6 X 16). (ISO Tariff 40.6.1, 40.6.8.1, 40.8.1.12.2). Economic Bids or Self-Schedules must be submitted under the Resource ID registered as an RA Resource on RA Supply Plan.	Same bidding requirement as above. (ISO Tariff 40.6.1, 40.6.5). RUC Availability Bids must be submitted under the Resource ID registered as an RA Resource on RA Supply Plan.	Economic Bids or Self-Schedules are to be submitted for any remaining RA Capacity from resources scheduled in IFM or RUC. No RTM Bids or Self-Schedules are required for resources not scheduled in IFM or RUC (ISO Tariff 40.6.2, 40.6.3).	Yes (1)
Non-Hydro and Dispatchable Use-Limited Resources	Economic Bids or Self-Schedules are to be submitted for all RA Capacity for all hours unit is capable of operating consistent with the use-limitations described in unit's Use-	$0/MW RUC Availability Bids are to be submitted for all RA capacity for all hours unit is capable of operating consistent with the use-limitations described in unit's Use-Plan. RA Capacity from	Economic Bids or Self-Schedules are to be submitted for any remaining RA Capacity from resources scheduled in IFM or RUC, consistent with the use-limitations	No (2)

Resource Type	Bidding Requirements			
	IFM	**RUC**	**RTM**	**ISO Inserts Required Bids**
	Plan. RA Capacity from Eligible Intermittent Resources is not required to be offered into the DAM. (ISO Tariff 40.6.4.3.1, 40.6.4.3.4).	Eligible Intermittent Resources is not required to be offered into the DAM. (ISO Tariff 40.6.4.3.1).	described in unit's Use-Plan. Energy Bids or Self-Schedules are to be submitted for all RA Capacity from Short-Start Units not scheduled in IFM, consistent with the use-limitations described in unit's Use-Plan (ISO Tariff 40.6.2, 40.6.3, 40.6.4.3.1).	
Hydro, Pumping Load, and Non-Dispatchable Use-Limited Resources	Economic Bids or Self-Schedules are to be submitted for RA Capacity that the market participant expects to be available Plan (ISO Tariff 40.6.4.3.2).	No RUC Availability Bids required (ISO Tariff 40.6.4.3.2).	Economic Bids or Self-Schedules are to be submitted for RA Capacity that the market participant expects to be available (ISO Tariff 40.6.4.3.2).	No (2)

Notes in table:

(1) ISO will insert economic bids and residual unit commitment (RUC) availability bids into DAM and RTM if required amounts of RA capacity are not offered into these markets.

(2) ISO will not insert bids for these resources when required amounts of RA capacity are not offered into the respective markets. An exception is that the ISO will insert economic bids into the IFM and/or RTM when there is a RUC availability bid or RUC schedule for a resource without a corresponding economic bid or self-schedule.

13. Appendix B

The ISO believes that assessing flexible RA and system RA availability separately would decrease the incentive for resources to provide economic bids for overlapping capacity. In order to not impose a double penalty on a resource for a single outage and still assess flexible and system RA separately, the ISO would have to have come up with prices that incent resources enough to comply with both requirements independently, yet do not double penalize capacity for a single outage. This is because the availability incentive mechanism applies to capacity that is solely system RA, solely flexible RA, or both flexible and system RA.

Under the construct where a MW can be shown as only flexible RA or only system RA, or as both system and flexible RA it may be infeasible to have separate prices for flexible RA and system RA without negative consequences. Under the two price system, either the ISO undervalues flexibility availability or double penalizes a resource that is shown as both flexible and system RA. This is because capacity has to cover its underlying going forward fixed costs regardless of whether it is shown as flexible and system RA. Therefore, there is no adder price to system RA that would appropriately incent capacity shown as only flexible RA to be available.

A simple example illustrates this point: Assume a resource's NQC = EFC = 100 MW and it must recover $3.5/kW- month. It believes that providing flexible RA will have a $.5/kW-month adder. The resource then would sell its capacity for either $3.5/kW-month as system RA or $4.0/kW-month as flexible and system RA, or $4.0/kW-month as flexible only RA. There is no difference in cost to the resource to provide system and flexible RA or flexible only RA. The resource can be shown to the ISO in three ways. However, in all cases in order to incent the resource to be available, the ISO has to have a price that is a significant enough proportion of the resources payments.

If the incentive prices were (as some participants have suggested) a system price and then "adder" flexible price, the incentive to be flexible would be small at best and non-existent at worst. For example, assume an availability price of $3.5/kW-month for system RA and $.5/kW-month for flexible RA. The following would then occur:

- If the resource was shown as flexible RA only, the ISO would only incent it by penalizing or paying it $.5/kW-month. This is only 1/4th of its capacity payment and far smaller than the resources RA payment of $4/kW-month, which undervalues flexible capacity.
- If the resource is shown as flexible and system RA and self-schedules for large portions of the month, the resource could end up being paid under the incentive mechanism for being fully compliant with the system obligation at up to $7/kW- month (twice the system price) and only end up being penalized $. 5/kW-month for sometimes not fulfilling the flexible obligation. This also undervalues the flexible RA portion of the resource and undermines the availability incentive mechanism for flexibility.

If the ISO therefore made both the flexible and system RA price equal at $3.5/kW-month, the ISO would end up over-penalizing resources on outage. For example, the following would occur:

- If the resource was shown as flexible and system RA and went on outage, the ISO would penalize the resource by charging it $7/kW-month. This is now overly punitive to the resource.

Therefore the ISO proposes to assess a single MW at a single price under a single availability metric as described in section 6.

The main counter argument to this proposal is that a single price financially penalizes capacity that is shown as flexible and system RA even if the capacity fulfills the system RA must-offer criteria in an hour and self-schedules. The ISO agrees that this mechanism does financially penalize the resource and believes this is the appropriate outcome. The ISO has determined that a subset of the system requirement must be met by flexible capacity. The ISO did not increase the system requirement. Therefore, if capacity is shown as both flexible and system RA, the ISO is counting on that MW to meet the flexible must-offer requirements. If that MW cannot meet the flexible must-offer requirements in those hours, it may actually make the system worse off by self-scheduling because this will increase the slope of the ISO's net load curve. The ISO does not believe that capacity that has committed to provide flexible RA and then makes the grid harder to manage should be rewarded under the incentive mechanism.

14. Appendix C

Figure 13: Current Resource Adequacy monthly process

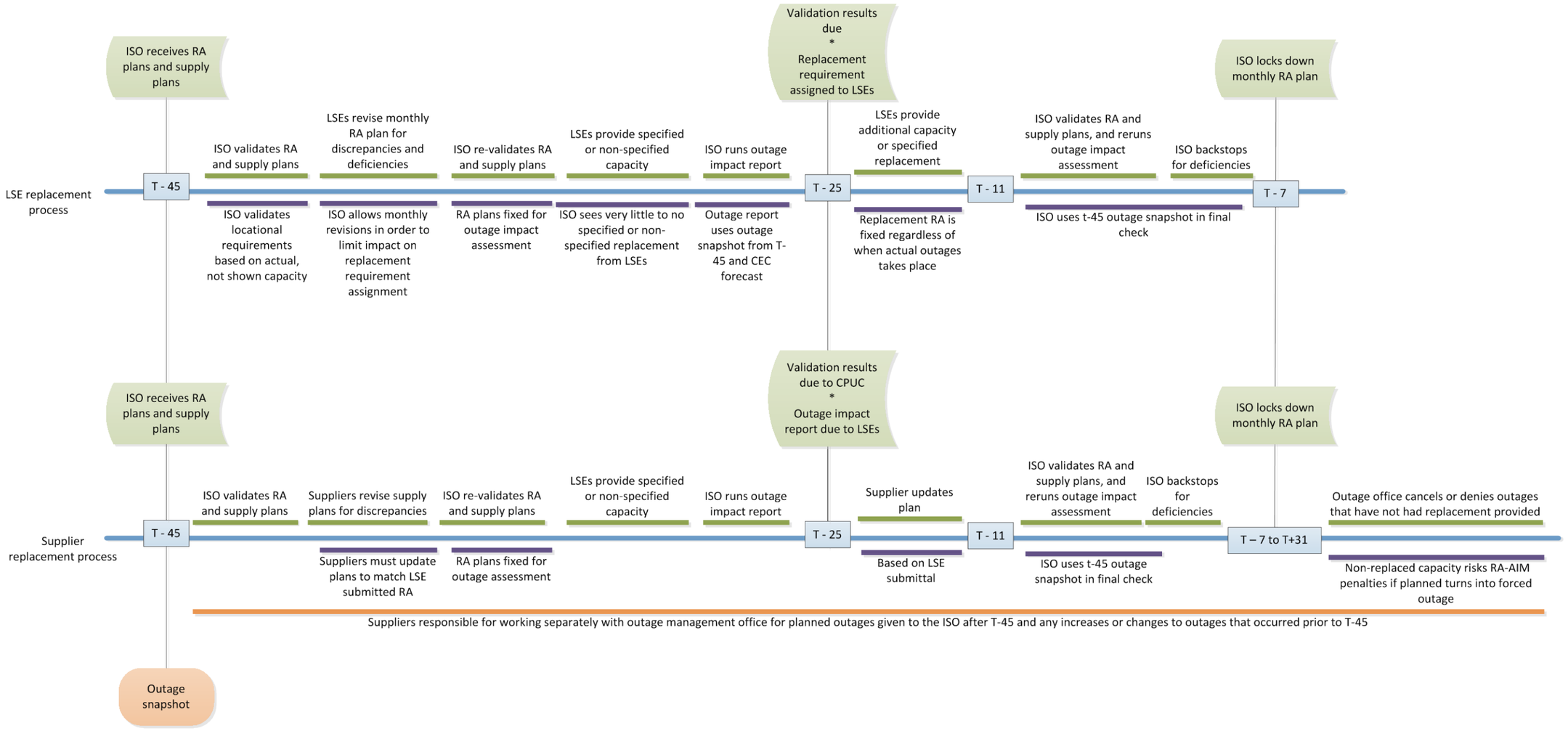


Figure 14: Current Resource Adequacy monthly process with issue boxes

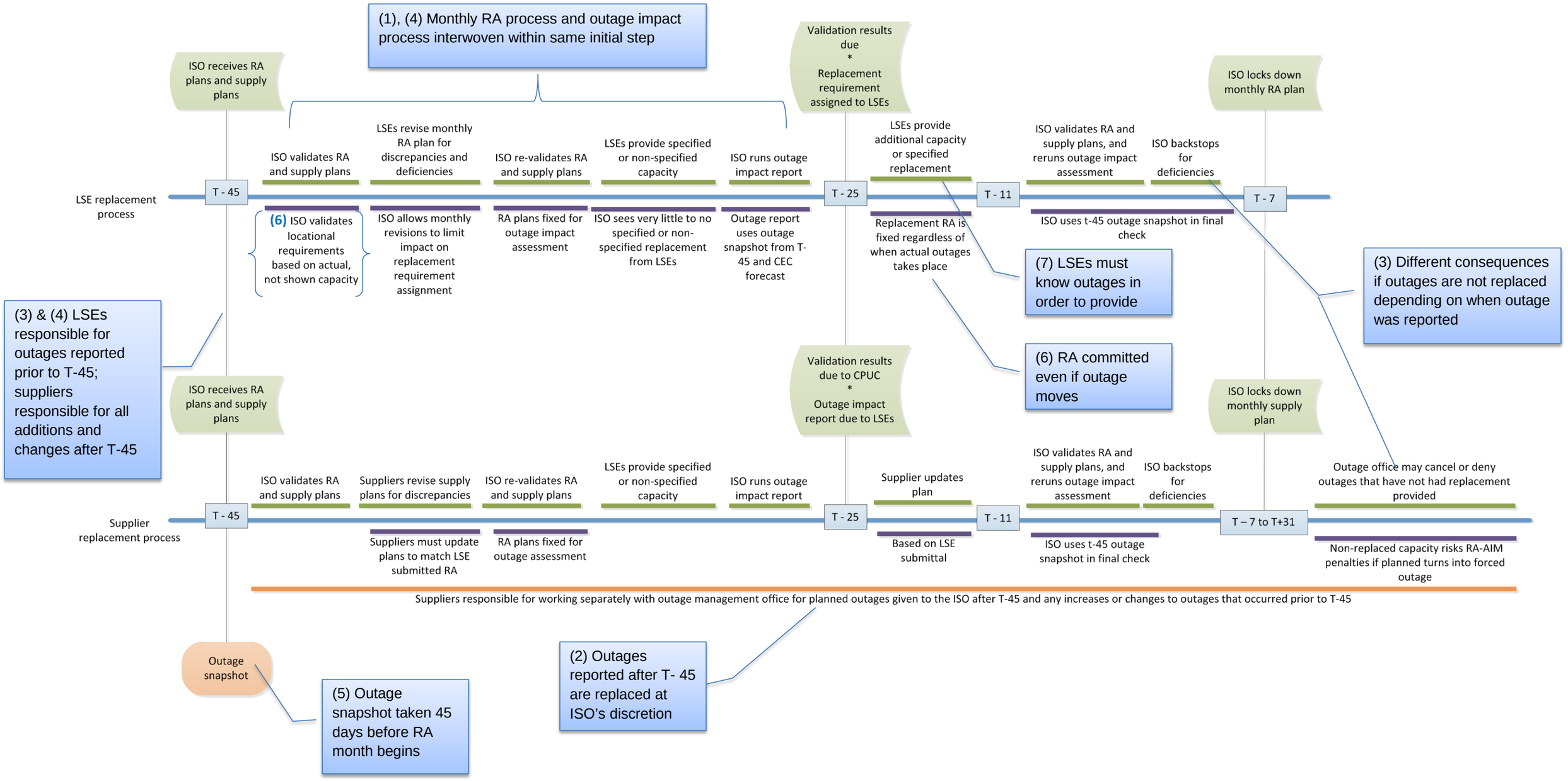


Figure 15: Proposed Resource Adequacy monthly process for 2017 RA year