



California Independent System  
Operator Corporation

May 29, 2015

The Honorable Kimberly D. Bose  
Secretary  
Federal Energy Regulatory Commission  
888 First Street, NE  
Washington, DC 20426

**Re: California Independent System Operator Corporation  
Docket No. ER15- \_\_\_ -000**

**Tariff Amendment to Implement Phase 1A of Reliability  
Services Initiative**

Dear Secretary Bose:

The California Independent System Operator Corporation (“CAISO”) submits this amendment to its tariff to implement Phase 1A of the CAISO’s two-phase reliability services initiative.<sup>1</sup> Phase 1A of the initiative focuses on enhancing and streamlining the CAISO’s rules and processes regarding resource adequacy to meet the needs of an increasingly dynamic power grid. This filing includes, among other revisions, proposed tariff provisions to (1) enhance the existing tariff criteria for determining default qualifying capacity values of specified types of resource adequacy resources; (2) enhance the existing tariff provisions regarding the must-offer obligations of specified types of resource adequacy resources; (3) include a methodology for allocating flexible capacity need to a load-following metered subsystem that is a load-serving entity under the resource adequacy program; and (4) add to the tariff a new resource adequacy availability incentive mechanism (“RAAIM”) that will replace the existing standard capacity product mechanism.

The CAISO requests that the Commission issue an order by September 21, 2015 accepting the tariff revisions contained in this filing effective as of March 1, 2016; except for the tariff revisions requiring load-following metered subsystem load-serving entities to submit resource adequacy plans, for which the CAISO requests an effective date of January 10, 2016. The CAISO also requests a

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<sup>1</sup> The CAISO submits this filing pursuant to section 205 of the Federal Power Act, 16 U.S.C. § 824d.

waiver of Section 35.3 of the Commission's regulations, 18 C.F.R. §35.3, to allow the proposed tariff provisions to go into effect more than 120 days after the date of this tariff amendment filing.

## **I. EXECUTIVE SUMMARY**

The reliability services initiative is a two-phase, multi-year effort to enhance the CAISO's rules and processes regarding resource adequacy resources to address the rapidly transforming energy industry in the western United States.<sup>2</sup> Unprecedented changes to the bulk power system, resulting mostly from the considerable and growing amount of renewable energy resources and other emerging technologies, have significantly altered, and will continue to alter, the CAISO's operational needs. The CAISO is not proposing a wholesale redesign of the resource adequacy tariff provisions and processes. The existing resource adequacy framework has developed and evolved over several years in collaboration with the California Public Utilities Commission ("CPUC") and other local regulatory authorities. The reliability services initiative builds on this foundation.

On October 16, 2014, the Commission accepted tariff provisions proposed by the CAISO to establish must-offer obligations and other requirements for flexible resource adequacy capacity and to enable the CAISO, under its capacity procurement mechanism, to undertake backstop procurement of flexible resource adequacy capacity in the event of a cumulative deficiency.<sup>3</sup> The CAISO proposed and implemented these tariff revisions regarding flexible resource adequacy capacity to accommodate the increasing amount of variable energy resources on the CAISO grid.

Although beneficial, the existing resource adequacy products alone are not enough to ensure grid reliability throughout this period of transformation. The CAISO and its stakeholders have identified gaps in the current resource adequacy framework for determining the default eligibility criteria and must-offer

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<sup>2</sup> The CAISO has divided Phase I of the reliability services initiative into two separate sub-phases that will correspond to two separate tariff amendment filings with the Commission. The instant tariff amendment filing constitutes Phase 1A and involves tariff revisions that will go into effect in 2016. The Phase 1B tariff amendments pertain to updated planned outage requirements and will be filed at a later date for implementation in 2017. The CAISO Governing Board has already approved the Phase 1B tariff amendments. The CAISO will commence the Phase 2 stakeholder process later this year. Phase 2 will seek to enhance flexible resource adequacy requirements and create rules for planned outages of flexible capacity resources within the proposed Phase 1B streamlined paradigm.

<sup>3</sup> *Cal. Indep. Sys. Operator Corp.*, 149 FERC ¶ 61,042 (2014) ("FRACMOO Order").

obligations for preferred resources, as well as gaps in the flexible resource adequacy capacity requirement for load-following metered subsystem load-serving entities. The reliability services initiative addresses these gaps. The current performance standards incent local and system resource adequacy capacity to be available and to replace resource adequacy capacity on a planned outage, if necessary for reliability during the planned-outage term, but the performance standards and outage rules were not designed to accommodate the proliferation of new technologies or the new flexible resource adequacy requirements. Tariff modifications are necessary to fully integrate flexible resource adequacy capacity and other technology types into the energy market and streamline processes.

The reliability services initiative augments the resource adequacy framework to ensure that sufficient resources with the right capabilities are available and offered into the CAISO markets to meet local, system, and flexible resource adequacy capacity requirements. This tariff amendment implements only Phase 1A of the reliability services initiative. The CAISO proposes the Phase 1A tariff revisions to –

- Enhance the existing tariff criteria for determining default qualifying capacity values (*i.e.*, the values used to determine the maximum resource adequacy capacity that a resource adequacy resource may be eligible to provide) for proxy demand resources and add tariff criteria for determining such values for distributed energy resources and non-generator resources. These tariff revisions will facilitate the use of a more diverse set of resource types to provide resource adequacy capacity as newer technologies develop.
- Clarify the existing tariff provisions regarding the resource adequacy must-offer obligations for proxy demand resources, add must-offer provisions for distributed energy resources and non-generator resources, and revise existing tariff provisions to accommodate the updated definition of a use-limited resource that the CAISO will file for Commission acceptance in another proceeding in June 2015. The CAISO believes the current must-offer rules must be improved by applying them in a more standardized manner and making them more universally accessible, across all resource types.
- Include a methodology for allocating flexible capacity needs to a load-following metered subsystem that is a load-serving entity under the resource adequacy program. This change will eliminate the current potential for a load-following metered subsystem to “lean” on other load-serving entities to provide the flexible capacity needed to address the variability of its resources.

- Implement a new bid-based resource adequacy availability incentive mechanism (RAAIM) that will replace the existing capacity-based standard capacity product mechanism and create incentives for resource adequacy resources to participate in the CAISO market consistent with the type of resource adequacy capacity they are providing. The RAAIM will assess whether scheduling coordinators are offering local, system, and flexible resource adequacy resources into the CAISO market consistent with their must-offer obligations. The RAAIM will then compare how each resource adequacy resource was required to bid into the energy market under its resource adequacy obligation with how the resource actually bid into the energy market, and assess a non-availability charge or make an availability incentive payment to the resource adequacy resource based on that comparison. This RAAIM framework will be adaptable to future flexible resource adequacy requirements and provide a foundation to assess use-limited and preferred resources equitably as compared with other types of resources.
- Implement consistent treatment of forced outages and end the automatic exemption of maintenance outage requests made four to seven days ahead of the start of forced outages from the availability incentive mechanism.
- Eliminate the category of modified reserve load-serving entity, because this category has never been used, and there is no indication that it will ever be used.
- Make miscellaneous clarifications and minor corrections.

In Phase 1B of the reliability services initiative, the CAISO will propose updated tariff provisions related to planned outage rules for system resources in advance of Phase 2. Phase 2 of the reliability services initiative will build upon the changes proposed in this tariff amendment and in both parts of Phase 1. The CAISO expects to commence Phase 2 of the initiative in mid-2015 and will file further tariff revisions following its conclusion.

## II. BACKGROUND

### A. Overview of CAISO Resource Adequacy Provisions

The CAISO works collaboratively with the CPUC and other local regulatory authorities to develop procurement requirements to ensure that the capacity procured by their respective load-serving entities is adequate to meet the CAISO's operational needs and maintain grid reliability. The resource adequacy program requires that load-serving entities procure resource capacity to meet their forecasted load, plus a reserve margin, local area capacity needs, and flexible resource adequacy requirements.

Under existing tariff provisions, each scheduling coordinator for a load-serving entity with demand in the CAISO balancing authority area must demonstrate that it satisfies the resource adequacy provisions set forth in section 40 of the CAISO tariff, either as (1) a reserve sharing load-serving entity, (2) a modified reserve sharing load-serving entity, or (3) a load-following metered subsystem.<sup>4</sup> If a local regulatory authority has not adopted explicit resource adequacy provisions, the tariff applies default provisions to scheduling coordinators for those load-serving entities. For example, if a local regulatory authority has not developed provisions for determining the amount of capacity of a particular resource type that qualifies for the resource adequacy program, the CAISO determines a default qualifying capacity value for the resource.<sup>5</sup>

Pursuant to the CAISO tariff, scheduling coordinators for load-serving entities must submit year-ahead and month-ahead resource adequacy plans to the CAISO to demonstrate that they will comply with their resource adequacy requirements for that reporting period.<sup>6</sup> Scheduling coordinators for the resources that will provide resource adequacy capacity must also submit year-ahead and monthly supply plans to the CAISO that verify their commitment to provide the listed resource adequacy capacity.<sup>7</sup> The CAISO validates the resource adequacy plans and supply plans to ensure compliance with the resource adequacy requirements.<sup>8</sup> Resources designated to meet local and

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<sup>4</sup> Existing tariff section 40.1.1. For the sake of clarity, this transmittal letter distinguishes between existing tariff provisions (*i.e.*, provisions in the current CAISO tariff), new or proposed tariff provisions (*i.e.*, new provisions that the CAISO proposes to add to the tariff in this filing), and revised tariff provisions (*i.e.*, tariff provisions that the CAISO proposes to revise in this filing).

<sup>5</sup> Existing tariff section 40.8.

<sup>6</sup> Existing tariff sections 40.2.2.4, 40.2.3.4.

<sup>7</sup> Existing tariff section 40.4.7.1

system (*i.e.*, non-flexible) resource adequacy requirements have must-offer obligations to make their resource adequacy capacity available to the CAISO markets through economic bids or self-schedules.<sup>9</sup>

The tariff also includes a flexible capacity resource adequacy requirement to ensure there is adequate flexible resource adequacy capacity to effectively integrate renewable resources in the CAISO balancing authority area.<sup>10</sup> A scheduling coordinator for a resource supplying flexible resource adequacy capacity must submit economic bids for energy for the full amount of the resource's flexible resource adequacy capacity.<sup>11</sup>

The current tariff contains three mechanisms to ensure there is sufficient resource adequacy capacity available in the event of an outage. One mechanism applies to maintenance (*i.e.*, planned) outages at resources providing resource adequacy capacity and addresses the circumstances in which replacement capacity is needed for the capacity on outage. The second mechanism applies to forced outages at resources providing resource adequacy and allows the resource to provide substitute capacity for the resource adequacy capacity on outage.<sup>12</sup>

The third tariff mechanism, the CAISO's standard capacity product mechanism, establishes standards for measuring the availability of resource adequacy capacity for most resources, provides for the assessment of non-availability charges for resources that fall short of the standards, and then distributes those funds as availability incentive payments to resources that exceed their availability targets.<sup>13</sup> More specifically, the standard capacity product mechanism uses a three-step assessment process:

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<sup>8</sup> Existing tariff sections 40.4.7.3, 40.7.

<sup>9</sup> Existing tariff sections 40.5, 40.6.

<sup>10</sup> Existing tariff section 40.10. The tariff defines flexible capacity as the capacity of a resource that is operationally able to respond to dispatch instructions to manage variations in load and variable energy resource output. Tariff appendix A, existing definition of "Flexible Capacity". The tariff defines flexible resource adequacy capacity as the flexible capacity of a resource listed on a load-serving entity flexible resource adequacy capacity plan and a resource flexible resource adequacy capacity plan. Tariff appendix A, existing definition of "Flexible RA Capacity".

<sup>11</sup> Existing tariff section 40.10.6.1(a). Existing tariff sections 40.10.6.1(e)-(h) set forth limited exceptions to the general must-offer obligation for flexible resource adequacy capacity.

<sup>12</sup> Existing tariff section 9.3.1.3; tariff appendix A, existing definitions of "RA Replacement Capacity," "Maintenance Outage," "RA Substitute Capacity," and "Forced Outage."

<sup>13</sup> Existing tariff section 40.9.

- (1) Each month, the mechanism assesses the availability of resource adequacy capacity during five consecutive peak hours of each day that is not a weekend day or a federal holiday. The CAISO then translates the availability of capacity during these availability assessment hours into a resource-specific monthly availability percentage. In this context, availability means capacity not on a forced outage or affected by a de-rate. The availability calculation counts the resource on outage as available to the extent that it provides substitute capacity.<sup>14</sup>
- (2) The CAISO compares resource availability during the availability assessment hours established under the first step with the target monthly percentage. The target is a variable monthly percentage based on all resource adequacy resources' average historical availability during that month for the past three years. A resource with an availability percentage that is more than 2.5 percent above the variable monthly average is eligible for an availability incentive payment, and a resource with an availability percentage that is less than 2.5 percent below the variable monthly average is subject to a non-availability charge.<sup>15</sup>
- (3) The CAISO calculates each resource's non-availability charge by multiplying the results of the calculation in step two by the availability price, *i.e.*, the current capacity procurement mechanism price of \$5.90 per kilowatt (kW)-month (\$70.88 per kW-year), which will expire on February 16, 2016.<sup>16</sup> The availability incentive payments are paid from the pool of the non-availability charges in the same month and are capped per megawatt (MW) at three times the non-availability charge.

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<sup>14</sup> Existing tariff sections 40.9.3, 40.9.4.

<sup>15</sup> Existing tariff sections 40.9.4, 40.9.6.

<sup>16</sup> Existing tariff sections 40.9.6, 43.7.1; existing tariff appendix F, schedule 6. The CAISO may procure backstop capacity through its capacity procurement mechanism if load-serving entities do not fulfill their resource adequacy obligations or there is a collective deficiency in a local capacity area. Existing tariff section 43.2.1. The CAISO allocates the costs of such procurement to the deficient load-serving entities or to the load-serving entities in the deficient local capacity area. Existing tariff section 43.8.

Specified types of resources, contracts, and outages are exempt from the standard capacity product mechanism.<sup>17</sup>

## **B. Reasons for the Reliability Services Initiative**

California's leadership in advancing climate change policies is driving an unprecedented transformation of the bulk electric system resulting from the significant and increasing amount of variable energy resources and new resource types that are producing and delivering energy onto the grid and participating in the CAISO markets. Enabling this transformation requires changes to the existing policy framework for resource adequacy to ensure it aligns with the CAISO's operational needs. Although the current reliability framework has provided for reliable operation of the grid, the CAISO recognized that there are gaps in this framework that must be remedied in order to address the rapidly changing reliability needs and new resource types.

First, the CAISO determined that it needed to adapt the resource adequacy rules to the new technology types that will be participating in the CAISO's markets and serving as resource adequacy resources. The existing default eligibility criteria, must-offer requirements, and outage rules were not set up to accommodate the significant increase in non-traditional resource adequacy resources, such as distributed energy resources, non-generation resources, and proxy demand resources, nor the emerging need for flexible resource adequacy requirements. Thus, the CAISO needs to enhance, or establish default qualifying capacity minimum eligible criteria applicable to certain resources providing system, local, and flexible resource adequacy capacity. This is necessary to allow a more diverse set of resources to provide resource adequacy capacity, while effectively meeting the grid's reliability needs. Further, the CAISO determined that the must-offer rules should be improved so that they apply in a more standardized, uniformly accessible manner, across all resource types, including use-limited resources, and better align with resource adequacy resources' minimum eligibility criteria.

Second, the CAISO identified a potential for load-following metered subsystem load-serving entities to "lean" on other load-serving entities with respect to flexible capacity. This could occur when a load-following metered subsystem load-serving entity does not have to account for flexible capacity needs from variable energy resources that are not included in the portfolio of resources to serve its load.

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<sup>17</sup> Existing tariff section 40.9.2.

Third, the current standard capacity product incentive mechanism is not easily adaptable to flexible resource adequacy capacity or the increasing amount of non-traditional resource types that are now participating as resource adequacy resources. Also, the standard capacity product only assesses availability based on whether a resource was on a forced outage. This is an overly narrow measurement of resource performance given the need to ensure that the CAISO has sufficient economic bids in the market to operate the grid during hours of significant variable energy resource output. Indeed, under the rules that exist today, certain resources may simply not offer into the energy market, but still count as being fully available.

To reliably manage the grid with large amounts of variable energy resources, it is imperative that resources perform up to their capabilities and expectations. System and local resource adequacy resources have a must-offer obligation to either submit self-schedules or bids, and flexible resource adequacy resources have an obligation to submit economic bids. The current standard capacity product mechanism does not assess the availability of flexible resource adequacy capacity and non-traditional resource adequacy resources (e.g., non-generation resources, distributed energy resources, and proxy demand resources). Thus, the CAISO needs to develop a new availability incentive mechanism to address these gaps, better accommodate non-traditional resources, account for flexible must-offer requirements, and incent necessary and appropriate performance.

Fourth, the CAISO identified several outdated, unnecessary, and unused provisions related to resource adequacy, which should be removed from the tariff.

Fifth, stakeholders requested refinements to the CAISO's outage replacement and substitution rules related to the timing of when additional capacity is required for capacity on outage, the distinction between whether the supplier or the load-serving entity must provide the additional capacity, and the responsibility for availability and procurement risk.<sup>18</sup> There is also stakeholder concern that the integration of flexible resource adequacy capacity into the replacement and substitution rules will significantly increase their complexity.<sup>19</sup>

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<sup>18</sup> Some of these issues are addressed in Phase 1A, while other stakeholder issues are taken up in Phase 1B.

<sup>19</sup> The CAISO will address these issues in its Phase 1B reliability services tariff amendment filing.

The CAISO undertook the reliability services initiative to address these matters and to further evolve the resource adequacy rules to respond to current and expected circumstances. A primary objective of the reliability services initiative is to move toward a more durable framework to ensure that sufficient resources with the right capabilities are available and actually offered into the CAISO markets to meet local, system, and flexible capacity requirements consistent with the CAISO's operational and reliability needs. Also, eligibility requirements and must-offer obligations should reflect the CAISO's reliability needs and be more consistent across resource types, while accounting for individual resource adequacy counting methodologies and obligations. Finally, outage rules should be simple, allow for the efficient and proper procurement of replacement and substitute capacity, not expose market participants to unnecessary availability or procurement risk, and be based on a defined reliability purpose.

**C. Stakeholder Process and Consideration by CAISO Governing Board and Market Monitors**

The resource adequacy provisions provide a solid foundation to ensure adequate available capacity in the CAISO balancing authority area. However, the CAISO and stakeholders have found that certain components of the CAISO tariff provisions regarding resource adequacy require enhancement. To that end, in January 2014, the CAISO established the reliability services initiative, a two-phase, multi-year effort to address the CAISO's rules and processes regarding resource adequacy resources.

The stakeholder process for parts A and B of Phase 1 of the reliability services initiative lasted more than a year. This extensive and robust stakeholder process included the following activities:

- A series of six papers issued by the CAISO;
- The development of draft tariff provisions and revised draft tariff provisions;
- Nine policy development meetings with stakeholders to discuss the CAISO papers and the draft tariff provisions;
- Four working group meetings with stakeholders to address certain issues in the initiative;
- Opportunities at each step of the initiative for stakeholders to submit written comments; and

- Opportunities for stakeholders to comment on the draft tariff language.<sup>20</sup>

The CAISO Governing Board authorized the preparation and filing of this tariff amendment at its March 26-27, 2015 meeting.<sup>21</sup>

The CAISO's Department of Market Monitoring and its Market Surveillance Committee generally support this tariff amendment.<sup>22</sup> Stakeholders generally support, or support with qualifications, the tariff revisions contained in this filing. Certain stakeholders object to specific elements of the proposal. The CAISO addresses specific issues raised by stakeholders in the relevant sections of this transmittal letter.

Phase 1 of the initiative is subdivided for purposes of filing into Phase 1A, which includes the proposed tariff changes discussed below that are targeted for implementation in 2016, and Phase 1B, which includes tariff modifications that will be filed at a later date to implement in 2017.

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<sup>20</sup> Materials relating to this stakeholder process are available on the CAISO website at <http://www.aiso.com/informed/Pages/StakeholderProcesses/ReliabilityServices.aspx>. The materials include the culminating paper the CAISO issued in the stakeholder process, the Reliability Services Addendum to the Draft Final Proposal (February 27, 2015) ("Addendum"), which is provided in attachment C to this filing. The CAISO also provides a list of key dates in the stakeholder process for this tariff amendment in attachment G to this filing.

<sup>21</sup> Materials related to the Board's authorization to prepare and submit this tariff amendment are available on the CAISO website at <http://www.aiso.com/informed/Pages/BoardCommittees/Default.aspx>. The materials include a memorandum to the Board from Keith Casey, Vice President, Market and Infrastructure Development (March 19, 2015) ("Board Memorandum"), which is provided in attachment D to this filing.

<sup>22</sup> See Department of Market Monitoring memorandum to the Board from Eric Hildebrandt, Director, Market Monitoring ("DMM Memorandum") (March 19, 2015); Final Opinion on Reliability Services Phase 1 and Commitment Costs Enhancements Phase 2 issued by the Market Surveillance Committee (March 23, 2015) ("MSC Final Opinion"). These documents are available on the CAISO website at <http://www.aiso.com/informed/Pages/BoardCommittees/Default.aspx> and are provided in attachments E and F, respectively, to this filing.

### III. PROPOSED TARIFF REVISIONS

#### A. Revisions to Default Qualifying Capacity Criteria for Specified Types of Resource Adequacy Resources

The tariff requires a resource to obtain a net qualifying capacity value to qualify as a resource adequacy resource.<sup>23</sup> The CAISO determines the net qualifying capacity based on a resource's deliverable capacity during peak periods using the resource's qualifying capacity value.<sup>24</sup> A local regulatory authority may establish a methodology to determine the qualifying capacity value for resources that their jurisdictional load-serving entities procure. In that circumstance, the CAISO uses this value in the net qualifying capacity determination.

However, a local regulatory authority may choose not to develop qualifying capacity provisions or may adopt provisions for only some specific resource types.<sup>25</sup> In those circumstances, the CAISO applies the criteria set forth in tariff section 40.8 to determine a default qualifying capacity value for the resource. Existing tariff sections 40.8.1.2 through 40.8.1.14 set forth categories of resources and contracts for which the CAISO has established default criteria for the purpose of calculating net qualifying capacity values.

In the reliability services initiative, the CAISO and stakeholders reviewed these tariff categories to determine whether modifications or enhancements were needed to reflect the influx of newer technologies that are delivering energy to the grid and allow a more diverse set of resource types to provide resource adequacy capacity. Based on this review and discussions with stakeholders, the CAISO proposes to revise tariff section 40.8.1 with regard to three categories of newer technologies: proxy demand resources, which section 40.8.1 already addresses; and distributed generation facilities and non-generator resources, which section 40.8.1 does not currently address.

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<sup>23</sup> The tariff defines net qualifying capacity as qualifying capacity reduced, as applicable, based on testing and verification, application of performance criteria, and deliverability restrictions. Tariff appendix A, existing definition of "Net Qualifying Capacity".

<sup>24</sup> See *generally* existing tariff section 40.4.

<sup>25</sup> See existing tariff sections 40.2.1.1(c), 40.4.1.

## **1. Proxy Demand Resources**

The CAISO proposes to revise the default criteria for proxy demand resources set forth in existing tariff section 40.8.1.13. The existing provisions state that a proxy demand resource must be available at least four hours per month in which it is eligible to provide resource adequacy capacity and must be dispatchable for a minimum of 30 minutes per event within that month.

These provisions differ from the current CPUC rules for counting demand resources as resource adequacy resources. Under the CPUC rules, all demand response resources must be available for dispatch no fewer than 24 hours per month, be capable of being dispatched on three consecutive days, and be able to respond for a minimum of four hours per day.<sup>26</sup>

The CAISO's proposes to revise the default criteria for proxy demand resources to be consistent with the CPUC counting rules for demand response resources to receive resource adequacy credit. The CAISO believes these criteria are reasonable and will facilitate the participation of proxy demand resources in the CAISO markets. Further, the CAISO's proposed provisions will provide greater consistency across multiple local regulatory authorities in the CAISO balancing authority area, which will be more likely to ensure resource adequacy. Therefore, the CAISO proposes to revise tariff section 40.8.1.13 to state that, in order to qualify as resource adequacy capacity, a proxy demand resource must have the ability to (i) be dispatched for at least 24 hours per month, (ii) be dispatched on at least three consecutive days, and (iii) respond for at least four hours per dispatch.

## **2. Distributed Generation Facilities**

Currently, for distributed generation facilities to qualify as resource adequacy resources, local regulatory authorities must have criteria to permit such resource adequacy qualification. The CAISO proposes that distributed generation facilities that meet the applicable CAISO tariff requirements addressing the relationship between the CAISO and generators will qualify as resource adequacy capacity.<sup>27</sup> Thus, a distributed energy resource may now

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<sup>26</sup> CPUC 2015 Filing Guide for System, Local and Flexible Resource Adequacy (RA) Compliance Filings (Sept. 9, 2014), available on the CPUC website at [www.cpuc.ca.gov/NR/rdonlyres/.../0/Final2015RAGuide.docx](http://www.cpuc.ca.gov/NR/rdonlyres/.../0/Final2015RAGuide.docx).

<sup>27</sup> New tariff section 40.8.1.15(a).

qualify as a resource adequacy resource using the CAISO's resource classification of the distributed energy resource.

The CAISO recognizes that it is not feasible to establish a single methodology for determining default qualifying capacity values that can apply to all technology types operating as distributed generation facilities. Therefore, in new tariff section 40.8.1.15, the CAISO proposes to determine the net qualifying capacity of each distributed generation facility for each resource adequacy compliance year consistent with similar resource classifications connected to the transmission system, as provided in the tariff provisions addressing deliverability within the CAISO balancing authority area.<sup>28</sup> For example, a solar resource connected to the distribution system will be subject to the same default availability and eligibility criteria for purposes of determining the resource's net qualifying capacity as a solar resource interconnected to the transmission system. This will provide consistent treatment of resources with the same technology.

Further, the scheduling coordinator for individual distributed generation facilities with the same resource type and maximum output (PMax) values less than 0.5 MW that seek to operate as a combined distributed generation facility must submit a request to the CAISO that the initial net qualifying capacity be determined and approved as a combined distributed generation facility.<sup>29</sup>

### **3. Non-Generator Resources**

In new tariff section 40.8.1.16 the CAISO proposes to require a non-generator resource to be a participating generator or a system unit to qualify as resource adequacy capacity, because non-generator resources can perform and be available similar to conventional generation.<sup>30</sup> Non-generator resources should be able to provide availability consistent with conventional thermal resource adequacy resources and the CAISO therefore does not propose lower minimum availability requirements such as a reduced number of hours or days the generation is available. Because the CAISO can optimize a non-generator resource based on the resource's charge and discharge bids, that resource can be available to the CAISO continually.

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<sup>28</sup> New tariff section 40.8.1.15(b). The existing availability and eligibility criteria for different technology types of resources interconnected to the transmission system are set forth in Appendix A to the Addendum.

<sup>29</sup> New tariff section 40.8.1.15(c).

<sup>30</sup> New tariff section 40.8.1.16(a).

In determining the maximum value of the default qualifying capacity for non-generator resources, the CAISO will only recognize the ability of energy storage resources to discharge and provide energy to system under peak load conditions. The tariff already reflects the unique ability of a non-generator resource to charge and discharge in its effective flexible capacity calculation, which the CAISO uses to determine the effective flexible capacity of non-regulation energy management resources based on their entire charge and discharge range.<sup>31</sup> For peak requirements, however, the CAISO proposes to limit the net qualifying capacity of an energy storage resource to the resource's maximum instantaneous discharge capability.<sup>32</sup> For example, a non-generator distributed energy storage resource that could discharge up to 5 MW may not have a net qualifying capacity value greater than 5 MW.

Because non-generator resources can perform and be available similar to conventional generation, the CAISO proposes to use the same default qualifying assessment period and assess the net qualifying capacity of all non-generator resources based on the output the resource can sustain over a four-hour period.<sup>33</sup>

## **B. Revisions to Must-Offer Obligations of Specified Types of Resource Adequacy Resources**

The existing tariff requires scheduling coordinators supplying resource adequacy capacity to make that resource adequacy capacity available to the CAISO, subject to specified conditions and exceptions.<sup>34</sup> In the reliability standards initiative, the CAISO and stakeholders reviewed these tariff provisions and determined that the must-offer obligations of proxy demand resources, distributed generation facilities, and non-generator resources should be clarified and that the current must-offer rules should be enhanced to apply in a more standardized manner across all resource types, including use-limited resources. For example, the existing tariff has no specific must-offer rules for proxy demand resources or non-generator resources, except that use-limited proxy demand resources are exempt from the CAISO's bid insertion rules. The proposed tariff revisions enhance the must-offer rules as described below.

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<sup>31</sup> Existing tariff section 40.10.4.1(d)(1).

<sup>32</sup> New tariff section 40.8.1.16(b).

<sup>33</sup> New tariff section 40.8.1.16(b).

<sup>34</sup> See *generally* existing tariff section 40.6.

## 1. Proxy Demand Resources

The tariff defines a proxy demand resource as a load or aggregation of loads that satisfies applicable tariff requirements and is capable of measurably and verifiably providing demand response services.<sup>35</sup> The existing tariff does not exempt any proxy demand resources from the standard resource adequacy requirements for participation in the residual unit commitment process. Therefore, any proxy demand resource that is a resource adequacy resource and bids into the day-ahead market must also provide that capacity in the residual unit commitment process.<sup>36</sup>

The residual unit commitment process ensures that sufficient capacity is available to meet the CAISO's forecast of CAISO demand.<sup>37</sup> This process is vital to ensure the reliability of the grid. The process compares all day-ahead schedules to the CAISO forecast of CAISO demand, and if the day-ahead market clears less capacity than the CAISO forecast of CAISO demand, then the capacity difference is procured through the residual unit commitment process to ensure sufficient capacity is available in the real-time markets. Resource adequacy resources are required to participate in this process using a zero-dollar residual unit commitment process availability bid.<sup>38</sup> If the resource adequacy capacity is insufficient to meet the CAISO's forecasted demand, then the process will begin committing additional resources and taking non-resource adequacy capacity that has a bid into the process to meet the CAISO forecast of CAISO demand at minimal cost.

As a step toward fully integrating proxy demand resources into the residual unit commitment process, the CAISO proposes to add new tariff section 40.6.4.3.5, which provides that: (a) short-start and medium-start proxy demand resources that provide resource adequacy capacity must submit \$0 per MW residual unit commitment process availability bids for all of their resource adequacy capacity for all hours of the month that the resources are physically available, but any residual unit commitment schedule for these resources, as with any short-start or medium start resource, will not be binding -- it will only be advisory; and (b) long-start proxy demand resources are not required to submit bids or self-schedules in the residual unit commitment process for their resource

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<sup>35</sup> Tariff appendix A, existing definition of "Proxy Demand Resource".

<sup>36</sup> See existing tariff section 40.6.1(5).

<sup>37</sup> See existing tariff section 31.5 and subsections thereunder (setting forth residual unit commitment process).

<sup>38</sup> See existing tariff section 40.6.1(5).

adequacy capacity, but any residual unit commitment schedule for these resources will be binding.<sup>39</sup>

Proxy demand resources do not have physical start-up times. Rather, these resources often have notification times specifying the amount of time necessary to notify their customers prior to curtailment. If a proxy demand resource needs to notify its customers more than five hours in advance, it cannot be started up in real-time and is the equivalent of a long-start thermal resource. If a long-start resource receives a residual unit commitment award, it also receives a binding residual unit commitment dispatch instruction.

In addition to the residual unit commitment bid price, the CAISO process considers minimum load cost and start-up cost. The residual unit commitment process uses these costs to determine whether to issue advisory schedules to short-start and medium-start resources or binding unit commitment schedules to long-start resources. Proxy demand resources typically do not have start-up costs or minimum load costs. This means proxy demand resources will appear to have zero unit commitment cost in the residual unit commitment process because, as explained above, the CAISO submits all resource adequacy capacity into the process at zero dollars. This could result in frequent residual unit commitment awards for proxy demand resources. However, because residual unit commitment awards to long-start resources result in binding dispatch instructions, long-start proxy demand resources will quickly use up the resource's limited number of starts within a month due to frequent, subsequently binding residual unit commitments. In real-time, the proxy demand resource is unlikely to be the economic choice once energy bids are considered. Therefore, if a long-start proxy demand resource were required to submit a bid or self-schedule in the residual unit commitment process for its resource adequacy capacity, the process would deplete the resource's limited dispatches sub-optimally.

In contrast, short-start and medium-start proxy demand resources do not have this same issue. Those proxy demand resources can notify their customers in real-time and therefore will not receive a binding residual unit commitment. Instead, any residual unit commitment schedule for those resources is only advisory. An advisory dispatch is for informational purposes only and

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<sup>39</sup> The tariff defines a long-start unit as a generating unit that requires between five and eighteen hours to start up and synchronize to the grid. Tariff appendix A, existing definition of "Long Start Unit". In contrast, the tariff defines a short-start unit as a generating unit that has a cycle time of less than five hours, has a start-up time less than two hours, and can be fully optimized with respect to this start-up time; the tariff also defines a medium-start unit as a generating unit that requires between two and five hours to start-up and synchronize to the grid. Tariff appendix A, existing definitions of "Short Start Unit" and "Medium Start Unit".

accordingly will not sub-optimally use up proxy demand resource starts. Consequently, the CAISO proposes to maintain the requirement that those resources participate in the residual unit commitment process.

Some stakeholders expressed concern with applying a must-offer obligation for proxy demand resources that are resource adequacy resources in the CAISO's residual unit commitment process. However, there is no compelling reason why short-start and medium-start proxy demand resources that are resource adequacy resources should not have comparable obligations to other resource adequacy resources. The primary argument raised by stakeholders to exempt proxy demand resources from the residual unit commitment process is that participation would result in excessive dispatch instructions. However, the frequency with which a proxy demand resource receives a mere *advisory* dispatch instruction does not provide a sufficient reason to exempt all proxy demand resources from participating in the residual unit commitment process, but it does provide the basis for the CAISO's proposed exemption for long-start proxy demand resources from residual unit commitment participation.

Also, some stakeholders contended that short-start and medium-start proxy demand resources should not be required to participate in the residual unit commitment process because such resources would also receive dispatch instructions. The CAISO believes that all dispatchable resource adequacy resources that can be available in real-time should have an obligation to participate in the residual unit commitment process. Proxy demand resources that are similarly situated to other resource adequacy resources in this regard should not be exempt from this obligation. These resources are selling resource adequacy capacity and should comply with all resource adequacy obligations they are physically able to fulfill. Proxy demand resources that are resource adequacy resources and can respond with less than a five-hour notification time to customers are able to participate in the residual unit commitment process using their existing functionality. However, advisory notifications are not binding dispatches and have no financial or physical impact on the short-start and medium-start proxy demand resource. This allows the CAISO to optimally dispatch short-start and medium-start resources based on real-time market conditions and energy bids, while still allowing the scheduling coordinator an opportunity to notify that load of the dispatch consistent with the required notification time.

Because proxy demand resources are only receiving advisory dispatches, no need exists to exempt these resources from the residual unit commitment. Including them in the residual unit commitment will more efficiently allocate commitments among the resource fleet. The inability to fully, efficiently, and effectively utilize resource adequacy resources that have contracted to support reliable operations consistent with their physical capabilities can cause the

CAISO unnecessarily to incur additional costs to procure services from non-resource adequacy resources that can and should otherwise be provided by resource adequacy resources. This will essentially result in load paying twice – once for the proxy demand resource and again for the resource the CAISO had to procure to provide the service because the proxy demand resource was not available in the residual unit commitment process.

Some stakeholders contend that the CAISO should not exempt long-start proxy demand resources from the residual unit commitment process. As noted above, proxy demand resources that are resource adequacy resources would have zero start-up and minimum load costs and a zero dollar bid for capacity. This, combined with the fact that long-start resources receive binding dispatch instructions if they receive an award from the residual unit commitment, means that a long-start proxy demand resource would potentially use all of its dispatches very early in a month. This exposes the CAISO to potential capacity shortfalls later in the month when the CAISO could have utilized the long-start proxy demand resource to resolve the shortfall. The CAISO's proposed exemption for long-start resources mitigates the potential need for the CAISO to exceptionally dispatch non-resource adequacy resources to fill the void left by suboptimal use of long-start proxy demand resources.

Although proxy demand resources do not have physical start-up times, these resources have notification times indicating the amount of time necessary to notify their customers prior to curtailment. The CAISO's proposal to exempt long-start proxy demand resources, but not short-and medium-start proxy demand resources, from the residual unit commitment process clearly recognizes the importance of this notification time. Long-start proxy demand resources cannot notify their customers of curtailment promptly enough to be started in real-time. The CAISO's proposal will treat similarly situated resources consistently, while still mitigating the potential for unnecessary exceptional dispatches caused by using proxy demand resources sub-optimally. This proposal is consistent with the Commission's stated objective that the CAISO take steps to minimize its use of exceptional dispatches.<sup>40</sup>

## **2. Distributed Generation Facilities**

The tariff defines a distributed generation facility as a generating facility connected to the distribution system of a utility distribution company.<sup>41</sup> The definition does not specify a resource technology type or facility size. The

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<sup>40</sup> *Cal. Indep. Sys. Operator Corp.*, 125 FERC ¶ 61,055, at P 100 (2008).

<sup>41</sup> Tariff appendix A, existing definition of "Distributed Generation Facility".

CAISO proposes to add new tariff section 40.6.1.1(a) to establish a day-ahead must-offer obligation and new section 40.6.2(d) to establish a real-time must-offer obligation for each distributed generation facility based on its use-limited status and technology type.

The CAISO proposes that a distributed generation facility that applies and is approved for use-limited status must comply with the applicable integrated forward market and residual unit commitment bidding requirements for use-limited resources of the same technology type.<sup>42</sup> If the distributed generation resource is not a use-limited resource, it must comply with the integrated forward market and residual unit commitment bidding requirements that apply to the same technology type of resource connected to the CAISO controlled grid.<sup>43</sup> The CAISO proposes that similar must-offer obligations apply in the real-time market. A use-limited distributed generation resource must comply with the real-time must-offer obligations for use-limited resources of the same technology type and distributed generation resources that are not use-limited must comply with the must-offer obligations that apply to the same technology type of resource connected to the CAISO controlled grid.<sup>44</sup>

These provisions fill a gap in the tariff, *i.e.*, lack of a must-offer obligation in the day-ahead and real-time markets for distributed generation facilities that are resource adequacy resources.

### **3. Non-Generator Resources**

The tariff defines a non-generator resource as a resource that operates as either generation or load and that can be dispatched to any operating level within its entire capacity range, but is also constrained by a megawatt-hour (MWh) limit to (1) generate energy, (2) curtail the consumption of energy in the case of demand response, or (3) consume energy.<sup>45</sup> The CAISO proposes to add new tariff sections 40.6.1.1(b) and 40.6.2(e) to establish day-ahead and real-time must-offer obligations for each non-generator resource based on its use-limited status and use of regulation energy management. For the day-ahead market, the CAISO proposes that:

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<sup>42</sup> New tariff section 40.6.1.1(a)(2).

<sup>43</sup> New tariff section 40.6.1.1(a)(1).

<sup>44</sup> New tariff section 40.6.2(d). The CAISO also proposes to split up tariff section 40.6.2 into named subsections to make the organization of the section more clear.

<sup>45</sup> Tariff appendix A, existing definition of "Non-Generator Resources".

- A non-generator resource that is a use-limited resource must comply with the applicable integrated forward market and residual unit commitment bidding requirements for use-limited resources.<sup>46</sup>
- A non-generator resource that uses regulation energy management and is not a use-limited resource must submit economic bids or self-schedules into the integrated forward market for all resource adequacy capacity for regulation for all hours in the month the resource is physically capacity of operating, and must submit \$0 per MW residual unit commitment availability bids for all resource adequacy capacity for all hours of the month the resource is physically capable of operating.<sup>47</sup>
- A non-generator resource that does not use regulation energy management and is not a use-limited resource must submit economic bids or self-schedules into the integrated forward market, and must submit \$0 per MW residual unit commitment availability bids for all resource adequacy capacity, for all hours of the month the resource is physical capable of operating.<sup>48</sup>

For the real-time market, the CAISO proposes to establish comparable real-time must-offer obligations for such resources.<sup>49</sup>

These provisions fill a gap in the tariff, *i.e.*, lack of a must-offer obligation in the day-ahead and real-time markets for non-generator resources that are resource adequacy resources.

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<sup>46</sup> New tariff section 40.6.1.1(b)(3).

<sup>47</sup> New tariff section 40.6.1.1(b)(2). The tariff defines regulation energy management as a market feature for resources located within the CAISO balancing authority area that require energy from the real-time market to offer their full capacity as regulation. Tariff appendix A, existing definition of "Regulation Energy Management".

<sup>48</sup> New tariff section 40.6.1.1(b)(1).

<sup>49</sup> New tariff section 40.6.2(e). In addition, the CAISO proposes to add new tariff sections 40.6.1.1(c) and 40.6.2(f) to include provisions regarding the day-ahead and real-time must-offer obligations for extremely long-start resources. The CAISO also proposes to delete existing tariff section 40.6.1(2), which contains similar provisions regarding those obligations.

#### **4. Revisions to Maintain the Current Treatment of Use-Limited Resources After the Revised Definition of “Use-Limited Capacity” Becomes Effective**

The CAISO will separately file a tariff amendment in June 2015 that, *inter alia*, will change the term “use-limited resource” to “use-limited capacity” and revise the definition of that term. If the Commission accepts that tariff change, some categories of resources that are currently considered use-limited resources will fall outside of the new definition of “use-limited capacity”.<sup>50</sup> In the instant proceeding, the CAISO proposes to revise two tariff sections to permit resources that may not meet the definition of “use-limited capacity” to continue to be treated the same under those tariff sections as they are treated currently as “use-limited resources”.

First, the CAISO proposes to revise tariff section 40.6.4.3.2, which addresses the bidding requirements of hydroelectric generating units, pumping load, reliability demand response resources, and non-dispatchable use-limited resources, to state that such resources, as well as resource adequacy resources providing regulatory must-take capacity, are not required to submit residual unit commitment availability bids for that capacity, but that any residual unit commitment availability bids they do submit must be \$0 per MW.<sup>51</sup> Further, participating load that is pumping load is required to submit economic bids for energy and/or self-provide ancillary services in the day-ahead market for its resource adequacy capacity certified to provide non-spinning reserve ancillary service, and economic bids in the real-time market for its non-spinning reserve capacity that receives an ancillary service award in the day-ahead market.<sup>52</sup>

Second, the CAISO proposes to revise tariff section 40.6.8, which addresses the use of generated bids, to state that the CAISO will not insert a bid in the day-ahead market or real-time market for resource adequacy capacity of a use-limited resource, non-generator resource, variable energy resource, or resource providing regulatory must-take generation unless the resource submits

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<sup>50</sup> The categories of resources that will be inside and outside the definition of new use-limited capacity are discussed at pages 8 to 17 of the Commitment Cost Enhancements Phase Two Draft Final Proposal issued on February 9, 2015. That draft final proposal is available on the CAISO website at: <http://www.caiso.com/informed/Pages/StakeholderProcesses/CommitmentCostEnhancementsPhase2.aspx>.

<sup>51</sup> Revised tariff section 40.6.4.3.2(a)(2). The CAISO also proposes to split up tariff section 40.6.4.3.2 into named subsections to make the organization of the section more clear.

<sup>52</sup> New tariff section 40.6.4.3.2(a)(3).

an energy bid and fails to submit an ancillary service bid.<sup>53</sup> For non-resource specific system resources providing resource adequacy capacity, the CAISO will submit a generated bid in the day-ahead or real-time market in each RAAIM assessment hour to the extent the resource provides resource adequacy capacity subject to the tariff's day-ahead and real-time availability requirements and does not submit an outage request or bid for the entire amount of that resource adequacy capacity.<sup>54</sup>

In Phase 2 of the reliability services initiative, the CAISO may consider whether it should further revise these tariff sections to treat resources that may not meet the definition of "use-limited capacity" differently from how "use-limited resources" are currently treated. However, at this time, the CAISO cannot easily accommodate such revisions. For example, most or all variable energy resources will not meet the definition of "use-limited capacity". Therefore, under the existing tariff provisions regarding generated bids and residual unit commitment, the CAISO must generate a bid price based on cost assumptions for variable energy resources.<sup>55</sup> The CAISO, however, has no cost-based price for these resources or feasible methodology for determining a cost-based price. Accordingly, the CAISO proposes to continue treating variable energy resources the same way they are currently treated.

As another example, a non-use-limited resource typically would be subject to tariff provisions regarding insertion of a generated bid if the resource failed to submit a bid. However, it is difficult to subject non-generator resources to the generated bid provisions. Before such tariff revisions could be made, the CAISO and stakeholders would need to better understand the bidding and operational challenges associated with making non-generator resources subject to generated bids. Such information is necessary to generate a bid for a resource at an operating level within its capacity range that will be operationally feasible. The CAISO will continue to monitor the bidding and operational performance of non-generator resources, including when and for how long they charge and

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<sup>53</sup> The CAISO also proposes to split up tariff section 40.6.8 into named subsections to make the organization of the section more clear. The updated provisions described above are in revised tariff section 40.6.8(e).

<sup>54</sup> New tariff section 40.6.8(f). The CAISO also proposes to delete existing tariff section 40.6.8.1.6, which addresses the circumstances in which the CAISO will submit generated bids for non-resource-specific system resources that provide resource adequacy capacity subject to a subset of hours contract. New tariff section 40.6.8(f) will supersede the language in section 40.6.8.1.6.

<sup>55</sup> Existing tariff section 40.6.8.

discharge, to assess whether there is any need for or viable method to develop generated bids for such resources.

### **C. Proposed Provisions for Load-Following Metered Subsystem Load-Serving Entities**

The CAISO proposes tariff modifications applicable to load-following metered subsystem load-serving entities that will (1) allow the CAISO to allocate a proportionate share of its system flexible capacity needs to a load-following metered subsystem load-serving entity under the resource adequacy program, (2) require a load-following metered subsystem to submit annual and monthly load-serving entity flexible resource adequacy capacity plans and fully cover its allocable share of the system flexible capacity needs,<sup>56</sup> and (3) permit bid cost recovery by the load-following metered subsystems.

#### **1. Allocation of Total System Flexible Capacity Need**

The CAISO has identified a gap in its resource adequacy tariff provisions regarding the allocation of flexible capacity needs to a load-following metered subsystem that is a load-serving entity.<sup>57</sup> The CAISO proposes to address this issue by applying to each load-following metered subsystem a modified version of the existing tariff methodology for calculating a local regulatory authority's allocable share of the total system flexible capacity need.

The CAISO allocates the flexible capacity need to local regulatory authorities based on the sum of three components: (1) the largest three-hour net-load ramp for each month; (2) the higher of the most severe contingency or 3.5 percent of the forecasted peak load for the month; and (3) a forecast adjustment.<sup>58</sup> The CAISO currently uses these same three components to allocate flexible capacity need to load-following metered subsystems.<sup>59</sup>

The CAISO currently calculates the first component as the average of the sum of the jurisdictional load-serving entities' change in load, minus the change

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<sup>56</sup> Existing tariff section 40.10.5.1(a).

<sup>57</sup> The tariff defines flexible capacity need as the megawatts of flexible capacity that the CAISO forecasts will be needed in the next resource adequacy compliance year to reliably operate the CAISO controlled grid. Tariff appendix A, existing definition of "Flexible Capacity Need".

<sup>58</sup> Existing tariff sections 40.10.2, 40.10.2.1.

<sup>59</sup> Existing tariff section 40.10.2.2.

in wind output, minus the change in solar photovoltaic output, minus the change in solar thermal output during the five highest three-hour net-load changes in the month.<sup>60</sup> Under new tariff section 40.10.2.2(a)(1), the CAISO will calculate the first component for a load-following metered subsystem load-serving entity as the local regulatory authority's average percent contribution to the change in wind output, minus the change in solar photovoltaic output, minus the change in solar thermal output, during the five highest three-hour net-load changes in the month for resources not included in the resource portfolio of the load-following metered subsystem a load-serving entity. The proposed equation omits the change-in-load element of the existing equation because resources in the portfolio of a load-following metered subsystem load-serving entity are already required to follow their load. Further, any changes in output from variable energy resources in the portfolio must be balanced using other resources as discussed above.

To calculate the second component under the existing tariff, the CAISO currently determines the higher of the most severe single contingency or 3.5 percent of forecasted peak load for each load-serving entity based on the load-serving entity's peak load ratio share. The CAISO then calculates each local regulatory authority's allocable share of flexible capacity need based on the sum of its jurisdictional load-serving entities' shares.<sup>61</sup> The CAISO designed the second component this way because some resources procured as flexible capacity are also able to provide a portion of the CAISO's contingency reserves, but the CAISO cannot tell in advance the extent to which such overlap may occur. The CAISO uses the second component to ensure that it has access to sufficient flexible capacity to both maintain address flexibility needs and maintain required contingency reserves in a given month.<sup>62</sup>

For similar reasons, the CAISO proposes to use a modified version of this second component to allocate the flexible capacity need to a load-following metered subsystem load-serving entity. If 3.5 percent of the expected peak load is greater than the contribution of the load-following metered subsystem to the three-hour net-load ramp, it will more than compensate for the potential overlap. Therefore, under new tariff section 40.10.2.2(a)(2), the CAISO will calculate the second component as the lesser of the load-following metered subsystem's contribution to the three-hour net-load ramp or 3.5 percent of its forecasted peak load. This modification will ensure that the load-following metered subsystem is

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<sup>60</sup> Existing tariff section 40.10.2.1(a).

<sup>61</sup> Existing tariff section 40.10.2.1(b).

<sup>62</sup> See transmittal letter for tariff amendment to implement flexible capacity requirement, Docket No. ER14-2574-000, at 23-24 (Aug. 1, 2014).

covering any potential overlap between flexible capacity resources and resources used to provide contingency reserves without having the 3.5-percent forecasted peak load drive the flexible capacity requirement.

Also, new tariff section 40.10.2.2(c) provides that if the contribution of the load-following metered subsystem load-serving entity to the three-hour net-load ramp is less than its contribution to the 3.5 percent of forecasted peak load, then the CAISO will not reallocate that difference to other local regulatory authorities to determine whether a cumulative deficiency in flexible resource adequacy capacity exists for purposes of the CAISO's backstop capacity procurement mechanism.

The third component of the calculation under the existing tariff is a forecast adjustment, if one is included in the CAISO's draft study results, which the CAISO will allocate using the same methodology that applies to the second component of the calculation.<sup>63</sup> Under proposed new tariff section 40.10.2.2(a)(3), the CAISO will calculate the third component for a load-following metered subsystem load-serving entity as the allocable share of any forecast adjustment for the load-following metered subsystem pursuant to the tariff section that sets forth the means of determining the flexible capacity need forecast adjustment.

## **2. Submission of Annual and Monthly Flexible Resource Adequacy Capacity Plans**

The existing tariff states that a load-following metered subsystem is not required to submit annual or monthly load-serving entity flexible resource adequacy capacity plans.<sup>64</sup> The CAISO included this provision in its tariff based on the presumption that load-following metered subsystems must manage all of their own variability, including the variability of variable energy resources (*e.g.*, wind and solar resources) in their metered subsystem resource portfolios.

A load-following metered subsystem must serve its load using resources from its identified portfolio of resources. If this portfolio includes variable energy resources, then any increase or decrease in supply from the variable energy resources must be balanced by a corresponding decrease or increase in supply from other resources in the portfolio. However, nothing in the tariff requires a load-following metered subsystem to include its contracted variable energy resources in its portfolio. Consequently, if a load-following metered subsystem

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<sup>63</sup> Existing tariff section 40.10.2.1(c).

<sup>64</sup> Existing tariff section 40.10.5.1(a).

does not include these resources in its portfolio, then it will not be required to use another resource to balance the portfolio. This creates the potential for the load-following metered subsystem to “lean” on other load-serving entities to provide the flexible capacity needed to address the variability of its resources. This potential should be eliminated. Each load-following metered subsystem should fully cover its allocable share of the total system flexible capacity need.

The issue cannot be resolved by the load-following metered subsystem merely submitting or revising its resource portfolio. The tariff requires the scheduling coordinator for a load-following metered subsystem to provide to the CAISO a list of all wind and solar resources owned by or under contract to the load-serving entity as part of the annual study of flexible capacity need.<sup>65</sup> The load-following metered subsystem can, as part of this data submission, designate resources that will be in its resource portfolio. The CAISO will rerun its study of flexible capacity need by May 1 of each year.<sup>66</sup> However, the load-following metered subsystem is not required to provide its resource portfolio to the CAISO until the last business day of October.<sup>67</sup> Therefore, it is possible that wind and solar resources listed in a resource portfolio during the annual study of flexible capacity need may not be in the final resource portfolio for a given resource adequacy month and, thus, the CAISO would be unable to rerun the study to determine the impact this deviation might have on the flexible capacity need.

To address this timing issue, the CAISO proposes to require each load-following metered subsystem load-serving entity for which the CAISO has calculated an allocable share of the flexible capacity need under tariff section 40.10.2.2 to submit annual and monthly load-serving entity flexible resource adequacy capacity plans.<sup>68</sup> If the load-following metered subsystem submits such a plan identifying variable energy resources not included in its resource portfolio on which it will rely to provide flexible resource adequacy capacity, the load-following metered subsystem must include additional flexible resource adequacy capacity in its plan equal to the megawatt amount of flexible resource adequacy capacity shown for the variable energy resources not included in the resource portfolio for that month.<sup>69</sup> This will ensure that each load-following

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<sup>65</sup> Existing tariff section 40.10.1.2(b)(2).

<sup>66</sup> Existing tariff sections 40.10.1.2.1(b)(2), -(c).

<sup>67</sup> Existing tariff section 40.10.5.1(b)(3).

<sup>68</sup> New tariff section 40.10.5.1.1(1). Concomitantly, the CAISO proposes to delete the provision in existing tariff section 40.10.5.1(a) that states that a load-following metered subsystem is not required to submit such a plan.

metered subsystem will fully cover its allocable share of the total system flexible capacity need.

### **3. Bid Cost Recovery**

Because load-following metered subsystems that are load-serving entities will be required to fully cover their allocable shares of the total system flexible capacity need pursuant to revised tariff section 40.10.2.2, such load-following metered subsystems should also be eligible for bid cost recovery. Therefore, the CAISO proposes to revise tariff sections 11.8.2.3.2 and 11.8.4.3.2 to permit bid cost recovery by the load-following metered subsystems.

### **4. Variable Energy Resources Contracted to Serve Load Outside the CAISO Balancing Authority Area**

One stakeholder asserted that it generally supports the CAISO's proposal for allocating flexible capacity need to load-following metered subsystem load-serving entities, but argued that the CAISO should apply this proposal not only to variable energy resources contracted to such load-following metered subsystems that are not included in the resource portfolio, but also to variable energy resources that are contracted to serve load outside the CAISO balancing authority area.

The Commission's October 16, 2014 order on the CAISO's flexible resource adequacy capacity requirements and must-offer obligation ("FRACMOO") proposal declined to require the CAISO to allocate flexible capacity obligations to variable energy resources that do not have contracts with CAISO load-serving entities. Rather, the Commission directed the CAISO to report on the contribution of non-contracted variable energy resources to the need for flexible capacity by January 1, 2016 and evaluate options for allocating flexible capacity obligations in a manner that would allocate a share of any burden proportionately to non-contracted variable energy resources or other

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<sup>69</sup> New tariff section 40.10.5.1.1(2). Based on comments provided by one stakeholder, the CAISO considered reducing this replacement requirement to less than a one-for-one ratio and using an average contribution or index to measure the replacement requirement. However, the CAISO determined that it should not do so because specific resources contribute differently toward the CAISO's three-hour net-load ramp, even if the resources are of a similar technology type. Therefore, using an average contribution or index may not accurately reflect a specific resource's impact on the three-hour net-load ramp. Because the CAISO cannot rerun the annual study of flexible capacity need as discussed above, implementing a one-for-one ratio is the only way the CAISO can ensure that the deviation from the original study assumptions do not impact the adequacy of flexible capacity on the system. It would be impossible to determine if a resource contributed more flexible capacity need than the average contribution.

appropriate entities.<sup>70</sup> The CAISO will file the required informational report with the Commission in the fourth quarter of 2015. This report will inform the CAISO and stakeholders whether further steps and assessment are necessary. Consistent with its ruling in the FRACMOO Order, the Commission should reject this request and allow the CAISO to consider this issue in connection with the required report.

#### **D. Resource Adequacy Availability Incentive Mechanism (RAAIM)**

The CAISO and stakeholders determined in the reliability services initiative that, although the existing standard capacity product mechanism is creating incentives for local and system resource adequacy capacity to be available for service, the incentives are not sufficient, and an enhanced mechanism is necessary. Therefore, the CAISO proposes to implement a new mechanism – the Resource Adequacy Availability Incentive Mechanism, *i.e.*, the RAAIM, which will replace the existing standard capacity product mechanism in tariff section 40.9.<sup>71</sup> The RAAIM will incorporate some components of the standard capacity product mechanism and will include enhancements to address the following issues:

- The existing standard capacity product only considers whether a resource adequacy resource is on a forced outage. Thus, it only captures one component of a resource's availability and does not assess whether the resource made its energy available to the CAISO markets at all. This approach is too limited and inadequate. Physical capability to be available is not the same thing as actually offering energy in the market to be used in the market optimization. Resource adequacy resources are not paid merely to be reflected in a monthly resource adequacy plan; they are paid to comply with their must-offer obligations and participate in CAISO markets. To remedy this deficiency in the current process, the CAISO proposes to assess resource adequacy capacity based on fulfillment of the must-offer obligations applicable to them.
- The standard capacity product mechanism does not extend to flexible resource adequacy capacity, thereby leaving a significant gap in availability measurement. A mechanism to assess and incent the availability and performance of flexible resource adequacy capacity is

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<sup>70</sup> See FRACMOO Order at P 46.

<sup>71</sup> To this end, the CAISO proposes to delete all the provisions in existing tariff section 40.9 and the existing subsections thereunder.

necessary given the significant changes on the system and the particular need for flexible capacity in the future.<sup>72</sup> The RAIM will apply to flexible resource adequacy capacity and will assess availability based on a flexible capacity resource adequacy resource's fulfillment of the applicable must-offer obligation, *i.e.*, the economic bidding requirement.

- The RAIM will more effectively capture the increasing number and capacity of resource adequacy resources that are use-limited. Unlike non-use-limited capacity, use-limited capacity that is also resource adequacy capacity is not subject to the CAISO's bid insertion rules. That is, use-limited resources are not subject the same generated bid and validation rules and may simply not bid at any time without consequences regardless of the system need. Therefore, it is difficult for the CAISO to validate and capture use-limited availability using the current forced-outage method of calculating availability.<sup>73</sup> Currently, approximately 40 percent of the resource fleet is use-limited. At this time the CAISO cannot validate the full availability of use-limited resources because these resources may under-report outages. The RAIM will provide incentives for use-limited resources to provide outage information to the CAISO by assessing their bids rather than their outages and then exempting outages that are due to use-limitations of the resource. A use-limited resource may submit a use-limit-reached outage in any hour and the CAISO can then validate this reason for the outage against the resource's use-plan. Without the outage information, the CAISO would have no means to connect a resource's absence of a bid with a use-limitation as the resource may have not bid for other reasons besides reaching a use-limitation.
- The RAIM will establish a price to use in calculating non-availability charges and availability incentive payments to replace the capacity procurement mechanism price, which expires on February 16, 2016.
- The RAIM will exempt a narrower set of acquired resource adequacy resources than does the standard capacity product mechanism. Over 16,000 MW of resource adequacy capacity are exempt from the

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<sup>72</sup> The Commission has found that a resource adequacy construct that "fails to provide adequate incentives for resource performance, [can] threaten[] reliable operation of the system and force[e] consumers to pay for capacity without receiving commensurate reliability benefits." *ISO New England Inc.*, 147 FERC ¶ 61,172, at P 23 (2014).

<sup>73</sup> See existing tariff sections 40.6.8 (last sentence), 40.9.2(9).

provisions of the existing mechanism. Under the current exemptions, this situation will improve only incrementally over the next 15 years as resources' exempted capacity contracts gradually expire.<sup>74</sup> Because these resources may under-report outages, the CAISO is unable to fully and accurately track their physical availability. The CAISO is able to assess exempt resources bidding, and both exempt and use-limited resources relatively are not bid into the market on average as much as non-exempt, non-use-limited capacity. Implementing the RAIM is the first step toward getting additional data to determine whether the exempt and use-limited resources are operationally unavailable and therefore pose a risk to reliability or simply were not bidding-in previously for economic or other reasons.

Like the existing standard capacity product mechanism, the new RAIM will consist of three steps. The following paragraphs summarize the steps and this transmittal letter then explains each step in detail.

In step one, the RAIM will assess a resource adequacy resource's availability for each month based on whether the resource is bid into the CAISO market. This is in contrast to the standard capacity product mechanism, which assesses availability based on whether the resource is on a forced outage or a de-rate. If all resources were previously reporting outages correctly, the results of step one under the RAIM and the standard capacity product mechanism would be the same for all non-use-limited resources. This is because all resource adequacy capacity should be bidding unless operationally unavailable, and if operationally unavailable, the resource should submit an outage. Basing availability on bidding allows the CAISO to have better insight into use-limited resource availability, including proxy demand response, and to account for the economic must-offer requirement of flexible resource adequacy resources.<sup>75</sup> A

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<sup>74</sup> See Addendum at 15.

<sup>75</sup> The existing tariff defines a use-limited resource as a resource that, due to design considerations, environmental restrictions on operations, cyclical requirements, such as the need to recharge or refill, or other non-economic reasons, is unable to operate continuously. This definition is not limited to resource adequacy resources. A use-limited resource that is a resource adequacy resource must also meet the definition of a resource adequacy resource. Tariff appendix A, existing definition of "Use-Limited Resource". In June 2015, the CAISO will separately file a tariff amendment to implement tariff changes resulting from its commitment cost enhancements phase 2 stakeholder initiative. That tariff amendment will include a proposal to change the term "use-limited resource" to "use-limited capacity" and revise the definition of the term to mean capacity with limitations or restrictions on its operation established by statute, regulation, ordinance, court order, design considerations, or other non-economic reasons that cannot be optimized by the appropriate CAISO commitment process without considering opportunity costs.

bid-based metric will better incent market participation and promote reliability compared to a metric that only incents a resource to avoid being on a forced outage.

Under the RAAIM, the bid must be consistent with the must-offer requirement for the resource adequacy resource technology type.<sup>76</sup> The RAAIM will apply somewhat different rules for performing the availability assessment depending on whether the resource's capacity is generic (*i.e.*, system or local) resource adequacy capacity, flexible resource adequacy capacity, or an overlap of generic and flexible resource adequacy capacity. The RAAIM will not count capacity that is on a planned outage as available and will remove such capacity from the availability assessment calculation. This is a significant improvement over the standard capacity product mechanism that counts a resource on planned outage as being fully available. As discussed in the MSC Final Opinion:

Further, if unreliable capacity which suffers more frequent forced or requires more planned outages can claim the same capacity value as more reliable sources, unreliable capacity could crowd-out more reliable sources from the procurement process. This concern is exemplified by the fact that, under the previous resource adequacy availability paradigm, resources could receive capacity credit, go on a planned outage for an extended period of time (multiple months) and be counted as 100% available during the entire period. Because payments are paid from a penalty pool, a resource on an extended planned outage would take away potential revenues to participating resources and potentially receive more availability payments than a resource adequacy resource that was actually participating in the energy markets.<sup>77</sup>

The RAAIM will also permit substitution of resources for resource adequacy resources on a forced outage or de-rate, as also permitted by the existing standard capacity product mechanism, with modifications to facilitate the substitution process and allow multiple resource substitution.

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<sup>76</sup> As explained above, under the existing tariff, local and system resource adequacy resources may meet their must-offer obligations by submitting economic bids or self-schedules, whereas flexible resource adequacy resources are generally required to meet their must-offer obligations by submitting economic bids. See existing tariff sections 40.10.5, 40.10.6, 40.10.6.1.

<sup>77</sup> MSC Final Opinion at 8-9.

In step two of the RAIM, the CAISO will compare a resource's availability as determined in step one with a fixed band around a fixed percentage value. The fixed band is based on the percentage that was included in the CAISO's originally proposed planning reserve margin<sup>78</sup> but that is expected to be on forced outage. The resource adequacy requirements are based on 100 percent of the monthly peak load plus a margin for error that accounts for a certain percentage of capacity to be on outage. The CAISO believes this is an appropriate target for resource adequacy capacity availability and that resource capacity should not be penalized if it is on outage for a period of time less than or equal to what was planned for by the CAISO and load-serving entities. Under the standard capacity product mechanism, the CAISO compares availability with a variable monthly percentage value based on the average performance of the resource adequacy fleet. This measurement is problematic because planned outages are counted as 100-percent available, which significantly increases the fleet availability percentage during outage months. Essentially, during the periods when outages are most likely, the CAISO standard will be artificially high. In other months, the average percentage has been so high that the upper band has exceeded 100 percent, with the result that there has been no potential for payments coming from the pool of non-availability charges. This is problematic, as the mechanism has only incented minimum performance and has not incented higher availability above the minimum band.

Based on the CAISO's analysis of resource availability, the CAISO expects that the fixed percentage value and band will not significantly change the non-availability charges or availability incentive payments, except in months where previously the upper band exceeded 100 percent and all such charges were paid to load rather than high availability resource adequacy capacity. This is because resources tend to perform very well or very badly, and the relatively small change in the percentage and band only tends to increase payments to high performers (again, especially in months where there were no payments to high performers) and slightly increase non-availability charges to low performers.

Ultimately, the fixed band will allow availability incentive payments to better reflect market conditions, because in months with higher amounts of capacity on outage, higher performers will be paid more for their availability due to the pool of charges being larger. Under the existing standard capacity product mechanism, because the band has been based on historical data, months with less availability have had a lower target. Because the CAISO has a monthly requirement that already adjusts to expected monthly peak load, resource adequacy availability is just as important in off-peak months as summer months,

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<sup>78</sup> The CAISO's planning reserve margin is used by 90 percent of load in the CAISO balancing authority area.

and so the availability target cannot be lowered without potentially affecting reliability. As the CAISO integrates renewable resources and the off-peak seasons become more difficult to manage, ensuring reliability from the resource adequacy fleet becomes increasingly important. Finally, the CAISO will also evaluate the performance of resource adequacy resources subject to those fixed percentages after the RAIM goes into effect, to ensure that the new band and target are not unduly penalizing resources.

In step three of the RAIM, the CAISO will calculate a non-availability charge for the resource by multiplying the extent of the resource's non-availability as determined in step two by a single RAIM price, or will provide an availability incentive payment from the pool of non-availability charges to the resource if it was determined to be available in step two. This recognizes that (1) the CAISO needs a range of resources and capabilities to participate the CAISO energy markets in order to reliably operate the grid, and (2) a resource's availability should reflect its overall contribution to grid reliability.

The existing tariff specifies types of resources that are exempt from participation in the standard capacity product mechanism. A narrower set of resources and capacity will be exempt from the RAIM. Exemptions for non-performance of must-offer obligations are generally incompatible with sound market design and reliable grid operations. Resources that are not participating in the market and meeting their must-offer obligations are not providing any contribution to system reliability on a given day.

The CAISO will employ a two-month advisory period for the RAIM that will begin with the implementation date, during which the CAISO will show RAIM non-availability charges and availability incentive payments on settlement statements, but will not include them on invoices for financial settlement. The advisory period will facilitate stakeholders' transition from the forced outage-based standard capacity product to the bid-based RAIM without financial impact.

### **1. Step One: Bid-based Availability Assessment Methodology**

For three primary reasons, the CAISO proposes to move from the outage-based assessment used for the standard capacity product to a bid-based assessment in order to determine a resource's availability under step one of the RAIM. First, using a bid-based methodology is more performance-based – and hence more effective – than the existing standard capacity product methodology, *i.e.*, it allows the CAISO to assess a resource adequacy resource's fulfillment of its applicable must-offer obligation as opposed to simply determining whether the resource was on a forced outage. A metric that assesses whether resources

meet their must-offer obligations will better promote reliability and incent market participation and the delivery of needed energy, flexibility, and ancillary services than a metric that only assesses whether resources are on forced outage. A resource that submits bids into the market is more likely to be picked up in the market optimization. Further, the flexible must-offer requirement mandates that scheduling coordinators bid flexible resource adequacy capacity into the market using an economic bid rather than a self-schedule. The current forced outage availability metric cannot monitor whether resources have an economic schedule or a self-schedule. Therefore, unless the CAISO moves to a bid-based availability metric, the CAISO cannot verify that flexible resource adequacy resources are in fact providing flexibility to the energy markets.

Second, a bid-based availability metric will treat use-limited resources more like non-use-limited resources that are subject to the availability metric under the standard capacity product. Under the current tariff, use-limited resources are subject to a must-offer obligation to bid when available.<sup>79</sup> However, availability is difficult to measure for use-limited resources under the current standard capacity product assessment. This is because the assessment uses outage data. Use-limited resources have the requirement to bid according to their use plans, but this does not require bidding in every hour and there is no validation that bidding reflects use-plan information. As a result, it is difficult for the CAISO to discern whether non-bidding is consistent with the use-limited resource's must-offer obligation, and the existing outage-based availability metric does not fully capture the availability of use-limited resources. A bid-based metric will allow the CAISO to calculate availability for these resources no differently than any other non-use-limited resources. This will ensure consistent treatment across resources and resource types regardless of use-limitation status.

Third, the bid-based metric better recognizes availability compared with the standard capacity product metric by categorizing every outage as exempt or non-exempt from the RAIM based on the resource's nature of work category. Previously, many outages were exempt despite the outage being fully within the resource's control. Tracking outages more specifically will allow the CAISO to better incentivize actions such as fuel assurance, by specifically categorizing outages due to lack of fuel availability as non-exempt. Resource adequacy capacity under the RAIM that is on outage due to insufficient fuel will be subject to non-availability charges due this outage period, unless substitute capacity is provided for the resource on outage. Thus, the bid-based metric will better incentivize fuel assurance and general maintenance, and therefore will incentivize better availability.

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<sup>79</sup> Existing tariff section 40.6.4.3.

Under step one of the RAAIM, the CAISO will determine a resource's monthly average availability on a percentage basis, based the availability assessment of the resource's minimum daily availability of local and system resource adequacy capacity, flexible resource adequacy capacity, and overlapping commitments of those types of resource adequacy capacity in the day-ahead market and real-time market:

- including the capacity, duration, and must-offer requirement for local and/or system resource adequacy capacity or flexible resource adequacy capacity on a forced outage, except to extent the resource provides resource adequacy substitute capacity for the outage or the forced outage is excluded from the RAAIM;
- including the capacity, duration, and must-offer requirement for any resource adequacy substitute capacity, resource adequacy replacement capacity, or capacity procurement mechanism capacity the resource is committed to provide; but
- excluding specified planned and approved maintenance outages.<sup>80</sup>

The immediately following sections of this transmittal letter discuss the components for determining a resource's monthly average availability.

**a. Availability of Local and System resource adequacy Capacity**

Under step one of the RAAIM, the CAISO will assess the availability of local and/or system resource adequacy capacity that does not overlap with flexible resource capacity.<sup>81</sup> The concept of overlapping capacity is discussed below.

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<sup>80</sup> New tariff section 40.9.4(a). If the resource's minimum daily availability is the same in the day-ahead market and the real-time market, the CAISO will use the availability in the real-time market in the calculation of the monthly availability average. New tariff section 40.9.4(b). Also, if the resource is committed to provide local and/or system resource adequacy capacity and flexible resource adequacy capacity in a month, but does not provide both for the full month, the CAISO will prorate the number of days that local and/or system resource adequacy capacity and flexible resource adequacy capacity was provided against the total number of days in the month. New tariff section 40.9.4(c).

<sup>81</sup> See new tariff sections 40.9.3.1, 40.9.4(a)(1).

### **(i) Availability assessment hours**

Prior to the start of each resource adequacy compliance year, the CAISO will establish and publish in the Business Practice Manual the availability assessment hours applicable for resources providing local and/or system resource adequacy capacity for each month of the year.<sup>82</sup> In Phase 1 of the reliability standards initiative, the CAISO proposes to maintain the current five-hour methodology used under the current standard capacity product to establish availability assessment hours for local and/ system resource adequacy capacity.<sup>83</sup> Currently there are no defined must-offer requirements that clearly delineate assessment hours for local versus system resource adequacy resource availability.

For both the standard capacity product and the RAIM, the pre-defined set of five consecutive hours correspond to the operating periods when high demand conditions typically occur and the availability of resource adequacy capacity is most critical to maintaining system reliability. By assessing availability during the hours when the system is most likely to be capacity-constrained, the proposed assessment period will provide appropriate incentives for resources to bid into CAISO markets and improve peak-period availability.<sup>84</sup>

### **(ii) Must-offer availability assessment**

The existing tariff contains specific must-offer requirements for each hour that a resource's capacity is shown as local or system resource adequacy capacity. For most local and system resource adequacy capacity, the must-offer requirement is the obligation to bid or self-schedule capacity into the CAISO market during all hours of the day. Specifically, the tariff requires suppliers to make available to the day-ahead market all operationally available resource adequacy capacity.<sup>85</sup> Scheduling coordinators must submit economic bids or self-schedules for all resource adequacy capacity and qualified ancillary

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<sup>82</sup> New tariff section 40.9.3.1(a)(1). The tariff defines a resource adequacy compliance year as a calendar year from January 1 through December 31. Tariff appendix A, existing definition of "Resource Adequacy Compliance Year".

<sup>83</sup> Compare new tariff section 40.9.3.1(a) with existing tariff section 40.9.3.

<sup>84</sup> In Phase 2 of the reliability standards initiative, the CAISO may evaluate the benefits of assessing resources every hour they are contracted as resource adequacy capacity.

<sup>85</sup> Existing tariff section 40.6.1.

services.<sup>86</sup> Resources must also participate in the residual unit commitment by submitting any additional capacity not procured in the day-ahead market.<sup>87</sup>

The CAISO proposes to determine the extent to which each resource providing local and/or system resource adequacy capacity made that capacity available to the CAISO in each availability assessment hour of the day by comparing (1) the megawatt amount of such resource adequacy capacity for which the resource's scheduling coordinator submitted economic bids or self-schedules in the day-ahead market and the real-time market; and (2) the megawatt amount of such resource adequacy capacity for which the resource's scheduling coordinator was required to submit economic bids or self-schedules in the CAISO markets under the applicable must-offer requirements.<sup>88</sup>

### **(iii) Example of System-Only RAIM assessment**

Figure 1 below provides a hypothetical example of a resource adequacy resource that is committed as 75 MW of system capacity and no flexible capacity, and there is only one day in the month. This resource both self-schedules and economically bids the capacity across the day. In the five assessment hours, the resource self-schedules 25 MW and economically bids 50 MW. This resource then is 100-percent available because it fulfilled its 75 MW must-offer obligation in the assessment hours. Note that the resource is still 100-percent available even though no capacity was self-scheduled or economically bid-in during hours 1 through 4. This is because, even though the resource has a compliance obligation to offer in 24 hours if able, the CAISO will perform the RAIM assessment only for the five system must-offer hours.

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<sup>86</sup> Existing tariff section 40.6.2 contains additional resource bidding requirements.

<sup>87</sup> Residual unit commitment is the process the CAISO conducts in the day-ahead market after the integrated forward market to ensure that sufficient resources are committed to meet the CAISO forecast of CAISO demand. Tariff appendix A, existing definition of "Residual Unit Commitment (RUC)".

<sup>88</sup> New tariff section 40.9.3.1(b).

**Figure 1**

Resource Adequacy Capacity	
<i>Flexible</i>	<i>System</i>
0 MW	75 MW

Hours	Bidding behavior	
	<i>Economic bid</i>	<i>Self-schedule</i>
1	0 MW	0 MW
2	0 MW	0 MW
3	0 MW	0 MW
4	0 MW	0 MW
5	75 MW	0 MW
6	75 MW	0 MW
7	75 MW	0 MW
8	75 MW	0 MW
9	75 MW	0 MW
10	75 MW	0 MW
11	75 MW	0 MW
12	75 MW	0 MW
13	75 MW	0 MW
14	75 MW	0 MW
15	75 MW	0 MW
16	75 MW	0 MW
17	50 MW	25 MW
18	50 MW	25 MW
19	50 MW	25 MW
20	50 MW	25 MW
21	50 MW	25 MW
22	0 MW	75 MW
23	0 MW	75 MW
24	0 MW	75 MW

**b. Availability of Flexible Resource Adequacy Capacity**

Under step one of the RAIM, the CAISO will assess the availability of flexible resource adequacy capacity that does not overlap with local or system resource adequacy capacity as discussed below.<sup>89</sup>

<sup>89</sup> See new tariff sections 40.9.3.2, 40.9.4(a)(1).

### **(i) Availability assessment hours**

The availability assessment hours for a flexible resource adequacy resource will be the same period as the must-offer obligation for the flexible capacity category that is designated on the resource flexible resource adequacy capacity plan for that month.<sup>90</sup> The existing tariff sets forth three flexible capacity categories (listed in order from highest quality to lowest quality) and associated must-offer obligations:

- (1) Base ramping resources – must submit economic bids for energy in the day-ahead and real-time markets every day within a seventeen-hour period from 5:00 a.m. to 10:00 p.m.;
- (2) Peak ramping resources – must submit economic bids for energy in the day-ahead and real-time markets every day for a five-hour period determined for each season by the CAISO’s flexible capacity needs assessment; and
- (3) Super-peak ramping resources – must submit economic bids for energy in the day-ahead and real-time markets every non-holiday weekday during a five-hour period determined for each season by the CAISO’s flexible capacity needs assessment, until they receive during the five-hour period, and respond to, five CAISO dispatches during the month, after which they are not subject to must-offer obligations as super peak ramping resources for the remainder of the month.<sup>91</sup>

### **(ii) Must-offer availability assessment**

The CAISO will determine the extent to which each flexible resource adequacy resource made that capacity available in each availability assessment hour of the day by comparing (1) the megawatt amount of flexible resource adequacy capacity for which the scheduling coordinator for the resource submitted economic bids in the day-ahead market and the real-time market; and (2) the megawatt amount of flexible resource adequacy capacity for which the scheduling coordinator for the resource was required to submit economic bids in the CAISO markets under the must-offer requirements applicable to the

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<sup>90</sup> New tariff section 40.9.3.2(a). The CAISO also proposes to define a flexible resource adequacy resource as a resource designated to provide flexible resource adequacy capacity. Tariff appendix A, definition of new term “Flexible RA Resource”.

<sup>91</sup> Existing tariff section 40.10.6.1(a). See also existing tariff section 40.10.3 (setting forth qualification criteria for the three flexible capacity categories) and tariff appendix A, existing definition of “Flexible Capacity Category”.

resource's flexible resource category.<sup>92</sup> This is the same methodology as applies to local and system resource adequacy resources (described above).

### **(iii) Use of highest flexible capacity category**

If a flexible resource adequacy resource is designated to provide flexible resource adequacy capacity and/or resource adequacy substitute capacity in more than one flexible capacity category, the CAISO will assess the availability of the resource using the must-offer obligation for the highest quality of flexible capacity category designated, *i.e.*, the base ramping category is higher-quality than the peak ramping and super-peak ramping categories, and the peak ramping category is higher-quality than the super-peak ramping category.<sup>93</sup> This tariff provision will reduce implementation complexity and recognize that the purpose of the flexible capacity categories is to allow different resources to participate as flexible resource adequacy capacity, not to reduce the participation of resources fully capable of meeting a higher category of must-offer obligation to a lower-quality category.

Introducing complexity into the resource adequacy rules is a serious concern for the CAISO. In order for resources providing resource adequacy capacity to offer into the market and understand the penalties and rewards of making themselves available, the rules must be as straightforward as possible. Although resources may count for more than one category for purposes of validating the flexible capacity plans, introducing multiple categories for a single resource for purposes of determining whether the resource has met the must-offer obligation for each category in each hour would add enormous complexity for the CAISO to implement, track, and settle multiple categories, and would decrease transparency. This complexity would be compounded when multiple load-serving entities contracted with a single flexible capacity resource. For example, if a resource with a 100 MW effective flexible capacity ("EFC") value was shown on one load-serving entity's monthly resource adequacy plan for 20 MW in the super-peak ramping category and shown on another load-serving entity's monthly resource plan for 30 MW in the base ramping category, the CAISO would have to track these amounts and decide, if there were an outage or minimum output (PMin) de-rate, how each must-offer obligation would be affected. The CAISO therefore proposes to count the flexible capacity of a resource as meeting each load-serving entity's requirements as shown in each category; however, for purposes of the must-offer obligation, the resource would have to offer all 50 MW into the CAISO's markets as base-ramping flexible

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<sup>92</sup> New tariff section 40.9.3.2(b).

<sup>93</sup> New tariff section 40.9.3.2(c).

capacity. Therefore, the resource's availability will be based on seventeen hours each day, consistent with the must-offer obligation for base-ramping flexible capacity.

Use of a single flexible capacity category to assess availability will significantly reduce complexity. If the CAISO were to assess availability in multiple categories, the CAISO would have to develop rules and process around stacking flexible categories – that is, how the CAISO would determine the specific flexible capacity category into which each specific MW of a resource must fall. For example, if a resource with 20 MW must be bid-in each weekday for five hours and 30 MW that must be bid every day for seventeen hours, and on a single weekday the resource only offered in 40 MW, the CAISO would have to determine which specific obligation was short by 10 MW. Was the resource short for 10 MW for one hour out of seventeen hours or was the resource short 10 MW for one hour out of five hours? This could get further complicated by the fact the resource could have additional uncommitted capacity that may be used on a day as substitute capacity for a peak ramping resource, which could lead to three different must-offer obligations on that day. The CAISO would then have to determine where in the stack the additional obligation would be in the event the resource, after taking on the obligation, failed to fully comply or went on partial outage.

Ultimately, if multiple flexible must-offer obligations were allowed for a single resource, the CAISO would have to determine a stacking order on the resource and track each category of capacity across the resource depending on outages, de-rates, and additional resource adequacy commitments through the provision of substitute or backstop capacity under the capacity procurement mechanism. Very quickly the rules would lead to significant complexity and lack of transparency. Fundamentally, the CAISO created the different flexible capacity categories to accommodate resources, not capacity, that could not meet the base ramping requirement. Establishing multiple must-offer obligations for a single flexible resource adequacy resource would produce no reliability or market benefit.

**(iv) Treatment of flexible resource adequacy resources with start-up times less than and greater than 90 minutes**

The CAISO will use different methods for assessing availability depending on whether the flexible resource adequacy resource has a start-up time less than or greater than 90 minutes. For resources with a start-up time less than 90 minutes, the CAISO will use the resource's megawatts of capacity from zero to the EFC value to assess the availability of the designated flexible resource adequacy capacity, provided that the scheduling coordinator for the resource

does not submit self-schedules for the capacity from zero to PMin or for any portion of the capacity under the must-offer obligation for energy. If the scheduling coordinator for the resource submits a self-schedule, the CAISO will deduct the MW value of PMin from the calculation of the resource's flexible resource adequacy capacity availability.<sup>94</sup> By comparison, for resources with a start-up time greater than 90 minutes, the CAISO will use the resource's megawatts of capacity between the resource's PMin and EFC value in the availability assessment and validate whether the scheduling coordinator for the resource submitted economic bids for all megawatts designated on the resource adequacy flexible capacity plan.<sup>95</sup> These different methods for assessing availability reflect the fact that the CAISO calculates the effective flexible capacity of most resources differently according to whether the resources have start-up times less than or greater than 90 minutes.<sup>96</sup>

When a resource's start-up time is greater than 90 minutes, the CAISO assesses its availability entirely between its PMin and its EFC value. The CAISO will therefore determine whether the scheduling coordinator has economically bid the resource up to the amount shown as flexible resource adequacy capacity. When a resource's start-up time is less than 90 minutes, the assessment is more complicated because the resource's PMin capacity will count toward its effective flexible capacity value. The tariff requires flexible capacity to be economically bid into the market. However, the energy market does not allow scheduling coordinators to bid PMin capacity explicitly, and resources' capacity is made available to the market through the submission of energy bids. Energy market bids are incremental to PMin capacity. This means that a resource's economic bid may not reflect its full effective flexible capacity value if that value includes PMin capacity. Therefore, in some cases the CAISO must account for the resource's PMin capacity that counts toward its effective flexible capacity value in order to evaluate whether the resource has met its bidding obligation. The different methods for assessing availability reflect these realities.

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<sup>94</sup> New tariff section 40.9.3.2(d).

<sup>95</sup> New tariff section 40.9.3.2(e).

<sup>96</sup> Existing tariff section 40.10.4.1(a). The tariff defines effective flexible capacity as the maximum megawatts of flexible capacity that a resource has the capability to provide based on the counting criteria set forth in the tariff. Tariff appendix A, existing definition of "Effective Flexible Capacity".

### (v) Treatment of variable energy resources

The tariff defines a variable energy resource as a device for the production of electricity that is characterized by an energy source that is renewable, cannot be stored by the facility owner or operator, and has variability beyond the control of the facility owner or operator.<sup>97</sup> The CAISO energy market optimization has functionality for variable energy (primarily wind and solar) resources that allows these resources to bid up to a specified forecast and be dispatched downward. This permits the market optimization to use variable energy resources as flexible resource adequacy resources.

To reflect the nature of these resources, the CAISO will use a different method for assessing availability according to whether the variable energy resource that is a flexible resource adequacy resource has flexible resource adequacy capacity equal to or less than its effective flexible capacity:

- If the flexible resource adequacy capacity designated on the monthly resource flexible resource adequacy capacity plan is equal to the resource's effective flexible capacity value, the CAISO will assess the availability of the designated flexible resource adequacy capacity based on the economic bids for flexible resource adequacy capacity the scheduling coordinator for the resource submitted up to the megawatts in the forecast that applies to the variable energy resource.<sup>98</sup>
- If the flexible resource adequacy capacity designated in the monthly resource flexible resource adequacy capacity plan is less than the effective flexible capacity value for the resource, the CAISO will assess availability using the ratio of the amount shown on the monthly plan to the relevant effective flexible capacity value, and will apply that ratio to the megawatts of economic bids and the variable energy resource forecast.<sup>99</sup> That is, the CAISO will not expect a resource that has sold

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<sup>97</sup> Tariff appendix A, existing definition of "Variable Energy Resource".

<sup>98</sup> New tariff section 40.9.3.2(f)(1).

<sup>99</sup> New tariff section 40.9.3.2(f)(2). For example, if the variable energy resource has a PMax of 200 MW, has an effective flexible capacity of 100 MW, and is only shown for 25 MW on the flexible resource adequacy capacity plan, the resource will not be held to the forecast, but rather will be held to 25 percent 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 flexible resource adequacy capacity 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

less than its total potential output to economically offer up to its maximum forecast. For example, if a resource's EFC is 100 MW and the resource had 50 MW of flexible capacity, in an hour where the resource's forecast was 80 MW, the resource would only have to economically bid-in 40 MW. The remaining 40 MW could be self-scheduled.

**(vi) Treatment of use-limited capacity under the Business Practice Manual**

The CAISO, in a tariff amendment filing it will submit for Commission acceptance in June 2015, will propose to change the definition of a use-limited resource to identify capacity with use limitations that the market software is unable to optimize because the optimization would require information over the month or even over an annual horizon to produce optimal schedules.<sup>100</sup> Because the software and load forecasts are unable to optimize resources longer than the current market runs, the CAISO is exploring the possibility of building additional functionality to allow use-limited resources to reflect the opportunity cost of using a limitation in their bids. For example, a resource that only has fifteen start-ups in a month due to environmental limitations would be able to reflect in its start-up bid the expected lost revenue of not starting up in the future. This functionality would allow resources to reflect the majority of use limitations using economic bids. It would also allow these resources to be able to fully offer their capacity into the market according to the resource adequacy must-offer obligation rule and therefore be assessed under the RAIM.

Until the CAISO develops such an opportunity cost functionality, however, the CAISO proposes to introduce in the Business Practice Manual two types of new generation nature-of-work category outages that would exempt use-limited capacity from the RAIM. The introduction of these categories in the Business Practice Manual will not require any tariff revisions.

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forecast was for 20 MW, the resource's availability would be assessed against 5 MW, rather than the full 20 MW.

<sup>100</sup> The June 2015 tariff amendment will implement tariff revisions developed in phase 2 of the commitment cost enhancements stakeholder initiative. To effectively dispatch use-limited resources, the CAISO is developing an opportunity cost methodology in phase 3 of that initiative to will give use-limited resources greater control over their start-up and run times using economic bidding. Further information regarding phase 3 of the initiative is available on the CAISO website at: <http://www.caiso.com/informed/Pages/StakeholderProcesses/CommitmentCostEnhancements.aspx>.

The first category is “use limit reached”. Once a resource expends the use-limitation indicated on the resource’s use-limit plan provided to the CAISO, the resource may stop bidding into the market, submit a use-limit-reached flag, and then be exempt from the RAIM until the capacity is available again. For example, if a resource was a resource adequacy resource for June and July and had twenty starts a month, and then expends all twenty starts on June 14, the resource would be exempt from the RAIM until July 1 when the resource would then have additional starts available.

Second, until the CAISO fully develops and the Commission approves the opportunity cost methodology, the CAISO will allow use-limited resources to submit an outage in a new nature-of-work category – a short-term use-limit-reached outage. Capacity on a short-term use-limit-reached outage will be exempt from the RAIM. For example, if the scheduling coordinator notices that the CAISO is dispatching a resource heavily in early May, but notes hotter weather in the following week and believes the CAISO will use up the resource’s starts before then, the resource may submit a short-term use-limit-reached outage and resume bidding later in warmer weather. Essentially, this outage is a tool for use-limited resource management so that the resource can optimize the limitations until the CAISO develops an economic management tool.

#### **(vii) Example of flexible RAIM assessment**

Figure 2 below illustrates a flexible RAIM assessment for a hypothetical resource adequacy resource with 50 MW of flexible capacity in the base flexible category and 0 MW of system capacity. The resource must economically offer into the market 50 MW during the shaded seventeen hours. Even though the resource self-schedules 25 MW during this time, the resource also economically offers in 50 MW and therefore is considered 100-percent available.

**Figure 2**

Resource Adequacy Capacity	
<i>Flexible</i>	<i>System</i>
50 MW	0 MW

Hours	Bidding behavior	
	<i>Economic bid</i>	<i>Self-schedule</i>
1	0 MW	0 MW
2	0 MW	0 MW
3	0 MW	0 MW
4	0 MW	0 MW
5	50 MW	25 MW
6	50 MW	25 MW
7	50 MW	25 MW
8	50 MW	25 MW
9	50 MW	25 MW
10	50 MW	25 MW
11	50 MW	25 MW
12	50 MW	25 MW
13	50 MW	25 MW
14	50 MW	25 MW
15	50 MW	25 MW
16	50 MW	25 MW
17	50 MW	25 MW
18	50 MW	25 MW
19	50 MW	25 MW
20	50 MW	25 MW
21	50 MW	25 MW
22	50 MW	0 MW
23	50 MW	0 MW
24	50 MW	0 MW

**c. Availability of Overlapping Local/System Resource Adequacy Capacity and Flexible Resource Adequacy Capacity**

Under step one of the RAIM, the CAISO will assess the availability of overlapping resource adequacy capacity (*i.e.*, megawatts of capacity counted as both (1) local and/or system resource adequacy capacity and (2) flexible resource adequacy capacity) as discussed below.<sup>101</sup>

**(i) Overlap determination**

<sup>101</sup> See new tariff sections 40.9.3.3, 40.9.4(a)(1).

The CAISO proposes to perform a single assessment of the availability of overlapping capacity and hold all of the capacity to the highest must-offer obligation of the various types of resource adequacy capacity the resource is committed. That is, all megawatts that are counted toward both the flexible and system/local requirements will be assessed under the flexible must-offer obligation, and all megawatts counted only toward the system/local requirements are assessed under the system/local must-offer obligation. This will only assess each megawatt one time during each must-offer obligation hour and avoid double-counting.

Specifically, the CAISO proposes that the availability assessment for overlapping resource adequacy commitments will apply to those hours in which a resource was subject to the must-offer obligations for local and/or system resource adequacy capacity and flexible resource adequacy capacity in any availability assessment hour and for any portion of the same capacity.<sup>102</sup> Further, the CAISO's calculation of the availability assessment for overlapping resource adequacy commitments will count (1) any portion of the overlapping megawatt only once; and (2) the total megawatts of capacity at the higher of the resource adequacy capacity commitment or the flexible resource adequacy capacity commitment.<sup>103</sup>

For example, assume that a resource is committed to provide 50 MW of flexible capacity and 75 MW of system capacity to the CAISO and, on average across the month, has submitted bids into the CAISO's markets in each hour according to Figure 3 below. In hours ending 5 through 17, the resource must economically bid at least 50 MW. In all hours, for compliance purposes the resource must offer in 75 MW total either through economic bidding or self-scheduling; however, the CAISO only assesses system resources in hours ending 17 through 22. During these hours, in addition to bidding 50 MW to meet the flexible requirement, the resource must offer-in at least 25 MW using either economic bids or self-schedules. As shown in Figure 3, the resource fully meets both requirements and is 100-percent available.

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<sup>102</sup> New tariff section 40.9.3.3(a). Pages 36-38 of the Addendum provide illustrative examples of overlapping availability assessment hours and overlapping capacity.

<sup>103</sup> New tariff section 40.9.3.3(c). Pages 39-40 of the Addendum provide an illustrative example of how the CAISO will perform this calculation.

**Figure 3**

<b>Resource Adequacy Capacity</b>	
<i>Flexible</i>	<i>System</i>
50 MW	75 MW

<b>Hours</b>	<b>Monthly average bidding behavior</b>	
	<i>Economic bid</i>	<i>Self-schedule</i>
1	0 MW	75 MW
2	0 MW	75 MW
3	0 MW	75 MW
4	0 MW	75 MW
5	50 MW	25 MW
6	50 MW	25 MW
7	50 MW	25 MW
8	50 MW	25 MW
9	50 MW	25 MW
10	50 MW	25 MW
11	50 MW	25 MW
12	50 MW	25 MW
13	50 MW	25 MW
14	50 MW	25 MW
15	50 MW	25 MW
16	50 MW	25 MW
17	50 MW	25 MW
18	50 MW	25 MW
19	50 MW	25 MW
20	50 MW	25 MW
21	50 MW	25 MW
22	50 MW	25 MW
23	50 MW	25 MW
24	50 MW	25 MW

In the next month, assume that the resource has the same resource adequacy requirements but on average throughout the month submits bids according to Figure 4 below. The resource has economically bid 50 MW in hours ending 5 through 16, but during hours 17 through 21 the resource self-scheduled all 75 MW. Instead of providing an additional flexible 50 MW to meet the net-load curve, the resource's self-schedules caused the net-load curve to be steeper. Additional capacity will have to make up for the loss of the counted-on flexible capacity and even more flexible capacity will be needed during these intervals due to the increase in the net-load curve ramping need caused by the resource's

self-schedules. Therefore, in hours ending 17 through 21, the resource is counted as zero-percent available. The resource is counted as 100-percent available in hours ending 5 through 16.

**Figure 4**

Hours	Monthly average bidding behavior	
	<i>Economic bid</i>	<i>Self-schedule</i>
1	0 MW	75 MW
2	0 MW	75 MW
3	0 MW	75 MW
4	0 MW	75 MW
5	50 MW	25 MW
6	50 MW	25 MW
7	50 MW	25 MW
8	50 MW	25 MW
9	50 MW	25 MW
10	50 MW	25 MW
11	50 MW	25 MW
12	50 MW	25 MW
13	50 MW	25 MW
14	50 MW	25 MW
15	50 MW	25 MW
16	50 MW	25 MW
17	0 MW	75 MW
18	0 MW	75 MW
19	0 MW	75 MW
20	0 MW	75 MW
21	0 MW	75 MW
22	50 MW	25 MW
23	50 MW	25 MW
24	50 MW	25 MW

Using this method of overlap determination will avoid introducing further complexity into an already complex system, eliminate the potential for double penalties, and maintain incentives for flexible resource adequacy resources to provide economic bids.

This method could use one price, two prices (one for system/local capacity and one for flexible capacity), or even use separate prices for each local area. Ideally, capacity prices would be transparent and based on marginal cost principles. However, capacity prices are highly variable over time. Price information is also limited, highly opaque, and unreliable due to the voluntary nature of data provision and the large aggregation in any capacity price report available.

Additionally, because the CAISO will have a single assessment and price for availability based on a megawatt's highest obligation, if an overlap occurs, the CAISO will not give credit to a scheduling coordinator for self-scheduling a megawatt. This method of overlap determination also reflects the fact that the CAISO created the flexible capacity requirement in part due to difficulties with over-generation caused by self-scheduling during periods of high renewable output.<sup>104</sup> Failing to penalize flexible resource adequacy capacity for scheduling practices that can potentially exacerbate over-generation and not meet the CAISO's reliability needs would be a flawed market design.

**(ii) Must-offer availability assessment**

The CAISO will determine the extent to which each resource with overlapping resource adequacy commitments made that capacity available to the CAISO in each overlapping availability assessment hour of the day by comparing (1) the megawatts of local and/or system resource adequacy capacity and flexible resource adequacy capacity for which the scheduling coordinator for the resource submitted economic bids in the day-ahead market and the real-time market; and (2) the megawatts of such capacity for which the scheduling coordinator for the resource was required to submit economic bids in the CAISO markets, under the applicable must-offer requirements.<sup>105</sup> This is the same type of methodology that applies to non-overlapping local/system resource adequacy capacity and to non-overlapping flexible resource adequacy capacity (discussed above).

**d. Exception for a Resource Adequacy Resource that Provides Resource Adequacy Substitute Capacity for a Forced Outage**

The CAISO's determination of a resource's monthly average availability under step one of the RAIM will include the capacity, duration, and must-offer requirement for local or system resource adequacy capacity or flexible resource adequacy capacity on a forced outage, except to the extent the resource provides resource adequacy substitute capacity for the outage.<sup>106</sup> Step one of the existing standard capacity product mechanism also excludes resource

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<sup>104</sup> Appendix C to the Addendum contains further details as to why the CAISO does not propose to implement an availability incentive metric that evaluates system resource adequacy capacity and flexible resource adequacy capacity separately.

<sup>105</sup> New tariff section 40.9.3.3(b).

<sup>106</sup> See new tariff sections 40.9.3.6, 40.9.4(a)(2).

adequacy resources that provide substitute capacity, but does not permit substitution for flexible resource adequacy resources.<sup>107</sup>

As discussed below, the CAISO proposes to: (1) maintain a number of the existing exclusions under the RAAIM but streamline them to eliminate substitution provisions that are unnecessary from a reliability perspective; and (2) permit flexible resource adequacy resource substitution. These changes will facilitate a wider range of resources being quickly substituted for capacity that experiences a forced outage.

### **(i) Permitted substitutions and availability requirements**

Similar to the existing standard capacity product tariff provisions, under the RAAIM the scheduling coordinator for a resource adequacy resource may provide resource adequacy substitute capacity for its resource adequacy capacity that experiences a forced outage or de-rate.<sup>108</sup> This resource adequacy substitute capacity must meet specified availability requirements.<sup>109</sup> If the resource on outage and the substituting resource do not have the same scheduling coordinator, the scheduling coordinator for the substituting resource must confirm and approve the requested substitution.<sup>110</sup>

### **(ii) Timing of the substitution request**

The existing standard capacity product tariff provisions generally require a scheduling coordinator that has a forced outage or de-rate that would count against its availability calculation to request to provide resource adequacy substitute capacity from an alternate resource prior to the close of the day-ahead market for the next trading day.<sup>111</sup> The tariff includes this day-ahead deadline because the CAISO formerly used a manual process to address substitution

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<sup>107</sup> Existing tariff section 40.9.4.2.1.

<sup>108</sup> New tariff section 40.9.3.6(a)(1). This new tariff section is comparable to existing tariff section 40.9.4.2.1(a).

<sup>109</sup> New tariff section 40.9.3.6(b). This new tariff section is identical to existing tariff section 40.9.4.2.1(b).

<sup>110</sup> New tariff section 40.9.3.6(a)(2).

<sup>111</sup> Existing tariff sections 40.9.4.2.1(c)-(f). The exception to this general rule is that a scheduling coordinator for a local capacity area resource adequacy resource may pre-qualify an alternative resource and submit a substitution request for such a resource prior to or in real-time. See existing tariff sections 40.9.4.2.1(c)(1), 40.9.3.2.1(e).

requests. Some stakeholders commented that this general deadline for requesting to provide resource adequacy substitute capacity is unnecessarily early in light of the automated process the CAISO now uses. The CAISO agreed with these comments.

The CAISO proposes that requests for substitution in the day-ahead market under the RAAIM must be submitted prior to the timeline that will be specified in the Business Practice Manual and be approved by the CAISO to be included in the day-ahead market for the next trading day.<sup>112</sup> The timeline will give the scheduling coordinator for the resource adequacy substitute capacity enough time to prepare and submit required bids prior to the day-ahead market run, and provide the CAISO sufficient time to evaluate that capacity. The RAAIM also requires that requests for substitution in the real-time market be submitted in accordance with the timeline in the Business Practice Manual.<sup>113</sup>

### **(iii) Substitution by a single resource for a single resource**

As discussed below, similar to the existing standard capacity product tariff provisions, the RAAIM permits a single resource to provide resource adequacy substitute capacity for another resource pursuant to processes that differ based on the type of resource for which the single resource is substituting, as discussed below.

#### Substitution for a local capacity area resource adequacy resource.

Consistent with existing tariff provisions, substitution for a local capacity area resource under the RAAIM can be either pre-qualified or non-pre-qualified.<sup>114</sup> The proposed tariff provisions regarding such substitution are similar to the existing tariff provisions allowing such substitution, with two exceptions.

First, the CAISO's proposal will streamline the pre-qualification process. Under the existing tariff, a scheduling coordinator for a local capacity area resource adequacy resource may pre-qualify alternate resources for substitution by submitting a pre-qualification request to the CAISO.<sup>115</sup> Under the RAAIM,

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<sup>112</sup> New tariff section 40.9.3.6(c)(1). Requests for substitution in the day-ahead market submitted at or after the timeline specified in the Business Practice Manual and approved by the CAISO will be included in the day-ahead market for the second trading day. *Id.*

<sup>113</sup> New tariff section 40.9.3.6(c)(2).

<sup>114</sup> Compare new tariff section 40.9.3.6.1(b) with existing tariff section 40.9.3.4.2.1(c).

<sup>115</sup> Existing tariff section 40.9.3.4.2.1(c)(1).

however, the CAISO will annually conduct a process to assess the eligibility of resources to pre-qualify as resource adequacy substitute capacity for local capacity resource adequacy resources.<sup>116</sup> The CAISO will assess all resources during the pre-qualification process, and scheduling coordinators or load-serving entities will not need to ask the CAISO to assess specific resources. This change streamlines the pre-qualification process by eliminating the need for individual pre-qualification requests and assessments and will ensure that all resources eligible to pre-qualify as resource adequacy substitute capacity are able to pre-qualify. The CAISO will publish the list of pre-qualified resources.

Second, the CAISO's proposal will relax the criteria for pre-qualification. Under the existing tariff, the CAISO will pre-qualify a resource to provide resource adequacy substitute capacity that is located at the same bus as the local capacity area resource adequacy resource for which it would substitute.<sup>117</sup> The CAISO proposes to relax the same-bus requirement by also allowing pre-qualified substitution for a local capacity area resource adequacy resource located at a compatible bus.<sup>118</sup> This change will allow additional resources to pre-qualify to provide resource adequacy substitute capacity, which will better ensure sufficiency of resource adequacy capacity.

Substitution for a non-local capacity area resource adequacy resource.

The proposed RAIM tariff requirements regarding substitution for a non-local capacity area resource adequacy resource are similar to the existing tariff provisions allowing such substitution, except that the CAISO proposes to allow scheduling coordinators to request such substitutions under the RAIM in either the day-ahead market or the real-time market rather than only in the day-ahead market as is the case under the standard capacity product.<sup>119</sup> Under the existing standard capacity product provisions, CAISO grid operator action is required if the substitute resource has a lower ramp rate than the resource on forced outage under standard capacity product. By removing this rule, substitution of system resources is allowed regardless of the resources' relative ramp rates. This eliminates the need for operator intervention, enabling the CAISO to fully automate its systems to allow real-time substitution for system resources on forced outage. This change will expand the ability of resources to provide resource adequacy substitute capacity and better ensure sufficiency of resource adequacy resources.

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<sup>116</sup> New tariff section 40.9.3.6.1(b)(1)(A).

<sup>117</sup> Existing tariff section 40.9.3.4.2.1(c)(1).

<sup>118</sup> New tariff section 40.9.3.6.1(b)(1)(B). The CAISO will define the phrase "compatible bus" in the Business Practice Manual for Reliability Requirements.

<sup>119</sup> Compare new tariff section 40.9.3.6.1(c) with existing tariff section 40.9.3.4.2.1(d).

The CAISO has also added a new provision to address use of an external resource to substitute for a non-local capacity area resource adequacy resource on outage. To use a dynamic system resource, non-dynamic system resource, non-resource-specific resource adequacy resource, or pseudo-tie as resource adequacy substitute capacity, the scheduling coordinator for the resource on outage must submit a timely substitution request in the day-ahead market. The CAISO will grant the request if the alternate resource is external to the CAISO balancing authority area (including pseudo-ties), the scheduling coordinator for the resource has an adequate available import allocation at the resource's scheduling point to provide the substitute capacity, and the tariff requirements for the request are met.<sup>120</sup>

Substitution for a flexible resource adequacy resource. The tariff currently does not include provisions that permit a resource to provide resource adequacy substitute capacity for a flexible resource adequacy resource that goes on a forced outage or de-rate. However, the CAISO proposes to permit such substitution under the RAIM.<sup>121</sup> To use a resource as resource adequacy substitute capacity, the scheduling coordinator for the flexible resource adequacy resource that has a forced outage or de-rate must submit a timely substitution request in the day-ahead market or real-time market and specify the megawatts of resource adequacy substitute capacity to be provided, which may not exceed the megawatts of the outage.<sup>122</sup> The CAISO will grant the request if the substituting resource has adequate deliverable capacity to provide the resource adequacy substitute capacity, meets the applicable availability requirements, and is capable of meeting the must-offer obligation applicable to the highest-quality flexible capacity category (*i.e.*, base ramping, peak ramping, or super-peak ramping) for the megawatts of the flexible resource capacity commitments of the resource on outage and the alternative resource.<sup>123</sup>

Because flexible resource adequacy capacity will be assessed under the RAIM, substitution for flexible resource adequacy capacity should be permitted to mitigate the impact of an outage. This change will expand the ability of resources to provide resource adequacy substitute capacity and minimize their exposure to non-availability charges. The change will also better ensure sufficiency of resource adequacy resources during the outage period.

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<sup>120</sup> New tariff section 40.9.3.6.1(d).

<sup>121</sup> New tariff section 40.9.3.6.1(e).

<sup>122</sup> New tariff section 40.9.3.6.1(e)(1).

<sup>123</sup> New tariff section 40.9.3.6.1(e)(2).

**(iv) Substitution by multiple resources for a single resource**

As is the case under the existing standard capacity product tariff provisions, the RAAIM allows multiple resources to provide resource adequacy substitute capacity for a single local capacity area resource adequacy resource, non-local capacity area resource adequacy resource, or non-resource-specific resource adequacy resource on a forced outage or de-rate.<sup>124</sup> The RAAIM tariff provisions for making such substitutions are mostly similar to the existing provisions. However, the existing tariff provides that if each substituting resource is pre-qualified to provide resource adequacy substitute capacity for a single local capacity area resource adequacy resource and none of the substituting resources are already providing resource adequacy substitute capacity for another resource adequacy resource, then the substitution request may be submitted in real-time.<sup>125</sup> Under the RAAIM, such a substitution request may be submitted in the day-ahead market or real-time market if all of the substituting resources are pre-qualified to provide resource adequacy substitute capacity for the resource; otherwise the request must be submitted for the day-ahead market.<sup>126</sup> The CAISO will approve the request if the alternate resources are pre-qualified, or if not pre-qualified, are located in the same local capacity area as the resource on outage. This will make it easier for resources to provide resource adequacy substitute capacity in real-time, expand the ability of resources to provide resource adequacy substitute capacity and better ensure sufficiency of resource adequacy resources.

Consistent with the implementation of substitution for flexible resource adequacy capacity on a forced outage, the CAISO also proposes to permit multiple resources to provide resource adequacy substitute capacity for multiple flexible resource adequacy resources. To use resource adequacy substitute capacity from multiple resources, the scheduling coordinator for a resource providing flexible resource adequacy capacity on a forced outage or de-rate must submit a timely substitution request in the day-ahead market or the real-time market and the alternate resources must be located in the CAISO balancing authority area.<sup>127</sup> The CAISO will grant the request if the alternate resources

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<sup>124</sup> Compare new tariff section 40.9.3.6.2 with existing tariff section 40.9.3.4.2.1(e).

<sup>125</sup> Existing tariff section 40.9.3.4.2.1(e).

<sup>126</sup> New tariff section 40.9.3.6.2(b)(1).

<sup>127</sup> New tariff section 40.9.3.6.2(d)(1).

meet the applicable tariff requirements.<sup>128</sup> The proposed change will expand the opportunities for substitution, thereby making it easier for suppliers to substitute capacity. This change will also better ensure reliability by maintaining the sufficiency of resource adequacy capacity through substitution.

**(v) Substitution by a single resource for multiple resources**

Similar to the existing standard capacity product tariff provisions, the RAAIM permits a single resource to provide resource adequacy substitute capacity for multiple resources.<sup>129</sup> However, the existing tariff only allows a resource to provide resource adequacy substitute capacity for no more than two resource adequacy resources at the same time because this type of substitution was handled by the CAISO through a manual process.<sup>130</sup>

The CAISO proposes to eliminate the current two-resource limit and permit the scheduling coordinator to request approval to provide resource adequacy substitute capacity for one or more additional resource adequacy resources on a forced outage or de-rate.<sup>131</sup> Suppliers of resource adequacy capacity requested this ability in order to facilitate the substitution of capacity. The CAISO can implement this change because it has recently developed capabilities in its various systems to allow such substitutions through an automated process without the restrictions previously imposed by the old manual substitution process.

**(vi) Resource adequacy obligation**

As is the case under the existing tariff, the CAISO proposes that, to the extent a resource under the RAAIM provides resource adequacy substitute capacity, the substituting resource must meet and comply with all requirements in tariff section 40 applicable to resource adequacy substitute capacity for the duration of the substitution.<sup>132</sup>

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<sup>128</sup> New tariff section 40.9.3.6.2(d)(2).

<sup>129</sup> Compare new tariff section 40.9.3.6.3 with existing tariff section 40.9.3.4.2.1(f).

<sup>130</sup> Existing tariff section 40.9.3.4.2.1(f).

<sup>131</sup> New tariff section 40.9.3.6.3(a).

<sup>132</sup> Compare new tariff section 40.9.3.6.4 with existing tariff section 40.9.3.4.2.1(h).

However, the CAISO also proposes to provide an exception to allow resource adequacy substitute capacity to be released from the resource adequacy obligation and the substitution requirements under the RAAIM either (1) at the end of the approved substitution period; or (2) upon request by either the scheduling coordinator for the resource on forced outage or the scheduling coordinator for the substitute resource, and approval by the other scheduling coordinator, in accordance with the process set forth in the Business Practice Manual.<sup>133</sup> This will allow suppliers to reduce their risk of being subject to the RAAIM when their capacity is no longer needed as planned outage substitute capacity on a given day.

### **(vii) Treatment of unbid capacity**

The CAISO proposes that, if the scheduling coordinator for resource adequacy substitute capacity does not submit bids or self-schedules for all or a portion of that capacity in accordance with the applicable must-offer obligation, the CAISO will treat the unbid capacity as unavailable for purposes of the RAAIM and will reflect that unavailability in the RAAIM availability calculation for the resource providing the substitute capacity.<sup>134</sup> These provisions are justified because once a resource substitutes for a resource on outage, the substituting resource takes on all the obligations of the original resource and should be held to the same availability requirements. If the substituting resource is not subject to the RAAIM, there is a potential that it will not provide the same reliability.

#### **e. Exception for a Forced Outage from the RAAIM**

The CAISO's determination of a resource's monthly average availability under step one of the RAAIM will include local, system, and flexible resource adequacy capacity on a forced outage, except to the extent the resource on outage provides substitute capacity or the forced outage is excluded from the RAAIM.<sup>135</sup> Specifically, the RAAIM excludes from the availability target calculation the capacity of local, system, and flexible resource adequacy capacity on a forced outage in a nature-of-work outage category relating to an administrative action by the resource owner (e.g., unit testing), certain narrow causes outside of the control of the resource owner (e.g., transmission outage), or a short-term use limitation, as those categories are specified in the Business

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<sup>133</sup> New tariff section 40.9.3.6.4.

<sup>134</sup> New tariff section 40.9.3.6.5.

<sup>135</sup> See new tariff sections 40.9.3.5, 40.9.4(a)(2).

Practice Manual.<sup>136</sup> In other words, the CAISO is recognizing these activities as outside of the intended purpose of the incentive mechanism and is accordingly excluding the outage categories related to those activities from the RAAIM availability assessment so they have no impact on the RAAIM non-availability charges or availability incentive payments for that resource.

**f. Exclusion of Specified Maintenance Outages from the RAAIM**

The CAISO's determination of a resource's monthly availability assessment under step one of the RAAIM will include the capacity, duration, and must-offer obligation for a maintenance outage requested by the resource adequacy resource less than forty-five days prior to the start of the month to the extent that the resource fails to provide replacement capacity for the outage that is required under Section 9.3.1.3.3.<sup>137</sup> Conversely, if the resource adequacy resource requested a maintenance outage forty-five days or less prior to the start of the month and provides replacement capacity required under Section 9.3.1.3.3, the capacity, duration, and must-offer obligation for the outage will be excluded from the RAAIM availability assessment to the extent that replacement capacity was provided.<sup>138</sup> In this circumstance, it is appropriate to exclude the outage from the availability assessment for the resource on outage because the commitment to provide the resource adequacy capacity is essentially being transferred to the resource providing the replacement capacity, and the RAAIM assessment for the replacement resource will include the capacity, duration, and must-offer obligation for that replacement commitment.

The RAAIM availability assessment will exclude an approved maintenance outage, or pending request for a maintenance outage as of forty-five days prior to the start of the resource adequacy month; however, if the capacity on outage or the duration of outage increases, that incremental increase will be subject to the RAAIM unless replacement capacity is required and provided. Excluding an outage approved or pending approval as of forty-five days in advance of the month will provide an incentive for resource adequacy resources to schedule their outages further in advance of the outage, which will improve overall outage management.

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<sup>136</sup> New tariff section 40.9.3.5(c).

<sup>137</sup> New tariff section 40.9.3.4(b)(2).

<sup>138</sup> New tariff section 40.9.3.4(b)(1).

The RAIM availability assessment will also exclude resource adequacy capacity that is unavailable if the maintenance outage can be accommodated without replacement capacity, e.g., it can be performed entirely during an off-peak period.<sup>139</sup> In this circumstance where the maintenance outage can be accommodated without replacement capacity, the outage will not detrimentally impact the sufficiency of resource adequacy capacity and therefore should not be counted against the availability of the resource on outage.

## **2. Step Two: Calculate Availability Incentive Standard Percentage**

Similar to the existing standard capacity product tariff provisions, the CAISO proposes to use a percentage band to assess individual resource availability under step two of the RAIM. Specifically, the CAISO will compare the monthly availability assessment percentage calculated for a resource under step one of the RAIM with a fixed availability incentive standard equal to 96.5 percent each month.<sup>140</sup> If the resource's availability assessment percentage is more than two percentage points below the availability incentive standard (*i.e.*, below 94.5 percent), the resource will be subject to a non-availability charge for the month. If the resource's availability assessment percentage is more than two percentage points above the availability incentive standard (*i.e.*, above 98.5 percent), the resource will be eligible for an availability incentive payment for the month. If the resource's availability assessment percentage falls within the four-percentage-point band between 94.5 percent and 98.5 percent, the resource will not be subject to a non-availability charge or eligible for an availability incentive payment. This four-percentage-point band will apply to all months of the year<sup>141</sup>

The CAISO proposal differs from the existing methodology for calculating non-availability charges and availability incentive payments, which uses an availability standard that varies from month to month based on an expected forced outage rate included in the 115-percent planning reserve margin and the historical outage average for the previous four years.<sup>142</sup> Under the existing methodology, a resource pays a non-availability charge for a deviation of more than 2.5 percent below the variable monthly availability standard and is eligible to

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<sup>139</sup> New tariff sections 40.9.3.4(a), 40.9.4(4).

<sup>140</sup> New tariff section 40.9.5(a).

<sup>141</sup> New tariff sections 40.9.5(b), 40.9.6.

<sup>142</sup> The resource adequacy requirement for load-serving entities is adjusted each month based on 115 percent of the monthly load forecast. Existing tariff sections 40.2.2.1(b), 40.2.3.1(b).

receive an availability incentive payment for a deviation of more than 2.5 percent above the variable monthly availability standard.<sup>143</sup> The availability standard has varied considerably over the past four years, ranging from a high of 98.0 percent to a low of 94.0 percent, and has averaged 96.4 percent.<sup>144</sup>

The RAAIM is a self-funding mechanism because the availability incentive payment is funded entirely through the monthly non-availability charges that are assessed. Therefore, while each megawatt below the standard band is charged the availability incentive price, each megawatt above the standard band is only paid at the availability incentive payment rate, which is equal to the total non-availability charges assessed for the month plus any unpaid funds rolled over from a prior month, divided by the resource adequacy capacity eligible to receive an availability incentive payment that month. In contrast, under the existing standard capacity product provisions, using historic and variable availability has resulted in no payments to generators that performed above the band in three months (January, February, and December in 2011-2013). The existing methodology required the CAISO to charge resources in these months but allocate these payments to load. That will not happen under the RAAIM because using a fixed standard percentage will allow well-performing resources to receive payments in months of high availability rather than allocating the payments to load. The RAAIM approach will better encourage high performance.

Fixing the percentage of the availability incentive standard will also allow the payments made to resources to better reflect current market conditions. In months with a high average availability, the CAISO will charge less capacity for underperformance and, therefore, high-performing resources will receive less of an incentive payment for their performance. In months with low availability, more capacity will be subject to availability charges, and resources with higher ability will be paid a higher amount per megawatt to perform. Therefore, although the unavailability charge per megawatt will always be the same, the availability incentive payment per megawatt will directly reflect monthly market conditions and will not exceed three times the non-availability charge rate.

Further, fixing the percentage of the availability incentive standard will allow the RAAIM always to charge resources if they are not providing the minimum amount of capacity that the CAISO relies upon to operate the grid. By paying resources that meet the requirements for availability payments more when average availability is lowest, fixing the percentage will motivate resources

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<sup>143</sup> Existing tariff sections 40.9.6, 40.9.6.1.

<sup>144</sup> Page 43 of the Addendum shows these figures.

to perform when they are most needed. This will create the correct incentives during the periods when the CAISO most needs availability for grid reliability.

Implementing an availability incentive standard of 96.5 percent is consistent with the 96.4-percent average historical availability of resources for the prior four years.<sup>145</sup> Also, as explained above, the CAISO adjusts the resource adequacy requirement for load-serving entities each month based on 115 percent of the monthly load forecast. Therefore, the percentage availability of resources should remain constant each month because any adjustment to needs is already reflected in the resource adequacy requirement for the month. For these reasons, the CAISO believes that the proposed 96.5-percent availability incentive standard is within the zone of reasonableness.<sup>146</sup>

In addition, the continued use of a percentage band (as opposed to comparing a resource's availability solely against the RAIM's 96.5-percent availability incentive standard) will ensure that incentive payments and non-availability charges under the RAIM will only be assessed when resources perform materially better or worse than the availability standard.<sup>147</sup> However, under the RAIM the CAISO proposes to set a four-percent dead band around the availability standard rather than the five-percent band applicable today under the standard capacity product. Thus, resources that perform more than two percentage points above the availability standard will be eligible for an availability incentive payment, and resources that perform two percentage points below the availability standard will be subject to an availability charge. This constitutes a slight reduction from the five percent dead band that exists under the standard capacity product. As the resource mix in the CAISO region changes rapidly and raises new and significant performance challenges, the tolerance for sub-par performance needs to be minimized. Reducing the dead band will slightly broaden the reach of potential availability charges, thereby incenting more resources to be available and meet their must-offer obligations. This change will result in a more robust "pay for performance" mechanism.

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<sup>145</sup> Addendum at 43.

<sup>146</sup> The Commission has explained that "the courts and this Commission have recognized that there is not a single just and reasonable rate. Instead, we evaluate [proposals submitted under section 205 of the Federal Power Act] to determine whether they fall into a zone of reasonableness. So long as the end result is just and reasonable, the [proposal] will satisfy the statutory standard." *Calpine Corp. v. Cal. Indep. Sys. Operator Corp.*, 128 FERC ¶ 61,271, at P 41 (2009) (citations omitted). See also *New England Power Co.*, 52 FERC ¶ 61,090, at 61,336 (1990), *aff'd sub nom. Town of Norwood v. FERC*, 962 F.2d 20 (D.C. Cir. 1992), citing *City of Bethany v. FERC*, 727 F.2d 1131, 1136 (D.C. Cir. 1984) (rate design proposed need not be perfect, it merely needs to be just and reasonable).

<sup>147</sup> See *Cal. Indep. Sys. Operator Corp.*, 127 FERC ¶ 61,298, at P 40 (2009) (authorizing a performance band under the existing standard capacity product methodology).

Although the CAISO believes that the 96.5-percent availability incentive standard and dead band of plus or minus two percentage points falls within the zone of reasonableness, the CAISO proposes to review these percentages periodically against actual resource availability. If the CAISO's review shows that the total annual average availability of resources deviates from 96.5 percent by more than one percentage point (*i.e.*, the total annual average availability of resources is less than 95.5 percent or more than 97.5 percent), the CAISO will report those findings to stakeholders along with an explanation of whether the level of the availability incentive standard should be adjusted.

### **3. Step Three: Calculate Non-Availability Charge or Availability Incentive Payment**

#### **a. Non-Availability Charge**

Under step three of the RAIM, the CAISO will calculate the non-availability charge of a resource other than a capacity procurement mechanism (CPM) resource<sup>148</sup> by (i) multiplying the resource's average monthly and flexible resource adequacy megawatts by the difference between the lower bound of the monthly availability incentive standard (94.5 percent) and the resource's monthly availability percentage, and then (ii) multiplying that product by the RAIM price.<sup>149</sup> The CAISO initially proposes to set the RAIM price at 60 percent of the proposed capacity procurement mechanism soft offer cap set forth in tariff section 43.4.1.1.<sup>150</sup> On May 26, 2015, the CAISO filed a separate tariff amendment pursuant to which it will procure CPM capacity through a competitive solicitation process and will set the CPM soft offer cap at \$6.31 per kW-month (\$75.68 per kW-year).<sup>151</sup> Therefore, if the Commission accepts that tariff amendment, the RAIM price will be set at \$3.79 per kW-month (\$45.41 per kW-year).

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<sup>148</sup> The CAISO will calculate the non-availability charge of a CPM resource based on the actual price the resource offered into the competitive solicitation.

<sup>149</sup> New tariff section 40.9.6.1(a)(1).

<sup>150</sup> New tariff section 40.9.6.1(b).

<sup>151</sup> See new tariff section 43A.4.1.1 and definition of term "CPM Soft Offer Cap" contained in the CAISO tariff amendment to implement capacity procurement mechanism replacement, Docket No. ER15-1783-000 (May 26, 2015), which is pending before the Commission. By comparison, the current capacity procurement mechanism capacity price is \$5.90 per kW-month (\$70.88 per kW-year). Existing tariff section 43.7.1.

The CAISO will calculate the non-availability charge of a CPM resource under step three of the RAAIM in a similar manner. The only difference will be that part (ii) of the calculation will consist of multiplying the product calculated in part (i) by the maximum of the resource's capacity procurement mechanism price and the RAAIM price.<sup>152</sup>

As reflected in these calculations, the CAISO proposes to continue to use only a single availability incentive price and not to use separate prices for system, local, or flexible resource availability.<sup>153</sup> This is consistent with the existing Commission-approved approach and is based on the premise that all resource adequacy capacity is needed to run the grid, and no particular type of resource adequacy capacity should be encouraged more or less than any other type of resource adequacy capacity to participate in the energy markets, undertake maintenance, and take all necessary steps to perform and prevent forced outages.

The CAISO notes that, unlike the eastern independent system operators and regional transmission organizations, in the CAISO, there is no standard price paid to all resource adequacy capacity or a specified subset of resource adequacy capacity. Rather, load-serving entities procure all of their resource adequacy capacity through bilateral contracts, all of which have different prices, terms, and conditions for resource adequacy capacity. This results in a multitude of resource adequacy contracts for the 757 resource adequacy resources and prices for system, local, and flexible capacity for the more than 49 load-serving entities that submit resource adequacy plans to the CAISO on a monthly basis. The CAISO does not have access to the prices paid under individual resource adequacy contracts. It is not in a position to calculate separate availability incentive prices every month for every single resource adequacy contract. Even if the CAISO had that information, it would be a monumental, burdensome, and unnecessary task to establish a multitude of availability incentive prices.

During the stakeholder process, some stakeholders argued for a lower availability incentive price, other stakeholders argued for a higher price. The CAISO believes that the availability incentive price must adequately balance two principles: (1) it should be high enough to incent resources that will be on outage to replace or substitute their capacity; and (2) it should be low enough not to cause any potential disruption of the resource adequacy market or unduly penalize entities that are receiving lower resource adequacy payments. Based on information available in the 2012 Resource Adequacy Report produced by the

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<sup>152</sup> New tariff section 40.9.6.1(a)(2).

<sup>153</sup> Compare new tariff section 40.9.6.1(a) with existing tariff section 40.9.6.2.

CPUC staff in April 2014, which is the best information available to the CAISO,<sup>154</sup> the CAISO believes that the proposed \$3.79 per kW-month availability incentive price strikes the proper balance between these principles. The data show an extremely broad range of resource adequacy prices. For resource adequacy years 2012-2016, the report shows that resource adequacy prices range from a low of \$0.08 per kW-month to a high of \$26.54 per kW-month.

The \$3.79 per kW-month RAIM price essentially equates to high-average resource adequacy bilateral market contract prices – both for system capacity and local capacity, as reflected in the 2012 Resource Adequacy Report. Table 10 in the report shows that the average resource adequacy price for the years 2012-2016 ranges from \$3.21 per kW-month to \$3.76 per kW-month, and the weighted average ranges from \$2.95 per kW-month to \$3.46 per kW-month. For the years 2012-2016, Table 11 in the report also shows the following: (1) the average and weighted average resource adequacy prices are \$3.37 per kW-month and \$3.28 per kW-month, respectively; (2) the average and weighted average system resource adequacy prices are \$2.74 per kW-month and \$2.90 per kW-month, respectively; and (3) the average and weighted average local resource adequacy prices are \$3.55 per kW-month and \$3.45 per kW-month, respectively.

Also, the information that the CPUC and market participants have provided to the CAISO suggests that the current capacity procurement mechanism capacity price of \$5.90 per kW-month (\$70.88 per kW-year) is significantly higher than the value needed to incent resource performance. A \$3.79 per kW-month availability price constitutes an above-average/high-average price (as opposed to a high-end or low-end price) for both system and local resource adequacy capacity.<sup>155</sup> Thus, it strikes a reasonable balance. Further,

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<sup>154</sup> That CPUC report is available at: <http://www.cpuc.ca.gov/NR/rdonlyres/94E0D083-C122-4C43-A2D2-B122D7D48DDD/0/2012RARReportFinal.pdf>. The report notes that in late 2013, CPUC Energy Division staff issued a data request to all jurisdictional load-serving entities requesting monthly capacity prices paid by them for every resource adequacy capacity contract covering the 2012-2016 compliance years. The report states that in 2012, the sum of monthly contracted capacity represents approximately 33 percent of the 2012 monthly sum of resource adequacy requirements, net of cost allocation mechanism, reliability must-run, and demand response allocations. The remainder of resource adequacy capacity for that year either was not reported because it was not provided via a resource adequacy-only contract, or it was not provided by a load-serving entity that did not respond to the Energy Division's data request. The data pool reflected in years 2013-2014 is even lower: 25.5 percent of the capacity for 2013; 18.9 percent of the capacity for 2014; 15.1 percent of the capacity for 2015; and 7.0 percent of the capacity for 2016.

<sup>155</sup> As reflected in Table 11 in the 2012 Resource Adequacy Report, a \$3.79 per kW-month price is much closer to average resource adequacy prices than it is to the 85<sup>th</sup> percentile prices of resource adequacy capacity for the period 2012-2106.

there is not such a significant differential between average system and local resource adequacy prices that would cause a \$3.79 per kW-month price to fall outside of the zone of reasonableness. A \$3.79 per kW-month RAIM price will reduce the risk of overly punitive charges being imposed on resource adequacy suppliers with low contract prices (particularly given how low some resource adequacy prices are), while incenting required maintenance or resource substitution in the event of long, unexpected forced outages because the price is above average. Using the proposed above-average RAIM price also avoids the additional complexity associated with having multiple availability incentive prices, particularly given that the difference between average prices is not material. The CAISO notes that in its CPM replacement tariff amendment filing, the CAISO states that it intends to reassess the CPM soft offer cap every four years. This will allow the CAISO to adjust the RAIM price along with the CPM soft offer cap to ensure that the RAIM price remains consistent with the two aforementioned guiding principles identified by the CAISO.

The CAISO also notes that there are no publically available reports summarizing the prices for flexible resource adequacy, which only became a new category of resource adequacy capacity commencing January 1, 2015. Thus, there is no basis to establish a separate RAIM price for flexible capacity. The CAISO initially thought there might be a premium on flexible resource adequacy capacity. While this ultimately may be the case, it has not been demonstrated. Also, some stakeholders have pointed out that, in the future, flexible resource adequacy resources are expected to receive additional revenue in the energy and ancillary service markets. Under these circumstances, flexible resource adequacy resources may not require a premium when compared with system or local resources. It may be that certain flexible resource adequacy resources require a contracting premium, while other flexible resource adequacy resources do not. At this point in time, the CAISO has no evidence to indicate that flexible resources are receiving a systematic and transparent premium. There is currently no publically available information regarding the bilateral contract prices for resource adequacy flexible capacity. Under these circumstances, the above-average availability price proposed by the CAISO is just and reasonable for flexible capacity resources, for the same reasons it is just and reasonable for system and local capacity.

Finally, a single RAIM price, rather than separate RAIM prices for local, system, and flexible resource adequacy capacity, is appropriate because all resource adequacy capacity is needed for reliability, and no particular type of resource should receive more or less of a price incentive that any other type of resources to be available to add resource adequacy capacity. Given the uncertainty regarding prices for flexible resource adequacy capacity, and the fact that a \$3.79 per kW-month price constitutes a high average price for both system and local capacity, the CAISO proposes to maintain the current structure of a

single availability price for all resource adequacy resource types.<sup>156</sup>

In the standard capacity product tariff amendment proceeding, the Commission approved a single availability incentive price as just and reasonable,<sup>157</sup> and the circumstances that previously justified use of a single price have not changed. Just as when the Commission approved a single availability incentive price for the standard capacity product, resource adequacy resources are still procured through bilateral contracts, there is a broad range of prices being paid for such capacity, and the prices for local capacity are still on average higher than the prices for system capacity. In that regard, for resource adequacy years 2009-2011 – when the standard capacity product was initially implemented – the median system resource adequacy price was \$1.50 per kW-month and the median prices for NP26 and SP26 local capacity were \$3.19 per kW-month and \$2.57 per kW-month, respectively.<sup>158</sup> If a single availability price was just and reasonable at that time given the difference between system and local prices, it remains just and reasonable today. There are no changed circumstances to make it unjust and unreasonable. Finally, a single price also has the additional benefit of simplifying the RAIM overall.

#### **b. Availability Incentive Payment**

Under step three of the RAIM, the CAISO will calculate the availability incentive payment of a resource by multiplying (i) the resource's capacity that is eligible to receive such a payment by (ii) the monthly availability incentive payment rate.<sup>159</sup> The resource's eligible capacity is its average monthly megawatts of capacity that exceed the upper bound (98.5 percent) of the availability incentive standard.<sup>160</sup> The monthly availability incentive payment rate equals the total non-availability charges assessed for the month plus any unpaid funds, divided by the total resource adequacy capacity eligible to receive the

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<sup>156</sup> Currently the CAISO has a single price for both local and system availability even though the prices for capacity in certain local areas is higher.

<sup>157</sup> See *Cal. Indep. Sys. Operator Corp.*, 127 FERC ¶ 61,298, at P 8.

<sup>158</sup> See 2010 Resource Adequacy Report, Table 13 ( Apr. 22, 2011), available on the CPUC website at: <http://www.cpuc.ca.gov/NR/rdonlyres/58DCCE4F-4096-42A9-BFDC-EC891129E8D9/0/2011RAreportFinal252012.docx>.

<sup>159</sup> New tariff section 40.9.6.2(c)(3).

<sup>160</sup> New tariff section 40.9.6.2(b).

availability incentive payment that month, except that the availability incentive payment rate cannot exceed three times the non-availability charge rate.<sup>161</sup>

Consistent with the funding of the existing standard capacity product, the availability incentive payment will be self-funded, *i.e.*, it will be funded entirely through the monthly non-availability charges assessed.<sup>162</sup> Any remaining non-availability charge funds that are not distributed to eligible resource adequacy resources will be added to the funds available for availability incentive payments in the next month and will continue to roll over to successive months. The CAISO will distribute any amount remaining on December 31 to load-serving entities based on their load ratio share for the year.<sup>163</sup>

### **c. Reporting**

By July 1 of each year, the CAISO will provide an informational report that will be posted on the CAISO website and include information on the average actual availability each month of resource adequacy resources, the total amount of non-availability charges assessed, and the total amount of availability incentive payments made.<sup>164</sup>

## **4. CAISO Response to Stakeholder Issues**

### **a. Requirement for Flexible Resource Adequacy Capacity to Submit Economic Bids**

Most stakeholders either supported or did not oppose the fundamental design of the RAIM that assesses availability based on resource adequacy resource offers into the CAISO market. However, some stakeholders objected to the requirement that flexible resource adequacy resources be available and submit economic offers into the market.

In response, the CAISO explained that the Commission has already approved the requirement that flexible resource adequacy capacity submit

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<sup>161</sup> New tariff sections 40.9.6.2(c)(1)-(2). The tariff provisions regarding the calculation of the monthly availability incentive payment rate are the same as in the current tariff. See existing tariff section 40.9.6.3.

<sup>162</sup> New tariff section 40.9.6.2(a).

<sup>163</sup> New tariff section 40.9.6.2(d).

<sup>164</sup> New tariff section 40.9.7. This tariff provision is similar to existing tariff section 40.9.8.

economic bids pursuant to the CAISO's resource adequacy rules.<sup>165</sup> Stakeholders' opposition to an economic bidding requirement for flexible capacity constitutes a collateral attack on the Commission's FRACMOO Order from last year and was beyond the scope of the changes the CAISO was considering in this initiative. The RAAIM does not change the existing requirement for economic bidding by flexible resource adequacy resources; rather, it merely subjects flexible resource adequacy resources to an availability incentive mechanism, which currently only applies to local and system resource adequacy resources. The CAISO did not have sufficient time in the FRACMOO initiative to develop an availability incentive mechanism to apply to flexible resource adequacy capacity and deferred that effort to this initiative.<sup>166</sup>

The CAISO needs to use economic bids to assess the availability of flexible resource adequacy resources to ensure access to flexible resource adequacy capacity. Self-schedules do not provide the CAISO with any flexibility. Under the existing must-offer requirements, local and system resource adequacy resources may submit economic bids or self-schedule, whereas flexible resource adequacy resources are required to submit economic bids. The RAAIM will build upon the existing must-offer requirements for flexible resource adequacy resources in order to (1) incent flexible resource adequacy resources to perform routine maintenance so that suppliers do not go on unnecessary forced outages and (2) ensure that resources purportedly selling flexible output are in fact economically bidding into the market. This is a fundamental reliability need that will only increase as the CAISO integrates larger amounts of variable energy resources into its markets in the future. If the RAAIM did not assess economic bids for flexible resource adequacy capacity, a resource could sell itself as flexible resource adequacy capacity but then self-schedule and thereby avoid being penalized by the RAAIM for failing to bid.

#### **b. Must-Offer Obligation for Overlapping Capacity**

Two stakeholders objected to the CAISO's proposal to base the RAAIM non-availability charges for overlapping capacity on the most stringent must-offer obligation category. The stakeholders object that the proposed methodology fails to account for all of the different must-offer obligations and, in the example above, would not give the resource credit for having met its system obligation. The stakeholders stated that the CAISO should not apply a rule that basically

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<sup>165</sup> FRACMOO Order at P 30. See *also* existing tariff section 40.10.6.

<sup>166</sup> See transmittal letter for tariff amendment to implement flexible capacity requirement, Docket No. ER14-2574-000, at 5 (Aug. 1, 2014).

assumes all resource adequacy capacity provided by a generator is of the highest quality.

The CAISO believes that assessing flexible resource adequacy capacity and system resource adequacy capacity 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 resource adequacy capacity separately, the CAISO would have to have come up with prices that sufficiently incent resources to comply with both requirements independently, yet do not double-penalize the same MW of capacity for a single outage. This is because the availability incentive mechanism applies to capacity that is solely system resource adequacy capacity, solely flexible resource adequacy capacity, or both flexible and system resource adequacy capacity.

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

A simple example illustrates this point: Assume a resource's net qualifying capacity (NQC) equals its EFC of 100 MW, and the resource must recover \$3.50 per kW-month. The resource believes that providing flexible resource adequacy capacity will have a \$0.50 per kW-month adder. The resource then would sell its capacity for either \$3.50 per kW-month as system resource adequacy capacity or \$4.00 per kW-month as flexible and system resource adequacy capacity, or \$4.00 per kW-month as flexible-only resource adequacy capacity. There is no difference in cost to the resource to provide system and flexible resource adequacy capacity or flexible-only resource adequacy capacity. The resource can be shown to the CAISO in three ways. However, in all cases in order to incent the resource to be available, the CAISO must have a price that is a significant enough proportion of the resource's payments.

If the incentive prices are a system price and then an "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 \$3.50 per kW-month for system resource adequacy capacity and \$0.50 per kW-month for flexible resource adequacy capacity. The following would then occur:

- If the resource was shown only as flexible resource adequacy capacity, the CAISO would only incent it by penalizing or paying it \$0.50 per kW-month. This is only one-fourth of its capacity payment and far smaller than the resource's resource adequacy payment of \$4 per kW-month. This undervalues flexible capacity.
- If the resource is shown as flexible and system resource adequacy capacity 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 \$7.00 per kW-month (twice the system price) and only end up being penalized \$0.50 per kW-month for occasionally not fulfilling the flexible capacity obligation. This also undervalues the flexible resource adequacy portion of the resource and undermines the availability incentive mechanism for flexibility.

If the CAISO therefore made both the flexible and system resource adequacy price equal at \$3.50 per kW-month, the CAISO would end up over-penalizing resources on outage. For example, if the resource was shown as both flexible and system resource adequacy and went on an outage, the CAISO would be required to double-penalize the same MW of capacity – once for the system capacity that was unavailable and once for the flexible capacity that was unavailable – by charging the resource \$7.00 per kW-month (\$3.50 per kW-month times two). This would be overly punitive to the resource.

For these reasons, the CAISO proposes to assess a single megawatt at a single price under a single availability metric. Any alternative approach will also add unnecessary complexity and be problematic for CAISO Settlements. At this early stage in the development of flexible capacity obligations, the CAISO is pursuing a straightforward approach for purposes of calculating availability incentives and non-availability charges that best avoids the risk of over-payments and over-penalties.

#### **c. RAIM Price**

One stakeholder raised concerns that the proposed RAIM price of \$3.79 per kW-month may not be high enough to create sufficient incentives for resources to substitute resource adequacy capacity and will, therefore, create costs for ratepayers as a result of the CAISO exercising its capacity procurement mechanism. The stakeholder asserted that the RAIM price should instead be set at the proposed capacity procurement mechanism soft offer cap of \$6.31 per

kW-month to better incent resources to provide resource adequacy substitute capacity.

The CAISO does not anticipate increased use of the capacity procurement mechanism after the RAAIM goes into effect. The RAAIM will encourage resources to provide additional resource adequacy capacity during forced outages to avoid non-availability charges, but the CAISO is not proposing to require – and cannot require – substitute capacity when forced outages occur. Further, the resource adequacy program requires all load-serving entities procure sufficient capacity to account for the peak-load hour of the month plus a reserve margin of 15 percent. The CPUC has explicitly recognized that this reserve margin addresses and accounts for the potential for forced outages.<sup>167</sup> The CAISO has used the capacity procurement mechanism only once as the result of a forced outage – for the unexpected outage and closure of the San Onofre Nuclear Generating Station. Obviously the circumstances there were unique and not the typical forced outage situations that the CAISO might realistically encounter. The high availability incentive mechanism price that exists today (which is comparable to the level of the proposed CPM soft offer cap) did not negate the need for the CAISO to procure additional backstop capacity at that time. Outages of that scope are extremely rare, and do not suggest that there will be significant use of backstop capacity to address forced outages. The CAISO's experience with backstop procurement supports this conclusion.

Also, the CPM soft offer cap is just that – a cap. It is not necessarily the price the CAISO will be paying for backstop capacity in a competitive solicitation process, especially when suppliers are submitting bids prior to knowing whether there is any reliability need or what exactly that need is.

There are sound reasons to avoid an overly high RAAIM price. A RAAIM price set equal or close to the capacity procurement mechanism soft offer cap would be much higher than the prices the majority of resources are receiving. Table 10 in the 2012 Resource Adequacy Report shows that the 85<sup>th</sup> percentile price for resource adequacy capacity for 2015 is \$6.10 per kW-year. Using the price of \$6.31 per kW-month proposed by this stakeholder would result in an

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<sup>167</sup> CPUC Decision 04-01-050, Rulemaking 01-10-024 (Jan. 22, 2004); CPUC Decision D.04-10-035, Rulemaking 04-04-003 (Apr. 1, 2004); CPUC Order Instituting Rulemaking to Consider Revisions to the Planning Reserve Margin for Reliable and Cost Effective Ratemaking, Rulemaking 08-04-012 (Apr. 16, 2008). The CAISO notes that in a prior resource adequacy decision addressing whether load-serving entities should be held responsible when a generating unit experiences a forced outage, the CPUC found that because the reserve margins encompass forced outages, requiring load-serving entities to engage in replacement following a forced outage would effectively require them to procure more than the adopted planning reserve margin. Decision D.06-07-031, Rulemaking 05-12-013 (Dec. 15, 2005).

availability incentive price that exceeds the resource adequacy prices being paid to more than 85 percent of the capacity accounted for in the report. Such a pricing approach could potentially influence resource prices and unduly “penalize” resources that were paid significantly lower resource adequacy prices pursuant to long-term contracts. If these resources were on forced outages 10 percent of the time (well under what the 115-percent planning reserve margin can accommodate) and did not find additional capacity to substitute for the outages, the resources could easily be penalized by the CAISO for almost the entire amount the resources were paid in that month. The above-average RAIM price the CAISO proposes will balance these considerations with the goal of incentivizing resource owners to substitute or replace capacity on a forced outage.

Finally, in its opinion, the CAISO’s Market Surveillance Committee concluded that the proposed “reduction in the performance penalty [is] a sensible change that appears to better align with the underlying price of capacity in the bilateral market.”<sup>168</sup> However, the Market Surveillance Committee urged the CAISO to monitor prices in the market. In response, at the March 2015 CAISO Board meeting at which the Board approved the proposed availability incentive price, the CAISO committed to review the RAIM price after it has been in effect for a year (and periodically thereafter) and to report to the Board. This will allow the CAISO to ensure the continued efficacy of the overall mechanism, maintain a continued linkage between that price and actual prices paid for resource adequacy resources, and ensure that it is adequately incenting replacement and substitution.

## **5. Advisory Period Under the RAIM**

For an advisory period of two calendar months following the effective date of the RAIM, the CAISO will calculate and publish the availability incentive payments and non-availability charges on settlement statements but will not include those payments and charges on invoices for financial settlement.<sup>169</sup> This two-month advisory period will give market participants and the CAISO an opportunity to become familiar with the operation of the RAIM and transition from the outage-based standard capacity product to the bid-based RAIM.

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<sup>168</sup> MSC Final Opinion at 10.

<sup>169</sup> New tariff section 40.9.1.

## 6. Resource Exemptions from the RAIM

The existing tariff exempts a number of categories of resources from the standard capacity product.<sup>170</sup> The bulk of the current exemptions are due to the exempted contracts provision. Because of these exemptions, over 16,000 MW of resource adequacy capacity is not currently subject to the existing mechanism. This situation will only incrementally improve over the next 15 years as resources' exempted capacity contracts gradually expire.<sup>171</sup>

In light of the significant changes and reliability challenges that the grid will face in future years, it is imperative that all resources have the proper incentives to perform to support reliable grid operations. Reliability is best served by minimizing the extent to which resources are exempted from the RAIM. Therefore, as described below, the CAISO is proposing to exempt a narrower set of resource adequacy resources than does the standard capacity product mechanism.

### a. Exempt Resources from Flexible, System, and Local RAIM Provisions

The following categories of resources, the first two of which are also exempt from the standard capacity product, will be exempt from the RAIM in its entirety:<sup>172</sup>

- Resources with a PMax of less than 1.0 MW.<sup>173</sup> In 2014, there were 58 resources with an NQC of greater than 0 MW and less than 1 MW that could provide a total of 28 MW of capacity.
- Non-specified resources that provide resource adequacy capacity under contracts for energy delivered within the CAISO balancing authority area.<sup>174</sup>

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<sup>170</sup> See existing tariff section 40.9.2.

<sup>171</sup> See Addendum at 15.

<sup>172</sup> New tariff section 40.9.2.

<sup>173</sup> New tariff section 40.9.2(a)(1). Such resources are also exempt from the standard capacity product pursuant to existing tariff section 40.9.2(1).

<sup>174</sup> New tariff section 40.9.2(a)(2). Such resources are also exempt from the standard capacity product pursuant to existing tariff section 40.9.2(5).

- Participating load that is also pumping load.<sup>175</sup> Such load will be exempt due to its unique must-offer requirement that requires real-time energy offers only if the resource receives a day-ahead ancillary service schedule. The RAIM framework cannot accommodate this. There are only five resources that fall under this exemption.
- Reliability must-run units.<sup>176</sup> There are only two resources currently under reliability must-run contracts. The CAISO has the rights to operate reliability must-run resources for the purposes of meeting local reliability needs or managing congestion on non-competitive paths without the resource providing bids to the market. These resources count toward the resource adequacy requirement, but do not have the same must-offer obligations. Therefore, the CAISO wants to make clear they will not be assessed under the RAIM.

**b. Exemptions from RAIM Provisions Applicable to only Local and System Resource Adequacy Capacity**

Four categories of resources will be exempt from the RAIM provisions applicable to only local and system resource adequacy capacity. These exemptions ensure that resources are not double-penalized for poor performance, and ensure that resources are not unfairly rewarded at the expense of better performing resources. The four categories of exemptions are discussed separately below.

**(i) Variable energy resources**

Variable energy (primarily wind and solar) resources will be exempt from the local and system RAIM provisions.<sup>177</sup> There are several reasons for this exemption. The amount of resource adequacy capacity variable energy resources may provide is dependent on historical performance. The expectation is not that the resource will be able to meet this performance level in every hour, but that on average the resource will be able to provide this much capacity. Unlike an energy bid for thermal generation, the forecast may exceed the variable energy resource's resource adequacy capacity value. It also is expected that it would be less than this value because the forecast is merely an average

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<sup>175</sup> New tariff section 40.9.2(a)(3).

<sup>176</sup> New tariff section 40.9.2(a)(4).

<sup>177</sup> New tariff section 40.9.2(b)(1)(A).

over a long period of time and not an hourly expected minimum value. Therefore, it would be overly punitive to assess variable energy resources similar to thermal generation and hold them responsible in every hour up to their local or system resource adequacy capacity values.

One alternative would be to assess a variable energy resource under the RAIM using the resource's forecast as a baseline for comparison. However, such an alternative approach would be problematic for several reasons. First, the forecast to some extent captures outages. This is because it is unlikely the entire variable energy resource will go on outage and instead a single turbine or panel may not be working. This will simply lower the forecast for the resource or potentially not impact the forecast at all. The CAISO will still insert self-schedules up to the CAISO forecast or the resource-provided forecast amount so this method would guarantee 100-percent availability for all variable energy resources even if a portion of the resource is unavailable. The only way a variable energy resource's availability would be impacted is if the entire resource went on outage, and the CAISO created a baseline forecast for the resource assuming it would not be on outage (*i.e.*, the CAISO did not simply adjust the forecast to zero). In practice, variable energy resources very rarely entirely go on outage, and their outages are typically outages that would exempt them from the RAIM anyway (*e.g.*, due to testing, CAISO equipment malfunction, *etc.*) Creating this functionality for variable energy resources would be overly burdensome for the CAISO settlements process and would not provide any useful incentives to variable energy resources. Additionally, this methodology could be unfair to other resource adequacy resources as described below.

Under the alternative methodology for variable energy resources, these resources would likely be 100-percent available most of the time and therefore be eligible for payments out of the pool of RAIM non-availability charges. These payments are paid from that pool, so if variable energy resources perform up to the forecast, even if this forecast is low due to external factors, the alternative methodology would be taking away payments from resources that are in fact performing up to their resource adequacy amounts in every hour. In other words, absent the exemption, these variable energy resources could be rewarded for performing less than other resources. The CAISO's proposed exemption strengthens the incentives for resources that are most likely to respond to CAISO performance payments by not lowering potential payments.

The CAISO also notes that on May 26, 2015, CPUC Administrative Law Judge Gamson issued a proposed decision that would approve a CPUC Energy Division staff proposal in the annual resource adequacy proceeding to reduce the amount of capacity variable energy resources and combined heat and power

resources can sell in future resource adequacy compliance years based on their historic performance.<sup>178</sup> If the CPUC adopts this proposal at its June 2015 meeting, outages in one year may directly reduce the amount of capacity the resources may sell in the next year. Applying an availability incentive penalty to these resources, in addition to their facing a reduction in the amount of capacity they can offer as a result of prior outages, would essentially result in a double penalty for these resources. That is the reason these resources were initially exempt from the initial standard capacity product. In exempting these resources from the standard capacity product, the Commission recognized that “it would be a harsh result to apply the same availability standards, which are designed to penalize poor performance, to resources already subject to qualifying capacity adjustments.”<sup>179</sup> The proposed decision recognizes that the adopted proposal is consistent with the CAISO’s proposal to exempt variable energy resources from the RAIM.

Finally, the variable energy resource community pointed out that variable energy resources typically are procured under contracts that either provide payments for energy produced or have severe penalties for under-performance. This is consistent with the investor-owned utilities’ *pro forma* contracts that the CAISO reviewed, as approved by the CPUC, which include provisions for non-performance. Inasmuch as these contracts are specific to wind and solar and are extremely standardized (unlike contracts for other resource types) the CAISO potentially would be double-penalizing renewables for non-performance without this exemption.

None of the aforementioned reasons, however, are applicable to flexible resource adequacy capacity provided by variable energy resources and, as such, the CAISO is not exempting variable energy resources from the RAIM as it pertains to flexible capacity performance. The CPUC does not consider whether variable energy resources economically bid into the CAISO when establishing the net qualifying resource adequacy value and the CAISO does not automatically insert an economic bid on behalf of variable energy resources that provide flexible resource adequacy capacity. The CAISO will assess flexible variable energy resource adequacy capacity based on whether the resource provides economic offers up to the CAISO forecast. There are no gaming concerns because the scheduling coordinator must economically offer into the market and CAISO settlements will use the economic bids to calculate availability, not the CAISO forecast that is inserted absent economic bidding.

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<sup>178</sup> Proposed Decision, Rulemaking 14-10-010, at 15-25 (May 26, 2015).

<sup>179</sup> *Cal. Indep. Sys. Operator Corp.*, 127 FERC ¶ 61,298, at P 56.

Therefore, variable energy resources should not be exempted from the assessment of availability for flexible capacity.

**(ii) Combined heat and power resources**

The second exemption from the RAAIM provisions is for combined heat and power resources.<sup>180</sup> The megawatt amount that a combined heat and power resource can sell as resource adequacy capacity from year to year is dependent on the historical output from the plant as described above for variable energy resources. Also, combined heat and power resources have the additional obligation of having a host facility that complicates whether and when the resource can generate for the CAISO market compared with the host. Because of these complicating factors, combined heat and power contracts have penalties for non-performance already in place to ensure performance. Although the CAISO can standardize performance measures for the majority of resources, combined heat and power resources have unique characteristics and CPUC counting rules that lead availability to be better accounted for in individual contracts and by the CPUC rather than potentially overly penalized by the CAISO. Therefore, these resources already have an incentive to perform and would be double-penalized under the RAAIM because the CAISO would assess a non-availability charge to the resource, and in some cases resources would have a lowered amount of capacity available to sell and in other cases resources would have contract penalties.

**(iii) Capacity of a resource with a load-following metered subsystem as its scheduling coordinator**

The capacity of a resource with a load-following metered subsystems as its scheduling coordinator that is designated on a load-following metered subsystem's monthly resource adequacy plan will be exempt from the RAAIM provisions applicable to local and system capacity, to the extent that capacity is also designated as resource adequacy capacity on the monthly supply plan of a load-following metered subsystem.<sup>181</sup>

**(iv) Resources with qualifying facility contracts that are resource adequacy resources**

Resources with existing or amended qualifying facility contracts that are resource adequacy resources and that meet other specified requirements will be

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<sup>180</sup> New tariff section 40.9.2(b)(1)(B).

<sup>181</sup> New tariff section 40.9.2(b)(2).

exempt from the RAIM provisions applicable to local and system capacity. A similar exemption applies under the existing standard capacity product tariff provisions.<sup>182</sup>

**c. Exemption from RAIM Provisions Applicable to Flexible Resource Adequacy Capacity**

A load-serving entity may meet its flexible requirements by combining two use-limited resources that individually would qualify for a peak or super-peak flexible category to meet the must-offer obligations of the base flexible category. The entire capacity of use-limited resources in a combination will be exempt from the RAIM provisions applicable to flexible resource adequacy capacity.<sup>183</sup> This exemption reflects the fact that assessing whether two resources combined have met a single must-offer obligation would be overly burdensome for the CAISO to calculate and enforce. The challenge in applying the RAIM to combined resources is best illustrated through a simple example. Suppose resource A and resource B combined to provide 100 MW in the base flexible category, and resource A additionally provided 20 MW of peak flexible capacity. On the non-holiday, week-day in hour 20, resource A offers 50 MW and resource B offers 40 MW. The CAISO would have to decide how to treat this situation. Is the combination short 10 MW and resource A short 20 MW, or is the combination short 30 MW and resource A fully compliant with the peak flexible requirement? In one instance the resource would be unavailable for one-fifth of the hours for the day and in another instance the megawatts would be unavailable for one-seventeenth of the hours of the day. These divergent situations lead to different availability measurements and potential non-availability charges. In either situation, the CAISO would have to track whether the non-availability applies to the resource's combination obligation or individual obligation.

Similar tracking would also have to be done for outages. Assume resource A has a PMax of 70 MW and experiences a 30 MW exempt outage. Does the exemption apply to the individual portion or the combination? These rules would quickly become overly burdensome and costly for the CAISO to try to transparently calculate and monitor, especially considering the CAISO only has only one combination resource at this time and does not expect a significant increase in resources signing up in combinations.

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<sup>182</sup> Compare new tariff section 40.9.2(b)(3) with existing tariff section 40.9.2(8).

<sup>183</sup> New tariff section 40.9.2(c).

#### **d. Exemptions for Acquired Resources**

The CASO proposes to provide exemptions from the RAIM for “acquired resources,” which are defined as resources providing resource adequacy capacity under resource-specific power supply contracts that were exempt from the provisions of the standard capacity product at the time the RAIM became effective.<sup>184</sup> The reason these resources were exempt from the standard capacity product mechanism was because it was assumed these resources had performance provisions in their contracts that could not be renegotiated, and therefore determining availability under the outage-based standard capacity product mechanism would have potentially resulted in a double penalty on unavailability due to an outage.

Under the RAIM, the CAISO is closing a gap in the previous exemption. Although the intent and assumption was that exempted preexisting contracts contained performance provisions, that requirement was not expressly enforced in the tariff. Thus, the possibility existed that resources were exempted from the standard capacity product even though their contracts did not actually contain performance provisions, and they would not have been subject to double penalties. Therefore, under the RAIM, the capacity of an acquired resource will be exempt from the RAIM provisions applicable to local and system resource adequacy capacity only if the resource provides resource adequacy capacity under a resource-specific supply contract that (1) was exempt from the standard capacity product when the RAIM went into effect and continues to meet the requirements for that exemption; (2) includes an availability provision, or the resource under the power supply contract is located outside of the CAISO balancing authority area and jointly operated with project participants located outside of that balancing authority area, such that no single load-serving entity with contractual rights for the resource’s output has the ability to effect changes to the resource’s availability; and (3) does not contain a provision that allows the contract to be modified for regulatory changes.<sup>185</sup> If a resource has a contractual performance provision and cannot renegotiate the contract, or if the resource is external the CAISO balancing authority area and jointly operated with external project participants, such that a single load-serving entity contracting for the output of the resource does not have the ability to change the resource’s

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<sup>184</sup> Tariff appendix A, definition of new term “Acquired Resource”.

<sup>185</sup> New tariff section 40.9.2.1(a). With regard to the first of the requirements listed above, new tariff section 40.9.2.1(a)(1) references the provisions of tariff sections 40.9.2(1) and 40.9.2(2) contained in tariff appendix J. In this regard, the CAISO proposes to revise tariff appendix J to include the referenced tariff sections as grandfathered provisions. Grandfathered tariff sections 40.9.2(1) and 40.9.2(2) are identical to existing tariff sections 40.9.2(2) and 40.9.2(3), respectively.

availability, it is reasonable to exempt these resources from the RAAIM. However, if a resource does not have any performance standards or can renegotiate the contract to remove or alter the performance standard, then the resource should be held to the same standards and rules as other similar resource adequacy resources.

The scheduling coordinator for the acquired resource must demonstrate that it meets these eligibility criteria by timely submitting an affidavit for resource adequacy compliance year 2016 and recertifying that the information in the affidavit remains accurate each subsequent resource adequacy compliance year until the contract terminates.<sup>186</sup> The CAISO will review of the information the scheduling coordinator provides and determine whether an exemption is appropriate or if the CAISO requires additional information to make that determination.<sup>187</sup> This exemption ensures that resources subject to pre-existing contracts with performance standards and that were exempt from the standard capacity product are not double-penalized for their non-performance, or that a load-serving entity with contractual rights to an external generation project is not penalized if it lacks the ability to affect the resource's availability. Otherwise, if resources are not subject to non-performance penalties in their existing contracts, they should not be exempt from the new RAAIM provisions. These resources would have no out-of-market incentives to perform. The goal should be to minimize the number of exemptions and ensure that sufficient incentives are in place for all resources to perform and satisfy their must-offer obligations. Poor performance should not be excused and exempted from financial consequences. The CAISO notes that the Commission approved stronger pay-for-performance measures for ISO New England to better incentivize generator performance.<sup>188</sup> The Commission stated that "exemptions for non-performance should be minimal."<sup>189</sup> The CAISO's proposed tariff changes are consistent with these objectives.

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<sup>186</sup> New tariff section 40.9.2.1(b).

<sup>187</sup> New tariff section 40.9.2.1(c).

<sup>188</sup> *ISO New England*, 147 FERC ¶ 61,172.

<sup>189</sup> *Id.* at P 62.

**e. CAISO Response to Stakeholder Issues**

**(i) Exemptions for variable energy resources and combined heat and power resources**

Some stakeholders objected to the CAISO's proposal to exempt variable energy resources and combined heat and power resources from the RAIM. The CAISO believes that both exemptions are appropriate for the reasons discussed above. Specifically, the exemptions are necessary to (1) ensure that these resources are not subject to double performance penalties, once in their contracts or by the CPUC rules that would reduce their eligible capacity in future years, and again through application of the RAIM, (2) address the potential issues associated with under-forecasting by these resources, and (3) ensure that resources that are not consistently meeting their resource adequacy values. The CAISO notes that these exemptions will be limited to the resource adequacy local and system capacity of these resources, and not their flexible resource adequacy capacity.

**(ii) Exemption requested by stakeholder for lack of fuel**

A stakeholder argued that the CAISO should also exempt a resource on a forced outage due to lack of fuel. Generator availability should not be excused due to a lack of fuel. The Commission is well aware of the generator availability and system reliability problems encountered by the eastern independent system operators due to a lack of fuel assurance by resource adequacy resources. The Commission has noted that “[f]uel assurance is a key to ensuring generator performance, which directly contributes to the overall reliability of the grid and just and reasonable rates” and that “[f]ailure to address fuel assurance could lead ISOs/RTOs to take costly actions to ensure reliability.”<sup>190</sup> In its Fuel Assurance Order the Commission identified market reform options to promote fuel assurance ranging from (i) stiffer penalties for failure to perform in order to encourage capacity resources to enter into firmer fuel arrangements, to (ii) mechanisms specifically requiring capacity resources to have certain fuel arrangements in place in order to be eligible to provide resource adequacy.<sup>191</sup> For example, the Commission approved stronger pay-for-performance measures for ISO New England to better incentivize generator performance and spur fuel

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<sup>190</sup> *Centralized Capacity Markets in Regional Transmission Organizations and Independent System Operators*, 149 FERC ¶ 61,145, at P 8 (2014) (“Fuel Assurance Order”).

<sup>191</sup> *Id.* at P 15.

assurance-related investments.<sup>192</sup> As discussed above, the Commission has stated that “exemptions for non-performance should be minimal.”<sup>193</sup> Exempting generators from availability incentive charges due to a lack of fuel would constitute an inappropriate step backwards in promoting fuel assurance and generator performance and would be contrary to the Commission’s efforts in the Fuel Assurance Order.

#### **E. Maintenance Outage Requests Made Four To Seven Days Ahead of Time as Forced Outages**

Under the existing tariff provisions, if the scheduling coordinator of a resource adequacy resource designated as resource adequacy capacity during the resource adequacy month submits a request for a maintenance outage no more than seven days and no fewer than four days prior to the start date of the outage, and it otherwise meets the applicable tariff requirements, the CAISO outage coordination office may approve the request as a forced outage, which is then treated as a forced outage exempt from the standard capacity product.<sup>194</sup>

The CAISO proposed this exemption in conjunction with the tariff amendment to improve the outage management process.<sup>195</sup> The CAISO changed the date by which scheduling coordinators for resources must submit planned outage requests from three to seven days prior to the start date of the outage in order to have a consistent timeline for requesting planned outages for resources and transmission facilities and to improve the accuracy of the network model by providing sufficient time for the CAISO to process and analyze outages and include them in the market runs. The CAISO exempted maintenance outage requests submitted four to seven days in advance of the start date of the outage from the standard capacity product in response to stakeholder concerns that the changed timeline would require them either to procure more substitute capacity to cover the additional resource adequacy capacity that would be on forced outage or pay additional non-availability charges due to the increase in the forced outage rate.

Because the RAIM will supersede and replace the standard capacity product and address forced outages as discussed above, the CAISO proposes to

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<sup>192</sup> *ISO New England*, 147 FERC ¶ 61,172.

<sup>193</sup> *Id.* at P 62.

<sup>194</sup> Existing tariff sections 9.3.1.3.3.1(c)(4), 9.3.1.3.3.2(c)(4), 9.3.1.3.3.3(c)(3).

<sup>195</sup> *Cal. Indep. Sys. Operator Corp.*, 148 FERC ¶ 61,168 (2014).

delete these existing tariff provisions.<sup>196</sup> The RAIM provisions will determine availability based on the submission of economic bids and self-schedules, rather than on the forced outage rate calculation used under the standard capacity product. Accordingly, the basis for the exemption no longer exists.

#### **F. Eliminate the Unused Category of Modified Reserve Load-Serving Entity**

As noted above, each scheduling coordinator for a load-serving entity with demand in the CAISO balancing authority area must demonstrate that it satisfies the resource adequacy provisions set forth in tariff section 40, either as (1) a reserve sharing load-serving entity, (2) a modified reserve sharing load-serving entity, or (3) a load-following metered subsystem.<sup>197</sup> The CAISO proposes to eliminate the second of these categories, the modified reserve sharing load-serving entity, because no entity has yet used this category and there is no indication that the category ever will be used. As a result, the only categories will be load-serving entities (which no longer need the words “reserve sharing” at the start of their name to differentiate them from modified reserve sharing load-serving entities) and load-following metered subsystems.

To implement these changes, the CAISO proposes to delete existing tariff sections 40.1.1 (addressing the election of load-serving entity status), 40.2.3 and the subsections thereunder (addressing modified reserve sharing load-serving entities), and 40.5 and the subsections thereunder (addressing requirements solely applicable to modified reserve sharing load-serving entities). The CAISO also proposes to delete the words “reserve sharing” before “load-serving entities” and references to modified reserve sharing load-serving entities in other tariff provisions that contain such language.<sup>198</sup>

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<sup>196</sup> In addition, the CAISO proposes to remove the cross-reference to deleted tariff section 9.3.1.3.3.1(c)(4) contained in existing tariff section 9.3.1.3.1.1(d) and to update existing tariff sections 9.3.1.3.3.1(d), 9.3.1.3.3.3(c)(4) (as renumbered to reflect the deletion of tariff section 9.3.1.3.3.3(c)(3) described above), and 9.3.1.3.3.4(c)(2)-(4) to correctly reference the RAIM rather than the standard capacity product.

<sup>197</sup> Existing tariff section 40.1.1.

<sup>198</sup> The CAISO proposes to make these revisions to tariff sections 40.2.1, 40.2.1.1, 40.2.2 and the subsections thereunder, 40.6, and 40.7.2.

### **G. Revision of Use Plan Provision**

Existing tariff section 40.6.4.2 requires the scheduling coordinator for a use-limited resource adequacy resource to submit an annual use plan. The provision lists the types of information that must be included in the annual use plan – *i.e.*, expected generation, run hours, limitations, and operating constraints on a month-by-month basis. It also describes the process for submitting the use plan and updating it in the monthly resource adequacy plans.

As an initial transitional step toward expanding use-limited status to non-resource adequacy resources, and consistent with the commitment cost enhancements phase 2 filing referenced above, the CAISO proposes to revise this section to update the requirements so they better align with the CAISO's informational needs. In particular, the CAISO proposes to (1) eliminate the requirement that the specified information in the annual plan be delineated by month and (2) permit updates to the annual plan to be submitted at any time. The CAISO also proposes to move the details of the submission process into the Business Practice Manual.

### **H. Outage Reporting Requirement for Small Resource Adequacy Resources**

Existing tariff section 40.9.5 contains an outage reporting requirement for scheduling coordinators of generating units or resource-specific system resources that provide resource adequacy capacity with a maximum output capability of 1 MW or more that do not meet the requirement to provide information on their forced outages in accordance with tariff section 9.3.10. The CAISO proposes a similar reporting requirement in new tariff section 40.9.3.5(d). Specifically, scheduling Coordinators for resource adequacy resources with a PMax of at least one MW but less than 10 MW that do not meet the requirement to provide information on forced outages in accordance with tariff section 9.3.10 will be required report outages and de-rates in accordance with the process set forth the Business Practice Manual. These small resource adequacy resources are subject to the RAIM and the information is necessary for purposes of the RAIM availability assessment.

**I. Miscellaneous Clarifications and Revisions to Address Incorrect Uses of Terms, Typographical Errors, and Outdated Tariff Provisions**

**1. Clarifications**

The CAISO proposes to revise tariff section 40.2.2.3 to clarify that if the California Energy Commission does not produce a coincident peak demand forecast for a load-serving entity, the scheduling coordinator for that load-serving entity must provide the information requested by the CAISO. The revisions streamline the section and make it clearer.

The CAISO also proposes to clarify tariff section 40.2.4 to state that the scheduling coordinator for a load-following metered subsystem must submit not only an annual resource adequacy plan, as required under the existing tariff, but also a monthly resource adequacy plan and supply plan.

The CAISO clarifies tariff section 40.10.1.2(b)(2) to state that the scheduling coordinator for each load-serving entity in the CAISO balancing authority area must submit not only information that identifies wind and solar resources under contractual commitment to the load-serving entity, as required by the existing tariff, but also information that identifies such resources under contractual commitment to the load-following metered subsystem that is a load-serving entity.

The CAISO also proposes to revise tariff section 40.10.4.1(c)(2) to clarify that the CAISO will use the applicable baseline load data to measure the load modification of the proxy demand resource in determining its effective flexible capacity.

**2. Corrections**

The CAISO proposes to revise tariff section 40.10.4.1(c) to delete the word “response” from the term “proxy demand response resource,” because the tariff-defined term is proxy demand resource. The CAISO also proposes to correct typographical errors and make other minor revisions in tariff sections 40.2.4 and 40.6.9, and to delete tariff sections 40.2.1.1(f), 40.2.2.4(f), and 40.4.7.1(e), which have become outdated because they concern time periods that have already passed.

#### IV. EFFECTIVE DATE

The CAISO respectfully requests that the Commission issue an order by September 21, 2015 accepting the tariff revisions contained in this filing effective as of March 1, 2016, except for the tariff revisions requiring load-following metered subsystem load-serving entities to submit annual and monthly resource adequacy plans, for which the CAISO requests an effective date of January 10, 2016.<sup>199</sup>

Pursuant to Section 35.11 of the Commission's regulations, 18 C.F.R. § 35.11, the CAISO also requests a waiver of Section 35.3 of the Commission's regulations, 18 C.F.R. §35.3, to allow the proposed tariff provisions to go into effect more than 120 days after this tariff amendment filing. Good cause exists for both the waiver and issuance of a Commission order by September 21, 2015. Implementation of the significant number of revised resource adequacy and outage requirements proposed herein will require substantial systems and process changes. The CAISO and market participants need adequate time to design, develop, implement, and test these systems and processes. Therefore, granting the requested waiver is appropriate.

#### V. COMMUNICATIONS

Correspondence and other communications regarding this filing should be directed to:

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<sup>199</sup> The tariff revisions for which the CAISO requests an effective date of January 10, 2016 are contained in tariff sections 40.2.4, 40.10.5.1(a), and 40.10.5.1.1.

## **VI. SERVICE**

The CAISO has served copies of this filing on the CPUC, the California Energy Commission, and all parties with Scheduling Coordinator Agreements under the CAISO tariff. In addition, the CAISO has posted a copy of the filing on the CAISO website.

## **VII. CONTENTS OF FILING**

In addition to this transmittal letter, this filing includes the following attachments:

Attachment A	Clean CAISO tariff sheets incorporating this tariff amendment
Attachment B	Red-lined document showing the revisions contained in this tariff amendment
Attachment C	Addendum
Attachment D	Board Memorandum
Attachment E	DMM Memorandum
Attachment F	MSC Final Opinion
Attachment G	List of key dates in the stakeholder process

## VIII. CONCLUSION

For the reasons set forth in this filing, the CAISO respectfully requests that the Commission issue an order by September 21, 2015 accepting accept the tariff revisions contained in this filing effective as of March 1, 2016; except for the tariff revisions requiring load-following metered subsystem load-serving entities to submit resource adequacy plans, for which the CAISO requests an effective date of January 10, 2016.

Respectfully submitted,

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**Attachment A – Clean Tariff Records**  
**Reliability Services Initiative Phase 1A**  
**California Independent System Operator Corporation**

#### 9.3.1.3.3.1 RA Maintenance Outage With Replacement

(a) **Replacement Option.** The Scheduling Coordinator of a Resource Adequacy Resource designated as Resource Adequacy Capacity during the resource adequacy month may request that a planned Maintenance Outage be scheduled, or an Approved Maintenance Outage be rescheduled, as an RA Maintenance Outage With Replacement during that month.

(b) **Request.** A request for an RA Maintenance Outage With Replacement must (i) be submitted to the CAISO Outage Coordination Office no more than forty-five days prior to the first day of the resource adequacy month for which the outage is requested and no less than eight days prior to the start of the outage,(ii) provide RA Replacement Capacity in an amount no less than the Resource Adequacy Capacity designated for the resource for the duration of the scheduled outage, and (iii) otherwise comply with the requirements set forth in Section 9.

(c) **Approval.**

- (1) The CAISO Outage Coordination Office will consider requests for an RA Maintenance Outage With Replacement in the order the requests are received.
- (2) The CAISO Outage Coordination Office may approve the request for an RA Maintenance Outage With Replacement if it determines that (i) the request meets the requirements in Section 9.3.1.3.3.1(b) and (ii) system conditions and the overall outage schedule provide an opportunity to take the resource out of service without a detrimental effect on the efficient use and reliable operation of the CAISO Controlled Grid.
- (3) If the request was submitted no more than forty-five days prior to the first day of the resource adequacy month for which the outage is requested and no less than eight days prior to the start date for the outage, and it meets the requirements in Section 9.3.1.3.3.1(c)(2) the CAISO Outage Coordination Office may approve the request as an RA Maintenance Outage With Replacement,
- (4) If the CAISO Outage Coordination Office denies the request for failing to meet the requirements in Section 9.3.1.3.3.1(c)(2), the Scheduling Coordinator for the Resource Adequacy Resource may request a different schedule for the RA

Maintenance Outage With Replacement or may request that the CAISO Outage Coordination Office accommodate the outage without RA Replacement Capacity at another time.

- (d) **Resource Adequacy Obligation.** The RA Replacement Capacity for an RA Maintenance Outage With Replacement approved under Section 9.3.1.3.3.1(c)(3) shall be subject to all of the availability, dispatch, testing, reporting, verification and any other applicable requirements imposed on Resource Adequacy Resources by the CAISO Tariff, including the must-offer obligations in Section 40.6 and the RAAIM provisions in Section 40.9, for the MW amount and duration of the outage replacement period, which includes the full day of the start date and the full day of the end date of the outage.

#### **9.3.1.3.3.2 RA Maintenance Outage Without Replacement**

- (a) **Option for No Replacement.** The Scheduling Coordinator for a Resource Adequacy Resource designated as Resource Adequacy Capacity during the resource adequacy month may request that a Maintenance Outage be scheduled, or an Approved Maintenance Outage be rescheduled, as an RA Maintenance Outage Without Replacement, without a requirement to provide RA Replacement Capacity for the unavailable capacity for the duration of the outage.
- (b) **Request.** A request for an RA Maintenance Outage Without Replacement must (i) be submitted to the CAISO Outage Coordination Office no more than forty-five days prior to the first day of the resource adequacy month for which the outage is requested and no less than eight days prior to the start date of the outage, and (ii) otherwise comply with the requirements of Section 9.
- (c) **Approval.**
  - (1) The CAISO Outage Coordination Office will consider requests received for an RA Maintenance Outage Without Replacement in the order the requests were received.
  - (2) The CAISO Outage Coordination Office may approve a request for an RA Maintenance Outage Without Replacement if it determines that (i) the request

meets the requirements in Section 9.3.1.3.3.2(b), (ii) system conditions and the overall outage schedule provide an opportunity to take the resource out of service without a detrimental effect on the efficient use and reliable operation of the CAISO Controlled Grid, and (iii) the outage will not result in insufficient available Resource Adequacy Capacity during the outage period. The analysis of system conditions and the overall outage schedule will include Approved Maintenance Outage requests that were received before and after the request for an RA Maintenance Outage Without Replacement.

- (3) The CAISO Outage Coordination Office will not approve a request for an RA Maintenance Outage Without Replacement earlier than seven days before the first day of the resource adequacy month, and may hold the request as pending until system conditions are sufficiently known for the CAISO to determine whether the outage meets the requirements in Section 9.3.1.3.3.2(c)(2).
- (4) If the CAISO Outage Coordination Office denies a request for an RA Maintenance Outage Without Replacement for failing to meet the requirements in Section 9.3.1.3.3.2(c)(2), the Scheduling Coordinator for the Resource Adequacy Resource may request an RA Maintenance Outage with Replacement or may request that the CAISO Outage Coordination Office accommodate the outage at another time.

#### **9.3.1.3.3.3 Off-Peak Opportunity RA Maintenance Outage**

- (a) **Option for Off-Peak Outage.** The Scheduling Coordinator for a Resource Adequacy Resource designated as Resource Adequacy Capacity during the resource adequacy month may submit a request for an Off-Peak Opportunity RA Maintenance Outage without a requirement to provide RA Replacement Capacity for the unavailable capacity for the duration of the outage.
- (b) **Request.** A request for an Off-Peak Opportunity RA Maintenance Outage must (i) be submitted to the CAISO Outage Coordination Office no more than forty-five days prior to the first day of the resource adequacy month for which the outage is requested and no

less than eight days prior to the start date for the outage, (ii) schedule the outage to begin during off-peak hours (as specified in the Business Practice Manual) on a weekday, and to be completed prior to on-peak hours (as specified in the Business Practice Manual) the following weekday, or to begin during off-peak hours (as specified in the Business Practice Manual) on Friday, or on Saturday, Sunday, or a holiday, and to be completed prior to on-peak hours (as specified in the Business Practice Manual) on the next weekday and (iii) otherwise comply with the requirements set forth in Section 9.

(c) **Approval.**

- (1) The CAISO Outage Coordination Office will consider requests for an Off-Peak Opportunity RA Maintenance Outage in the order the requests were received.
- (2) If the request was submitted no more than forty-five days prior to the first day of the resource adequacy month for which the outage is requested and no less than eight days prior to the start date for the outage, the CAISO Outage Coordination Office may approve the request as an Off-Peak Opportunity RA Maintenance Outage if it determines that (i) the request meets the requirements set forth in Section 9.3.1.3.3.3(b) and (ii) system conditions and the overall outage schedule provide an opportunity to take the resource out of service without a detrimental effect on the efficient use and reliable operation of the CAISO Controlled Grid.
- (3) If the CAISO Outage Coordination Office denies a request for an Off-Peak Opportunity RA Maintenance Outage for failing to meet the requirements in Section 9.3.1.3.3.3(c)(2), the Scheduling Coordinator for the Resource Adequacy Resource may request an RA Maintenance Outage with Replacement or may request that the CAISO Outage Coordination Office accommodate the outage at another time.
- (4) To the extent that an approved Off-Peak Opportunity RA Maintenance Outage is not completed during off-peak hours as scheduled, and extends into on-peak hours, the Scheduling Coordinator for the resource shall submit the portion of the outage that extends into on-peak hours as a new Forced Outage, which shall be

subject to the RAIM provisions in Section 40.9.

**9.3.1.3.3.4 Short-Notice Opportunity RA Outage**

- (a) **Option for Short-Notice Outage.** The Scheduling Coordinator for a Resource Adequacy Resource designated as Resource Adequacy Capacity during the resource adequacy month may submit a request for a Short-Notice Opportunity RA Outage without a requirement to provide RA Replacement Capacity or RA Substitute Capacity for the Resource Adequacy Capacity that will be on the Forced Outage or de-rate.
- (b) A Short-Notice Opportunity RA Outage shall not exceed five days in length. The request for a Short-Notice Opportunity RA Outage must (i) be submitted no more than seven days prior to the requested start date for the outage, (ii) provide the CAISO Outage Coordination Office adequate time to analyze the request before the outage begins, (iii) be submitted before the outage has commenced as a Forced Outage, and (iv) otherwise comply with the requirements of Section 9.
- (c) **Approval.**
  - (1) The CAISO Outage Coordination Office will consider Short-Notice Opportunity RA Outages in the order the requests are received.
  - (2) If the request was submitted no more than seven days and no less than four days prior to the start date of the outage, the CAISO Outage Coordination Office may approve the request as a Short Notice Opportunity RA Outage if it determines that (i) the outage and the request meet the requirements set forth in Section 9.3.1.3.3.4(b), (ii) system conditions and the overall outage schedule provide an opportunity to take the resource out of service without a detrimental effect on the efficient use and reliable operation of the CAISO Controlled Grid, and (iii) the outage will not result in insufficient available Resource Adequacy Capacity during the outage period. The approved outage will be a Forced Outage and will be subject to the RAIM provisions in Section 40.9.
  - (3) If the request was submitted three days or less prior to the start date of the outage, the CAISO Outage Coordination Office may approve the request as a

Forced Outage if it determines that (i) the outage and request meet the requirements set forth in Section 9.3.1.3.3.4(b), (ii) system conditions and the overall outage schedule provide an opportunity to take the resource out of service without a detrimental effect on the efficient use and reliable operation of the CAISO Controlled Grid, (iii) the outage will not result in insufficient available Resource Adequacy Capacity during the outage period, and (iv) the repairs are necessary to maintain system or resource reliability and require immediate attention to prevent equipment damage or failure. A Short-Notice Opportunity RA Outage approved under this Section will be a Forced Outage but it will not be subject to the RAIM provisions in Section 40.9.

- (4) To the extent that an approved Short-Notice Opportunity RA Outage is not completed during the originally approved outage schedule, the Scheduling Coordinator for the resource must submit the portion of the outage that continues from the approved completion time until the time the outage is actually completed as a new Forced Outage, which will be subject to the RAIM provisions in Section 40.9.

\* \* \*

#### **11.8.2.3.2 MSS Elected Net Settlement**

For an MSS Operator that has elected net Settlement, regardless of other MSS optional elections (Load following or RUC opt-in or out), the Energy bid costs and revenues for IFM Bid Cost Recovery is settled at the MSS level. The IFM Bid Cost as described in Section 11.8.2.1 above and IFM Market Revenue as provided in Section 11.8.2.2 above, of each MSS will be, respectively, the total of the IFM Bid Costs and IFM Market Revenues over all BCR Eligible Resources within the MSS where each BCR Eligible Resource's IFM Market Revenues for its Energy shall be calculated as described in Section 11.2.3.2 at the relevant IFM MSS price. The IFM Bid Cost Shortfalls and Surpluses for Energy and AS are first calculated separately for the MSS for each Trading Hour of the Trading Day with qualified Start-Up Cost and qualified Minimum Load Cost included in the IFM Bid Cost Shortfalls and Surpluses for Energy calculation.

The MSS's overall IFM Bid Cost Shortfall or Surplus is then calculated as the algebraic sum of the IFM Bid Cost Shortfall or Surplus for Energy and the IFM Bid Cost Shortfall or Surplus for AS for each Trading Hour.

\* \* \*

#### **11.8.4.3.2 MSS Elected Net Settlement**

For MSS entities that have elected net Settlement regardless of other MSS optional elections (i.e., Load following or not, or RUC opt-in or out), unlike non-MSS resources, the RUC and RTM Bid Cost Shortfall or Surplus is treated at the MSS level and not at the resource specific level, and is calculated as the RUC and RTM Bid Cost Shortfall or Surplus of all BCR Eligible Resources within the MSS. In calculating the Energy RTM Market Revenue for all the resources within the MSS as provided in Section 11.8.4.2, the CAISO will use the Real-Time Settlement Interval MSS Price. The RUC and RTM Bid Cost Shortfall and Surplus for Energy, RUC Availability and Ancillary Services are first calculated separately for the MSS for each Settlement Interval of the Trading Day, with qualified Start-Up Cost, qualified Minimum Load Cost and qualified Multi-Stage Generator transition cost included into the RUC and RTM Bid Cost Shortfalls and Surpluses of Energy calculation. The MSS's overall RUC and RTM Bid Cost Shortfall or Surplus is then calculated as the algebraic sum of the RUC and RTM Bid Cost Shortfall or Surplus for Energy and the RUC and RTM Bid Cost Shortfall or Surplus for AS for each Settlement Interval.\* \* \*

#### **40. Resource Adequacy Demonstration For All SCs In The CAISO BAA**

\* \* \*

##### **40.1.1 [Not Used]**

#### **40.2 Information Requirements For Resource Adequacy Programs**

##### **40.2.1 Load Serving Entities**

##### **40.2.1.1 Requirements for CPUC Load Serving Entities**

- (a) The Scheduling Coordinator for a CPUC Load Serving Entity must provide the CAISO with all information or data to be provided to the

CAISO as required by the CPUC and pursuant to the schedule adopted by the CPUC, except that the monthly Resource Adequacy Plans or the same information as required to be included in the monthly Resource Adequacy Plans, plus any other information the CAISO requires as identified in the Business Practice Manual, shall be submitted to the CAISO no less than 45 days in advance of the first day of the month covered by the plan, as provided in Section 40.2.1.1(e).

- (b) Where the information or data provided to the CAISO under Section 40.2.1.1(a) does not include Reserve Margin(s), then the provisions of Section 40.2.2.1(b) shall apply.
- (c) Where the information or data provided to the CAISO under Section 40.2.1.1(a) does not include criteria for determining qualifying resource types and their Qualifying Capacity, then the provisions of Section 40.8 shall apply.
- (d) Where the information or data provided to the CAISO under Section 40.2.1.1(a) does not include annual and monthly Demand Forecast requirements, then the provisions of Section 40.2.2.3 shall apply.
- (e) Where the information or data provided to the CAISO under Section 40.2.1.1(a) does not include annual and monthly Resource Adequacy Plan requirements, or where there is a requirement to submit monthly Resource Adequacy Plans but the submission date is less than 45 days in advance of the first day of the month covered by the plan, then Section 40.2.2.4 shall apply.

**40.2.2 Non-CPUC Load Serving Entities**

**40.2.2.1 Reserve Margin**

- (a) The Scheduling Coordinator for a Non-CPUC Load Serving Entity must provide the CAISO with the Reserve Margin(s) adopted by the

appropriate Local Regulatory Authority or federal agency for use in the annual Resource Adequacy Plan and monthly Resource Adequacy Plans listed as a percentage of the Demand Forecasts developed in accordance with Section 40.2.2.3.

- (b) For the Scheduling Coordinator for a Non-CPUC Load Serving Entity for which the appropriate Local Regulatory Authority or federal agency has not established a Reserve Margin(s) or a CPUC Load Serving Entity subject to Section 40.2.1.1(b), the Reserve Margin for each month shall be no less than fifteen percent (15%) of the LSE's peak hourly Demand for the applicable month, as determined by the Demand Forecasts developed in accordance with Section 40.2.2.3.

#### **40.2.2.2 Qualifying Capacity Criteria**

The Scheduling Coordinator for a Non-CPUC Load Serving Entity must provide the CAISO with a description of the criteria adopted by the Local Regulatory Authority or federal agency for determining qualifying resource types and the Qualifying Capacity from such resources and any modifications thereto as they are implemented from time to time. The LSE may elect to utilize the criteria set forth in Section 40.8.

#### **40.2.2.3 Demand Forecasts**

If the California Energy Commission does not produce a coincident peak Demand Forecast for a Load Serving Entity, the Scheduling Coordinator for that Load Serving Entity must provide the information requested by the CAISO on the schedule and in the reporting format(s) set forth in the Business Practice Manual.

#### **40.2.2.4 Annual and Monthly Resource Adequacy Plans**

The Scheduling Coordinator for a Non-CPUC Load Serving Entity or a CPUC Load Serving Entity subject to Section 40.2.1.1(b) must provide annual and monthly Resource Adequacy Plans for such Load Serving Entity, as follows:

- (a) Each annual Resource Adequacy Plan must be submitted to the CAISO on a schedule and in the reporting format(s) set forth in the Business Practice Manual.

The annual Resource Adequacy Plan must, at a minimum, set forth the Local Capacity Area Resources, if any, procured by the Load Serving Entity as described in Section 40.3.

- (b) Each monthly Resource Adequacy Plan or the same information as required to be included in the monthly Resource Adequacy Plan, plus any other information the CAISO requires as identified in the Business Practice Manual, must be submitted to the CAISO at least 45 days in advance of the first day of the month covered by the plan, and in accordance with the schedule and in the reporting format(s) set forth in the Business Practice Manual. The monthly Resource Adequacy Plan must identify all resources, including Local Capacity Area Resources, the Load Serving Entity will rely upon to satisfy the applicable month's peak hour Demand of the Load Serving Entity as determined by the Demand Forecasts developed in accordance with Section 40.2.2.3 and applicable Reserve Margin. Resource Adequacy Plans must utilize the Net Qualifying Capacity requirements of Section 40.4.
- (c) The Scheduling Coordinator for the Load Serving Entity may submit at any time from 45 days through 11 days in advance of the relevant month, a revision to its monthly Resource Adequacy Plan to correct an error in the plan. The CAISO will not accept any revisions to a monthly Resource Adequacy Plan from 10 days in advance of the relevant month through the end of the month, unless the Scheduling Coordinator for the Load Serving Entity demonstrates good cause for the change and explains why it was not possible to submit the change earlier.
- (d) In order to ensure that the CAISO's outage replacement determination remains accurate, the Scheduling Coordinator for the Load Serving Entity that submits a revision to its monthly Resource Adequacy Plan to correct an error must include in the revision a MW amount of Resource Adequacy Capacity for each day of month that is no less than the MW amount of Resource Adequacy Capacity included in its original plan for each day of the month.

- (e) In order to ensure that the amount of Resource Adequacy Capacity required to be included in the Load Serving Entity's Resource Adequacy Plan is operationally available to the CAISO throughout the resource adequacy month, the Load Serving Entity that submits the monthly Resource Adequacy Plan is subject to the replacement requirement in Section 9.3.1.3.1.

**40.2.3 [Not Used]40.2.4 Load-Following MSS**

- (1) **Annual RA Plan.** A Scheduling Coordinator for a Load-following MSS must provide an annual Resource Adequacy Plan that sets forth, at a minimum, the Local Capacity Area Resources, if any, procured by the Load-following MSS as described in Section 40.3. The annual Resource Adequacy Plan shall utilize the annual coincident peak Demand determination provided by the California Energy Commission for such Load-following MSS using Demand Forecast data submitted to the California Energy Commission by the Load-following MSS, or, if the California Energy Commission does not produce coincident peak Demand Forecasts for the Load-following MSS, the annual coincident peak Demand Forecast produced by the CAISO for such Load-following MSS in accordance with its Business Practice Manual using Demand Forecast data submitted to the CAISO by the Load-following MSS. .
- (2) **Monthly RA Plan and Supply Plan.** The Scheduling Coordinator for a Load-following MSS must submit a monthly Resource Adequacy Plan and Supply Plan on the schedule set forth in the Business Practice Manual.\* \* \*

**40.4.7 Submission Of Supply Plans**

**40.4.7.1 Schedule for Submission of Supply Plans**

Scheduling Coordinators representing Resource Adequacy Resources supplying Resource Adequacy Capacity shall provide the CAISO with annual and monthly Supply Plans, as follows:

- (a) The annual Supply Plan shall be submitted to the CAISO on the schedule set forth in the Business Practice Manual and shall verify their agreement to provide Resource Adequacy Capacity during the next Resource Adequacy Compliance Year.
- (b) The monthly Supply Plans or the same information as required to be included in

the monthly Supply Plan, plus any other information the CAISO requires as identified in the Business Practice Manual, shall be submitted to the CAISO at least 45 days in advance of the first day of the month covered by the plan, and in accordance with the schedule and in the reporting format(s) set forth in the Business Practice Manual, and shall verify their agreement to provide Resource Adequacy Capacity during that resource adequacy month.

- (c) The Scheduling Coordinator for the Resource Adequacy Resource may submit, at any time from 45 days through 11 days in advance of the relevant month, a revision to its monthly Supply Plan to correct an error in the plan. The CAISO will not accept any revisions to a monthly Supply Plan from 10 days in advance of the relevant month through the end of the month, unless the Scheduling Coordinator for the Resource Adequacy Resource demonstrates good cause for the change and explains why it was not possible to submit the change earlier.
- (d) The monthly Supply Plan may indicate the willingness of the resource to offer capacity for procurement as backstop capacity under the Capacity Procurement Mechanism pursuant to Section 43, and provide the identity of the resource, the available capacity amount, the time periods when the capacity is available, and other information as may be specified in the Business Practice Manual.

\* \* \*

**40.5 [Not Used]**

**40.6 Requirements For SCs And Resources For LSEs**

This Section 40.6 does not apply to Resource Adequacy Resources of Load-following MSSs. Scheduling Coordinators supplying Resource Adequacy Capacity shall make the Resource Adequacy Capacity listed in the Scheduling Coordinator's monthly Supply Plans under Section 40.4.7 available to the CAISO each hour of each day of the reporting month in accordance with this Section 40.6 and Section 9.3.1.3.

#### **40.6.1 Day-Ahead Availability**

Scheduling Coordinators supplying Resource Adequacy Capacity shall make the Resource Adequacy Capacity, available Day-Ahead to the CAISO, except as provided in Section 40.6.1.1 for specific resource types, and Section 40.6.4 for Use-Limited Resources, as follows:

- (1) Resource Adequacy Resources physically capable of operating must submit: (a) Economic Bids for Energy and/or Self-Schedules for all their Resource Adequacy Capacity and (b) Economic Bids for Ancillary Services and/or a Submission to Self-Provide Ancillary Services in the IFM for all of their Resource Adequacy Capacity that is certified to provide Ancillary Services. For Resource Adequacy Capacity that is certified to provide Ancillary Services and is not covered by a Submission to Self-Provide Ancillary Services, the resource must submit Economic Bids for each Ancillary Service for which the resource is certified. For Resource Adequacy Capacity subject to this requirement for which no Economic Energy Bid or Self-Schedule has been submitted, the CAISO shall insert a Generated Bid in accordance with Section 40.6.8. For Resource Adequacy Capacity subject to this requirement for which no Economic Bids for Ancillary Services or Submissions to Self-Provide Ancillary Services have been submitted, the CAISO shall insert a Generated Bid in accordance with Section 40.6.8 for each Ancillary Service the resource is certified to provide.
- (2) Resource Adequacy Resources must be available except for limitations specified in the Master File, legal or regulatory prohibitions or as otherwise required by this CAISO Tariff or by Good Utility Practice.
- (3) Through the IFM co-optimization process, the CAISO will utilize available Resource Adequacy Capacity to provide Energy or Ancillary Services in the most efficient manner to clear the Energy market, manage

congestion and procure required Ancillary Services. In so doing, the IFM will honor submitted Energy Self-Schedules of Resource Adequacy Capacity unless the CAISO is unable to satisfy one hundred percent (100%) of the Ancillary Services requirements. In such cases, the CAISO may curtail all or a portion of a submitted Energy Self-Schedule to allow Ancillary Service-certified Resource Adequacy Capacity to be used to meet the Ancillary Service requirements. The CAISO will not curtail for the purpose of meeting Ancillary Service requirements a Self-Schedule of a resource internal to a Metered Subsystem that was submitted by the Scheduling Coordinator for that Metered Subsystem. If the IFM reduces the Energy Self-Schedule of Resource Adequacy Capacity to provide an Ancillary Service, the Ancillary Service Marginal Price for that Ancillary Service will be calculated in accordance with Section 27.1.2 using the Ancillary Service Bids submitted by the Scheduling Coordinator for the Resource Adequacy Resource or inserted by the CAISO pursuant to this Section 40.6.1, and using the resource's Generated Energy Bid to determine the Resource Adequacy Resource's opportunity cost of Energy. If the Scheduling Coordinator for the Resource Adequacy Resource believes that the opportunity cost of Energy based on the Resource Adequacy Resource's Generated Energy Bid is insufficient to compensate for the resource's actual opportunity cost, the Scheduling Coordinator may submit evidence justifying the increased amount to the CAISO and to the FERC no later than seven (7) days after the end of the month in which the submitted Energy Self-Schedule was reduced by the CAISO to provide an Ancillary Service. The CAISO will treat such information as confidential and will apply the procedures in Section 20.4 of this CAISO Tariff with regard to requests

for disclosure of such information. The CAISO shall pay any higher opportunity costs approved by FERC.

- (4) A Resource Adequacy Resources must participate in the RUC to the extent that the resource has available Resource Adequacy Capacity that is not reflected in an IFM Schedule. Resource Adequacy Capacity participating in RUC will be optimized using a zero dollar (\$0/MW-hour) RUC Availability Bid.
- (5) Capacity from Resource Adequacy Resources selected in RUC will not be eligible to receive a RUC Availability Payment.

#### **40.6.1.1 Day-Ahead Availability -- Specific RA Resource Types**

##### **(a) Distributed Generation Facilities**

- (1) Distributed Generation Facilities that are not Use-Limited Resources under Section 40.6.4.1 shall comply with the IFM and RUC bidding requirements that apply to the same technology type of a resource connected to the CAISO Controlled Grid.
- (2) Distributed Generation Facilities that are Use-Limited Resources under Section 40.6.4.1 shall comply with the applicable IFM and RUC bidding requirements for Use-Limited Resources under Section 40.6.4.3.

##### **(b) Non-Generator Resources**

- (1) Non-Generator Resources that do not use Regulation Energy Management and are not Use-Limited Resources under Section 40.4.6.1 shall submit –
  - (A) Economic Bids or Self-Schedules into the IFM for all RA Capacity for all hours of the month the resource is physically capable of operating; and
  - (B) \$0/MW RUC Availability Bids for all RA Capacity for all hours of the month the resource is physically capable of operating,
- (2) Non-Generator Resources using Regulation Energy Management that are not Use-Limited Resources under Section 40.4.6.1 shall submit –

- (A) Economic Bids or Self-Schedules into the IFM for all RA Capacity for Regulation for all hours of the month the resource is physically capable of operating; and
  - (B) \$0/MW RUC Availability Bids for all RA Capacity for all hours of the month the resource is physically capable of operating,
  - (3) Non-Generator Resources that are Use-Limited Resources under Section 40.6.4.1 shall comply with the applicable IFM and RUC bidding requirements for Use-Limited Resources under Section 40.6.4.3.
- (c) **Extremely Long-Start Resources.** Extremely Long-Start Resources that are Resource Adequacy Resources must make themselves available to the CAISO by complying with –
- (1) the Extremely Long-Start Commitment Process under Section 31.7 or otherwise committing the ELS Resource upon instruction from the CAISO, if physically capable; and
  - (2) the applicable provisions of Section 40.6.1 regarding Day-Ahead availability for the Trading Days for which it was committed.

#### **40.6.2 Real-Time Availability**

- (a) **General Requirement.** Resource Adequacy Resources that have received an IFM Schedule for Energy or Ancillary Services or a RUC Schedule for all or part of their Resource Adequacy Capacity must remain available to the CAISO through Real-Time for Trading Hours for which they receive an IFM or RUC Schedule, including any Resource Adequacy Capacity of such resources that is not included in an IFM Schedule or RUC Schedule, except for Resource Adequacy Capacity that is subject to Section 40.6.4.
- (b) **Short Start Units or Long Start Units.** Short Start Units or Long Start Units that are Resource Adequacy Resources that do not have an IFM Schedule or a RUC Schedule for any of their Resource Adequacy Capacity for a given Trading Hour may be required to be available to the CAISO through Real-Time as specified in Sections 40.6.3 and 40.6.7. Resource Adequacy Resources with Resource Adequacy Capacity that is required to be available to the CAISO through Real-Time and does not have an IFM Schedule or a RUC

Schedule for a given Trading Hour must submit to the RTM for that Trading hour: (a) Energy Bids and Self-Schedules for the full amount of the available Resource Adequacy Capacity, including capacity for which it has submitted Ancillary Services Bids or Submissions to Self-Provide Ancillary Services; and (b) Ancillary Services Bids and Submissions to Self-Provide Ancillary Services for the full amount of the available Ancillary Service-certified Resource Adequacy Capacity and for each Ancillary Service for which the resource is certified, including capacity for which it has submitted Energy Bids and Self-Schedules. The CAISO will insert Generated Bids in accordance with Section 40.6.8 for any Resource Adequacy Capacity subject to the above requirements for which the resource has failed to submit the appropriate bids to the RTM.

(c) **Self-Schedules.** The CAISO will honor submitted Energy Self-Schedules of Resource Adequacy Capacity unless the CAISO is unable to satisfy one hundred (100) percent of its Ancillary Services requirements. In such cases, the CAISO may curtail all or a portion of a submitted Energy Self-Schedule to allow Ancillary Service-certified Resource Adequacy Capacity to be used to meet the Ancillary Service requirements, as long as such curtailment does not lead to a real-time shortfall in energy supply. If the CAISO reduces a submitted Real-Time Energy Self-Schedule for Resource Adequacy Capacity when that capacity is needed to meet an Ancillary Services requirement, the Ancillary Service Marginal Price for that capacity will be calculated in accordance with Sections 27.1.2 and 40.6.1.

(d) **Distributed Generation Facilities**

- (1) Distributed Generation Facilities that are not Use-Limited Resources under Section 40.6.4.1 shall comply with the RTM bidding requirements that apply to the same technology type of resource connected to the CAISO Controlled Grid.
- (2) Distributed Generation Facilities that are Use-Limited Resources under Section 40.6.4.1 shall comply with the applicable RTM bidding requirements for Use-Limited Resources under Section 40.6.4.3.

(e) **Non-Generator Resources**

- (1) Non-Generator Resources that do not use Regulation Energy Management and are not Use-Limited Resources under Section 40.4.6.1 shall submit –
  - (A) Economic Bids or Self-Schedules into the RTM for any remaining RA Capacity scheduled in the IFM or RUC; and
  - (B) Economic Bids or Self-Schedules into the RTM for all RA Capacity not scheduled in the IFM,
- (2) Non-Generator Resources using Regulation Energy Management that are not Use-Limited Resources under Section 40.4.6.1 shall submit –
  - (A) Economic Bids or Self-Schedules into the RTM for any remaining RA Capacity from resource scheduled in IFM or RUC; and
  - (B) Economic Bids or Self-Schedules into the RTM for all RA Capacity not scheduled in IFM,
- (3) Non-Generator Resources that are Use-Limited Resources under Section 40.6.4.1 shall comply with the applicable RTM bidding requirements for Use-Limited Resources under Section 40.6.4.3.

(f) **Extremely Long-Start Resources.**

Once an Extremely Long Start Resource providing Resource Adequacy Capacity is committed by the CAISO, it shall comply with the applicable provisions of Section 40.6.2 regarding Real-Time availability for the Trading Days for which it was committed.

\* \* \*

**40.6.4.2 Use Plan**

The Scheduling Coordinator shall provide for the following Resource Adequacy Compliance Year a proposed annual use plan for each Use-Limited Resource that is a Resource Adequacy Resource. For each Use-Limited Resource that is a Resource Adequacy Resource but is not a Reliability Demand Response Resource, the proposed annual use plan will provide the information described in the Business Practice Manual. The CAISO will have an opportunity to discuss the proposed annual use plan with the Scheduling Coordinator and suggest potential

revisions to meet reliability needs of the system. The Scheduling Coordinator shall then submit its final annual use plan. Scheduling Coordinators for Use-Limited Resources must submit the proposed and final annual use plans, and any updates to those use plans, in accordance with the schedule set forth in the Business Practice Manual. The annual use plan must reflect the potential operation of the Use-Limited Resource at a level no less than the minimum criteria set forth by the Local Regulatory Authority for qualification of the resource.

\* \* \*

#### **40.6.4.3.2 Hydro, RDRR, and Non-Dispatchable Use-Limited Resources**

(a) **Must-Offer Obligation.**

- (1) Hydroelectric Generating Units, Pumping Load, and Non-Dispatchable Use-Limited Resources, but not Reliability Demand Response Resources, shall submit Self-Schedules or Bids in the Day-Ahead Market for their expected available Energy or their expected as-available Energy, as applicable, in the Day-Ahead Market and RTM. Such resources shall also revise their Self-Schedules or submit additional Bids in RTM based on the most current information available regarding Expected Energy deliveries.
- (2) Hydroelectric Generating Units, Pumping Load, Reliability Demand Response Resources, Non-Dispatchable Use-Limited Resources, and Resource Adequacy Resources providing Regulatory Must-Take Capacity are not required to submit RUC Availability Bids for that capacity, but any such bids they do submit must be \$0/MW RUC Availability Bids.
- (3) Participating Load that is Pumping Load shall submit Economic Bids for Energy and/or a Submission to Self-Provide Ancillary Services in the Day-Ahead Market for its Resource Adequacy Capacity that is certified to provide Non-Spinning Reserve Ancillary Service, and Economic Bids in the Real-Time Market for its Non-Spinning Reserve Capacity that receives an Ancillary Service Award in the Day-Ahead Market.

- (b) **Determination of Non-Dispatchable Status.** The CAISO will retain discretion as to whether a particular resource should be considered a Non-Dispatchable Use-Limited Resource, and this decision will be made in accordance with the provisions of Section 40.6.4.1.

\* \* \* \*

#### **40.6.4.3.5 Proxy Demand Resources**

- (a) Short Start and Medium Start Proxy Demand Resources that provide Resource Adequacy Capacity shall submit \$0/MW RUC Availability Bids for all of their Resource Adequacy Capacity for all hours of the month the resource is physically available; however, any RUC schedule for these resources will not be binding.
- b) Long Start Proxy Demand Resources are not required to submit Bids or Self Schedules in the RUC for their Resource Adequacy Capacity.

\* \* \*

#### **40.6.8 Use Of Generated Bids**

- (a) **Day-Ahead Market.** Prior to completion of the Day-Ahead Market, the CAISO will determine if Resource Adequacy Capacity subject to the requirements of Section 40.6.1 and for which the CAISO has not received notification of an Outage has not been reflected in a Bid and will insert a Generated Bid for such capacity into the CAISO Day-Ahead Market.
- (b) **Real-Time Market.** Prior to running the Real-Time Market, the CAISO will determine if Resource Adequacy Capacity subject to the requirements of Section 40.6.2 and for which the CAISO has not received notification of an Outage has not been reflected in a Bid and will insert a Generated Bid for such capacity into the Real-Time Market.
- (c) **Partial Bids for RA Capacity.** If a Scheduling Coordinator for an RA Resource submits a partial bid for the resource's RA Capacity, the CAISO will insert a Generated Bid only for the remaining RA Capacity. In addition, the CAISO will determine if all dispatchable Resource Adequacy Capacity from Short Start Units, not otherwise selected in the IFM or RUC, is reflected in a Bid into the Real-Time Market and will insert a Generated Bid for

any remaining dispatchable Resource Adequacy Capacity for which the CAISO has not received notification of an Outage.

- (d) **Calculation of Generated Bids.** As provided in the Business Practice Manuals, a Generated Bid for Energy will be calculated and will include: (i) a greenhouse gas cost adder for a resource registered with the California Air Resources Board as having a greenhouse gas compliance obligation; and (ii) a volumetric Grid Management Charge adder that consists of: (i) the Market Services Charge; (ii) the System Operations Charge; and (iii) the Bid Segment Fee divided by the MW in the Bid segment. A Generated Bid for Ancillary Services will equal zero dollars (\$0/MW-hour).
- (e) **Exemptions.** Notwithstanding any of the provisions of Section 40.6.8, the CAISO will not insert any Bid in the Day-Ahead Market or Real-Time Market required under this Section 40 for Resource Adequacy Capacity of a Use-Limited Resource, Non-Generator Resource, Variable Energy Resource, or resource providing Regulatory Must-Take Generation unless the resource submits an Energy Bid and fails to submit an Ancillary Service Bid.
- (f) **NRS-RA Resources.** The CAISO will submit a Generated Bid in the Day-Ahead Market or Real-Time Market for a non-Resource Specific System Resource in each RAAIM assessment hour, to the extent that the resource provides Resource Adequacy Capacity subject to the requirements of Sections 40.6.1 or 40.6.2 and does not submit an outage request or Bid for the entire amount of that Resource Adequacy Capacity.

\* \* \*

#### **40.6.9 Firm Liquidated Damages Contracts Requirements**

Resource Adequacy Capacity represented by a Firm Liquidated Damages Contract and relied upon by a Scheduling Coordinator in a monthly or annual Resource Adequacy Plan shall be submitted as a Self-Schedule or Bid in the Day-Ahead IFM to the extent such scheduling right exists under the Firm Liquidated Damages Contract.

\* \* \*

#### **40.7.2 Penalties For Non-Compliance**

The failure of a Resource Adequacy Resource or Resource Adequacy Capacity to be available to the CAISO in accordance with the requirements of this Section 40 or Section 9.3.1.3, and the failure to operate a Resource Adequacy Resource by placing it online or in a manner consistent with a submitted Bid or Generated Bid shall be subject to the applicable Sanctions set forth in Section 37.2.4. However, any failure of the Resource Adequacy Resource to satisfy any obligations prescribed under this Section 40 or Section 9.3.1.3 during a Resource Adequacy Compliance Year for which Resource Adequacy Capacity has been committed to a Load Serving Entity shall not limit in any way, except as otherwise established under Section 40.4.5 or requirements of the CPUC, Local Regulatory Authority, or federal agency, as applicable, the ability of the Load Serving Entity to whom the Resource Adequacy Capacity has been committed to use such Resource Adequacy Capacity for purposes of satisfying the resource adequacy requirements of the CPUC, Local Regulatory Authority, or federal agency, as applicable. In addition, an LSE shall not be subject to any sanctions, penalties, or other compensatory obligations under this Section 40 on account of a Resource Adequacy Resource's satisfaction or failure to satisfy its obligations under this Section 40 or Section 9.3.1.3.

\* \* \*

#### **40.8.1.13 Proxy Demand Resources**

A Proxy Demand Resource must have the ability to (i) be dispatched for at least twenty-four hours per month, (ii) be dispatched on at least three consecutive days, and (iii) respond for at least four hours per dispatch in order to qualify as Resource Adequacy Capacity. The Qualifying Capacity of a Proxy Demand Resource, for each month, will be based on the resource's average monthly historic demand reduction performance during that same month during the Availability Assessment Hours, as described in Section 40.9.3, using a three-year rolling average. For a Proxy Demand Resource with fewer than three years of performance history, for all months for which there is no historic data, the CAISO will utilize a monthly megawatt value as certified and reported to the CAISO by the Demand Response Provider; otherwise, where available, the

CAISO will use the average of historic demand reduction performance data available, by month, for a Proxy Demand Resource.

#### **40.8.1.14 Reliability Demand Response Resources**

The Net Qualifying Capacity of a Reliability Demand Response Resource, for each month, will be based on the resource's average monthly historic demand reduction performance during that same month during the Availability Assessment Hours, as described in Section 40.9.3, using a three-year rolling average. For a Reliability Demand Response Resource with fewer than three years of performance history, for all months for which there is no historic data, the CAISO will use a monthly megawatt value as certified and reported to the CAISO by the Demand Response Provider; otherwise, where available, the CAISO will use the average of historic demand reduction performance data available, by month, for a Reliability Demand Response Resource.

#### **40.8.1.15 Distributed Generation Facilities**

- (a) Distributed Generation Facilities that meet the applicable requirements in Section 4.6 qualify as Resource Adequacy Capacity.
- (b) The CAISO will determine the Net Qualifying Capacity of each Distributed Generation Facility for each Resource Adequacy Compliance Year consistent with similar resource classifications connected to the transmission system, as provided in Section 40.4.6.1.
- (c) The Scheduling Coordinator for individual Distributed Generation Facilities, with the same resource type and PMax values less than 0.5 MW, that seek to operate as a combined Distributed Generation Facility, must submit to the CAISO a request that the initial Net Qualifying Capacity be determined and approved as a combined Distributed Generation Facility.

#### **40.8.1.16 Non-Generator Resources**

- (a) Non-Generator Resources must be either Participating Generators or System Units to qualify as Resource Adequacy Capacity.
- (b) The CAISO will determine the Net Qualifying Capacity of each Non-Generator Resource based on the CAISO testing of the resource's sustained output over a four-hour period;

however, the Net Qualifying Capacity shall not exceed the resource's maximum instantaneous discharge capability.

\* \* \*

## **40.9 Resource Adequacy Availability Incentive Mechanism**

### **40.9.1 Transition To RAAIM**

The CAISO shall use RAAIM to determine the availability of resources providing local and/or system Resource Adequacy Capacity and Flexible RA Capacity during the Availability Assessment Hours each month and then assess the resultant Availability Incentive Payments and Non-Availability Charges through the CAISO's settlements process; except that, for an advisory period of two calendar months following the effective date of RAAIM, the CAISO will calculate and publish the Availability Incentive Payments and Non-Availability Charges on Settlement Statements but will not include those payments and charges on Invoices for financial settlement.

### **40.9.2 Exemptions**

- (a) **Capacity Exempt from RAAIM – All Provisions.** The entire capacity of a resource in any of the following categories is exempt from the RAAIM provisions in Section 40.9 --
- (1) Resources with a PMax less than 1.0 MW;
  - (2) Non-specified resources that provide Resource Adequacy Capacity under contracts for Energy delivered within the CAISO Balancing Authority Area;
  - (3) Participating Load that is also Pumping Load; and
  - (4) RMR Units.
- (b) **Capacity Exempt from RAAIM – Local/System**
- (1) The entire capacity of a resource in any of the following categories is exempt from the RAAIM provisions in Section 40.9 applicable to local and system Resource Adequacy Capacity –
    - (A) Variable Energy Resources; and
    - (B) Combined Heat and Power Resources.
  - (2) The capacity of a resource with a Load-following MSS as its Scheduling Coordinator that is designated on a Load-following MSS's monthly Resource

Adequacy Plan is exempt from the RAAIM provisions in Section 40.9 applicable to local and system Resource Adequacy Capacity, to the extent that the resource's capacity is also designated as Resource Adequacy Capacity on the monthly Supply Plan of that Load-following MSS or another Load-following MSS.

- (3) Resources with Existing QF Contracts or Amended QF Contracts that are Resource Adequacy Resources are exempt from the RAAIM provisions in Section 40.9 applicable to local and system capacity --
  - (A) if the QF resource previously provided Resource Adequacy Capacity pursuant to an Existing QF Contract that was executed prior to August 22, 2010 and remained in effect pursuant to California Public Utilities Commission Decision 07-09-040 that extended the term of expiring contracts until such time as the new contracts resulting from that decision are available; or
  - (B) until the QF Resource's Existing QF Contract or Amended QF Contract terminates or if requested by the Scheduling Coordinator for the resource, whichever is earlier.

(c) **Capacity Exempt from RAAIM – Flexible Capacity.**

- (1) The capacity of Use-Limited Resources in a combination under Section 40.10.3.2(b), 40.10.3.3(b) or 40.10.3.4(b) is exempt from the RAAIM provisions in Section 40.9 applicable to Flexible RA Capacity to the extent that the resources are committed to provide Flexible RA Capacity as a combination on their respective monthly Supply Plans.
- (2) The Capacity of a resource with a Load-following MSS as its Scheduling Coordinator that is designated on a Load-following MSS's monthly Flexible RA Plan is exempt from the RAAIM provisions in Section 40.10 applicable to Flexible RA Capacity, to the extent that the resource's capacity is also designated as Flexible RA Capacity on the monthly Supply Plan of that Load-following MSS or another Load-following MSS.

**40.9.2.1 Acquired Resources.**

(a) **Exemption.** The entire capacity of an Acquired Resource is exempt from the RAAIM provisions in Section 40.9 applicable to local and system Resource Adequacy Capacity if the resource provides Resource Adequacy Capacity under a resource-specific power supply contract that --

- (1) was exempt from the prior standard capacity product in Section 40.9 as of the RAAIM effective date, and continues to meet the requirements for that exemption, under the provisions of Sections 40.9.2(1) or 40.9.2(2) contained in Appendix J.
- (2) includes an availability provision, or the resource under the power supply contract is located outside of the CAISO Balancing Authority Area and jointly operated with project participants located outside of the CAISO Balancing Authority Area, such that no single Load Serving Entity with contractual rights for the resource's output has the ability to effect changes to the resource's availability; and
- (3) does not contain a provision that allows the contract to be modified for regulatory changes.

(b) **Request.** To maintain the exemption, the Scheduling Coordinator for the Acquired Resource must annually request renewal of the exemption and --

- (1) for Resource Adequacy Compliance Year 2016, submit an affidavit to the CAISO, by either the Scheduling Coordinator or resource owner, demonstrating that the Acquired Resource meets the eligibility criteria in Section 40.9.2.1(a), in accordance with the process and schedule in the Business Practice Manual; and
- (2) for each Resource Adequacy Compliance Year thereafter until the contract terminates, submit confirmation to the CAISO that the information in the affidavit is still accurate and the Acquired Resource continues to meet the eligibility criteria in Section 40.9.2.1(a), in accordance with the process and schedule in Business Practice Manual.

- (c) **Approval.** The CAISO shall review the information submitted and --
- (1) approve a request that contains the information required by Sections 40.9.2.1(a) and (b) and that demonstrates the resource meets the eligibility criteria in Section 40.9.2.1(a);
  - (2) advise the Scheduling Coordinator for the resource if the request does not contain all of the information required by Sections 40.9.2.1(a) and (b), and allow the opportunity for the Scheduling Coordinator to submit the additional required information, in accordance with the process and schedule in the Business Practice Manual; or
  - (3) deny the request and permanently terminate the exemption if --
    - (A) the Scheduling Coordinator for the resource does not timely submit a request under Section 40.9.2.1(b);
    - (B) the Scheduling Coordinator for the resource does not submit, or does not timely submit, additional information required to complete the request under Section 40.9.2(c)(2); or
    - (C) the CAISO determines the resource does not meet the eligibility criteria in Section 40.9.2.1(a).
- (d) **Failure to Request Renewal.** If the Scheduling Coordinator for the resource does not submit a request to renew the exemption under Section 40.9.2.1(b), the exemption shall terminate and the CAISO shall notify the Scheduling Coordinator of the termination in accordance with the process and schedule in Business Practice Manual.
- (e) **Notice of Termination.** The Scheduling Coordinator for an Acquired Resource must notify the CAISO within 10 days if the contract terminates or no longer meets the eligibility criteria in Section 40.9.2.1(a).

**40.9.3 Availability Assessment**

**40.9.3.1 Local and System RA Capacity Availability**

**(a) Availability Assessment Hours**

- (1) Prior to the start of each Resource Adequacy Compliance Year, the CAISO shall establish and publish in the Business Practice Manual the Availability Assessment Hours applicable for resources providing local and/or system Resource Adequacy Capacity for each month of that year.
- (2) The Availability Assessment Hours shall be a pre-defined set of five consecutive hours for each month that --
  - (A) correspond to the operating periods when high demand conditions typically occur and when the availability of Resource Adequacy Capacity is most critical to maintaining system reliability;
  - (B) vary by season as necessary so that the coincident peak load hour typically falls within the five-hour range each day during the month, based on historical actual load data; and
  - (C) apply to each Trading Day that is a weekday and not a federal holiday.

**(b) Must Offer Availability Assessment.** The CAISO shall determine the extent to which each resource providing local and/or system Resource Adequacy Capacity made that capacity available to the CAISO in each Availability Assessment Hour of the day by comparing --

- (1) the MWs of local and/or system Resource Adequacy Capacity for which the Scheduling Coordinator for the resource submitted Economic Bids or Self-Schedules in the Day-Ahead Market and the Real-Time Market; and
- (2) the MWs of local and/or system Resource Adequacy Capacity for which the Scheduling Coordinator for the resource was required to submit Economic Bids or Self-Schedules in the CAISO Markets under the must-offer requirements applicable under Section 40.6.

#### **40.9.3.2 Flexible RA Capacity Availability**

- (a) **Availability Assessment Hours.** The Availability Assessment Hours for a Flexible RA Resource shall be the same period as the must-offer obligation for the Flexible Capacity Category that is designated on the Resource Flexible RA Capacity Plan for that month, as set forth in Section 40.10.6.
- (b) **Must-Offer Availability Assessment.** The CAISO shall determine the extent to which each Flexible RA Resource made that capacity available in each Availability Assessment Hour of the day by comparing --
  - (A) the MWs of Flexible RA Capacity for which the Scheduling Coordinator for the resource submitted Economic Bids in the Day-Ahead Market and the Real-Time Market; and
  - (B) the MWs of Flexible RA Capacity for which the Scheduling Coordinator for the resource was required to submit Economic Bids in the CAISO Markets under the must-offer requirements applicable under Section 40.10.6.
- (c) **Flexible Capacity Category.** If a Flexible RA Resource is designated to provide Flexible RA Capacity and/or RA Substitute Capacity in more than one Flexible Capacity Category, the CAISO will assess the availability of the resource using the must-offer obligation for the highest quality of Flexible Capacity Category designated.
- (d) **Start-Up Less Than 90 Minutes.** For resources with a start-up time less than 90 minutes, the CAISO will use the resource's MWs of capacity from zero to the EFC value to assess the availability of the designated Flexible RA Capacity; provided that the Scheduling Coordinator for the resource does not submit Self-Schedules for the capacity from zero to PMin or for any portion of the capacity under the must-offer obligation for Energy. If the Scheduling Coordinator for the resource submits a Self-Schedule, the CAISO will deduct the MW value of PMin from the calculation of the resource's Flexible RA Capacity availability,

- (e) **Start-Up Greater Than 90 Minutes.** For resources with a start-up time greater than 90 minutes, the CAISO will use the MWs of capacity between the resource's PMin and EFC value in the availability assessment and validate whether the Scheduling Coordinator for the resource submitted Economic Bids for all MWs designated on the Resource Flexible RA Capacity Plan.
- (f) **Variable Energy Resources**
- (1) **Flexible RA Capacity Equal to EFC.** If the Flexible RA Capacity designated on the monthly Resource Flexible RA Capacity Plan is equal to the resource's EFC value, the CAISO will assess the availability of the designated Flexible RA Capacity based on the Economic Bids for Flexible RA Capacity the Scheduling Coordinator for the resource submitted up to the MWs in the Variable Energy Resource forecast applicable under Section 4.8.2.
  - (2) **Flexible RA Capacity Less Than EFC.** If the Flexible RA Capacity designated in the monthly Resource Flexible RA Capacity Plan is less than the EFC value for the resource, the CAISO will assess availability using the ratio of the amount shown on the monthly plan to the relevant EFC value, and applies that ratio to the MWs of Economic Bids and the Variable Energy Resource forecast.
  - (3) **VER Forecast Less Than Flexible RA Capacity.** If the MWs in the Variable Energy Resource forecast are less than the MWs of Flexible RA Capacity designated in the monthly Resource Flexible RA Capacity Plan, and the Economic Bids are greater than or equal to the forecast amount for that hour, the resource is 100 percent available up to the forecast amount.
  - (4) **VER Forecast Greater Than Flexible RA Capacity.** If the MWs in the Variable Energy Resource forecast are greater than the MWs of Flexible RA Capacity designated in the monthly Resource Flexible RA Capacity Plan, the Scheduling Coordinator for the resource must submit Economic Bids equal to the forecast amount. If the Scheduling Coordinator for the resource submits Economic Bids

for MWs above the forecast, or the resource generates above the forecast, the CAISO will limit the calculated availability to the forecast amount.

- (5) **No Day-Ahead Market Obligation.** For Variable Energy Resources that do not have an obligation to submit Economic Bids into the Day-Ahead Market, the CAISO will base the availability assessment of the Flexible RA Capacity only on the resource's Economic Bids in the Real-Time Market.

#### **40.9.3.3 Availability for Overlapping Local/System and Flexible RA Capacity**

- (a) **Overlap Determination.** The availability assessment for overlapping Resource Adequacy commitments shall apply to those hours in which a resource was subject to the must-offer obligations for local and/or system Resource Adequacy Capacity and Flexible RA Capacity in any Availability Assessment Hour and for any portion of the same capacity.
- (b) **Must-Offer Availability Assessment.** The CAISO shall determine the extent to which each resource with overlapping Resource Adequacy commitments made that capacity available to the CAISO in each overlapping Availability Assessment Hour of the day by comparing --
- (1) the MWs of local and/or system Resource Adequacy Capacity and Flexible RA Capacity for which the Scheduling Coordinator for the resource submitted Economic Bids in the Day-Ahead Market and the Real-Time Market; and
  - (2) the MWs of local and/or system Resource Adequacy Capacity and Flexible RA Capacity for which the Scheduling Coordinator for the resource was required to submit Economic Bids in the CAISO Markets, in accordance with the applicable must-offer requirements in Sections 40.6 and 40.10.6.
- (c) **Calculation.** The CAISO's calculation of the Availability Assessment for overlapping RA commitments shall count--
- (1) any portion of the overlapping MW only once; and
  - (2) the total MWs of capacity at the higher of the Resource Adequacy Capacity commitment or the Flexible RA Capacity commitment.

#### 40.9.3.4 Treatment of Maintenance Outages

- (a) **Replacement Not Required.** The RAAIM Availability Assessment for a Resource Adequacy Resource excludes the capacity, duration, and must-offer requirements for Resource Adequacy Capacity --
- (1) with an Approved Maintenance Outage or pending request for a Maintenance Outage as of 45 days prior to the start date of the Resource Adequacy month; however any subsequent incremental increase in the MWs or duration of the outage will be subject to RAAIM unless RA Replacement Capacity for the incremental outage is required and provided or is not required; or
  - (2) on an Approved Maintenance Outage during the Resource Adequacy month that does not require RA Replacement Capacity under Section 9.3.1.3.3.
- (b) **Replacement Requirement Provided.** For each Maintenance Outage that a Resource Adequacy Resource requests less than 45 days prior to the start of the relevant resource adequacy month and that requires RA Replacement Capacity --
- (1) the RAAIM Availability Assessment for the resource excludes the capacity, duration, and must-offer requirement for Resource Adequacy Capacity on an Approved Maintenance Outage to the extent the resource provides RA Replacement Capacity for that outage as required under Section 9.3.1.3.3; and
  - (2) the RAAIM Availability Assessment for the replacement resource includes the capacity, duration, and must-offer requirement for the RA Replacement Capacity commitment.
- (c) **Replacement Requirement Not Provided.** For each Maintenance Outage that a Resource Adequacy Resource requests less than 45 days prior to the start of the relevant resource adequacy month, the RAAIM Availability Assessment for the resource includes the capacity, duration, and must-offer requirement for Resource Adequacy Capacity on an Approved Maintenance Outage to the extent the resource does not provide RA Replacement Capacity for the outage as required under Section 9.3.1.3.3.

#### 40.9.3.5 Treatment of Forced Outages

- (a) **RA Substitute Capacity – Local And System** (1) The RAAIM Availability Assessment for a Resource Adequacy Resource includes the capacity, duration, and must-offer requirement for Resource Adequacy Capacity on a Forced Outage, except to extent the resource provides RA Substitute Capacity for the outage in accordance with Section 40.9.3.6.
- (2) The RAAIM Availability Assessment for the substitute resource includes the capacity, duration, and must-offer requirement for the RA Substitute Capacity.
- (b) **RA Substitute Capacity – Flexible**
- (1) The RAAIM Availability Assessment for a Flexible RA Resource includes the capacity, duration, and must-offer requirement for Flexible RA Capacity on a Forced Outage, except to extent the resource provides RA Substitute Capacity for that outage in accordance with Section 40.9.3.6.
- (2) The RAAIM Availability Assessment for the substitute resource includes the capacity, duration, and must-offer requirement for the RA Substitute Capacity.
- (3) For each day the substitute resource is committed to provide Flexible RA Capacity and/or RA Substitute Capacity in more than one Flexible Capacity Category, the RAAIM Availability Assessment applies the must-offer obligation for the highest quality Flexible Capacity Category to the total MWs of the flexible capacity requirement.(c)
- Exclusions from RAAIM.** The RAAIM Availability Assessment excludes the capacity, duration, and must-offer requirement for local and/or system Resource Adequacy Capacity or Flexible RA Capacity on a Forced Outage in a nature of work category relating to an administrative action by the resource owner, a cause outside of the control of the resource owner, or a short-term use limitation, as those categories are specified in the Business Practice Manual.
- (d) Scheduling Coordinators for Resource Adequacy Resources with a PMax of at least one (1) MW but less than 10 MWs that do not meet the requirement to provide information on

Forced Outages in accordance with Section 9.3.10 shall report outages and de-rates in accordance with the process set forth the Business Practice Manual.

**40.9.3.6 Substitute Capacity**

(a) **Substitution**

(1) The Scheduling Coordinator for a Resource Adequacy Resource may provide RA Substitute Capacity for its local and/or system Resource Adequacy Capacity or Flexible RA Capacity on a Forced Outage or de-rate.

(2) If the Resource Adequacy Resource on outage and the substituting resource do not have the same Scheduling Coordinator, the Scheduling Coordinator for the substituting resource must confirm and approve the proposed substitution in accordance with the process set forth in the Business Practice Manual. (b) **Availability**

(1) RA Substitute Capacity must be operationally available to the CAISO:

(2) Capacity on, or scheduled to be on, a Forced Outage, Approved Maintenance Outage, or de-rate, is not operationally available and shall not qualify to be RA Substitute Capacity for the duration of the period that it is unavailable.

(3) RA Replacement Capacity, RMR Capacity, CPM Capacity, and capacity committed to be Resource Adequacy Capacity in a monthly Supply Plan shall not qualify to be RA Substitute Capacity for the duration of that commitment.

(4) RA Substitute Capacity shall not qualify to be RA Replacement Capacity, RMR Capacity, CPM Capacity, or Resource Adequacy Capacity in a monthly Supply Plan, for the duration of the substitution.

(5) If a resource provides RA Substitute Capacity for multiple Resource Adequacy Resources under Section 40.9.3.6.3, the same capacity committed as RA Substitute Capacity for one Resource Adequacy Resource shall not qualify as RA Substitute Capacity for a different Resource Adequacy Resource during the same substitution period.

(6) RA Substitute Capacity will be treated as Resource Adequacy Capacity during the period of substitution for purposes of a Forced Outage or de-rate allocation.

(c) **Timing of Substitution Request**

(1) **Day-Ahead Market.** Requests for substitution in the Day-Ahead Market must be submitted in accordance with the timeline specified in the Business Practice Manual and be approved by the CAISO to be included in the Day-Ahead Market for the next Trading Day. Requests for substitution in the Day-Ahead Market submitted at or after the timeline specified in the Business Practice Manual and that are approved by the CAISO will be included in the Day-Ahead Market for the second Trading Day.

(2) **Real-Time Market.** Requests for substitution in the Real-Time Market must be submitted in accordance with the timeline in the Business Practice Manual.**40.9.3.6.1 RA Substitute Capacity From A Single Resource**

(a) **Option.** The Scheduling Coordinator for a Resource Adequacy Resource that is on a Forced Outage or de-rate may provide RA Substitute Capacity for that capacity from a single resource.

(b) **Local Capacity Area Resource Substitution**

(1) **Pre-Qualified Substitution.**

(A) **Annual Process.** The CAISO will annually conduct a process to assess the eligibility of resources to pre-qualify as RA Substitute Capacity for Local Capacity Resource Adequacy Resources. The CAISO will publish a list of the pre-qualified resources in accordance with the timeline in the Business Practice Manual.

(B) **Pre-Qualification Requirement.** The CAISO will pre-qualify a resource to provide RA Substitute Capacity that is located at the same bus as, or a compatible bus to, that of the Local Capacity Area Resource Adequacy Resource for which it could substitute.

(C) **Request.** To use a pre-qualified resource in the Day-Ahead Market or Real-Time Market as RA Substitute Capacity, the Scheduling Coordinator for the Local Capacity Area Resource Adequacy Resource

on a Forced Outage or de-rate must submit a timely substitution request in accordance with Section 40.9.3.6(c).

(D) **Approval.** The CAISO will grant a request that meets the requirements in Sections 40.9.3.6.1(b)(1)(C) and 40.9.3.6(b).

(2) **Non-Pre-Qualified Substitution.**

(A) **Day-Ahead Market.** The Scheduling Coordinator for a Local Capacity Area Resource Adequacy Resource on a Forced Outage or de-rate may submit a request to substitute a non-pre-qualified resource only in the Day-Ahead Market.

(B) **Request.** To use a non-pre-qualified resource as RA Substitute Capacity, the Scheduling Coordinator for the Local Capacity Area Resource Adequacy Resource must submit a timely substitution request in accordance with Section 40.9.3.6(c), and the alternate resource must be located in the same Local Capacity Area.

(C) **Approval.** The CAISO will grant a request that meets the requirements in Sections 40.9.3.6.1(b)(2)(A) and (B), and 40.9.3.6(b).

(c) **Non-Local Capacity Area Resource Substitution**

(1) **Request.** To use a resource as RA Substitute Capacity, the Scheduling Coordinator for a non-Local Capacity Area Resource Adequacy Resource that has a Forced Outage or de-rate must submit a timely substitution request in the Day-Ahead Market or Real-Time Market in accordance with Section 40.9.3.6(c).

(2) **Approval.** The CAISO will grant the request if the alternate resource has adequate deliverable capacity to provide the RA Substitute Capacity and meets the requirements in Sections 40.9.3.6.1(c)(1) and 40.9.3.6(b).

(d) **External Resources**

(1) **Request.** To use a Dynamic System Resource, Non-Dynamic System Resource, NRS-RA Resource, or Pseudo-Tie as RA Substitute Capacity, the Scheduling Coordinator for a Resource Adequacy Resource that has a Forced

Outage or de-rate must submit a timely substitution request in the Day-Ahead Market in accordance with Section 40.9.3.6(c).

- (2) **Approval.** The CAISO will grant the request if the alternate resource is external to the CAISO Balancing Authority Area (including Pseudo-Ties), the Scheduling Coordinator for the resource has an adequate available import allocation at the resource's Scheduling Point to provide the RA Substitute Capacity, and meets the requirements in Sections 40.9.3.6.1(d)(1) and 40.9.3.6(b).

(e) **Flexible RA Capacity**

- (1) **Request.** To use a resource as RA Substitute Capacity, the Scheduling Coordinator for the Flexible RA Resource that has a Forced Outage or de-rate must submit a timely substitution request in the Day-Ahead Market or Real-Time Market in accordance with Section 40.9.3.6(c) and specify the MW of RA Substitute Capacity to be provided, which may not exceed the MWs of the outage.
- (2) **Approval.** The CAISO will grant the request if the alternate resource has adequate deliverable capacity to provide the RA Substitute Capacity, meets the applicable requirements in Sections 40.9.3.6.1(e) and 40.9.3.6(b), and is capable of meeting the must-offer obligation in Section 40.10.6 applicable to the highest quality Flexible Capacity Category for the MWs of the Flexible RA Capacity commitments of the resource on outage and the alternate resource.

**40.9.3.6.2 RA Substitute Capacity From Multiple Resources**

- (a) **Option.** The Scheduling Coordinator for a Resource Adequacy Resource on a Forced Outage or de-rate may submit a request to substitute that capacity with RA Substitute Capacity from multiple alternate resources, including a resource already providing RA Substitute Capacity for one or more Resource Adequacy Resources.

(b) **Local Capacity Area Resource Substitution**

- (1) **Request.** To use RA Substitute Capacity from multiple resources, the Scheduling Coordinator for the Local Capacity Area Resource Adequacy

Resource on a Forced Outage or de-rate must submit a timely substitution request in the Day-Ahead Market in accordance with Section 40.9.3.6(c) if any of the alternate resources are not pre-qualified to substitute for the resource on the outage; however, if all of the alternate resources are pre-qualified to provide RA Substitute Capacity for that resource, the request may be submitted in the Day-Ahead Market or Real-Time Market.

- (2) **Approval.** The CAISO will grant the request if it meets the requirements in Sections 40.9.3.6.2(b)(1) and 40.9.3.6(c) and the alternate resources are either pre-qualified, or are not pre-qualified but are located in the same Local Capacity Area as the Resource Adequacy Resource.

(c) **Non-Local Capacity Area Resources**

- (1) **Request.** To use RA Substitute Capacity from multiple resources, the Scheduling Coordinator for a non-Local Capacity Area Resource Adequacy Resource on a Forced Outage or de-rate must submit a timely substitution request in the Day-Ahead Market or the Real-Time Market in accordance with Section 40.9.3.6(c).
- (2) **Approval.** The CAISO will grant the request if all of the alternate resources meet the requirements in Sections 40.9.3.6.2(c)(1) and 40.9.3.6(c).

(d) **External Resources**

- (1) **Request.** To use multiple Dynamic System Resources, Non-Dynamic System Resources, NRS-RA Resources, or Pseudo-Ties as RA Substitute Capacity, the Scheduling Coordinator for a Resource Adequacy Resource that has a Forced Outage or de-rate must submit a timely substitution request in the Day-Ahead Market in accordance with Section 40.9.3.6(c).
- (2) **Approval.** The CAISO will grant the request if the alternate resources are external to the CAISO Balancing Authority Area (including Pseudo-Ties), and the Scheduling Coordinator of each alternate resource has an adequate available import allocation at the

resource's Scheduling Point to provide the RA Substitute Capacity, and meet the requirements in Sections 40.9.3.6.e(d)(1) and 40.9.3.6(b).(e) **Flexible RA Capacity**

- (1) **Request.** To use RA Substitute Capacity from multiple resources, the Scheduling Coordinator for a resource providing Flexible RA Capacity on a Forced Outage or de-rate must submit a timely substitution request in the Day-Ahead Market or the Real-Time Market and the alternate resources must be located in the CAISO Balancing Authority Area, which does not include a Pseudo-Tie of a Generating Unit or a Resource-Specific System Resource.
- (2) **Approval.** The CAISO will grant the request if the alternate resources meet the requirements in Sections 40.9.3.6.2(d)(1) and 40.9.3.6(c).

**40.9.3.6.3 Multiple Substitution by One Resource.** The Scheduling Coordinator for a resource already providing RA Substitute Capacity may provide RA Substitute Capacity for one or more additional Resource Adequacy Resources on a Forced Outage or de-rate, subject to approval by the CAISO pursuant to Section 40.9.3.6.1 or 40.9.3.6.2.

**40.9.3.6.4 Resource Adequacy Obligation.** To the extent a resource provides RA Substitute Capacity, the resource must meet and comply with all requirements in Section 40 applicable to RA Substitute Capacity for the duration of the substitution; except that RA Substitute Capacity shall be released from this obligation and the substitution requirements in Section 40.9 –

- (a) at the end of the approved substitution period; or
- (b) upon request by either the Scheduling Coordinator for the resource on Forced Outage or the Scheduling Coordinator for the substitute resource, and approval by the other Scheduling Coordinator, in accordance with the process set forth in the Business Practice Manual.

**40.9.3.6.5 Treatment of Unbid Capacity.** If the Scheduling Coordinator for RA Substitute Capacity does not submit Bids or Self-Schedules for all or a portion of that capacity in accordance with Section 40.6 or 40.10.6, the CAISO --

- (1) will treat the unbid capacity as unavailable for purposes of Section 40.9; and

- (2) will reflect that unavailability in the RAAIM availability calculation for the Resource Adequacy Resource providing the RA Substitute Capacity.

#### **40.9.4 Availability Assessment**

- (a) The CAISO shall determine a resource's monthly average availability on a percentage basis, based on --
  - (1) the availability assessment of the resource's minimum daily availability of local and/or system Resource Adequacy Capacity under Section 40.9.3.1, Flexible RA Capacity under Section 40.9.3.2, and overlapping Resource Adequacy commitments under Section 40.9.3.3, in the Day-Ahead Market and Real-Time Market;
  - (2) including the capacity, duration, and must-offer requirement for local and/or system Resource Adequacy Capacity or Flexible RA Capacity on a Forced Outage, except to the extent the resource provides RA Substitute Capacity for the outage in accordance with Section 40.9.3.6, or the Forced Outage is excluded from RAAIM under Section 40.9.3.5;
  - (3) including the capacity, duration, and must-offer requirement for any RA Substitute Capacity, RA Replacement Capacity, or CPM Capacity the resource is committed to provide; and
  - (4) excluding the Maintenance Outages specified in Section 40.9.3.4.
- (b) If the resource's minimum daily availability is the same in the Day-Ahead Market and the Real-Time Market, the CAISO will use the availability in the Real-Time Market in the calculation of the monthly average availability.
- (c) If the resource is committed to provide local and/or system RA capacity and Flexible RA Capacity in a month, but does not provide both for the full month, the CAISO prorates the number of days that local and/or system Resource Adequacy Capacity and Flexible RA Capacity was provided against the total number of days in the month.

#### **40.9.5 Availability Standard**

- (a) **Percentage.** The Availability Standard shall be 96.5 percent each month.
- (b) **Availability Range.** The CAISO shall apply the Availability Standard with a bandwidth of plus and minus two percent, which produces a range with a lower bound of 94.5 percent and an upper bound of 98.5 percent.

#### **40.9.6 Non-Availability Charges And Availability Incentive Payments**

- (a) **Non-Availability Charges.** A resource providing local and/or system Resource Adequacy Capacity, Flexible RA Capacity, or CPM Capacity that is subject to the availability assessment in accordance with Section 40.9.3 and whose monthly availability calculation under Section 40.9.4 is below the lower bound of the monthly Availability Standard of 94.5 percent will be subject to a Non-Availability Charge for the month.
- (b) **Availability Incentive Payments.** A resource providing local and/or system Resource Adequacy Capacity, Flexible RA Capacity, or CPM Capacity that is subject to the availability assessment under Section 40.9.3 and whose availability calculation under Section 40.9.4 is above the upper bound of the monthly Availability Standard of 98.5 percent will be eligible for an Availability Incentive Payment for the month.
- (c) **No Payment or Charge.** A resource providing local and/or system Resource Adequacy Capacity, Flexible RA Capacity, or CPM Capacity that is subject to the availability assessment under Section 40.9.3 and whose monthly availability calculation under Section 40.9.4 is equal to or between the lower bound of 94.5 percent and the upper bound of 98.5 percent of the Availability Standard will not be assessed a Non-Availability Charge nor paid an Availability Incentive Payment.
- (d) **Advisory Period.** During the advisory period of March 1, 2016 through April 30, 2016, the CAISO will show the Non-Availability Charges and Availability Incentive Payments on Settlement Statements but will not include those Non-Availability Charges and Availability Incentive Payments on Invoices for financial settlement.

#### **40.9.6.1 Determination of Non-Availability Charge**

##### **(a) Calculation**

- (1) **RA Capacity.** The Non-Availability Charge for a Resource Adequacy Resource providing local, system, or Flexible RA Capacity shall be determined by the resource's average monthly RA and Flexible RA MWs multiplied by the difference between the lower bound of the monthly Availability Standard of 94.5 percent and the resource's monthly availability percentage, and multiplying the product by the RAAIM price.
  - (2) **CPM Capacity.** The Non-Availability Charge for a Resource Adequacy Resource providing CPM Capacity shall be determined by the resource's average monthly CPM MWs multiplied by the difference between the lower bound of the monthly Availability Standard of 94.5 percent and the resource's monthly availability percentage, and multiplying the product by the maximum of the resource's CPM price and the RAAIM price.
- (b) **RAAIM Price.** The RAAIM price shall be 60 percent of the CPM Soft-Cap Price in Section 43.4.1.1.

#### **40.9.6.2 Determination of Availability Incentive Payment**

- (a) **Self-Funding.** The Availability Incentive Payment will be funded entirely through the monthly Non-Availability Charges assessed.
- (b) **Eligible Capacity.** The capacity of a Resource Adequacy Resource providing local, system or Flexible RA Capacity that is eligible to receive an Availability Incentive Payment shall be the resource's average monthly MWs of capacity that exceed the upper bound of the Availability Standard.
- (c) **Calculation.**

  - (1) The monthly Availability Incentive Payment rate will equal the total Non-Availability Charges assessed for the month plus any unpaid funds under Section 40.9.6.2(d), divided by the total Resource Adequacy Capacity eligible to receive the Availability Incentive Payment that month.

- (2) The Availability Incentive Payment rate shall not exceed three times the Non-Availability Charge rate.
- (3) The Availability Incentive Payment the CAISO shall pay to each eligible resource shall equal the product of its eligible capacity and the Availability Incentive Payment rate.
- (d) **Unpaid Funds.** Any Non-Availability Charge funds that are not distributed to Resource Adequacy Resources eligible to receive Availability Incentive Payments in a month will be added to the funds available for Availability Incentive Payments in the next month and will continue to roll over to the successive month until paid out or December 31, at which time the funds will be distributed to Load Serving Entities based on their load ratio share for the year.

**40.9.7 Reporting**

By July 1 of each year, the CAISO will provide an informational report that will be posted on the CAISO Website and include information on the average actual availability each month of Resource Adequacy Resources, the total amount of Non-Availability Charges assessed and the total amount of Availability Incentive Payments made.

\* \* \*

**40.10 Flexible RA Capacity**

\* \* \*

**40.10.1.2 Required Information From LSEs**

(a) **Submission Requirement.** The Scheduling Coordinator for each Load Serving Entity in the CAISO Balancing Authority Area shall submit the information required by this Section, no later than January 15 each year, for use in the CAISO's study to generate minute-by-minute net-load data that will be used to determine the Maximum Three-Hour Net-Load Ramp for each month.

(b) **Required Information.** The Scheduling Coordinator for each Load Serving Entity in the CAISO Balancing Authority Area must submit information that --

- (1) covers the calendar year in which the information is submitted and each year in the next five-year period;
  - (2) identifies each wind and solar resource connected to the CAISO Controlled Grid, and distributed wind and solar resources, that is owned, in whole or in part, by the Load Serving Entity, or under contractual commitment to the Load Serving Entity or the Load-following MSS Load Serving Entity, for all or a portion of its capacity;
  - (3) indicates the status of the resource as either in service or in development with its expected commercial operation date;
  - (4) for each wind and solar resource, specifies the MWs of installed capacity, renewable energy area location, MWs of flexible capacity owned by or contractually committed to the Load Serving Entity, and other information required by the Business Practice Manual;
  - (5) describes the balancing services, if any, provided by another balancing authority area for a wind or solar resource that is located outside of the CAISO Balancing Authority Area and that is owned by or contractually committed to the Load Serving Entity; and
  - (6) forecasts the MW of installed, behind-the-meter solar capacity in the Load Serving Entity's service area or part of its forecast served load.
- (c) **Confidential Treatment.** The CAISO will treat the resource-specific information provided under Section 40.10.1.2(b) as confidential under Section 20.
- (d) **Aggregated Information.** In addition to the required resource-specific information, the Scheduling Coordinator for each Load Serving Entity in the CAISO Balancing Authority Area shall submit the information required in Section 40.10.1.2(b) on an aggregated basis, as described in the Business Practice Manual, for inclusion in the Flexible Capacity Needs Assessment that will be posted on the CAISO Website.

\* \* \*

#### **40.10.2.2 Allocation to Load-Following MSS**

- (a) The CAISO will calculate the allocable share of the Flexible Capacity Need for each Load-following MSS as --
  - (1) the Local Regulatory Authority's average percent contribution to the change in wind output, minus the change in solar PV output, minus the change in solar thermal output, during the five highest three-hour net-load changes in the month, for resources not included in the Load-following MSS Load Serving Entity's resource portfolio; and
  - (2) plus the lesser of the MSS contribution calculated under Section 40.10.2.2(a)(1) or 3.5 percent of its forecasted peak load.
  - (3) plus the Load-following MSS Load Serving Entity's allocable share of any forecast adjustment under Section 40.10.1.4.
- (b) The CAISO will deduct the Flexible Capacity Need allocated to each Load-following MSS from the calculation to determine whether a cumulative deficiency in Flexible RA Capacity exists under Section 43.2.7.
- (c) If the Load-following MSS Load Serving Entity's contribution to the three-hour net-load ramp calculated under Section 40.10.2.2(a)(1) is less than its contribution to the 3.5 percent of expected peak load, the CAISO will not reallocate that difference to other Local Regulatory Authorities to determine whether a cumulative deficiency in Flexible RA Capacity exists under Section 43.2.7.

\* \* \*

#### **40.10.4.1 Effective Flexible Capacity Calculation**

- (a) **Flexible Resources.** The CAISO will calculate the Effective Flexible Capacity value of a resource, for use (i) if a Local Regulatory Authority has not established criteria for calculating the Effective Flexible Capacity value for eligible resource types, and (ii) for determining if a cumulative deficiency exists under Sections 43.2.7(a) and (b), as follows, except as provided in Sections 40.10.4.1 (b) through (f) --

- (1) If the Start-Up Time of the resource is greater than 90 minutes, the Effective Flexible Capacity value shall be the weighted average ramp rate of the resource calculated from PMin to Net Qualifying Capacity multiplied by 180 minutes. The Effective Flexible Capacity shall not exceed the difference between the PMin and PMax of the resource.
  - (2) If the Start-Up Time of the resource is less than or equal to 90 minutes, the Effective Flexible Capacity value shall be the weighted average ramp rate of the resource calculated from zero to Net Qualifying Capacity multiplied by 180 minutes. The Effective Flexible Capacity shall not exceed the Net Qualifying Capacity of the resource.
- (b) **Hydroelectric Generating Unit.** The Effective Flexible Capacity of a hydroelectric generating unit will be the amount of capacity from which the resource can produce Energy consistently for 6 hours based upon the resource's physical storage capacity, which shall not exceed its Net Qualifying Capacity.
- (c) **Proxy Demand Resource.** The Effective Flexible Capacity of a Proxy Demand Resource will be based on the resource's actual MWs of load modification in response to a dispatch by the CAISO during a test event. In determining the Effective Flexible Capacity of a Proxy Demand Resource, the CAISO will --
- (1) conduct the test at a random time during the flexible capacity must-offer obligation period for the resource;
  - (2) use the applicable baseline load data, as described in the CAISO Tariff or Business Practice Manual, to measure the load modification of the Proxy Demand Resource being tested; and
  - (3) pay the resource's bid price for the testing period.
- (d) **Energy Storage Resource.** The Effective Flexible Capacity value for an energy storage resource will be determined as follows --
- (1) for an energy storage resource that provides Flexible RA Capacity but not Regulation Energy Management, the Effective Flexible Capacity value will be the

MW output range the resource can provide over three hours of charge/discharge while constantly ramping.

- (2) for an energy storage resource that provides Flexible RA Capacity and Regulation Energy Management, the Effective Flexible Capacity value will be the resource's 15-minute energy output capability.
- (e) **Multi-Stage Generating Resource.** The Effective Flexible Capacity value for a Multi-Stage Generating Resource will be calculated using the longest Start-Up Time of the resource's configuration that has the lowest PMin.
- (f) **Combined Heat and Power Resource.** The Effective Flexible Capacity value of a Combined Heat and Power Resource will be the lesser of (i) the resource's Net Qualifying Capacity, or (ii) the MW difference between the CHP resource's maximum output and its minimum operating level, such quantity not to exceed the quantity of generating capacity capable of being delivered over a three-hour period.

\* \* \*

#### **40.10.5 Flexible RA Capacity Plans**

##### **40.10.5.1 LSE Flexible RA Capacity Plans**

- (a) **Submission Requirement.** A Scheduling Coordinator must submit annual and monthly LSE Flexible RA Capacity Plans for each Load Serving Entity it represents.
- (b) **Annual Plan.** Each annual LSE Flexible RA Capacity Plan must –
  - (1) demonstrate that the Load Serving Entity has procured for each month at least 90 percent of the annual Flexible RA Capacity requirement determined by the CAISO; or the amount of Flexible RA Capacity required by the Load Serving Entity's Local Regulatory Authority, if the Local Regulatory Authority has set such requirement;
  - (2) identify the resources the Load Serving Entity intends to rely on to provide the Flexible RA Capacity, but need not identify the flexible resource adequacy categories; and
  - (3) include all information and be submitted no later than the last Business Day in

October, in accordance with the reporting requirements and schedule set forth in the Business Practice Manual.

- (c) **Monthly Plan.** The monthly LSE Flexible RA Capacity Plan must --
- (1) demonstrate that the Load Serving Entity procured 100 percent of the total monthly Flexible RA Capacity requirement determined by the CAISO; or the monthly amount of Flexible RA Capacity required by the Local Regulatory Authority, if the Local Regulatory Authority has set such requirement;
  - (2) demonstrate that the Load Serving Entity met the total monthly requirement determined by the CAISO within the minimum or maximum quantity, as applicable, for each Flexible Capacity Category; or only if the Local Regulatory Authority has established its own flexible capacity requirement, show that the Load Serving Entity has met the total monthly requirement determined by the Local Regulatory Authority within the minimum or maximum quantity for each Flexible Capacity Category required by the Local Regulatory Authority, if applicable;
  - (3) identify all resources the Load Serving Entity will rely on to provide the Flexible RA Capacity and for each resource specify the Flexible Capacity Category in which the Flexible RA Capacity will be provided; and
  - (4) include all information and be submitted to the CAISO at least 45 days in advance of the first day of the month covered by the plan, in accordance with the reporting requirements and schedule set forth in the Business Practice Manual.
- (d) **Correction to Monthly Plan.** The Scheduling Coordinator for the Load Serving Entity may submit at any time from 45 days through 11 days in advance of the first day of the month covered by the plan, a revision to its monthly LSE Flexible RA Capacity Plan to correct an error in the plan. The CAISO will not accept any revisions to a monthly LSE Flexible RA Capacity Plan from 10 days in advance of the relevant month through the end of the month, unless the Scheduling Coordinator for the Load Serving Entity demonstrates good cause for the change and explains why it was not possible to submit

the change earlier.

**40.10.5.1.1 Load-Following MSS**

- (1) Each Load-following MSS Load Serving Entity for which the CAISO has calculated an allocable share of the Flexible Capacity Need under Section 40.10.2.2 must submit annual and monthly LSE Flexible RA Capacity Plans pursuant to this Section 40.10.5.1 to identify the Flexible RA Capacity it is using to satisfy such requirement.
- (2) The Load-following MSS must increase the Flexible RA Capacity in its monthly plan by the MW amount of Capacity for the Variable Energy Resources shown in the information required pursuant to Section 40.10.1.2 but not included in the current MSS resource portfolio for that month.

\* \* \*

**APPENDIX A  
MASTER DEFINITIONS**

\* \* \*

**Acquired Resource**

A resource providing Resource Adequacy Capacity under a resource-specific power supply contract that was exempt from the provisions of the standard capacity product at the time RAAIM became effective.

\* \* \*

**Availability Standard**

The standard used to determine if a Resource Adequacy Resource is subject to Non-Availability Charges or Availability Incentive Payments.

\* \* \*

**Flexible RA Resource**

A resource designated to provide Flexible RA Capacity.

\* \* \*

## **RAAIM**

Resource Adequacy Availability Incentive Mechanism

\* \* \*

## **RA Substitute Capacity**

Capacity that substitutes for a Resource Adequacy Resource that is on a Forced Outage or de-rate.

\* \* \*

## **APPENDIX J**

### **GRANDFATHERED METERING AND SETTLEMENT PROVISIONS FOR TRADING DAYS PRIOR TO OCTOBER 1, 2011, AND GRANDFATHERED STANDARD CAPACITY PRODUCT PROVISIONS**

\* \* \*

#### **2. Grandfathering of Standard Capacity Product Provisions**

Notwithstanding any other provisions of the CAISO Tariff, the following provisions shall apply pursuant to Section 40.9.2.1(a)(1).

##### **40.9.2 Exemptions**

The following exemptions apply to the CAISO's Availability Standards program of this Section 40.9:

- (1) Capacity under a resource specific power supply contract that existed prior to June 28, 2009 and Resource Adequacy Capacity that was procured under a contract that was either executed or submitted to the applicable Local Regulatory Authority for approval prior to June 28, 2009, and is associated with specific Generating Units or System Resources, will not be subject to Non-Availability Charges or Availability Incentive Payments. Such contracted Resource Adequacy Capacity, except for non-Resource-Specific System Resources, will be included in the development of Availability Standards and will be subject to any Outage reporting requirements necessary for this purpose. The exemption will apply only for the initial term of the contract and to the MW capacity quantity and Resource Adequacy Resources specified in the contract prior to June 28, 2009. The exemption shall terminate upon the conclusion of the initial contract term. Exempt contracts may be re-assigned or undergo novation on or after June 28, 2009, but the exemption shall not apply for any extended contract term, increased capacity quantity or additional resource(s) beyond those specified in the contract prior to June 28, 2009, except as provided in Section 40.9.2(7) or 40.9.2(8). Scheduling Coordinators for Resource Adequacy Resources subject to these contracts will be required to certify the start date of the contract, the

expiration date, the Resource ID(s), and the amount of Resource Adequacy Capacity associated with each Resource ID included in the contract. For Resource Adequacy Resources whose Qualifying Capacity value is determined by historical output, the capacity under a resource specific power supply contract or Resource Adequacy Capacity that was procured under a contract that was either executed or submitted to the applicable Local Regulatory Authority for approval that meets the requirements in this subsection (2) will not be subject to Non-Availability Charges or Availability Incentive Payments, except that the deadline date for either type of contract shall be August 22, 2010 instead of June 28, 2009.

- (2) For a contract entered into prior to June 28, 2009 that provides for the amount of Resource Adequacy Capacity to increase during the original term of the contract, based on a ratio of the Resource Adequacy Resource's output or due to an addition of capacity, the exemption provided in subsection (2) of this Section 40.9.2 will apply to the additional capacity allowed under the contract; provided that the capacity increase (i) is expressly contained in the provisions of the contract, (ii) occurs during the primary term of the contract; and (iii) does not result from contract extensions or other amendments to the original terms and conditions of the contract, except as provided in Section 40.9.2(7) or 40.9.2(8). Scheduling Coordinators for Resource Adequacy Resources subject to contracts that provide for such capacity increases or additions must include in their certification, in addition to the requirements of subsection (2) of this Section 40.9.2, (i) the citation to any contract provisions that might entitle them to increased exempt Resource Adequacy Capacity from the contracted resources during the primary term of the contract; (ii) the amount of additional capacity to which they might be entitled; and (iii) the actual effective date of the capacity increase. If the actual amount of capacity and/or the actual effective date of the capacity increase is not known at the time of the initial certification, the Scheduling Coordinator shall provide a supplemental certification(s) when this information becomes known. For Resource Adequacy Resources whose Qualifying Capacity value is determined by historical output the exemption provided in subsection (2) of this Section 40.9.2 will apply to an increase in the capacity under a resource specific power supply contract or Resource Adequacy Capacity that was procured under a contract that was either executed or submitted to the applicable Local Regulatory Authority for approval that meets the requirements in this subsection (3), except that the deadline date for either type of contract to be exempt shall be August 22, 2010 instead of June 28, 2009.

### **3. Definitions**

As used in this Appendix J, the capitalized terms defined below shall have the definitions specified in this Section 2. All other capitalized terms shall have the meaning specified in the Master Definition Supplement in Attachment A.

\* \* \*

**Attachment B – Marked Tariff Records**  
**Reliability Services Initiative Phase 1A**  
**California Independent System Operator Corporation**

#### 9.3.1.3.3.1 RA Maintenance Outage With Replacement

(a) **Replacement Option.** The Scheduling Coordinator of a Resource Adequacy Resource designated as Resource Adequacy Capacity during the resource adequacy month may request that a planned Maintenance Outage be scheduled, or an Approved Maintenance Outage be rescheduled, as an RA Maintenance Outage With Replacement during that month.

(b) **Request.** A request for an RA Maintenance Outage With Replacement must (i) be submitted to the CAISO Outage Coordination Office no more than forty-five days prior to the first day of the resource adequacy month for which the outage is requested and no less than eight days prior to the start of the outage, (ii) provide RA Replacement Capacity in an amount no less than the Resource Adequacy Capacity designated for the resource for the duration of the scheduled outage, and (iii) otherwise comply with the requirements set forth in Section 9.

(c) **Approval.**

- (1) The CAISO Outage Coordination Office will consider requests for an RA Maintenance Outage With Replacement in the order the requests are received.
- (2) The CAISO Outage Coordination Office may approve the request for an RA Maintenance Outage With Replacement if it determines that (i) the request meets the requirements in Section 9.3.1.3.3.1(b) and (ii) system conditions and the overall outage schedule provide an opportunity to take the resource out of service without a detrimental effect on the efficient use and reliable operation of the CAISO Controlled Grid.
- (3) If the request was submitted no more than forty-five days prior to the first day of the resource adequacy month for which the outage is requested and no less than eight days prior to the start date for the outage, and it meets the requirements in Section 9.3.1.3.3.1(c)(2) the CAISO Outage Coordination Office may approve the request as an RA Maintenance Outage With Replacement,

~~(4) If the request was submitted no more than seven days and no less than four days prior to the start date of the outage, and it otherwise meets the requirements in Section 9.3.1.3.3.1(c)(2), the CAISO Outage Coordination Office~~

~~may approve the request as a Forced Outage. A Forced Outage approved under this Section will not be subject to the standard capacity product provisions in Section 40.9.~~

(54) If the CAISO Outage Coordination Office denies the request for failing to meet the requirements in Section 9.3.1.3.3.1(c)(2), the Scheduling Coordinator for the Resource Adequacy Resource may request a different schedule for the RA Maintenance Outage With Replacement or may request that the CAISO Outage Coordination Office accommodate the outage without RA Replacement Capacity at another time.

(d) **Resource Adequacy Obligation.** The RA Replacement Capacity for an RA Maintenance Outage With Replacement approved under Section 9.3.1.3.3.1(c)(3) ~~or a Forced Outage approved under Section 9.3.1.3.3.1(c)(4)~~ shall be subject to all of the availability, dispatch, testing, reporting, verification and any other applicable requirements imposed on Resource Adequacy Resources by the CAISO Tariff, including the must-offer obligations in Section 40.6 and the ~~standard capacity product~~RAAIM provisions in Section 40.9, for the MW amount and duration of the outage replacement period, which includes the full day of the start date and the full day of the end date of the outage.

#### **9.3.1.3.3.2 RA Maintenance Outage Without Replacement**

(a) **Option for No Replacement.** The Scheduling Coordinator for a Resource Adequacy Resource designated as Resource Adequacy Capacity during the resource adequacy month may request that a Maintenance Outage be scheduled, or an Approved Maintenance Outage be rescheduled, as an RA Maintenance Outage Without Replacement, without a requirement to provide RA Replacement Capacity for the unavailable capacity for the duration of the outage.

(b) **Request.** A request for an RA Maintenance Outage Without Replacement must (i) be submitted to the CAISO Outage Coordination Office no more than forty-five days prior to the first day of the resource adequacy month for which the outage is requested and no less than eight days prior to the start date of the outage, and (ii) otherwise comply with

the requirements of Section 9.

(c) **Approval.**

(1) The CAISO Outage Coordination Office will consider requests received for an RA Maintenance Outage Without Replacement in the order the requests were received.

(2) The CAISO Outage Coordination Office may approve a request for an RA Maintenance Outage Without Replacement if it determines that (i) the request meets the requirements in Section 9.3.1.3.3.2(b), (ii) system conditions and the overall outage schedule provide an opportunity to take the resource out of service without a detrimental effect on the efficient use and reliable operation of the CAISO Controlled Grid, and (iii) the outage will not result in insufficient available Resource Adequacy Capacity during the outage period. The analysis of system conditions and the overall outage schedule will include Approved Maintenance Outage requests that were received before and after the request for an RA Maintenance Outage Without Replacement.

(3) The CAISO Outage Coordination Office will not approve a request for an RA Maintenance Outage Without Replacement earlier than seven days before the first day of the resource adequacy month, and may hold the request as pending until system conditions are sufficiently known for the CAISO to determine whether the outage meets the requirements in Section 9.3.1.3.3.2(c)(2).

~~(4) If the request is submitted no more than seven days and no less than four days prior to the start date of the outage, and it otherwise meets the requirements in Section 9.3.1.3.3.2(c)(2), the CAISO Outage Coordination Office may approve the request as a Forced Outage. A Forced Outage approved under this Section will not be subject to the standard capacity product provisions in Section 40.9.~~

~~(5)~~ If the CAISO Outage Coordination Office denies a request for an RA Maintenance Outage Without Replacement for failing to meet the requirements in Section 9.3.1.3.3.2(c)(2), the Scheduling Coordinator for the Resource Adequacy

Resource may request an RA Maintenance Outage with Replacement or may request that the CAISO Outage Coordination Office accommodate the outage at another time.

**9.3.1.3.3.3 Off-Peak Opportunity RA Maintenance Outage**

- (a) **Option for Off-Peak Outage.** The Scheduling Coordinator for a Resource Adequacy Resource designated as Resource Adequacy Capacity during the resource adequacy month may submit a request for an Off-Peak Opportunity RA Maintenance Outage without a requirement to provide RA Replacement Capacity for the unavailable capacity for the duration of the outage.
- (b) **Request.** A request for an Off-Peak Opportunity RA Maintenance Outage must (i) be submitted to the CAISO Outage Coordination Office no more than forty-five days prior to the first day of the resource adequacy month for which the outage is requested and no less than eight days prior to the start date for the outage, (ii) schedule the outage to begin during off-peak hours (as specified in the Business Practice Manual) on a weekday, and to be completed prior to on-peak hours (as specified in the Business Practice Manual) the following weekday, or to begin during off-peak hours (as specified in the Business Practice Manual) on Friday, or on Saturday, Sunday, or a holiday, and to be completed prior to on-peak hours (as specified in the Business Practice Manual) on the next weekday and (iii) otherwise comply with the requirements set forth in Section 9.
- (c) **Approval.**
  - (1) The CAISO Outage Coordination Office will consider requests for an Off-Peak Opportunity RA Maintenance Outage in the order the requests were received.
  - (2) If the request was submitted no more than forty-five days prior to the first day of the resource adequacy month for which the outage is requested and no less than eight days prior to the start date for the outage, the CAISO Outage Coordination Office may approve the request as an Off-Peak Opportunity RA Maintenance Outage if it determines that (i) the request meets the requirements set forth in Section 9.3.1.3.3.3(b) and (ii) system conditions and the overall outage schedule

provide an opportunity to take the resource out of service without a detrimental effect on the efficient use and reliable operation of the CAISO Controlled Grid.

~~(3) If the request was submitted no more than seven days and no less than four days prior to the start date of the outage, the CAISO Outage Coordination Office may approve the request as a Forced Outage if it determines that (i) the request otherwise meets the requirements set forth in Section 9.3.1.3.3.3(b) and (ii) system conditions and the overall outage schedule provide an opportunity to take the resource out of service without a detrimental effect on the efficient use and reliable operation of the CAISO Controlled Grid. A Forced Outage approved under this Section will not be subject to the standard capacity product provisions in Section 40.9.~~

(43) If the CAISO Outage Coordination Office denies a request for an Off-Peak Opportunity RA Maintenance Outage for failing to meet the requirements in Section 9.3.1.3.3.3(c)(2), the Scheduling Coordinator for the Resource Adequacy Resource may request an RA Maintenance Outage with Replacement or may request that the CAISO Outage Coordination Office accommodate the outage at another time.

(54) To the extent that an approved Off-Peak Opportunity RA Maintenance Outage is not completed during off-peak hours as scheduled, and extends into on-peak hours, the Scheduling Coordinator for the resource shall submit the portion of the outage that extends into on-peak hours as a new Forced Outage, which shall be subject to the ~~standard capacity product~~ RAAIM provisions in Section 40.9.

#### **9.3.1.3.3.4 Short-Notice Opportunity RA Outage**

(a) **Option for Short-Notice Outage.** The Scheduling Coordinator for a Resource Adequacy Resource designated as Resource Adequacy Capacity during the resource adequacy month may submit a request for a Short-Notice Opportunity RA Outage without a requirement to provide -RA Replacement Capacity or RA Substitute Capacity for the Resource Adequacy Capacity that will be on the Forced Outage or de-rate.

(b) A Short-Notice Opportunity RA -Outage shall not exceed five days in length. The request for a Short-Notice Opportunity RA Outage must (i) be submitted no more than seven days prior to the requested start date for the outage, (ii) provide the CAISO Outage Coordination Office adequate time to analyze the request before the outage begins, (iii) be submitted before the outage has commenced as a Forced Outage, and (iv) otherwise comply with the requirements of Section 9.

(c) **Approval.**

- (1) The CAISO Outage Coordination Office will consider Short-Notice Opportunity RA Outages in the order the requests are received.
- (2) If the request was submitted no more than seven days and no less than four days prior to the start date of the outage, the CAISO Outage Coordination Office may approve the request as a Short Notice Opportunity RA Outage if it determines that (i) the outage and the request meet the requirements set forth in Section 9.3.1.3.3.4(b), (ii) system conditions and the overall outage schedule provide an opportunity to take the resource out of service without a detrimental effect on the efficient use and reliable operation of the CAISO Controlled Grid, and (iii) the outage will not result in insufficient available Resource Adequacy Capacity during the outage period. The approved outage will be a Forced Outage ~~but it and~~ will ~~not~~ be subject to the ~~standard capacity product~~ RAAIM provisions in Section 40.9.
- (3) If the request was submitted three days or less prior to the start date of the outage, the CAISO Outage Coordination Office may approve the request as a Forced Outage if it determines that (i) the outage and request meet the requirements set forth in Section 9.3.1.3.3.4(b), (ii) system conditions and the overall outage schedule provide an opportunity to take the resource out of service without a detrimental effect on the efficient use and reliable operation of the CAISO Controlled Grid, (iii) the outage will not result in insufficient available Resource Adequacy Capacity during the outage period, and (iv) the repairs are

necessary to maintain system or resource reliability and require immediate attention to prevent equipment damage or failure. A Short-Notice Opportunity RA Outage approved under this Section will be a Forced Outage but it will not be subject to the ~~standard capacity product~~RAAIM provisions in Section 40.9.

- (4) To the extent that an approved Short-Notice Opportunity RA Outage is not completed during the originally approved outage schedule, the Scheduling Coordinator for the resource must submit the portion of the outage that continues from the approved completion time until the time the outage is actually completed as a new Forced Outage, which will be subject to the ~~standard capacity product~~RAAIM provisions in Section 40.9.

\* \* \*

#### 11.8.2.3.2 MSS Elected Net Settlement

For an MSS Operator that has elected net Settlement, regardless of other MSS optional elections (Load following or RUC opt-in or out), the Energy ~~bid costs and revenues for affected by~~IFM Bid Cost Recovery is ~~settled at the MSS level~~~~net Energy where the MSS Supply exceeds the MSS Demand within the MSS. The IFM Bid Cost Shortfall or Surplus is also settled at the MSS level as opposed to the individual resource level.~~ The IFM Bid Cost as described in Section 11.8.2.1 above and IFM Market Revenue as provided in Section 11.8.2.2 above, of each MSS will be, respectively, the total of the IFM Bid Costs and IFM Market Revenues ~~of~~over all BCR Eligible Resources within the MSS ~~where each BCR Eligible Resource's IFM Market Revenues for its Energy shall be calculated as described in Section 11.2.3.2 at the relevant IFM MSS price.~~ The IFM Bid Cost Shortfalls and Surpluses for Energy and AS are first calculated separately for the MSS for each Trading Hour of the Trading Day with qualified Start-Up Cost and qualified Minimum Load Cost included in the IFM Bid Cost Shortfalls and Surpluses for Energy calculation. ~~The IFM Bid Cost Shortfall or Surplus of Energy in each Trading Hour is then pro-rated by the MSS's ratio of the net positive MSS Generation Schedule to the gross MSS Generation Schedule of that Trading Hour. If the MSS CAISO Demand is in excess of the MSS Generation in a given Trading Hour in the Day Ahead Schedule, the CAISO will set the pro-rating ratio for that Trading~~

~~Hour to zero.~~ The MSS's overall IFM Bid Cost Shortfall or Surplus is then calculated as the algebraic sum of the ~~prorated~~ IFM Bid Cost Shortfall or Surplus for Energy and the IFM Bid Cost Shortfall or Surplus for AS for each Trading Hour.

\* \* \*

#### **11.8.4.3.2 MSS Elected Net Settlement**

For MSS entities that have elected net Settlement regardless of other MSS optional elections (i.e., Load following or not, or RUC opt-in or out), unlike non-MSS resources, the RUC and RTM Bid Cost Shortfall or Surplus is treated at the MSS level and not at the resource specific level, and is calculated as the RUC and RTM Bid Cost Shortfall or Surplus of all BCR Eligible Resources within the MSS. In calculating the Energy RTM Market Revenue for all the resources within the MSS as provided in Section 11.8.4.2, the CAISO will use the Real-Time Settlement Interval MSS Price. The RUC and RTM Bid Cost Shortfall and Surplus for Energy, RUC Availability and Ancillary Services are first calculated separately for the MSS for each Settlement Interval of the Trading Day, with qualified Start-Up Cost, qualified Minimum Load Cost and qualified Multi-Stage Generator transition cost included into the RUC and RTM Bid Cost Shortfalls and Surpluses of Energy calculation. ~~The RUC and RTM Bid Cost Shortfall or Surplus for Energy for each Settlement Interval is pro-rated by the ratio of the net positive metered Generation to the gross metered Generation of the MSS for that interval. If the MSS metered CAISO Demand is in excess of the MSS Generation in a given Settlement Interval, the CAISO will set the pro-rating ratio for that Settlement Interval to zero.~~ The MSS's overall RUC and RTM Bid Cost Shortfall or Surplus is then calculated as the algebraic sum of the RUC and RTM Bid Cost Shortfall or Surplus for Energy and the RUC and RTM Bid Cost Shortfall or Surplus for AS for each Settlement Interval.

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#### **40. Resource Adequacy Demonstration For All SCs In The CAISO BAA**

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**40.1.1 ~~Election Of Load Serving Entity Status~~[Not Used]**

~~On an annual basis, in the manner and schedule set forth in the Business Practice Manual, the Scheduling Coordinator for a Load Serving Entity, not exempt under Section 40.1, shall inform the CAISO whether each such LSE elects to be either: (i) a Reserve Sharing LSE or (ii) a Modified Reserve Sharing LSE. A Scheduling Coordinator for a Load following MSS is not required to make an election under this Section. Scheduling Coordinators for Load following MSSs are subject solely to Sections 40.2.4, 40.3, and with respect to their Local Capacity Area Resources identified in accordance with Section 40.2.4, Section 40.9.~~

~~The CAISO may confirm with the CPUC, Local Regulatory Authority, or federal agency, as applicable, the accuracy of the election by the Scheduling Coordinator for any LSE under its respective jurisdiction, or, in the absence of any election by the Scheduling Coordinator, the desired election for any LSE under its jurisdiction. The determination of the CPUC, Local Regulatory Authority, or federal agency will be deemed binding by the CAISO on the Scheduling Coordinator and the LSE. If the Scheduling Coordinator and CPUC, Local Regulatory Authority, or federal agency, as appropriate, fail to make the election on behalf of an LSE in accordance with the Business Practice Manual, the LSE shall be deemed a Reserve Sharing LSE.~~

**40.2 Information Requirements For Resource Adequacy Programs**

**40.2.1 ~~Reserve Sharing LSEs~~Load Serving Entities**

**40.2.1.1 Requirements for CPUC Load Serving Entities ~~Electing Reserve Sharing LSE Status~~**

- (a) The Scheduling Coordinator for a CPUC Load Serving Entity ~~electing Reserve Sharing LSE status~~ must provide the CAISO with all information or data to be provided to the CAISO as required by the CPUC and pursuant to the schedule adopted by the CPUC, except that the monthly Resource Adequacy Plans or the same information as required to be included in the monthly Resource Adequacy Plans, plus any other information the CAISO requires as identified in the Business Practice Manual, shall be submitted to the CAISO no less than 45 days in advance of the first day of the month covered by the plan, as provided in

Section 40.2.1.1(e).

- (b) Where the information or data provided to the CAISO under Section 40.2.1.1(a) does not include Reserve Margin(s), then the provisions of Section 40.2.2.1(b) shall apply.
- (c) Where the information or data provided to the CAISO under Section 40.2.1.1(a) does not include criteria for determining qualifying resource types and their Qualifying Capacity, then the provisions of Section 40.8 shall apply.
- (d) Where the information or data provided to the CAISO under Section 40.2.1.1(a) does not include annual and monthly Demand Forecast requirements, then the provisions of Section 40.2.2.3 shall apply.
- (e) Where the information or data provided to the CAISO under Section 40.2.1.1(a) does not include annual and monthly Resource Adequacy Plan requirements, or where there is a requirement to submit monthly Resource Adequacy Plans but the submission date is less than 45 days in advance of the first day of the month covered by the plan, then Section 40.2.2.4 shall apply.

~~(f) Notwithstanding Section 40.2.1.1(a) and (e), for the resource adequacy month of January 2013, the monthly Resource Adequacy Plans or the same information as required to be included in the monthly Resource Adequacy Plans, plus any other information the CAISO requires as identified in the Business Practice Manual, shall be submitted to the CAISO no later than November 20, 2012, which is 42 days in advance of the first day of the month.~~

**40.2.2**

**Non-CPUC ~~LSEs Electing Reserve Sharing LSE Status~~ Load Serving**

**Entities**

**40.2.2.1**

**Reserve Margin**

- (a) The Scheduling Coordinator for a Non-CPUC Load Serving Entity ~~electing Reserve Sharing LSE status~~ must provide the CAISO with the Reserve Margin(s) adopted by the appropriate Local Regulatory Authority or federal agency for use in the annual Resource Adequacy Plan and monthly Resource Adequacy Plans listed as a percentage of the Demand Forecasts developed in accordance with Section 40.2.2.3.
- (b) For the Scheduling Coordinator for a Non-CPUC Load Serving Entity for which the appropriate Local Regulatory Authority or federal agency has not established a Reserve Margin(s) or a CPUC Load Serving Entity subject to Section 40.2.1.1(b) ~~that has elected Reserve Sharing LSE status~~, the Reserve Margin for each month shall be no less than fifteen percent (15%) of the LSE's peak hourly Demand for the applicable month, as determined by the Demand Forecasts developed in accordance with Section 40.2.2.3.

**40.2.2.2 Qualifying Capacity Criteria**

The Scheduling Coordinator for a Non-CPUC Load Serving Entity ~~electing Reserve Sharing LSE status~~ must provide the CAISO with a description of the criteria adopted by the Local Regulatory Authority or federal agency for determining qualifying resource types and the Qualifying Capacity from such resources and any modifications thereto as they are implemented from time to time.

The ~~Reserve Sharing~~ LSE may elect to utilize the criteria set forth in Section 40.8.

**40.2.2.3 Demand Forecasts**

~~If the California Energy Commission does not produce a coincident peak Demand Forecast for a Load Serving Entity, the Scheduling Coordinator for a Non-CPUC Load Serving Entity or CPUC that Load Serving Entity subject to Section 40.2.1.1(b) electing Reserve Sharing LSE status must provide annual and monthly Demand Forecasts~~ the information requested by the CAISO on the schedule and in the reporting format(s) set forth in the Business Practice Manual. ~~The annual and monthly Demand Forecasts shall utilize the annual and monthly coincident peak Demand determinations provided by the California Energy Commission for such Load Serving~~

~~Entity, which will be calculated from the Demand Forecast information submitted to the California Energy Commission by each Reserve Sharing LSE; or (ii) if the California Energy Commission does not produce coincident peak Demand Forecasts for the Load Serving Entity, the annual and monthly coincident peak Demand Forecasts produced by the CAISO for such Load Serving Entity in accordance with its Business Practice Manual. Scheduling Coordinators must provide data and information, as may be requested by the CAISO, necessary to develop or support the Demand Forecasts required by this Section.~~

#### **40.2.2.4 Annual and Monthly Resource Adequacy Plans**

The Scheduling Coordinator for a Non-CPUC Load Serving Entity or a CPUC Load Serving Entity subject to Section 40.2.1.1(b) ~~electing Reserve Sharing LSE status~~ must provide annual and monthly Resource Adequacy Plans for such Load Serving Entity, as follows:

- (a) Each annual Resource Adequacy Plan must be submitted to the CAISO on a schedule and in the reporting format(s) set forth in the Business Practice Manual. The annual Resource Adequacy Plan must, at a minimum, set forth the Local Capacity Area Resources, if any, procured by the Load Serving Entity as described in Section 40.3.
- (b) Each monthly Resource Adequacy Plan or the same information as required to be included in the monthly Resource Adequacy Plan, plus any other information the CAISO requires as identified in the Business Practice Manual, must be submitted to the CAISO at least 45 days in advance of the first day of the month covered by the plan, and in accordance with the schedule and in the reporting format(s) set forth in the Business Practice Manual. The monthly Resource Adequacy Plan must identify all resources, including Local Capacity Area Resources, the Load Serving Entity will rely upon to satisfy the applicable month's peak hour Demand of the Load Serving Entity as determined by the Demand Forecasts developed in accordance with Section 40.2.2.3 and applicable Reserve Margin. Resource Adequacy Plans must utilize the Net Qualifying Capacity requirements of Section 40.4.

- (c) The Scheduling Coordinator for the Load Serving Entity may submit at any time from 45 days through 11 days in advance of the relevant month, a revision to its monthly Resource Adequacy Plan to correct an error in the plan. The CAISO will not accept any revisions to a monthly Resource Adequacy Plan from 10 days in advance of the relevant month through the end of the month, unless the Scheduling Coordinator for the Load Serving Entity demonstrates good cause for the change and explains why it was not possible to submit the change earlier.
- (d) In order to ensure that the CAISO's outage replacement determination remains accurate, the Scheduling Coordinator for the Load Serving Entity that submits a revision to its monthly Resource Adequacy Plan to correct an error must include in the revision a MW amount of Resource Adequacy Capacity for each day of month that is no less than the MW amount of Resource Adequacy Capacity included in its original plan for each day of the month.
- (e) In order to ensure that the amount of Resource Adequacy Capacity required to be included in the Load Serving Entity's Resource Adequacy Plan is operationally available to the CAISO throughout the resource adequacy month, the Load Serving Entity that submits the monthly Resource Adequacy Plan is subject to the replacement requirement in Section 9.3.1.3.1.
- ~~(f) Notwithstanding Section 40.2.2.4(b), for the resource adequacy month of January 2013, the monthly Resource Adequacy Plans or the same information as required to be included in the monthly Resource Adequacy Plans, plus any other information the CAISO requires as identified in the Business Practice Manual, shall be submitted to the CAISO no later than November 20, 2012, which is 42 days in advance of the first day of the month. Notwithstanding Section 40.2.2.4(c), for the resource adequacy month of January 2013, the Scheduling Coordinator for the Load Serving Entity may submit at any time from 42 days through 11 days in advance of the relevant month, a revision to its monthly Resource Adequacy Plan to correct an error in the plan.~~

**40.2.3 Modified Reserve Sharing LSEs[Not Used]**

**40.2.3.1 Reserve Margin**

- (a) The Scheduling Coordinator for a Load Serving Entity electing Modified Reserve Sharing LSE status must provide the CAISO with the Reserve Margin(s) adopted by the CPUC, Local Regulatory Authority, or federal agency, as appropriate, for use in the annual Resource Adequacy Plan and monthly Resource Adequacy Plans listed as a percentage of the Demand Forecasts developed in accordance with Section 40.2.3.3.
- (b) For the Scheduling Coordinator for a Load Serving Entity electing Modified Reserve Sharing LSE status for which the CPUC, Local Regulatory Authority, or federal agency, as appropriate, has not established a Reserve Margin, the Reserve Margin shall be no less than fifteen percent (15%) of the applicable month's peak hour Demand of the Load Serving Entity, as determined by the Demand Forecasts developed in accordance with Section 40.2.3.3.

**40.2.3.2 Qualifying Capacity**

The Scheduling Coordinator for a Load Serving Entity electing Modified Reserve Sharing LSE status must provide the CAISO with a description of the criteria for determining qualifying resource types and the Qualifying Capacity from such resources and any modifications thereto as they are implemented from time to time. The Modified Reserve Sharing LSE may elect to utilize the criteria set forth in Section 40.8.

**40.2.3.3 Demand Forecasts**

- (a) The Scheduling Coordinator for a Load Serving Entity electing Modified Reserve Sharing LSE status must provide annual and monthly Demand Forecasts on the schedule and in the reporting format(s) set forth in the Business Practice Manual. The annual and monthly Demand Forecasts shall utilize the annual and monthly coincident peak Demand determinations provided by the California Energy Commission for such

~~Load Serving Entity, which will be calculated from Demand Forecast data submitted to the California Energy Commission by each Modified Reserve Sharing LSE; or (ii) if the California Energy Commission does not produce coincident peak Demand Forecasts for the Load Serving Entity, the annual and monthly coincident peak Demand Forecasts produced by the CAISO for such Load Serving Entity in accordance with its Business Practice Manual. Scheduling Coordinators must provide data and information, as may be requested by the CAISO, to develop or support the Demand Forecast required by this Section 40.2.3.3(b).~~

~~(b) The Scheduling Coordinator for a Load Serving Entity electing Modified Reserve Sharing LSE status must submit, on the schedule and in the reporting format set forth in the Business Practice Manual, hourly Demand Forecasts for each Trading Hour of the next Trading Day for each Modified Reserve Sharing LSE represented. The Scheduling Coordinator for a Load Serving Entity electing Modified Reserve Sharing LSE status must provide data or supporting information, as requested by the CAISO, for the Demand Forecasts required by this Section 40.2.3.3(b) for each Modified Reserve Sharing LSE served by the Scheduling Coordinator and a description of the criteria upon which the Demand Forecast was developed, and any modifications thereto as they are implemented from time to time.~~

#### ~~40.2.3.4 Annual and Monthly Resource Adequacy Plans~~

~~The Scheduling Coordinator for a Load Serving Entity electing Modified Reserve Sharing LSE status must provide annual and monthly Resource Adequacy Plans, for each Modified Reserve Sharing LSE served by the Scheduling Coordinator, as follows:~~

- ~~(a) Each annual Resource Adequacy Plan must be submitted to the CAISO on a schedule and in the reporting format(s) set forth in the Business Practice Manual. The annual Resource Adequacy Plan must, at a minimum, set forth the Local~~

~~Capacity Area Resources, if any, procured by the Modified Reserve Sharing LSE as described in Section 40.3.~~

- ~~(b) — Each monthly Resource Adequacy Plan or the same information as required to be included in the monthly Resource Adequacy Plan, plus any other information the CAISO requires as identified in the Business Practice Manual, must be submitted to the CAISO at least 45 days in advance of the first day of the month covered by the plan, and in accordance with the schedule and in the reporting format(s) set forth in the Business Practice Manual. The monthly Resource Adequacy Plan must identify the resources the Modified Reserve Sharing LSE will rely upon to satisfy its forecasted monthly Demand and Reserve Margin as set forth in Section 40.2.3.1, for the relevant reporting period and must utilize the Net Qualifying Capacity requirements of Section 40.4.~~
- ~~(c) — The Scheduling Coordinator for the Load Serving Entity may submit, at any time from 45 days through 11 days in advance of the relevant month, a revision to its monthly Resource Adequacy Plan to correct an error in the plan. The CAISO will not accept any revisions to a monthly Resource Adequacy Plan from 10 days in advance of the relevant month through the end of the month, unless the Scheduling Coordinator for the Load Serving Entity demonstrates good cause for the change and explains why it was not possible to submit the change earlier.~~
- ~~(d) — In order to ensure that the CAISO's outage replacement determination remains accurate, the Scheduling Coordinator for the Load Serving Entity that submits a revision to its monthly Resource Adequacy Plan to correct an error must include in the revision a MW amount of Resource Adequacy Capacity for each day of month that is no less than the MW amount of Resource Adequacy Capacity included in its original plan for each day of the month.~~
- ~~(e) — In order to ensure that the Resource Adequacy Capacity required to be included in the Load Serving Entity's monthly Resource Adequacy Plan is operationally available to the CAISO throughout the resource adequacy month, the Load~~

~~Serving Entity that submits the monthly Resource Adequacy Plan is subject to the replacement requirement in Section 9.3.1.3.1.~~

~~(f) Notwithstanding Section 40.2.3.4(b), for the resource adequacy month of January 2013, the monthly Resource Adequacy Plans or the same information as required to be included in the monthly Resource Adequacy Plans, plus any other information the CAISO requires as identified in the Business Practice Manual, shall be submitted to the CAISO no later than November 20, 2012, which is 42 days in advance of the first day of the month. Notwithstanding Section 40.2.3.4(c), for the resource adequacy month of January 2013, the Scheduling Coordinator for the Load Serving Entity may submit at any time from 42 days through 11 days in advance of the relevant month, a revision to its monthly Resource Adequacy Plan to correct an error in the plan.~~

#### **40.2.4 Load-Following MSS**

~~(1) **Annual RA Plan.** A Scheduling Coordinator for a Load-following MSS must provide an annual Resource Adequacy Plan that sets forth, at a minimum, the Local Capacity Area Resources, if any, procured by the Load-following MSS as described in Section 40.3. The annual Resource Adequacy Plan shall utilize the annual coincident peak Demand determination provided by the California Energy Commission for such Load-following MSS using Demand Forecast data submitted to the California Energy Commission by the Load-following MSS, or, if the California Energy Commission does not produce coincident peak Demand Forecasts for the Load-following MSS, the annual coincident peak Demand Forecast produced by the CAISO for such Load-following MSS in accordance with its Business Practice Manual using Demand Forecast data submitted to the CAISO by the Load-following MSS. **The Local Capacity Area Resources identified by the annual Resource Adequacy Plan submitted by the Load following MSS shall be subject to the Availability Standards, Non-Availability Charge, and Availability Incentive Payment specified in Section 40.9.**~~

(2) Monthly RA Plan and Supply Plan. The Scheduling Coordinator for a Load-following MSS must submit a monthly Resource Adequacy Plan and Supply Plan on the schedule set forth in the Business Practice Manual.

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#### **40.4.7 Submission Of Supply Plans**

##### **40.4.7.1 Schedule for Submission of Supply Plans**

Scheduling Coordinators representing Resource Adequacy Resources supplying Resource Adequacy Capacity shall provide the CAISO with annual and monthly Supply Plans, as follows:

- (a) The annual Supply Plan shall be submitted to the CAISO on the schedule set forth in the Business Practice Manual and shall verify their agreement to provide Resource Adequacy Capacity during the next Resource Adequacy Compliance Year.
- (b) The monthly Supply Plans or the same information as required to be included in the monthly Supply Plan, plus any other information the CAISO requires as identified in the Business Practice Manual, shall be submitted to the CAISO at least 45 days in advance of the first day of the month covered by the plan, and in accordance with the schedule and in the reporting format(s) set forth in the Business Practice Manual, and shall verify their agreement to provide Resource Adequacy Capacity during that resource adequacy month.
- (c) The Scheduling Coordinator for the Resource Adequacy Resource may submit, at any time from 45 days through 11 days in advance of the relevant month, a revision to its monthly Supply Plan to correct an error in the plan. The CAISO will not accept any revisions to a monthly Supply Plan from 10 days in advance of the relevant month through the end of the month, unless the Scheduling Coordinator for the Resource Adequacy Resource demonstrates good cause for the change and explains why it was not possible to submit the change earlier.
- (d) The monthly Supply Plan may indicate the willingness of the resource to offer capacity for procurement as backstop capacity under the Capacity Procurement

Mechanism pursuant to Section 43, and provide the identity of the resource, the available capacity amount, the time periods when the capacity is available, and other information as may be specified in the Business Practice Manual.

~~(e) Notwithstanding Section 40.4.7.1(b), for the resource adequacy month of January 2013, the monthly Supply Plans or the same information as required to be included in the monthly Supply Plans, plus any other information the CAISO requires as identified in the Business Practice Manual, shall be submitted to the CAISO no later than November 20, 2012, which is 42 days in advance of the first day of the month. Notwithstanding Section 40.2.2.4(c), for the resource adequacy month of January 2013, the Scheduling Coordinator for the resource adequacy resource may submit at any time from 42 days through 11 days in advance of the relevant month, a revision to its monthly Supply Plan to correct an error in the plan.~~

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**40.5 Requirements Applying To Modified Reserve Sharing LSEs Only [Not Used]**

**~~40.5.1 Day Ahead Scheduling And Bidding Requirements~~**

~~(1) Scheduling Coordinators on behalf of Modified Reserve Sharing LSEs serving Load within the CAISO Balancing Authority Area for whom they submit Demand Bids shall submit into the IFM Bids or Self Schedules for Demand equal to one hundred (100) percent and for Supply equal to one hundred and fifteen (115) percent of the hourly Demand Forecasts for each Modified Reserve Sharing LSE it represents for each Trading Hour for the next Trading Day. Subject to Section 40.5.5, the resources included in a Self Schedule or a Bid in each Trading Hour to satisfy one hundred and fifteen (115) percent of the Modified Reserve Sharing LSE's hourly Demand Forecasts will be deemed Resource Adequacy Resources and (a) shall be comprised of those resources listed in the~~

~~Modified Reserve Sharing LSE's monthly Resource Adequacy Plan and (b) shall include all Local Capacity Area Resources listed in the Modified Reserve Sharing LSE's annual Resource Adequacy Plan, if any, except to the extent the Local Capacity Area Resources, if any, are unavailable due to any Outages or reductions in capacity reported to the CAISO in accordance with this CAISO Tariff.~~

~~(i) Local Capacity Area Resources physically capable of operating must submit: (a) Economic Bids for Energy and/or Self-Schedules for all their Resource Adequacy Capacity and (b) Economic Bids for Ancillary Services and/or a Submission to Self-Provide Ancillary Services for all of their Resource Adequacy Capacity that is certified to provide Ancillary Services. For Local Resource Adequacy Capacity that is certified to provide Ancillary Services and is not covered by a Submission to Self-Provide Ancillary Services, the resource must submit Economic Bids for each Ancillary Service for which the resource is certified. For Resource Adequacy Capacity subject to this requirement for which no Economic Energy Bid or Self-Schedule has been submitted, the CAISO shall insert a Generated Bid in accordance with Section 40.6.8. For Resource Adequacy Capacity subject to this requirement for which no Economic Bids for Ancillary Services or Submissions to Self-Provide Ancillary Services have been submitted, the CAISO shall insert a Generated Bid in accordance with Section 40.6.8 for each Ancillary Service the resource is certified to provide. However, to the extent the Generating Unit providing Local Capacity Area Resource~~

~~capacity constitutes a Use-Limited Resource under Section 40.6.4, the provisions of Section 40.6.4 will apply.~~

- ~~(ii) Resource Adequacy Resource must participate in the RUC to the extent that the resource has available Resource Adequacy Capacity that was offered into the IFM and is not reflected in an IFM Schedule. Resource Adequacy Capacity participating in RUC will be optimized using zero dollar (\$0/MW-hour) RUC Availability Bid.~~
- ~~(iii) Capacity from Resource Adequacy Resources selected in RUC will not be eligible to receive a RUC Availability Payment.~~
- ~~(iv) Through the IFM co-optimization process, the CAISO will utilize available Local Capacity Area Resource Adequacy Capacity to provide Energy or Ancillary Services in the most efficient manner to clear the Energy market, manage congestion and procure required Ancillary Services. In so doing the IFM will honor submitted Energy Self-Schedules of the Local Capacity Area Resource Adequacy Capacity of the Modified Reserve Sharing LSE unless the CAISO is unable to satisfy one hundred (100) percent of the Ancillary Services requirements. In such cases the CAISO may curtail all or a portion of a submitted Energy Self-Schedule to allow Ancillary Service-certified Local Capacity Area Resource Adequacy Capacity to be used to meet the Ancillary Service requirements. The CAISO will not curtail for the purpose of meeting Ancillary Service requirements a Self-Schedule of a resource internal to a Metered Subsystem that was submitted by the Scheduling Coordinator for that Metered Subsystem. If the IFM reduces the Energy Self-Schedule of Resource Adequacy Capacity to provide an~~

~~Ancillary Service, the Ancillary Service Marginal Price for that Ancillary Service will be calculated in accordance with Section 27.1.2 using the Ancillary Service Bids submitted by the Scheduling Coordinator for the Resource Adequacy Resource or inserted by the CAISO pursuant to this Section 40.5.1, and using the resource's Generated Energy Bid to determine the Resource Adequacy Resource's opportunity cost of Energy. If the Scheduling Coordinator for the Modified Reserve Sharing LSE's Resource Adequacy Resource believes that the opportunity cost of Energy based on the Resource Adequacy Resource's Generated Energy Bid is insufficient to compensate for the resource's actual opportunity cost, the Scheduling Coordinator may submit evidence justifying the increased amount to the CAISO and to the FERC no later than seven (7) days after the end of the month in which the submitted Energy Self-Schedule was reduced by the CAISO to provide an Ancillary Service. The CAISO will treat such information as confidential and will apply the procedures in Section 20.4 of this CAISO Tariff with regard to requests for disclosure of such information. The CAISO shall pay the higher opportunity costs after those amounts have been approved by FERC.~~

~~(2) Resource Adequacy Resources of Modified Reserve Sharing LSEs that do not clear in the IFM or are not committed in RUC shall have no further offer requirements in the RTM, except under System Emergencies as provided in this CAISO Tariff.~~

~~(3) Resource Adequacy Resources committed by the CAISO must maintain that commitment through Real-Time. In the event of a Forced Outage on a Resource Adequacy Resource committed in the Day-Ahead Market to~~

~~provide Energy, the Scheduling Coordinator for the Modified Reserve Sharing LSE will have up to the next RTM bidding opportunity, plus one hour, to replace the lesser of: (i) the committed resource suffering the Forced Outage, (ii) the quantity of Energy committed in the Day-Ahead Market, or (iii) one hundred and seven (107) percent of the hourly forecast Demand.~~

#### ~~40.5.2 Demand Forecast Accuracy~~

~~On a monthly basis, the CAISO will review Meter Data to evaluate the accuracy or quality of the hourly Day-Ahead Demand Forecasts submitted by the Scheduling Coordinator on behalf of Modified Reserve Sharing LSEs. If the CAISO determines, based on its review, that one or more Demand Forecasts materially under-forecasts the Demand of the Modified Reserve Sharing LSEs for whom the Scheduling Coordinator schedules, after accounting for weather adjustments, the CAISO will notify the Scheduling Coordinator of the deficiency and will cooperate with the Scheduling Coordinator and Modified Reserve Sharing LSE(s) to revise its Demand Forecast protocols or criteria. If the material deficiency affects ten (10) hourly Demand Forecasts over a minimum of two (2) non-consecutive Business Days within a month, the CAISO may: (i) inform State of California authorities including, but not necessarily limited to, the California Legislature, and identify the Modified Reserve Sharing LSE(s) represented by the Scheduling Coordinator and (ii) assign to the Scheduling Coordinator responsibility for all tier 1 RUC charges as specified in Section 11.8.6.5 to address the uncertainty caused by the Scheduling Coordinator's deficient hourly Demand Forecasts until the deficiency is addressed.~~

#### ~~40.5.3 Requirement To Make Resources Available In System Emergency~~

~~Scheduling Coordinators for Modified Reserve Sharing LSEs that are MSS Operators shall make resources available to the CAISO during a System Emergency in accordance with the provisions of their Metered Subsystem Agreement. Scheduling Coordinators for all other Modified Reserve Sharing LSEs shall make available to the CAISO upon a warning or emergency notice of an actual or imminent System Emergency all resources that have not submitted a Self-Schedule or Economic Bid in the IFM that were listed in the Modified Reserve Sharing LSE's monthly~~

~~Resource Adequacy Plan that are physically capable of operating without violation of any applicable law.~~

#### ~~40.5.4 Consequence Of Failure To Meet Scheduling Obligation~~

- ~~(1) If the Scheduling Coordinator for the Modified Reserve Sharing LSE fails to submit a Self-Schedule or submit Bids equal to 115% of its hourly Demand Forecasts for each Trading Hour for the next Trading Day in the IFM and RUC, the Scheduling Coordinator will be charged a capacity surcharge of three times the price of the relevant Day-Ahead Hourly LAP LMP in the amount of the shortfall. To the extent the Scheduling Coordinator for the Modified Reserve Sharing LSE schedules imports on one or more Scheduling Points in an aggregate megawatt amount greater than its aggregate import deliverability allocation under Section 40.4.6.2, the quantity of megawatts in excess of its import deliverability allocation will not count toward satisfying the Modified Reserve Sharing LSE's scheduling obligation, unless it clears the Day-Ahead Market.~~
- ~~(2) If the Scheduling Coordinator for the Modified Reserve Sharing LSE cannot fulfill its obligations under Section 40.5.1(3), the Scheduling Coordinator for the Modified Reserve Sharing LSE will be charged a capacity surcharge of two times the average of the six (6) Settlement Interval LAP prices for the hour in the amount of the shortfall. Energy scheduled in the RTM will not net against, or be used as a credit to correct, any failure to fulfill the Day-Ahead IFM hourly scheduling and RUC obligation in Section 40.5.1(1).~~
- ~~(3) Any Energy surcharge received by the CAISO pursuant to this Section 40.5.4 shall be allocated to Scheduling Coordinators representing other Load-Serving Entities in proportion to each such Scheduling Coordinator's Measured Demand during the relevant Trading Hour(s) to~~

~~the aggregate CAISO Measured Demand during the relevant Trading Hour(s).~~

#### ~~40.5.5~~ **Substitution Of Resources**

~~Subject to the provisions of this Section 40.5, the Scheduling Coordinator for a Modified Reserve Sharing LSE may substitute for its Resource Adequacy Resources listed in its monthly Resource Adequacy Plan provided:~~

- ~~(1) Substitutions must occur no later than the close of the IFM; and~~
- ~~(2) Resources eligible for substitution are either imports or capacity from non-Resource Adequacy Resources or Resource Adequacy Resources with additional available capacity defined as Net Qualifying Capacity in excess of previously sold Resource Adequacy Capacity; however a Local Capacity Area Resource may be substituted only with capacity from non-Resource Adequacy Resources located in the same Local Capacity Area.~~

#### **40.6 Requirements For SCs And Resources For Reserve Sharing LSEs**

This Section 40.6 does not apply to Resource Adequacy Resources of Load-following MSSs ~~and those entities that participate in the Modified Reserve Sharing LSE program under Section 40.5.~~

Scheduling Coordinators supplying Resource Adequacy Capacity shall make the Resource Adequacy Capacity listed in the Scheduling Coordinator's monthly Supply Plans under Section 40.4.7 available to the CAISO each hour of each day of the reporting month in accordance with this Section 40.6 and Section 9.3.1.3.

##### **40.6.1 Day-Ahead Availability**

Scheduling Coordinators supplying Resource Adequacy Capacity shall make the Resource Adequacy Capacity, ~~except for that subject to Section 40.6.4,~~ available Day-Ahead to the CAISO, except as provided in Section 40.6.1.1 for specific resource types, and Section 40.6.4 for Use-Limited Resources, as follows:

- (1) Resource Adequacy Resources physically capable of operating must submit: (a) Economic Bids for Energy and/or Self-Schedules for all their

Resource Adequacy Capacity and (b) Economic Bids for Ancillary Services and/or a Submission to Self-Provide Ancillary Services in the IFM for all of their Resource Adequacy Capacity that is certified to provide Ancillary Services. For Resource Adequacy Capacity that is certified to provide Ancillary Services and is not covered by a Submission to Self-Provide Ancillary Services, the resource must submit Economic Bids for each Ancillary Service for which the resource is certified. For Resource Adequacy Capacity subject to this requirement for which no Economic Energy Bid or Self-Schedule has been submitted, the CAISO shall insert a Generated Bid in accordance with Section 40.6.8. For Resource Adequacy Capacity subject to this requirement for which no Economic Bids for Ancillary Services or Submissions to Self-Provide Ancillary Services have been submitted, the CAISO shall insert a Generated Bid in accordance with Section 40.6.8 for each Ancillary Service the resource is certified to provide.

- ~~(2) Resource Adequacy Resources that are Extremely Long Start Resources must make themselves available to the CAISO by complying with the Extremely Long Start Commitment Process under Section 31.7 or otherwise committing the ELS Resource upon instruction from the CAISO, if physically capable. Once the ELS Resource is committed by the CAISO, it is subject to the provisions of this Section 40.6.1 regarding Day Ahead Availability and Section 40.6.2 regarding Real Time Availability for the Trading Days for which it was committed.~~
- ~~(32)~~ Resource Adequacy Resources must be available except for limitations specified in the Master File, legal or regulatory prohibitions or as otherwise required by this CAISO Tariff or by Good Utility Practice.
- ~~(43)~~ Through the IFM co-optimization process, the CAISO will utilize available Resource Adequacy Capacity to provide Energy or Ancillary Services in

the most efficient manner to clear the Energy market, manage congestion and procure required Ancillary Services. In so doing, the IFM will honor submitted Energy Self-Schedules of Resource Adequacy Capacity unless the CAISO is unable to satisfy one hundred percent (100%) of the Ancillary Services requirements. In such cases, the CAISO may curtail all or a portion of a submitted Energy Self-Schedule to allow Ancillary Service-certified Resource Adequacy Capacity to be used to meet the Ancillary Service requirements. The CAISO will not curtail for the purpose of meeting Ancillary Service requirements a Self-Schedule of a resource internal to a Metered Subsystem that was submitted by the Scheduling Coordinator for that Metered Subsystem. If the IFM reduces the Energy Self-Schedule of Resource Adequacy Capacity to provide an Ancillary Service, the Ancillary Service Marginal Price for that Ancillary Service will be calculated in accordance with Section 27.1.2 using the Ancillary Service Bids submitted by the Scheduling Coordinator for the Resource Adequacy Resource or inserted by the CAISO pursuant to this Section 40.6.1, and using the resource's Generated Energy Bid to determine the Resource Adequacy Resource's opportunity cost of Energy. If the Scheduling Coordinator for the Resource Adequacy Resource believes that the opportunity cost of Energy based on the Resource Adequacy Resource's Generated Energy Bid is insufficient to compensate for the resource's actual opportunity cost, the Scheduling Coordinator may submit evidence justifying the increased amount to the CAISO and to the FERC no later than seven (7) days after the end of the month in which the submitted Energy Self-Schedule was reduced by the CAISO to provide an Ancillary Service. The CAISO will treat such information as confidential and will apply the procedures in Section 20.4 of this CAISO Tariff with regard to requests

for disclosure of such information. The CAISO shall pay any higher opportunity costs approved by FERC.

(54) A Resource Adequacy Resources must participate in the RUC to the extent that the resource has available Resource Adequacy Capacity that is not reflected in an IFM Schedule. Resource Adequacy Capacity participating in RUC will be optimized using a zero dollar (\$0/MW-hour) RUC Availability Bid.

(65) Capacity from Resource Adequacy Resources selected in RUC will not be eligible to receive a RUC Availability Payment.

#### **40.6.1.1 Day-Ahead Availability -- Specific RA Resource Types**

##### **(a) Distributed Generation Facilities**

(1) Distributed Generation Facilities that are not Use-Limited Resources under Section 40.6.4.1 shall comply with the IFM and RUC bidding requirements that apply to the same technology type of a resource connected to the CAISO Controlled Grid.

(2) Distributed Generation Facilities that are Use-Limited Resources under Section 40.6.4.1 shall comply with the applicable IFM and RUC bidding requirements for Use-Limited Resources under Section 40.6.4.3.

##### **(b) Non-Generator Resources**

(1) Non-Generator Resources that do not use Regulation Energy Management and are not Use-Limited Resources under Section 40.4.6.1 shall submit –

(A) Economic Bids or Self-Schedules into the IFM for all RA Capacity for all hours of the month the resource is physically capable of operating; and

(B) \$0/MW RUC Availability Bids for all RA Capacity for all hours of the month the resource is physically capable of operating.

(2) Non-Generator Resources using Regulation Energy Management that are not Use-Limited Resources under Section 40.4.6.1 shall submit –

(A) Economic Bids or Self-Schedules into the IFM for all RA Capacity for Regulation for all hours of the month the resource is physically capable of operating; and

(B) \$0/MW RUC Availability Bids for all RA Capacity for all hours of the month the resource is physically capable of operating.

(3) Non-Generator Resources that are Use-Limited Resources under Section 40.6.4.1 shall comply with the applicable IFM and RUC bidding requirements for Use-Limited Resources under Section 40.6.4.3.

(c) **Extremely Long-Start Resources.** Extremely Long-Start Resources that are Resource Adequacy Resources must make themselves available to the CAISO by complying with –

(1) the Extremely Long-Start Commitment Process under Section 31.7 or otherwise committing the ELS Resource upon instruction from the CAISO, if physically capable; and

(2) the applicable provisions of Section 40.6.1 regarding Day-Ahead availability for the Trading Days for which it was committed.

#### **40.6.2 Real-Time Availability**

(a) **General Requirement.** Resource Adequacy Resources that have received an IFM Schedule for Energy or Ancillary Services or a RUC Schedule for all or part of their Resource Adequacy Capacity must remain available to the CAISO through Real-Time for Trading Hours for which they receive an IFM or RUC Schedule, including any Resource Adequacy Capacity of such resources that is not included in an IFM Schedule or RUC Schedule, except for Resource Adequacy Capacity that is subject to Section 40.6.4.

(b) **Short Start Units or Long Start Units.** Short Start Units or Long Start Units that are Resource Adequacy Resources that do not have an IFM Schedule or a RUC Schedule for any of their Resource Adequacy Capacity for a given Trading Hour may be required to be available to the CAISO through Real-Time as specified in Sections 40.6.3 and 40.6.7. Resource Adequacy Resources with Resource Adequacy Capacity that is required to be available to the CAISO through Real-Time and does not have an IFM Schedule or a RUC

Schedule for a given Trading Hour must submit to the RTM for that Trading hour: (a) Energy Bids and Self-Schedules for the full amount of the available Resource Adequacy Capacity, including capacity for which it has submitted Ancillary Services Bids or Submissions to Self-Provide Ancillary Services; and (b) Ancillary Services Bids and Submissions to Self-Provide Ancillary Services for the full amount of the available Ancillary Service-certified Resource Adequacy Capacity and for each Ancillary Service for which the resource is certified, including capacity for which it has submitted Energy Bids and Self-Schedules. The CAISO will insert Generated Bids in accordance with Section 40.6.8 for any Resource Adequacy Capacity subject to the above requirements for which the resource has failed to submit the appropriate bids to the RTM.

**(c) Self-Schedules.** The CAISO will honor submitted Energy Self-Schedules of Resource Adequacy Capacity unless the CAISO is unable to satisfy one hundred (100) percent of its Ancillary Services requirements. In such cases, the CAISO may curtail all or a portion of a submitted Energy Self-Schedule to allow Ancillary Service-certified Resource Adequacy Capacity to be used to meet the Ancillary Service requirements, as long as such curtailment does not lead to a real-time shortfall in energy supply. If the CAISO reduces a submitted Real-Time Energy Self-Schedule for Resource Adequacy Capacity when that capacity is needed to meet an Ancillary Services requirement, the Ancillary Service Marginal Price for that capacity will be calculated in accordance with Sections 27.1.2 and 40.6.1.

**(d) Distributed Generation Facilities**

**(1) Distributed Generation Facilities that are not Use-Limited Resources under Section 40.6.4.1 shall comply with the RTM bidding requirements that apply to the same technology type of resource connected to the CAISO Controlled Grid.**

**(2) Distributed Generation Facilities that are Use-Limited Resources under Section 40.6.4.1 shall comply with the applicable RTM bidding requirements for Use-Limited Resources under Section 40.6.4.3.**

**(e) Non-Generator Resources**

(1) Non-Generator Resources that do not use Regulation Energy Management and are not Use-Limited Resources under Section 40.4.6.1 shall submit –

(A) Economic Bids or Self-Schedules into the RTM for any remaining RA Capacity scheduled in the IFM or RUC; and

(B) Economic Bids or Self-Schedules into the RTM for all RA Capacity not scheduled in the IFM,

(2) Non-Generator Resources using Regulation Energy Management that are not Use-Limited Resources under Section 40.4.6.1 shall submit –

(A) Economic Bids or Self-Schedules into the RTM for any remaining RA Capacity from resource scheduled in IFM or RUC; and

(B) Economic Bids or Self-Schedules into the RTM for all RA Capacity not scheduled in IFM,

(3) Non-Generator Resources that are Use-Limited Resources under Section 40.6.4.1 shall comply with the applicable RTM bidding requirements for Use-Limited Resources under Section 40.6.4.3.

(f) **Extremely Long-Start Resources.** Once an Extremely Long Start Resource providing Resource Adequacy Capacity is committed by the CAISO, it shall comply with the applicable provisions of Section 40.6.2 regarding Real-Time availability for the Trading Days for which it was committed.

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#### **40.6.4.2 Use Plan**

The Scheduling Coordinator shall provide for the following Resource Adequacy Compliance Year a proposed annual use plan for each Use-Limited Resource that is a Resource Adequacy Resource. For each Use-Limited Resource that is a Resource Adequacy Resource but is not a Reliability Demand Response Resource, the proposed annual use plan will ~~delineate on a month-by-month basis the total MWhs of Generation, total run hours, expected daily supply capability (if greater than four hours) and the daily Energy limit, operating constraints, and the timeframe for each constraint~~ provide the information described in the Business Practice Manual. The CAISO

will have an opportunity to discuss the proposed annual use plan with the Scheduling Coordinator and suggest potential revisions to meet reliability needs of the system. The Scheduling Coordinator shall then submit its final annual use plan. Scheduling Coordinators for Use-Limited Resources must submit the proposed and final annual use plans, and any updates to those use plans, in accordance with the schedule set forth in the Business Practice Manual. ~~The Scheduling Coordinator will be able to update the projections made in the annual use plan in the monthly Resource Adequacy Plans. Hydroelectric Generating Units and Pumping Load will be able to update use plans intra-monthly as necessary to reflect evolving hydrological and meteorological conditions.~~ The annual use plan must reflect the potential operation of the Use-Limited Resource at a level no less than the minimum criteria set forth by the Local Regulatory Authority for qualification of the resource.

\* \* \*

#### **40.6.4.3.2 Hydro, RDRR, and Non-Dispatchable Use-Limited Resources**

##### **(a) Must-Offer Obligation.**

(1) Hydroelectric Generating Units, Pumping Load, and Non-Dispatchable Use-Limited Resources, but not Reliability Demand Response Resources, shall submit Self-Schedules or Bids in the Day-Ahead Market for their expected available Energy or their expected as-available Energy, as applicable, in the Day-Ahead Market and RTM. Such resources shall also revise their Self-Schedules or submit additional Bids in RTM based on the most current information available regarding Expected Energy deliveries.

(2) Hydroelectric Generating Units, Pumping Load, Reliability Demand Response Resources, ~~and~~ Non-Dispatchable Use-Limited Resources, and Resource Adequacy Resources providing Regulatory Must-Take Capacity are not required to submit RUC Availability Bids for that capacity, but any such bids they do submit must be \$0/MW RUC Availability Bids will not be subject to commitment in the RUC process.

(3) Participating Load that is Pumping Load shall submit Economic Bids for Energy and/or a Submission to Self-Provide Ancillary Services in the Day-Ahead Market for its Resource Adequacy Capacity that is certified to provide Non-Spinning Reserve Ancillary Service, and Economic Bids in the Real-Time Market for its Non-Spinning Reserve Capacity that receives an Ancillary Service Award in the Day-Ahead Market.

(b) Determination of Non-Dispatchable Status. The CAISO will retain discretion as to whether a particular resource should be considered a Non-Dispatchable Use-Limited Resource, and this decision will be made in accordance with the provisions of Section 40.6.4.1.

\* \* \* \*

#### **40.6.4.3.5 Proxy Demand Resources**

(a) Short Start and Medium Start Proxy Demand Resources that provide Resource Adequacy Capacity shall submit \$0/MW RUC Availability Bids for all of their Resource Adequacy Capacity for all hours of the month the resource is physically available; however, any RUC schedule for these resources will not be binding.

b) Long Start Proxy Demand Resources are not required to submit Bids or Self Schedules in the RUC for their Resource Adequacy Capacity.

\* \* \*

#### **40.6.8 Use Of Generated Bids**

(a) Day-Ahead Market. Prior to completion of the Day-Ahead Market, the CAISO will determine if Resource Adequacy Capacity subject to the requirements of Section ~~s 40.5.4~~ ~~or~~ 40.6.1 and for which the CAISO has not received notification of an Outage has not been reflected in a Bid and will insert a Generated Bid for such capacity into the CAISO Day-Ahead Market.

(b) Real-Time Market. Prior to running the Real-Time Market, the CAISO will determine if Resource Adequacy Capacity subject to the requirements of Section 40.6.2 and for which the CAISO has not received notification of an Outage has not been reflected in a Bid and

will insert a Generated Bid for such capacity into the Real-Time Market.

**(c) Partial Bids for RA Capacity.** If a Scheduling Coordinator for an RA Resource submits a partial bid for the resource's RA Capacity, the CAISO will insert a Generated Bid only for the remaining RA Capacity. In addition, the CAISO will determine if all dispatchable Resource Adequacy Capacity from Short Start Units, not otherwise selected in the IFM or RUC, is reflected in a Bid into the Real-Time Market and will insert a Generated Bid for any remaining dispatchable Resource Adequacy Capacity for which the CAISO has not received notification of an Outage.

**(d) Calculation of Generated Bids.** As provided in the Business Practice Manuals, a Generated Bid for Energy will be calculated and will include: (i) a greenhouse gas cost adder for a resource registered with the California Air Resources Board as having a greenhouse gas compliance obligation; and (ii) a volumetric Grid Management Charge adder that consists of: (i) the Market Services Charge; (ii) the System Operations Charge; and (iii) the Bid Segment Fee divided by the MW in the Bid segment. A Generated Bid for Ancillary Services will equal zero dollars (\$0/MW-hour).

**(e) Exemptions.** Notwithstanding any of the provisions of Section 40.6.8 ~~set forth above~~, the CAISO will not insert any Bid in the Day-Ahead Market or Real-Time Market required under this Section 40 for ~~a~~ Resource Adequacy ~~Resource that is~~ Capacity of a Use-Limited Resource, Non-Generator Resource, Variable Energy Resource, or resource providing Regulatory Must-Take Generation unless the resource submits an Energy Bid and fails to submit an Ancillary Service Bid.

**(f) NRS-RA Resources.** The CAISO will submit a Generated Bid in the Day-Ahead Market or Real-Time Market for a non-Resource Specific System Resource in each RAAIM assessment hour, to the extent that the resource provides Resource Adequacy Capacity subject to the requirements of Sections 40.6.1 or 40.6.2 and does not submit an outage request or Bid for the entire amount of that Resource Adequacy Capacity.

\* \* \*

#### ~~40.6.8.1.6~~ ~~Subset of Hours Contracts~~

~~The CAISO will submit Generated Bids for non-Resource-Specific System Resources that provide Resource Adequacy Capacity subject to a Subset of Hours Contract during only those hours in which the resource is contractually obligated to make the Resource Adequacy Capacity available and the CAISO has not received either notification of an Outage or a Bid for such capacity. If the Scheduling Coordinator for the non-Resource-Specific System Resource submits a Bid for part of the Resource Adequacy Capacity subject to a Subset of Hours Contract for any hour the resource is contractually obligated to provide the Resource Adequacy Capacity, the CAISO will insert a Generated Bid only for the remaining Resource Adequacy Capacity. Non-Resource-Specific System Resources that provide Resource Adequacy Capacity subject to a Subset of Hours Contract must meet the technical interface specifications and submit contractual information as required by a Business Practice Manual.~~

#### ~~40.6.9~~ ~~Grandfathered Firm Liquidated Damages Contracts Requirements~~

Resource Adequacy Capacity represented by a Firm Liquidated Damages Contract and relied upon by a Scheduling Coordinator in a monthly or annual Resource Adequacy Plan shall be submitted as a Self-Schedule or Bid in the Day-Ahead IFM to the extent such scheduling right exists under the Firm Liquidated Damages Contract.

\* \* \*

#### ~~40.7.2~~ ~~Penalties For Non-Compliance~~

The failure of a Resource Adequacy Resource or Resource Adequacy Capacity to be available to the CAISO in accordance with the requirements of this Section 40 or Section 9.3.1.3, and the failure to operate a Resource Adequacy Resource by placing it online or in a manner consistent with a submitted Bid or Generated Bid shall be subject to the applicable Sanctions set forth in Section 37.2.4. However, any failure of the Resource Adequacy Resource to satisfy any obligations prescribed under this Section 40 or Section 9.3.1.3 during a Resource Adequacy Compliance Year for which Resource Adequacy Capacity has been committed to a Load Serving Entity shall not limit in any way, except as otherwise established under Section 40.4.5 or requirements of the CPUC, Local Regulatory Authority, or federal agency, as applicable, the

ability of the Load Serving Entity to whom the Resource Adequacy Capacity has been committed to use such Resource Adequacy Capacity for purposes of satisfying the resource adequacy requirements of the CPUC, Local Regulatory Authority, or federal agency, as applicable. In addition, an ~~an Reserve Sharing~~-LSE shall not be subject to any sanctions, penalties, or other compensatory obligations under this Section 40 on account of a Resource Adequacy Resource's satisfaction or failure to satisfy its obligations under this Section 40 or Section 9.3.1.3.

\* \* \*

#### **40.8.1.13 Proxy Demand Resources**

A Proxy Demand Resource must have the ability to (i) be dispatched for at least twenty-four hours per month, (ii) be dispatched on at least three consecutive days, and (iii) respond for at least four hours per dispatch in order to qualify as Resource Adequacy Capacity. The Qualifying Capacity of a Proxy Demand Resource, for each month, will be based on the resource's average monthly historic demand reduction performance during that same month during the Availability Assessment Hours, as described in Section 40.9.3, using a three-year rolling average. For a Proxy Demand Resource with fewer than three years of performance history, for all months for which there is no historic data, the CAISO will utilize a monthly megawatt value as certified and reported to the CAISO by the Demand Response Provider; otherwise, where available, the CAISO will use the average of historic demand reduction performance data available, by month, for a Proxy Demand Resource. ~~Proxy Demand Resources must be available at least four (4) hours per month in which they are eligible to provide RA Capacity and must be dispatchable for a minimum of thirty (30) minutes per event within each of those months.~~

#### **40.8.1.14 Reliability Demand Response Resources**

The Net Qualifying Capacity of a Reliability Demand Response Resource, for each month, will be based on the resource's average monthly historic demand reduction performance during that same month during the Availability Assessment Hours, as described in Section 40.9.3, using a three-year rolling average. For a Reliability Demand Response Resource with fewer than three years of performance history, for all months for which there is no historic data, the CAISO will use a monthly megawatt value as certified and reported to the CAISO by the Demand Response

Provider; otherwise, where available, the CAISO will use the average of historic demand reduction performance data available, by month, for a Reliability Demand Response Resource.

**40.8.1.15 Distributed Generation Facilities**

- (a) Distributed Generation Facilities that meet the applicable requirements in Section 4.6 qualify as Resource Adequacy Capacity.
- (b) The CAISO will determine the Net Qualifying Capacity of each Distributed Generation Facility for each Resource Adequacy Compliance Year consistent with similar resource classifications connected to the transmission system, as provided in Section 40.4.6.1.
- (c) The Scheduling Coordinator for individual Distributed Generation Facilities, with the same resource type and PMax values less than 0.5 MW, that seek to operate as a combined Distributed Generation Facility, must submit to the CAISO a request that the initial Net Qualifying Capacity be determined and approved as a combined Distributed Generation Facility.

**40.8.1.16 Non-Generator Resources**

- (a) Non-Generator Resources must be either Participating Generators or System Units to qualify as Resource Adequacy Capacity.
- (b) The CAISO will determine the Net Qualifying Capacity of each Non-Generator Resource based on the CAISO testing of the resource's sustained output over a four-hour period; however, the Net Qualifying Capacity shall not exceed the resource's maximum instantaneous discharge capability.

\* \* \*

**40.9. Standard Capacity Product [ALL EXISTING PROVISIONS DELETED]**

**40.9.1 General**

~~Except for the exemptions specified in Section 40.9.2, the CAISO will track the availability of Resource Adequacy Capacity during the Availability Assessment Hours of each month, as specified in Section 40.9.3, in order to determine the amount of Resource Adequacy Capacity that was available to the CAISO. Each non-exempt Resource Adequacy Resource will be subject to the Availability Standards determined in accordance with either Section 40.9.4 or 40.9.7,~~

~~whichever is applicable, for each month during each Resource Adequacy Compliance Year, starting with the 2010 Resource Adequacy Compliance Year. Scheduling Coordinators for Resource Adequacy Resources will be subject to Non-Availability Charges or Availability Incentive Payments as specified in either Section 40.9.4 or Section 40.9.7, whichever is applicable. MW values or percentages used by the CAISO in this Section 40.9 will be calculated to no less than two decimal places.~~

#### ~~40.9.2 Exemptions~~

~~The following exemptions apply to the CAISO's Availability Standards program of this Section 40.9:~~

- ~~(1) Resources with a PMax less than one (1.0) MW will not be used to determine Availability Standards, will not be subject to Non-Availability Charges or Availability Incentive Payments, and will not be subject to the additional Outage reporting requirements of this Section 40.9.~~
- ~~(2) Capacity under a resource specific power supply contract that existed prior to June 28, 2009 and Resource Adequacy Capacity that was procured under a contract that was either executed or submitted to the applicable Local Regulatory Authority for approval prior to June 28, 2009, and is associated with specific Generating Units or System Resources, will not be subject to Non-Availability Charges or Availability Incentive Payments. Such contracted Resource Adequacy Capacity, except for non-Resource Specific System Resources, will be included in the development of Availability Standards and will be subject to any Outage reporting requirements necessary for this purpose. The exemption will apply only for the initial term of the contract and to the MW capacity quantity and Resource Adequacy Resources specified in the contract prior to June 28, 2009. The exemption shall terminate upon the conclusion of the initial contract term. Exempt contracts may be re-assigned or undergo novation on or after June 28, 2009, but the exemption shall not apply for any extended contract term, increased capacity quantity or additional resource(s) beyond those specified in~~

~~the contract prior to June 28, 2009, except as provided in Section 40.9.2(7) or 40.9.2(8). Scheduling Coordinators for Resource Adequacy Resources subject to these contracts will be required to certify the start date of the contract, the expiration date, the Resource ID(s), and the amount of Resource Adequacy Capacity associated with each Resource ID included in the contract. For Resource Adequacy Resources whose Qualifying Capacity value is determined by historical output, the capacity under a resource specific power supply contract or Resource Adequacy Capacity that was procured under a contract that was either executed or submitted to the applicable Local Regulatory Authority for approval that meets the requirements in this subsection (2) will not be subject to Non-Availability Charges or Availability Incentive Payments, except that the deadline date for either type of contract shall be August 22, 2010 instead of June 28, 2009.~~

~~(3) For a contract entered into prior to June 28, 2009 that provides for the amount of Resource Adequacy Capacity to increase during the original term of the contract, based on a ratio of the Resource Adequacy Resource's output or due to an addition of capacity, the exemption provided in subsection (2) of this Section 40.9.2 will apply to the additional capacity allowed under the contract; provided that the capacity increase (i) is expressly contained in the provisions of the contract, (ii) occurs during the primary term of the contract; and (iii) does not result from contract extensions or other amendments to the original terms and conditions of the contract, except as provided in Section 40.9.2(7) or 40.9.2(8). Scheduling Coordinators for Resource Adequacy Resources subject to contracts that provide for such capacity increases or additions must include in their certification, in addition to the requirements of subsection (2) of this Section 40.9.2, (i) the citation to any contract provisions that might entitle them to increased exempt Resource Adequacy Capacity from the contracted resources during the primary term of the contract; (ii) the amount of additional capacity to~~

~~which they might be entitled; and (iii) the actual effective date of the capacity increase. If the actual amount of capacity and/or the actual effective date of the capacity increase is not known at the time of the initial certification, the Scheduling Coordinator shall provide a supplemental certification(s) when this information becomes known. For Resource Adequacy Resources whose Qualifying Capacity value is determined by historical output the exemption provided in subsection (2) of this Section 40.9.2 will apply to an increase in the capacity under a resource-specific power supply contract or Resource Adequacy Capacity that was procured under a contract that was either executed or submitted to the applicable Local Regulatory Authority for approval that meets the requirements in this subsection (3), except that the deadline date for either type of contract to be exempt shall be August 22, 2010 instead of June 28, 2009.~~

~~(4) Demand response resources will not be used to determine Availability Standards, will not be subject to Non-Availability Charges or Availability Incentive Payments, and will not be subject to the additional Outage reporting requirements of this Section 40.9.~~

~~(5) Resource Adequacy Capacity provided through contracts for Energy from non-specified resources delivered within the CAISO Balancing Authority Area will not be used to determine Availability Standards, will not be subject to Non-Availability Charges or Availability Incentive Payments, and will not be subject to the additional Outage reporting requirements of this Section 40.9.~~

~~(6) Resource Adequacy Resources of a Modified Reserve Sharing LSE or a Load following MSS will be used to determine the Availability Standards and will be subject to any Outage reporting requirements necessary for this purpose. Non-Local Capacity Area Resource Adequacy Resources of a Modified Reserve Sharing LSE or a Load following MSS will not be subject to Non-Availability Charges or Availability Incentive Payments, but those entities shall remain~~

~~responsible for any other applicable deficiency payments under this CAISO Tariff or the applicable MSS Agreement.~~

~~(7) Scheduling Coordinators for resources with Existing QF Contracts or Amended QF Contracts that are Resource Adequacy Resources shall be exempt from the Outage reporting requirements of Section 40.9 if the resource previously provided Resource Adequacy Capacity under an Existing QF Contract that was exempt from the application of Non-Availability Charges and Availability Incentive Payments pursuant to Section 40.9.2(2) or 40.9.2(3). This exemption from the Outage reporting requirements of Section 40.9 shall end for each resource when the Existing QF Contract or Amended QF Contract terminates or it is no longer eligible for exemption under Section 40.9.2(2) or 40.9.2(3), or if requested by the Scheduling Coordinator for the resource, whichever is earlier.~~

~~(8) Scheduling Coordinators for resources with Existing QF Contracts or Amended QF Contracts that are Resource Adequacy Resources shall be exempt from the Outage reporting requirements of Section 40.9, and will not be subject to Non-Availability Charges or Availability Incentive Payments, if the QF resource previously provided Resource Adequacy Capacity pursuant to an Existing QF Contract that was executed prior to the August 22, 2010 deadline for exemption under Section 40.9.2(2), and remained in effect pursuant to California Public Utilities Commission Decision 07-09-040 that extended the term of expiring contracts until such time as the new contracts resulting from that decision are available. This exemption from the Outage reporting requirements of Section 40.9, and the Availability Incentive Payments and Non-Availability Charges, shall end for each resource when its Existing QF Contract or Amended QF Contract terminates or if requested by the Scheduling Coordinator for the resource, whichever is earlier.~~

~~(9) An RA Maintenance Outage With Replacement, RA Maintenance Outage Without Replacement, Off-Peak Opportunity RA Outage, or Short Notice~~

~~Opportunity RA Outage that was submitted no more than seven days and no less than four days prior to the requested start date for the outage and that was approved as a Forced Outage under Section 9.3.1.3.3.1(c)(4), 9.3.1.3.3.2(c)(4), 9.3.1.3.3.3(c)(3), or 9.3.1.3.3.4(c)(2), and a Short Notice Opportunity RA Outage that was submitted three days or less prior to the requested start date for the outage and that was approved as Forced Outage under Section 9.3.1.3.3.4(c)(3), shall not be –~~

- ~~(a) — subject to the Outage reporting requirements of Section 40.9;~~
- ~~(b) — included in the availability determination under Section 40.9.4;~~
- ~~(c) — subject to the substitution option under Section 40.9.4.2.1; and~~
- ~~(d) — subject to Non-Availability Charges and Availability Incentive Payments under Section 40.9.6.~~

~~Exclusions from the Availability Standards and Outage reporting requirements established in this Section 40.9 are for this Section 40.9 alone and do not affect any other obligation arising under the CAISO Tariff.~~

#### ~~**40.9.3 — Availability Assessment Hours**~~

~~The CAISO shall establish Availability Assessment Hours applicable for each month of each Resource Adequacy Compliance Year, which shall be applied starting with Resource Adequacy Compliance Year 2010, in order to assess the extent to which each Resource Adequacy Resource has met the Availability Standards of this Section 40.9. The Availability Assessment Hours shall be a pre-defined set of hours in each month corresponding to the operating periods when high demand conditions typically occur and when the availability of Resource Adequacy Capacity is most critical to maintaining system reliability. The Availability Assessment Hours shall be comprised of five consecutive hours of each non-weekend, non-federal holiday day. The five hour period will vary by season as necessary such that, based on historical actual load data, the coincident peak load hour typically falls within the five-hour range each day during the month. The CAISO shall annually determine the five-hour range for the Availability Assessment Hours for~~

~~each month of the next Resource Adequacy Compliance year prior to the start of each Resource Adequacy Compliance Year and shall specify them in the Business Practice Manual.~~

#### ~~40.9.4 — Availability Determinations~~

~~This Section 40.9.4 addresses availability assessment for all Resource Adequacy Capacity, including the Resource Adequacy Capacity of Resource Specific System Resources, subject to the Section 40.9 Availability Standards program; however, this Section 40.9.4 does not apply to Resource Adequacy Capacity provided by non Resource Specific System Resources which are addressed in Section 40.9.7.~~

#### ~~40.9.4.1 — Availability Standard~~

~~The CAISO shall calculate and publish the monthly Availability Standards for each Resource Adequacy Compliance Year by July 1 of the preceding calendar year. The monthly Availability Standards applicable to Resource Adequacy Resources subject to this Section 40.9.4 will be based on the historical availability of Resource Adequacy Resources during the Availability Assessment Hours over the previous three years. Each monthly Availability Standard will be calculated as the sum of the available Resource Adequacy Capacity of the included Resource Adequacy Resources across all the Availability Assessment Hours of the month, divided by the sum of the designated Resource Adequacy Capacity for the same set of hours and resources, and multiplied by 100 to obtain a number between zero (0) and one hundred percent (100%). For the purpose of determining the available Resource Adequacy Capacity in each month, the CAISO will use the Outage information reported in SLIC and, when available, the Outage reports submitted pursuant to Section 40.9.5. To ensure consistency between the calculation of the monthly Availability Standard and the calculation of each resource's monthly availability, the data utilized for both calculations will be in accordance with the provisions of Sections 40.9.4.2. All Resource Adequacy Resources except for the following will be included in the calculation of the Availability Standards:~~

- ~~(1) — Resource Adequacy Resources exempted in Section 40.9.2;~~
- ~~(2) — Non Resource Specific System Resources; and~~

~~(3) Resources between one (1) MW and ten (10) MW subject to the reporting requirements of Section 40.9.5, until such time that the CAISO has received the outage reports and can begin to utilize the data.~~

#### ~~40.9.4.2 Availability Calculation for a Resource Adequacy Resource~~

~~The CAISO will calculate the monthly availability for each Resource Adequacy Resource subject to this Section 40.9.4 as follows:~~

~~The sum of the hourly available Resource Adequacy Capacity of the resource over all Availability Assessment Hours of the month, divided by the sum of the hourly Resource Adequacy Capacity of the resource as designated in the Supply Plan for the resource for those hours, and multiplied by 100 to obtain a number between zero percent (0%) and one hundred percent (100%).~~

~~(c) A Resource Adequacy Resource will be determined to be less than one hundred percent (100%) available in a given month if it has any Forced Outages or temperature-related ambient de-rates that impact the availability of its designated Resource Adequacy Capacity during the Availability Assessment Hours of that month.~~

~~(d) For Resource Adequacy Resources whose Qualifying Capacity value is determined by historical output, its hourly available Resource Adequacy Capacity for each Availability Assessment Hour will be determined from three components: the total actual amount of Energy the resource delivered during that hour; Resource Adequacy Capacity of the resource as designated in its Supply Plan; and the resource's Net Qualifying Capacity as reduced for that hour by the same percentage by which any Forced Outages or temperature-related ambient de-rates reduced the resource's capacity from its PMax capacity. If the total actual amount of Energy delivered by the resource in an Availability Assessment Hour is greater than or equal to the amount of Resource Adequacy Capacity designated in the Supply Plan, the hourly available Resource Adequacy Capacity for the hour will equal the resource's Resource Adequacy Capacity as designated in its Supply Plan. If the total actual amount of Energy delivered by~~

~~the resource in an Availability Assessment Hour is less than the amount of Resource Adequacy Capacity designated in the Supply Plan, the available Resource Adequacy Capacity of the resource for that hour will be the higher of the total actual Energy the resource delivered in that hour or the resource's Net Qualifying Capacity as reduced for that hour by the same percentage by which any Forced Outages or temperature-related ambient de-rates reduced the resource's capacity from its PMax capacity. The Resource Adequacy Capacity for each resource will be determined in accordance with the following formula:~~

$$\text{Hourly Available Resource Adequacy Capacity} = \text{Min} (\text{RA Capacity}, \text{Max} (\text{Actual Energy}, \text{Proportional Derated Capacity}))$$

~~Where:~~

~~RA Capacity = Resource Adequacy Capacity designated in the Supply Plan~~

~~Actual Energy = Total actual Energy delivered by the resource in the Availability Assessment Hour~~

~~Proportional Derated Capacity = Resource's Net Qualifying Capacity as reduced for that hour by the same percentage by which any Forced Outages or temperature-related ambient de-rates reduced the resource's capacity from its PMax capacity~~

~~If the SC for the Resource Adequacy Resource requests to convert from a Forced Outage to a Maintenance Outage in accordance with Section 9.3.3, the SC must terminate the existing Forced Outage and submit a new request for a Maintenance Outage. In the event the CAISO rejects the request to convert from a Forced Outage to a Maintenance Outage due to reliability criteria, the Outage will not be converted and the Forced Outage will continue. Outages properly submitted for temperature-related ambient derates for a Use Limited Resource will be counted against its availability only until such time as the Use Limited Resource reaches its energy limit constraint, at which time such Outages or derates will no longer count against the availability of the Use Limited Resource for the relevant month.~~

~~The start and end times used in calculating the availability of each resource each month will be the Outage time reported in the SLIC system or through the alternative reporting process of Section 40.9.5 for resources not included in the SLIC system.~~

~~**40.9.4.2.1 RA Substitute Capacity**~~

~~(a) **Substitution Option.** A Scheduling Coordinator may provide RA Substitute Capacity for its Resource Adequacy Capacity that is on a Forced Outage or de-rate in order to mitigate the impact of the Forced Outage or de-rate on its Resource Adequacy Resource's availability calculation.~~

~~(b) **RA Substitute Capacity Availability.**~~

~~(1) RA Substitute Capacity must be operationally available to the CAISO:~~

~~(2) Capacity on, or scheduled to be on, a Forced Outage, Approved Maintenance Outage, or de-rate, is not operationally available and shall not qualify to be RA Substitute Capacity for the duration of the period that it is unavailable.~~

~~(3) RA Replacement Capacity, RMR Capacity, CPM Capacity, and capacity committed to be Resource Adequacy Capacity in a monthly Supply Plan shall not qualify to be RA Substitute Capacity for the duration of that commitment.~~

~~(4) RA Substitute Capacity shall not qualify to be RA Replacement Capacity, RMR Capacity, CPM Capacity, or Resource Adequacy Capacity in a monthly Supply Plan, for the duration of the substitution.~~

~~(5) If a resource provides RA Substitute Capacity for multiple Resource Adequacy Resources under Section 40.9.4.2.1(f), the same capacity committed as RA Substitute Capacity for one Resource Adequacy Resource shall not qualify as RA Substitute Capacity for a different Resource Adequacy Resource during the same substitution period.~~

~~(6) RA Substitute Capacity will be treated as Resource Adequacy Capacity during the period of substitution for purposes of a Forced Outage or de-rate allocation.~~

~~(c) **Local Capacity Area Resource Substitution.**~~

~~(1) — **Pre-Qualification.** A Scheduling Coordinator for a Local Capacity Area Resource Adequacy Resource may pre-qualify alternate resources for substitution by submitting a prequalification request to the CAISO in accordance with the form and schedule specified in the Business Practice Manual. If the alternate resource is located at the same bus as the Local Capacity Area Resource Adequacy Resource for which it would substitute and has similar operational characteristics, the CAISO will approve the pre-qualification request for use of the substitute resource in the subsequent Resource Adequacy Compliance Year. To use a pre-qualified resource as RA Substitute Capacity, the Scheduling Coordinator for the Local Capacity Area Resource Adequacy Resource must submit a substitution request prior to or in real time, and the resource must meet the requirements in Section 40.9.4.2.1(b).~~

~~(2) — **Non-Pre-Qualified Substitution.** A Scheduling Coordinator for a Local Capacity Area Resource Adequacy Resource that has a Forced Outage or de-rate may, prior to the close of the Day Ahead Market for the next Trading Day, request to provide RA Substitute Capacity from a non-pre-qualified resource. The CAISO will grant the request if the alternate resource meets the requirements in Section 40.9.4.2.1(b) and (i) is located at the same bus as the Local Capacity Area Resource Adequacy Resource and meets the CAISO's operational needs, or (ii) if not located at the same bus, is located in the same Local Capacity Area, and meets the CAISO's effectiveness and operational needs, including size of resource, as determined by the CAISO in its reasonable discretion.~~

~~(d) — **Non-Local Capacity Area Resource Substitution.** A Scheduling Coordinator for a non-Local Capacity Area Resource Adequacy Resource that has a Forced Outage or de-rate that would count against its availability under Section 40.9.4.2, may, prior to the close of the Day Ahead Market for the next Trading Day, request to provide RA Substitute Capacity from an alternate resource. A Scheduling Coordinator for an NRS-RA Resource that has a Forced Outage or de-rate that would count against its availability~~

~~under Section 40.9.4.2, may, prior to the close of the Day Ahead Market for the next Trading Day, request to provide RA Substitute Capacity from an alternate resource that is internal to the CAISO Balancing Area Authority (which does not include a Pseudo-Tie of a Generating Unit to the CAISO Balancing Authority Area) to be used in the place of the original resource. The CAISO will grant the request if the alternative resource (i) has adequate deliverable capacity to provide the RA Substitute Capacity, (ii) meets the requirements in Section 40.9.4.2.1(b), and (iii) meets the CAISO's effectiveness and operational needs, as determined by the CAISO in its reasonable discretion.~~

~~(e) **RA Substitute Capacity From Multiple Resources.** The Scheduling Coordinator for Resource Adequacy Capacity on a Forced Outage or de-rate may request to substitute that capacity with RA Substitute Capacity from multiple alternate resources, including a resource already providing RA Substitute Capacity for one or more different Resource Adequacy Resources. The request must be submitted prior to the close of the Day Ahead Market for the next Trading Day; except that, if each alternate resource is pre-qualified to provide RA Substitute Capacity for that Resource Adequacy Resource and if none of the alternate resources are already providing RA Substitute Capacity for another Resource Adequacy Resource, then the substitution request may be submitted in real time. If the request includes an alternate resource providing RA Substitute Capacity for another resource adequacy resource during the same period, that alternate resource must submit a request to provide RA Substitute Capacity in accordance with Section 40.9.4.2.1(f).~~

~~(1) **Local Capacity Area Resources.** If the Scheduling Coordinator for an RA Local Capacity Area Resource on a Forced Outage or de-rate requests to substitute that capacity with RA Substitute Capacity from multiple resources, the CAISO will grant the request if the alternate resources are (i) located at the same bus as the Local Capacity Area Resource Adequacy Resource and pre-qualified under Section 40.9.4.2.1(c)(1), or (ii) if not located at the same bus, are located in the~~

~~same Local Capacity Area and meet the CAISO's effectiveness and operational needs, as determined by the CAISO in its reasonable discretion.~~

~~(2) — **Non-Local Capacity Area Resources.** If the Scheduling Coordinator for a non-Local Capacity Area Resource Adequacy Resource or an NRS-RA Resource on a Forced Outage or de-rate requests to substitute that capacity with RA Substitute Capacity from multiple resources, the CAISO will grant the request if the alternate resources are located within the CAISO Balancing Authority Area, meet the requirements in Section 40.9.4.2.1(b), and meet the CAISO's effectiveness and operational needs, as determined by the CAISO in its reasonable discretion.~~

~~(f) — **Multiple Substitution By One Resource.** A resource may provide RA Substitute Capacity for no more than two Resource Adequacy Resources at the same time. The Scheduling Coordinator for a resource already providing RA Substitute Capacity may request approval to provide RA Substitute Capacity for a second Resource Adequacy Resource on a Forced Outage or de-rate through the CAISO's manual process. The request must be submitted prior to the close of the Day Ahead Market for the next Trading Day. The CAISO will approve the request if the alternate resources are located within the CAISO Balancing Authority Area, meet the requirements in Section 40.9.4.2.1(b), and meet the CAISO's effectiveness and operational needs, as determined by the CAISO in its reasonable discretion.~~

~~(g) — **Approval of Multiple Substitution By One Resource.** Within five Business Days of receiving the substitution request through the manual process, the CAISO will respond to the request and include approved substitutions in CAISO systems. Approved substitutions shall be effective on the start date requested for the substitution.~~

~~(h) — **Resource Adequacy Obligation.** To the extent a resource provides RA Substitute Capacity, the resource must meet and comply with all requirements in Section 40 applicable to RA Substitute Capacity for the duration of the substitution.~~

~~(i) — **Treatment of Unbid Capacity.** If the Scheduling Coordinator for RA Substitute Capacity does not submit bids or Self-Schedules for all or a portion of that capacity in accordance with Section 40.6, the CAISO —~~

~~(1) — will treat the unbid capacity as unavailable for purposes of Section 40.9;~~

~~(2) — will reflect that unavailability in the availability calculation under Section 40.9.4.2 for the Resource Adequacy Resource for which the RA Substitute Capacity is substituting; and~~

~~(3) — will not submit Generated Bids for unbid RA Substitute Capacity; however, if a resource providing both RA Capacity and RA Substitute Capacity has a partial Forced Outage, the CAISO will submit Generated Bids for the resource up to the MW amount of its RA Capacity commitment or its MW amount of availability, whichever is lower.~~

~~(j) — **Allocation of Unavailable RA Substitute Capacity.** In the event the resource providing RA Substitute Capacity has an Outage or de-rate during the substitution period, the CAISO shall allocate the MW reduction in available capacity in accordance with Section 40.9.4.2.2. The allocation to any non-exempt Resource Adequacy Capacity shall be made on a pro-rata basis to each commitment of the substitute resource to provide RA Capacity, RA Replacement Capacity, RA Substitute Capacity, and CPM Capacity.~~

#### ~~40.9.4.2.2 — **Accounting for De-Rates**~~

~~In accounting for a de-rate of a unit that has not committed one hundred percent (100%) of its Net Qualified Capacity in its Monthly Supply Plan, the CAISO will follow the following principles:~~

~~(1) — Any de-rate will be applied first to any non-Resource Adequacy Capacity of the resource; and~~

~~(2) — Any de-rate to Resource Adequacy Capacity will be applied pro-rata to any contract capacity exempt under Section 40.9.2(2) and any non-exempt Resource Adequacy Capacity commitment from that resource.~~

#### ~~40.9.5 — **Outage Reporting**~~

~~Scheduling Coordinators for Generating Units or Resource-Specific System Resources that are also Resource Adequacy Resources with a maximum output capability of one (1) MW or more, but which do not meet the requirement to provide information on Forced Outages in accordance with Section 9.3.10, shall provide equivalent availability-related information in the form and on the schedule specified in the Business Practice Manuals. This information shall identify all Forced Outages and temperature-related ambient de-rates that have occurred over the previous calendar month and shall contain all relevant details needed to enable the CAISO to perform the availability calculation for the resource in accordance with Section 40.9.4, including: the start and end times of any Outages or de-rates, the MW availability in all Availability Assessment Hours, and the causes of any Forced Outages or de-rates. Scheduling Coordinators for Resource Adequacy Resources whose maximum output capability is ten (10) MW or more shall report Outage-related information in accordance with the reporting obligations in Section 9.3.10.~~

#### ~~40.9.6 ——— Non-Availability Charges And Availability Incentive Payments~~

~~A Resource Adequacy Resource that is subject to the availability assessment in accordance with Section 40.9.4 and whose monthly availability calculation under Section 40.9.4.2 is more than two and a half percent (2.5%) below the monthly Availability Standard will be subject to a Non-Availability Charge for the month. A Resource Adequacy Resource subject to Section 40.9.4 whose availability calculation under Section 40.9.4.2 is more than two and a half percent (2.5%) above the monthly Availability Standard will be eligible for an Availability Incentive Payment for the month. For Resources whose Qualifying Capacity is determined by their historical output, the CAISO will calculate but not apply through the settlements process the Non-Availability Charges or Availability Incentive Payments to Trading Days within the three months of January, February, and March 2011.~~

#### ~~40.9.6.1 ——— Determination of Resource Adequacy Capacity Subject to Non-Availability Charge~~

~~The amount of Resource Adequacy Capacity of a Resource Adequacy Resource subject to the Non-Availability Charge will be determined as follows:~~

~~(1) A Resource Adequacy Resource with actual availability calculated in accordance with Section 40.9.4.2 that is less than the Availability Standard minus the tolerance band of two and a half percent (2.5%) for a given month will have the Non-Availability Charge assessed to that portion of its non-exempt Resource Adequacy Capacity determined in accordance with the following formula:~~

$$~~P = RA * (S - .025) - X~~$$

~~Where:~~

~~P = The RA Resource's RA Capacity subject to Non-Availability Charge~~

~~S = Monthly Availability Standard as a fraction, so that  $0 < S < 1.0$~~

~~RA = The RA Resource's RA Capacity (MW) {as designated in its Supply Plan, less any exempt capacity}~~

~~X = The {mean of the} RA Resource's {hourly available RC Capacity over all Availability Assessment Hours of the month (MW).}~~

~~(2) No Non-Availability Charge will be applied when a Resource Adequacy Resource's actual availability, calculated in accordance with Section 40.9.4.2 for a given month, is equal to or greater than the Availability Standard less two and a half percent (2.5%).~~

~~(3) Any Forced Outage or temperature-related ambient de-rates of a resource providing RA Substitute Capacity for a Resource Adequacy Resource in accordance with Section 40.9.4.2.1 will be applied in calculating the availability of the Resource Adequacy Resource for which it is substituting.~~

#### ~~40.9.6.2 Determination of the Non-Availability Charge~~

~~The per-MW Non-Availability Charge rate will be the Monthly CPM Capacity Payment price as specified in Schedule 6 of Appendix F of this CAISO Tariff. The Non-Availability Charge for a Resource Adequacy Resource shall be determined by multiplying the resource's capacity subject to the Non-Availability Charge calculated in accordance with Section 40.9.6.1 by the Non-Availability Charge rate.~~

#### ~~40.9.6.3 Availability Incentive Payment~~

~~Scheduling Coordinators for Resource Adequacy Resources that achieve monthly availability that is more than two and a half percent (2.5%) above the monthly Availability Standard are eligible to receive the monthly Availability Incentive Payment. This payment will be funded entirely through the monthly Non-Availability Charges assessed for the same month. For each resource eligible for the Availability Incentive Payment, its eligible capacity will be that portion of its designated Resource Adequacy Capacity equal to its actual availability calculated in accordance with Section 40.9.4.2 minus the Availability Standard percent minus two and a half percent (2.5%). The monthly Availability Incentive Payment rate will equal the total Non-Availability Charges assessed for the month divided by the total Resource Adequacy Capacity eligible to receive the Availability Incentive Payment that month, provided that the Availability Incentive Payment rate shall not exceed three times the Non-Availability Charge rate. The Availability Incentive Payment the CAISO shall pay to each eligible resource will equal the product of its eligible capacity and the Availability Incentive Payment rate. Any remaining Non-Availability Charge funds that are not distributed to eligible Resource Adequacy Resources will be credited against the Real-Time neutrality charge to metered CAISO Demand for that Trade Month.~~

#### ~~40.9.6.4 Monthly Settlement~~

~~The CAISO shall calculate and settle Non-Availability Charges and Availability Incentive Payments on a Trade Month basis so that all Non-Availability Charges collected for a Trade Month are allocated in accordance with Section 40.9.6.3 for that same Trade Month.~~

#### ~~40.9.7 Assessment For NRS-RA Resources~~

~~Non-Resource-Specific System Resources that provide Resource Adequacy Capacity will comprise a distinct category for purposes of the CAISO's Availability Standards program. This category will utilize the same Availability Standard determined for other Resource Adequacy Resources in accordance with Section 40.9.4.1, but will have its own availability calculations, as well as a separate account for settling Non-Availability Charges and Availability Incentive Payments.~~

#### ~~40.9.7.1 Availability Standard for NRS-RA Resources~~

~~Through Resource Adequacy Compliance Year 2015, the monthly Availability Standard for the non-Resource-Specific System Resources that provide Resource Adequacy Capacity will be the Availability Standard determined in accordance with Section 40.9.4.1. Beginning with Resource Adequacy Compliance year 2016, the monthly Availability Standard for the non-Resource-Specific System Resources that provide Resource Adequacy Capacity will be based on historical availability for the Availability Assessment Hours over the previous three years. Each monthly Availability Standard will be calculated as the sum of the available Resource Adequacy Capacity of the included non-Resource-Specific System Resources across all Availability Assessment Hours of the month, divided by the sum of the designated Resource Adequacy Capacity for the same set of hours and resources, and multiplied by one hundred (100) to obtain a number between zero (0) and one hundred (100) percent. For non-Resource-Specific System Resources that provide Resource Adequacy Capacity subject to a Subset of Hours Contract, the sum of the available Resource Adequacy Capacity will be based on the Availability Assessment Hours of the month that overlap the hours during which the resource is contractually obligated to make the Resource Adequacy Capacity available to the CAISO. The Availability Standard applicable to a non-Resource-Specific System Resource shall not include any hours in which the resource was prohibited by Section 30.8 from bidding across an out-of-service transmission path at its designated Scheduling Point. A non-Resource-Specific System Resource providing Resource Adequacy Capacity whose monthly availability calculation under Section 40.9.7.2 is more than two and a half (2.5) percent below the monthly Availability Standard will be subject to a Non-Availability Charge for the month. A non-Resource-Specific System Resource providing Resource Adequacy Capacity whose monthly availability calculation under Section 40.9.7.2 is more than two and a half (2.5) percent above the monthly Availability Standard will be eligible for Availability Incentive Payments. Non-Resource-Specific System Resources will not be included in the calculation of the Availability Standards for other Resource Adequacy Resources as determined in Section 40.9.4.~~

~~**40.9.7.2 Availability Calculation for NRS-RA Resources**~~

~~The availability of Resource Adequacy Capacity provided by a non-Resource-Specific System~~

~~Resource will be calculated as the sum of the MW hours of the resource's available Resource Adequacy Capacity over all Availability Assessment Hours of the month, divided by the sum of the resource's designated non-exempt hourly Resource Adequacy Capacity for all Availability Assessment Hours, times one hundred (100) to obtain a number between zero (0) and one hundred (100) percent. For non-Resource-Specific System Resources that provide Resource Adequacy Capacity subject to a Subset of Hours Contract, the sum of the available Resource Adequacy Capacity will be based on the Availability Assessment Hours of the month that overlap the hours during which the resource is contractually obligated to make the Resource Adequacy Capacity available to the CAISO. The Scheduling Coordinator for Resource Adequacy Capacity provided by non-Resource-Specific System Resources is expected to secure sufficient transmission rights to deliver the Resource Adequacy Capacity to its designated CAISO Scheduling Point. In determining monthly availability of a non-Resource-Specific System Resource under Section 40.9.7.2, any hours in which the resource was prohibited by Section 30.8 from bidding across an out-of-service transmission path at its designated Scheduling Point will be excluded from the calculation. Scheduling Coordinators for non-Resource-Specific System Resources must submit a monthly report of such hours occurring under Section 30.8, in the format and manner described in the Business Practice Manual for Reliability Requirements.~~

~~**40.9.7.3 Determination of Non-Availability Charges and Availability Incentive Payments for NRS-RA Resources**~~

~~A Non-Resource-Specific System Resource that provides Resource Adequacy Capacity and whose actual availability calculated in accordance with Section 40.9.7.2 is less than the Availability Standard defined in Section 40.9.7.1 minus the tolerance band of two and one-half (2.5) percent for a given month shall be assessed a Non-Availability Charge. This charge for such a resource shall apply to that portion of the resource's designated non-exempt Resource Adequacy Capacity equal to one hundred (100) percent minus the ratio of its actual availability calculated in accordance with Section 40.9.7.2 to the Availability Standard minus two and one-half (2.5) percent. The Non-Availability Charge will then equal the resource's applicable capacity that is subject to Non-Availability Charges multiplied by the a Non-Availability Charge rate equal to the Monthly CPM Capacity Payment price as specified in Schedule 6 of Appendix F of this~~

#### ~~CAISO Tariff.~~

~~Funds collected for Non-Availability Charges pursuant to this Section 40.9.7.3 in a Trade Month will be used to provide Availability Incentive Payments to non-Resource-Specific System Resources providing Resource Adequacy Capacity that exceed the Availability Standard established in Section 40.9.7.1 plus the tolerance band of two and one-half (2.5.) percent for that same Trade Month. The funds will be distributed to each such resource in proportion to the resource's share of the total non-exempt Resource Adequacy Capacity provided by non-Resource-Specific System Resources that are eligible for Availability Incentive Payments or the month.~~

~~Any Availability Incentive Payment to a non-Resource-Specific System Resource providing Resource Adequacy Capacity under this Section 40.9.7.3 will be capped at three times the Non-Availability Charge rate multiplied by the amount of the resource's non-exempt Resource Adequacy Capacity. Any remaining monthly surplus of Non-Availability Charges from non-Resource-Specific System Resources providing Resource Adequacy Capacity in a Trade Month will be credited against the Real-Time neutrality charge for that Trade Month in accordance with Section 11.5.2.3. Only revenues received from the assessment of Non-Availability Charges to non-Resource-Specific System Resources providing Resource Adequacy Capacity will be used to fund Availability Incentive Payments for non-Resource-Specific System Resources providing Resource Adequacy Capacity.~~

#### ~~40.9.8 Reporting~~

~~By July 1 of each year, the CAISO will provide an informational report that will be posted on the CAISO Website and include the following information: (1) the Availability Standard value for each month of the year and (2) information on the average actual availability each month of Resource Adequacy Resources, the total amount of Non-Availability Charges assessed and the total amount of Availability Incentive Payments made.~~

## **40.9 Resource Adequacy Availability Incentive Mechanism**

### **40.9.1 Transition To RAIM**

The CAISO shall use RAIM to determine the availability of resources providing local and/or system Resource Adequacy Capacity and Flexible RA Capacity during the Availability Assessment Hours each month and then assess the resultant Availability Incentive Payments and Non-Availability Charges through the CAISO's settlements process; except that, for an advisory period of two calendar months following the effective date of RAIM, the CAISO will calculate and publish the Availability Incentive Payments and Non-Availability Charges on Settlement Statements but will not include those payments and charges on Invoices for financial settlement.

### **40.9.2 Exemptions**

(a) **Capacity Exempt from RAIM – All Provisions.** The entire capacity of a resource in any of the following categories is exempt from the RAIM provisions in Section 40.9 --

- (1) Resources with a PMax less than 1.0 MW;
- (2) Non-specified resources that provide Resource Adequacy Capacity under contracts for Energy delivered within the CAISO Balancing Authority Area;
- (3) Participating Load that is also Pumping Load; and
- (4) RMR Units.

(b) **Capacity Exempt from RAIM – Local/System**

- (1) The entire capacity of a resource in any of the following categories is exempt from the RAIM provisions in Section 40.9 applicable to local and system Resource Adequacy Capacity –
  - (A) Variable Energy Resources; and
  - (B) Combined Heat and Power Resources.
- (2) The capacity of a resource with a Load-following MSS as its Scheduling Coordinator that is designated on a Load-following MSS's monthly Resource Adequacy Plan is exempt from the RAIM provisions in Section 40.9 applicable to local and system Resource Adequacy Capacity, to the extent that the resource's capacity is also designated as Resource Adequacy Capacity on the

monthly Supply Plan of that Load-following MSS or another Load-following MSS.

(3) Resources with Existing QF Contracts or Amended QF Contracts that are Resource Adequacy Resources are exempt from the RAIM provisions in Section 40.9 applicable to local and system capacity --

(A) if the QF resource previously provided Resource Adequacy Capacity pursuant to an Existing QF Contract that was executed prior to August 22, 2010 and remained in effect pursuant to California Public Utilities Commission Decision 07-09-040 that extended the term of expiring contracts until such time as the new contracts resulting from that decision are available; or

(B) until the QF Resource's Existing QF Contract or Amended QF Contract terminates or if requested by the Scheduling Coordinator for the resource, whichever is earlier.

(c) **Capacity Exempt from RAIM – Flexible Capacity.**

(1) The capacity of Use-Limited Resources in a combination under Section 40.10.3.2(b), 40.10.3.3(b) or 40.10.3.4(b) is exempt from the RAIM provisions in Section 40.9 applicable to Flexible RA Capacity to the extent that the resources are committed to provide Flexible RA Capacity as a combination on their respective monthly Supply Plans.

(2) The Capacity of a resource with a Load-following MSS as its Scheduling Coordinator that is designated on a Load-following MSS's monthly Flexible RA Plan is exempt from the RAIM provisions in Section 40.10 applicable to Flexible RA Capacity, to the extent that the resource's capacity is also designated as Flexible RA Capacity on the monthly Supply Plan of that Load-following MSS or another Load-following MSS.

**40.9.2.1 Acquired Resources.**

(a) **Exemption.** The entire capacity of an Acquired Resource is exempt from the RAIM provisions in Section 40.9 applicable to local and system Resource Adequacy Capacity if

the resource provides Resource Adequacy Capacity under a resource-specific power supply contract that --

(1) was exempt from the prior standard capacity product in Section 40.9 as of the RAAIM effective date, and continues to meet the requirements for that exemption, under the provisions of Sections 40.9.2(1) or 40.9.2(2) contained in Appendix J.

(2) includes an availability provision, or the resource under the power supply contract is located outside of the CAISO Balancing Authority Area and jointly operated with project participants located outside of the CAISO Balancing Authority Area, such that no single Load Serving Entity with contractual rights for the resource's output has the ability to effect changes to the resource's availability; and

(3) does not contain a provision that allows the contract to be modified for regulatory changes.

(b) **Request.** To maintain the exemption, the Scheduling Coordinator for the Acquired Resource must annually request renewal of the exemption and --

(1) for Resource Adequacy Compliance Year 2016, submit an affidavit to the CAISO, by either the Scheduling Coordinator or resource owner, demonstrating that the Acquired Resource meets the eligibility criteria in Section 40.9.2.1(a), in accordance with the process and schedule in the Business Practice Manual; and

(2) for each Resource Adequacy Compliance Year thereafter until the contract terminates, submit confirmation to the CAISO that the information in the affidavit is still accurate and the Acquired Resource continues to meet the eligibility criteria in Section 40.9.2.1(a), in accordance with the process and schedule in Business Practice Manual.

(c) **Approval.** The CAISO shall review the information submitted and --

(1) approve a request that contains the information required by Sections 40.9.2.1(a) and (b) and that demonstrates the resource meets the eligibility criteria in Section

40.9.2.1(a):

(2) advise the Scheduling Coordinator for the resource if the request does not contain all of the information required by Sections 40.9.2.1(a) and (b), and allow the opportunity for the Scheduling Coordinator to submit the additional required information, in accordance with the process and schedule in the Business Practice Manual; or

(3) deny the request and permanently terminate the exemption if --

(A) the Scheduling Coordinator for the resource does not timely submit a request under Section 40.9.2.1(b);

(B) the Scheduling Coordinator for the resource does not submit, or does not timely submit, additional information required to complete the request under Section 40.9.2(c)(2); or

(C) the CAISO determines the resource does not meet the eligibility criteria in Section 40.9.2.1(a).

(d) **Failure to Request Renewal.** If the Scheduling Coordinator for the resource does not submit a request to renew the exemption under Section 40.9.2.1(b), the exemption shall terminate and the CAISO shall notify the Scheduling Coordinator of the termination in accordance with the process and schedule in Business Practice Manual.

(e) **Notice of Termination.** The Scheduling Coordinator for an Acquired Resource must notify the CAISO within 10 days if the contract terminates or no longer meets the eligibility criteria in Section 40.9.2.1(a).

**40.9.3 Availability Assessment**

**40.9.3.1 Local and System RA Capacity Availability**

**(a) Availability Assessment Hours**

(1) Prior to the start of each Resource Adequacy Compliance Year, the CAISO shall establish and publish in the Business Practice Manual the Availability Assessment Hours applicable for resources providing local and/or system Resource Adequacy Capacity for each month of that year.

(2) The Availability Assessment Hours shall be a pre-defined set of five consecutive hours for each month that --

(A) correspond to the operating periods when high demand conditions typically occur and when the availability of Resource Adequacy Capacity is most critical to maintaining system reliability;

(B) vary by season as necessary so that the coincident peak load hour typically falls within the five-hour range each day during the month, based on historical actual load data; and

(C) apply to each Trading Day that is a weekday and not a federal holiday.

(b) **Must Offer Availability Assessment.** The CAISO shall determine the extent to which each resource providing local and/or system Resource Adequacy Capacity made that capacity available to the CAISO in each Availability Assessment Hour of the day by comparing --

(1) the MWs of local and/or system Resource Adequacy Capacity for which the Scheduling Coordinator for the resource submitted Economic Bids or Self-Schedules in the Day-Ahead Market and the Real-Time Market; and

(2) the MWs of local and/or system Resource Adequacy Capacity for which the Scheduling Coordinator for the resource was required to submit Economic Bids or Self-Schedules in the CAISO Markets under the must-offer requirements applicable under Section 40.6.

#### 40.9.3.2 Flexible RA Capacity Availability

(a) **Availability Assessment Hours.** The Availability Assessment Hours for a Flexible RA Resource shall be the same period as the must-offer obligation for the Flexible Capacity Category that is designated on the Resource Flexible RA Capacity Plan for that month, as set forth in Section 40.10.6.

(b) **Must-Off Offer Availability Assessment.** The CAISO shall determine the extent to which each Flexible RA Resource made that capacity available in each Availability Assessment Hour of the day by comparing --

(A) the MWs of Flexible RA Capacity for which the Scheduling Coordinator for the resource submitted Economic Bids in the Day-Ahead Market and the Real-Time Market; and

(B) the MWs of Flexible RA Capacity for which the Scheduling Coordinator for the resource was required to submit Economic Bids in the CAISO Markets under the must-offer requirements applicable under Section 40.10.6.

(c) **Flexible Capacity Category.** If a Flexible RA Resource is designated to provide Flexible RA Capacity and/or RA Substitute Capacity in more than one Flexible Capacity Category, the CAISO will assess the availability of the resource using the must-offer obligation for the highest quality of Flexible Capacity Category designated.

(d) **Start-Up Less Than 90 Minutes.** For resources with a start-up time less than 90 minutes, the CAISO will use the resource's MWs of capacity from zero to the EFC value to assess the availability of the designated Flexible RA Capacity; provided that the Scheduling Coordinator for the resource does not submit Self-Schedules for the capacity from zero to PMin or for any portion of the capacity under the must-offer obligation for Energy. If the Scheduling Coordinator for the resource submits a Self-Schedule, the CAISO will deduct the MW value of PMin from the calculation of the resource's Flexible RA Capacity availability.

(e) **Start-Up Greater Than 90 Minutes.** For resources with a start-up time greater than 90 minutes, the CAISO will use the MWs of capacity between the resource's PMin and EFC value in the availability assessment and validate whether the Scheduling Coordinator for the resource submitted Economic Bids for all MWs designated on the Resource Flexible RA Capacity Plan.

(f) **Variable Energy Resources**

(1) **Flexible RA Capacity Equal to EFC.** If the Flexible RA Capacity designated on the monthly Resource Flexible RA Capacity Plan is equal to the resource's EFC value, the CAISO will assess the availability of the designated Flexible RA

Capacity based on the Economic Bids for Flexible RA Capacity the Scheduling Coordinator for the resource submitted up to the MWs in the Variable Energy Resource forecast applicable under Section 4.8.2.

(2) **Flexible RA Capacity Less Than EFC.** If the Flexible RA Capacity designated in the monthly Resource Flexible RA Capacity Plan is less than the EFC value for the resource, the CAISO will assess availability using the ratio of the amount shown on the monthly plan to the relevant EFC value, and applies that ratio to the MWs of Economic Bids and the Variable Energy Resource forecast.

(3) **VER Forecast Less Than Flexible RA Capacity.** If the MWs in the Variable Energy Resource forecast are less than the MWs of Flexible RA Capacity designated in the monthly Resource Flexible RA Capacity Plan, and the Economic Bids are greater than or equal to the forecast amount for that hour, the resource is 100 percent available up to the forecast amount.

(4) **VER Forecast Greater Than Flexible RA Capacity.** If the MWs in the Variable Energy Resource forecast are greater than the MWs of Flexible RA Capacity designated in the monthly Resource Flexible RA Capacity Plan, the Scheduling Coordinator for the resource must submit Economic Bids equal to the forecast amount. If the Scheduling Coordinator for the resource submits Economic Bids for MWs above the forecast, or the resource generates above the forecast, the CAISO will limit the calculated availability to the forecast amount.

(5) **No Day-Ahead Market Obligation.** For Variable Energy Resources that do not have an obligation to submit Economic Bids into the Day-Ahead Market, the CAISO will base the availability assessment of the Flexible RA Capacity only on the resource's Economic Bids in the Real-Time Market.

#### **40.9.3.3 Availability for Overlapping Local/System and Flexible RA Capacity**

(a) **Overlap Determination.** The availability assessment for overlapping Resource Adequacy commitments shall apply to those hours in which a resource was subject to the must-offer obligations for local and/or system Resource Adequacy Capacity and Flexible

RA Capacity in any Availability Assessment Hour and for any portion of the same capacity.

**(b) Must-Offer Availability Assessment.** The CAISO shall determine the extent to which each resource with overlapping Resource Adequacy commitments made that capacity available to the CAISO in each overlapping Availability Assessment Hour of the day by comparing --

(1) the MWs of local and/or system Resource Adequacy Capacity and Flexible RA Capacity for which the Scheduling Coordinator for the resource submitted

Economic Bids in the Day-Ahead Market and the Real-Time Market; and

(2) the MWs of local and/or system Resource Adequacy Capacity and Flexible RA Capacity for which the Scheduling Coordinator for the resource was required to submit Economic Bids in the CAISO Markets, in accordance with the applicable must-offer requirements in Sections 40.6 and 40.10.6.

**(c) Calculation.** The CAISO's calculation of the Availability Assessment for overlapping RA commitments shall count--

(1) any portion of the overlapping MW only once; and

(2) the total MWs of capacity at the higher of the Resource Adequacy Capacity commitment or the Flexible RA Capacity commitment.

#### **40.9.3.4 Treatment of Maintenance Outages**

**(a) Replacement Not Required.** The RAAIM Availability Assessment for a Resource Adequacy Resource excludes the capacity, duration, and must-offer requirements for Resource Adequacy Capacity --

(1) with an Approved Maintenance Outage or pending request for a Maintenance Outage as of 45 days prior to the start date of the Resource Adequacy month; however any subsequent incremental increase in the MWs or duration of the outage will be subject to RAAIM unless RA Replacement Capacity for the incremental outage is required and provided or is not required; or

(2) on an Approved Maintenance Outage during the Resource Adequacy month that does not require RA Replacement Capacity under Section 9.3.1.3.3.

(b) **Replacement Requirement Provided.** For each Maintenance Outage that a Resource Adequacy Resource requests less than 45 days prior to the start of the relevant resource adequacy month and that requires RA Replacement Capacity --

(1) the RAAIM Availability Assessment for the resource excludes the capacity, duration, and must-offer requirement for Resource Adequacy Capacity on an Approved Maintenance Outage to the extent the resource provides RA Replacement Capacity for that outage as required under Section 9.3.1.3.3; and

(2) the RAAIM Availability Assessment for the replacement resource includes the capacity, duration, and must-offer requirement for the RA Replacement Capacity commitment.

(c) **Replacement Requirement Not Provided.** For each Maintenance Outage that a Resource Adequacy Resource requests less than 45 days prior to the start of the relevant resource adequacy month, the RAAIM Availability Assessment for the resource includes the capacity, duration, and must-offer requirement for Resource Adequacy Capacity on an Approved Maintenance Outage to the extent the resource does not provide RA Replacement Capacity for the outage as required under Section 9.3.1.3.3.

#### **40.9.3.5 Treatment of Forced Outages**

(a) **RA Substitute Capacity – Local And System**

(1) The RAAIM Availability Assessment for a Resource Adequacy Resource includes the capacity, duration, and must-offer requirement for Resource Adequacy Capacity on a Forced Outage, except to extent the resource provides RA Substitute Capacity for the outage in accordance with Section 40.9.3.6.

(2) The RAAIM Availability Assessment for the substitute resource includes the capacity, duration, and must-offer requirement for the RA Substitute Capacity.

(b) **RA Substitute Capacity – Flexible**

- (1) The RAAIM Availability Assessment for a Flexible RA Resource includes the capacity, duration, and must-offer requirement for Flexible RA Capacity on a Forced Outage, except to extent the resource provides RA Substitute Capacity for that outage in accordance with Section 40.9.3.6.
- (2) The RAAIM Availability Assessment for the substitute resource includes the capacity, duration, and must-offer requirement for the RA Substitute Capacity.
- (3) For each day the substitute resource is committed to provide Flexible RA Capacity and/or RA Substitute Capacity in more than one Flexible Capacity Category, the RAAIM Availability Assessment applies the must-offer obligation for the highest quality Flexible Capacity Category to the total MWs of the flexible capacity requirement.

(c) **Exclusions from RAAIM.** The RAAIM Availability Assessment excludes the capacity, duration, and must-offer requirement for local and/or system Resource Adequacy Capacity or Flexible RA Capacity on a Forced Outage in a nature of work category relating to an administrative action by the resource owner, a cause outside of the control of the resource owner, or a short-term use limitation, as those categories are specified in the Business Practice Manual.

(d) Scheduling Coordinators for Resource Adequacy Resources with a PMax of at least one (1) MW but less than 10 MWs that do not meet the requirement to provide information on Forced Outages in accordance with Section 9.3.10 shall report outages and de-rates in accordance with the process set forth the Business Practice Manual.

#### **40.9.3.6 Substitute Capacity**

##### **(a) Substitution**

- (1) The Scheduling Coordinator for a Resource Adequacy Resource may provide RA Substitute Capacity for its local and/or system Resource Adequacy Capacity or Flexible RA Capacity on a Forced Outage or de-rate.
- (2) If the Resource Adequacy Resource on outage and the substituting resource do not have the same Scheduling Coordinator, the Scheduling Coordinator for the

substituting resource must confirm and approve the proposed substitution in accordance with the process set forth in the Business Practice Manual.

**(b) Availability**

- (1) RA Substitute Capacity must be operationally available to the CAISO:
- (2) Capacity on, or scheduled to be on, a Forced Outage, Approved Maintenance Outage, or de-rate, is not operationally available and shall not qualify to be RA Substitute Capacity for the duration of the period that it is unavailable.
- (3) RA Replacement Capacity, RMR Capacity, CPM Capacity, and capacity committed to be Resource Adequacy Capacity in a monthly Supply Plan shall not qualify to be RA Substitute Capacity for the duration of that commitment.
- (4) RA Substitute Capacity shall not qualify to be RA Replacement Capacity, RMR Capacity, CPM Capacity, or Resource Adequacy Capacity in a monthly Supply Plan, for the duration of the substitution.
- (5) If a resource provides RA Substitute Capacity for multiple Resource Adequacy Resources under Section 40.9.3.6.3, the same capacity committed as RA Substitute Capacity for one Resource Adequacy Resource shall not qualify as RA Substitute Capacity for a different Resource Adequacy Resource during the same substitution period.
- (6) RA Substitute Capacity will be treated as Resource Adequacy Capacity during the period of substitution for purposes of a Forced Outage or de-rate allocation.

**(c) Timing of Substitution Request**

- (1) **Day-Ahead Market.** Requests for substitution in the Day-Ahead Market must be submitted in accordance with the timeline specified in the Business Practice Manual and be approved by the CAISO to be included in the Day-Ahead Market for the next Trading Day. Requests for substitution in the Day-Ahead Market submitted at or after the timeline specified in the Business Practice Manual and that are approved by the CAISO will be included in the Day-Ahead Market for the second Trading Day.

(2) **Real-Time Market.** Requests for substitution in the Real-Time Market must be submitted in accordance with the timeline in the Business Practice Manual.

**40.9.3.6.1 RA Substitute Capacity From A Single Resource**

(a) **Option.** The Scheduling Coordinator for a Resource Adequacy Resource that is on a Forced Outage or de-rate may provide RA Substitute Capacity for that capacity from a single resource.

**(b) Local Capacity Area Resource Substitution**

(1) **Pre-Qualified Substitution.**

(A) **Annual Process.** The CAISO will annually conduct a process to assess the eligibility of resources to pre-qualify as RA Substitute Capacity for Local Capacity Resource Adequacy Resources. The CAISO will publish a list of the pre-qualified resources in accordance with the timeline in the Business Practice Manual.

(B) **Pre-Qualification Requirement.** The CAISO will pre-qualify a resource to provide RA Substitute Capacity that is located at the same bus as, or a compatible bus to, that of the Local Capacity Area Resource Adequacy Resource for which it could substitute.

(C) **Request.** To use a pre-qualified resource in the Day-Ahead Market or Real-Time Market as RA Substitute Capacity, the Scheduling Coordinator for the Local Capacity Area Resource Adequacy Resource on a Forced Outage or de-rate must submit a timely substitution request in accordance with Section 40.9.3.6(c).

(D) **Approval.** The CAISO will grant a request that meets the requirements in Sections 40.9.3.6.1(b)(1)(C) and 40.9.3.6(b).

(2) **Non-Pre-Qualified Substitution.**

(A) **Day-Ahead Market.** The Scheduling Coordinator for a Local Capacity Area Resource Adequacy Resource on a Forced Outage or de-rate may submit a request to substitute a non-pre-qualified resource only in the

Day-Ahead Market.

(B) Request. To use a non-pre-qualified resource as RA Substitute Capacity, the Scheduling Coordinator for the Local Capacity Area Resource Adequacy Resource must submit a timely substitution request in accordance with Section 40.9.3.6(c), and the alternate resource must be located in the same Local Capacity Area.

(C) Approval. The CAISO will grant a request that meets the requirements in Sections 40.9.3.6.1(b)(2)(A) and (B), and 40.9.3.6(b).

(c) Non-Local Capacity Area Resource Substitution

(1) Request. To use a resource as RA Substitute Capacity, the Scheduling Coordinator for a non-Local Capacity Area Resource Adequacy Resource that has a Forced Outage or de-rate must submit a timely substitution request in the Day-Ahead Market or Real-Time Market in accordance with Section 40.9.3.6(c).

(2) Approval. The CAISO will grant the request if the alternate resource has adequate deliverable capacity to provide the RA Substitute Capacity and meets the requirements in Sections 40.9.3.6.1(c)(1) and 40.9.3.6(b).

(d) External Resources

(1) Request. To use a Dynamic System Resource, Non-Dynamic System Resource, NRS-RA Resource, or Pseudo-Tie as RA Substitute Capacity, the Scheduling Coordinator for a Resource Adequacy Resource that has a Forced Outage or de-rate must submit a timely substitution request in the Day-Ahead Market in accordance with Section 40.9.3.6(c).

(2) Approval. The CAISO will grant the request if the alternate resource is external to the CAISO Balancing Authority Area (including Pseudo-Ties), the Scheduling Coordinator for the resource has an adequate available import allocation at the resource's Scheduling Point to provide the RA Substitute Capacity, and meets the requirements in Sections 40.9.3.6.1(d)(1) and 40.9.3.6(b).

(e) Flexible RA Capacity

(1) **Request.** To use a resource as RA Substitute Capacity, the Scheduling Coordinator for the Flexible RA Resource that has a Forced Outage or de-rate must submit a timely substitution request in the Day-Ahead Market or Real-Time Market in accordance with Section 40.9.3.6(c) and specify the MW of RA Substitute Capacity to be provided, which may not exceed the MWs of the outage.

(2) **Approval.** The CAISO will grant the request if the alternate resource has adequate deliverable capacity to provide the RA Substitute Capacity, meets the applicable requirements in Sections 40.9.3.6.1(e) and 40.9.3.6(b), and is capable of meeting the must-offer obligation in Section 40.10.6 applicable to the highest quality Flexible Capacity Category for the MWs of the Flexible RA Capacity commitments of the resource on outage and the alternate resource.

#### **40.9.3.6.2 RA Substitute Capacity From Multiple Resources**

(a) **Option.** The Scheduling Coordinator for a Resource Adequacy Resource on a Forced Outage or de-rate may submit a request to substitute that capacity with RA Substitute Capacity from multiple alternate resources, including a resource already providing RA Substitute Capacity for one or more Resource Adequacy Resources.

#### **(b) Local Capacity Area Resource Substitution**

(1) **Request.** To use RA Substitute Capacity from multiple resources, the Scheduling Coordinator for the Local Capacity Area Resource Adequacy Resource on a Forced Outage or de-rate must submit a timely substitution request in the Day-Ahead Market in accordance with Section 40.9.3.6(c) if any of the alternate resources are not pre-qualified to substitute for the resource on the outage; however, if all of the alternate resources are pre-qualified to provide RA Substitute Capacity for that resource, the request may be submitted in the Day-Ahead Market or Real-Time Market.

(2) **Approval.** The CAISO will grant the request if it meets the requirements in Sections 40.9.3.6.2(b)(1) and 40.9.3.6(c) and the alternate resources are either

pre-qualified, or are not pre-qualified but are located in the same Local Capacity Area as the Resource Adequacy Resource.

**(c) Non-Local Capacity Area Resources**

**(1) Request.** To use RA Substitute Capacity from multiple resources, the Scheduling Coordinator for a non-Local Capacity Area Resource Adequacy Resource on a Forced Outage or de-rate must submit a timely substitution request in the Day-Ahead Market or the Real-Time Market in accordance with Section 40.9.3.6(c).

**(2) Approval.** The CAISO will grant the request if all of the alternate resources meet the requirements in Sections 40.9.3.6.2(c)(1) and 40.9.3.6(c).

**(d) External Resources**

**(1) Request.** To use multiple Dynamic System Resources, Non-Dynamic System Resources, NRS-RA Resources, or Pseudo-Ties as RA Substitute Capacity, the Scheduling Coordinator for a Resource Adequacy Resource that has a Forced Outage or de-rate must submit a timely substitution request in the Day-Ahead Market in accordance with Section 40.9.3.6(c).

**(2) Approval.** The CAISO will grant the request if the alternate resources are external to the CAISO Balancing Authority Area (including Pseudo-Ties), and the Scheduling Coordinator of each alternate resource has an adequate available import allocation at the resource's Scheduling Point to provide the RA Substitute Capacity, and meet the requirements in Sections 40.9.3.6.e(d)(1) and 40.9.3.6(b).

**(e) Flexible RA Capacity**

**(1) Request.** To use RA Substitute Capacity from multiple resources, the Scheduling Coordinator for a resource providing Flexible RA Capacity on a Forced Outage or de-rate must submit a timely substitution request in the Day-Ahead Market or the Real-Time Market and the alternate resources must be

located in the CAISO Balancing Authority Area, which does not include a Pseudo-Tie of a Generating Unit or a Resource-Specific System Resource.

(2) **Approval.** The CAISO will grant the request if the alternate resources meet the requirements in Sections 40.9.3.6.2(d)(1) and 40.9.3.6(c).

**40.9.3.6.3 Multiple Substitution by One Resource.** The Scheduling Coordinator for a resource already providing RA Substitute Capacity may provide RA Substitute Capacity for one or more additional Resource Adequacy Resources on a Forced Outage or de-rate, subject to approval by the CAISO pursuant to Section 40.9.3.6.1 or 40.9.3.6.2.

**40.9.3.6.4 Resource Adequacy Obligation.** To the extent a resource provides RA Substitute Capacity, the resource must meet and comply with all requirements in Section 40 applicable to RA Substitute Capacity for the duration of the substitution; except that RA Substitute Capacity shall be released from this obligation and the substitution requirements in Section 40.9 –

(a) at the end of the approved substitution period; or

(b) upon request by either the Scheduling Coordinator for the resource on Forced Outage or the Scheduling Coordinator for the substitute resource, and approval by the other Scheduling Coordinator, in accordance with the process set forth in the Business Practice Manual.

**40.9.3.6.5 Treatment of Unbid Capacity.** If the Scheduling Coordinator for RA Substitute Capacity does not submit Bids or Self-Schedules for all or a portion of that capacity in accordance with Section 40.6 or 40.10.6, the CAISO --

(1) will treat the unbid capacity as unavailable for purposes of Section 40.9; and

(2) will reflect that unavailability in the RAIM availability calculation for the Resource Adequacy Resource providing the RA Substitute Capacity.

#### **40.9.4 Availability Assessment**

(a) The CAISO shall determine a resource's monthly average availability on a percentage basis, based on --

(1) the availability assessment of the resource's minimum daily availability of local and/or system Resource Adequacy Capacity under Section 40.9.3.1, Flexible RA

Capacity under Section 40.9.3.2, and overlapping Resource Adequacy commitments under Section 40.9.3.3, in the Day-Ahead Market and Real-Time Market;

(2) including the capacity, duration, and must-offer requirement for local and/or system Resource Adequacy Capacity or Flexible RA Capacity on a Forced Outage, except to the extent the resource provides RA Substitute Capacity for the outage in accordance with Section 40.9.3.6, or the Forced Outage is excluded from RAAIM under Section 40.9.3.5;

(3) including the capacity, duration, and must-offer requirement for any RA Substitute Capacity, RA Replacement Capacity, or CPM Capacity the resource is committed to provide; and

(4) excluding the Maintenance Outages specified in Section 40.9.3.4.

(b) If the resource's minimum daily availability is the same in the Day-Ahead Market and the Real-Time Market, the CAISO will use the availability in the Real-Time Market in the calculation of the monthly average availability.

(c) If the resource is committed to provide local and/or system RA capacity and Flexible RA Capacity in a month, but does not provide both for the full month, the CAISO prorates the number of days that local and/or system Resource Adequacy Capacity and Flexible RA Capacity was provided against the total number of days in the month.

#### **40.9.5 Availability Standard**

(a) **Percentage.** The Availability Standard shall be 96.5 percent each month.

(b) **Availability Range.** The CAISO shall apply the Availability Standard with a bandwidth of plus and minus two percent, which produces a range with a lower bound of 94.5 percent and an upper bound of 98.5 percent.

#### **40.9.6 Non-Availability Charges And Availability Incentive Payments**

(a) **Non-Availability Charges.** A resource providing local and/or system Resource Adequacy Capacity, Flexible RA Capacity, or CPM Capacity that is subject to the availability assessment in accordance with Section 40.9.3 and whose monthly availability

calculation under Section 40.9.4 is below the lower bound of the monthly Availability Standard of 94.5 percent will be subject to a Non-Availability Charge for the month.

(b) **Availability Incentive Payments.** A resource providing local and/or system Resource Adequacy Capacity, Flexible RA Capacity, or CPM Capacity that is subject to the availability assessment under Section 40.9.3 and whose availability calculation under Section 40.9.4 is above the upper bound of the monthly Availability Standard of 98.5 percent will be eligible for an Availability Incentive Payment for the month.

(c) **No Payment or Charge.** A resource providing local and/or system Resource Adequacy Capacity, Flexible RA Capacity, or CPM Capacity that is subject to the availability assessment under Section 40.9.3 and whose monthly availability calculation under Section 40.9.4 is equal to or between the lower bound of 94.5 percent and the upper bound of 98.5 percent of the Availability Standard will not be assessed a Non-Availability Charge nor paid an Availability Incentive Payment.

(d) **Advisory Period.** During the advisory period of March 1, 2016 through April 30, 2016, the CAISO will show the Non-Availability Charges and Availability Incentive Payments on Settlement Statements but will not include those Non-Availability Charges and Availability Incentive Payments on Invoices for financial settlement.

#### **40.9.6.1 Determination of Non-Availability Charge**

##### **(a) Calculation**

(1) **RA Capacity.** The Non-Availability Charge for a Resource Adequacy Resource providing local, system, or Flexible RA Capacity shall be determined by the resource's average monthly RA and Flexible RA MWs multiplied by the difference between the lower bound of the monthly Availability Standard of 94.5 percent and the resource's monthly availability percentage, and multiplying the product by the RAAIM price.

(2) **CPM Capacity.** The Non-Availability Charge for a Resource Adequacy Resource providing CPM Capacity shall be determined by the resource's average monthly CPM MWs multiplied by the difference between the lower

bound of the monthly Availability Standard of 94.5 percent and the resource's monthly availability percentage, and multiplying the product by the maximum of the resource's CPM price and the RAIM price.

(b) **RAAIM Price.** The RAIM price shall be 60 percent of the CPM Soft-Cap Price in Section 43.4.1.1.

#### **40.9.6.2 Determination of Availability Incentive Payment**

(a) **Self-Funding.** The Availability Incentive Payment will be funded entirely through the monthly Non-Availability Charges assessed.

(b) **Eligible Capacity.** The capacity of a Resource Adequacy Resource providing local, system or Flexible RA Capacity that is eligible to receive an Availability Incentive Payment shall be the resource's average monthly MWs of capacity that exceed the upper bound of the Availability Standard.

(c) **Calculation.**

(1) The monthly Availability Incentive Payment rate will equal the total Non-Availability Charges assessed for the month plus any unpaid funds under Section 40.9.6.2(d), divided by the total Resource Adequacy Capacity eligible to receive the Availability Incentive Payment that month.

(2) The Availability Incentive Payment rate shall not exceed three times the Non-Availability Charge rate.

(3) The Availability Incentive Payment the CAISO shall pay to each eligible resource shall equal the product of its eligible capacity and the Availability Incentive Payment rate.

(d) **Unpaid Funds.** Any Non-Availability Charge funds that are not distributed to Resource Adequacy Resources eligible to receive Availability Incentive Payments in a month will be added to the funds available for Availability Incentive Payments in the next month and will continue to roll over to the successive month until paid out or December 31, at which time the funds will be distributed to Load Serving Entities based on their load ratio share for the year.

#### **40.9.7 Reporting**

By July 1 of each year, the CAISO will provide an informational report that will be posted on the CAISO Website and include information on the average actual availability each month of Resource Adequacy Resources, the total amount of Non-Availability Charges assessed and the total amount of Availability Incentive Payments made.

\* \* \*

#### **40.10 Flexible RA Capacity**

\* \* \*

##### **40.10.1.2 Required Information From LSEs**

- (a) **Submission Requirement.** The Scheduling Coordinator for each Load Serving Entity in the CAISO Balancing Authority Area shall submit the information required by this Section, no later than January 15 each year, for use in the CAISO's study to generate minute-by-minute net-load data that will be used to determine the Maximum Three-Hour Net-Load Ramp for each month.
- (b) **Required Information.** The Scheduling Coordinator for each Load Serving Entity in the CAISO Balancing Authority Area must submit information that --
- (1) covers the calendar year in which the information is submitted and each year in the next five-year period;
  - (2) identifies each wind and solar resource connected to the CAISO Controlled Grid, and distributed wind and solar resources, that is owned, in whole or in part, by the Load Serving Entity, or under contractual commitment to the Load Serving Entity or the Load-following MSS Load Serving Entity, for all or a portion of its capacity;
  - (3) indicates the status of the resource as either in service or in development with its expected commercial operation date;
  - (4) for each wind and solar resource, specifies the MWs of installed capacity, renewable energy area location, MWs of flexible capacity owned by or

contractually committed to the Load Serving Entity, and other information required by the Business Practice Manual;

- (5) describes the balancing services, if any, provided by another balancing authority area for a wind or solar resource that is located outside of the CAISO Balancing Authority Area and that is owned by or contractually committed to the Load Serving Entity; and
  - (6) forecasts the MW of installed, behind-the-meter solar capacity in the Load Serving Entity's service area or part of its forecast served load.
- (c) **Confidential Treatment.** The CAISO will treat the resource-specific information provided under Section 40.10.1.2(b) as confidential under Section 20.
- (d) **Aggregated Information.** In addition to the required resource-specific information, the Scheduling Coordinator for each Load Serving Entity in the CAISO Balancing Authority Area shall submit the information required in Section 40.10.1.2(b) on an aggregated basis, as described in the Business Practice Manual, for inclusion in the Flexible Capacity Needs Assessment that will be posted on the CAISO Website.

\* \* \*

#### 40.10.2.2 Allocation to Load-Following MSS

- (a) The CAISO will calculate the allocable share of the Flexible Capacity Need for each Load-following MSS ~~in accordance with the provisions for Local Regulatory Authorities in Section 40.10.2as --~~
- (1) ~~the Local Regulatory Authority's average percent contribution to the change in wind output, minus the change in solar PV output, minus the change in solar thermal output, during the five highest three-hour net-load changes in the month, for resources not included in the Load-following MSS Load Serving Entity's resource portfolio; and~~
  - (2) ~~plus the lesser of the MSS contribution calculated under Section 40.10.2.2(a)(1) or 3.5 percent of its forecasted peak load.~~

(3) plus the Load-following MSS Load Serving Entity's allocable share of any forecast adjustment under Section 40.10.1.4.

(b) The CAISO will deduct the Flexible Capacity Need allocated to each Load-following MSS from the calculation to determine whether a cumulative deficiency in Flexible RA Capacity exists under Section 43.2.7.

(c) If the Load-following MSS Load Serving Entity's contribution to the three-hour net-load ramp calculated under Section 40.10.2.2(a)(1) is less than its contribution to the 3.5 percent of expected peak load, the CAISO will not reallocate that difference to other Local Regulatory Authorities to determine whether a cumulative deficiency in Flexible RA Capacity exists under Section 43.2.7.

\* \* \*

#### **40.10.4.1 Effective Flexible Capacity Calculation**

(a) **Flexible Resources.** The CAISO will calculate the Effective Flexible Capacity value of a resource, for use (i) if a Local Regulatory Authority has not established criteria for calculating the Effective Flexible Capacity value for eligible resource types, and (ii) for determining if a cumulative deficiency exists under Sections 43.2.7(a) and (b), as follows, except as provided in Sections 40.10.4.1 (b) through (f) --

(1) If the Start-Up Time of the resource is greater than 90 minutes, the Effective Flexible Capacity value shall be the weighted average ramp rate of the resource calculated from PMin to Net Qualifying Capacity multiplied by 180 minutes. The Effective Flexible Capacity shall not exceed the difference between the PMin and PMax of the resource.

(2) If the Start-Up Time of the resource is less than or equal to 90 minutes, the Effective Flexible Capacity value shall be the weighted average ramp rate of the resource calculated from zero to Net Qualifying Capacity multiplied by 180 minutes. The Effective Flexible Capacity shall not exceed the Net Qualifying Capacity of the resource.

- (b) **Hydroelectric Generating Unit.** The Effective Flexible Capacity of a hydroelectric generating unit will be the amount of capacity from which the resource can produce Energy consistently for 6 hours based upon the resource's physical storage capacity, which shall not exceed its Net Qualifying Capacity.
- (c) **Proxy Demand ~~Response~~ Resource.** The Effective Flexible Capacity of a Proxy Demand ~~Response~~ Resource will be based on the resource's actual MWs of load modification in response to a dispatch by the CAISO during a test event. In determining the Effective Flexible Capacity of a Proxy Demand ~~Response~~ Resource, the CAISO will --
- (1) conduct the test at a random time during the flexible capacity must-offer obligation period for the resource;
  - (2) use the applicable baseline load data, as described in the CAISO Tariff or Business Practice Manual, to measure the load modification ~~for~~of the Proxy Demand ~~Response~~ Resource being tested; and
  - (3) pay the resource's bid price for the testing period.
- (d) **Energy Storage Resource.** The Effective Flexible Capacity value for an energy storage resource will be determined as follows --
- (1) for an energy storage resource that provides Flexible RA Capacity but not Regulation Energy Management, the Effective Flexible Capacity value will be the MW output range the resource can provide over three hours of charge/discharge while constantly ramping.
  - (2) for an energy storage resource that provides Flexible RA Capacity and Regulation Energy Management, the Effective Flexible Capacity value will be the resource's 15-minute energy output capability.
- (e) **Multi-Stage Generating Resource.** The Effective Flexible Capacity value for a Multi-Stage Generating Resource will be calculated using the longest Start-Up Time of the resource's configuration that has the lowest PMin.
- (f) **Combined Heat and Power Resource.** The Effective Flexible Capacity value of a Combined Heat and Power Resource will be the lesser of (i) the resource's Net Qualifying

Capacity, or (ii) the MW difference between the CHP resource's maximum output and its minimum operating level, such quantity not to exceed the quantity of generating capacity capable of being delivered over a three-hour period.

\* \* \*

#### **40.10.5 Flexible RA Capacity Plans**

##### **40.10.5.1 LSE Flexible RA Capacity Plans**

- (a) **Submission Requirement.** A Scheduling Coordinator must submit annual and monthly LSE Flexible RA Capacity Plans for each Load Serving Entity it represents ~~;~~ ~~except that an annual plan for 2015 is not required. A Load-Following MSS is not required to submit annual or monthly LSE Flexible RA Capacity Plans.~~
- (b) **Annual Plan.** Each annual LSE Flexible RA Capacity Plan must –
- (1) demonstrate that the Load Serving Entity has procured for each month at least 90 percent of the annual Flexible RA Capacity requirement determined by the CAISO; or the amount of Flexible RA Capacity required by the Load Serving Entity's Local Regulatory Authority, if the Local Regulatory Authority has set such requirement;
  - (2) identify the resources the Load Serving Entity intends to rely on to provide the Flexible RA Capacity, but need not identify the flexible resource adequacy categories; and
  - (3) include all information and be submitted no later than the last Business Day in October, in accordance with the reporting requirements and schedule set forth in the Business Practice Manual.
- (c) **Monthly Plan.** The monthly LSE Flexible RA Capacity Plan must --
- (1) demonstrate that the Load Serving Entity procured 100 percent of the total monthly Flexible RA Capacity requirement determined by the CAISO; or the monthly amount of Flexible RA Capacity required by the Local Regulatory Authority, if the Local Regulatory Authority has set such requirement;
  - (2) demonstrate that the Load Serving Entity met the total monthly requirement

determined by the CAISO within the minimum or maximum quantity, as applicable, for each Flexible Capacity Category; or only if the Local Regulatory Authority has established its own flexible capacity requirement, show that the Load Serving Entity has met the total monthly requirement determined by the Local Regulatory Authority within the minimum or maximum quantity for each Flexible Capacity Category required by the Local Regulatory Authority, if applicable;

- (3) identify all resources the Load Serving Entity will rely on to provide the Flexible RA Capacity and for each resource specify the Flexible Capacity Category in which the Flexible RA Capacity will be provided; and
- (4) include all information and be submitted to the CAISO at least 45 days in advance of the first day of the month covered by the plan, in accordance with the reporting requirements and schedule set forth in the Business Practice Manual.

(d) **Correction to Monthly Plan.** The Scheduling Coordinator for the Load Serving Entity may submit at any time from 45 days through 11 days in advance of the first day of the month covered by the plan, a revision to its monthly LSE Flexible RA Capacity Plan to correct an error in the plan. The CAISO will not accept any revisions to a monthly LSE Flexible RA Capacity Plan from 10 days in advance of the relevant month through the end of the month, unless the Scheduling Coordinator for the Load Serving Entity demonstrates good cause for the change and explains why it was not possible to submit the change earlier.

#### **40.10.5.1.1 Load-Following MSS**

- (1) Each Load-following MSS Load Serving Entity for which the CAISO has calculated an allocable share of the Flexible Capacity Need under Section 40.10.2.2 must submit annual and monthly LSE Flexible RA Capacity Plans pursuant to this Section 40.10.5.1 to identify the Flexible RA Capacity it is using to satisfy such requirement.
- (2) The Load-following MSS must increase the Flexible RA Capacity in its monthly plan by the MW amount of Capacity for the Variable Energy Resources shown in the information

required pursuant to Section 40.10.1.2 but not included in the current MSS resource portfolio for that month.

\* \* \*

## APPENDIX A MASTER DEFINITIONS

\* \* \*

### **Acquired Resource**

A resource providing Resource Adequacy Capacity under a resource-specific power supply contract that was exempt from the provisions of the standard capacity product at the time RAAIM became effective.

\* \* \*

### **Availability Standards**

The standard ~~established in accordance with Sections 40.9.4 and 40.9.7~~used to determine if a Resource Adequacy Resource is subject to Non-Availability Charges or Availability Incentive Payments.

\* \* \*

### **Flexible RA Resource**

A resource designated to provide Flexible RA Capacity.

\* \* \*

### **RAAIM**

Resource Adequacy Availability Incentive Mechanism

\* \* \*

### **RA Substitute Capacity**

Capacity that substitutes for a Resource Adequacy Resource that is on a Forced Outage or de-rate ~~as provided in Section 40.9.4.2.1.~~

\* \* \*

## APPENDIX J

### GRANDFATHERED METERING AND SETTLEMENT PROVISIONS FOR TRADING DAYS

#### PRIOR TO OCTOBER 1, 2011, AND GRANDFATHERED STANDARD CAPACITY PRODUCT

#### PROVISIONS

\* \* \*

#### 2. Grandfathering of Standard Capacity Product Provisions

Notwithstanding any other provisions of the CAISO Tariff, the following provisions shall apply pursuant to Section 40.9.2.1(a)(1).

#### 40.9.2 Exemptions

The following exemptions apply to the CAISO's Availability Standards program of this Section

#### 40.9:

- (1) Capacity under a resource specific power supply contract that existed prior to June 28, 2009 and Resource Adequacy Capacity that was procured under a contract that was either executed or submitted to the applicable Local Regulatory Authority for approval prior to June 28, 2009, and is associated with specific Generating Units or System Resources, will not be subject to Non-Availability Charges or Availability Incentive Payments. Such contracted Resource Adequacy Capacity, except for non-Resource-Specific System Resources, will be included in the development of Availability Standards and will be subject to any Outage reporting requirements necessary for this purpose. The exemption will apply only for the initial term of the contract and to the MW capacity quantity and Resource Adequacy Resources specified in the contract prior to June 28, 2009. The exemption shall terminate upon the conclusion of the initial contract term. Exempt contracts may be re-assigned or undergo novation on or after June 28, 2009, but the exemption shall not apply for any extended contract term, increased capacity quantity or additional resource(s) beyond those specified in the contract prior to June 28, 2009, except as provided in Section 40.9.2(7) or 40.9.2(8). Scheduling Coordinators for Resource Adequacy Resources subject to these contracts will be required to certify the start date of the contract, the expiration date, the Resource ID(s), and the amount of Resource Adequacy Capacity associated with each Resource ID included in the contract. For Resource Adequacy Resources whose Qualifying Capacity value is determined by historical output, the capacity under a resource specific power supply contract or Resource Adequacy Capacity that was procured under a contract that was either executed or submitted to the applicable Local Regulatory Authority for approval that meets the requirements in this subsection (2) will not be subject to Non-Availability Charges or Availability Incentive Payments, except that the deadline date for either type of contract shall be August 22, 2010 instead of June 28, 2009.
- (2) For a contract entered into prior to June 28, 2009 that provides for the amount of Resource Adequacy Capacity to increase during the original term of the contract, based on a ratio of the Resource Adequacy Resource's output or due to an addition of capacity, the exemption provided in subsection (2) of this Section 40.9.2 will apply to the additional capacity allowed under the contract; provided that the capacity increase (i) is expressly contained in the provisions of the

contract, (ii) occurs during the primary term of the contract; and (iii) does not result from contract extensions or other amendments to the original terms and conditions of the contract, except as provided in Section 40.9.2(7) or 40.9.2(8). Scheduling Coordinators for Resource Adequacy Resources subject to contracts that provide for such capacity increases or additions must include in their certification, in addition to the requirements of subsection (2) of this Section 40.9.2, (i) the citation to any contract provisions that might entitle them to increased exempt Resource Adequacy Capacity from the contracted resources during the primary term of the contract; (ii) the amount of additional capacity to which they might be entitled; and (iii) the actual effective date of the capacity increase. If the actual amount of capacity and/or the actual effective date of the capacity increase is not known at the time of the initial certification, the Scheduling Coordinator shall provide a supplemental certification(s) when this information becomes known. For Resource Adequacy Resources whose Qualifying Capacity value is determined by historical output the exemption provided in subsection (2) of this Section 40.9.2 will apply to an increase in the capacity under a resource specific power supply contract or Resource Adequacy Capacity that was procured under a contract that was either executed or submitted to the applicable Local Regulatory Authority for approval that meets the requirements in this subsection (3), except that the deadline date for either type of contract to be exempt shall be August 22, 2010 instead of June 28, 2009.

**32. Definitions**

As used in this Appendix J, the capitalized terms defined below shall have the definitions specified in this Section 2. All other capitalized terms shall have the meaning specified in the Master Definition Supplement in Attachment A.

\* \* \*

**Attachment C – Addendum**  
**Reliability Services Initiative Phase 1A**  
**California Independent System Operator Corporation**



**Reliability Services**  
**Addendum to the Draft Final Proposal**  
**February 27, 2015**

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## 1. Addendum to the draft final proposal

Besides the below changes, minor clarifying changes have also been made to this addendum.

### **Part 2: Availability incentive mechanism:**

- The ISO will have a two month advisory period for the availability incentive mechanism that will begin with the implementation date. All availability incentive mechanism penalties and payments will be advisory only. The ISO decreased the period from three months to two months to limit the gap in availability assessment. Two months will still allow time for market participants and the ISO to make any final adjustments needed to accommodate the new mechanism.
- Use-limited resources may use the availability incentive mechanism exempt outage, “short-term use-limit reached” in the period between the incentive mechanism implementation and opportunity cost methodology implementation. The outage was previously titled “non-environmental use-limit reached,” but has been changed to better fit the outage circumstance.
- Use-limited resources, including use-limited resources automatically deemed use-limited, must register through the use-limited capacity registration process. This will make the resources eligible to take short-term use-limit reached outages and allow the resources to remain on the registered cost option for start-up and minimum load.
- Although the opportunity cost methodology portion of Commitment Cost Enhancements phase 2 has been delayed, the new definition for use-limited resources in Commitment Cost Enhancements Phase 2 and new RA RUC and bid insertion rules for use-limited resources in this proposal shall be implemented concurrently.
- The ISO would like to clarify a typo in the previous draft. Wind, solar, and CHP are exempted from the generic RAIM assessment, not the generic must-offer obligation.
- The ISO has added an example in section 6.6 that describes further the ISO’s proposal for assessment of multiple categories within a single resource.

### **Part 3: RA process, replacement, and substitution sections**

- In the monthly and annual resource adequacy process, the ISO proposes to cap a load serving entity's local capacity requirement at that load serving entity's system requirement. The ISO clarifies in section 10.4.2 that if an LSE has requirements in multiple TAC areas, the ISO will cap each local requirement at the LSE's system requirement for that TAC area (i.e. based on load in each TAC area relative to their total load).
- Figure 19 has been corrected to follow the described replacement policy timelines.

## 2. Executive summary

The Reliability Services initiative is a two-phase, multi-year effort to address the ISO's rules and processes surrounding resource adequacy (RA) resources. California's resource planners are preparing for unprecedented changes to the bulk power system resulting mostly from the significant and growing amount of variable energy and other resources that present new operational challenges. Although the current reliability framework has provided for reliable operation of the grid, there is an acknowledged gap in future forward procurement processes to effectively address changed grid conditions. 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.<sup>1</sup>

The existing RA framework has developed and evolved over several years based on the collaboration of the ISO, the California Public Utilities Commission (CPUC), and the other local regulatory authorities (LRAs). The Reliability Services initiative continues this collaboration and works in conjunction with the CPUC's *Order Instituting Rulemaking to Consider Electric Procurement Policy Refinements* under the *Joint Reliability Plan (JRP)* (CPUC Docket No. R.14-02-001).

The Reliability Services initiative has two phases. In the first phase, the initiative will focus on RA rules and processes that must be updated for reliability or regulatory reasons. These relate to (1) enhancements to further integrate preferred resources into the grid, (2) rules for integrating flexible resource adequacy resources into the energy market, (3) an update to the availability incentive mechanism price based on the Capacity Procurement Mechanism price that expires on February 16, 2016, and finally, (4) revisions to RA outage management rules that will serve as a platform to develop flexible RA outage rules in phase two.

Phase one proposes significant policy changes that will affect how RA resources are treated and assessed as available while on outage. Because certain changes will require significant implementation work, affect contracting, and involve coordination with the CPUC, the ISO proposes a staged implementation approach. Although the ISO will seek ISO Board of Governors' approval for all phase one items in March 2015 to give market participants certainty that the policy changes will move forward, the ISO will stage the FERC filing and eventually the implementation of some of the larger outage management rule changes. The FERC filing is discussed further in section 3.3 and outage management implementation is further discussed below.

The second phase of the Reliability Services initiative will begin in the first half of 2015. The ISO anticipates the second phase will be split into several parts. Initially, the ISO will conduct and use transparent studies to propose durable flexible RA requirements. This will include an

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<sup>1</sup> 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.

assessment of the ability of intertie capacity to participate as flexible RA capacity. The ISO's studies will look more closely at the need to address operational concerns associated with over-generation, including a review of the associated minimum operating levels run times that come with many resources and the need for ramping capabilities for time intervals less than three hours.

Then, using these studies the ISO will propose flexible RA planned outage rules and make any updating changes needed to accommodate the new flexible RA requirements.

Finally, the ISO will assess current RA rules, and the ISO will propose changes where necessary. This will likely include:

- Assessing how flexible RA and non-flexible RA resources are performing under the revised must-offer obligations and new availability incentive mechanism;
- Addressing any updating changes to outage rules needed due to changes to the Maximum Import Capability (MIC) allocation methodology; and
- Evaluating how the ISO could separate local and system RA showings so a MW could be physically in a local area, but not count toward the local monthly requirement.

The ISO will include more details on the second phase of this initiative in an issue paper in the first half of 2015.

This paper culminates the first phase of the Reliability Services initiative and is broken into four parts. **Part I** describes potential enhancements to resource adequacy criteria and must-offer requirements for resources not accounted for in section 40 of the ISO's tariff. The section also resolves RA policy gaps in the must-offer requirements for energy, ancillary service, and RUC bids from RA resources that occur due to the change in the use-limited definition.

As newer technologies produce and deliver energy onto the grid, the ISO must adapt RA rules to a more diverse set of resource types. As a start to this broader effort, the ISO proposes to:

- Enhance or establish the default qualifying capacity 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, 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, and the default qualifying capacity rules will follow current rules for thermal generation,
- Establish default qualifying capacity counting rules based on the non-generator resources output measured over a four hour period, 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 making them 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. Specifically, the ISO proposes:

- Distributed generation resources will have the same offer obligations as thermal generation,
- A non-generator resource should be non-use-limited unless the ISO approves the resource's application for use-limited resource status, but will not be subject to bid insertion rules.

Three additional items are identified in the FRAC-MOO stakeholder initiative that require resolution. The first two issues require the ISO to determine rules and requirements for inertie resources and block dispatchable pumping resources that want to provide flexible capacity. The third issue is a reassessment of the MCC buckets, with existing availability hours covered by standard capacity product, to provide guidance to LRAs, LSEs, and supply resources regarding the products needed to address system and local capacity needs. These issues will be addressed in the second phase of this initiative.

Also related to FRAC MOO, the ISO identified a gap in the FRAC-MOO tariff as it pertains to MSS load-following LSEs and their flexible capacity obligation for variable energy resources not included on the portfolio of resources used to follow load. The ISO proposes to require a MSS load-following LSE that does not include variable energy resources in its portfolio to provide adequate flexible capacity to address the contributions these resources might have on the ISO flexible capacity need.

Finally, the ISO proposes new requirements for bid insertion, ancillary service participation, and RUC bidding from RA resources. The requirements tie into a use-limited definition being developed in the Commitment Cost Enhancements phase two initiative and specifically exempt certain resource-types that are no longer considered use-limited, but cannot automatically be accommodated under the full must-offer requirements without additional policy and review. The ISO will reexamine these resources and must-offer requirements in phase two of Reliability Services initiative to determine if full participation from all non-use-limited resources is feasible.

In **Part 2**, the ISO 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. The current mechanism only uses forced outages to gauge whether a resource is available or not. Under the new flexible RA requirement, flexible RA resources must economically offer into the energy market. To capture this requirement the ISO proposes to move to a paradigm that assesses whether a resource offered in during its RA must-offer

obligation hours. The mechanism's design is built on two fundamental questions: (1) whether and how the resource was *supposed to bid* into the energy market, and (2) whether and how the resource *actually bid* into the energy market. The ISO believes this framework will be adaptable to future flexible RA requirements in addition to the interim ones approved by FERC in August 2014.

The current SCP mechanism also does not easily capture use-limited resources' availability because rather than putting in an outage a use-limited resource sometimes will not bid in a certain hour. The resource then is not available to the energy market, and this non-availability is not captured by the current mechanism. In the future, if a use-limited resource does not provide its capacity to the energy market by providing energy bids, the availability incentive mechanism will assess the resource as not available. This rule will be implemented with an opportunity cost methodology being developed in phase two of the Commitment Cost Enhancement initiative that will allow use-limited resources greater control over the start-up and run times using economic bidding.

The ISO proposes three main design features for the new available incentive mechanism. It will:

- Calculate availability based on the resource offers into the energy market,
- Assess this bid-based availability against a fixed allowed availability percentage threshold where resources that perform under the availability threshold will be charged a penalty, and resources that perform over the availability threshold will be paid, and
- Enhance the calculation of availability charges and incentive payments using a new availability incentive price of \$3.79/kW-month, to more equitably reflect monthly resource availability across resources. This involves decreasing capacity exemptions from the availability mechanism and accounting for differences in the number of days the RA capacity was provided to the ISO.

The ISO will have a two month advisory period for the availability incentive mechanism that will begin with the implementation date. This will allow time for market participants and the ISO to make any final adjustments needed to accommodate the new mechanism.

In **Part 3**, the ISO addresses needed changes to the ISO's RA process and outage rules-substitution rules for forced outages and replacement rules for planned outages. The goal of the new policy is to (1) enhance reliability by aligning the ISO's need for high quality resources with market participants incentives to provide RA capacity, (2) simplify the current design to increase transparency and decrease transaction costs, and (3) build a platform to develop rules related to flexible RA resource's planned outages. The ISO proposes to implement new policies in a staged approach.

***For implementation by the 2016 RA year, the ISO proposes to:***

- Change the deadline for requesting day-ahead substitution to the ISO from 6:00 AM to 8:00 AM to allow additional time for participants to submit additional RA capacity in the instance of a forced outage.

- Allow real-time substitution for system resources and remove the rule requiring substitute resources to have a higher ramp rate than the original resource. This removes the incentive for load serving entities to hold back faster ramping resources to use if a forced outage of another resource occurs. Under the ISO's proposal, load serving entities are incented to always provide the highest quality resource on the initial RA plan.
- Develop criteria to relax the local "like for like" rules requiring substitution to occur at the same bus. This will allow additional resources that are electrically similar to provide resource adequacy capacity in real time.
- Implement substitution policy for flexible RA resources. The ISO will require substitution at the same flexible category or better must offer obligation and allow the scheduling coordinator full control over how many flexible RA MWs are substituted during an outage. There will be no check for substitution on whether the resource can meet the minimum flexible category over the entire month.
- 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.
- Allow the "release" of substitution capacity if an outage moves and the ISO therefore no longer requires the capacity.
- Expose resource adequacy capacity to the RAIM mechanism if any non-exempt outage occurs, including planned outages that have not provided required replacement, under 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 coordinating additional capacity during planned outages onto the supplier.
- Allow planned outage capacity to be "released" for the originally scheduled timeframe if an outage moves and the ISO therefore no longer requires the capacity in that timeframe.
- Use a consistent forecast and set of rules to assign replacement responsibility for all planned outages reported to the ISO.

### 3. Schedule

#### 3.1. Stakeholder engagement

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

Item	Date
Paper: Draft Final Proposal	January 22, 2015
Call: Draft Final Proposal meeting	January 29, 2015
Comments due: Draft Final Proposal comments due	February 12, 2015
Board of Governors Meeting	March 2015

#### 3.2. Coordination with CPM replacement initiative

Stakeholders have asked the ISO to identify where the CPM replacement proposal overlaps with the Reliability Services initiative proposal and their relative timing to go to the ISO BOG and FERC. The ISO will take the CPM Replacement proposal to the ISO BOG in February 2015, prior to taking the Reliability Services proposal to the ISO BOG in March. This way any dependencies in Reliability Services initiative may still be changed if the BOG changes any aspects of the CPM Replacement proposal. The ISO has identified only one dependency of the Reliability Services proposal on the CPM Replacement initiative.

The proposed timeline for the 2017 RA year depends on whether the BOG approves the proposed Competitive Solicitation Process to replace the current backstop administrative rate. To accommodate the new backstop process, the ISO must accommodate extra time in the 2017 RA proposed timeline.

#### 3.3. Schedule for FERC filing

The Reliability Services initiative and CPM Replacement will have separate FERC filings; however, the two filings will be sent to FERC together. This is because of the overlap between the two initiatives. The ISO is considering a two-staged FERC filing for the Replacement and Substitution proposal. As described in section 7, the RA process, replacement, and substitution proposal roadmap, due to contracting, and implementation requirements, the ISO proposes a staged approach to the proposed rule changes. While it therefore makes sense for all aspects of the proposal to go to the BOG at one time, the ISO is considering whether certain items should go through a separate tariff process at a later date and be included in a separate FERC filing.

# PART I: MINIMUM ELIGIBILITY CRITERIA AND MUST-OFFER RULES

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

### 4.1. Purpose

A resource must obtain a net qualifying capacity (NQC) value to qualify as a resource adequacy resource. The ISO determines the NQC based on a resource's deliverable capacity during peak periods using a resource's qualifying capacity value. Typically a local regulatory authority (LRA) establishes a methodology to determine the qualifying capacity value for resources procured by their jurisdictional LSEs. If so, the ISO will use this value in the NQC determination. However, sometimes either an LRA chooses not to develop qualifying capacity provisions 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."<sup>2</sup> In such a case, the ISO can apply default provisions and establish a qualifying capacity value to 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<sup>3</sup> and non-generator resources.<sup>4</sup> 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 believes that proxy demand resources default eligibility criteria should also be updated.

### 4.2. Issue statement

The ISO tariff provides default qualifying capacity provisions for thirteen resource classifications.<sup>5</sup> The ISO has also undertaken several initiatives to enable distributed generation facilities and energy storage resources to provide capacity to the ISO system. Specifically, the ISO has completed or is conducting the following stakeholder initiatives to enable these resources to provide capacity to the ISO system:

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<sup>2</sup> ISO tariff section 40.8

<sup>3</sup> 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.

<sup>4</sup> A non-generator resource is defined as a resource that operate as either Generation or Load and that can be dispatched to any operating level within their entire capacity range but are also constrained by a MWh limit to (1) generate Energy, (2) curtail the consumption of Energy in the case of demand response, or (3) consume Energy.

<sup>5</sup> 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.

- Deliverability for distributed generation,
- Non-generator resources in ancillary services market,
- Flexible RA criteria and must-offer obligation (FRAC MOO), 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 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 ensure that the resources given a qualifying capacity value under these provisions 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 methodology allows a resource to receive qualifying capacity and NQC values. The current stakeholder initiative will not revisit this process. Instead, it focuses 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. A distributed generation could be a solar, gas-fired resource, or storage resource. So the ISO proposes to apply the same availability and bidding criteria for a resource classification of distributed generation facilities as those applied to the same resource classification interconnected to the transmission system. 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. This requires the resource be at least 0.5 MW. However, individual distributed generation facilities smaller than 0.5 MW can be aggregated to meet the 0.5 MW minimum size requirement. All aggregated resources must be from the same resource type.

### 4.3.2. Non-generator resources

The ISO proposes to develop default qualify capacity and eligibility criteria for non-generator resources. First, as with the distributed generation facilities described above, non-generator resources must be a participating generator or a system resource. The ISO expects that non-generator resources can provide availability consistent with conventional thermal resource adequacy resources and therefore proposes no lowered minimum availability requirements such as a reduced number of hours or days the generation is available. Because the ISO can optimize a non-generator resource based on the resource's charge and discharge bids, that resource could be available to the ISO continually. Therefore a non-generator RA resource will be fully subject to RA must-offer obligation rather than have any specific default eligibility criteria.

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. This benefit is captured in the effective flexible capacity calculation, which determines the effective flexible capacity based on the entire charge and discharge range for non-regulation energy management resources. For peak requirements; however, the ISO proposes to limit the default qualifying capacity of an energy storage resource to only 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.

Because non-generator resources can perform and be available similar to conventional generation, ISO proposes to use the same default qualifying assessment period and assess the default qualifying capacity of all non-generator resources based on the output the resource can sustain over a four-hour period. The current flexible capacity counting rules recently approved by FERC<sup>6</sup> and the existing non-generator resource technical requirements for providing regulation provided in section 8.4.1.2 of the ISO tariff will not change.

The ISO is not proposing different treatment for REM and non-REM non-generator resources for default qualifying capacity provisions. In the revised straw proposal the ISO proposed default

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<sup>6</sup> The qualifying capacity provisions are designed to assess the resource output during peak hours of the day. The Effective Flexible Capacity rules are designed to measure the resource's ability to change its output over a three hour time period. Non-generator resources may provide each of these capacity values very differently due to the charge and discharge capabilities of the resource. As such, a non-generator resource may be able to provide more Effective Flexible Capacity than qualifying capacity.

qualifying capacity rules for REM non-generator resources based on the resource's ability to provide 15 minutes of energy while non-REM non-generator resources would be measured over four hours, but modified this proposal in the second revised straw proposal. There are two reasons the ISO's made this modification. First, treating REM and non-REM resources differently (both from each other and other resources) would be discriminatory since all resource adequacy resources are measured based on their ability to provide energy during the four peak hours, not regulation. Second, this follows the CPUC's recently released qualifying capacity provisions, detailed in the final decision in the RA proceeding (D.14-06-050). The CPUC made no distinction between an REM and non-REM non-generator resource for RA purposes.

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

In section 40.8.1.13, the ISO defines the default qualifying capacity provisions for proxy demand resource. For a proxy demand 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 and are unlikely to ensure resource adequacy. Therefore, the ISO is proposing to replace the existing proxy demand response requirements with requirements that more closely align with the existing CPUC requirements. Specifically, the ISO proposes that the minimum availability requirements be:

- Able to be dispatched for at least 24 hours per month,
- Able to be dispatched for at least three consecutive days, and
- At least four hours per dispatch.

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

#### **4.5. Default flexible qualifying capacity provisions for phase two consideration**

This section describes future work on default flexible qualifying capacity that will be taken up in more detail in phase two of this initiative. The ISO expects that the issues outlined in this section will require significant 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 longer 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. On October 16, 2014, FERC agreed that the ISO should conduct additional review regarding how rules and requirements needed to allow 15 minute intertie resources to provide flexible capacity. FERC also instructed the ISO to “assess the feasibility of permitting static import resources to provide flexible resource adequacy capacity and to include this assessment in [an] informational report.”<sup>7</sup>

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.<sup>8</sup> 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 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 ISO is seeking stakeholder input on how the ISO might assess intertie resources for flexible capacity. In comments to the second revised straw proposal, Powerex provided comments regarding the difference between the frequency of the dispatch instruction (5 minute vs. 15) and the timing of the dispatch instruction (T minus 7.5 minutes vs. T minus 37.5 minutes). While the Powerex comments provided no specific proposal about how the ISO should consider dispatch timing in its comments, the ISO believes this matter warrants additional consideration. The ISO will include dispatch timing as part of the assessment of interties to be conducted in phase two of this initiative.

The ISO will conduct additional analysis determine the minimum five-minute dispatchable resources needed to meet the five-minute net load variations. This will be based on an analysis of the difference between fifteen-minute granularity of net load variations and five-minute granularity of net load variations. It will include an evaluation of: (1) continuous ramping needs, which will inform the CAISO of how long and at what rate the system must be able to maintain a continuous ramp to meet the maximum needs; (2) load following needs; (3) ramp rate needs, which compare the load following must the 15-minute and five-minute ramp rate needs; (4) minimum load burden, which is the amount of minimum load online for the ramping needs and the impact of dispatch frequency and timing.

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<sup>7</sup> FERC Design on FRAC-MOO at paragraph 79.

<sup>8</sup> See Table 2 in the Flexible Resource Adequacy Criteria and Must-Offer Obligation revised Draft Final proposal. Available at <http://www.aiso.com/Documents/RevisedDraftFinalProposal-FlexibleRACriteriaMustOfferObligation-Clean.pdf>

#### 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 fits within the non-generator resource model. NGRs are treated as generators (with positive and negative output) and never as load. Their ability to continuously move between positive and negative output bolsters their treatment as a generator. Introducing the concept of transition times between positive and negative output weakens their treatment as a generator and makes them look like a combination of generator and load.

Pumped hydro pump storage is an example of a storage resource that does not fit into the ISO NGR model. The ISO's pumped hydro storage model treats the resource as two resources (load and generation). While this model works reasonably well to ensure the resource can charge for peak load, it is not clear that such a model is well suited for addressing the CAISO's need for five-minute dispatchability or transitioning from charge to discharge during peak net load ramping hours. Further, the CAISO's NGR model efficiently manages flexible capacity between the charge and discharge capabilities of a storage resource, with both states being dispatchable every five minutes. The NGR model, however, does not allow for a transition time. Currently, the resources with transition times would fall under the pumped hydro model. The pumped hydro model, unlike the NGR model, is not five-minute dispatchable for the pumping portion of the resource and lacks detail regarding the parameters for the load component of the resource (i.e. start-up time, ramp rates) that are present in the NGR mode.

The CAISO does not currently have a resource model that can manage an energy storage resource with a transition time like pumping load. The CAISO may need to design a new product that would likely pull various aspects from the existing models for NGR, pumped hydro, and multistage generation resources. This is a reliability question. The CAISO is in the best position to assess the reliability concerns that arise from energy storage resources that do not meet the requirements of the NGR model and develop a model for treatment as flexible capacity.

The CAISO's NGR tool is ideally designed to address flexible capacity from the storage portion of energy storage resources. The continuous transition between charge and discharge allows for a smooth transition of the energy storage resource during peak net load ramping hours (i.e., from the belly of the duck to the neck) and managing shorter duration flexibility needs. It is not clear that the same can be said for the ISO's pump hydro model. The reliability impact of a transition time for energy storage resources for flexible capacity, regardless of duration, is unclear.

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

CPUC's maximum cumulative capacity buckets (MCC buckets) are an 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<sup>9</sup>

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](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 cause 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.<sup>10</sup>

The first step of this reassessment will be to collect information.<sup>11</sup> 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.

<sup>9</sup> *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>

<sup>10</sup> 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.

<sup>11</sup> 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.

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 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 collect subset of hours contract information, which will help the ISO determine how these contracts align with the ISO's needs.

#### 4.6. MSS Load Following Flexible Capacity Requirements

In the FRAC MOO stakeholder initiative the ISO proposed the MSS load-following LSEs should not be required to provide the ISO with monthly or annual flexible capacity showings. This proposal was based on the presumption that the MSS load-following LSEs had to manage all of their own variability, including the variability of wind and solar resources on their MSS resource portfolio.

An MSS load following LSE must 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, nothing in the ISO tariff requires an MSS load-following LSE to include all of its contracted wind and solar resources in its portfolio of resources. 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.

In the FRAC MOO initiative, the ISO established a methodology for allocating an LRA's contribution to the ISO's flexible capacity need. With a minor modification, the ISO proposes to utilize this methodology for variable energy resources contracted with MSS load following LSEs. Specifically, the proposed FRAC MOO allocation methodology to an LRA was done as follows:

$$\text{Contribution} = \Delta \text{ Load} - \Delta \text{ Wind Output} - \Delta \text{ Solar PV} - \Delta \text{ Solar Thermal}^{12}$$

Because MSS load following resources must follow their load already, the  $\Delta$  Load component of this formula is not needed for calculating its contribution to flexible capacity needs. Further, any changes in output from variable energy resources on the MSS resource portfolio must also be compensated for through other resources. ISO will remove these factors from the MSS load following LSE's contribution to the flexible need. Therefore, an MSS load following LSE's contribution to the maximum three hour net load ramp would be calculated as:

$$\text{MSS Contribution} = - \Delta \text{ Wind Output}^* - \Delta \text{ Solar PV}^* - \Delta \text{ Solar Thermal}^*$$

Where:

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<sup>12</sup> The ISO's [FRAC-MOO Revised Draft Final Proposal](#), at p. 20.

- 1)  $\Delta$  Wind Output\* – LRA's average percent contribution to changes in wind output *from wind resources not included in the MSS load following LSE's resource portfolio* during the five greatest forecasted 3-hour net load changes x ISO total change in wind output during the largest 3-hour net load change
- 2)  $\Delta$  Solar PV\* – LRA's average percent contribution to changes in solar PV output *from Solar PV resources not included in the MSS load following LSE's resource portfolio* during the five greatest forecasted 3-hour net load changes x total change in solar PV output during the largest 3-hour net load change
- 3)  $\Delta$  Solar Thermal\* – LRA's average percent contribution to changes in solar thermal output *from solar thermal resources not included in the MSS load following LSE's resource portfolio* during the five greatest forecasted 3-hour net load changes x total change in solar thermal output during the largest 3-hour net load change

While the ISO will calculate an MSS load-following LSE's contribution to the three hour net load ramp using only the resources not on the resource portfolio, the MSS load following LSE must submit to the ISO, as part of the annual flexible capacity needs assessment, a list of all wind and solar resource under contract to the LSE. The MSS load-following LSE can, as part of this data submission, designate resources that will be on its MSS resource portfolio. The ISO as part of the FRAC-MOO FERC filing stated that it will not rerun the annual flexible capacity needs assessment after May 1 each year. However, an MSS load following LSE's resource portfolio is not due to the ISO until October 31. It is possible that wind and solar resources designated as being part of the MSS resource portfolio during the study may not be on the final resource portfolio for a given RA month. The ISO cannot rerun the flexible capacity needs assessment at the time to determine the impact this deviation might have on the need for flexible capacity. Therefore, the ISO proposes that MSS load-following LSE provide an additional MW of flexible capacity for each MW of capacity from variable energy resources that was supposed to be on an MSS resource portfolio but was not. Based on comments provided by Six Cities, the ISO considered reducing this replacement to less than a one-for-one requirement. However, specific resources contribute differently towards the ISO's three hour net load ramp, even resources of a similar technology type. Therefore, using an average contribution or index may not accurately reflect the resource's impact on the three hour net load ramp. Because the ISO cannot rerun the flexible capacity needs assessment, this requirement is the only way the ISO can ensure that the deviation from the original study assumptions do not impact the adequacy of flexible capacity on the system. It would not be possible to determine if a resource contributed more flexible capacity need than the average.

Finally, the FRAC-MOO tariff filing contemplated there would be overlap between flexible capacity resources and resources used to cover contingency reserves. As such, the ISO included in the flexible capacity requirement an additional 3.5 percent expected peak load to address this overlap. As per the recently ISO's approved FRAC-MOO tariff this component of the flexible capacity need will be allocated using peak-load ratio share. It is appropriate to include this component for MSS load-following LSEs as well. However, if 3.5 percent expected peak load is greater than an MSS load following LSEs contribution to the three hour net load ramp, then it would more than compensate for the potential overlap. Therefore, the ISO

proposes to include in an MSS load following LSE the lesser of 3.5 percent expected peak load or the LSE's contribution to the three hour net load ramp. This provision ensures that the MSS load following LSE is covering any potential overlap between flexible capacity resources and resources used to provide contingency reserves without having the 3.5 percent expected peak load drive the flexible capacity requirement. If MSS load following LSE's contribution to the three hour net load ramp is less than the LSE's contribution to the 3.5 percent of expected peak load then the ISO will not reallocate the remainder of the 3.5 percent expected peak load to other LRAs or consider it while assessing the need for backstop procurement.

Therefore, an MSS load following LSE's total flexible capacity contribution, excluding any potential allocation of an adjustment factor, will be determined as

Flexible capacity contribution =  $-\Delta \text{Wind Output}^* - \Delta \text{Solar PV}^* - \Delta \text{Solar Thermal}^* + \text{Minimum [contribution to 3.5\% Expected Peak Load, } (-\Delta \text{Wind Output}^* - \Delta \text{Solar PV}^* - \Delta \text{Solar Thermal}^*)]$

The ISO specifically exempts MSS load-following LSEs monthly and annual flexible capacity RA plan requirements. These plans are covered under section 40.10.5 for non-MSS load following LSE. Once an MSS load following LSE's contribution to the flexible capacity need for resources outside of the MSS load following portfolio has been determined, it would be required to provide monthly and annual flexible capacity RA plans to show the flexible capacity it is committing to satisfy that requirement as determined herein, consistent with the provisions 40.10.5 of the ISO tariff.

## 5. ISO Review of Must-offer Obligations

### 5.1. Purpose

The ISO has reviewed 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, non-generator resources, and proxy demand resources require additional clarification.

### 5.2. Issues brief

While the must-offer obligation for most resource types appears appropriate 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, the ISO proposes that the default qualifying capacity provisions for distributed generation facilities should mirror the default provisions for similar resource classifications connected to the transmission system. The ISO proposes that the must-offer obligation of distributed generation facilities should mirror resources connected to the transmission system. 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

The ISO proposes not to include a minimum number of hours when non-generator resources must be available. However, the ISO must establish the must-offer obligation for non-generator resources. The basis for a must-offer obligation starts with a determination of whether the resource is use-limited or not. Two stakeholders have provided significant feedback on this matter. PG&E favors defining non-generator resources as use-limited, while CESA prefers a default of non-use-limited.

The ISO defines a use-limited resource as:

A resource that, due to design considerations, environmental restrictions on operations, cyclical requirements, such as the need to recharge or refill, or other non-economic reasons, is unable to operate continuously. This definition is not limited to Resource Adequacy Resources. A Use-Limited Resource that is a Resource Adequacy Resource must also meet the definition of a Resource Adequacy Resource.<sup>13</sup>

In Commitment Cost enhancement Phase 2, the ISO is adding additional clarity to this use-limited resource definition. Specifically, the ISO has proposed to enhance this definition to:

Capacity with operational limitations or restrictions established by statute, regulation, ordinance, or court order that cannot be optimized by the appropriate ISO commitment process without allowance for opportunity costs.<sup>14</sup>

Any changes to the treatment of use-limited resources rely on this new proposed definition.

The ISO can send dispatch instructions for a non-generator resource to charge or discharge based on ISO system needs. Because the ISO markets optimize the charge and discharge

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<sup>13</sup> FERC approved the ISO revised definition for use-limited resources on December 30, 2014 in the ISO's commitment cost enhancements filing (ER15-15).

<sup>14</sup> See the Commitment Cost Enhancements Phase 2 revised straw proposal at p. 8. More information is available on the commitment cost enhancements webpage.  
<http://www.caiso.com/informed/Pages/StakeholderProcesses/CommitmentCostEnhancementsPhase2.aspx>

states of the resource based on market conditions, there is not a “cyclical requirement” that limits the resource either. All charging and discharging needs are optimized through the ISO market. A non-generator resource that is fully discharged (charged) and unable to provide upward (downward) regulation because of ISO dispatch instructions does not differ from a conventional resource that cannot 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, there does not appear to be inherent operational or environmental limits to justify the ISO classifying a non-generator resource as a use-limited resource by definition. Therefore, the ISO proposes that a non-generator resource be classified as non-use-limited, unless it applies for use-limited resource status demonstrating the resource’s limitations meet the ISO’s definition of use-limited resources. If the limitations meet the ISO’s definition, then the ISO would approve the resource as use-limited.<sup>15</sup>

Typically, a non-use-limited resource would be subject to bid insertion provisions if the resource submitted no bid. In the second revised straw proposal, the ISO proposed to use a NGR’s default energy bid for bid insertion. However, after further review, the ISO determined that the default energy bid, regardless of how it was established, is not appropriate for NGRs. At this time, the ISO proposes to exempt NGR resources from bid insertion provisions.<sup>16</sup> There is current no way to determine the best way to determine a rule for determining bid insertion rules for NGR resources. Further, there is still a significant need to understand the bidding and operational challenges associated with NGR resources. Therefore, the ISO will continue to monitor NGR bidding performance and the need to develop bid insertion rules.

## 5.5. Proxy Demand Resources

There are no tariff provisions exempting PDR from the standard RA requirements for Residual Unit Commitment (RUC) participation. Therefore, any PDR RA resource that bids into the day-ahead market must also provide that capacity in the RUC process. The ISO proposes to loosen this requirement as a first step to fully integrate PDR resources into the RUC.

At a high level, the purpose of RUC is to ensure there is sufficient capacity online to meet the CAISO Forecast of CAISO Demand (CFCD), unlike the day-ahead market that clears only to bid-in demand. This process is vital to ensure the reliability of the grid. The RUC process works by first taking all day-ahead schedules and comparing it to the CFCD. If additional capacity is still needed, RUC will then take all remaining RA capacity from resources committed in the day-ahead. This is because RA capacity is “free” to the RUC process. If this still is not sufficient to meet the CFCD, then RUC will begin committing additional resources and taking non-RA energy that has a bid into RUC based on cost minimization strategy to meet the CFCD. The

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<sup>15</sup> See the ISO [Second Revised Straw Proposal](#) in the Commitment Cost Enhancement, Phase 2 for additional detail regarding the treatment of non-generator resources and use-limited status.

<sup>16</sup> This does not apply to storage resources such as participating load or pumped storage (and are already deemed use-limited).

consequence is that in some circumstances RUC will send binding commitments to long-start resources that cannot be started up by the real-time market.

RA proxy demand resources that do not have a minimum load cost or start-up cost will look “free” to the RUC process. This is because all RA capacity is inserted into RUC at \$0. If a PRD needs to notify its customers more than 5 hours in advance, it cannot be “started up” in real-time and is the equivalent of a long-start thermal resource. If a long-start PDR receives a RUC award, then it will receive a binding RUC dispatch instruction. This will use up proxy demand resource’s starts quickly within a month due to frequent, subsequent binding RUC commitments. In real-time the resource is unlikely to be the economic choice once energy bids are considered and therefore if a long-start PDR resource participated in RUC, RUC would deplete the resource’s limited dispatches sub-optimally.

Short- and medium- start PDRs do not have this same issue. These resources can notify customers in the real-time and therefore will not receive a binding RUC commitment. Instead, any RUC schedule for these resources will be advisory. An advisory dispatch is for informational purposes only and therefore will not sub-optimally use up PDR starts. Therefore the ISO proposes to maintain the status quo for these resources and maintain the requirement to participate in RUC.

## 5.6. Changes to existing must-offer rules to accommodate updated use-limited definition

The Commitment Costs Enhancements phase 2 initiative is redefining the definition of use-limited resources.<sup>17</sup> The ISO proposes new policy rules for RA resources to account for the use-limited definition. These rules will not change the underlying current policy, but simply accommodate a new use-limited definition. Certain RA rules depend on the use-limited definition:

- Residual unit commitment (RUC) participation (tariff section 40.6.4.3.2) mandates that the ISO will not insert a \$0 RUC bid or require participation by hydro, pumping load, and non-dispatchable, use-limited resources
- Energy and ancillary service bid insertion rules (tariff section 40.6.8) mandate that the ISO will not insert any bid into the energy or ancillary service market for an RA resource that is use-limited.

The ISO proposes to revise these definitions to maintain exemptions for resources previously exempt under the previous use-limited definition, but will no longer be exempt after implementation of the new policy. The ISO may revisit whether these exemptions are appropriate in phase II of the RSI; however, at this time the ISO cannot easily accommodate

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<sup>17</sup> More information is available on the commitment cost enhancements webpage. <http://www.caiso.com/informed/Pages/StakeholderProcesses/CommitmentCostEnhancementsPhase2.aspx>

new rules for the many various resource types subject to generating bid and RUC rules without these changes.

For example, solar and wind resources are unlikely to be use-limited resources under the new definition. Therefore under the current generated bid and RUC rules the ISO must generate a bid price based on cost assumptions for solar and wind resources. The ISO has no cost-based price for these resources. While it may be appropriate for this to be developed, at this time the ISO proposes to maintain the status quo RA policy.

Therefore, besides use-limited resources and the NGR exemptions, the ISO proposes to exempt regulatory must-take, and variable energy resources from generated bid rules. And in addition to hydro, pumping load, and non-dispatchable, use-limited resources, the ISO proposes to also exempt QFs and regulatory must-take resources from RUC insertion. If these RA resources choose to participate in RUC, they still must participate and be paid consistent with other RA resources.

## 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. RA capacity has a must-offer obligation in the ISO energy markets, which is essential to maintain grid reliability. The ISO provides incentives beyond energy market revenues for RA capacity to participate in the energy market and meet a resource-specific must-offer obligation. This is done through an availability incentive mechanism that pays capacity for availability and charges capacity for non-availability. The availability incentive mechanism increases reliability through rewarding high performing resources and penalizing low performing resources, reducing potential gaming, and increasing the standardization of RA contracts.

### 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.<sup>18</sup> The ISO cannot fully capture use-limited resource availability with the current mechanism, and does not consider flexible RA at any level. In August 2014, FERC approved a flexible RA requirement, compliance categories, and associated must-offers for the 2015 RA compliance year. The initiative process will address development of a flexible RA availability mechanism and price and review the incentive mechanism. The current availability price for RA resources is the CPM price, which expires February 16, 2016.

To integrate the flexible capacity requirement, the ISO proposes a new availability incentive mechanism that will address the following issues<sup>19</sup>:

- The significant number and capacity of RA resources not subject to the current availability incentive mechanism due to exemptions in the tariff (40.9.2),
- The significant number and capacity of RA resources that are use-limited and therefore not fully subject to the current forced outage method of calculating availability due to less

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<sup>18</sup> Working group presentation beginning on slide 37: [http://www.aiso.com/Documents/Presentation-ReliabilityServices-WorkingGroupApr23\\_2014.pdf](http://www.aiso.com/Documents/Presentation-ReliabilityServices-WorkingGroupApr23_2014.pdf)

<sup>19</sup> For additional information on the issues please read the issue paper: <http://www.aiso.com/Documents/IssuePaper-ReliabilityServices.pdf> and working group presentation beginning on slide 37: [http://www.aiso.com/Documents/Presentation-ReliabilityServices-WorkingGroupApr23\\_2014.pdf](http://www.aiso.com/Documents/Presentation-ReliabilityServices-WorkingGroupApr23_2014.pdf)

restrictive outage requirements and exemption from the bid insertion rules that apply exclusively to use-limited resources,

- Enhancement of the availability incentive mechanism 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 to replace the CPM Procurement Mechanism price that expires on February 16<sup>th</sup>, 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 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 over 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 (\$5.91/kW-month), 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 23<sup>rd</sup> working group presentation.<sup>20</sup>

### 6.4. Summary of proposed design

The ISO proposes to use a portion of the current SCP incentive mechanism design in creating 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 during assessment hours.<sup>21</sup>

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

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<sup>20</sup> ibid

<sup>21</sup> System and local resources may self-schedule, whereas flexible RA resources and Proxy Demand Resources must economically bid into the energy market.

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. There will only be one availability price for RA capacity, with the exception that any RA capacity that is also CPM capacity will have a different price for the CPM RA MWs. The CPM capacity price is discussed further in section 6.8.

The ISO will calculate a monthly MW availability incentive range specific for the resource, based on the standard availability incentive percentage range. Any capacity that falls below the standard availability incentive percentage range will be charged the incentive price. The incentive mechanism will be self-funding so available capacity above the standard percentage range will be 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 roll over into the following month's payment pool. Any excess funds in the pool at the end of the year will be allocated to load. Because of the roll over account, all settlement statements will be final at the T+55 statement.

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 the flexible RA obligation that requires an economic offer into the energy market. It will also better calculate availability for use-limited resources.
- Second, the ISO will assess a resource's availability 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 for the ISO 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 non-CPM 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 and that a resource's availability should reflect the resource's overall contribution to grid reliability.

The ISO will have a two month advisory period for the availability incentive mechanism that will begin with the implementation date. This will allow time for market participants and the ISO to make any final adjustments needed to accommodate the new mechanism.

## 6.5. Bid-based availability assessment methodology

The availability assessment is how the ISO determines whether a resource is providing itself 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 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 availability meant '*not on forced outage*', availability is redefined to mean '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 because use-limited resources only have the requirement to bid according to their use-plan. This does not require bidding in every hour and so it is difficult for the ISO to track legitimate non-bidding and what is inappropriate non-bidding. A bid-based metric will allow the ISO to calculate availability for these resources using the same process as non-use-limited resources, promoting more consistent treatment among 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 cannot verify that flexible resources are in fact providing flexibility to the energy markets.

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

## 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<sup>22</sup> 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 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 6.6.

### ***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,

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<sup>22</sup> "Overlap" refers to the event where a single MW is both counted as flexible and generic resource adequacy capacity.

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 availability assessment (evaluated each day) 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*.

## 6.6. 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 must 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.

The ISO proposes that each resource only has a single flexible must-offer obligation for the availability assessment. A resource may be shown in multiple categories, but the availability assessment on all the resource's RA capacity will be equal to the highest quality category shown. This policy reduces implementation complexity and recognizes that flexible categories were created to allow different resources to participate as flexible requirements, not to reduce the obligation of resources fully capable of meeting the higher must-offer obligation.

For showing purposes a resource may be shown in multiple categories. If an LSE has 100 MW available in category two left before hitting the maximum and only 50 MW left in category three, but has a 150 MW resource it wants to show as RA. Then 100 MW may be shown in category two, and the remaining 50 MWs may be shown in category three. This will allow LSEs to use the peak and super peak flexible categories. However, for availability assessment purposes, the resource will have all 150 MWs in category two.

This simplification is made so the ISO can assess the resource's availability. Assume that resource X has an EFC of 100MWs and was assessed in two categories- one and two – each for 50 MW, so the resource is showing a total of 100 MW. Let's assume in hour 15 on day 1 the resource was supposed to offer in 100 MW, but only offers in 50 MW and nothing else for the rest of the day. The ISO would have to assess how this 50 MW counted toward the requirement. Was it 100% of the category two requirement which is out of 5 hours, so 20% available in category two, plus 0% available in category one (0/17) or are they ~6% compliant for category one, which is out of 17 hours and 0% for category two (0/5). Whichever way the calculation is done, it would lead the ISO needing to track not just the MW quantity, but the MW range of flexible category. That is, resource X is flexible category two from 0 to 50 MW and category one from 50.1 MW to 100 MW. Alternatively, the ISO could pro-rate the MWs so each MW has a fraction counted toward the different category requirements by relative weights. This however has the effect of reducing transparency because getting an assessment MW value becomes a long equation. This gets increasingly complicated when factoring in substitution for forced outages and prorating of MWs if a resource has varying RA capacity over a month. The assessment calculation becomes so complicated it would be hard to validate or maintain a transparency.

Ultimately, the ISO proposes that the additional complication needed is not worth any additional benefit at this time. If an LSE wants a resource to be shown in category one and category two, it can show the resource entirely under category two and bid to the higher category requirement when able. If there is a time when the categories are closer to reaching their maximums, the ISO would consider enhancing the RAIM to allow assessment in multiple categories, but at this time the maximum capacity allowed in category two and three are not causing a need for a resource to be shown in multiple categories for operational reasons.

### ***Proposed availability assessment hours***

Flexible capacity will be assessed during the hours determined by the resource's flexible category. RA resources that fulfill their must-offer requirement in *either* the day-ahead or real-

time market will only have hours assessed under the availability incentive mechanism rules in that market.

### ***Proposed availability assessment methodology***

The flexible assessment methodology will be the same as the methodology for generic capacity. 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. If the availability was the same in the day-ahead and real-time, the ISO will use the real-time availability, even if the real-time and day-ahead capacity obligation is different.

A monthly availability allows a resource to be above or below the standard percentage without incurring a charge or payment. Only if the resource's monthly MW-weighted average percentage fell above or below the standard percentage would it incur a charge or payment.

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 the shown RA capacity. For flexible capacity, however, the ISO must check if 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 because Pmin capacity may or may not count as flexible RA, as discussed below.

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

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 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 its full EFC value if the 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.

### ***Overlapping 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 its 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.<sup>23</sup> The ISO proposes to assess

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<sup>23</sup> 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.

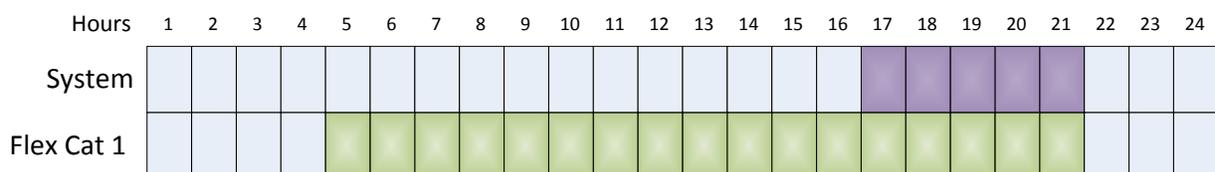
availability all within a single assessment and price. The overlapping concepts and assessment proposal are discussed in the following subsections.

**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. At 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**

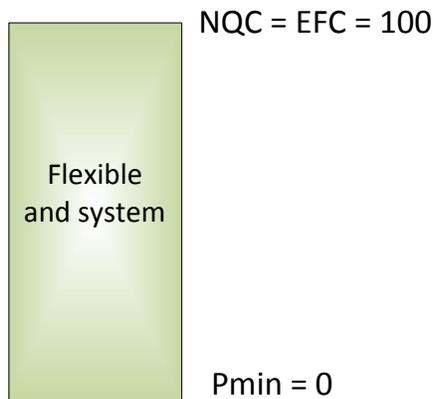
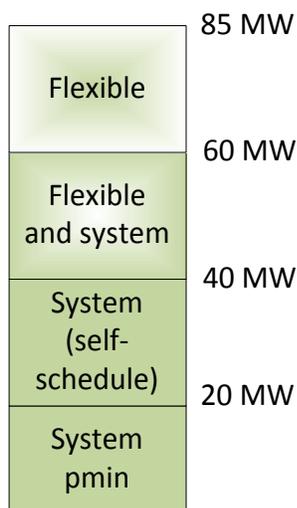


Figure 4 illustrates a slightly more complicated example of overlapping capacity. The resource has a minimum load equal to 20 MW and because the start-up time is greater than 90 minutes, none of the Pmin capacity counts as flexible RA capacity. Therefore the NQC is equal to 85 MW, but the EFC is equal 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**



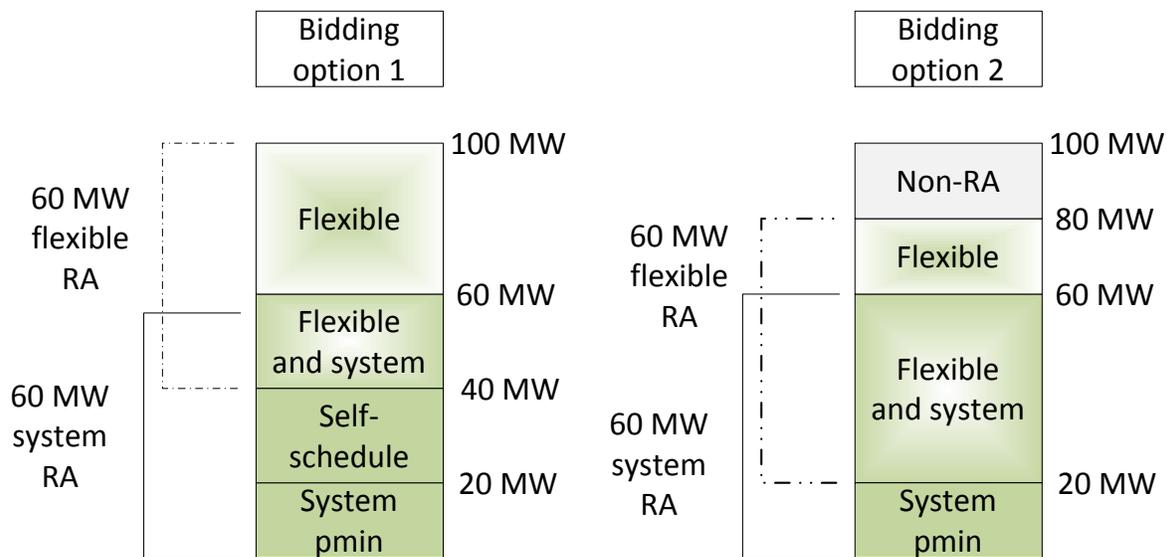
To complicate matters further, based on how the resource is bid into the energy market, the overlapping flexible and system portions can increase or decrease. Figure 5 illustrates how a single resource can be bid into the energy market in different ways to meet their system and

flexible capacity requirement. Based on how the resource is bid in, the resource may have 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 20 MW 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: Varying overlapping capacity example



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.

### **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 both 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 for overlapping capacity. 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 single MW could be both paid and penalized under the availability metric if a resource self-scheduled in any overlapping capacity. The double assessment also could lead to a double penalty during forced outages.

Alternatively, 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. These assessments could be combined under one price or evaluated completely separately using two prices as well.

In the interest of (1) not introducing further complexity into an already complex system, (2) limiting the potential for double penalties, and (3) maintaining incentives for flexible RA to provide economic bids, 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 MW's highest obligation. Therefore, if an overlap occurs, 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 over-generation caused by self-scheduling during periods of high renewable output. Appendix B further describes why the ISO does not propose to move toward an availability incentive metric that evaluates flexible and system capacity separately.

If generic and flexible capacity overlap, 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.

The ISO will use the following formula to calculate hourly availability. The formula can be used if a resource has overlapping RA commitments or flexible RA or generic RA. It determines the hourly MW availability value that will be used in the availability incentive assessment (section 6.9).

Hourly MW availability value:

- 1)  $\{ \text{Min}(\text{economic bid} + \text{eligible Pmin}, \text{flexible RA showing}) + \text{Min} \{ \text{Max generic incentive}, \text{Max}(0, \text{Total bid} - \text{flexible RA showing}) \} / \text{Total RA requirement}$ ,  
where:

- a.  $\text{Total bid} = \text{self-schedule} + \text{economic bid} + \text{Pmin}$
- b.  $\text{Total RA requirement} = \text{Max}(\text{committed flexible RA}, \text{committed generic RA})$
- c.  $\text{Max generic incentive} = \text{Max}(0, \text{committed generic RA} - \text{committed flexible RA})$
- d. Economic bid is the market bid set, i.e. the clean bid set with outages
- e. Eligible Pmin is the Pmin eligible to count toward the flexible requirement.

Committed RA is the amount of RA committed to the ISO by either being shown on a monthly RA plan or being designated to account for forced and/or planned outages minus any exempt outage capacity. Non-exempt outage capacity is still considered committed RA until substitute or replacement capacity is provided.

Using this formula in an example, suppose 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 resource has a Pmin = 0 MW. The ISO will do the following calculation:

- Economic bid = 10 MW
- Eligible Pmin = 0 MW
- Flexible RA showing = 70 MW
- Max generic incentive =  $\text{Max}(0, 100 \text{ MW} - 70 \text{ MW}) = 30 \text{ MW}$
- Total bid =  $90 \text{ MW} + 10 \text{ MW} + 0 \text{ MW} = 100 \text{ MW}$
- Total RA requirement =  $\text{Maximum}(\text{flexible requirement}, \text{generic requirement}) = 100 \text{ MW}$

In this hour, therefore, the resource's total availability is:

$\text{Min}(10 \text{ MW}, 70 \text{ MW}) + \text{Min}(30 \text{ MW}, (\text{Max}(0, 30 \text{ MW}))) / 100 \text{ MW}$ , which equals

$10 \text{ MW} + 30 \text{ MW} / 100 \text{ MW}$ , which equals:  $40 \text{ MW} / 100 \text{ MW}$  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.

In the circumstance where a resource provides flexible and generic RA capacity in a month, but does not provide both for the full month, the ISO will prorate the average MW value by the

number of days RA was provided against the total number of days that could have been provided, weighted by the difference in average daily flexible RA and generic RA committed.

## 6.7. 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 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 need not reflect this in availability standard. The ISO proposes to move from an availability incentive standard percentage 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 well-performing 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 three times the availability incentive mechanism price.

***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	
	<i>Lower bound</i>	<i>Upper bound</i>		<i>Lower bound</i>	<i>Upper bound</i>
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%. Resources within this band will neither be charged nor paid an availability incentive payment. 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.*) The Resource Adequacy requirement for load serving entities is adjusted each month based on 115% of the monthly load forecast, therefore, the percentage availability should remain constant each month as any adjust to needs is already done so in the RA requirement.

**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%	<b>97.6%</b>
Feb	97.0%	97.7%	97.8%	98.0%	<b>97.6%</b>
Mar	96.8%	97.0%	95.7%	96.0%	<b>96.4%</b>
Apr	96.2%	95.8%	95.4%	95.0%	<b>95.6%</b>
May	95.3%	94.9%	94.0%	95.0%	<b>94.8%</b>
Jun	96.3%	96.3%	96.6%	97.0%	<b>96.6%</b>
Jul	96.9%	96.6%	96.0%	96.0%	<b>96.3%</b>
Aug	95.1%	95.3%	96.8%	96.0%	<b>95.8%</b>
Sep	95.9%	95.5%	95.8%	96.0%	<b>95.8%</b>
Oct	95.3%	96.3%	97.2%	98.0%	<b>96.7%</b>
Nov	95.9%	96.1%	97.1%	96.0%	<b>96.3%</b>
Dec	97.4%	97.8%	97.7%	98.0%	<b>97.7%</b>
<b>Average</b>	<b>96.3%</b>	<b>96.4%</b>	<b>96.4%</b>	<b>96.6%</b>	<b>96.4%</b>

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. The ISO proposes to review these percentages periodically over time and if under the new availability metric the annual average availability standard percentage departs from the 96.5% proposal by more than a percentage point, will report findings to stakeholders along with an explanation of why or why not the availability target should be adjusted.

## 6.8. Availability incentive price

The ISO proposes to use only a single availability incentive price and not have separate 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 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 have sufficient, easily accessible information -- essentially specific bilateral contract information for each resource -- 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 thought there would be a premium on flexible resource adequacy capacity. While this may be the case, it has not been demonstrated. Also, 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 systematic and transparent premium. Given this uncertainty, the ISO proposes to maintain the current structure of a single availability price for all RA types.<sup>24</sup> 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 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 \$3.79/kW-month as the availability incentive mechanism price. This is 60% of the proposed CPM offer cap price.<sup>25</sup> This price reflects current RA bilateral market contract prices as illustrated in the CPUC 2012 RA Report.<sup>26</sup> 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 significantly higher than the value needed to incent resource performance.

The ISO therefore proposes a \$3.79 / kW-month (\$45.48 / kW-year) 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. An above average incentive price strikes an appropriate balance.

Because the RAIM price is tied to the CPM offer cap, the ISO will reevaluate the RAIM price during the offer cap review that will happen no less than every four years. The ISO will benchmark the RAIM price to available data on bilateral market transactions. If there is a

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<sup>24</sup> Currently the ISO has a single price for both local and system availability, despite an established capacity price premium for certain local areas.

<sup>25</sup>

<http://www.caiso.com/informed/Pages/StakeholderProcesses/CapacityProcurementMechanismReplacement.aspx>

<sup>26</sup> <http://www.cpuc.ca.gov/NR/rdonlyres/94E0D083-C122-4C43-A2D2-B122D7D48DDD/0/2012RARReportFinal.pdf>

significant shift in RA market prices, the ISO will include changing the RAAIM price in a stakeholder initiative.

Capacity under a CPM designation will have a different RAAIM price than non-CPM committed RA capacity. The CPM capacity RAAIM price will be the CPM price. The resource will have a single availability percentage. If a resource has both CPM capacity and non-CPM RA capacity, any availability penalties will be pro-rated based on the relative CPM MW value and non-CPM RA MW value.

The ISO proposes to cap the availability incentive mechanism payment for all RA capacity, including CPM RA capacity, at three times the availability incentive mechanism price. This follows the current tariff. 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.

### **6.9. Availability incentive assessment**

The ISO will assess availability each month only during availability incentive hours. If the resource is on an outage and has provided substitute or replacement capacity, the obligation on the resource on outage will transfer to the substitute or replacement capacity resource up to the MW amount provided. For non-exempt capacity, the ISO will compare all applicable bids during availability assessment hours against the expected RA incentive capacity value. This value will be based on a resource-specific capacity eligibility calculation that takes in account shown RA quantities, resource-specific rules, and exempt outages. The ISO will sum all hourly RA obligation hours across the month and divide this by the total number of assessment hours in the month. The total number of assessment hours is determined by generic and flexible RA committed during the month. In the circumstance where a resource provides flexible and generic RA capacity in a month, but does not provide both for the full month, the ISO will prorate the average monthly MW value by the number of days RA was provided against the total number of days that could have been provided, weighted by the difference in average daily flexible RA and generic RA committed. This allows a resource to provide a single day of flexible RA capacity without it affecting the average monthly MW value used in the availability incentive assessment as if flexible RA was provided equally to generic RA.

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 \$3.79/kW\*1,000.
- 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*<sup>27</sup>. This model was updated on December 12, 2014.

The ISO will provide market participants with enough resource specific data to validate all availability charges and payments.

## 6.10. 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 removed 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,
- RTU/RIG,

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<sup>27</sup> The model can be found here: <http://www.caiso.com/Documents/RAAIMIncentiveCalculationModel.xls>

- ICCP,
- AVR/Exciter
- Transmission induced outage, and
- Use-limit reached.

The ISO proposes to include an additional category that would also be exempt:

- Short-term use-limit reached.

The short-term use-limit reached category would capture short term use-limitations that cannot be accounted for in the market optimization or opportunity cost methodology. For example, Proxy Demand Response resources' use-limitations are not for the remainder of the month, but allowed for under the must-offer rules. Proxy Demand Response is further discussed in Section 6.12. Additionally, the ISO expects that resources that qualify as super-peak flexible RA resources may use the short-term use-limit reached outage consistent with their use plans.

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 on an outage is not eligible as substitute (or replacement) capacity.

RA capacity on outage due to lack of fuel is not except from the availability incentive mechanism and should note the reason for being out on a forced outage is due to fuel unavailability.

### **6.11. Use-limited resources and the availability incentive mechanism**

Use-limited resources can have daily, monthly, or annual limitations.<sup>28</sup> Daily limitations (*e.g.* minimum run times, output levels, etc.) that can be accounted for in the optimization should not necessitate special treatment under the availability incentive mechanism. On the other hand, the ISO's market optimization cannot account for certain other limitations that are constrained over a longer than 24 hour time period. These limitations often create a situation where a scheduling coordinator must take action counter to the must-offer obligation in order to ensure an optimal dispatch. For example, a resource with a limited number of monthly starts may not offer into the energy market to preserve the start capability for a forecasted higher priced interval. Under the availability incentive mechanism, this resource would be penalized for this behavior despite the behavior leading to a more efficient market outcome. To address this deficiency, the ISO proposes to enhance the energy market optimization and rules where possible and exempt the use-limited capacity from the availability incentive mechanism where energy market changes are not sufficient.

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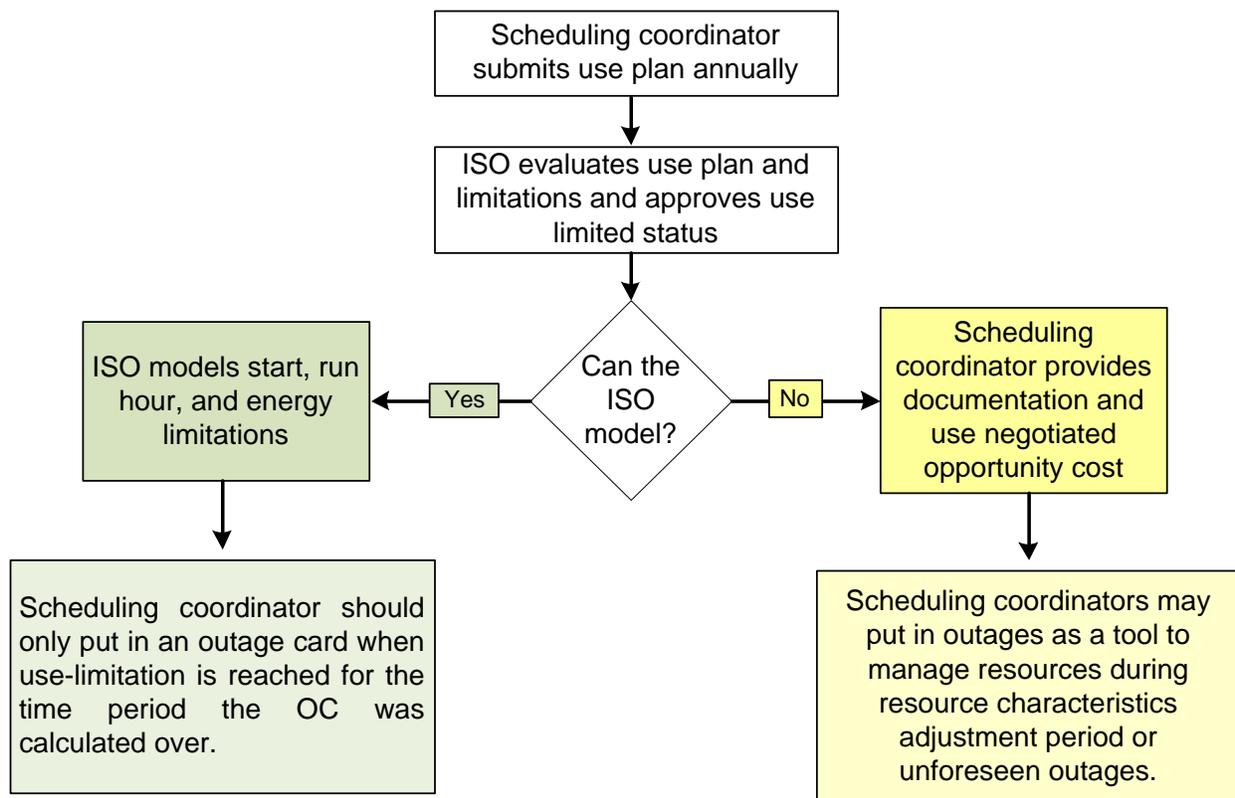
<sup>28</sup> The use-limited definition is being revised in the upcoming phase two of the Commitment Cost Enhancement initiative.

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.<sup>29</sup> The opportunity cost functionality will be implemented prior to or at the same time the availability incentive mechanism becomes effective.

RA resources that have monthly use-limitations will have the following exemptions:

- If the resource has an ISO calculable opportunity cost in their minimum load, start-up, or default energy bid costs, the ISO will allow the resource to be exempted from the availability incentive mechanism once its use-limitation is reached in that month and the resource has put in the appropriate outage card. The ISO will not allow resources with a calculable opportunity cost to submit outages to manage their resource limitations.
- If the ISO determines the resource has non-calculable “negotiated” opportunity cost, then a resource will be allowed to manage its use-limitation with outage cards and be exempted for the availability incentive mechanism during these outage periods.

**Figure 8: Use-limited resources outage management tools and exemptions from availability incentive mechanism**



<sup>29</sup> <http://www.caiso.com/informed/Pages/StakeholderProcesses/CommitmentCostEnhancements.aspx>

## 6.12. Proxy Demand Response (PDR)

Like traditional resources, PDR that is also an RA resource must offer into the energy market during relevant must-offer hours for the associated RA type (generic or flexible). However, PDR resources have the following additional rules.

- Must be available for at least three consecutive days, and
- Must be able to be dispatched for at least 24 hours a month.

Therefore, in order for PDR to be treated equally under the availability incentive mechanism, the ISO must manage the periods in which PDR is evaluated in accordance with these rules. The ISO will allow a PDR resource to manage its use-limitations through a new outage nature of work category, "Short-term use-limit reached." This category will exempt PDR resources from the availability incentive mechanism for 48 hours after being dispatched for three consecutive days. This category will exempt PDR resources from the availability incentive mechanism for the remainder of the month after the resource has been dispatched for 24 hours.

If a resource has been dispatched 24 hours, but can still operate at a portion of the original RA capacity, the resource may put in a partial derate, provided the baseline for that amount has been established in advance and the derate does not cause the resource to have a total MW value of less than 500 kW.

For flexible RA, PDR can qualify as a super-peak flexible resource. This requires that the resource be available to be dispatched at least 5 days in a month and offer into the energy market for 5 hours every non-holiday, weekday. The resource may submit a short-term use-limit reached outage after the resource was dispatched for 5 days in the month (if desired) and will be exempt from the availability incentive mechanism.

PDR that is also RA will be assessed under the flexible availability incentive mechanism for all applicable hours until the resource goes on exempt outage.

## 6.13. Flexible availability calculation for wind and solar resources

The ISO will not exempt wind and solar capacity that is shown as flexible RA from the flexible incentive mechanism assessment.

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 up 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.<sup>30</sup> It would not make sense to both penalize and reward a resource for deviating above its forecast.

Under a different situation where a resource is shown on the RA monthly supply plan for an amount less than the EFC for flexible RA, so is a partial RA resource, 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.

#### **6.14. Exempt resource capacity**

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.

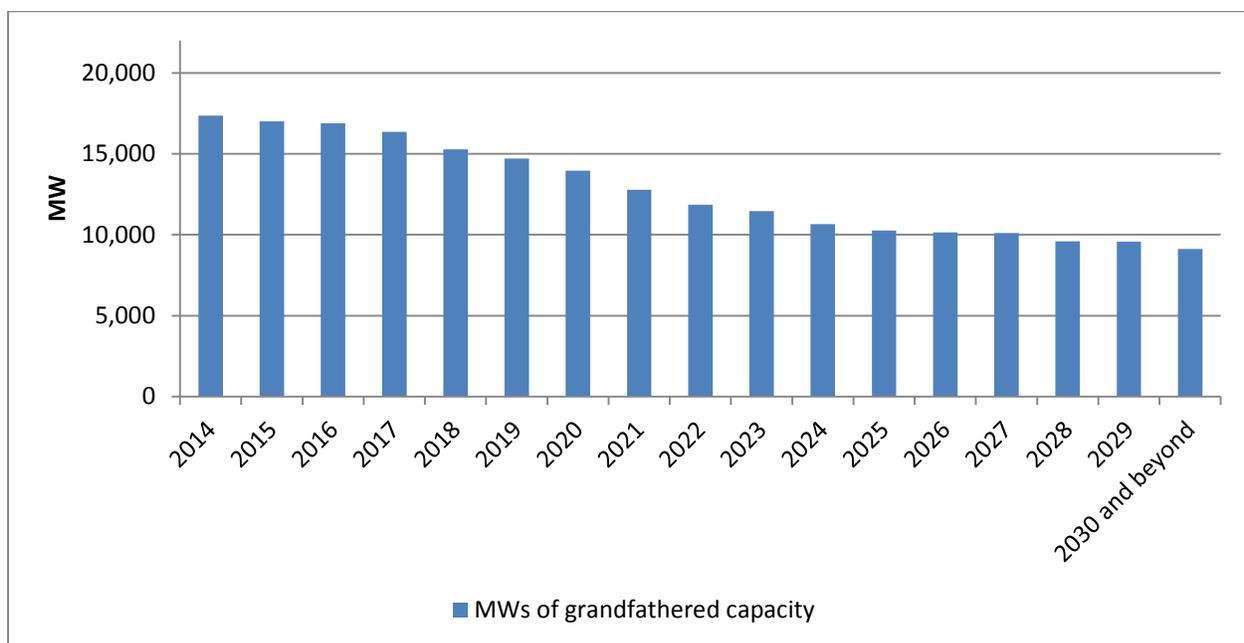
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<sup>30</sup> For example, 25% of the flexible ramping constraint is allocated to uninstructed imbalance energy.

Figure 9 shows the acquired 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, it is not 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 and have limited acquired resource provisions.

**Figure 9: Acquired capacity exempt from current Standard Capacity Product availability mechanism by year**

### 6.14.1.



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
- Load following MSS capacity for system, flexible, and local RA
- Most Qualified Facilities (QFs) as currently described in ISO tariff
- CHP resources for generic RA only
- Solar and wind resources for generic RA only
- Participating Load
- Acquired resources under specific conditions

### 6.14.2. Acquired resource rules

The ISO proposes to exempt acquired resources from the generic availability incentive mechanism under the following conditions:

- Capacity must be under a resource specific contract that existed prior to June 28<sup>th</sup>, 2009,<sup>31</sup> AND
- The scheduling coordinator for the capacity must specifically seek an exemption each year and demonstrate to the ISO that the resource's RA contract:
  - Includes penalties for nonperformance, or
  - Does not have a reopener clause due to ISO market design changes.

This demonstration must be done in advance of the annual RA showing deadline in accordance with the BPM and be recertified each year as accurate by the scheduling coordinator for the resource. While the scheduling coordinator must submit the affidavit, the affidavit may be from either the resource owner or the scheduling coordinator. After the initial affidavit is submitted, the scheduling coordinator will only have confirm each year that this affidavit is still valid and not resubmit a new affidavit. If any capacity on a resource is approved by the ISO as exempt under the acquired resource conditions, the full capacity on the resource shall be exempt from the availability incentive mechanism. These requirements will ensure both that resources are not double-penalized for non-performance and that all resources have an incentive to perform. Given the significant changes and reliability challenges that the grid will be facing, it is imperative that all resources have the proper incentives to perform to support reliable grid operations.

### 6.14.3. Wind and solar resources

If wind or solar resource is shown as system or local RA, the ISO proposes to exempt the resource from the availability incentive mechanism for two reasons. First, wind and solar resources' typically are procured under contracts that either provide payments for energy produced or have severe penalties for under-performance. In their September 5, 2014 comments LSA<sup>32</sup> stated, "...virtually all PPAs for wind/solar resources provide payments only for energy produced, i.e., there is no capacity payment and all PPA revenues are completely dependent on maximum equipment availability and production. Moreover, these PPA contain multipliers that provide for higher payments (and thus even greater availability/production incentives) during hours that are designed to be highly correlated with system needs."

Additionally, the ISO has reviewed the recent drafts of the Investor Owned Utilities' 2014 pro forma contracts for renewables awaiting approval by the CPUC. The ISO's understanding of at least some of these contracts is that they have provisions for non-performance. Given that these contracts are specific to wind and solar and are extremely standardized (unlike contracts for

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<sup>31</sup> Specifically, the conditions to meet the current tariff section 40.9.2 subsection 2.

<sup>32</sup> <http://www.caiso.com/Documents/LSAComments-ReliabilityServices-RevisedStrawProposal.pdf>

other resource types) the ISO potentially would be double-penalizing renewables for non-performance without this exemption.

Second, and more importantly, the only way to assess wind and solar under the proposed methodology is to use the resource's 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 would be taking away payments from resources that are in fact performing up to their RA amount. In other words, absent the exemption, these resources could be rewarded for performing less than other resources. Additionally wind and solar resources could provide their own forecast and always slightly under forecast their output in order to ensure full availability payments. The ISO's proposal strengthens the incentives for resources that are most likely to respond to ISO performance payments.

#### **6.14.4. Combined Heat and Power**

Somewhat 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 and CHP contracts typically have penalties for non-performance already in place. Therefore, these resources already have an incentive to perform and would be double penalized under the availability incentive mechanism. A penalty would first come in form of a penalty by the ISO, and then second by having a lowered amount of capacity available to sell in some cases or in other circumstances have contract penalties.

#### **6.14.5. Participating Load that is also pumping load**

Participating load that is also pumping load will be exempt from the availability incentive mechanism due to their unique must-offer requirement that requires real-time energy offers only if the resource receives a DA AS schedule. This cannot be accommodated in the availability incentive mechanism framework.

### **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 three times availability incentive price (proposed at \$3.79/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 3: RA PROCESS, REPLACEMENT, AND SUBSTITUTION

## 7. RA process, 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 as the ISO is considering provisions to simplify and increase the transparency of replacement and substitution rules, the ISO will also clarify outages terms and reliability needs instead of relying on unnecessary compartmentalization of the 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 created 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 proposed flexible replacement requirements within this initiative, the market design must likely 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 market design proposal 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 ISO anticipates that there will need to be significant revisions to the current policy in order to implement the additional flexible RA component. These 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 the 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 10 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 10: 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 (Q1 2015 BOG)	Planned outages	N/A	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 (Q1 2016 BOG)	Planned outages	N/A	Any additional changes in advance of implementing updated flexible RA requirements and associated outage rules, potentially intertie rules for outage replacement	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 flexible planned outages policies that will be discussed in phase two. 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 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 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.<sup>33</sup> 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.

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<sup>33</sup> 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.

### 8.3. Proposed rule changes

In the Revised Straw Proposal, the ISO proposed that in order to address the time gap between flexible RA requirements and the implementation of rules related to flexible RA planned outages, the ISO would impose minor limitations on system replacement for planned outages. These limitations would restrict the replacement by use-limitation and dispatchability. In response to this proposal, many stakeholders pointed out that this would cause the ISO to ask for more stringent requirements for system resources than originally asked for in the monthly showing. Therefore, the ISO proposes to delay all aspects related to flexible characteristics for planned outages until phase 2. The consequence of this is a slightly higher risk of the ISO needing to CPM a resource during the operating month in order to ensure the fleet can meet the real-time net load ramping needs. The ISO believes reliability can be maintained absent replacement rules for flexible characteristics in the next few years using already established tools such as outage cancellation and CPM designations. However, it will be imperative that once durable flexible rules are established that planned outages have rules ensuring the flexible attributes of the resource on outage are provided by the planned outage substitute resource. During this gap period the ISO will monitor flexible planned outages that are overlapping with system outages and monitor whether outages are being replaced with flexible resources, i.e. resources with an EFC and therefore would qualify as flexible RA.

## 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.

A resource on a forced outage has the option 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 provides reliability to the 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 ISO proposes to establish an 8:00 AM deadline. This will provide additional time for suppliers to submit substitute capacity while still providing the ISO enough time to evaluate the capacity and providing the scheduling coordinator for the substitute resource enough time to prepare and submit required bids 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 will also develop the functionality for a single resource to substitute for two separate resource outages, one that requires flexible capacity and one that requires generic capacity and vice versa.

### **9.2.3. Real-time substitution for system resources**

Currently scheduling coordinators only have the ability to provide substitute capacity for system resources on forced outages day-ahead. This is because there is a rule that requires ISO grid operator action if the substitute resource has a lower ramp rate than the resource on forced outage. The ISO proposes to remove this rule and allow substitution of system resources regardless of their relative ramp rates. Therefore, because operator intervention is no longer needed, the ISO can fully automate the real-time system substitution process and allow real-time substitution for system resources on forced outage.

#### 9.2.4. Changes to the local pre-qualification process for real-time substitution

In order to relax the requirement that substitute capacity for local RA in real-time must be located at the same bus, the ISO proposes to change the local pre-qualification process. The ISO will relax the same bus criteria, and in annual local pre-qualification process assess whether resources are at “compatible buses.” The ISO will assess all resources during the pre-qualification process and scheduling coordinators or LSEs will not need to ask for specific resources to be assessed.

The ISO proposes to define compatible bus in more detail in the Reliability Requirements BPM process.

#### 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 comply with the flexible RA category must-offer requirements of the resource on outage. The exception to this is if the resource that has capacity substituted had capacity shown at a higher quality than the original capacity on outage, the substitute capacity must comply with the higher quality category must-offer requirements for the entire resource’s committed RA capacity. That is, a flexible RA resource cannot take on multiple categories must-offer requirements for different portions of its resource. While a category 1 resource may substitute for a category 2 resource, if the category 1 resource had any capacity shown on an RA plan on that day as category 1, it must take on the higher must-offer obligations for all RA on the resource.

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 it will run the resource and the ISO will make no presumptions as to how much substitute capacity a scheduling coordinator must provide to the ISO to meet its flexible RA obligations. If an outage occurs, 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 forced outage days policy

Proposed tariff language to implement the new OMS system<sup>34</sup> in the fall of 2014 clarifies the rules under which RA resources may request outages without the outage impacting affecting 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. The OMS system tariff changes were not intended to address changes to the SCP incentive mechanism. This initiative addresses both outage and the availability incentive mechanism policy and, thus, it is appropriate in this initiative to remove the tariff exemption for forced outages reported from seven to four days.

### 9.2.7. Release of forced outage substitute capacity as RA capacity if an outage moves

The ISO proposes that forced outage substitute capacity can be released from RA capacity obligations if an outage moves. Scheduling coordinators can move up to quantity of the original substitution MW. 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. RA process and outage rules proposal for implementation for 2017 RA year

### 10.1. Purpose and background

The ISO developed the replacement and substitution rules in recognition 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 should ensure sufficient capacity is 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.

Numerous issues have been identified with the current replacement and substitution rules. Figure 16 in Appendix C illustrates the ISO's current monthly RA process. There are two

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<sup>34</sup> <http://www.caiso.com/informed/Pages/StakeholderProcesses/OutageManagementSystemProject.aspx>

different processes in place today for providing replacement capacity for a planned outage. This is illustrated by the two horizontal lines in Figure 16 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-45.** 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 last in, first out order and on any day that the system is short and an LSE that showed the capacity on their RA plan is also short compared to their LSE system requirement, the LSE then must 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.** If 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 require replacement based on updated system conditions at the ISO's discretion.
- **Non-replaced outages may be cancelled.** If 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 17 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 17's issue boxes correspond to the numbered issues below.

### 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 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 and 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***

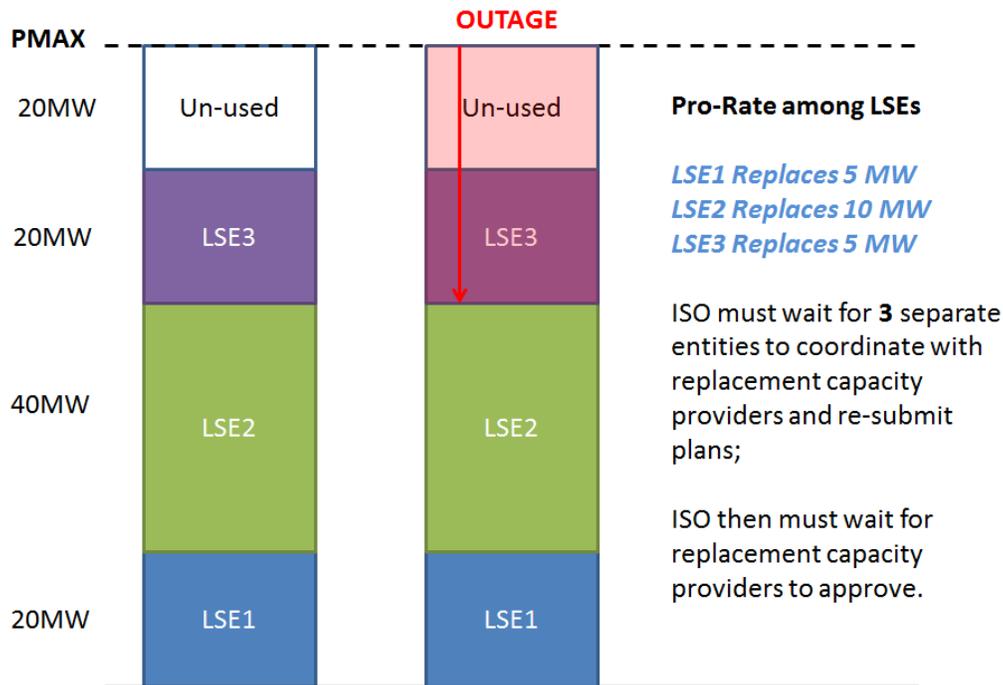
Another reason that the process is complex is that the outage replacement responsibility is split between the LSEs and the suppliers requiring the tracking of outage replacement responsibility across these two different functional entities. The ISO analyzes a snapshot of outages taken 45 days prior to 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 11 of an RA resource shared by three LSEs with a single outage.

Figure 11: 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 17 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.

### ***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 canceling 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 short 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.

### **10.3. 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 on local, 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.<sup>35</sup>

#### ***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 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.

#### **10.3.1. 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.

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

### ***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.

## **10.4. Proposed rule changes**

The ISO intends to address these issues by redesigning 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 RSI 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 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 18 in Appendix D 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, 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.<sup>36</sup> 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 Appendix D.

The revised monthly RA timeline allows the ISO to fully separate the monthly RA process from the planned outage analysis 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 last in, first out ("LIFO") 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. If the ISO required additional capacity for the planned outage and the supplier did not provide the additional capacity, the outage capacity will be subject to the availability incentive mechanism. The availability incentive mechanism penalty is proposed to initially be \$3.79/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 substitute capacity amount.

Figure 12 below summarizes the ISO's proposed changes and their associated benefits. The proposal is further described in detail in sections 10.4.1 through 10.4.7.

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<sup>36</sup> 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 12: Summary of ISO proposed changes and benefits of the proposed changes

<u>ISO proposed changes</u>	<u>Proposal benefits and issues addressed</u>
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 RA coordination with the ISO	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.
Penalties for planned and forced outages aligned at \$3.79/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.
Cap the local RA requirement at the system requirement	This will ensure that LSEs do not need to show more than their system requirement and therefore suppliers will not have to replace any capacity on forced outage above the system requirement.
Remove replacement requirement in the event the ISO tells a supplier move a previously approved outage	Reduces financial risks due to ISO planning and moving outage after the fact.
Release RA capacity associated with an outage if the planned 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.
Develop rules for the 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 <b>in phase II</b> of this initiative	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. 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.

#### **10.4.1. Monthly RA timeline changes**

The ISO proposes to change the ISO's monthly RA process timeline. Figure 18 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 as the current deadline. 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. The ISO will provide an informational outage snapshot at T-42 to the relevant scheduling coordinators. As shown in Figure 18 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.

#### **10.4.2. Local requirement capped at the system requirement**

The ISO proposes a minor adjustment to the local resource adequacy requirement. This change is to accommodate planned outage rules. In the monthly resource adequacy process, the ISO proposes to cap a load serving entity's local capacity requirement at that load serving entity's system requirement. In the event that an LSE has requirements in multiple TAC areas, the ISO will cap each local requirement at the LSE's system requirement for that TAC area (i.e. based on load in each TAC area relative to their total load). This will not impact the current local capacity technical study methodology used to determine the load serving entity local capacity requirements each year.

Currently, during some months of the year, a load serving entity may be required to demonstrate local capacity in excess of its monthly peak demand and reserve margin. This occurs because the local requirement is determined for August and applied to all months in order to assure local reliability. Since the inception of the local capacity technical study, peak load requirements have become increasingly different from month to month. The impact of this is that there is a potential for the monthly local requirement to be greater than the monthly system requirement. This will have a negative consequence in the future if a load serving entity commits more local capacity to the ISO than system requirement. Under the ISO replacement rule if a local resource goes on a planned outage that resource is also automatically considered a system resource and therefore has a replacement requirement associated with it. In the event planned outages bring the ISO system to an amount less than the system requirement and the

ISO requests additional capacity for capacity on outage in last in, first out order. If a load serving entity commits more than its system requirement two things may occur. First, other load serving entities may take outages and lean on the over-committed capacity. Second, the load serving entity may be required to replace an outage that would require the load serving entity's total capacity in aggregate to be beyond the load serving entity's peak demand and reserve margin requirement.

The ISO believes that it is reasonable to only require total commitment of resource adequacy capacity up to a load serving entity's peak demand and reserve margin requirements. In months where the peak demand and reserve margin requirement is less than the local requirement, the ISO would still receive local resource adequacy commitment up to the updated forecasted peak demand and reserve margin for that month. Therefore all committed capacity would be local capacity for these load serving entities. There is no reliability reason why the ISO should require additional local capacity beyond the peak demand and reserve margin requirements.

### **10.4.3. Separation of LSE and supplier responsibility for outage coordination**

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 outage coordination. LSEs monthly local requirement will be capped at the monthly system requirement. Therefore LSEs only need to show the monthly system requirement on their showing. Then, in last in, first out "LIFO" order suppliers will be required to replace outages. If all LSEs exactly show their system requirement, all outages will be required to be replaced. 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 18 in Appendix C illustrates this new process where the obligation for replacement coordination 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 RA outage coordination, rather than having to coordinate with both LSEs and suppliers throughout the month on outages.

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 coordinate with the supplier on outage 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 CAISO/M&ID/C.Bentley

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.

Figure 13 and Figure 14 illustrate the number of “touch points” the ISO expects to occur during outage coordination under current rules and after the proposed separate outage coordination rules are implemented.

Figure 13 first describes the process for suppliers and LSEs to provide the ISO with replacement capacity if the ISO was notified of the outage prior to T-45. If the supplier and LSE have a non-firm contract, this is illustrated by the graphic on the left. When the resource goes out on replacement, then the LSE may be contractually obligated to provide the ISO replacement capacity.<sup>37</sup> Often a single supplier will contract with multiple LSEs. In the event the supplier goes on outage, the supplier must notify the LSEs and ISO (indicated by the black arrow). The ISO then assigns the LSEs a replacement obligation amount (indicated by the blue arrow). The LSEs then will contract with suppliers (or the supplier side of their house) and provide this capacity to the ISO as replacement capacity (indicated by the orange arrow). The supplier providing the replacement will then validate that they agreed to provide RA capacity (indicated by the dashed orange line). A very typical scenario is that multiple LSEs will provide multiple resource replacements for a single outage. Each arrow that touches the ISO is a “touch point” and increases the complexity and reduces transparency for all parties involved.

The graphic on the right shows the same scenario, except for in this scenario the LSE and supplier have decided that the supplier will bear the replacement risk. This complicates things further because although the LSE is the entity coordinating the replacement with the ISO, the ISO must also verify with the suppliers all information.

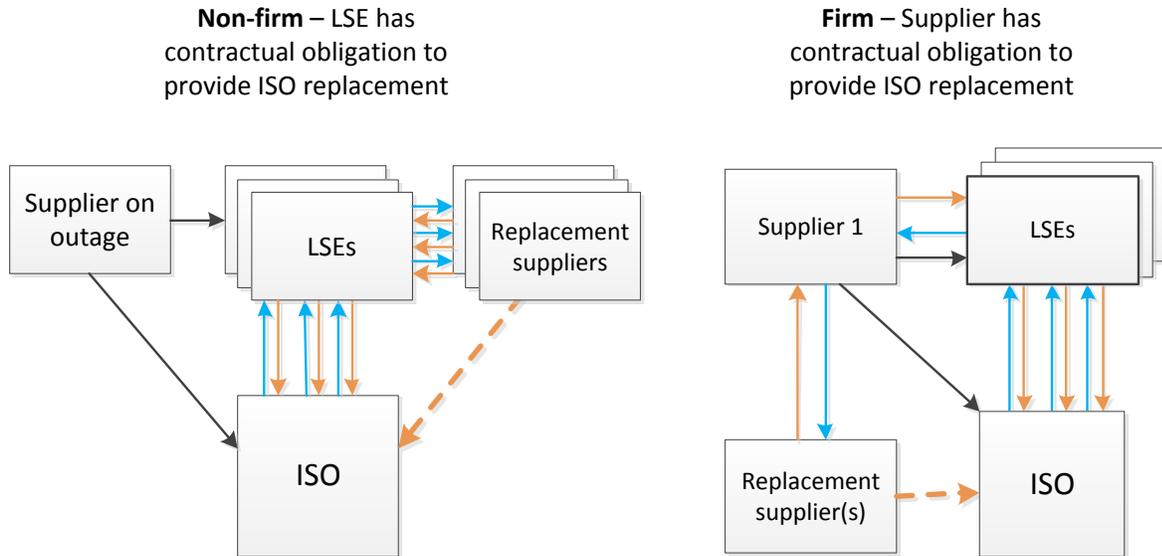
Below the previously described graphics are depictions of the coordination that occurs today after T-45, when outage coordination falls on the supplier. Note the number of touch points between the ISO and outside entities is significantly reduced. Figure 14 shows these same graphics as this is consistent with the ISO proposal for all time periods. The ISO only coordinates outages with suppliers; however, this does not in any way prohibit contractual obligations from being fulfilled. Just as today, parties may enter into a firm, non-firm, or other more complicated capacity contract. The ISO only proposes to change the coordination responsibility to make all outage coordination the same it is today after T-45 and does not intend to prevent or incent any changes to contract replacement obligations.

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<sup>37</sup> The ISO is aware that contracts are more complicated than just “firm” and “non-firm” and is just using this classification for illustrative purposes.

Figure 13: Illustration of outage coordination communication under current rules

ISO notified of outage prior to T-45



ISO notified of outage after T-45

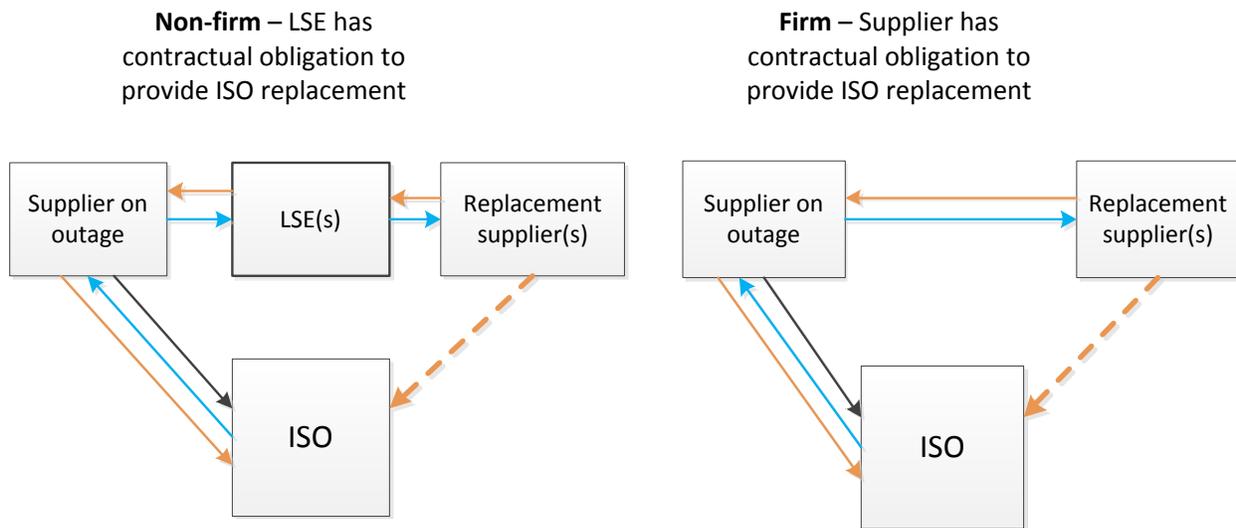
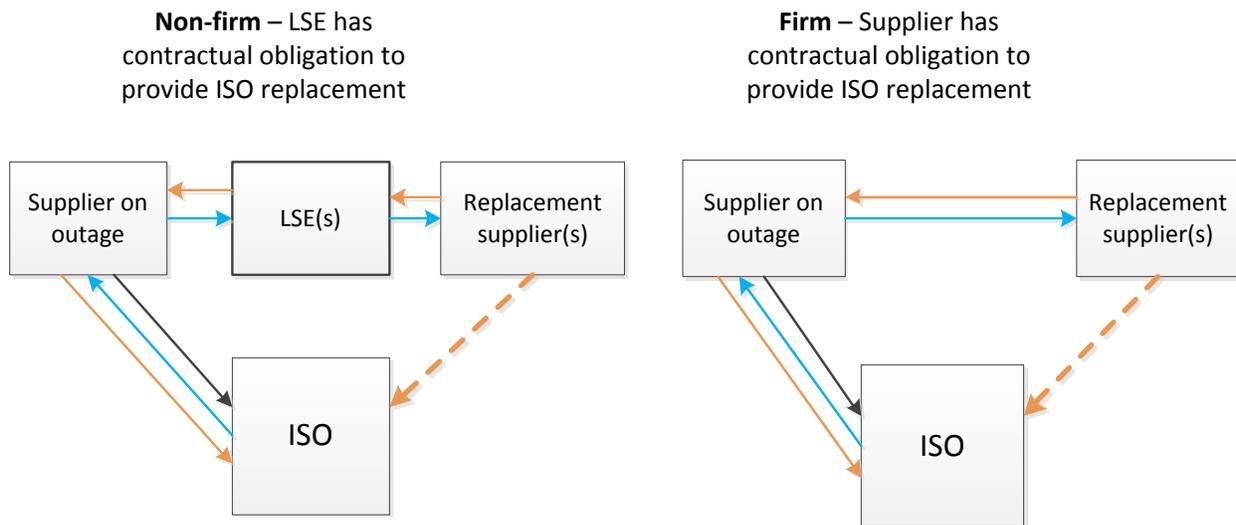


Figure 14: Illustration of outage coordination communication under proposed rules



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.
- 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 RA outage coordination, even ones reported prior to T-45.
- Exempt previously approved outages that are moved by the ISO from the replacement requirement.
- 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 last in, first out (“LIFO”) 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.

#### 10.4.4. 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, the ISO will continue to rely on the CEC 1 in 10 forecast. Any outage reported after T-25 would be moved to the top of the stack and asked for replacement if any was needed. This approach removes the incentive for resources to wait until the last minute to report their planned outages

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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.

#### 10.4.5. 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.<sup>38</sup> 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.<sup>39</sup>

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.

#### 10.4.6. 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.

The ISO proposes in phase II of this initiative to explore the possibility of LSEs to specifically indicate on their month-ahead showing whether a resource is being shown to satisfy a local or system requirement. This would be a resource (rather than capacity MW) designation and even if only a single MW was shown as local capacity, the entire resource would then be categorized as local for CPM and outage purposes. The ISO would then track the status of resource through the month and in the event it goes on outage, the ISO would allow the capacity to be substituted under the rules governing the shown resource type, and not the actual resource type. This would 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. The ISO would also do all local CPM determination assessments

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<sup>38</sup> The ISO will still be able to use the significant event and exceptional dispatch CPM as needed.

<sup>39</sup> The ISO proposes to implement this piece concurrently with the availability incentive mechanism, expected to be implemented in Fall 2016.

using only the resources shown specifically as local RA. There are significant implementation and policy details to figure out concerning the unbundling of local and system capacity and the ISO proposes to begin a more robust policy discussion on this in phase II of this initiative.

#### **10.4.7. Flexible CPM allocation methodology**

If the ISO does not receive a flexible CPM allocation methodology that allocates 100% of the LRA's flexible RA requirement by the deadline published in the Reliability Requirements BPM, the ISO will use the ISO's flexible CPM default allocation. The ISO proposes this to address a gap in the current policy that could potentially lead to unallocated CPM capacity.

#### **10.4.8. Plan resubmittal rules for 2017**

The ISO would like to clarify submittal and resubmittal rules for RA plans so that going-forward in the revised process there is no confusion.

The ISO proposes an LSE can resubmit plans prior to T-30 under the following circumstances:

- If there is a valid discrepancy between the supply plan and RA plan;
- If there is a valid deficiency in the RA plan;
- Once RA capacity is validated then it cannot be removed from the RA plan.

The ISO proposes a supplier can resubmit plans prior to T-30 under the following circumstances:

- If there is a valid discrepancy between the supply plan and RA plan;
- Once RA capacity is validated then it cannot be removed from the supply plan.

### **11. Next Steps**

The ISO will bring this policy to the March Board meeting.

## 12. Appendices

### 12.1. Appendix A

Figure 15: Summary of Bidding Requirements for Resources Providing RA Capacity<sup>40</sup>

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 <sup>(1)</sup>
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 <sup>(1)</sup>
Dynamic, Non-Resource-Specific System	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 <sup>(1)</sup>

<sup>40</sup> 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
Resources				
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 <sup>(1)</sup>
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 <sup>(1)</sup>
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	\$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	Economic Bids or Self-Schedules are to be submitted for any remaining RA Capacity from resources scheduled in IFM or	No <sup>(2)</sup>

Resource Type	Bidding Requirements			
	IFM	RUC	RTM	ISO Inserts Required Bids
	with the use-limitations described in unit's Use-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).	described in unit's Use-Plan. RA Capacity from Eligible Intermittent Resources is not required to be offered into the DAM. (ISO Tariff 40.6.4.3.1).	RUC, consistent with the use-limitations 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 <sup>(2)</sup>

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.

## 12.2. Appendix B

To provide a clear understanding of how the new must-offer obligations proposed shall be applied to each of these markets, the ISO provides the following summary.

Resource Type	Bidding Requirements			
	IFM	RUC	RTM	ISO Inserts Required Bids
Distributed Energy Resources (Single resource Type)	Economic Bids or Self-Schedules are to be submitted for all RA Capacity for all hours of the month the resource is physically available.	\$0/MW RUC Availability Bids are to be submitted for all RA Capacity for all hours of the month the resource is physically available.	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.	Yes <sup>(1)</sup>
Distributed Energy Resources	Same as resources type for grid connected resource	Same as resources type for grid connected resource	Same as resources type for grid connected resource	Same as resource type for grid connected resource
Non-generator resource (Non-REM)	Economic Bids or Self-Schedules are to be submitted for all RA Capacity for all hours of the month the resource is physically available.	\$0/MW RUC Availability Bids are to be submitted for all RA Capacity for all hours of the month the resource is physically available.	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 not scheduled in IFM.	Yes
Non-generator resource	Economic Bids or Self-Schedules are to be submitted for all RA	\$0/MW RUC Availability Bids are to be submitted for all RA Capacity for	Economic Bids or Self-Schedules are to be submitted for any	Yes

Resource Type	Bidding Requirements			
	IFM	RUC	RTM	ISO Inserts Required Bids
(REM)	Capacity for regulation for all hours of the month the resource is physically available.	all hours of the month the resource is physically available.	remaining RA Capacity from resources scheduled in IFM or RUC. Economic Bids or Self-Schedules are to be submitted for all RA Capacity not scheduled in IFM.	
Proxy Demand Resource	Economic Bids or Self-Schedules are to be submitted for RA Capacity that the market participant expects to be available Plan.	\$0/MW RUC Availability Bids are to be submitted for all short and medium start RA Capacity for all hours of the month the resource is physically available. No RUC Availability Bids required for long-start RA Capacity.	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.	No <sup>(2)</sup>

(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.

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.

### 12.3. Appendix C

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 must 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 \$3.50/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 must 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.

Alternatively, the ISO could assess all overlapping capacity as flexible and all system and local non-overlapping capacity as generic- and have separate prices for flexible and generic capacity availability. It has been discussed that FRAC MOO was designed because of the potential for

flexible scarcity and so the RA price of flexible capacity should rise above the price for system capacity. Although this is potentially true, at this time the ISO does not have any insight into the premium of an average flexible RA contract compared to an average system RA contract. Furthermore, the ISO does have and has had data on the difference between local area RA contracts and observes that these differences are likely to be significantly and consistently more diverse than the differences in flexible and generic RA prices. The ISO; however, contends that because there is no capacity market, the differences from area to area and attribute to attribute are unlikely to be systematic and consistent enough to capture accurately and simply enough to be useful in the availability incentive mechanism.

12.4. Appendix D

Figure 16: Current Resource Adequacy monthly process

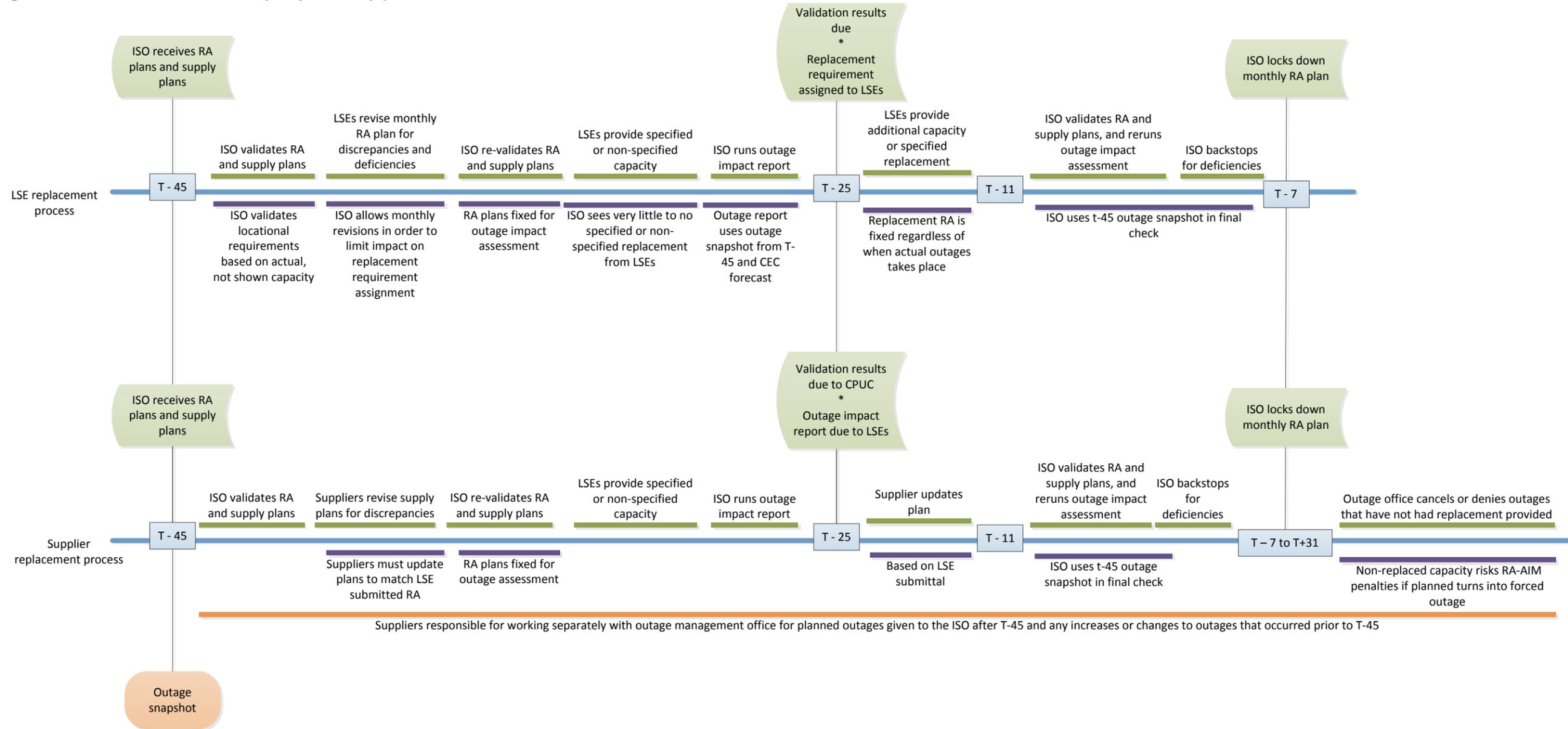




Figure 18: Proposed Resource Adequacy monthly process for 2017 RA year with current CPM process

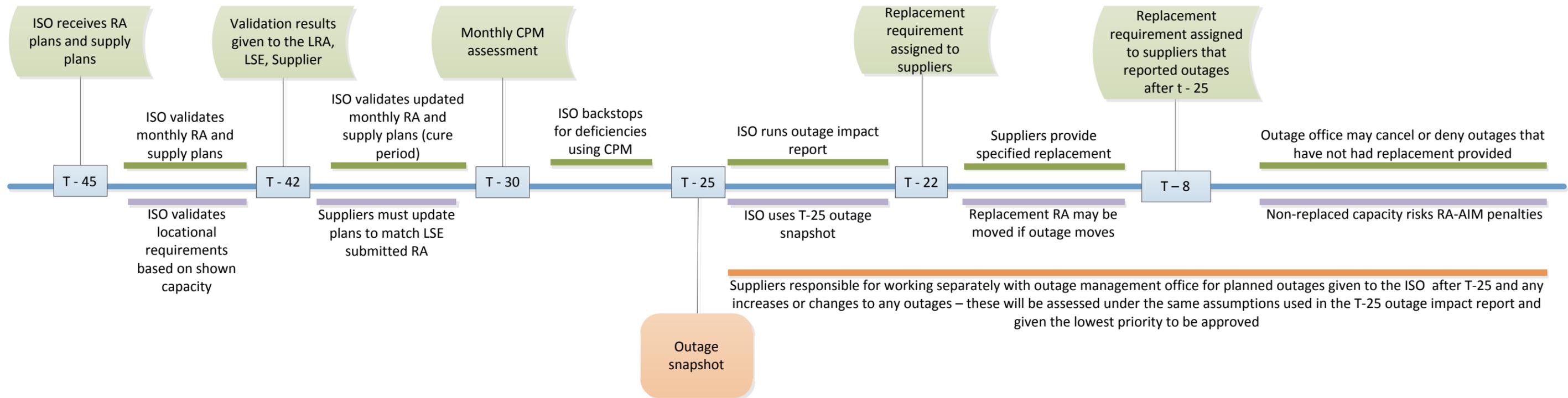
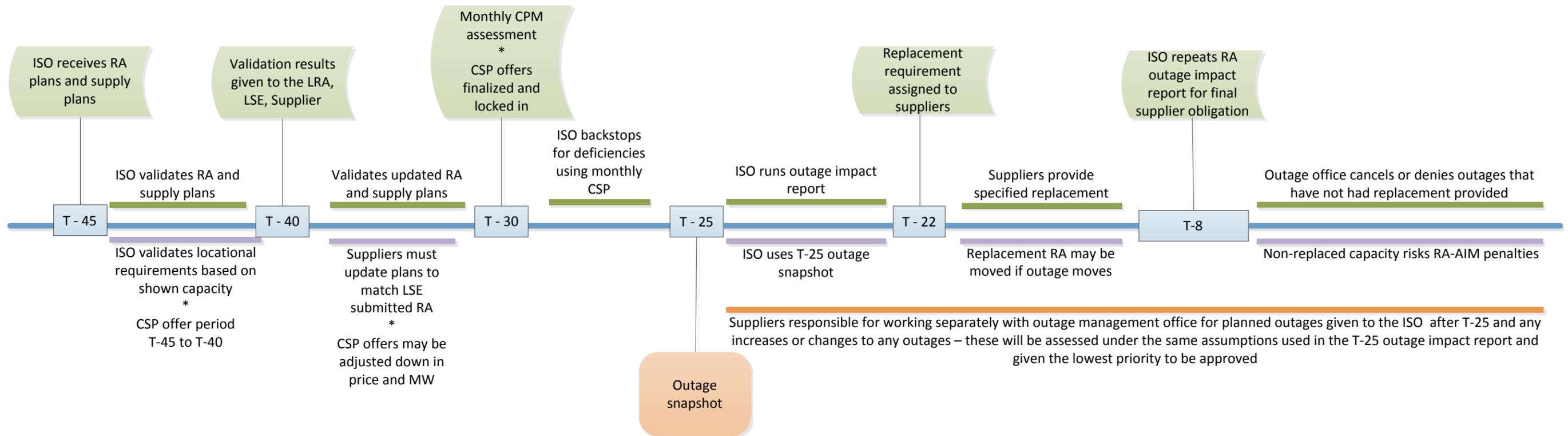


Figure 19: Proposed Resource Adequacy monthly process for 2017 RA year with proposed CPM process



**Attachment D – Board Memorandum**  
**Reliability Services Initiative Phase 1A**  
**California Independent System Operator Corporation**



# Memorandum

**To:** ISO Board of Governors

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

**Date:** March 19, 2015

**Re:** **Decision on EIM year 1 enhancements phase 1**

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*This memorandum requires Board action.*

## EXECUTIVE SUMMARY

The energy imbalance market (EIM) year 1 enhancements initiative includes proposed design changes to address FERC compliance, commitments made during the original stakeholder process, and other design elements identified during implementation activities with both PacifiCorp and NV Energy. The initiative has two phases. The first phase addresses design changes that Management believes should be implemented when NV Energy joins the EIM in October 2015, and are therefore being proposed now. The second phase will address items that will benefit from having six months of operational experience under the EIM, and items that were deferred from phase 1 to allow additional stakeholder discussion. The phase 2 items will be presented to the Board later this year.

In phase 1, Management proposes modifications that further the scalability of the EIM design, address FERC compliance directives regarding the bidding of greenhouse gas costs, and address matters identified during the initial implementation with PacifiCorp.

Management believes the proposed design changes build upon the current EIM design and will support additional balancing authorities joining the EIM in the future.

***Moved, that the ISO Board of Governors approves phase 1 of the energy imbalance market year 1 enhancements proposal, as described in the memorandum dated March 19, 2015; and***

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

## DISCUSSION AND ANALYSIS

In phase 1, Management proposes modifications that further the scalability of the EIM design, address FERC compliance directives regarding the bidding of greenhouse gas costs, and other changes to resolve matters identified during the initial implementation with PacifiCorp. Management has determined that these design modifications should be implemented when NV Energy joins the EIM in October 2015.

The proposed phase 1 modifications include:

- Modifications to further scalability of the EIM design
  - EIM transfer limit constraints
  - Flexible ramping combination constraints
- Modifications to comply with a FERC order
  - Greenhouse gas bidding by EIM participating resources
- Modifications to resolve implementation matters
  - EIM administrative charge
  - Settlement of EIM non-participating resources
  - Resource sufficiency evaluation
  - Administrative pricing rules

In the following sections, Management discusses each of the proposed design elements.

### ***EIM transfer limit constraints***

The EIM transfer limit ensures that imbalance energy moved between EIM balancing authority areas is within the transmission capability made available to the EIM. The current EIM design enforces the EIM transfer limit by ensuring the changes in net scheduled interchange between balancing authority areas in the EIM are within the aggregate transmission rights made available to support EIM transfers. This implementation approach was appropriate for the initial implementation with PacifiCorp because there is a single path between each balancing authority area. However, as more balancing authority areas join the EIM, the EIM transfer limits should be considered separately for each intertie scheduling point. This will allow for multiple transmission providers to offer available transmission capacity to maximize the EIM transfers between balancing authority areas. Since NV Energy will be using available transmission capacity over multiple intertie scheduling points between both the ISO and PacifiCorp East to support EIM transfers, the proposed changes are needed when NV Energy joins the EIM in October 2015.

In the fifteen-minute market and real-time dispatch, the ISO enforces intertie scheduling limits to ensure energy schedules do not exceed each intertie's transmission capacity. The ISO will similarly apply these intertie scheduling limits to interties used in the EIM.

In addition, the ISO will continue to enforce EIM transfer limits to ensure that EIM transfers across EIM interties do not exceed available transfer capacity. All resources within the EIM footprint and at EIM interties compete equally to ensure the most economically efficient use of transmission up to intertie scheduling limits.

Since there will potentially be multiple intertie scheduling paths on which EIM transfers can be scheduled, Management proposes to include a transfer cost, anticipated to be a few cents per MWh, in the market optimization to enable the market to select the most direct path. In addition, the transfer cost can also be used to maximize the efficient use of EIM transfer capability made available to the EIM via intertie schedules. The ISO, as the market operator, will determine the appropriate level of the transfer cost. If an EIM entity has multiple intertie schedules that can account for EIM transfers, the ISO will consult with the EIM entity to determine the appropriate transfer costs to maximize the use of the transmission made available to the EIM.

This transfer cost included in the market optimization will not be explicitly settled. However, since the cost is included in the market optimization it can impact locational market prices. To ensure that the lowest effective transfer cost is used, during market simulation Management will determine the appropriate amount of the transfer cost by balancing the benefits from including transfer costs with the impact to locational marginal prices. Furthermore to address stakeholders concerns, once determined, Management will brief the Board on the maximum EIM transfer cost that may be used by the ISO in the market optimization and will file the proposed transfer cost with FERC to include it in the ISO tariff.

Management also proposes to calculate the financial value of EIM transfers that will be used as part of the financial settlement of the real-time imbalance energy offset for each balancing authority area in the EIM. EIM transfers are not explicitly settled because a transfer represents the imbalance energy of generators supporting the EIM transfer, which is settled with individual resources. However, to calculate the real-time imbalance energy offset for a balancing authority area, the ISO settlement calculations must consider the financial value of the EIM transfer so that supply and demand settlements within the balancing authority area are balanced. Currently, the ISO calculates the financial value by multiplying the price at the intertie over which the EIM transfer is scheduled by the quantity of the EIM transfer. Since the intertie is not the location where generation within an EIM balancing authority is located, Management proposes to use the locational marginal price of the default generation aggregation point of the exporting EIM balancing authority. This represents a weighted average locational marginal price that considers the locational marginal prices of all the generation resources in an EIM balancing authority area.

### ***Flexible ramping constraint combinations***

In the current EIM design, the ISO calculates a flexible ramping requirement and enforces a flexible ramping constraint for all combinations of balancing authority areas participating in the EIM. As new entities join the EIM, the number of requirements and

constraints will rapidly increase. Currently, there are seven combinations with PacifiCorp. The number of combinations will increase to fifteen with the addition of NV Energy and to thirty-one with the addition of Puget Sound Energy. Therefore, Management proposes to calculate a flexible ramping requirement and enforce a flexible ramping constraint only for the combination of all balancing authority areas in the EIM, and for each individual balancing authority area, to limit the number of combinations to a manageable amount.

### ***Greenhouse gas bidding by EIM participating resources***

The EIM was designed to ensure that greenhouse gas (“GHG”) compliance costs do not affect the locational marginal price in an EIM balancing authority area. This provision was included in the design because only energy generated in California or imported into California is subject to California’s GHG regulations. In its June 19 Order approving the EIM design, FERC directed the ISO to include a mechanism to allow an EIM participating-resource scheduling coordinator to opt out completely from consideration for EIM transfer into the ISO. In addition, FERC directed the ISO to design the GHG bidder to be based on the expected cost of GHG compliance obligations.

Management’s proposal meets the FERC requirements and, in response to stakeholder input, provides additional flexibility. Management proposes to allow an EIM participating resource to submit a single MW quantity and single bid price on an hourly basis to express its willingness to serve as the source of an EIM transfer into the ISO and be subject to California’s GHG regulations. The MW quantity will, by default, be set to zero. Thus an EIM participating resource will not be deemed delivered to the ISO unless it has submitted a positive MW quantity. The MW quantity is independent of the resource’s energy bid curve, thus the total output of the EIM participating resource up to the MW quantity bid is eligible to be deemed delivered to the ISO.

Management proposes to calculate a daily maximum GHG cost to meet FERC’s directive that GHG bids be based on the expected costs of compliance. On a daily basis, the ISO will calculate a single GHG cost in a similar manner to how GHG costs are calculated when included in ISO resources’ default energy bids. The GHG emissions cost will be based on the resource’s maximum heat rate, as registered with the ISO, the daily GHG allowance price, and the resource’s GHG emission rate. An EIM participating resource will submit an hourly GHG bid price at or below its daily maximum GHG cost, but not less than zero. If an EIM participating resource submits a GHG bid price above the resource’s daily GHG cost, the GHG bid price will be set to the daily maximum GHG cost. If an EIM participating resource submits a MW quantity, but fails to submit a GHG bid price, the default will be the daily maximum GHG cost.

Finally, if an EIM entity allows economic participation in the 15-minute market by imports on EIM external interties, the import resources will also submit an hourly GHG MW quantity and bid price. The daily maximum GHG cost will be consistent with the calculation of the import’s GHG regulation compliance obligation.

### ***EIM administrative charge***

The EIM administrative charge is the mechanism the ISO uses to recover ongoing operational costs from EIM market participants. After go-live with PacifiCorp, the EIM administrative charges exceeded revenue expectations. In response, on January 5, 2015 the Board approved applying only the minimum charge to the EIM entity scheduling coordinator during the redesign of the administrative charge through this stakeholder initiative. Management now proposes an EIM administrative charge that charges ISO market participants and EIM market participants the same cost for similar real-time market services.

The EIM administrative charge will be split into two separate charges: the EIM market services charge and the EIM system operations charge. The EIM market services charge will be allocated to gross instructed imbalance energy. The EIM system operations charge will be allocated to gross real-time energy flow, which is the absolute difference between the meter and the base schedule. The billing determinants for the two charges are consistent with the billing determinants of the ISO grid management charge for market services and system operations.

Management proposes that if ISO costs or forecasted volumes change, the EIM market services rate and/or EIM system operations rate will be updated when the ISO grid management charge rates are updated. Management proposes to only charge the minimum charge if an EIM entity decides to withdraw from the EIM and requests suspension of the EIM. During the six month termination period, both the EIM market services charge and the EIM system operations charge will be allocated to 5% of the EIM entity's load and exports plus 5% of its generation and imports.

### ***Settlement of EIM non-participating resources***

EIM non-participating resources are resources that have base schedules in the EIM balancing authority area, but are not dispatched through the EIM. Management proposes to align the settlement of these resources with the settlement of ISO resources with day-ahead schedules that do not economically bid into the real-time market. This will ensure that the calculation of uninstructed imbalance energy is consistent between the ISO and EIM balancing authority areas.

### ***Resource sufficiency evaluation***

The current EIM design includes a resource sufficiency evaluation to ensure that each EIM balancing authority area has sufficient bid range from participating resources to meet the 15-minute net-load forecast and ramping requirements independently prior to the start of the operating hour. If a balancing authority area fails the resource sufficiency evaluation, incremental EIM transfers with other EIM balancing authority areas are not allowed. To provide equitable treatment among all balancing authority areas, Management also proposes to perform the resource sufficiency evaluation on the ISO balancing authority area.

Management also proposes to enhance the resource sufficiency evaluation by including the historical scheduling error of imports and exports included in the base schedules.

### ***Administrative pricing rules***

On December 18, 2014, the Board approved Management's pricing enhancements proposal which included revisions to administrative pricing rules that are used during market disruptions. Since the EIM is an extension of the ISO real-time market, Management proposes to have the same administrative pricing rules apply to the EIM, which generally base real-time market prices during a market disruption on other representative real-time market prices. However, the administrative pricing rules uses the day-ahead price when real-time prices are unavailable for an extended period of time. Since the EIM does not include the day-ahead market, there are not day-ahead prices that can be used for the period of the market disruption. In this circumstance, Management proposes to use the open access transmission tariff-approved price used by the EIM entity during a market suspension to settle imbalance energy within the EIM entity balancing authority area.

## **POSITIONS OF THE PARTIES**

Stakeholders generally support the proposed design changes. Stakeholders have expressed concerns regarding the accelerated pace of the stakeholder initiative. In response, Management has deferred certain items to phase 2 that are not required to support the implementation of NV Energy in October 2015 in order to allow for additional stakeholder discussions.

**Position 1** – Including a transfer cost to determine the intertie scheduling path of an EIM transfer will be scheduled should be discussed further and alternatives should be considered that would eliminate the potential impact to locational marginal prices.

Several stakeholders have expressed concerns that the EIM transfer cost will impact the locational marginal prices in the EIM. Given the potential impact, stakeholders suggest other options be considered which minimize or eliminate the impact, such as seeking a waiver of tagging rules between balancing authority areas in the EIM.

**Response:** Management shares this concern and will balance the impact to locational marginal prices with the need to maximize the EIM transfers under the existing scheduling rules. With NV Energy joining the EIM, the number of intertie schedules to support EIM transfers will increase. The proposed transfer cost will ensure the market can reach a unique solution and can maximize the use of transmission capability made available to the EIM. During market simulation, Management will determine the appropriate level of the EIM transfer cost balancing these competing objectives. In addition, Management has committed to include in the ISO tariff, the maximum allowed EIM transfer costs to provide stakeholders with transparency of the potential impact to locational marginal prices.

**Position 2** – Some stakeholders expressed concern that the proposed greenhouse gas (“GHG”) bidding rules provide more flexibility than is required to comply with FERC’s order and could limit EIM transfers into the ISO.

**Response:** To comply with FERC’s June 19 order, Management sought to develop a design to allow EIM participating resources to opt out from being considered for delivery to the ISO, and to include measures to ensure GHG bids are consistent with actual compliance costs. Some stakeholders requested a narrow interpretation of the FERC order, but also highlighted that implementing a flag could result in lower EIM transfers into the ISO, which would reduce the benefits of the EIM. Other stakeholders requested additional bidding flexibility given that actual compliance obligations are not known at the time the GHG bid is submitted, but rather at the end of the year. Management believes that the flexibility to bid an hourly MW quantity and a GHG bid capped at the maximum compliance cost balances these two competing views. The flexibility will allow EIM participating resource scheduling coordinators to manage their GHG bids to ensure compliance costs can be recovered, which should increase the number of resources willing to be the source of transfers to the ISO. In the event that EIM benefits are reduced because EIM transfers into the ISO were limited, Management has agreed to review potential long-term design changes, which could not be implemented by October 2015, in phase 2 of this initiative.

**Position 3** – Some stakeholders object that the ISO’s real-time market design used for the EIM undermines existing rights for transmission purchased under other balancing areas’ open access transmission tariffs, most notably in association with the EIM transfer proposal.

**Response:** The extension of the ISO’s real-time market to enable the EIM has already been accepted by FERC in its June 19 order. Management’s proposed treatment of EIM transfers when an EIM entity makes use of available transmission capacity is no different than how the ISO currently manages intertie scheduling limits on its own system. FERC’s order approving the 15-minute market accepted the ISO’s market timeline and settlement rules, whereby the fifteen-minute market commences prior to the final WECC tagging deadline for hourly intertie schedules and real-time hourly block schedules are price takers.

## **CONCLUSION**

Management requests Board approval of phase 1 of the EIM year 1 enhancements proposal discussed above. The proposed modifications will further the scalability of the EIM design, address FERC compliance directives regarding the bidding of greenhouse gas costs, and resolve matters identified during the initial implementation. The proposed modifications are important measures that will support additional balancing authorities joining the EIM. Management looks forward to continued stakeholder discussions on phase 2 items over the remainder of the year.

**Attachment E – DMM Memorandum**  
**Reliability Services Initiative Phase 1A**  
**California Independent System Operator Corporation**

# Memorandum

**To:** ISO Board of Governors  
**From:** Eric Hildebrandt, Director, Market Monitoring  
**Date:** March 19, 2015  
**Re:** Department of Market Monitoring report

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*This memorandum does not require Board action.*

## EXECUTIVE SUMMARY

This memo provides comments by the Department of Market Monitoring (DMM) on three Management proposals being presented to the Board:

- **Energy imbalance market year 1 enhancements.** DMM supports Management's proposed design changes to the energy imbalance market (EIM) scheduled for implementation when NV Energy joins the EIM in October 2015. DMM believes the most important element of Management's proposal involves how transfer limit constraints between EIM balancing authority areas will be modeled. The approach proposed by Management is designed to maximize the use of transmission rights made available in the EIM on different interties while avoiding any inappropriate impact this has on locational prices within EIM areas. DMM believes this approach can effectively balance these objectives, but recommends that the details of this approach be carefully tested and adjusted as necessary based on market simulation prior to implementation, as described in Management's memo.
- **Commitment cost enhancements phase 2.** DMM supports Management's proposal to clarify the current definition and qualification criteria for resources that are granted use-limited status. This has important implications since units deemed to be use-limited will continue to be exempted from some important bidding and availability standards established through other market initiatives to help ensure sufficient capacity is available for dispatch to meet the ISO's growing need for operational flexibility. However, DMM is concerned that the ISO's effort to develop a methodology and model for calculating opportunity costs that could be directly incorporated in bids for use-limited resources has again been deferred. DMM has provided detailed input on this project and will continue to work with the ISO and stakeholders on this important market enhancement.

- **Reliability services initiative.** DMM is supportive of Management’s proposal under the first phase of this initiative as a step forward toward improving and streamlining resource adequacy requirements and processes to meet the need for increased operational flexibility to integrate new renewable energy resources. Under Management’s proposal, until opportunity cost estimates can be implemented, use-limited resources can exempt themselves from the availability standards by submitting special outages. Therefore, DMM urges the ISO to commit the resources necessary to develop and implement the opportunity cost estimation method, as noted above. DMM also recommends that the ISO monitor whether the new level of the availability incentive established under this initiative is high enough to prevent suppliers from opting to pay a penalty rather than provide substitute capacity when supply conditions are relatively tight. If this occurs, the ISO will need to procure capacity through the capacity procurement mechanism.

## **ENERGY IMBALANCE MARKET YEAR 1 ENHANCEMENTS**

### **EIM transfer limits constraints**

DMM believes the most important element of Management’s proposal involves how transfer limit constraints between EIM balancing authority areas will be modeled. As described in Management’s memo, the approach proposed by the ISO is designed to maximize the use of contractual transmission rights made available in the EIM on different interties, while minimizing the impact these contractual considerations have on locational prices within EIM areas. DMM believes Management’s proposed approach for modeling EIM transfer limit constraints should accomplish these objectives if carefully tested prior to implementation, as proposed by the ISO.

DMM has closely reviewed the proposed approach for modeling EIM transfer limit constraints based on the level of detail provided in the ISO’s final proposal, and submitted a detailed summary of DMM’s analysis.<sup>1</sup> Based on this analysis, DMM concurs with the ISO and the Market Surveillance Committee that if the transfer cost used in the market software is set at a relatively low value, the proposed approach should allow the ISO to efficiently make use of EIM transfer capacity while limiting the impact of the transfer cost on locational market prices.

The final proposal outlined in Management’s memo specifies that the transfer cost used in the market software will be determined by the ISO. If an EIM entity has multiple EIM internal interties, the ISO will consult with the EIM entity to determine the appropriate

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<sup>1</sup> The detailed summary of DMM’s analysis can be found here:  
[http://www.caiso.com/Documents/DMMComments\\_EnergyImbalanceMarketYear1Enhancements-DraftFinalProposal.pdf](http://www.caiso.com/Documents/DMMComments_EnergyImbalanceMarketYear1Enhancements-DraftFinalProposal.pdf).

transfer costs to balance the goals of maximizing use of transmission made available in EIM while minimizing impacts of the transfer cost on locational market prices. This clarification addresses concerns that an EIM entity could be subject to scrutiny by DMM if the transfer cost was set by the EIM entity rather than by the ISO. DMM is prepared to work closely with the ISO and EIM entities to determine the level at which transfer costs should be set based on pre-implementation market simulation results and actual market results after implementation.

### **Greenhouse gas bidding rules**

DMM supports proposed changes involving greenhouse gas bidding rules. These changes would implement recommendations made by DMM during the initial EIM design to encourage EIM participation and address stakeholder concerns. FERC's June 19 order on the initial EIM design directed the ISO to include these provisions in the future EIM design.

As noted in Management's memo, one detail involved in complying with FERC's June 19 order was the degree of flexibility that will be provided to participants in terms of "flagging" resources' bids that could be deemed delivered to the ISO versus being available only to meet demand within other EIM balancing authority areas not subject to California's cap and trade program compliance obligations. Management's proposal seeks to provide flexibility by allowing the portion of each resource's bid quantity eligible for delivery to the ISO to vary from hour to hour, rather than requiring each resource to "opt in or out" of being potentially subject to California's greenhouse gas program on a daily or longer term basis.

DMM appreciates that this flexibility is being provided in response to requests from some stakeholders and to encourage participation in EIM. Some stakeholders have expressed concerns about the need for this flexibility and requested that DMM review this market design feature for potential gaming or other detrimental market impacts. DMM has reviewed this issue, and while we see limited value or need for this additional flexibility, we also do not have any significant concerns about potential gaming or other detrimental impacts of this bidding flexibility. Nonetheless, DMM will monitor any bidding behavior that may indicate an attempt to detrimentally affect market outcomes by hourly changes in greenhouse gas bidding.

## **COMMITMENT COST ENHANCEMENTS PHASE 2**

### **Transition costs**

Management is proposing to simplify the calculation of multi-stage generating resource transition costs and treat these costs similar to generator start-up costs. Scheduling coordinators will be allowed to bid transition costs in the same manner that proxy and

registered costs are currently bid into the market, so that transition cost bids may be submitted up to 125 to 150 percent of cost-based calculations.

DMM is highly supportive of these enhancements which address recommendations that have been reiterated by DMM in each of our last three annual reports. These two enhancements greatly simplify the current calculation of transition costs, provide more clarity for market participants, and provide a basis for the ISO to review and verify these costs.

### **Use-limited status**

DMM also supports Management's proposal to clarify the current definition and qualification criteria for resources that are granted use-limited status. The proposal clarifies that under current market rules resources can only be deemed use-limited based on physical, environmental or regulatory limits, and that units cannot be eligible for use-limited status based on contract-based limitations or economic operating costs.

This has important implications since units deemed to be use-limited will continue to be exempted from key bidding limits and availability standards established through other market rules and initiatives aimed at making sure capacity is available for dispatch to meet the growing operational need for flexible capacity.

As noted by DMM in this stakeholder process, the ISO's efforts to limit the number of resources with exemptions due to actual physical or regulatory use limits may be undermined if scheduling coordinators can use other unit operating constraints in the market model to limit unit usage and flexibility. One key model input currently used by participants to limit unit operation is the limit on start-ups per day that can be entered into the ISO master file by each unit's scheduling coordinator.

DMM has expressed concerns that daily start limits entered by participants do not reflect the actual physical limits of generating units. In 2014, the ISO started a process to examine this issue. Under the flexible resource adequacy program requirements being implemented by the ISO and CPUC, units will be required to enter at least two start-ups per day in order to meet requirements for this most flexible category of resources. DMM encourages the ISO to continue to review and clarify rules regarding daily start limits and other unit operating constraints submitted by scheduling coordinators that can also have a major impact on unit availability and flexibility.

One common factor cited by participants for wanting to be deemed use-limited resources or limit their daily start-ups, is to limit the longer term maintenance costs ultimately incurred as a result of starting-up or running a unit. However, starting in 2014 resources are eligible to apply to have a major maintenance adder included in their start-up and minimum load bids. This adder is designed to cover the incremental maintenance costs incurred from major maintenance actions that periodically occur

based on the number of times a unit has started up and/or the number of hours it has run. Including these additional costs in start-up and minimum load bids can reduce the frequency that units get cycled on and off, and ensure that generators recover these costs whenever they are dispatched to operate.

Although the process for implementing major maintenance adders in 2014 was initially problematic, the ISO, in consultation with DMM, assumed responsibility for this process in mid-2014. Starting in 2015, fewer units were allowed to bid up to 150 percent of costs under the registered cost option as a result of changes made under the first phase of the commitment cost initiative. This led many units that had previously not applied for a major maintenance adder to avail themselves of this bidding option.

DMM believes further refinements to the tariff provisions regarding the major maintenance adder could be made. These changes would make this market feature even more effective at ensuring that unit commitments reflect actual marginal unit commitment costs and that resourced owners recover the additional costs associated with starting up and operating flexible generating units more frequently to meet the ISO's growing need for operational flexibility.

### **Opportunity cost bid adder**

As noted in previous comments in the stakeholder process and to the Board, DMM is very supportive of the concept of including opportunity costs in start-up and minimum load bids, and is supportive of the ISO's general approach to calculating opportunity costs. We recommend that the ISO continue further refining and developing their current prototype spreadsheet model and continue to engage stakeholders in developing and refining the opportunity cost methodology and model.

DMM supported removing the opportunity cost adder from this initiative, given the lack of progress that has been made on developing a complete and well-designed model and process that would allow this option to be implemented. DMM is concerned that this important market enhancement has been deferred again, as this represents at least the fourth time this market enhancement has been dropped from a stakeholder initiative since 2010.

During the course of this initiative, the ISO has begun to implement a process to verify the actual use limits of various resources. This represents an important input to the process of establishing opportunity costs for various resources. However, DMM is concerned that given the current status and resources being applied to this project, it may be very difficult for the ISO to complete the development, testing and stakeholder review of an opportunity cost model and rules in time for consideration of this issue by the Board in September, as indicated in Management's memo.

Currently, this methodology has only been tested using a simple prototype spreadsheet model that can incorporate only one type of use-limit (e.g. a limit on start-ups or run

hours per month). The next step is to develop a software model that will allow inclusion of additional features including multiple usage constraints commonly included in air permits, such as simultaneous monthly and annual limits on both start-up and run hours.

For ISO staff to actually implement opportunity costs in the market, this software must also be highly automated and allow for opportunity cost to be updated as necessary based on changes in market prices or actual generating units. DMM has also recommended that a version of the model be made available to market participants so that they may perform their own analysis and request updates or modifications to their opportunity cost bids as appropriate.

DMM continues to look forward to working closely with the ISO and stakeholders on working out the details of this important market enhancement and implementing this functionality in the market.

## **RELIABILITY SERVICES INITIATIVE**

As described in Management's memo, changes being proposed under the first phase of the reliability services initiative include (1) enhancements to further integrate preferred resources into the grid; (2) a new availability incentive mechanism to assess resource adequacy resources including demand response and use-limited resources; and (3) revisions to resource adequacy outage rules to streamline ISO processes and provide a framework for flexible resource adequacy outage rules.

DMM is supportive of Management's recommendations as a step forward toward improving and streamlining resource adequacy requirements and processes to meet the need for increased operational flexibility to integrate new renewable energy resources. DMM has two recommendations concerning this initiative, as described below.

### **Exemption for use-limited resources**

The new availability incentive mechanism to assess use-limited resource adequacy resources was designed on the assumption that the opportunity cost estimates for use-limited resources would be available before these changes were implemented. As noted above, the development of the method to estimate opportunity costs has been postponed yet again. Until these opportunity cost estimates can be implemented, use-limited resources can exempt themselves from the availability standards by submitting special outages. Therefore, DMM urges the ISO to commit the resources necessary to develop and implement the opportunity cost estimation method in a timely manner.

## **Penalty price**

The ISO proposes to set the penalty price for not meeting availability standards at 60 percent of the soft offer cap for the capacity procurement mechanism that was approved at the February 5 Board meeting. DMM notes that if the cost of replacement capacity approaches the soft offer cap, it will be less costly for generating unit owners to pay the penalty rather than provide substitute capacity. DMM believes this scenario could occur precisely when supply conditions are tightest and options for capacity that can be procured bilaterally by participants or by the ISO through the capacity procurement mechanism is most limited and non-competitive.

DMM recommends that the ISO monitor this issue once the new incentive mechanism has been implemented. DMM has suggested that the ISO set the penalty price for not meeting availability standards higher than 60 percent of the soft offer cap for the capacity procurement mechanism. Setting the penalty price at 100 percent of this soft cap would appear to maintain a clear logic that exists in the current standard capacity procurement policy.

**Attachment F – MSC Final Opinion**  
**Reliability Services Initiative Phase 1A**  
**California Independent System Operator Corporation**

**Opinion on**  
**Reliability Services Phase 1 and**  
**Commitment Costs Enhancements Phase 2**

by

James Bushnell, Member  
Scott M. Harvey, Member  
Benjamin F. Hobbs, Chair  
Shmuel S. Oren, Member

Members of the Market Surveillance Committee of the California ISO

Final Opinion  
March 23, 2015

**1. Introduction and Summary of Recommendations**

With a goal of 33% renewable electricity production by 2020, the California power system will face increasing challenges to manage the variable output of wind and solar resources. Since the publication of the ISO's "20% Study" in 2010, it has been recognized that inadequate investment in flexible resources or a failure of those resources to offer flexibly into the ISO markets will increase the cost of integrating variable renewables and could result in difficulties in matching system supply and demand during periods of steep up- or down-ramps.<sup>1</sup> In response, the ISO has developed a series of initiatives designed to motivate flexible offers and, ultimately, to encourage appropriate investments in flexible resources. Some of these initiatives, such as the flexible ramping product, change the operation of the short-term dispatch and spot markets for energy and ancillary services. Others, in cooperation with the California Public Utilities Commission focus on resource adequacy (RA) mechanisms, including the definition of flexible RA requirements and the must-offer obligations (MOO) imposed upon capacity designated as flexible by RA mechanisms.

The Market Surveillance Committee (MSC) of the California Independent System Operator (CAISO) has been asked to comment on two related proposals that address implementation issues for the flexible RA requirements and rules governing their offers into the ISO day-ahead and real-time markets. These proposals are the Reliability Services Initiative Phase 1 (RSI)<sup>2</sup> and

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<sup>1</sup> CAISO, Operational Requirements and Generation Fleet Capability at 20% RPS, August 31, 2010, [www.caiso.com/Documents/Integration-RenewableResources-OperationalRequirementsandGenerationFleetCapabilityAt20PercRPS.pdf](http://www.caiso.com/Documents/Integration-RenewableResources-OperationalRequirementsandGenerationFleetCapabilityAt20PercRPS.pdf)

<sup>2</sup> CAISO, Reliability Services, Draft Final Proposal, Jan. 22, 2015, [www.caiso.com/Documents/DraftFinalProposal-ReliabilityServices.pdf](http://www.caiso.com/Documents/DraftFinalProposal-ReliabilityServices.pdf); Addendum, Feb. 27, 2015,

the Commitment Costs Enhancements Phase 2 Initiative (CCE2).<sup>3</sup> These will be considered by the Governing Board of the California ISO during their March 2015 meeting

The RSI initiative consists of two phases, the first of which we address in this opinion. The overall initiative is to address the ISO's RA rules and processes to ensure that the system's requirements for flexible resources, as well as local and system resources, will be met. As explained in the RSI draft final proposal, the first phase of the initiative focuses on RA rules and processes that must be updated for reliability or regulatory reasons. It is divided into three parts. The first part relates to enhancements to further integrate preferred resources into the grid and rules for integrating flexible RA resources into the energy market. The second part updates the RA availability incentive mechanism, most notably basing the incentive for flexible RA upon whether or not a flexible resource economically offers into the market, not just on whether it is on forced outage or not. The third part revises RA outage management rules, and is intended to serve as a platform to develop flexible RA outage rules in phase two of the RSI.

The second initiative, CCE2 is a continuation of the Commitment Cost Enhancements proposal<sup>4</sup> adopted by the Governing Board at its September 2014 meeting. The original (phase 1) CCE proposal addressed procedures used to calculate start-up and minimum-load costs for electricity generators. Under the CAISO's current market design, accurate estimation of these commitment costs by the CAISO is important to ensure efficiency of market operations. Caps upon offers for energy and for start-up and minimum run costs should be broadly reflective of actual costs in order to ensure that resources are incented to make offers without having an opportunity to exercise market power. The CCE Phase 1 proposal deferred the consideration of how opportunity costs, which can be a large component of marginal energy costs and of start-up and minimum load expenses for use-limited resources, can be estimated because of the need for further development of calculation procedures. Opportunity costs arise because of limitations upon the amount of energy production, number of starts, or number of operating hours during a time period; as a result, a generating unit should husband its limited energy, starts, or hours of operation for the times when its energy production and ancillary services are most valuable to the system.

The present CCE Phase 2 proposal again defers the opportunity cost calculation rules and procedures further to a later CCE Phase 3 proposal, which will also address some other unresolved issues concerning major maintenance adders, greenhouse gas costs, and accounting for gas transportation costs. CCE Phase 2 addresses two other sets of issues not fully addressed in Phase 1. The first is a clarification of the definition of use-limited resources, whose must-offer rules differ from those for non-use-limited resources. The issue of must-offer rules is where the CCE Phase 2 and RSI Phase 1 proposals intersect, and is the reason we are considering them together. After CCE Phase 3 is implemented, it is anticipated that many use-limited resources will be allowed to

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[www.caiso.com/Documents/DraftFinalProposalAddendum-ReliabilityServices.pdf](http://www.caiso.com/Documents/DraftFinalProposalAddendum-ReliabilityServices.pdf)

<sup>3</sup> CAISO, Commitment Costs Enhancement Phase 2, Draft Final Proposal, Feb. 9, 2015, [www.caiso.com/Documents/DraftFinalProposal\\_CommitmentCostEnhancementsPhase2.pdf](http://www.caiso.com/Documents/DraftFinalProposal_CommitmentCostEnhancementsPhase2.pdf)

<sup>4</sup> CAISO, Commitment Costs Enhancement, Revised Draft Final Proposal, Aug. 21, 2014, [www.caiso.com/Documents/RevisedDraftFinalProposalCommitmentCostEnhancements.pdf](http://www.caiso.com/Documents/RevisedDraftFinalProposalCommitmentCostEnhancements.pdf)

bid their opportunity costs, but at the present time, most such resources manage their use limitations by withholding their capacity from the market when it is not expected to be needed, and are excused from must-offer obligations if they offer their output in accord with their approved use plans. Resources should not be allowed to claim use-limited status simply to be held to a more lenient performance standard. The second set of issues addressed is relatively minor, and concerns cost accounting and offers, such as the treatment of multistage generators. In this opinion, we comment on the first set of issues.

The MSC has addressed the RSI proposal in recent meetings, including March 11 and May 19, 2014 and Feb. 19, 2015. More generally, the MSC has been considering the design of resource adequacy mechanisms and short-term energy markets to encourage flexibility for several years. Since the publication of the ISO's "20% study" in 2010, the MSC has examined a range of issues and initiatives concerning incentives for provision of flexible resources. These have included our 2012 opinion on flexible capacity procurement and risk of retirement,<sup>5</sup> a 2014 opinion on must-offer obligations for flexible RA,<sup>6</sup> and several opinions addressing how the ISO's short-term energy markets should be designed to encourage efficient offers and dispatch of flexible capacity. The latter include opinions on how commitment costs should be estimated, bid, and compensated in the ISO markets;<sup>7</sup> on payments for capacity used to meet the flexiramp constraint in real-time markets;<sup>8</sup> and on the Renewable Integration: Market and Product Review, which addressed bid floors, bid cost recovery calculations, and revisions to the Participating Intermittent Resource Program (PIRP) designed to have contracting parties realize more directly the value of their real-time production so as to motivate them to bid more flexibly.<sup>9</sup>

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<sup>5</sup> Market Surveillance Committee of the California ISO, "Final Opinion on Flexible Capacity Procurement - Risk of Retirement," Sept. 2012, [www.caiso.com/Documents/MSCFinalOpinion-FlexibleCapacityProcurementRisk-Retirement.pdf](http://www.caiso.com/Documents/MSCFinalOpinion-FlexibleCapacityProcurementRisk-Retirement.pdf)

<sup>6</sup> Market Surveillance Committee of the California ISO, "Final Opinion on Flexible Resource Adequacy Criteria Must Offer Obligation," March 11, 2014 <http://www.caiso.com/Documents/FinalOpinion-FlexibleResourceAdequacyCriteriaMustOfferObligation.pdf>

<sup>7</sup> Market Surveillance Committee of the California ISO, "Final MSC Opinion on Commitment Cost Enhancements," September 2014, [www.caiso.com/Documents/MSC\\_FinalOpinionCommitmentCostEnhancements-Sept2014.pdf](http://www.caiso.com/Documents/MSC_FinalOpinionCommitmentCostEnhancements-Sept2014.pdf); Market Surveillance Committee of the California ISO, "Opinion on Bid Cost Recovery Mitigation Measures and Commitment Costs Refinement", May 7, 2012, [www.caiso.com/Documents/MSCFinalOpinion-BidCostRecoveryMitigationMeasures\\_CommitmentCostsRefinement.pdf](http://www.caiso.com/Documents/MSCFinalOpinion-BidCostRecoveryMitigationMeasures_CommitmentCostsRefinement.pdf); Market Surveillance Committee of the California ISO, "Opinion on Changes to Bidding and Mitigation of Commitment Costs," June 4, 2010, [www.caiso.com/Documents/FinalOpiniononChanges-BiddingandMitigation-CommitmentCosts.pdf](http://www.caiso.com/Documents/FinalOpiniononChanges-BiddingandMitigation-CommitmentCosts.pdf); Market Surveillance Committee of the California ISO, "Comments on Changes to Bidding Start-Up and Minimum Load," July 16, 2009, [www.caiso.com/Documents/FinalOpiniononStart-UpandMinimumLoadBiddingRules.pdf](http://www.caiso.com/Documents/FinalOpiniononStart-UpandMinimumLoadBiddingRules.pdf)

<sup>8</sup> Market Surveillance Committee of the California ISO, "Final Opinion on Payment for Provision of Flexible Ramping," Aug. 16, [www.caiso.com/Documents/FinalOpinion\\_Payment\\_Provision\\_FlexibleRamping.pdf](http://www.caiso.com/Documents/FinalOpinion_Payment_Provision_FlexibleRamping.pdf)

<sup>9</sup> Market Surveillance Committee of the California ISO, "Opinion on Renewable Integration: Market and Product Review, Phase 1," Dec. 8 2011,

More recently than these opinions, the MSC has considered the issues of flexible ramping product in public meetings of the MSC on August 22, October 15, and December 16, 2014, as well as the definition of future flexible capacity needs at the latter meeting.

Based on our review of the ISO proposal, stakeholder input, and our review of experience with similar problems in the eastern ISOs, we have reached the following conclusions about the elements of the ISO proposals:

- The first part of the RSI addresses the development of eligibility criteria and must-offer obligations for certain resource categories. We support treatment of distributed resources in the same manner as resources interconnected with the transmission system. Defining the default qualifying capacity of non-generator resources based on the output the resource can sustain over a 4 hour period is not unreasonable, but the choice of period is not a precise bright line driven by physics and economics. The need for this and other somewhat arbitrary bright lines is inevitable in resource adequacy markets. Thus, such lines will likely need to be adjusted with experience. We have discussed in prior opinions and meetings the difficulty of defining the default qualifying capacity requirements that will ensure that RA resources that are capable of providing flexible capacity will indeed offer their capacity in a manner that most effectively and efficiently contributes to meeting CAISO resource needs. We have also stressed the consequent importance of energy and ancillary service market mechanisms that will incent resources capable of providing flexible capacity to operate in that manner.
- The RAAIM is designed to split the difference between the view that the RA design needs to provide a strong incentive for RA suppliers to live up to the obligations undertaken when selling RA, and the view that the energy and ancillary service markets will generally provide adequate and efficient incentives. It reduces the per-MWh penalty for non-performance relative to the current design while also eliminating important exemptions to the non-performance penalties. An important example is including planned outages that are triggered in the wake of a forced outage in order to make the necessary repairs. In our opinion both steps are, in general, an improvement upon the previous mechanism as it has been applied to standard capacity resources. However, as we note below, higher, not lower, penalties could be more efficient during high demand periods, but this would entail a much more complex RAAIM design.
- Significantly, the RAAIM also expands the performance metrics to cover the additional obligations undertaken by units selling flexible capacity. This adds financial consequence to the expanded Must-offer Obligation that is applied to flexible capacity resources. We note the potential for the RAAIM penalties to be too high in some periods (when there is more than enough capacity) and, more importantly, to be too low during times of resource scarcity. Too low a penalty could provide an inadequate incentive for making the expenditures needed to reduce forced outage rates.

- The choice of penalty is a difficult balance to achieve in any capacity based RA design and the CAISO will have to monitor how these penalties are affecting the propensity of units to bid their capacity flexibly, and to offer it as flexible capacity in the RA process. With regard to the structure of the proposed penalty, we support the CAISO proposal which opts for simplicity by having a single penalty which is applied whenever a resource fails to meet its Generic RA or Flexible RA must offer obligation rather than a more complex approach with different penalties for Generic and Flexible RA or a tiered structure of the must offer obligation with incremental penalties. While the single penalty approach is a blunt instrument, we are persuaded that in combination with the market based premium for Flexible RA (induced by the Flexible RA capacity requirement) and efficient spot market pricing of energy and ancillary services, it will be sufficient to induce a willingness to provide flexibility and compliance with the must offer obligation in the day-ahead and real time markets. We expect that the finer tuning of incentives will be accomplished through the short term energy and ancillary services markets.
- To better understand how to set the performance incentives we also recommend that the ISO continue to study the reasons apparently flexible resources do not bid flexibly, which we hope would provide guidance as to market rule changes that would incent greater flexibility in offers.
- Regarding the proposed adjustments to exceptions to the RAIM, we support all of them as they, on balance, reduce exemptions and start to normalize the standards of performance across different technology types. However, we note that significant gaps remain. Renewable intermittent resources will continue to be exempt from the performance metrics. Units subject to verified use-limitations that extend beyond the daily scope of the ISO's market runs will continue to be able to use outages to manage these limits and will not be subject to RAIM penalties for these outages. Permitting opportunity cost-based bidding of start-up and minimum load costs, as is intended in the Commitment Cost Enhancements Part 3 initiative, would allow for more efficient utilization of these use limited resources and enable the ISO to apply performance metrics to a broader set of RA resources.
- Although it may be possible over time to tinker with the RAIM penalties to better reflect the capacity contributions of different types of resources at different times, the potential for significant improvements will be limited by the RA mechanism's fundamental inflexibility to reflect rapidly changing system needs and the many attributes of a resource's design, operation and bidding strategy that impact the value of the capacity provided by the resource. For this reason, we reiterate our previous conclusion that a well-functioning spot market will in theory correctly value a resource's availability, flexibility, location, and other attributions, and incent the resource owner to offer and manage the resource in a manner that effectively utilizes the resource's flexibility. The ISO should therefore aim to enhance the efficiency of spot markets so that resource revenues will make up a material portion of the gross margin of resources. As a result, RA mechanisms (and RAIM in particular) would become relatively unimportant in incenting the efficient operation of resources, while continuing to provide for the recovery of a portion of

investment and going forward costs, which means that the consequences of distortions in capacity credit/AIM penalty calculations will matter less. The proposed RAAIM system will, we believe, provide improved performance incentives, but they are not a substitute for a properly functioning set of ISO markets for energy and ancillary services.

- The changes that the RSI proposes in replacement rules are positive steps towards simplifying the process of replacing RA capacity that is not available due to planned or forced outages. They pave the way for expanding this process to accommodate Flexible Capacity in phase 2 of the RSI. The CAISO hopes that these changes would make it easier for unavailable resources to replace their RA obligation with other resources owned by other entities, and thereby avoid penalties under the incentive mechanism and contributing to improved system reliability. We note, however, that shifting the replacement process onto the resource will lead to increased communications among suppliers about outage plans, which might contribute to facilitating of coordinated exercise of market power (either tacit or explicit) if large market players routinely exchange information about capacity outages. This shifting might also make it more difficult for small suppliers to arrange for replacement capacity and avoid penalties at times when there is no actual shortage of capacity. In theory, such coordination would be more difficult if replacement transactions were made through an arms-length central market. Moving slow in implementing such changes is probably a good idea given all the moving parts that need to be coordinated between the ISO, market participants and the CPUC, and the need by participants to evaluate the impact of such changes.
- Regarding the Commitment Cost Enhancements Phase 2, we are disappointed that the opportunity cost calculation procedures are delayed again, although we appreciate the potential complexity of those procedures and the need for careful review. Because of this delay, use-limited resources with true opportunity costs for their energy production, start-up, and running hours will have to continue to use inherently inefficient use plans to manage those limitations. As we have stated in a previous opinion, we believe that the best way to manage these use-limitations is to allow opportunity costs be included in resource offers to the market so that the decision to dispatch or not right now balances the benefits of operation immediately against the benefits of instead using the resource later.
- We understand the need for the restrictions proposed by the CCE2 proposal to restrict use-limited designations to units with genuine physical or regulatory constraints that result in opportunity costs beyond the time horizons of the ISO market software. If contractual provisions rather than regulations or physical limitations were to be allowed to justify a use-limited status, this could conceivably weaken incentives to avoid signing contracts that limit output, starts, or operating hours and perhaps incent the use of contractual provisions to avoid performance penalties when there are no physical or regulatory reasons for those restrictions. However, these changes in use limited designations need to be accompanied by the changes in restrictions in commitment cost offers to be implemented as part of CCE Phase 3 that will allow resources to make offers that are reflective of their actual costs, including opportunity costs.

## 2. RSI Part I: Enhancements to Resource Adequacy Criteria and Must Offer Obligation

The first part of the Reliability Services Initiative is the development of eligibility criteria, qualifying capacity criteria and must offer obligations for additional categories of resources (distributed generation and non-generator resources<sup>10</sup>) and adjustments to the existing rules for proxy demand response.<sup>11</sup>

The CAISO proposes that distributed generation resources qualifying as a resource adequacy resource must be visible to CAISO, so must be a participating generator or system resource. The resources must either be at least 0.5 megawatts in size or aggregated to 0.5 megawatts or more across resources of the same type, but potentially at different locations.<sup>12</sup> The CAISO proposes to apply the same availability, bidding and must offer obligations to distributed resources as would be applied to a similar resource on the transmission system.<sup>13</sup> We have not identified any valid reasons for applying different obligations to distributed resources.

The CAISO proposes that the default qualifying capacity of non-generator resources will be based on the output the resource can sustain over a 4 hour period.<sup>14</sup> This approach is reasonable, but it needs to be recognized that it is an approximation. There is no bright line between the value of resources that are available, say, 3.75 hours, 4 hours or 4.25 hours. Resources capable of longer sustained output are potentially more valuable at the margin, but whether this is the case in practice to any material degree will depend on the overall mix of resources available to the CAISO. The need for such bright line distinctions is unavoidable in a capacity-based RA mechanism. The CPUC's maximum cumulative capacity buckets serve to balance the overall resource mix between resources with shorter and longer availability, but again necessarily relies on bright line distinctions when the operational impacts are not that discrete in practice.

The CAISO has determined that the default energy bid, regardless of how it is established, is not appropriate for use with non-generation resources. The CAISO therefore proposes to exempt non-generation resources from the bid insertion provisions of the must offer requirement. Instead, the CAISO proposes to monitor non-generator resource performance and the need for bid insertion rules.<sup>15</sup>

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<sup>10</sup> NGR is "a resource that operate as either Generation or Load and that can be dispatched to any operating level within their entire capacity range but are also constrained by a MWH limit to (1) generate Energy, (2) curtail the consumption of Energy in the case of demand response, or (3) consume energy." Footnote 4 p. 17

<sup>11</sup> See Reliability Services, Addendum to the Draft Final Proposal, February 27, 2015 Part I, Sections 4 and 5.

<sup>12</sup> *Ibid.*, Section 4.3.1, p. 13.

<sup>13</sup> *Ibid.*, Section 4.3.1, p. 14.

<sup>14</sup> *Ibid.*, Section 4.3.2, p. 14.

<sup>15</sup> *Ibid.*, Section 5.4, p. 23

Finally, the CAISO proposes to change the qualifying capacity requirements for proxy demand resources to require that they are available to be dispatched at 24 hours a month, for at least 3 consecutive days and for at least 4 hours per dispatch event.<sup>16</sup> These bright line standards are again an approximation of more complex variations in the value of these resources but this is a necessary consequence of the capacity-based resource adequacy design. The proposed minimum dispatch duration is consistent with the requirement for other resources such as non-generator resources and is also consistent with the direction of changes in other ISO RTO markets, which are also tending to require longer and more frequent availability.

We have discussed in prior opinions and meetings the difficulty of defining requirements that will ensure that RA resources that are capable of providing flexible capacity will indeed offer their capacity in a manner that most effectively and efficiently contributes to meeting CAISO resource needs. We have also stressed the consequent importance of energy and ancillary service market mechanisms that will incent resources capable of providing flexible capacity to operate in that manner.<sup>17</sup>

### **3. RSI Part II. Resource Adequacy Availability Incentive Mechanism (RAAIM)**

There have been different views about the need for and role of availability incentives as a feature of capacity-based products, such as California's resource adequacy framework. Although capacity and RA frameworks are designed to provide incentives primarily for the advanced procurement (and therefore construction) of generation capacity, such capacity is of no value when it fails to perform.

Of course, the prospect of revenues from sales of energy and ancillary services would be expected, absent market power, to provide incentives for generation owners to make their units available. Most stakeholders agree that the bulk of the performance incentive should and does come through these short-term market incentives.<sup>18</sup> However, a view that the short-term markets will generally provide efficient incentives for unit availability once the capacity is built must recognize that the energy market will not provide efficient incentives when the cost of being remaining available is high relative to real-time shortage prices, if such prices are lower than the actual value of power to the system at such times. Further, if unreliable capacity which suffers more frequent forced or requires more planned outages can claim the same capacity value as more reliable sources, unreliable capacity could crowd-out more reliable sources from the procurement process. This concern is exemplified by the fact that, under the previous resource adequacy availability paradigm, resources could receive capacity credit, go on a planned outage for an extended period of time (multiple months) and be counted as 100% available during the entire period. Because payments are paid from a penalty pool, a resource on an extended planned out-

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<sup>16</sup> Ibid., Section 4.4, p. 15.

<sup>17</sup> Market Surveillance Committee of the California ISO, "Final Opinion on Flexible Resource Adequacy Criteria Must Offer Obligation," *op. cit.*

<sup>18</sup> As we argue in *ibid.*

age would take away potential revenues to participating resources and potentially receive more availability payments than a resource adequacy resource that was actually participating in the energy markets.

The proposed resource adequacy availability incentive mechanism (RAAIM) is designed to split the difference between the view that firms need a strong incentive to live up to the obligations undertaken when selling RA, and the view that the energy and ancillary service markets will generally provide adequate and efficient incentives. It reduces the per-MWh penalty for non-performance while also eliminating important exemptions to the non-performance penalties, most notably including all forced outages in the incentive mechanism. In our opinion, both steps are an improvement upon the previous mechanism as it has been applied to standard capacity resources.

Significantly, the RAAIM also expands the performance metrics to cover the increased obligations undertaken by units selling flexible capacity. This adds financial consequence to expanded Must-offer Obligation that is applied to flexible capacity resources.

We address several aspects of the RAAIM design. These include the level of the RAAIM payment, the number of payment categories, and the remaining exemptions for resources in the following subsections.

### **3.1 RAAIM Incentive Price Level**

The challenge in setting performance penalties is establishing a level that is high enough to incent generation units to be available when needed, but not so high that the potential penalties from under performance could exceed the revenues from selling capacity in the first place. Under the expiring Standardized Capacity Product (SCP) framework, availability incentive payments were based upon a price of \$5.91/kW-month. One of the concerns with this level is that we understand that it is higher than some of the prices being paid for capacity in today's bilateral market. The new RAAIM framework would initially set this price to \$3.79/kW-month.<sup>19</sup>

There are several potential concerns with the pricing level. Several could be construed as concerns that the price is too high. First, if the level is set considerably above the going bilateral price for RA capacity, the exposure to penalties could exceed the revenues from RA sales. This would put upward pressure on the RA price. This effect would also disproportionately impact units with higher outage rates, even if those units are available during periods of true system-wide scarcity. Last, as we discuss below, generation units owned by small firms may find it more difficult to find substitute capacity than larger firms that can substitute within their own generation portfolios.

Conversely, if the price level were too low, firms may find it preferable to simply under-perform and pay the penalty rather than undertake the expenditures necessary to maintain availability at the desired levels. One concern is that this effect would be strongest during periods when substi-

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<sup>19</sup> See Reliability Services, Draft Final Proposal, op. cit., Section 6.8, p. 49.

tute capacity is scarce and expensive, or simply not available. In other words, the gap between the availability penalty and desired incentive level would be largest exactly when the system needs higher availability from units that have sold RA.

As it applies to standard capacity, we believe this reduction in the performance penalty to be a sensible change that appears to better align with the underlying price of capacity in the bilateral capacity market. However, if the bilateral market tightens and bilateral prices increase, there would be a significant lag before the incentive payment would also be increased to reflect the new reality. This is in part because there is not a transparent RA price in California that is generated by a liquid market, so it is difficult to have the incentive mirror conditions in the bilateral market.

As the performance penalty will apply to flexible resources, the issue of an appropriate incentive price is complicated by the lack of clarity as to why flexible resources are not already bidding in ways that would comply with the FRACMOO standards. In a previous opinion on this must-offer requirement,<sup>20</sup> we noted that:

*(a)bsent knowing exactly what factors currently discourage resources from offering their output flexibly, it is impossible to assess how successful this must offer requirement will be in overcoming these factors.*

While it makes intuitive sense to link performance penalties for different types of RA to the different requirements faced by RA, the effects are difficult to predict in the case of flexible capacity. Previously we were concerned that the bidding requirements of FRACMOO might raise the cost of participation in RA, and therefore procurement of RA, in unforeseen ways. This concern extends to the impacts of availability penalties that are also applied, as proposed, when flexible RA units fail to bid flexibly as required. The CAISO will have to monitor closely how these penalties are affecting the propensity of units to bid their capacity flexibly, and to offer it as flexible capacity in the RA process. We also recommend that the ISO continue to study the reasons why apparently flexible resources do not bid flexibly, which we hope would provide guidance as to market rule changes that would incent greater flexibility in offers.

### **3.2 RAIM Single Incentive Price**

The compound nature of the FRACMOO obligation, which (1) requires that units not only be available but offer their capacity in a manner that meets rules defining flexibility and (2) co-exists with generic RA, raises some issues regarding the structure of the incentive mechanism. Specifically, generic RA capacity is only required to operate either by bidding into the CAISO markets or through self-scheduling, whereas Flexible RA is required to offer economic bids into the DA and RT markets. Requiring resources to be available in real-time whether or not the CAISO foresees a need for them will raise the cost of capacity. The hours of required performance also differ between the two types of capacity resources.

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<sup>20</sup> See “Opinion on Flexible Resource Adequacy Criteria and Must-Offer Obligation,” Market Surveillance Committee of the California ISO, op. cit.

One of the questions that has been raised has been whether there should be two different penalties for nonperformance by generic RA and by flexible RA. Another question is whether those penalties should be tiered and compounded so that, for example, Flexible RA that ends up self-scheduling will be deemed as performing as generic RA and be penalized only for not meeting its must offer flexibility. Such a differentiated and tiered penalty scheme can be rationalized on the grounds that providing flexibility constitutes an incremental service relative to generic RA with additional opportunity cost relative to self-scheduling. However, a tiered scheme would also increase the complexity of the incentive mechanism. The CAISO opted for a simple approach consisting for a single penalty that will be imposed on a resource if it does not provide the type of RA it committed to. Thus a flexible RA resource performing as generic RA will be treated as if it did not perform at all, and will pay the same penalty as a generic resource that does not perform at all. The penalty, and incremental payment for flexibility must, of course, be designed so as to not discourage Flexible resources from offering Flexible RA. Likewise the penalty should be high enough relative to the Flexible RA premium so as to discourage non-flexible resources from posing as Flexible RA and then paying the penalty for non-performance.

In theory, if there were transparent prices for both generic and flexible RA from liquid markets that reveal how much load-serving entities pay for each type of RA, then the incentives could be based on those prices. However, such prices do not exist.

We support the single penalty approach for its simplicity if combined with reasonably efficient energy and ancillary service market incentives. Such an approach indeed can achieve the objective of both incentivizing truthful revelation of flexibility in the RA commitment as well as incentivizing performance to the level required by the must offer obligations in the energy markets. To do so we analyze the decision process faced by a resource owner at both stages, the RA contracting stage and the energy markets bidding stage. This is done in form of a decision tree illustrated in the Appendix.

One should recognize that the single penalty approach is a rather blunt mechanism that will not lead to perfect incentives for real-time operation absent adequate compensation for real time energy when needed. For example, consider a flexible unit suffering an operating problem that prevents it from ramping up and down but that can stay on line despite the problem and operate at a fixed output. Such a unit would not have any RA incentive to stay on line since it would lose its entire capacity payment for the period because of its inability to ramp. Hopefully these situations are rare enough so that they are not a critical consideration, and furthermore if the output of such a resource were needed, we also hope that energy market prices would be high enough to provide adequate incentives for the resource operator to incur the costs needed to keep it on line.

In light of the problems with CAISO bidding restrictions, there may be times when there are large benefits to self-scheduling that will swamp the penalty and the self-scheduling may even be beneficial. For example, this can occur when there are large gains from getting a unit on-line when it is needed, but ISO bidding rules are inflating its minimum load and/or start-up costs, so the resource owner self-schedules the resource's minimum load block.

We also need to keep in mind that there is another possible situation in which self-scheduling is efficient. This can occur when the penalty is less the relative inefficiency of self-scheduling the unit or achieving a similar outcome with bids that do not trigger penalties. For example, instead of self-scheduling a unit's minimum load block to get it on line, the penalty could cause a generator to bid in a range above minimum load at an artificially low price to compensate for an inflated minimum load and/or start-up bid and get the unit on line. However, that could result in not only the minimum load block being dispatched, but also the capacity above minimum load that was offered at a very low price below both the actual marginal cost and the market price. So getting energy market prices and bidding rules right is important.

### **3.3 RAAIM Exemptions**

The wide variety and extensive application of exemptions has undercut the impact of previous availability mechanisms.<sup>21</sup> Exemptions fall under two categories: exempt classes of generation technologies and exempt actions taken by generation plants that reduce availability of those units. One of the positive elements of this initiative is that it reduces exemptions and tries to apply a more consistent standard of compliance to what a diverse set of obligations and unit capabilities.

Given the transition from an outage-based to a bidding-based availability metric, non-standard resources like participating demand resources can now be evaluated on the same basis as other resources.

The category of use-limited resources was a significant and growing concern under the previous SCP framework. Like other unconventional sources, it was difficult under the previous performance framework to measure the value of these resources in terms of availability, as the lack of a forced outage is only one factor determining the availability of a use-limited resource. The shift to a bid-based availability metric allows for some improvement in this regard. To the extent that the ISO's market optimization properly captures use-limitations and to the extent that bidders can reflect opportunity costs in their offers, bidding by these units is both appropriate and should be expected by units who have sold their capacity as RA. As with other generation, it would be a legitimate metric upon which to base performance penalties.

The CAISO proposal points out that while their day-ahead market runs can properly capture intra-day use limitations, any constraints on plant usage that tradeoff usage now against, for example, operation in a subsequent month, are more difficult to capture in the ISO's optimization. The ISO will continue to work to develop methods for incorporating these longer-term opportunity costs into the optimization, but in the meantime the proposal will not apply the bid-based availability metric to outages used to manage resource usage limitations that cannot be modeled in the software. It is crucial for the efficient operation of the ISO markets that, first, resources can reflect opportunity costs in their bids and, second, intraday unit commitments consider opportunity costs within the day since the intraday market runs' multi-hour time horizon does not consider the entire day. The CCE Phase 3 initiative is intended to address the former need, and

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<sup>21</sup> See Reliability Services Issues Paper, January 28, 2014.

we urge its rapid development and implementation.

Another area in which the ISO will limit exemptions is by requiring verification of a real physical use limitation rather than allowing units to unilaterally declare themselves to be use-limited. This is being proposed as part of the CCE2 proposal discussed in Section 5, below. The present use-limitation rules have provided a significant loophole in the enforcement of availability metrics, as a firm could exempt their units from these metrics simply by declaring its capacity to be use-limited.

We support all of these adjustments as they, on balance, reduce exemptions and start to normalize the standards of performance across different technology types. However, we note that significant gaps remain. Renewable intermittent resources will continue to be exempt from the performance metrics, as will units subject to verified use-limitations that extend beyond the daily scope of the ISO's market runs. Allowing opportunity cost-based bidding of start-up and minimum load costs, as is intended in the Commitment Cost Enhancements Part 3 initiative, should allow the ISO to further restrict exemptions in the latter case.

In the future, one possible course is to make further adjustments toward metrics and penalty structures that could be applied fairly to a broad class of units, while still capturing the relative capacity resource values that those units provide. For example, variable resource penalties could be assessed based on average performance over a longer period, such as a month, in a manner similar to the PIRP program. A similar approach could be applied to use-limited resources, but it would require the relative capacity value be downscaled in some way that is proportionate to the use limitation. This would require more analysis and stakeholder consideration of how to value, for example, a reliable but more use-limited resource relative to one that is perhaps less reliable but also a less limited resource. For example, how should a 240 MW resource that is available only for a single hour of a day be compared to a 120 MW resource that is available for 2 hours of the day, or a 10 MW resource that is available 24 hours a day.

We encourage the ISO and stakeholders to continue to explore how the RAAIM framework could be elaborated in a way that could incorporate the broadest set of resources under a single performance framework in way that is consistent with the actual benefits that those resources provide to the system. However, as we concluded in our FRACMOO opinion, the RA construct is an awkward and inherently inaccurate way to value flexible capacity in a market with diverse flexible resources with many different restrictions and capabilities that will be used to backstop the output from an increasing amount of intermittent renewable generation. It is important to give appropriate credit to capacity of different types if market failures in the short term markets mean that capacity revenues turn out to be a significant portion of a resource's gross margin. The wrong credits can give the ISO too little or too much capacity, or the wrong mix. Engineering calculations, based on reliability theory, of the marginal capacity contribution of different resources are difficult and will yield fluctuating values over time as system conditions change, including loads, hydro availability, and the mix of resources.<sup>22</sup> Stakeholder processes without

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<sup>22</sup> In theory, metrics could be based on the expected load carrying capability ELCC method developed by power engineers in which the marginal contribution of a resource to the ability of a system to meet an in-

careful analyses to back them up are unlikely to yield accurate assessments of the capacity value of different resources with dramatically different types of operating constraints and availability.

For this reason, we reiterate our previous conclusion<sup>23</sup> that a well-functioning spot market will in theory correctly value a resource's availability, flexibility, location, and other attributions, and incent the resource owner to offer and manage the resource in a manner that effectively utilizes the resource's flexibility. The ISO should therefore aim to enhance the efficiency of spot markets so that resource revenues will make up a material portion of the gross margin of resources. As a result, RA mechanisms (and RAAIM in particular) would become relatively unimportant in incenting the efficient operation of resources, while continuing to provide for the recovery of a portion of investment and going forward costs, which means that the consequences of distortions in capacity credit/AIM penalty calculations will matter less. The proposed RAAIM system will, we believe, provide improved incentives, but they are not a substitute for a properly functioning set of ISO markets for energy and ancillary services.

#### **4. RSI Part III: Replacement and Substitution Rules**

An important component of the CAISO RSI proposal is the set of rules for replacement and substitution of resources in case that resources that have a must-offer obligation as generic RA capacity or are Flexible RA capacity are unavailable due to planned or forced outages. Under current rules, the CAISO uses the term “replacement” for additional capacity provided during planned outages of RA capacity which is not accounted for in the planning reserve margin (PRM). In contrast, “substitution” refers to additional capacity provided during forced outages of the committed RA capacity which is partially accounted for in the PRM. Integration of Flexible RA necessitates significant changes to the current rule that would likely not be implemented until Fall 2016. Hence the CAISO proposes to delay until phase two of the RSI any changes concerning planned outages of flexible RA. It is proposed that such changes will be implemented for the 2017 RA year to allow for gradual adjustment by participants and for proper coordination with the CPUC.

In response to stakeholders' comments, the CAISO opted to delay all aspects related to flexible characteristics for planned outages until phase 2, although this delay leaves a time gap between the implementation of flexible RA requirements and the implementation of rules related to flexible RA planned outages. During this time gap the ISO may need to rely on the CPM to ensure

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creased road at a given reliability (e.g., LOLP = 1 day in 10 years) (L.L. Garver, “Effective Load Carrying Capability of Generating Units.” IEEE Trans. on Power Apparatus and Systems, Vol. PAS-85, August 1966, pp. 910–919). But this is a difficult calculation for a system with hydro and other resources with complex constraints. ELCC calculations used to be against system peaks, but now they must account for ramps and possible occurrences of resource deficits off-peak, further increasing their complexity (See S. Madeani, R. Sioshansi, and P. Denholm, Comparison of Capacity Value Methods for Photovoltaics in the Western United States, NREL, July 2012, [www.nrel.gov/docs/fy12osti/54704.pdf](http://www.nrel.gov/docs/fy12osti/54704.pdf)).

<sup>23</sup> “Opinion on Flexible Resource Adequacy Criteria and Must-Offer Obligation,” Market Surveillance Committee of the California ISO, op. cit.

that the fleet can meet real time net load ramping needs.<sup>24</sup>

The CAISO proposal describes a variety of problems with the current replacement and substitution rules, some of which result from complexity due to timing and overlapping cure periods for LSE and supplier replacement requirements. The proposed rule changes are designed to address these shortcomings and streamline the cure processes for planned and forced outages of RA resources. The proposed rule changes eliminate the distinction between replacement and substitution, focusing instead on the outage type and whether or not substitute capacity is needed. The proposal also revises the monthly RA timeline so as to fully separate the monthly RA process from the planned outage analysis process.

The changes that the RSI proposes in replacement rules are positive steps towards simplifying the process of replacing RA capacity that is not available due to planned or forced outages. They pave the way for expanding this process to accommodate Flexible Capacity in phase 2 of the RSI. The CAISO hopes that these changes would make it easier for unavailable resources to replace their RA obligation with other resources owned by other entities, and thereby avoid penalties under the incentive mechanism, when there is adequate capacity, and contributing to improved system reliability by reducing outages and improving availability of supply when capacity supply would be tight. We note, however, that shifting the replacement process onto the resource could increase awareness among suppliers about outage plans, which might contribute to facilitating of coordinated exercise of market power (either tacit or explicit) if large market players routinely exchange information about capacity outages. This shift in responsibility might also make it more difficult for small suppliers to arrange for replacement capacity and avoid penalties at times when there is no actual shortage of capacity. In theory, such coordination would be more difficult if replacement transactions were made through an arms-length central market. Moving slow in implementing such changes is probably a good idea given all the moving parts that need to be coordinated between the ISO, market participants and the CPUC, and the need by participants to evaluate the impact of such changes.

## **5. Commitment Costs Enhancements Phase 2**

The feature of the CCE2 proposal that we focus on in this opinion is the clarification of the definition of use-limited resources, whose must-offer rules differ from those for non-use-limited resources. It is important that resources claiming use-limited status be limited to those that actually have physical or regulatory limits in order to maximize the resources available to the market.

In general, a resource may face limitations to the number of hours and starts or the amount of energy it can provide over a given period of time. This limits can restrict when and how much a resource can provide, which means that a decision to dispatch a resource now must consider the benefits that may be foregone later (“opportunity costs”) if the resource runs out of starts, hours, or energy and cannot be dispatched during a time of high energy prices. For instance, a hydro-power plant’s production is limited by the amount of water available, and so its production may

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<sup>24</sup> See Section 8.3 of the RSI proposal, *op. cit.*

be rationed to peak periods during the day. Emissions limits can similarly restrict the output of a fossil fuel-fired resource, meaning that its owner should consider when its production would be most valuable. Maintenance needs or inherent resource limitations may limit number of starts per month or season or other period. As a result of these limits, there is an opportunity cost that could mean that even though the price of energy now might exceed out-of-pocket expenses for fuel or other short-run costs, the resource should still not be dispatched. The calculation of these opportunity costs and their inclusion in commitment cost calculations was discussed briefly in an earlier opinion of the MSC,<sup>25</sup> and is to be considered in the CCE Phase 3 initiative later this year.

As we have stated in that previous opinion, we believe that the best way to manage these use-limitations is to allow the opportunity costs be included in resource offers to the market so that the decision to dispatch or not right now balances the benefits of operation immediately against the benefits of instead using the resource later. However, present market rules for calculating commitment costs and default energy bids do not allow for explicit inclusion of opportunity costs, so instead resources must either submit a use-plan or bid higher commitment costs under the registered cost option. Also, under the RSI proposal, limited use resources will also be able to declare themselves on outage when in case the use limitation is reached; of course, this does not help ration starts, hours, or energy earlier when it might have been more optimal. For reasons we have explained in our previous commitment cost opinions, we believe that these approaches to managing opportunity costs are likely to be significantly less efficient than management based on bids that reflect opportunity costs.

Based on information provided to us by the ISO in August 2014, the following resources had a limited-use designation as of that time:

- Biofuel 638 MW
- Coal 118 MW
- Gas 6476 MW
- Geothermal 258 MW
- Nuclear 2300 MW
- Oil 45 MW
- Other 2700 MW
- Solar 3529 MW
- Waste 103 MW
- Hydro 10,731 MW
- Wind 4198 MW
- Total 31,098 MW

This is compared to the reported 2013 installed capacity of 78 GW in the state.<sup>26</sup> Thus the amount of capacity whose flexibility is limited due to declared use-limitations is about 40% of the total. This large percentage implies that it is important to carefully examine whether those

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<sup>25</sup> “Final MSC Opinion on Commitment Cost Enhancements,” September 2014, op. cit.

<sup>26</sup> [www.energy.ca.gov/renewables/tracking\\_progress/documents/installed\\_capacity.pdf](http://www.energy.ca.gov/renewables/tracking_progress/documents/installed_capacity.pdf)

limitations are due to physical or regulatory restrictions, or are due to economic factors that would be more appropriately reflected in offers and managed by the ISO market software.

The CCE2 proposal aims to remove the use-limited designation from resources that do not need the designation because they do not have a clear use-limitation per the ISO's tariff. The proposed change in the definition of use-limited resources has two parts. First, use limitations must be due to physical or regulatory restrictions, and not economic considerations such as cost of wear and tear or fuel supplies, or the terms of tolling agreements (unless those terms reflect underlying physical or regulatory restrictions). For instance, the ISO has clarified that natural gas unavailability or high costs are not a use limitation, and so under the new availability incentive mechanism, RA resources that do not meet their must-offer requirements for those reasons will be fully exposed to the availability incentive mechanism.

We agree with this part of the changed definition for two reasons. First, it is intended that changes in restrictions in commitment cost offers to be implemented as part of CCE Phase 3 will allow resources to make offers that are more reflective of their actual costs, including opportunity costs, than in the past. It is important for market efficiency that resources bid flexibly, but also in a way that reflects their costs. The past and likely future reforms to commitment cost calculation procedures still need to be worked out and will not be perfect. However, the goal is that they will improve upon past procedures and lessen the need for resources to self-schedule in order to either (1) avoid incurring costs that would not be compensated by the market or (2) bring a resource on line when its operation would be economic, but CAISO bidding rules preclude the submission of appropriate economic bids. Second, if contractual provisions rather than regulations or physical limitations were to be allowed to justify a use-limited status, this could conceivably weaken incentives to avoid signing contracts that limit output, starts, or operating hours and perhaps incent the use of contractual provisions to avoid performance penalties when there are no physical or regulatory reasons for those restrictions. Such contracts would lessen the amount of flexible resources available to the market and, in some circumstances, might abet the exercise of market power by providing an opportunity cost-based excuse to keep resources out of the market or raise bids.

We note, however, that in practice the distinction between contractual and physical or regulatory limitations can be difficult to draw. For instance, a resource may be able to choose to sign higher-cost maintenance contracts that would provide for more starts or operating hours between planned outages for major maintenance.<sup>27</sup> To build upon a point we made earlier (Section 3.3), if spot markets appropriately reward flexibility, then the correct incentives would be in place to motivate signing of an efficient contract.

The second part of the changed definition narrows the definition of use-limitation for the day-ahead, and short-term and real-time unit commitment processes, making clear that it must involve an opportunity cost. In particular, the applicability of start-up and hour use limitations

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<sup>27</sup> However, increased starts would still raise the probability of forced outages later in the season, so increased starts when they are not needed can simultaneously raise contract costs and adversely impact reliability

would be restricted to those limitations whose relevant time horizon is longer than the time horizon considered in the particular unit commitment process. Only such limitations could have an opportunity cost. Thus, for instance, intermittent solar and wind resources do not have opportunity costs, and so will not qualify as use-limited. On the other hand, demand response resources with a limited number of calls per month would be use-limited. We agree with this part of the changed definition as well, and look forward to reviewing the ISO's proposals for opportunity cost calculations in the CCE Phase 3 initiative.

The proposal provides details on how the proposed definition would be applied to various categories of resources. One category of resource that the proposal says that use-limitations are proposed to not apply, but we believe could be applicable in the future is geothermal. It is possible for a given geothermal resource to have an energy limitation over a period of time because of limited heat transfer capability and storage in the tapped source of geothermal energy, which might imply that some husbanding of energy output for use in the highest price hours might be desirable. Such limits might be a contributing reason, for instance, for the Geysers plant and other US geothermal power plants to have a capacity factor of only about 70%.<sup>28</sup>

### **Appendix: Incentive Compatibility of Single Incentive Price**

Following the decision tree in the figure below, a resource can either be flexible or not and in either case can sell generic RA or Flexible RA (if it can still sell flexible RA with the intention of not performing). Then in the energy market after various uncertainties have materialized, a resource that committed to provide flexible RA can choose to either (i) not be available at all, (ii) self-schedule or (iii) submit flexible economic bids. In contrast, a resource that is not flexible can either not be available or provide generic RA. The rewards resulting from the different combinations of capability and choices for different resources are indicated at the end points of the tree branches in the figure.

The objective of the RAAIM is to induce the decisions designated by the two paths denoted on the decision tree, i.e., to incentivize flexible resources to show Flexible RA and bid flexibly in the energy market while incentivizing nonflexible resources to show generic RA and be available in the energy market. For this choices to be consistent with economic behavior it is necessary that the nonperformance penalty is such that: **Penalty > FlexRAPrem + Max [UnAvailGain, SelfSchGain]**, where

FlexRAPrem = Difference between Flexible RA and Generic RA payment for the period.

UnAvailGain = costs avoided if the unit is not available for the period

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<sup>28</sup> Geothermal resources used to produce renewable electricity in western states, Today in Energy, USEIA, Sept. 8, 2014 <http://www.eia.gov/todayinenergy/detail.cfm?id=17871>; Capacity factors of geothermal plants, a global analysis by Bloomberg New Energy Finance, <http://thinkgeoenergy.com/archives/9644>

SelfSchGain = costs avoided if the unit self-schedules its output rather than being dispatched in the period

This will deter a nonflexible resource from contracting to provide Flexible RA and will induce a generic RA resource to be available in the energy market.

The above condition also implies that **Penalty > UnAvailGain** so a flexible resource offering generic RA will choose to be available. However, if **FlexRAprem > SelfSchGain** the option to show Flexible RA by a flexible resource dominates the option to show generic RA and realize any savings from self-scheduling. The latter condition will result naturally since the flexible RA premium will adjust to whatever the market will bear until the Flexible RA capacity needs are met. The conditions above on the penalty does not necessarily mean that it should be higher than the self-scheduling benefit or the unavailability benefit under any circumstance. By setting the penalty the CAISO, effectively sets, an upper bound on the level of self-scheduling benefits and unavailability benefits for which it wants to deter noncompliance. Under the penalty scheme if a resource's self-scheduling benefit exceeds the penalty it will choose to self-schedule and if that is a frequent occurrence that resource will be better off not offering its capacity as Flexible RA. Likewise a resource that frequently has unavailability benefits (or avoided cost) that exceed the penalty should not offer its capacity as RA. By selecting the proper penalty level the CAISO can control what resources should be available in real time and what resources offer flexible capacity and ensure that these resources have the incentives to reveal their intended behavior through their RA and Flexible RA commitments.

The above analysis demonstrates that a well calibrated single penalty will suffice to achieve the RAIM goals. Such calibration may not be easy since, as shown above it will depend on estimates of gains and avoided costs that are not well understood. However, calibrating a more complex mechanism with two penalties and tiered compliance will most likely be even harder. If the required flexible RA premium is small because the energy market provides strong incentives for flexible resources to offer in a manner that enables them to be dispatched flexibly, then the required penalty for flexible resources would also be small. As we argue in the body of the opinion, and elsewhere,<sup>29</sup> this is the most desirable outcome, and spot market designs should be sought to achieve this outcome.

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<sup>29</sup> See "Opinion on Flexible Resource Adequacy Criteria and Must-Offer Obligation," Market Surveillance Committee of the California ISO, op. cit.

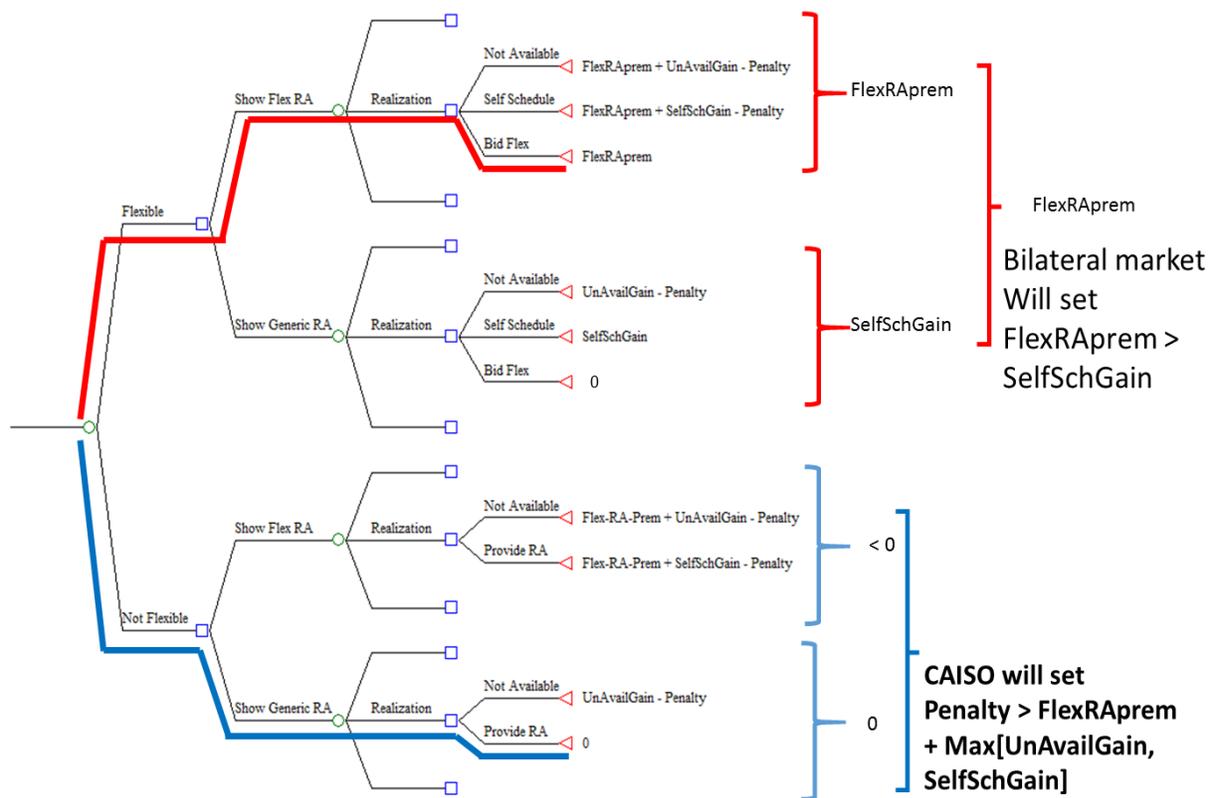


Figure 1: Decision tree for resource self-selection of RA category and performance

**Attachment G – List of Key Dates in the Stakeholder Process**

**Reliability Services Initiative Phase 1A**

**California Independent System Operator Corporation**

**List of Key Dates in the Stakeholder Process for this Tariff Amendment**

<b>Date</b>	<b>Event/Due Date</b>
January 28, 2014	CAISO issues paper entitled "Reliability Services – Issue Paper"
February 4, 2014	CAISO hosts stakeholder meeting that includes discussion of paper issued on January 28 and presentation entitled "Reliability Services Initiative"
February 18, 2014	Due date for written stakeholder comments on paper issued on January 28
February 24, 2014	CAISO hosts working group meeting that includes discussion of paper issued on January 28 and presentation entitled "Reliability Services – Market Mechanism Working Group"
March 3, 2014	Due date for written stakeholder comments on discussion at working group meeting held on February 24
March 27, 2014	CAISO hosts working group meeting that includes discussion of presentation entitled "Reliability Services – Market Mechanism Working Group"
April 9, 2014	Due date for written stakeholder comments on discussion at working group meeting held on March 27
April 23, 2014	CAISO hosts working group meeting that includes discussion of presentation entitled "Reliability Services – Working Group Meeting"
April 30, 2014	Due date for written stakeholder comments on discussion at working group meeting held on April 23
June 5, 2014	CAISO issues paper entitled "Reliability Services – Straw Proposal"
June 12, 2014	CAISO hosts stakeholder meeting that includes discussion of paper issued on June 5 and presentation entitled "Reliability Services Initiative – Draft Straw Proposal Meeting"
June 19, 2014	Due date for written stakeholder comments on paper issued on June 5
June 23, 2014	CAISO hosts stakeholder web conference that includes discussion of presentation entitled "Reliability Services Initiative – Incentive Calculation Model"
August 11, 2014	CAISO issues paper entitled "Reliability Services – Revised Straw Proposal"
August 18, 2014	CAISO hosts stakeholder meeting that includes discussion of paper issued on August 11 and presentation entitled "Reliability Services Initiative"

September 5, 2014	Due date for written stakeholder comments on paper issued on August 11
September 16, 2014	CAISO hosts working group meeting that includes discussion of presentation entitled "Reliability Services Initiative – Replacement and Substitution Working Group Meeting"
September 24, 2014	Due date for written stakeholder comments on discussion at working group meeting held on September 16
October 22, 2014	CAISO issues paper entitled "Reliability Services – Second Revised Straw Proposal"
October 29, 2014	CAISO hosts stakeholder meeting that includes discussion of paper issued on October 22 and presentation entitled "Reliability Services Initiative – Second Revised Straw Proposal Meeting"
November 19, 2014	Due date for written stakeholder comments on paper issued on October 22
December 10, 2014	CAISO hosts working group conference call that includes presentation entitled "Reliability Services Incentive – Working Group"
December 17, 2014	Due date for written stakeholder comments on discussion at working group conference call held on December 10
January 22, 2015	CAISO issues paper entitled "Reliability Services – Draft Final Proposal"
January 29, 2015	CAISO hosts stakeholder web conference that includes discussion of paper issued on January 22 and presentation entitled "Reliability Services Initiative – Draft Final Proposal Call"
February 6, 2015	CAISO hosts joint stakeholder web conference regarding reliability services and commitment cost enhancements phase 2 initiatives that includes presentation entitled "Reliability Services Initiative and Commitment Costs Enhancements Phase 2 Policy Changes"
February 19, 2015	Due date for written stakeholder comments on paper issued on January 22
February 27, 2015	CAISO issues paper entitled "Reliability Services – Addendum to the Draft Final Proposal"
April 15, 2015	CAISO issues draft tariff revisions to implement phase one of reliability services proposal
April 24, 2015	Due date for written stakeholder comments on draft tariff revisions issued on April 15
April 30, 2015	CAISO hosts stakeholder conference call that includes discussion of draft tariff revisions issued on April 15
May 7, 2015	CAISO issues updated draft tariff revisions to implement phase one of reliability services proposal

May 15, 2015	Due date for written stakeholder comments on updated draft tariff revisions issued on May 7
May 19, 2015	CAISO hosts stakeholder conference call that includes discussion of updated draft tariff revisions issued on May 7