



California Independent  
System Operator Corporation

December 22, 2009

VIA FEDEX

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

**Re: California Independent System Operator Corporation**

**Docket No. ER09-213**

**Docket No. ER10-\_\_\_\_\_**

Dear Secretary Bose:

The California Independent System Operator Corporation (ISO) hereby submits for approval by the Federal Energy Regulatory Commission (Commission or FERC) a proposed ISO Tariff<sup>1</sup> amendment that will enable the ISO to procure incremental Ancillary Services from external Non-Dynamic System Resources in the Hour-Ahead Scheduling Process (HASP).<sup>2</sup> The ISO respectfully requests that the Commission accept the proposed amendment.

The proposed amendments reinstate provisions, which due to implementation complications the ISO was experiencing prior to the start of its new market design on April 1, 2009 were removed from the ISO Tariff.<sup>3</sup> In addition, the proposed amendments include new rules that (1) would apply in the Real-Time Market dispatch of energy bids associated with any Ancillary Services awarded in HASP to Non-Dynamic System Resources and (2) would limit the use of energy Bids associated with the Ancillary Services bids submitted for Non-Dynamic System Resources in HASP to the extent such resources are not

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<sup>1</sup> *California Indep. Sys. Operator Corp.*, FERC Electric Tariff, Fourth Replacement Volume Nos. 1 and 2 (ISO Tariff).

<sup>2</sup> Capitalized terms not otherwise defined herein have the meanings set forth in the Master Definitions Supplement, Appendix A to the ISO Tariff.

<sup>3</sup> See *California Indep. Sys. Operator Corp.*, 126 FERC ¶ 61,081 (2009) (*Deferral Order*).

dispatched for Ancillary Services. This filing is submitted pursuant to and consistent with Section 205 of the Federal Power Act (FPA).<sup>4</sup> The ISO requests an effective date of April 1, 2010, for the proposed tariff amendment.

The ISO has included an original and five copies of the instant filing for filing. One additional copy is included to be date-stamped and returned to the ISO in the enclosed pre-paid and self-addressed envelope.

## **I. Background**

On April 1, 2009, the ISO began its operation under a Locational Marginal Price (LMP) based energy and Ancillary Services market.<sup>5</sup> Prior to the start of the market, the ISO identified certain non-core features of its market design the implementation of which it proposed to defer because these features provided minimal benefits to the ISO markets but that due to implementation challenges at the time could interfere with successful implementation of the new market design.<sup>6</sup> On October 31, 2008 the ISO requested Commission approval of the deferral of the following four features of the ISO market:

- Enforcement of Forbidden Operating Region constraints for Generating Units in the Real-Time Market;
- Unlimited Operational Ramp Rate changes for Generating Units;
- Procurement of incremental Ancillary Services in the Hour-Ahead Scheduling Process; and
- Automation of the commitment process for Extremely Long-Start Resources.

On January 30, 2009, the Commission issued its order accepting the deferral of the four market features subject to the ISO's commitment to work through the stakeholder process to implement these functionalities expediently. The Commission also accepted the ISO's proposal to implement multi-stage modeling within six to nine months of the start of its new market design, as well as its commitment to address each of the functionalities shortly after go-live. The Commission required the ISO to report the status of the ISO's efforts to resolve and restore the four deferred functionalities accepted in the January 30 *Deferral Order* in the ISO's quarterly reports on its new market performance evaluation, and to lay out a timeframe in which each of the functionalities can be restored

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<sup>4</sup> 16 U.S.C. § 824d.

<sup>5</sup> See [MRTU Docket and Certification Order]

<sup>6</sup> See *Deferral Order*.

and implemented. The ISO has provided such status updates in its quarterly reports.<sup>7</sup>

Through a stakeholder process initiated since the start of the new market, the ISO and market participants have developed several market rules for the dispatch of energy associated with Ancillary Services procured in HASP that, as discussed further below, will enable the ISO to reinstate the ability to procure Ancillary Services from Non-Dynamic System Resources in the HASP.

## **II. Discussion**

### **A. Procurement of Incremental Ancillary Services from Non-Dynamic System Resources in the Hour Ahead Scheduling Process and New Dispatch Logic to Support such Procurement**

In its October 31, 2008 filing, the ISO reported that the then current software design prevented the CAISO from dispatching energy in real-time from Non-Dynamic System Resources that have been awarded Ancillary Services in HASP. The ISO explained that the HASP was designed to determine the optimal mix of Ancillary Services from internal resources, dynamic external resources, and external Non-Dynamic System Resources for the next trading hour. However, in HASP only the Ancillary Services awards to Non-Dynamic System Resources are binding, while dynamic external resources and resources within the CAISO Balancing Authority Area are given non-binding advisory awards, as the CAISO would re-optimize the use of such by the subsequent Real-Time Unit Commitment that is run closer to the time the Ancillary Service will actually be needed.

Under the Real-Time Market requirements as designed at the time, external Non-Dynamic System Resources designated in the HASP to provide Ancillary Services (Operating Reserves) in the next trading hour were required to be dispatchable for energy in real time. The ISO explained in its request for deferral that if it were to continue to procure Ancillary Services from Non-Dynamic System Resources through the Hour-Ahead Scheduling Process, it would be procuring Ancillary Services from resources that are no longer dispatchable in the next hour for the energy required for the Operating Reserves. This would result in the procurement and payment for Operating Reserves that are in essence useless for the ISO in the Real-Time Market, because Non-Dynamic System Resources are not dispatchable intra-hour.

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<sup>7</sup> See *Quarterly Reports on Market Performance of the California Independent System Operator Corporation under ER06-615, et al.*, Filed October 30, 2009.

Since the start of its new market on April 1, 2009, through its stakeholder process the ISO has developed certain dispatch software modifications that will enable it to adopt a new dispatch rule that eliminates this problem for the ISO and its market participants. Under the prior market design, if a Non-Dynamic System Resource was awarded Ancillary Services, it was required to be dispatchable within the next trading hour following the HASP run in which it was awarded. The ISO has developed a proposed solution that changes this dispatch logic for the energy from Ancillary Services procured from Non-Dynamic System Resources in HASP. Under the proposed solution, if a Non-Dynamic System Resource receives a Dispatch Instruction in mid-hour for energy associated with its Ancillary Services (Operating Reserve) capacity awarded in HASP, the ISO will dispatch the resource to operate at a constant level until the end of the hour. In the event that the ISO dispatches the system resource across an hourly boundary, the energy will be dispatched at a constant level until the end of the next hour.

This new dispatch logic is more compatible with the hourly requirements of provision of service by external Non-Dynamic System Resources that are constrained by requirements outside the CAISO Balancing Authority Area and was unopposed in the stakeholder process. The ISO has limited flexibility to dispatch energy from Operating Reserves for Non-Dynamic System Resources in real-time due to agreements between the market participants and the neighboring Balancing Authority Areas. These agreements typically only allow for a one time mid-hour schedule change per hour. This rule allows the ISO to dispatch any required energy without interfering with the external requirements.

The ISO's proposed methodology for dispatching hourly inter-tie Operating Reserve capacity is based on the assumption that the Non-Dynamic System Resources are capable of one mid-hour change in their interchange schedule in real time. Moreover, because under the ISO market design all Operating Reserves procured in HASP are Contingency Only reserves, under the proposed dispatch logic it also follows that the associated energy from Non-Dynamic System Resources are also dispatchable under a Contingency dispatch as Contingency Only reserves.

This proposed dispatch logic reconciles the limitation that Non-Dynamic System Resources are only hourly pre-dispatchable and renders the energy associated with Ancillary Services procured from Non-Dynamic System Resources in HASP useful to the ISO market. The ISO respectfully requests that the commission accept this new rule.

**B. Proposed Rules for Treatment of Energy Bids Associated with Ancillary Services Bids from Non-Dynamic System Resources in the Hour-Ahead Scheduling Process.**

During the stakeholder process in which the ISO addressed the reinstatement of the ISO's ability to procure Ancillary Services from Non-Dynamic System Resources in HASP, stakeholders expressed a concern with the ISO's existing rules pertaining to the treatment of energy bids associated with Ancillary Services bids. Under the current rules, when any Scheduling Coordinator submits an Ancillary Services bid or a submission to self-provide Ancillary Services in the HASP or real-time market, the Scheduling Coordinator is required to also submit an associated energy bid for the affected capacity, for any type of resource including Non-Dynamic System Resources. Even if the ISO does not award the Ancillary Service bid in HASP under the current market rules, it may still dispatch the associated energy bid in the real-time five-minute energy market. While discussing the merits of the proposed energy dispatch logic rules discussed above in the recent stakeholder process, stakeholders expressed concerns that the tariff language should be clarified so as to exempt Non-Dynamic System Resources from these otherwise generally applicable rules.

The ISO reviewed the requests and proposed a solution to accommodate this concern as it pertains specifically to Non-Dynamic System Resources submitting a bid or submission to self-provide Ancillary Services in the HASP. Under the proposed rules, the Scheduling Coordinators would continue to be required to submit an energy bid for Non-Dynamic System Resources submitting an Ancillary Services bid in HASP or the Real-Time Market. However, the ISO will only use the Ancillary Service bid in solving the optimization problem and the associated energy bids will not be used. The ISO will, therefore, not dispatch any energy from the associated energy bid if there is no Ancillary Services awarded to the Non-Dynamic System Resource. However, this proposal does not include any changes to the existing bidding and bid validation rules that require an associated energy bid for all Ancillary Services bids. Therefore, if the Scheduling Coordinator fails to submit an energy bid with an Ancillary Services bid, the ISO will continue to generate an energy bid for the associated default energy bid for the associated Ancillary Services bid and will simply not use such bid to dispatch energy as discussed above.

With this rule change the ISO will not actually consider the energy bid associated Ancillary Services bid from a Non-Dynamic System Resource in HASP. Therefore, there is no opportunity cost from not providing energy by the non-dynamic system resource. In this filing, the ISO proposes no changes to the way in which the Ancillary Services price will be determined, which will reflect the cost of providing the Ancillary Services capacity if the Ancillary Service prices are set by Non-Dynamic System Resource.

Also, as explained above, the ISO will adopt the dispatch rule explained above that if the ISO awards Ancillary Services to a Non-Dynamic System Resource in HASP, any energy dispatched will be held over the full trading hour and such Operating Reserves will be treated as Contingency Only reserves.

These rule changes will prevent the dispatch of energy bids associated with Ancillary Services bids in the event that the ISO does not award the Ancillary Services bid in the HASP. This proposal was put forth in response to specific stakeholder request and no other stakeholder expressed any opposition to these proposed rule changes.

### **III. Stakeholder Process**

The ISO has conducted a stakeholder process to develop the proposed amendments discussed above. The ISO posted a straw proposal on August 5, 2009 and conducted a stakeholder conference call on August 12. Stakeholders submitted written comments and the ISO further developed the policy as discussed above to address specific stakeholder issues. The ISO then developed the draft final proposal and conducted another stakeholder conference call in late August. The draft final proposal was unopposed and in September 2009 the ISO Board of Governors approved the two rule changes proposed in this filing and discussed above.<sup>8</sup>

On November 24, 2009, the ISO posted proposed tariff language to implement the ability to procure Ancillary Services in the HASP and the additional rule changes discussed above. The ISO received written comments by two parties on December 10, 2009, both of which offered clarifying proposed edits, most of which the ISO accepted.

### **IV. Description of Proposed Tariff Changes**

There are four types of amendments proposed in this filing. First, for the most part, the proposed tariff amendments are necessary to reinstate provisions regarding the procurement of Ancillary Services in HASP that were removed from the ISO Tariff before the start of the ISO's new market on April 1, 2009. Second, proposed amendments include new rules that came out of the recent stakeholder process and as discussed above (1) would apply in the Real-Time Market dispatch of energy bids associated with any Ancillary Services awarded in HASP to Non-Dynamic System Resources, and (2) would limit the use of energy Bids associated with the Ancillary Services bids submitted for Non-Dynamic System Resources in HASP to the extent such resources are not dispatched for Ancillary Services. Third, in reviewing the existing tariff language, the ISO determined it is necessary to provide some additional non-substantive clarifications that enable better understanding of the proposed revisions and existing language. Finally, the ISO is proposing changes to shorten or include the title of sections it is

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<sup>8</sup> All stakeholder process related documents are available at:  
<http://www.caiso.com/2401/2401702e12ca0.html>.

modifying in this filing to comply with the Commission's Order 714<sup>9</sup> upcoming eTariff requirements.

The table in Attachment C provides a section by section of the various changes proposed in the context of these general areas.

## **V. Materials Provided in the Instant Filing**

The following documents, in addition to this transmittal letter, support the instant filing:

- |              |   |
|--------------|---|
| Attachment A | Clean ISO Tariff sheets incorporating the red-lined changes contained in Attachment B   |
| Attachment B | Red-lined changes to the ISO Tariff to implement the revisions contained in this filing |
| Attachment C | Table explaining proposed changes by Tariff section                                     |
| Attachment D | Board Memo and Decision Accepting Proposed changes                                      |

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<sup>9</sup> The following section titles are being modified for this purpose: 8.3.2, 8.3.5, 8.3.7, 8.7.11.1.2, 11.10.4.1, 11.10.9, 11.10.9.1, 11.16.1, 27.1.2.2 and 34.13. 124 FERC ¶ 61,270 (2008).

## **VI. Correspondence**

The ISO requests that all correspondence, pleadings and other communications concerning this filing be served upon the following:

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Senior Counsel

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Senior Counsel

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\*Individuals designated for service pursuant to 18 C.F.R. § 203(b)(3).

## **VII. Effective Date.**

The ISO requests that the Commission approve this compliance filing as submitted to be effective April 1, 2010.

## **VIII. Service.**

Copies of this filing have been served upon the California Public Utilities Commission and the California Energy Commission. In addition, the filing has been served upon all parties designated on the Service List for Docket No. ER06-213 and all the ISO Scheduling Coordinators. The filing is also posted on the CAISO's website.

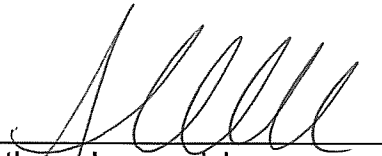
## **IX. Conclusion**

For the reasons set forth above, the ISO respectfully requests that the Commission approve the instant tariff amendment filing as it will enable the ISO to procure Ancillary Services from Non-Dynamic System Resources as previously accepted by the Commission.



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Respectfully submitted,



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## CERTIFICATE OF SERVICE

I hereby certify that I have served the foregoing document upon the parties listed on the official service list in the captioned proceedings, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated at Folsom, California this 21<sup>st</sup> day of December, 2009.

  
Jane Ostapovich

**Attachment A – Clean Sheets**  
**HASP Procurement of Ancillary Services Amendment**  
**Fourth Replacement CAISO Tariff**  
**December 23, 2009**

**8. ANCILLARY SERVICES.**

**8.1 Scope.**

The CAISO shall be responsible for ensuring that there are sufficient Ancillary Services available to maintain the reliability of the CAISO Controlled Grid consistent with NERC and WECC reliability standards, including any requirements of the NRC. The CAISO's Ancillary Services requirements may be self-provided by Scheduling Coordinators as further provided in the Business Practice Manuals. Those Ancillary Services which the CAISO requires to be available but which are not being self-provided will be competitively procured by the CAISO from Scheduling Coordinators in the Day-Ahead Market, the HASP, and the RTM consistent with Section 8.3. The provision of Ancillary Services from the Interties with interconnected Balancing Authority Areas is limited to Ancillary Services bid into the competitive procurement processes in the IFM, HASP, and RTM. The CAISO will not accept Submissions to Self-Provide Ancillary Services that are imports to the CAISO Balancing Authority Area over the Interties with interconnected Balancing Authority Areas, except from Dynamic System Resources certified to provide Ancillary Services or if provided pursuant to ETCs, TORs or Converted Rights. The CAISO will calculate payments for Ancillary Services supplied by Scheduling Coordinators and charge the cost of Ancillary Services to Scheduling Coordinators based on their Ancillary Service Obligations.

include, but are not limited to: (a) analysis of the deviation between actual and forecast Demand; (b) analysis of patterns of unplanned Generating Unit Outages; (c) analysis of compliance with NERC and WECC reliability standards, including any requirements of the NRC; (d) analysis of operation during system disturbances; (e) analysis of patterns of shortfalls between Day-Ahead Schedules and actual Generation and Demand; and (f) analysis of patterns of unplanned transmission Outages.

### **8.2.3 Quantities of Ancillary Services Required and Use of Ancillary Service Regions.**

For each of the Ancillary Services, the CAISO shall determine the quantity and location of the Ancillary Service which is required using Ancillary Service Regions as described in Section 8.3.3. For each of the Ancillary Services, the CAISO shall determine the required locational dispersion in accordance with CAISO Controlled Grid reliability requirements. The Ancillary Services provided must be under the direct Dispatch control of the CAISO on a Real-Time Dispatch Interval basis. The CAISO shall determine the quantities it requires as provided for in Sections 8.2.3.1 to 8.2.3.3.

#### **8.2.3.1 Regulation Service.**

The CAISO shall maintain sufficient Generating Units immediately responsive to AGC in order to provide sufficient Regulation service to allow the CAISO Balancing Authority Area to meet NERC and WECC reliability standards, including any requirements of the NRC by continuously balancing Generation to meet deviations between actual and scheduled Demand and to maintain Interchange Schedules. The quantity of Regulation Down and Regulation Up capacity needed for each Settlement Period of the Day-Ahead Market and in each fifteen (15) minute period in Real-Time shall be determined by the CAISO as a percentage of the applicable CAISO Forecast of CAISO Demand for the Day-Ahead and Real-Time Markets. In HASP, the amount of advisory Regulation from Dynamic System Resources required for each Settlement Period in the next Trading Hour is also determined based on the CAISO Forecast of CAISO Demand. The advisory awards of Regulation from Dynamic System Resources in HASP are not binding and are re-optimized through the RTUC and RTD processes in the Real-Time Market. The CAISO's determination is based upon its need to meet the NERC and WECC reliability standards, including any requirements of the NRC.

- (c) Regulation Up and Spinning Reserve requirements must be collectively satisfied by the combination of Regulation Up and Spinning Reserve Bids. Spinning Reserve and Regulation may be provided as separate services from the same Generating Unit, provided that the sum of Spinning Reserve and Regulation Up provided is not greater than the maximum Ramp Rate of the Generating Unit (MW/minute) times ten (10);
- (d) Additional Regulation Up and Spinning Reserve capacity can be used to satisfy requirements for Non-Spinning Reserve.
- (e) Regulation Up, Spinning Reserve, and Non-Spinning Reserve requirements must be collectively satisfied by the combination of Regulation Up, Spinning Reserve and Non-Spinning Reserve Bids;
- (f) Total MW purchased from the Regulation Up, Spinning Reserve, and Non-Spinning Reserve markets will not be changed by this Section 8.2.3.5; and
- (g) Regulation Energy resulting from Regulation that substituted for another Ancillary Service continues to be treated as Regulation Energy regardless of for what service it substituted.

**8.3 Procurement of Ancillary Services, Certification and Testing Requirements for Providers of Ancillary Services, and Time-frame For Contracting for Ancillary Services.**

**8.3.1 Procurement of Ancillary Services.**

The CAISO shall operate a competitive Day-Ahead Market, HASP, and Real-Time Markets to procure Ancillary Services. The Security Constrained Unit Commitment (SCUC) and Security Constrained Economic Dispatch (SCED) applications used in the Integrated Forward Market (IFM), HASP, and the Real-Time Market (RTM) shall calculate optimal resource commitment, Energy, and Ancillary Services Awards and Schedules at least cost to End-Use Customers consistent with maintaining System Reliability. Any

Scheduling Coordinator representing Generating Units, System Units, Participating Loads or imports of System Resources may submit Bids into the CAISO's Ancillary Services markets provided that it is in possession of a current certificate for the Generating Units, System Units, imports of System Resources or Participating Loads concerned. Regulation Up, Regulation Down, and Operating Reserves necessary to meet CAISO requirements not met by self-provision will be procured by the CAISO as described in this CAISO Tariff. The amount of Ancillary Services procured in the IFM is based on the CAISO Forecast of CAISO Demand and the forecasted intertie schedules in HASP for the Operating Hour net of (i) Self-Provided Ancillary Services from Generating Units internal to the CAISO Balancing Authority Area and Dynamic System Resources certified to provide Ancillary Services and (ii) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right. The amount of additional Ancillary Services procured in the HASP is based on the CAISO Forecast of CAISO Demand, the Day-Ahead Schedules established net interchange, and the forecast of the intertie schedules for the Operating Hour in the HASP net of (i) available awarded Day-Ahead Ancillary Services, (ii) Self-Provided Ancillary Services from Generating Units internal to the CAISO Balancing Authority Area and Dynamic System Resources certified to provide Ancillary Services, and (iii) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right. The amount of Ancillary Services procured in the Real-Time Market is based upon the CAISO Forecast of CAISO Demand and the HASP Intertie Schedule established net interchange for the Operating Hour net of (i) available awarded Day-Ahead Ancillary Services, (ii) Self-Provided Ancillary Services from Generating Units internal to the CAISO Balancing Authority Area and Dynamic System Resources certified to provide Ancillary Services, (iii) additional Operating Reserves procured in HASP, and (iv) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right.

The CAISO will manage the Energy from both CAISO procured and Self-Provided Ancillary Services as part of the Real-Time Dispatch. In the Day-Ahead Market, the CAISO procures one-hundred percent (100%) of its Ancillary Service requirements based on the Day-Ahead Demand Forecast net of Self-Provided Ancillary Services. After the Day-Ahead Market, the CAISO procures additional Ancillary Services needed to meet system requirements from all resources, including imports from Non-Dynamic System Resources in the HASP, and Dynamic System Resources and Generation from internal resources in the Real-Time Market. The amount of Ancillary Services procured in the HASP and Real-Time Market is based upon the CAISO Forecast of CAISO Demand for the Operating Hour and RTUC Time Horizon, respectively, net of Self-Provided Ancillary Services.

The CAISO procurement of Ancillary Services from Non-Dynamic System Resources in the HASP is for the entire next Operating Hour. The CAISO procurement of Ancillary Services from Dynamic System Resources and internal Generation in the Real-Time Market is for a fifteen (15) minute RTUC Time Horizon. The CAISO's procurement of Ancillary Services from Non-Dynamic System Resources in HASP and from Dynamic System Resources and internal Generation in the Real-Time Market is based on the Ancillary Service Bids submitted or generated in the HASP consistent with the requirements in Section 30. The CAISO may also procure Ancillary Services pursuant to the requirements in Section 42.1 and as permitted under the terms and conditions of a Reliability Must-Run Contract.



As of the CAISO Operations Date, the CAISO will contract for long-term Voltage Support service with owners of Reliability Must-Run Units under Reliability Must-Run Contracts. Black Start capability will initially be procured by the CAISO through individual contracts with Scheduling Coordinators for Reliability Must-Run Units and other Generating Units which have Black Start capability. These requirements and standards apply to all Ancillary Services whether self-provided or procured by the CAISO.

### **8.3.2 Procurement Internal and External Resources**

The CAISO will procure Spinning Reserves and Non-Spinning Reserves from Generating Units operating within the CAISO Balancing Authority Area and from imports of System Resources. Scheduling Coordinators are allowed to bid Regulation from resources located outside the CAISO Balancing Authority Area by dynamically scheduling such System Resources certified to provide Regulation. Each System Resource used to bid Regulation must comply with the Dynamic Scheduling Protocol in Appendix X. Scheduling Coordinators may submit Bids for Operating Reserves from Non-Dynamic System Resources but they may not submit Bids for Regulation from such resources because these resources cannot be dynamically scheduled consistent with Appendix X. When bidding to supply Ancillary Services in the IFM, HASP, or RTM, imports compete for use of Intertie transmission capacity when the requested use is in the same direction, e.g., imports of Ancillary Services compete with Energy on Interties in the import direction and exports of Ancillary Services (i.e., on demand obligations) compete with Energy on Interties in the export direction. To the extent there is Congestion, imports of Ancillary Services will pay Congestion costs in the IFM, HASP, and RTM markets pursuant to Section 11.

### **8.3.3 Ancillary Service Regions and Regional Limits.**

The CAISO will procure Ancillary Services using Ancillary Service Regions and Ancillary Service Sub-Regions. There are two Ancillary Service Regions and eight Ancillary Service Sub-Regions. The two Ancillary Service Regions are the System Region (i.e., the CAISO Balancing Authority Area) and the Expanded System Region (i.e., the System Region and Intertie Scheduling Points with adjacent

### **8.3.3.2 Criteria For Use of Ancillary Service Regions and Sub-Regions.**

The CAISO's use of an Ancillary Service Sub-Region occurs when the CAISO establishes a minimum or maximum limit for that Sub-Region. The CAISO's use of minimum and maximum procurement limits for Ancillary Services help to ensure that the Ancillary Services required in the CAISO Balancing Authority Area are dispersed appropriately throughout the CAISO Balancing Authority Area and accurately reflect the system topology and deliverability needs. The factors the CAISO will look to in determining whether to establish or change minimum or maximum limits, include but are not limited to, the following: (a) the CAISO Forecast of CAISO Demand, (b) the location of Demand within the Balancing Authority Area, (c) information regarding network and resource operating constraints that affect the deliverability of Ancillary Services into or out of an Ancillary Service Region, (d) the locational mix of generating resources, (e) generating resource Outages, (f) historical patterns of transmission and generating resource availability, (g) regional transmission limitations and Constraints, (h) transmission Outages, (i) Available Transfer Capability, (j) DA Schedules or HASP Intertie Schedules, (k) whether any Ancillary Services provided from System Resources requiring a NERC tag fail to have a NERC tag, and (l) other factors affecting System Reliability. Ancillary Services procured within a Sub-Region count toward satisfying the Ancillary Service requirements for the System Region or the Expanded System Region.

### **8.3.3.3 Notice to Market Participants.**

Pursuant to Section 6.5.2.3.3, the CAISO will publish forecasted Ancillary Service requirements, regional constraints, and the minimum and/or maximum Ancillary Service Regional Limits for the Ancillary Service Regions and any Sub-Regions by 6:00 p.m. prior to the Day-Ahead Market (two days prior to the Operating Day). After the completion of the Day-Ahead Market for a given Trading Day, the CAISO will publish the limits that were used in the IFM. If prior to the close of the HASP for a Trading Hour the CAISO makes a substantial change to a minimum and/or maximum limit for an Ancillary Service Region or Sub-Region, it

will issue a Market Notice as soon as reasonably practicable after the occurrence of the circumstances that led to the change. After the close of the HASP for a Trading Hour, the CAISO will publish the limits that were used in the HASP and RTUC.

#### **8.3.3.4 Establishment of New Ancillary Service Regions or Sub-Regions.**

The CAISO will consider adjusting the boundaries of the existing Ancillary Service Regions or creating a new Ancillary Service Region through a stakeholder process if: (a) there is a persistent difficulty in obtaining an appropriate distribution of Ancillary Services in the CAISO Balancing Authority Area using market procurement mechanisms, and (b) adjusting the boundaries of the existing Ancillary Service Regions or creating a new Ancillary Service Region would reduce the persistent difficulty in obtaining an appropriate distribution of Ancillary Services in the CAISO Balancing Authority Area using market procurement mechanisms. Factors that would affect the CAISO's determination to consider adjusting the boundaries of the existing Ancillary Service Regions or creating a new Ancillary Service Region include, but are not limited to operational reliability needs, the pattern of the growth of Demand in the CAISO Balancing Authority Area, the addition of new generating resources, the retirement of existing generating resources, the addition of new transmission facilities, changes in regional transmission limitations, changes in Available Transfer Capability, and extended transmission or generating resource Outages. If the CAISO considers adjusting the boundaries of the existing Ancillary Service Regions or creating a new Ancillary Service Region, the CAISO will conduct an analysis to determine whether the adjustments being considered create market power issues in either the new Ancillary Service Regions being considered or the pre-existing Ancillary Service Regions. The CAISO's analysis will be included in the stakeholder process and stakeholders will be able to comment on any new market power mitigation measures proposed for the CAISO's procurement of Ancillary Services.

from resources including Loads, Generating Units, and System Units, which have been certified and tested by the CAISO using the process defined in Part D of Appendix K. Black Start capability may only be provided from Generating Units which have been certified and tested by the CAISO using the process defined in Part E of Appendix K. CAISO certification to provide Ancillary Services may be revoked by the CAISO under the provisions of this CAISO Tariff, including Appendix K.

### **8.3.5 Daily and Hourly Procurement**

The CAISO shall procure Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve on a daily and Real-Time basis in the IFM and RTM, respectively. The CAISO shall also procure Spinning and Non-Spinning Reserves on an hourly basis in the HASP. The CAISO shall procure Ancillary Services on a longer-term basis pursuant to Section 42.1.3 if necessary to meet Reliability Criteria. The CAISO shall contract for Voltage Support annually (or for such other period as the CAISO may determine is economically advantageous) and on a daily or hourly basis as required to maintain System Reliability. The CAISO shall contract annually (or for such other period as the CAISO may determine is economically advantageous) for Black Start Generation.

### **8.3.6 Market-Based Prices.**

Public utilities under the FPA must submit Bids for Ancillary Services capped at FERC authorized cost-based rates unless and until FERC authorizes different pricing. Public utilities under the FPA shall seek FERC Ancillary Services rate approval on bases consistent with the CAISO time-frame for contracting for each Ancillary Service (hourly rate for some Ancillary Services, annual rate or otherwise for other Ancillary Services) so that cost-based Bids and market-based Bids for each service shall be on comparable terms. All other entities may use market-based rates not subject to any restrictions apart from those found in this CAISO Tariff. Public utilities under the FPA which have not been approved to bid at market-based rates will not be paid above their cost-based Bid for the Ancillary Service concerned even if the relevant Market Clearing Price is higher.

### **8.3.7 AS Bidding Requirements**

Scheduling Coordinators may submit Bids or Submissions to Self-Provide an Ancillary Service consistent with the rules specified in Section 30 and any further requirements in this Section 8.3.7. Scheduling Coordinators may (i) submit Bids or Submissions to Self-Provide an Ancillary Service from resources located within the CAISO Balancing Authority Area or Dynamic System Resources certified to provide Ancillary Services, (ii) submit Submissions to Self-Provide an Ancillary Service from System Resources located outside the CAISO Balancing Authority Area if provided pursuant to ETCs, TORs, or Converted Rights, (iii) submit Bids for Ancillary Services from Dynamic and Non-Dynamic System Resources located outside the CAISO Balancing Authority Area certified to provide Ancillary Services, or (iv) submit Inter-SC Trades of Ancillary Services. Ancillary Services procured in the IFM and in the Real-Time Market are comprised of the following: Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve. The HASP process evaluates the need for Energy, Regulation and Operating Reserves from System Resources and internal Generating Units and issues binding Ancillary Services awards only for Operating Reserves Ancillary Services from Non-Dynamic System Resources. Each Generating Unit (including Physical Scheduling Plants), System Unit, Participating Load, or System Resource for which a Scheduling Coordinator wishes to submit Ancillary Service Bids must meet the requirements set forth in this CAISO Tariff. The same resource capacity may be simultaneously offered to the same CAISO Market for multiple Ancillary Services types. Ancillary Services Bids and Submissions to Self-Provide an Ancillary Service can be submitted up to seven (7) days in advance. The CAISO will only use Operating Reserve Ramp Rates for procuring capacity associated with the specific Ancillary Services. The CAISO will issue Real-Time Dispatch Instructions in the Real-Time Market for the Energy associated with the awarded capacity based upon the applicable Operational Ramp Rate submitted with the single Energy Bid Curve in accordance with Section 30.7.7. There is no ability to procure Ancillary Services for export.

To the extent a Scheduling Coordinator has an on-demand obligation to serve loads outside the CAISO Balancing Authority Area, it can do so provided that (1) it is using export transmission capacity available in Real-Time, and (2) the resource capacity providing Energy to satisfy the on-demand obligation is not under an RMR Contract or Resource Adequacy Capacity obligation, and has not been paid a RUC Availability Payment for the Trading Hour. All resources subject to the Ancillary Services must offer requirements, as specified in Section 40.6, must submit Bids consistent with the requirements specified therein and in Section 30.

**8.6 Obligations for and Self-Provision of Ancillary Services.**

**8.6.1 Ancillary Service Obligations.**

Each Scheduling Coordinator shall be assigned a share of the total Regulation Down, Regulation Up, Spinning Reserve, and Non-Spinning Reserve requirements by the CAISO, as set forth in Sections 11.10.2, 11.10.3 and 11.10.4, (i.e., a share of the total requirements for each Ancillary Service in the Day-Ahead Market, HASP, and the Real-Time Market). Any references in this CAISO Tariff to Regulation shall be read as referring to Regulation Up or Regulation Down.

**8.6.2 Right to Self-Provide.**

Each Scheduling Coordinator may choose to self-provide all, or a portion, of its Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve obligations in the IFM, and, to the extent needed to satisfy CAISO's additional requirement, HASP and the Real-Time Market, from resources eligible for self-provision, as may be permissible for any given Ancillary Service in these respective markets. The right to self-provide Ancillary Services from capacity that is under a contractual obligation to provide Energy, including but not limited to capacity subject to an RMR Contract and local Resource Adequacy Resources, shall be conditional; self-provision of Ancillary Services from such capacity will only be permitted to the extent that capacity is not needed for Energy as a result of the MPM-RRD process described in this CAISO Tariff. To self-provide Ancillary Services a Scheduling Coordinator must provide the CAISO with a Submission to Self-Provide an Ancillary Service. Both Ancillary Service Bids and Submissions to Self-Provide an Ancillary Service can be provided to the CAISO for the same Ancillary Service and for the same hour in the same market. To the extent the Submission to Self-Provide an Ancillary Service is from a resource that is a Partial Resource Adequacy Resource, and Energy is needed, including for purposes under Section 31.3.1.3, from that resource the

CAISO shall only disqualify the self-provision of Ancillary Services from the portion of the resource's capacity that has must-offer obligation, provided that the Scheduling Coordinator has not submitted an Energy Bid for the capacity that is not subject to a must-offer obligation. The CAISO will treat resources subject to Resource Adequacy requirements consistently with and such resources must comply with the bidding requirements in Section 40.6. If there is an Energy Bid submitted for the capacity of a Partial Resource Adequacy Resource that is not subject to a must-offer obligation the CAISO may disqualify the Submission to Self-Provide an Ancillary Service for the portion of the resources capacity that is not under a must-offer obligation consistent with the principles of co-optimization under the CAISO Tariff.

Prior to evaluating Ancillary Service Bids, the CAISO will determine whether Submissions to Self-Provide Ancillary Services are feasible with regard to resource operating characteristics and regional constraints and are qualified to provide the Ancillary Services in the markets for which they were submitted.



If the total Submissions to Self-Provide Ancillary Services exceed the maximum regional requirement for the relevant Ancillary Service in an Ancillary Service Region, the submissions that would otherwise be accepted by the CAISO as feasible and qualified will be awarded on a pro-rata basis among the suppliers offering to self-provide the Ancillary Service up to the amount of the Ancillary Services requirement. If a regional constraint imposes a limit on the total amount of Regulation Up, Spinning Reserve, and Non-Spinning Reserve, and the total self-provision of these Ancillary Services in that region exceeds that limit, Self-Provided AS are qualified pro rata from higher to lower quality service in three tiers: Regulation Up first, followed by Spinning Reserve, and then by Non-Spinning Reserve. Submissions to Self-Provide Ancillary Services in excess of the maximum regional requirement for the relevant Ancillary Service in an Ancillary Service Region will not be accepted and qualified by the CAISO as Self-Provided Ancillary Services.

The CAISO shall schedule Self-Provided Ancillary Services to the extent qualified in the IFM, HASP, and the RTM and Dispatch Self-Provided Ancillary Services in the Real-Time. To the extent that a Scheduling Coordinator self-provides Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve, the CAISO shall correspondingly reduce the quantity of the Ancillary Services it procures from Bids submitted in the IFM, HASP, and the Real-Time Market. To the extent a Scheduling Coordinator's Self-Provided Ancillary Service for a particular Ancillary Service is greater than the Scheduling Coordinator's obligation for that particular Ancillary Service in a Settlement Interval, the Scheduling Coordinator will receive the user rate for the Self-Provided Ancillary Service for the amount of the Self-Provided Ancillary Service in excess of the Scheduling Coordinator's obligation.

## **8.7 Ancillary Services Awards**

The CAISO shall provide Scheduling Coordinators with Ancillary Services Awards for the Day-Ahead, HASP and Real-Time Markets consistent with the provisions of the CAISO Tariff. The CAISO shall post the Ancillary Service Awards and Ancillary Service Schedules for the applicable Day-Ahead Market no later than the publication of the Day-Ahead Schedule for the applicable Day-Ahead Market; no later than approximately forty (40) minutes prior to the Operating Hour of their Ancillary Services Awards and Ancillary Service Schedules from Non-Dynamic System Resources in the HASP; and no later than approximately fifteen (15) minutes prior to the next Commitment Interval in the Real-Time Market. Where long-term contracts are involved, the information may be treated as standing information for the duration of the contract.

Once the CAISO has given Scheduling Coordinators notice of the Day-Ahead, HASP and Real-Time Market Ancillary Service Awards and Ancillary Service Schedules, these awards and Schedules represent binding commitments made in the markets between the CAISO and the Scheduling Coordinators concerned, subject to any amendments issued as described above.

## **8.8 Black Start.**

- (a) Black Start shall meet the standards specified for Black Start in this CAISO Tariff and Appendix K; and
- (b) the CAISO will dispatch Black Start Generating Units as required in accordance with the applicable Black Start agreement.

## **8.9 Verification, Compliance Testing, and Audit of Ancillary Services.**

Availability of contracted and Self-Provided Ancillary Services and RUC Capacity shall be verified by the CAISO by unannounced testing of Generating Units, Loads and System Resources, by auditing of response to CAISO Dispatch Instructions, and by analysis of the appropriate Meter Data, or Interchange Schedules. The CAISO may test the capability of any Generating Unit, System Unit, System Resource, external import of a System Resource, Participating Load, or reactive device providing Ancillary Services or RUC Capacity. Participating Generators, owners or operators of Participating Loads, operators of

- (d) The CAISO shall calculate, account for and settle all charges and payments based on the Settlement Quality Meter Data it has received, or, if Settlement Quality Meter Data is not available, based on the best available information or estimate it has received in accordance with the provisions in Section 10 and the applicable Business Practice Manuals; and
- (e) Day-Ahead Schedules, RUC Awards and AS Awards shall be settled at the relevant LMP, RUC Price, and ASMPs, respectively. HASP Intertie Schedules shall be settled at the relevant HASP Intertie LMP at the relevant Scheduling Point. All Dispatch Instructions shall be deemed delivered and settled at relevant Real-Time Market prices. Deviations from Dispatch Instructions shall be settled as Uninstructed Deviations.

**11.1.1 [NOT USED]**

**11.1.2 Settlement Charges and Payments**

The CAISO shall settle the following charges in accordance with this CAISO Tariff: (1) Grid Management Charge; (2) Bid Cost Recovery; (3) IFM charges and payments, including Energy and Ancillary Services; (4) RUC charges and payments; (5) Real-Time Market charges and payments, including Energy and Ancillary Services; (6) HASP charges and payments for Energy and Ancillary Services; (7) High Voltage Access Charges and TAC Transition Charges; (8) Wheeling Access Charges; (9) Voltage Support and Black Start charges; (10) Excess Cost Payments; (11) default interest charges; (12) CRR Charges and Payments, (13) Inter-SC Trades charges and payments; (14) neutrality adjustments; (15) FERC Annual Charges; (16) distribution of excess Marginal Losses; (17) miscellaneous charges and payments; and (18) Participating Intermittent Resource Fees.

**11.10.1.1.1 Congestion Charges for Day-Ahead Intertie Ancillary Service Awards.**

Suppliers of Day-Ahead Ancillary Services Awards and qualified Self-Provided Ancillary Services over the Interties also are charged for Congestion if the Ancillary Service Award or the qualified Self-Provided Ancillary Service is at a congested Scheduling Point. The charge shall be equal to the Shadow Price of the applicable congested Scheduling Point multiplied by the quantity of the Ancillary Service Award or the capacity of the qualified Self-Provided Ancillary Service for the Settlement Period; provided, however, that no such charge for Congestion will apply to any qualified Self-Provided Ancillary Service that is within the entitlement of an Existing Right, Converted Right or Transmission Ownership Right.

**11.10.1.2 Ancillary Services Provided in HASP**

The HASP optimization establishes Ancillary Services Awards and prices for Ancillary Services provided from Non-Dynamic System Resources in the HASP. The CAISO pays Scheduling Coordinators that supply Ancillary Services from Non-Dynamic System Resources an amount equal to the product of the simple average of the ASMPs computed for four (4) fifteen (15) minute intervals of HASP for each Ancillary Service as described in Section 27.1.2, and the quantity of the capacity awarded for the Ancillary Service in the Settlement Period. The CAISO charges Scheduling Coordinators that receive an Ancillary Service Award or have qualified Self-Provided Ancillary Services at a Scheduling Point in HASP the simple average of the fifteen (15) minute Marginal Cost of Congestion over the applicable Trading Hour as described in Section 11.10.1.2.1.

#### **11.10.1.2.1 Congestion Charges**

If a Scheduling Coordinator receives an Ancillary Services Award or provides a qualified Self-Provided Ancillary Service at a congested Scheduling Point, the CAISO will charge the Scheduling Coordinator for Congestion. The charge for Congestion at such locations is equal to the simple average of the fifteen (15) minute applicable intertie constraint Shadow Price over the applicable Trading Hour at the location of the Ancillary Service Award, multiplied by the quantity of Ancillary Services Award or the capacity of the qualified Self-Provided Ancillary Service for the Settlement Period. No such charge for Congestion will apply when Scheduling Coordinator's HASP Ancillary Services Awards and qualified Self-Provided Ancillary Services at Scheduling Points are provided pursuant to the CAISO Tariff rules that apply to Existing Rights and Transmission Ownership Rights.

#### **11.10.1.3 Ancillary Services Provided in Real-Time.**

Suppliers of Ancillary Services from resources awarded in RTUC are paid a price equal to one-quarter of the fifteen (15) minute ASMP (in \$/MW/h) in each fifteen (15) minute interval of the applicable Trading Hour in which the capacity is procured for each Ancillary Service times the amount of the capacity awarded (MW) for the Ancillary Service in the relevant Ancillary Services Region for the applicable trading hour in which the capacity is procured. For each Ancillary Service, the ASMP is calculated as set forth in Section 27.1.2. Suppliers of Self-Provided Ancillary Services in the Real-Time Market are not eligible to receive payment using the ASMP; rather to the extent the self-provision is qualified it will be valued at the user rate for the relevant service (i.e., will either reduce the Ancillary Services Obligation or receive the user rate if it exceeds the Scheduling Coordinator's Ancillary Service Obligation) as described in Sections 11.10.2, 11.10.3 and 11.10.4.

**11.10.1.3.1 Congestion Charges for Real-Time Intertie Ancillary Service Awards from Dynamic System Resources.**

For each Settlement Period, the suppliers of Real-Time Ancillary Services Awards or qualified Self-Provided Ancillary Services at Scheduling Points for Dynamic System Resources shall be charged for Congestion and such charge shall be equal to the simple average of the fifteen (15) minute Shadow Prices at the applicable Scheduling Point for the applicable Trading Hour for the awarded or Self-Provided Ancillary Service multiplied by the quantity of the Ancillary Service Award for the capacity of the qualified Self-Provided Ancillary Service for the Settlement Period; provided, however, that no such charge for Congestion will apply to any qualified Self-Provided Ancillary Service that is within the entitlements of an Existing Right or Transmission Ownership Right.

**11.10.1.6 Inadvertent Interchange between Balancing Authority Areas.**

The CAISO shall calculate imbalances between scheduled, instructed and actual quantities of Energy provided based upon Meter Data obtained pursuant to Section 10. Schedules between Balancing Authority Areas shall be deemed as being delivered in accordance with Good Utility Practice. Dynamic Schedules shall be integrated over time through the Operating Hour and the MWh quantity obtained by such integration shall be deemed to be the associated scheduled Interchange for that Operating Hour. The difference between actual and scheduled Interchange shall then be addressed in accordance with the WECC and NERC inadvertent Interchange practices and procedures. Following this practice, all Dynamic Schedules for Ancillary Services provided to the CAISO from Dynamic System Resources in other Balancing Authority Areas shall be deemed delivered to the CAISO. The difference between the Energy requested by the CAISO and that actually delivered by the other Balancing Authority Area shall then be accounted for and addressed through the WECC and NERC inadvertent Interchange practices and procedures.

**11.10.2 Settlement for User Charges for Ancillary Services**

The CAISO shall determine a separate hourly user rate for Regulation Down Reserve, Regulation Up Reserve, Spinning Reserve, and Non-Spinning Reserve purchased for each Settlement Period. The hourly user rates for Regulation Down, Regulation Up, Spinning Reserve, and Non-Spinning Reserve include the cost incurred by the CAISO across the Day-Ahead Market, HASP, and the Real-Time Market to procure this service. In computing the user rate for each service the quantity (MW) and costs of any substituting Ancillary Service will be treated as if they are costs and MW associated with the Ancillary Service need they are being used to fulfill. Each rate will be charged to Scheduling Coordinators on a volumetric basis applied to each Scheduling Coordinator's obligation for the specific Ancillary Service concerned which it has not self-provided, as adjusted by any Inter-SC Trades of Ancillary Services.

Each Scheduling Coordinator's obligation for Regulation Down Reserve, Regulation Up Reserve, Spinning Reserve, and Non-Spinning Reserve shall be calculated in accordance with this Section 11.10.2, notwithstanding any adjustment to the quantities of each Ancillary Service purchased by the CAISO in accordance with Section 8.2.3.5. The cost of Voltage Support and Black Start shall be allocated to Scheduling Coordinators as described in Sections 11.10.7 and 11.10.8.

Ancillary Services Obligations for an individual Scheduling Coordinator (before taking into account Self-Provided Ancillary Services) or Inter-SC Trades of Ancillary Services may be negative. Credits for such negative obligations will be in accordance with the rates calculated in this Section 11.10.2, except that a Scheduling Coordinator's credit shall be reduced pro rata to the extent the sum of the negative obligations of all Scheduling Coordinators with the negative Ancillary Services Obligation (before self-provision or Inter-SC Trade) exceeds the obligation of all Scheduling Coordinators with positive obligation net of Self-Provided Ancillary Services, as specified in Section 11.10.5 in any Settlement Period, the net procurement quantity of Regulation Up, Regulation Down, Spinning Reserve, or Non-Spinning Reserve purchased by the CAISO in the Day-Ahead Market, HASP, and the Real-Time Market due to the operation of Section 8.2.3.5 is zero (0), then the user rate for that Ancillary Service type will be zero (0). With respect to each Settlement Period, in addition to the user rates determined in accordance with this Section 11.10.2, each Scheduling Coordinator shall be charged an additional amount equal to its proportionate share, based on total purchases by Scheduling Coordinators of Regulation Down, Regulation Up, Spinning Reserve, and Non-Spinning Reserve of the amount, if any, by which (i) the total payments to Scheduling Coordinators pursuant to this Section 11.10.2 for the Day-Ahead Market, HASP, and the Real-Time Market, exceed (ii) the total amounts charged to Scheduling Coordinators pursuant to this Section 11.10.2, for the Day-Ahead Market, HASP, and the Real-Time Market. If total amounts charged to Scheduling Coordinators exceed the total payments to Scheduling Coordinators, each Scheduling Coordinator will be refunded its proportionate share, based on total purchases by Scheduling Coordinators of Regulation Down, Regulation Up, Spinning Reserve, and Non-Spinning Reserve.



### **11.10.3 Spinning Reserves.**

The charges a Scheduling Coordinator must pay for Spinning Reserves for each Settlement Period of the Trading Day are based upon the product of the Scheduling Coordinator's hourly obligation for Spinning Reserves (MW) and the hourly user rate for Spinning Reserves (\$/MW).

If the Scheduling Coordinator's Operating Reserve Obligation (before self provision or Inter-SC Trade of Spinning Reserve or Non-Spinning Reserve) is negative, the SC may be entitled to a credit rather than a charge. In that case, the quantity of the SC's negative Operating Reserve Obligation (before self provision and Inter-SC Trade) shall be multiplied by the Negative Operating Reserve Obligation Credit Adjustment Factor (NOROCAP) computed for the Trading Hour as specified in Section 11.10.5.

#### **11.10.3.1 Hourly User Rate for Spinning Reserves.**

The hourly user rate for Spinning Reserves is the ratio of: (1) the sum of the portion of Spinning Reserve Cost used to meet the spin requirement and the portion of Regulation Up cost that can substitute for Spinning Reserve and (2) the Net Procurement quantity of Spinning Reserves by the CAISO (\$/MW).

The cost of Regulation Up substituting for Spinning Reserve is the user rate for Regulation Up multiplied by the quantity of Regulation Up used to satisfy the Spinning Reserve requirement.

The CAISO's Spinning Reserve Cost is equal to: (i) the revenues paid to the suppliers of the total awarded Spinning Reserve capacity in the Day-Ahead Market, HASP, and Real-Time Market, minus, (ii) the payments rescinded due to either the failure to conform to Dispatch Instructions or the unavailability of the Spinning Reserves under Section 8.10.8. The Net Procurement of Spinning Reserves is equal to: (i) the amount (MWs) of total awarded Spinning Reserve capacity in the Day-Ahead Market, HASP, and Real-Time Market, minus, (ii) the Spinning Reserve capacity associated with payments rescinded pursuant to any of the provisions of Section 8.10.8. The amount (MW) of awarded Spinning Reserve capacity includes the amounts (MW) associated with any Regulation Up Reserve capacity used as Spinning Reserve under Section 8.2.3.5.

#### **11.10.4 Non-Spinning Reserves.**

The charges an SC must pay for Non-Spinning Reserves for each Settlement Period of the Trading Day are based upon the product of SC's hourly obligation for Non-Spinning Reserves (MWs) and the hourly user rate for Non-Spinning Reserves (\$/MW).

If the Scheduling Coordinator's Operating Reserve Obligation (before self provision or Inter-SC Trade of Spinning Reserve or Non-Spinning Reserve) is negative, the Scheduling Coordinator may be entitled to a credit rather than a charge. In that case, the quantity of the Scheduling Coordinator's negative Non-Spinning Reserve Obligation (before self provision and Inter-SC Trade) shall be multiplied by the Negative Operating Reserve Obligation Credit Adjustment Factor (NOROCAP) computed for the Trading Hour as specified in Section 11.10.5.

##### **11.10.4.1 Hourly User Rate Non-Spinning Reserves**

The hourly user rate for Non-Spinning Reserves is calculated as the ratio of: i) the sum of the portion of the Non-Spinning Reserve Cost used to meet the Non-Spinning requirement and a portion of the Regulation Up and Spinning Reserve costs that can substitute for Non-Spinning Reserve and ii) the Net Procurement quantity of Non-Spinning Reserves by the CAISO (\$/MW). The CAISO's Non-Spinning Reserve Cost includes the costs associated with any Regulation Up Reserve or Spinning Reserve capacity used as Non-Spinning Reserve under Section 8.2.3.5.

The CAISO's Non-Spinning Reserve Cost is equal to: (i) the revenues paid to the suppliers of the total awarded Non-Spinning Reserve capacity in the Day-Ahead Market, HASP, and Real-Time Market, minus, (ii) the payments rescinded due to either the failure to conform to CAISO Dispatch Instructions or the unavailability of the Non-Spinning Reserves under Section 8.10.8. The Net Procurement of Non-Spinning Reserves is equal to: (i) the amount (MWs) of total awarded Non-Spinning Reserve capacity in the Day-Ahead Market, HASP, and Real-Time Market, minus, (ii) the Non-Spinning Reserve capacity associated with payments rescinded pursuant to any of the provisions of Section 8.10.8. The amount (MW) of

awarded Non-Spinning Reserve capacity includes the amounts (MW) associated with any Regulation Up Reserve or Spinning Reserve capacity used as Non-Spinning Reserve under Section 8.2.3.5.

**11.10.4.2 Hourly Net Obligation for Non-Spinning Reserves.**

Each Scheduling Coordinator's hourly net obligation for Non-Spinning Reserves is determined as follows: the product of the Scheduling Coordinator's total Ancillary Services Obligation for Operating Reserve for the hour (and if negative, multiplied by NOROCAP) multiplied by the ratio of the CAISO's total Ancillary Services Obligation for Non-Spinning Reserves in the hour to the CAISO's total Operating Reserve obligations in the hour, reduced by the accepted Self-Provided Ancillary Services for Non-Spinning Reserves, plus or minus any Non-Spinning Reserve Obligations for the hour acquired or sold through Inter-SC Trades of Ancillary Services. The Scheduling Coordinator's total Operating Reserve Obligation for the hour is the sum of five percent (5%) of its Real-Time Demand (except the Demand covered by firm purchases from outside the CAISO Balancing Authority Area) met by Generation from hydroelectric resources plus seven percent (7%) of its Demand (except the Demand covered by firm purchases from outside the CAISO Balancing Authority Area) met by Generation from non-hydroelectric resources, plus one hundred percent (100%) of any Interruptible Imports, which can only be submitted as a Self-Schedule in the Day-Ahead Market, plus five percent (5%) (if hydro) or seven percent (7%) (if thermal) of any unit-contingent or dynamic imports which it schedules.

**11.10.4.3 Non-Spinning Reserve Neutrality Adjustment.**

For each Settlement Period, the difference between the Non-Spinning Reserve net requirement at the hourly Non-Spinning Reserve user rate determined in Section 11.10.4.1 and the total revenue collected from all Scheduling Coordinators in the Non-Spinning Reserve charge pursuant to Section 11.10.4.2 shall be allocated to all Scheduling Coordinators in proportion to their Non-Spinning Reserve Obligation quantity. The Non-Spinning Reserve net requirement is the Real-Time Non-Spinning Reserve requirement net of the sum of effective qualified Non-Spinning Reserve self-provision over all resources.

**11.10.9 Rescission of Payments for AS Capacity**

The rescission of payments for Ancillary Services for Undispatchable, Unavailable, and Undelivered Capacity applies to Ancillary Services that are awarded in the Day-Ahead Market, HASP, or Real-Time Market and the rescission will be the weighted average of the Ancillary Service Marginal Prices (ASMPs) and Ancillary Services Award amounts for a resource across the Day-Ahead Market, HASP, and Real-Time Market. For Self-Provided Ancillary Service capacity that becomes Undispatchable Capacity, Unavailable Capacity, or Undelivered Capacity, the rescission of Ancillary Services self-provision in the Day-Ahead Market, HASP, and Real-Time Market reduces the relevant Scheduling Coordinator's effective Ancillary Services self-provision in the Ancillary Services cost allocation, effectively resulting in a charge back at the relevant Ancillary Services rate. The rescission of payments in this Section 11.10.9 shall not apply to a capacity payment for any particular Ancillary Service if the Ancillary Service Marginal Price (ASMP) is less than or equal to zero (0).

**11.10.9.1 Rescission Undispatchable AS**

If a Scheduling Coordinator has Undispatchable Capacity that it is obligated to supply to the CAISO during a Settlement Interval, the Ancillary Service capacity payment for the amount of Energy that cannot be delivered from the Generating Unit, Participating Load, System Unit or System Resource for the Settlement Interval shall be rescinded. To the extent that an Ancillary Service procured in the IFM from a System Resource becomes Undispatchable Capacity due to an Intertie transmission derate before the Operating Hour for which it was procured, in rescinding the Ancillary Service capacity payment, the CAISO shall credit back to the Scheduling Coordinator any charge for Congestion assessed pursuant to Section 11.10.1.1.1. If the CAISO procured the Ancillary Services from a Dynamic System Resource, the CAISO will rescind the payments at the lower of the Day-Ahead LMP and the simple average of the fifteen (15) minute Real-Time Shadow Price over the applicable Trading Hour on the corresponding Intertie. If the CAISO procured the Ancillary Service from a Non-Dynamic System Resource, the CAISO will rescind the payments at the lower of the Day-Ahead LMP or, the HASP Shadow Price on the corresponding Intertie.

**11.10.9.2 Rescission of Payments for Unavailable Ancillary Service Capacity.**

Payments to the Scheduling Coordinator representing the Generating Unit, Participating Load, System Unit or System Resource for the Ancillary Service capacity used to supply Uninstructed Imbalance Energy shall not be eliminated to the extent of the deficiency if: (i) the deficiency in the availability of Ancillary Service capacity from the Generating Unit, Participating Load, System Unit or System Resource is attributable to control exercised by the CAISO in that Settlement Interval through AGC operation, an RMR Dispatch Notice, or an Exceptional Dispatch; or (ii) a penalty is imposed under Section 8.10.7 with respect to the deficiency.

In calculating the amount of the payment to be rescinded under Section 8.10.8.2, the CAISO shall reduce the payment for Ancillary Service capacity otherwise payable for the Settlement Interval by the product of the applicable prices and the amount of Ancillary Service capacity from which the Generating Unit, Participating Load, System Unit or System Resource has supplied Uninstructed Imbalance Energy in that Settlement Interval.

#### **11.16.1 Order of Payment Rescission**

If the Generating Unit, Participating Load, System Unit or System Resource is scheduled to provide more than one capacity obligation in a Settlement Interval, the order in which the non-compliant Ancillary Service and RUC Capacity will be apportioned to the various services under Section 8.10.8 is as follows. For Undispatchable Capacity the non-compliant capacity is first apportioned to RUC Capacity and then to any Non-Spinning Reserves. If the amount of Undispatchable Capacity exceeds the amount of Non-Spinning Reserves, then the payment shall be eliminated for Spinning Reserves. For Unavailable Capacity or Undelivered Capacity the non-compliant capacity is first apportioned to any Non-Spinning Reserves. If the amount of non-compliant Ancillary Service capacity exceeds the amount of Non-Spinning Reserves, then the payment shall be eliminated for Spinning Reserves. If the same Ancillary Service is scheduled in the Day-Ahead Market, HASP, or Real-Time Market, then the payments shall be rescinded in proportion to the amount of each Ancillary Service scheduled in each market. If the same Ancillary Service is self-provided and Bid, the order of rescission will be first the amount of Ancillary Service amounts submitted in Bids and then the Self-Provided Ancillary Service.

#### **11.16.2 Load Following Metered Subsystems with an Obligation to Provide Ancillary Service Capacity or RUC Capacity in a Settlement Interval.**

If a Load following MSS Operator is scheduled to provide Ancillary Service capacity, RUC Capacity, or some combination thereof in a Settlement Interval and if the scheduled capacity or a portion thereof is unavailable for some reason during the Settlement Interval, the non-compliant Ancillary Services and RUC Capacity (i.e., Undispatchable, Unavailable, or Undelivered Capacity) will be not be apportioned to the capacity designated by the MSS Operator as Load following up capacity and Load following down capacity. In determining which of the MSS Operator's capacity obligations were not available in Real-Time, the capacity designated by the MSS Operator as Load following up capacity and Load following down capacity shall be preserved or take precedence over the other capacity obligations.

shall assess the cost of Transmission Losses to Scheduling Coordinators using each such facility based on the quantity of losses agreed upon with the neighboring Balancing Authority multiplied by the LMP at the PNode of the Transmission Interface with the neighboring Balancing Authority Area. The MCLs calculated for Locations within the CAISO Balancing Authority Area shall not reflect the cost of Transmission Losses on those facilities.

#### **27.1.1.3 Marginal Cost of Congestion.**

The Marginal Cost of Congestion at a PNode reflects a linear combination of the Shadow Prices of all binding Constraints in the network, each multiplied by the corresponding Power Transfer Distribution Factor (PTDF). The Marginal Cost of Congestion may be positive or negative depending on whether a power injection (i.e., incremental Load increase) at that Location marginally increases or decreases Congestion.

#### **27.1.2 Ancillary Service Prices.**

##### **27.1.2.1 Ancillary Service Marginal Prices.**

As provided in Section 8.3, Ancillary Services are procured and awarded through the IFM, HASP and the Real-Time Market. The IFM calculates hourly Day-Ahead Ancillary Service Awards and establishes Ancillary Service Marginal Prices (ASMPs) for the accepted Regulation Up, Regulation Down, Spinning Reserve and Non-Spinning Reserve Bids. The IFM co-optimizes Energy and Ancillary Services subject to resource, network and regional constraints. In the HASP, the CAISO procures Ancillary Services from Non-Dynamic System Resources for the next Trading Hour as described in Section 33.7. The CAISO calculates the HASP settlement Ancillary Services price as described herein and further described in Section 33.8. In the Real-Time Market, the RTUC process that is performed every fifteen (15) minutes establishes fifteen (15) minute Ancillary Service Schedules, Awards, and prices for the upcoming quarter of the given Trading Hour. ASMPs are determined by first calculating the Ancillary Services shadow prices for each Ancillary Service type and the applicable Ancillary Services Regions. The Ancillary Services shadow prices are produced as a result of the co-optimization of Energy and Ancillary Services for each Ancillary Service Region through the IFM, HASP, and the Real-Time Market, subject to resource, network, and requirements constraints. The Ancillary Services shadow prices

represent the cost sensitivity of the relevant binding regional constraint at the optimal solution, or the marginal reduction of the combined Energy and Ancillary Service procurement cost associated with a marginal relaxation of that constraint. If the regional constraint is not binding for an Ancillary Services Region, then the corresponding Ancillary Services shadow price in the Ancillary Services Region is zero (0). The ASMP for a particular Ancillary Service type and Ancillary Services Region is then the sum of the Ancillary Services shadow prices for the specific type of Ancillary Service and all the other types of Ancillary Services for which the subject Ancillary Service can substitute, as described in Section 8.2.3.5, and for the given Ancillary Service Region and all the other Ancillary Service Regions that include that given Ancillary Service Region.

#### **27.1.2.2 Opportunity Cost in ASMP**

The Ancillary Services shadow price, which as described above, is a result of the Energy and Ancillary Service co-optimization, includes the forgone opportunity cost of the marginal resource, if any, for not providing Energy or other types of Ancillary Services the marginal resource is capable of providing in the relevant market. The ASMPs determined by the IFM or RTUC optimization process for each resource whose Ancillary Service Bid is accepted will be no lower than the sum of (i) the Ancillary Service capacity Bid price submitted for that resource, and (ii) the foregone opportunity cost of Energy in the IFM or RTUC for that resource. The foregone opportunity cost of Energy for this purpose is measured as the positive difference between the IFM or RTUC LMP at the resource's Pricing Node and the resource's Energy Bid price. If the resource's Energy Bid price is higher than the LMP, the opportunity cost measured for this calculation is \$0. If a resource has submitted an Ancillary Service Bid but no Energy Bid and is under an obligation to offer Energy in the Day-Ahead Market (e.g. a non-hydro Resource Adequacy Resource), its Default Energy Bid will be used, and its opportunity cost will be calculated accordingly. If a resource has submitted an Ancillary Service Bid but no Energy Bid and is not under an obligation to offer Energy in the Day-Ahead Market, its Energy opportunity cost measured for this calculation is \$0 since it cannot be dispatched for Energy. For Non-Dynamic System Resources that receive Ancillary Services Awards in HASP, the opportunity cost measured for this purpose is \$0 because, as provided in Section 33.7, the CAISO cannot Schedule Energy in HASP from the Energy Bid under the same Resource ID as the submitted Ancillary Service Bid.



Forecast for the MSS. For an MSS that elects Load following, the MSS Operator shall also self-schedule or bid Supply to match the Demand Forecast. All Bids for MSSs must identify each Generating Unit on an individual unit basis or a System Unit. For an MSS that elects Load following consistent with Section 4.9.13.2, the Scheduling Coordinator for the MSS Operator must include the following additional information with its Bids: the Generating Unit(s) that are Load following; the range of the Generating Unit(s) being reserved for Load following; whether the quantity of Load following capacity is either up or down; and, if there are multiple Generating Units in the MSS, the priority list or distribution factors among the Generating Units. The CAISO will not dispatch the resource within the range declared as Load following capacity, leaving that capacity entirely available for the MSS to dispatch. The CAISO uses this information in the IFM runs and the RUC to simulate MSS Load following. The Scheduling Coordinator for the MSS Operator may change these characteristics through the Bid submission process in the HASP. If the Load following resource is also an RMR Unit, the MSS Operator must not specify the Maximum Net Dependable Capacity specified in the RMR Contract as Load following up or down capacity to allow the CAISO to access such capacity for RMR Dispatch.

#### **30.5.2.6 Ancillary Services Bids.**

There are four distinct Ancillary Services: Regulation Up, Regulation Down, Spinning Reserve and Non-Spinning Reserve. Participating Generators are eligible to provide all Ancillary Services. Dynamic System Resources are eligible to provide Operating Reserves and Regulation. Non-Dynamic System Resources are eligible to provide Operating Reserves only. Scheduling Coordinators may use Dynamic System Resources to Self-Provide Ancillary Services as specified in Section 8. Scheduling Coordinators may not use Non-Dynamic System Resources to Self-Provide Ancillary Services. All System Resources, including Dynamic System Resources and Non-Dynamic System Resources, will be charged the Shadow Price as prescribed in Section 11.10, for any awarded Ancillary Services. Participating Loads are eligible to provide Non-Spinning Reserve only. A Scheduling Coordinator may submit Ancillary Services Bids for Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve for the same capacity by providing a separate price in

\$/MW per hour as desired for each Ancillary Service. The Bid for each Ancillary Services is a single Bid segment. Only resources certified by the CAISO as capable of providing Ancillary Services are eligible to provide Ancillary Services and submit Ancillary Services Bids. In addition to the common elements listed in Section 30.5.2.1, all Ancillary Services Bid components of a Supply Bid must contain the following: (1) the type of Ancillary Service for which a Bid is being submitted; (2) Ramp Rate (Operating Reserve Ramp Rate and Regulation Ramp Rate, if applicable); and (3) Distribution Curve for Physical Scheduling Plant or System Unit. An Ancillary Services Bid submitted to the Day-Ahead Market when submitted to the Day-Ahead Market may be, but is not required to be, accompanied by an Energy Bid that covers the capacity offered for the Ancillary Service. Submissions to Self-Provide an Ancillary Services submitted to the Day-Ahead Market when submitted to the Day-Ahead Market may be, but are not required to be, accompanied by an Energy Bid that covers the capacity to be self-provided. If a Scheduling Coordinator's Submission to Self-Provide an Ancillary Service is qualified as specified in Section 8.6, the Scheduling Coordinator must submit an Energy Bid that covers the self-provided capacity prior to the close of the Real-Time Market for the day immediately following the Day-Ahead Market in which the Ancillary Service Bid was submitted. Except as provided below, the Self-Schedule for Energy need not include a Self-Schedule for Energy from the resource that will be self-providing the Ancillary Service. If a Scheduling Coordinator is self-providing an Ancillary Service from a Fast Start Unit, no Self-Schedule for Energy for that resource is required. If a Scheduling Coordinator proposes to self-provide Spinning Reserve, the Scheduling Coordinator is obligated to submit a Self-Schedule for Energy for that particular resource, unless as discussed above the particular resource is a Fast Start Unit. When submitting Ancillary Service Bids in the HASP and Real-Time Market, Scheduling Coordinators for resources that either have been awarded or self-provide Spinning Reserve or Non-Spinning Reserve capacity in the Day-Ahead Market must submit an Energy Bid for at least the awarded or self-provided Spinning Reserve or Non-Spinning Reserve capacity, otherwise the CAISO will apply the Bid validation rules described in Section 30.7.6.1.

As provided in Section 30.5.2.6.4, a Submission to Self-Provide an Ancillary Service shall contain all of the requirements of a Bid for Ancillary Services with the exception of Ancillary Service Bid price information. In addition, Scheduling Coordinators must comply with the Ancillary Services requirements of Section 8. Scheduling Coordinators submitting Ancillary Services Bids for System Resources in the HASP or Real-Time Market must also submit an Energy Bid for the associated Ancillary Services Bid under the same Resource ID, otherwise the bid validation rules in Section 30.7.6.1 will apply to cover any portion of the Ancillary Services Bid not accompanied by an Energy Bid. As described in Section 33.7, if the resource is a Non-Dynamic System Resource, the CAISO will only use the Ancillary Services Bid in the HASP optimization and will not use the associated Energy Bid for the same Resource ID to schedule Energy from the Non-Dynamic Hourly Resource in the HASP. Scheduling Coordinators must also comply with the bidding rules associated with the must offer requirements for Ancillary Services specified in Section 40.6.

capacity for Regulation, or Operating Reserves on the Generating Units, System Units, Participating Loads and external imports/exports bid. The Scheduling Coordinator will be notified within a reasonable time of any validation errors. For each error detected, an error message will be generated by the CAISO in the Scheduling Coordinator's notification screen, which will specify the nature of the error. The Scheduling Coordinator can then look at the notification messages to review the detailed list of errors, make changes, and resubmit if it is still within the CAISO's timing requirements. The Scheduling Coordinator is also notified of successful validation. If a resource is awarded or has qualified Self-Provided Ancillary Services in the Day-Ahead Market, if no Energy Bid is submitted to cover the awarded or Self-Provided Ancillary Services by the Market Close of HASP and the RTM, the CAISO will generate or extend an Energy Bid as necessary to cover the awarded or Self-Provided Ancillary Services capacity using the registered values in the Master File and relevant fuel prices as described in the Business Practice Manuals for use in the HASP and IFM. If an AS Bid or Submission to Self-Provide an AS is submitted in the Real-Time for Spinning Reserve or Non-Spinning Reserve without an accompanying Energy Bid at all, the AS Bid or Submission to Self-Provide an Ancillary Service will be erased. If an AS Bid or Submission to Self-Provide an AS is submitted in the Real-Time Market for Spinning Reserve and Non-Spinning Reserve with only a partial Energy Bid for the AS capacity bid in, the CAISO will generate an Energy Bid for the uncovered portions. Scheduling Coordinators whose resources are subject to the must offer requirements for Ancillary Services as provided in Section 40 must also comply with the bidding requirements in Section 40.6. The CAISO will apply the bid validation rules to generate necessary Bids consistent with Section 40.6. As provided in Section 33.7, for Non-Dynamic System Resources the CAISO will not use the associated submitted Energy Bid or a Generated Bid for the same Resource ID in the HASP optimization.

For Generating Units with certified Regulation capacity, if there no Bid for Regulation in the Real-Time Market, but there is a Day-Ahead award for Regulation Up or Regulation Down or a submission to self-provide Regulation Up or Regulation Down, respectively, the CAISO will generate a Regulation Up or Regulation Down Bid at the default Ancillary Service Bid price of \$0 up to the certified Regulation capacity for the Generating Unit minus any Regulation awarded or self-provided in the Day-Ahead. If there is a Bid for Regulation Up or Regulation Down in the Real-Time Market, the CAISO will increase the respective Bid up to the certified Regulation capacity for the Generating Unit minus any Regulation awarded or self-provided in the Day-Ahead. If a Self-Schedule amount is greater than the Regulation Limit for Regulation Up, the Regulation Up Bid will be erased.

Notwithstanding any of the provisions of Section 30.7.6.1 set forth above, the CAISO will not insert or extend any Bid for a Resource Adequacy Resource that is a Use-Limited Resource.

### **30.7.6.2 Treatment of Ancillary Services Bids.**

When Scheduling Coordinators bid into the Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve markets, they may submit Bids for the same capacity into as many of these markets as desired at the same time by providing the appropriate Bid information specified in Section 30 to the CAISO. The CAISO optimization will evaluate AS Bids simultaneously with Energy Bids. In the HASP, the CAISO will not consider Energy Bids from Non-Dynamic System Resources submitted in association with Ancillary Services Bids under the same Resource ID in the HASP optimization. A Scheduling Coordinator may specify that its Bid applies only the markets it desires. A Scheduling Coordinator shall also have the ability to specify different capacity prices for the Spinning Reserve, Non-Spinning Reserve, and Regulation markets. A Scheduling Coordinator providing one or more Regulation Up, Regulation Down, Spinning Reserve or Non-Spinning Reserve services may not change the identification of the Generating Units offered in the Day-Ahead Market or in the Real-Time Market for such services unless specifically approved by the CAISO (except with respect to System Units, if any, in which case Scheduling Coordinators are required to identify and disclose the resource specific information for all Generating Units and Participating Loads constituting the System Unit for which Bids and Submissions to Self-Provide Ancillary Services are submitted into the CAISO's Day-Ahead Market and Real-Time Market.

The following principles will apply in the treatment of Ancillary Services Bids in the CAISO Markets:

- (a) The CAISO Market will not differentiate between bidders for Ancillary Services and Energy other than through cost, price, effectiveness, and capability to provide the Ancillary Service or Energy, and the required locational mix of Ancillary Services;

- (b) The CAISO Market will select the bidders with most cost effective Bids for Ancillary Service capacity which meet its technical requirements, including location and operating capability to minimize the costs to users of the CAISO Controlled Grid;
- (c) The CAISO Market will evaluate the Day-Ahead Bids over the twenty-four (24) Settlement Periods of the following Trading Day along with Energy, taking into transmission constraints and AS Regional Limits;

- (d) The CAISO Market will evaluate Bids (of System Resources and Generating Units) in the HASP and establish Ancillary Services Awards from Non-Dynamic System Resources by approximately forty (40) minutes prior to the hour of operation;
- (e) The CAISO Market will establish Real-Time Ancillary Service Awards through RTUC from imports and generation internal to the CAISO Balancing Authority Area at fifteen (15) minutes intervals to the hour of operation; and
- (f) The CAISO Market will procure sufficient Ancillary Services in the Day-Ahead, HASP, and Real-Time Markets to meet its forecasted requirements.

### **30.7.7 Format and Validation of Operational Ramp Rates.**

The submitted Operational Ramp Rate expressed in megawatts per minute (MW/min) as a function of the operating level, expressed in megawatts (MW), must be a staircase function with up to four segments.

There is no monotonicity requirement for the Operational Ramp Rate. The submitted Operational Ramp Rate shall be validated as follows:

- (a) The range of the submitted Operational Ramp Rate must cover the entire capacity of the resource, from the minimum to the maximum operating capacity, as registered in the Master File for the relevant resource.
- (b) The operating level entries must match exactly (in number, sequence, and value) the corresponding minimum and maximum Operational Ramp Rate breakpoints, as registered in the Master File for the relevant resource.
- (c) If a Scheduling Coordinator does not submit an Operational Ramp Rate for a generating unit for a day, the CAISO shall use the maximum Ramp Rate for each operating range set forth in the Master File as the Ramp Rate for that unit for that same operating range for the Trading Day.



**33.5 [NOT USED]**

**33.6 HASP Results.**

The CAISO publishes the binding HASP Intertie Schedules and HASP AS Awards for System Resources, as well as HASP Advisory Schedules and HASP AS Awards for internal Generating Units no later than forty-five (45) minutes prior to the Trading Hour.

**33.7 Ancillary Services in the HASP**

After establishing the Day-Ahead Ancillary Services Awards, the CAISO will procure additional Ancillary Services needed to meet Reliability Criteria to maintain required Ancillary Services arising from changes in forecasts of Demand and resource Outages. The CAISO utilizes the HASP (for Spinning and Non-Spinning Reserve) and the RTUC to procure additional Ancillary Services needed for this purpose for the next Trading Hour. The HASP optimization will consider the optimal mix of Ancillary Services from System Resources and from Generating Units, but only the Ancillary Service from Non-Dynamic System Resources awarded in HASP are binding. These binding Ancillary Services Awards are for the full Trading Hour for which the given HASP run applies. Generating Units and Dynamic System Resources designated in the HASP to provide Ancillary Services for the same Trading Hour receive non-binding advisory Ancillary Services awards because the CAISO will re-optimize the use of these Generating Units and Dynamic System Resources to provide Ancillary Services in a subsequent RTUC run, as described in Section 34.2. The CAISO settles the HASP Ancillary Services Awards for Non-Dynamic System Resources as provided in Section 11.10.1.2. All Operating Reserves procured in HASP are Contingency Only Operating Reserves, as described in Section 30.5.2.6. Scheduling Coordinators submitting Ancillary Services Bids for Non-Dynamic System Resources in the HASP must also submit an Energy Bid under the same Resource ID for the associated Ancillary Services Bid. For these Non-Dynamic System Resources, the CAISO will only use the Ancillary Services Bid in the HASP optimization and will not Schedule Energy in HASP from the Energy Bid provided under the same Resource ID as the Ancillary Services Bid. The CAISO may dispatch Energy from the Contingency Only Operating Reserves awarded to Non-Dynamic System Resources in HASP through the Real-Time Contingency Dispatch as described in Section 34.3.2.

**33.8 HASP Prices for HASP Intertie Schedules.**

The RTUC will produce fifteen (15) minute LMPs for the four (4) fifteen (15) minute RTUC intervals for the applicable Trading Hour. The fifteen (15) minute LMPs corresponding to the Scheduling Points are then used to derive a simple average hourly price for the Settlement of hourly Intertie Schedules at each Scheduling Point. The RTUC also produces fifteen (15) minute ASMPs for the four (4) fifteen (15) minute intervals for the next Trading Hour. The CAISO uses these fifteen (15) minute ASMPs to derive a simple average hourly price for the Settlement of hourly HASP AS Awards. The RTUC run will also produce fifteen (15) minute Shadow Prices for each of the Intertie constraint for the four (4) fifteen (15) minute intervals for the applicable Trading Hour. These fifteen (15) minute Shadow Prices are then used to derive a simple average hourly price for charging hourly Intertie AS Awards providers for Congestion at the applicable intertie. HASP Intertie Schedules and HASP AS Awards are settled in accordance with Section 11.4 and 11.10.1.2, respectively.

**33.8.1 Eligibility to Set the HASP Intertie LMP.**

All Generating Units, Participating Loads, System Resources, System Units, or COGs subject to the provisions in Section 27.7 with Bids, including Generated Bids, that are unconstrained due to Ramp Rates or other temporal constraints are eligible to set the HASP Intertie LMP, provided that (a) the Generating Unit or Resource-Specific System Resource is Dispatched between its Minimum Operating Limit and the highest MW value in its Economic Bid or Generated Bid, or (b) the Participating Load, non-Resource-Specific System Resource, or System Unit is Dispatched between zero (0) MW and the highest MW value in its Economic Bid or Generated Bid. If (a) a resource's Dispatch is constrained by its Minimum Operating Limit or the highest MW value in its Economic Bid or Generated Bid, (b) the CAISO enforces a resource-specific constraint on the resource due to an RMR or Exceptional Dispatch, or (c) the resource's full Ramping capability is constraining its Dispatch for additional Energy in a target interval, the resource cannot be marginal and thus is not eligible to set the HASP Intertie LMP. Resources identified as MSS Load following resources are not eligible to set the HASP Intertie LMP. A Constrained Output Generator that has the ability to be committed or shut off within the Time Horizon of HASP will be eligible to set the Dispatch Interval LMP if any portion of its Energy is necessary to serve Demand. Dispatches of Regulation resources to a Dispatch Operating Point by SCED will be eligible to set the HASP Intertie LMP.

**34.2.1 Commitment of Fast Start and Short Start Resources.**

RTUC produces binding and advisory Start-Up and Shut-Down Dispatch Instructions for Fast Start and Short Start resources that have Start-Up Times that would allow the resource to be committed prior to the end of the relevant Time Horizon of the RTUC run. A Start-Up Dispatch Instruction is considered binding if the resource could not achieve the target start time as determined in the current RTUC run in a subsequent RTUC run as a result of the Start-Up Time of the resource. A Start-Up Instruction is considered advisory if it is not binding, such that the resource could achieve its target Start-Up Time as determined in the current RTUC run in a subsequent RTUC run based on its Start-Up Time. A Shut-Down Instruction is considered binding if the resource could achieve the target Shut-Down Time as determined in the current RTUC in a subsequent RTUC run. A Shut-Down Dispatch Instruction is considered advisory if the resource Shut-Down Instruction is not binding such that the resource could achieve its target Shut-Down time as determined in the current RTUC run in a subsequent RTUC run. A binding Dispatch Instruction that results in a change in Commitment Status will be issued, in accordance with Section 6.3, after review and acceptance of the Start-Up Instruction by the CAISO Operator. An advisory Dispatch Instruction changing the Commitment Status of a resource may be modified by the CAISO Operator to a binding Dispatch Instruction and communicated in accordance with Section 6.3 after review and acceptance by the CAISO Operator. Only binding and not advisory Dispatch Instructions will be issued by the CAISO.

**34.2.2 Real-Time Ancillary Services Procurement.**

If the CAISO determines that additional Ancillary Services are required, other than those procured in the IFM, HASP, the RTUC will procure Ancillary Services on a fifteen (15) minute basis as necessary to meet reliability requirements and will determine Real-Time Ancillary Service interval ASMPs for such AS for the next Commitment Period. All Operating Reserves procured in the RTM are considered Contingency Only Operating Reserves. Any Ancillary Service awarded in RTUC will be taken as fixed for

the three (3) five (5) minute RTD intervals of its target fifteen (15) minute interval. In the RTUC, all resources certified and capable of providing Operating Reserves that have submitted Real-Time Energy Bids shall also submit applicable Spinning or Non-Spinning Reserves Bids, respectively, depending on whether the resource is online or offline. The CAISO will utilize the RTUC to procure Operating Reserves to restore its Operating Reserve requirements in cases when: (1) Operating Reserves awarded in IFM, HASP or RTUC have been dispatched to provide Energy, (2) resource(s) awarded to provide Operating Reserves in the IFM, HASP or RTUC are no longer capable of providing such awarded Operating Reserves, or (3) the Operator determines that additional Operating Reserves are necessary to maintain Operating Reserves within NERC and WECC reliability standards, including any requirements of the NRC. The CAISO will utilize the RTUC to procure additional Regulation capacity in Real-Time in cases when: (1) resource(s) awarded to provide Regulation in the IFM, HASP or RTUC are no longer capable of providing such awarded Regulation, or (2) the Operator determines that additional Regulation is necessary to maintain sufficient control consistent with NERC and WECC reliability standards, including any requirements of the NRC and Good Utility Practice. The RTUC will produce fifteen (15) minute ASMPs for the four (4) binding fifteen (15) minute intervals for the applicable Trading Hour. These fifteen (15) minute ASMPs are then used for the Settlement of the fifteen (15) minute AS Awards. The RTUC run will also produce fifteen (15) minute Shadow Prices for each of the Interties for the four (4) fifteen (15) minute intervals for the applicable Trading Hour. These fifteen (15) minute Shadow Prices are then used to charge for Intertie Real-Time AS Award providers for Congestion on the Interties. RTUC AS Awards are settled in accordance with 11.10.1.3.

### **34.3 Real-Time Dispatch.**

The RTD can operate in three modes: RTED, RTCD and RTMD. The RTED uses a Security Constrained Economic Dispatch (SCED) algorithm every five (5) minutes throughout the Trading Hour to determine optimal Dispatch Instructions to balance Supply and Demand. The CAISO will use the Real-Time Economic Dispatch (RTED) under most circumstances to optimally dispatch resources based on their Bids. The RTED can be used to Dispatch Contingency Only Operating Reserves, pursuant to Section 34.8, when needed to avoid an imminent System Emergency. The Real-Time Contingency Dispatch (RTCD) can be invoked in place of the RTED when a transmission or generation contingency occurs and will include all Contingency Only Operating Reserves in the optimization. If the CAISO awards a Non-Dynamic System Resource Ancillary Services in the IFM or HASP and issues a Dispatch Instruction in the middle of the Trading Hour for Energy associated with its Ancillary Services (Operating Reserve) capacity, the CAISO will Dispatch the Non-Dynamic System Resource to operate at a constant level until the end of the Trading Hour. If the CAISO dispatches a Non-Dynamic System Resource such that the binding interval of the Dispatch is in the next Trading Hour, the CAISO will dispatch Energy from the Non-Dynamic System Resource at a constant level until the end of the next Trading Hour. The dispatched Energy will not exceed the awarded Operating Reserve capacity for the next Trading Hour and will be at a constant level for the entire next Trading Hour. The Real Time Manual Dispatch (RTMD) will be invoked as a fall-back mechanism only when the RTED or RTCD fails to provide a feasible Dispatch. These three (3) modes of the RTD are described in Sections 34.3.1 to 34.3.3.

**34.12 Metered Subsystems.**

Scheduling Coordinators that represent MSSs may submit Bids for Supply of Energy to the RTM, irrespective of whether the MSS is a Load following MSS. All Bids submitted for MSS generating resources for the RTM and all Dispatch Instructions shall be generating resource-specific. MSS non-Load following resources are responsible for following Dispatch Instructions. Load following MSS Operators shall provide the CAISO with an estimate of the number of MWs the applicable generating resource(s) will be generating over the next two hours in five-minute interval resolution. The Dispatch Instructions for Load following resources are incorporated with Generation estimates provided by MSS Operators. Such MSS Load following resources can deviate from the Dispatch Instructions in Real-Time to facilitate the following of Load without being subject to the Uninstructed Deviation Penalty as further described in Section 11.23. The State Estimator will estimate all MSS Load in Real-Time and the CAISO will incorporate the information provided by the Load following MSS Operator for utilization in clearing the RTM and its Dispatch Instructions.

**34.13 Resource Adequacy Capacity Real-Time Market**

Resource Adequacy Resources required to offer their Resource Adequacy Capacity in accordance with Section 40 shall be required to submit Energy Bids for: (1) all such Resource Adequacy Capacity and (2) any Ancillary Services capacity awarded or self-provided in the IFM, HASP, or Real-Time Market. In the absence of submitted Bids, as part of the validation described in 30.7, Generated Bids will be used for Resource Adequacy Resources required to offer their Resource Adequacy Capacity in accordance with Section 40. For any capacity from a Resource Adequacy Resource not required to offer Resource Adequacy Capacity in accordance with Section 40 that was awarded or is self-providing Operating Reserves capacity in the IFM, Scheduling Coordinators must submit an Energy Bid for no less than the amount of awarded or self-provided Operating Reserves capacity above their Day-Ahead

Schedule. Resource Adequacy Resources that are not required to offer their Resource Adequacy Capacity in accordance with Section 40 may voluntarily submit Energy Bids or Ancillary Services Bids. Submitted Energy Bids shall be subject to the maximum and minimum Bid requirements and Mitigation Measures as set forth in Section 39.

**34.14 Real-Time Operational Activities in the Hour Prior to the Settlement Period.**

**34.14.1 Confirm Interchange Transaction Schedules (ITSs).**

Also in the hour prior to the beginning of the Operating Hour the CAISO will:

- (a) adjust Interchange transaction schedules (ITSs) as required under Existing Contracts in accordance with the procedures in the CAISO Tariff for the management of Existing Contracts;
- (b) adjust ITSs as required by changes in transfer capability of transmission paths occurring after Market Close of the HASP; and
- (c) agree on ITS changes with adjacent Balancing Authorities.

**34.15 Rules For Real-Time Dispatch of Imbalance Energy Resources.**

**34.15.1 Resource Constraints.**

The SCED shall enforce the following resource physical Constraints:

- (a) Minimum and maximum operating resource limits. Outages and limitations due to transmission clearances shall be reflected in these limits. The more restrictive operating or regulating limit shall be used for resources providing Regulation so that the SCED shall not Dispatch them outside their Regulating Range.
- (b) Forbidden Operating Regions. When ramping in the Forbidden Operating Region, the implicit ramp rate as determined from the resource's transit time will be used when Dispatching in the Forbidden Operating Region even if the Forbidden Operating Region constraint is not enforced through the SCED process.



**Attachment B - Blacklines**  
**HASP Procurement of Ancillary Services Amendment**  
**Fourth Replacement CAISO Tariff**  
**December 23, 2009**

## **8.1 Scope.**

The CAISO shall be responsible for ensuring that there are sufficient Ancillary Services available to maintain the reliability of the CAISO Controlled Grid consistent with NERC and WECC reliability standards, including any requirements of the NRC. The CAISO's Ancillary Services requirements may be self-provided by Scheduling Coordinators as further provided in the Business Practice Manuals. Those Ancillary Services which the CAISO requires to be available but which are not being self-provided will be competitively procured by the CAISO from Scheduling Coordinators in the Day-Ahead Market, [the HASP](#), and the RTM consistent with Section 8.3. The provision of Ancillary Services from the Interties with interconnected Balancing Authority Areas is limited to Ancillary Services bid into the competitive procurement processes in the IFM, [HASP](#), and RTM. The CAISO will not accept Submissions to Self-Provide Ancillary Services that are imports to the CAISO Balancing Authority Area over the Interties with interconnected Balancing Authority Areas, except from Dynamic System Resources certified to provide Ancillary Services or if provided pursuant to ETCs, TORs or Converted Rights. The CAISO will calculate payments for Ancillary Services supplied by Scheduling Coordinators and charge the cost of Ancillary Services to Scheduling Coordinators based on their Ancillary Service Obligations.

For purposes of this CAISO Tariff, Ancillary Services are: (i) Regulation Up and Regulation Down, (ii) Spinning Reserve, (iii) Non-Spinning Reserve, (iv) Voltage Support, and (v) Black Start capability. These services will be procured as stated in Section 8.3.5. Bids for Non-Spinning Reserve may be submitted by Scheduling Coordinators for Curtailable Demand as well as for Generation. Bids for Regulation, Spinning Reserve, Non-Spinning Reserve, and Voltage Support may be submitted by a Scheduling Coordinator for other non-generation resources that are capable of providing the specific service and that meet applicable Ancillary Service standards and technical requirements, as set forth in Sections 8.1 through 8.4, and are certified by the CAISO to provide Ancillary Services. The provision of Regulation, Spinning Reserve, Non-Spinning Reserve, and Voltage Support by other non-generation resources is subject to the same requirements applicable to other providers of these Ancillary Services, as set forth in Sections 8.5 through 8.11. Identification of specific services in this CAISO Tariff shall not preclude development of additional interconnected operation services over time. The CAISO and Market

Participants will seek to develop additional categories of these unbundled services over time as the operation of the CAISO Controlled Grid matures or as required by regulatory authorities.

\* \* \*

### **8.2.3.1 Regulation Service.**

The CAISO shall maintain sufficient Generating Units immediately responsive to AGC in order to provide sufficient Regulation service to allow the CAISO Balancing Authority Area to meet NERC and WECC reliability standards, including any requirements of the NRC by continuously balancing Generation to meet deviations between actual and scheduled Demand and to maintain Interchange Schedules. The quantity of Regulation Down and Regulation Up capacity needed for each Settlement Period of the Day-Ahead Market and in each fifteen (15) minute period in Real-Time shall be determined by the CAISO as a percentage of the applicable CAISO Forecast of CAISO Demand for the Day-Ahead and Real-Time Markets. [In HASP, the amount of advisory Regulation from Dynamic System Resources required for each Settlement Period in the next Trading Hour is also determined based on the CAISO Forecast of CAISO Demand. The advisory awards of Regulation from Dynamic System Resources in HASP are not binding and are re-optimized through the RTUC and RTD processes in the Real-Time Market.](#) The CAISO's determination is based upon its need to meet the NERC and WECC reliability standards, including any requirements of the NRC.

The CAISO will publish on OASIS the estimated quantity, or the percentage used to determine the estimated quantity, of Regulation Reserves required for each hour of the Day-Ahead Market and in each fifteen (15) minute period in Real-Time for the Trading Day.

\* \* \*

### **8.3.1 Procurement of Ancillary Services.**

The CAISO shall operate [a](#) competitive Day-Ahead [Market, HASP,](#) and Real-Time Markets to procure Ancillary Services. The Security Constrained Unit Commitment (SCUC) and Security Constrained Economic Dispatch (SCED) applications used in the Integrated Forward Market (IFM), [HASP,](#) and the Real-Time Market (RTM) shall calculate optimal resource commitment, Energy, and Ancillary Services Awards and Schedules at least cost to End-Use Customers consistent with maintaining System Reliability. Any Scheduling Coordinator representing Generating Units, System Units, [Participating](#) Loads

or imports of System Resources may submit Bids into the CAISO's Ancillary Services markets provided that it is in possession of a current certificate for the Generating Units, System Units, imports of System Resources or [Participating](#) Loads concerned. Regulation Up, Regulation Down, and Operating Reserves necessary to meet CAISO requirements not met by self-provision will be procured by the CAISO as described in this CAISO Tariff. The amount of Ancillary Services procured in the IFM ~~and in the Real-Time Market~~ is based upon the CAISO Forecast of CAISO Demand ~~and the forecasted plus~~ [intertie schedules in](#) HASP ~~Intertie Schedule~~ for the Operating Hour net of (i) Self-Provided Ancillary Services from Generating Units internal to the CAISO Balancing Authority Area and Dynamic System Resources certified to provide Ancillary Services and (ii) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right. [The amount of additional Ancillary Services procured in the HASP is based on the CAISO Forecast of CAISO Demand, the Day-Ahead Schedules established net interchange, and the forecast of the intertie schedules for the Operating Hour in the HASP net of \(i\) available awarded Day-Ahead Ancillary Services, \(ii\) Self-Provided Ancillary Services from Generating Units internal to the CAISO Balancing Authority Area and Dynamic System Resources certified to provide Ancillary Services, and \(iii\) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right. The amount of Ancillary Services procured in the Real-Time Market is based upon the CAISO Forecast of CAISO Demand and the HASP Intertie Schedule established net interchange for the Operating Hour net of \(i\) available awarded Day-Ahead Ancillary Services, \(ii\) Self-Provided Ancillary Services from Generating Units internal to the CAISO Balancing Authority Area and Dynamic System Resources certified to provide Ancillary Services, \(iii\) additional Operating Reserves procured in HASP, and \(iv\) Ancillary Services self-provided pursuant to an ETC, TOR or Converted Right.](#) The CAISO will manage [the Energy from](#) both CAISO procured and Self-Provided Ancillary Services as part of the Real-Time Dispatch. In the Day-Ahead Market, the CAISO procures one-hundred percent (100%) of its Ancillary Service requirements based on the Day-Ahead Demand Forecast net of Self-Provided Ancillary Services. After the Day-Ahead Market, the CAISO procures additional Ancillary Services needed to meet system requirements from all resources, including imports from [Non-Dynamic](#) System Resources [in the HASP, and Dynamic System Resources](#) and Generation from internal resources in the Real-Time Market. The amount of Ancillary Services procured in the [HASP and](#) Real-Time Market is based upon the CAISO Forecast of CAISO

Demand for the [Operating Hour and RTUC Time Horizon, respectively](#), net of Self-Provided Ancillary Services.

The CAISO procurement of Ancillary Services [from Non-Dynamic System Resources in the HASP is for the entire next Operating Hour. The CAISO procurement of Ancillary Services from Dynamic System Resources and internal Generation in the Real-Time Market is for a fifteen \(15\) minute RTUC Time Horizon. The CAISO's procurement of Ancillary Services from Non-Dynamic imports or System Resources in HASP and from Dynamic System Resources and internal Generation in the Real-Time Market is based on the Ancillary Service Bids submitted or generated in the HASP consistent with the requirements in Section 30. The CAISO may also procure Ancillary Services pursuant to the requirements in Section 42.1 and as permitted under the terms and conditions of a Reliability Must-Run Contract.](#)

As of the CAISO Operations Date, the CAISO will contract for long-term Voltage Support service with owners of Reliability Must-Run Units under Reliability Must-Run Contracts. Black Start capability will initially be procured by the CAISO through individual contracts with Scheduling Coordinators for Reliability Must-Run Units and other Generating Units which have Black Start capability. These requirements and standards apply to all Ancillary Services whether self-provided or procured by the CAISO.

### **8.3.2 Procurement [Internal and External Resources](#)~~Not Limited to CAISO Balancing Authority Area.~~**

The CAISO will procure Spinning Reserves and Non-Spinning Reserves from Generating Units operating within the CAISO Balancing Authority Area and from imports of System Resources. Scheduling Coordinators are allowed to bid Regulation from resources located outside the CAISO Balancing Authority Area by dynamically scheduling such [resources](#)[System Resources certified to provide Regulation](#). Each System Resource used to bid Regulation must comply with the Dynamic Scheduling Protocol in Appendix X. [Scheduling Coordinators may submit Bids for Operating Reserves from Non-Dynamic System Resources but they may not submit Bids for Regulation from such resources because these resources cannot be dynamically scheduled consistent with Appendix X.](#) When bidding to supply Ancillary Services in the IFM, [HASP](#), or RTM, imports compete for use of Intertie transmission capacity when the requested use is in the same direction, e.g., imports of Ancillary Services compete with Energy

on Interties in the import direction and exports of Ancillary Services (i.e., on demand obligations) compete with Energy on Interties in the export direction. To the extent there is Congestion, imports of Ancillary Services will pay Congestion costs in the IFM, [HASP](#), and RTM markets pursuant to Section 11.

\* \* \*

### **8.3.3.3 Notice to Market Participants.**

Pursuant to Section 6.5.2.3.3, the CAISO will publish forecasted Ancillary Service requirements, regional constraints, and the minimum and/or maximum Ancillary Service Regional Limits for the Ancillary Service Regions and any Sub-Regions by 6:00p.m. prior to the Day-Ahead Market (two days prior to the Operating Day). After the completion of the ~~DAM~~ [Day-Ahead Market](#) for a given Trading Day, the CAISO will publish the limits that were used in the ~~DAM~~ [IFM](#). If prior to the close of the ~~HASP~~ [Real-Time Market](#) for a Trading Hour the CAISO makes a substantial change to a minimum and/or maximum limit for an Ancillary Service Region or Sub-Region, it will issue a Market Notice as soon as reasonably practicable after the occurrence of the circumstances that led to the change. After the close of the ~~HASP~~ [Real-Time Market](#) for a Trading Hour, the CAISO will publish the limits that were used in the [HASP](#) and RTUC.

\* \* \*

### **8.3.5 [Daily and Hourly Procurement](#)**

The CAISO shall procure Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve on a daily, ~~hourly~~ and Real-Time basis in the IFM and RTM, respectively. [The CAISO shall also procure Spinning and Non-Spinning Reserves on an hourly basis in the HASP.](#) The CAISO shall procure Ancillary Services on a longer-term basis pursuant to Section 42.1.3 if necessary to meet Reliability Criteria. The CAISO shall contract for Voltage Support annually (or for such other period as the CAISO may determine is economically advantageous) and on a daily or hourly basis as required to maintain System Reliability. The CAISO shall contract annually (or for such other period as the CAISO may determine is economically advantageous) for Black Start Generation.

\* \* \*

### **8.3.7 [AS Bidding Requirements, Including Submission to Self-Provide an Ancillary Service.](#)**

Scheduling Coordinators may submit Bids or Submissions to Self-Provide an Ancillary Service consistent with the rules specified in Section 30 and any further requirements in this Section 8.3.7. Scheduling Coordinators may (i) submit Bids or Submissions to Self-Provide an Ancillary Service from resources located within the CAISO Balancing Authority Area or Dynamic System Resources certified to provide Ancillary Services, (ii) submit Submissions to Self-Provide an Ancillary Service from [System Resources](#) located outside the CAISO Balancing Authority Area if provided pursuant to ETCs, TORs, or Converted Rights, (iii) submit Bids for Ancillary Services from [Dynamic and Non-Dynamic System Resources](#) located outside the CAISO Balancing Authority Area [certified to provide Ancillary Services](#), or (iv) [specify submit](#) Inter-SC Trades of Ancillary Services. Ancillary Services [procured](#) in the [Day-Ahead Market IFM](#) and in the Real-Time Market are comprised of the following: Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve. [The HASP process evaluates the need for Energy, Regulation and Operating Reserves from System Resources and internal Generating Units and issues binding Ancillary Services awards only for Operating Reserves Ancillary Services from Non-Dynamic System Resources.](#) Each Generating Unit (including Physical Scheduling Plants), System Unit, Participating Load, or System Resource for which a Scheduling Coordinator wishes to submit Ancillary Service Bids must meet the requirements set forth in this CAISO Tariff. The same resource capacity may be [simultaneously](#) offered ~~into more than one CAISO Ancillary Service to the same CAISO Market for multiple Ancillary Services types auction at the same time~~. Ancillary Services Bids and Submissions to Self-Provide an Ancillary Service can be submitted up to seven (7) days in advance. [The CAISO will only use Operating Reserve Ramp Rates will be only used by the CAISO](#) for procuring capacity associated with the specific Ancillary Services. The CAISO will issue Real-Time Dispatch Instructions in the Real-Time Market for the Energy associated with the awarded capacity based upon the applicable Operational Ramp Rate submitted with the single Energy Bid Curve in accordance with Section 30.7.7. There is no ability to procure Ancillary Services for export. To the extent a Scheduling Coordinator has an on-demand obligation to serve loads outside the CAISO Balancing Authority Area, it can do so provided that (1) it is using export transmission capacity available in Real-Time, and (2) the resource capacity providing Energy to satisfy the on-demand obligation is not under an RMR Contract or Resource Adequacy Capacity obligation, and has not been paid a RUC Availability Payment for the Trading Hour. [All](#)

[resources subject to the Ancillary Services must offer requirements, as specified in Section 40.6, must submit Bids consistent with the requirements specified therein and in Section 30.](#)

\* \* \*

#### **8.6.2 Right to Self-Provide.**

Each Scheduling Coordinator may choose to self-provide all, or a portion, of its Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve obligations in the ~~Day-Ahead Market IFM~~, and, to the extent needed to satisfy CAISO's additional requirement, [HASP and](#) the Real-Time Market, from resources eligible for self-provision, [as may be permissible for any given Ancillary Service in these respective markets](#). The right to self-provide Ancillary Services from capacity that is under a contractual obligation to provide Energy, including but not limited to capacity subject to an RMR Contract and local Resource Adequacy Resources, shall be conditional; self-provision of Ancillary Services from such capacity will only be permitted to the extent that capacity is not needed for Energy as a result of the MPM-RRD process described in this CAISO Tariff. To self-provide Ancillary Services a Scheduling Coordinator must provide the CAISO with a Submission to Self-Provide an Ancillary Service. Both Ancillary Service Bids and Submissions to Self-Provide an Ancillary Service can be provided to the CAISO for the same Ancillary Service and for the same hour in the same market. To the extent the Submission to Self-Provide an Ancillary Service is from a resource that is a Partial Resource Adequacy Resource, and Energy is needed, including for purposes under Section 31.3.1.3, from that resource the CAISO shall only disqualify the self-provision of Ancillary Services from the portion of the resource's capacity that has must-offer obligation, provided that the Scheduling Coordinator has not submitted an Energy Bid for the capacity that is not subject to a must-offer obligation. [The CAISO will treat resources subject to Resource Adequacy requirements consistently with and such resources must comply with the bidding requirements in Section 40.6.](#) If there is an Energy Bid submitted for the capacity of a Partial Resource Adequacy Resource that is not subject to a must-offer obligation the CAISO may disqualify the Submission to Self-Provide an Ancillary Service for the portion of the resources capacity that is not under a must-offer obligation consistent with the principles of co-optimization under the CAISO Tariff.



Prior to evaluating Ancillary Service Bids, the CAISO will determine whether Submissions to Self-Provide Ancillary Services are feasible with regard to resource operating characteristics and regional constraints and are qualified to provide the Ancillary Services in the markets for which they were submitted.

If the total Submissions to Self-Provide Ancillary Services exceed the maximum regional requirement for the relevant Ancillary Service in an Ancillary Service Region, the submissions that would otherwise be accepted by the CAISO as feasible and qualified will be awarded on a pro-rata basis among the suppliers offering to self-provide the Ancillary Service up to the amount of the [Ancillary Services](#) requirement. If a regional constraint imposes a limit on the total amount of Regulation Up, Spinning Reserve, and Non-Spinning Reserve, and the total self-provision of these Ancillary Services in that region exceeds that limit, Self-Provided AS are qualified pro rata from higher to lower quality service in three tiers: Regulation Up first, followed by Spinning Reserve, and then by Non-Spinning Reserve. Submissions to Self-Provide Ancillary Services in excess of the maximum regional requirement for the relevant Ancillary Service in an Ancillary Service Region will not be accepted and qualified by the CAISO as Self-Provided Ancillary Services.

The CAISO shall schedule Self-Provided Ancillary Services [to the extent qualified](#) in the ~~Day-Ahead Market~~ [IFM, HASP](#), and the RTM and Dispatch Self-Provided Ancillary Services in the Real-Time. To the extent that a Scheduling Coordinator self-provides Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve, the CAISO shall correspondingly reduce the quantity of the Ancillary Services it procures from Bids submitted in the ~~Day-Ahead Market~~ [IFM, HASP](#), and the Real-Time Market. To the extent a Scheduling Coordinator's Self-Provided Ancillary Service for a particular Ancillary Service is greater than the Scheduling Coordinator's obligation for that particular Ancillary Service in a Settlement Interval, the Scheduling Coordinator will receive the user rate for the Self-Provided Ancillary Service for the amount of the Self-Provided Ancillary Service in excess of the Scheduling Coordinator's obligation. Scheduling Coordinators may trade Ancillary Services so that any Scheduling Coordinator may reduce its Ancillary Services Obligation through purchase of Ancillary Services capacity from another Scheduling Coordinator, or self-provide in excess of its obligation to sell Ancillary Services to another Scheduling Coordinator.

\* \* \*

## 8.7 Scheduling of Units to Provide Ancillary Services Awards

The CAISO shall provide Scheduling Coordinators with Ancillary Services Awards for the Day-Ahead, HASP and Real-Time Markets consistent with the provisions of the CAISO Tariff. The CAISO shall post the Ancillary Service Awards and Ancillary Service Schedules for the applicable Day-Ahead Market ~~notify each Scheduling Coordinator~~ no later than the publication of the Day-Ahead Schedule for the applicable Day-Ahead Market ~~1:00 p.m. of the day prior to the Operating Day of their Ancillary Service Awards and Ancillary Service Schedules for the Day-Ahead Market; no later than approximately forty (40) minutes prior to the Operating Hour of their Ancillary Services Awards and Ancillary Service Schedules from Non-Dynamic System Resources in the HASP;~~ and no later than approximately fifteen (15) minutes prior to the next Commitment Interval in the Real-Time Market. Where long-term contracts are involved, the information may be treated as standing information for the duration of the contract.

Once the CAISO has given Scheduling Coordinators notice of the Day-Ahead ~~Market~~, HASP and Real-Time Market Ancillary Service Awards and Ancillary Service Schedules, these awards and Schedules represent binding commitments made in the markets between the CAISO and the Scheduling Coordinators concerned, subject to any amendments issued as described above.

\* \* \*

## 11.1.2 Settlement Charges and Payments

The CAISO shall settle the following charges in accordance with this CAISO Tariff: (1) Grid Management Charge; (2) Bid Cost Recovery; (3) IFM charges and payments, including Energy and Ancillary Services; (4) RUC charges and payments; (5) Real-Time Market charges and payments, including Energy and Ancillary Services; (6) HASP charges and payments for- Energy and Ancillary Services; (7) High Voltage Access Charges and TAC Transition Charges; (8) Wheeling Access Charges; (9) Voltage Support and Black Start charges; (10) Excess Cost Payments; (11) default interest charges; (12) CRR Charges and Payments, (13) Inter-SC Trades charges and payments; (14) neutrality adjustments; (15) FERC Annual Charges; (16) distribution of excess Marginal Losses; (17) miscellaneous charges and payments; and (18) Participating Intermittent Resource Fees.

\* \* \*

### **11.10.1.2**      ~~[NOT USED]~~ Ancillary Services Provided in HASP

The HASP optimization establishes Ancillary Services Awards and prices for Ancillary Services provided from Non-Dynamic System Resources in the HASP. The CAISO pays Scheduling Coordinators that supply Ancillary Services from Non-Dynamic System Resources an amount equal to the product of the simple average of the ASMPs computed for four (4) fifteen (15) minute intervals of HASP for each Ancillary Service as described in Section 27.1.2, and the quantity of the capacity awarded for the Ancillary Service in the Settlement Period. The CAISO charges Scheduling Coordinators that receive an Ancillary Service Award or have qualified Self-Provided Ancillary Services at a Scheduling Point in HASP the simple average of the fifteen (15) minute Marginal Cost of Congestion over the applicable Trading Hour as described in Section 11.10.1.2.1.

### **11.10.1.2.1**      ~~[NOT USED]~~ Congestion Charges

If a Scheduling Coordinator receives an Ancillary Services Award or provides a qualified Self-Provided Ancillary Service at a congested Scheduling Point, the CAISO will charge the Scheduling Coordinator for Congestion. The charge for Congestion at such locations is equal to the simple average of the fifteen (15) minute applicable intertie constraint Shadow Price over the applicable Trading Hour at the location of the Ancillary Service Award, multiplied by the quantity of Ancillary Services Award or the capacity of the qualified Self-Provided Ancillary Service for the Settlement Period. No such charge for Congestion will apply when Scheduling Coordinator's HASP Ancillary Services Awards and qualified Self-Provided Ancillary Services at Scheduling Points are provided pursuant to the CAISO Tariff rules that apply to Existing Rights and Transmission Ownership Rights.

\* \* \*

### **11.10.2**      **Settlement for User Charges for Ancillary Services-**

The CAISO shall determine a separate hourly user rate for Regulation Down Reserve, Regulation Up Reserve, Spinning Reserve, and Non-Spinning Reserve purchased for each Settlement Period. The hourly user rates for Regulation Down, Regulation Up, Spinning Reserve, and Non-Spinning Reserve include the cost incurred by the CAISO across the Day-Ahead Market, HASP, and the Real-Time Market to procure this service. In computing the user rate for each service the quantity (MW) and costs of any substituting Ancillary Service will be treated as if they are costs and MW associated with the Ancillary

Service need they are being used to fulfill. Each rate will be charged to Scheduling Coordinators on a volumetric basis applied to each Scheduling Coordinator's obligation for the specific Ancillary Service concerned which it has not self-provided, as adjusted by any Inter-SC Trades of Ancillary Services.

Each Scheduling Coordinator's obligation for Regulation Down Reserve, Regulation Up Reserve, Spinning Reserve, and Non-Spinning Reserve shall be calculated in accordance with this Section 11.10.2, notwithstanding any adjustment to the quantities of each Ancillary Service purchased by the CAISO in accordance with Section 8.2.3.5. The cost of Voltage Support and Black Start shall be allocated to Scheduling Coordinators as described in Sections 11.10.7 and 11.10.8.

Ancillary Services Obligations for an individual Scheduling Coordinator (before taking into account Self-Provided Ancillary Services) or Inter-SC Trades of Ancillary Services) may be negative. Credits for such negative obligations will be in accordance with the rates calculated in this Section 11.10.2, except that a Scheduling Coordinator's credit shall be reduced pro rata to the extent the sum of the negative obligations of all Scheduling Coordinators with the negative Ancillary Services Obligation (before self-provision or Inter-SC Trade) exceeds the obligation of all Scheduling Coordinators with positive obligation net of Self-Provided Ancillary Services, as specified in Section 11.10.5 in any Settlement Period, the net procurement quantity of Regulation Up, Regulation Down, Spinning Reserve, or Non-Spinning Reserve purchased by the CAISO in the Day-Ahead Market, [HASP](#), and the Real-Time Market due to the operation of Section 8.2.3.5 is zero [\(0\)](#), then the user rate for that Ancillary Service type will be zero [\(0\)](#).

With respect to each Settlement Period, in addition to the user rates determined in accordance with this Section 11.10.2, each Scheduling Coordinator shall be charged an additional amount equal to its proportionate share, based on total purchases by Scheduling Coordinators of Regulation Down, Regulation Up, Spinning Reserve, and Non-Spinning Reserve of the amount, if any, by which (i) the total payments to Scheduling Coordinators pursuant to this Section 11.10.2 for the Day-Ahead Market, [HASP](#), and the Real-Time Market, exceed (ii) the total amounts charged to Scheduling Coordinators pursuant to this Section 11.10.2, for the Day-Ahead Market, [HASP](#), and the Real-Time Market. If total amounts charged to Scheduling Coordinators exceed the total payments to Scheduling Coordinators, each Scheduling Coordinator will be refunded its proportionate share, based on total purchases by Scheduling Coordinators of Regulation Down, Regulation Up, Spinning Reserve, and Non-Spinning Reserve.

With respect to each Settlement Period, in addition to Ancillary Service charges at the applicable user rates determined in accordance with this Section 11.10.2, each Scheduling Coordinator shall be charged additional neutrality adjustment amounts for each Ancillary Service type pursuant to Sections 11.10.2.4, 11.10.2.2.3, 11.10.3.3, and 11.10.4.3 and a neutrality adjustment amount for upward Ancillary Service types pursuant to Section 11.14.

\* \* \*

#### **11.10.3.1 Hourly User Rate for Spinning Reserves.**

The hourly user rate for Spinning Reserves is the ratio of: (1) the sum of the portion of Spinning Reserve Cost used to meet the spin requirement and the portion of Regulation Up cost that can substitute for Spinning Reserve and (2) the Net Procurement quantity of Spinning Reserves by the CAISO (\$/MW). The cost of Regulation Up substituting for Spinning Reserve is the user rate for Regulation Up multiplied by the quantity of Regulation Up used to satisfy the Spinning Reserve requirement.

The CAISO's Spinning Reserve Cost is equal to: (i) the revenues paid to the suppliers of the total awarded Spinning Reserve capacity in the Day-Ahead Market, HASP, and Real-Time Market, minus, (ii) the payments rescinded due to either the failure to conform to Dispatch Instructions or the unavailability of the Spinning Reserves under Section 8.10.8. The Net Procurement of Spinning Reserves is equal to: (i) the amount (MWs) of total awarded Spinning Reserve capacity in the Day-Ahead Market, HASP, and Real-Time Market, minus, (ii) the Spinning Reserve capacity associated with payments rescinded pursuant to any of the provisions of Section 8.10.8. The amount (MW) of awarded Spinning Reserve capacity includes the amounts (MW) associated with any Regulation Up Reserve capacity used as Spinning Reserve under Section 8.2.3.5.

\* \* \*

#### **11.10.4.1 Hourly User Rate ~~for~~ Non-Spinning Reserves.**

The hourly user rate for Non-Spinning Reserves is calculated as the ratio of: i) the sum of the portion of the Non-Spinning Reserve Cost used to meet the Non-Spinning requirement and a portion of the Regulation Up and Spinning Reserve costs that can substitute for Non-Spinning Reserve and ii) the Net Procurement quantity of Non-Spinning Reserves by the CAISO (\$/MW). The CAISO's Non-Spinning

Reserve Cost includes the costs associated with any Regulation Up Reserve or Spinning Reserve capacity used as Non-Spinning Reserve under Section 8.2.3.5.

The CAISO's Non-Spinning Reserve Cost is equal to: (i) the revenues paid to the suppliers of the total awarded Non-Spinning Reserve capacity in the Day-Ahead Market, [HASP](#), and Real-Time Market, minus, (ii) the payments rescinded due to either the failure to conform to CAISO Dispatch Instructions or the unavailability of the Non-Spinning Reserves under Section 8.10.8. The Net Procurement of Non-Spinning Reserves is equal to: (i) the amount (MWs) of total awarded Non-Spinning Reserve capacity in the Day-Ahead Market, [HASP](#), and Real-Time Market, minus, (ii) the Non-Spinning Reserve capacity associated with payments rescinded pursuant to any of the provisions of Section 8.10.8. The amount (MW) of awarded [Non](#)-Spinning Reserve capacity includes the amounts (MW) associated with any Regulation Up Reserve or Spinning Reserve capacity used as Non-Spinning Reserve under Section 8.2.3.5.

\* \* \*

**11.10.9      ~~Settlements of Rescission of Payments for Ancillary Services~~ [AS](#) Capacity ~~that is Undispatchable, Unavailable, and Undelivered Capacity.~~**

The rescission of payments for Ancillary Services for Undispatchable, Unavailable, and Undelivered Capacity applies to Ancillary Services that are awarded in the Day-Ahead Market, [HASP](#), or Real-Time Market and the rescission will be the weighted average of the Ancillary Service Marginal Prices (ASMPs) and Ancillary Services Award amounts for a resource across the Day-Ahead Market, [HASP](#), and Real-Time Market. For Self-Provided Ancillary Service capacity that becomes Undispatchable Capacity, Unavailable Capacity, or Undelivered Capacity, the rescission of Ancillary Services self-provision in the Day-Ahead Market, [HASP](#), and Real-Time Market reduces the relevant Scheduling Coordinator's effective Ancillary Services self-provision in the Ancillary Services cost allocation, effectively resulting in a charge back at the relevant Ancillary Services rate. The rescission of payments in this Section 11.10.9 shall not apply to a capacity payment for any particular Ancillary Service if the Ancillary Service Marginal Price (ASMP) is less than or equal to zero [\(0\)](#).

**11.10.9.1      ~~Rescission of Payments for~~ Undispatchable [AS](#) Ancillary Service Capacity.**

If a Scheduling Coordinator has Undispatchable Capacity that it is obligated to supply to the CAISO during a Settlement Interval, the Ancillary Service capacity payment for the amount of Energy that cannot

be delivered from the Generating Unit, Participating Load, System Unit or System Resource for the Settlement Interval shall be rescinded, ~~provided, however, that~~ To the extent that an Ancillary Service procured in the IFM from a System Resource becomes Undispatchable Capacity due to an Intertie transmission derate before the Operating Hour for which it was procured, in rescinding the Ancillary Service capacity payment, the CAISO shall credit back to the Scheduling Coordinator any charge for Congestion assessed pursuant to Section 11.10.1.1.1, ~~but~~ If the CAISO procured the Ancillary Services from a Dynamic System Resource, the CAISO will rescind the payments at the lower of the Day-Ahead LMP and the simple average of the fifteen (15) minute Real-Time Shadow Price over the applicable Trading Hour on the corresponding Intertie. If the CAISO procured the Ancillary Service from a Non-Dynamic System Resource, the CAISO will rescind the payments at the lower of the Day-Ahead LMP or, the HASP Shadow Price on the corresponding Intertie.

\* \* \*

**11.16.1 Order of Payment Rescission ~~for Resources with More Than One Capacity Obligation in a Settlement Interval.~~**

If the Generating Unit, Participating Load, System Unit or System Resource is scheduled to provide more than one capacity obligation in a Settlement Interval, the order in which the non-compliant Ancillary Service and RUC Capacity will be apportioned to the various services under Section 8.10.8 is as follows. For Undispatchable Capacity the non-compliant capacity is first apportioned to RUC Capacity and then to any Non-Spinning Reserves. If the amount of Undispatchable Capacity exceeds the amount of Non-Spinning Reserves, then the payment shall be eliminated for Spinning Reserves. For Unavailable Capacity or Undelivered Capacity the non-compliant capacity is first apportioned to any Non-Spinning Reserves. If the amount of non-compliant Ancillary Service capacity exceeds the amount of Non-Spinning Reserves, then the payment shall be eliminated for Spinning Reserves. If the same Ancillary Service is scheduled in the Day-Ahead Market, HASP, or Real-Time Market, then the payments shall be rescinded in proportion to the amount of each Ancillary Service scheduled in each market. If the same Ancillary Service is self-provided and Bid, the order of rescission will be first the amount of Ancillary Service amounts submitted in Bids and then the Self-Provided Ancillary Service.

\* \* \*

#### **27.1.2.1 Ancillary Service Marginal Prices.**

As provided in Section 8.3, Ancillary Services are procured and awarded through the IFM, [HASP](#) and the Real-Time Market. The IFM calculates hourly Day-Ahead Ancillary Service Awards and establishes Ancillary Service Marginal Prices (ASMPs) for the accepted Regulation Up, Regulation Down, Spinning Reserve and Non-Spinning Reserve Bids. The IFM co-optimizes Energy and Ancillary Services subject to resource, network and regional constraints. [In the HASP, the CAISO procures Ancillary Services from Non-Dynamic System Resources for the next Trading Hour as described in Section 33.7. The CAISO calculates the HASP settlement Ancillary Services price as described herein and further described in Section 33.8.](#) In the Real-Time Market, the RTUC process that is performed every fifteen (15) minutes establishes fifteen (15) minute Ancillary Service Schedules, Awards, and prices for the upcoming quarter of the given Trading Hour. ASMPs are determined by first calculating the Ancillary Services shadow prices for each Ancillary Service type and the applicable Ancillary Services Regions. The Ancillary Services shadow prices are produced as a result of the co-optimization of Energy and Ancillary Services for each Ancillary Service Region through the IFM, [HASP](#), and the Real-Time Market, subject to resource, network, and requirements constraints. The Ancillary Services shadow prices represent the cost sensitivity of the relevant binding regional constraint at the optimal solution, or the marginal reduction of the combined Energy and Ancillary Service procurement cost associated with a marginal relaxation of that constraint. If the regional constraint is not binding for an Ancillary Services Region, then the corresponding Ancillary Services shadow price in the Ancillary Services Region is zero [\(0\)](#). The ASMP for a particular Ancillary Service type and Ancillary Services Region is then the sum of the Ancillary Services shadow prices for the specific type of Ancillary Service and all the other types of Ancillary Services for which the subject Ancillary Service can substitute, as described in Section 8.2.3.5, and for the given Ancillary Service Region and all the other Ancillary Service Regions that include that given Ancillary Service Region.

#### **27.1.2.2 Opportunity Cost in ~~Ancillary Services Marginal Prices~~—[ASMP](#)**

The Ancillary Services shadow price, which as described above, is a result of the Energy and Ancillary Service co-optimization, includes the forgone opportunity cost of the marginal resource, if any, for not providing Energy or other types of Ancillary Services the marginal resource is capable of providing in the



relevant market. The ASMPs determined by the IFM or RTUC optimization process for each resource whose Ancillary Service Bid is accepted will be no lower than the sum of (i) the Ancillary Service capacity Bid price submitted for that resource, and (ii) the foregone opportunity cost of Energy in the IFM or RTUC for that resource. The foregone opportunity cost of Energy [for this purpose](#) is measured as the positive difference between the IFM or RTUC LMP at the resource's Pricing Node and the resource's Energy Bid price. If the resource's Energy Bid price is higher than the LMP, the opportunity cost [measured for this calculation](#) is \$0. If a resource has submitted an Ancillary Service Bid but no Energy Bid and is under an obligation to offer Energy in the [Day-Ahead Market](#) (e.g. a non-hydro Resource Adequacy Resource), its Default Energy Bid will be used, and its opportunity cost will be calculated accordingly. If a resource has submitted an Ancillary Service Bid but no Energy Bid and is not under an obligation to offer Energy in the [Day-Ahead Market](#), its Energy opportunity cost [measured for this calculation](#) is \$0 since it cannot be dispatched for Energy. [For Non-Dynamic System Resources that receive Ancillary Services Awards in HASP, the opportunity cost measured for this purpose is \\$0 because, as provided in Section 33.7, the CAISO cannot Schedule Energy in HASP from the Energy Bid under the same Resource ID as the submitted Ancillary Service Bid.](#)

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### **30.5.2.6 Ancillary Services Bids.**

There are four distinct Ancillary Services: Regulation Up, Regulation Down, Spinning Reserve and Non-Spinning Reserve. Participating Generators are eligible to provide all Ancillary Services. Dynamic System Resources are eligible to provide Operating Reserves and Regulation. Non-Dynamic System Resources are eligible to provide Operating Reserves only. [Scheduling Coordinators may use Dynamic No-System Resources \(including Non-Dynamic Resource-Specific System Resources\) can be used for self-provision of to Self-Provide Ancillary Services, except for Dynamic System Resources which can be used for self-provision of Ancillary Services](#) as specified in Section 8. [Scheduling Coordinators may not use Non-Dynamic System Resources to Self-Provide Ancillary Services.](#) All System Resources, including Dynamic ~~Resource-Specific~~ System Resources and Non-Dynamic ~~Resource-Specific~~ System Resources, will be charged the Shadow Price as prescribed in Section 11.10, [for any awarded Ancillary Services.](#) Participating Loads are eligible to provide Non-Spinning Reserve only. A Scheduling Coordinator may

submit Ancillary Services Bids for Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve for the same capacity by providing a separate price in \$/MW per hour as desired for each Ancillary Service. The Bid for each Ancillary Services is a single Bid segment. Only resources certified by the CAISO as capable of providing Ancillary Services are eligible to provide Ancillary Services [and submit Ancillary Services Bids](#). In addition to the common elements listed in Section 30.5.2.1, all Ancillary Services Bid components of a Supply Bid must contain the following: (1) the type of Ancillary Service for which a Bid is being submitted; (2) Ramp Rate (Operating Reserve Ramp Rate and Regulation Ramp Rate, if applicable); and (3) Distribution Curve for Physical Scheduling Plant or System Unit. An Ancillary Services Bid submitted to the Day-Ahead Market when submitted to the Day-Ahead Market may be, but is not required to be, accompanied by an Energy Bid that covers the capacity offered for the Ancillary Service. Submissions to Self-Provide an Ancillary Services submitted to the Day-Ahead Market when submitted to the Day-Ahead Market may be, but are not required to be, accompanied by an Energy Bid that covers the capacity to be self-provided; [If a Scheduling Coordinator's Submission to Self-Provide an Ancillary Service is qualified as specified in Section 8.6, provided, however, that the Scheduling Coordinator must submit such an Energy Bid that covers the self-provided capacity shall be submitted](#) prior to the close of the Real-Time Market for the day immediately following the Day-Ahead Market in which the Ancillary Service Bid was submitted ~~if the Submission to Self-Provide an Ancillary Service is qualified as specified in Section 8.6. Submissions to Self-Provide an Ancillary Services submitted in the Day-Ahead Market must be accompanied by a Self-Schedule to which the Submission to Self-Provide an Ancillary Service is related.~~ Except as provided below, the Self-Schedule [for Energy](#) need not include a Self-Schedule [for Energy](#) from the resource that will be self-providing the Ancillary Service. If a Scheduling Coordinator is self-providing an Ancillary Service from a Fast Start Unit, no Self-Schedule [for Energy](#) for that resource is required. If a Scheduling Coordinator proposes to self-provide Spinning Reserve, the Scheduling Coordinator is obligated to submit a Self-Schedule [for Energy](#) for [that](#) particular resource, unless as discussed above the particular resource is a Fast Start Unit. When submitting Ancillary Service Bids in the [HASP and Real-Time Market](#), Scheduling Coordinators for resources that either have been awarded or self-provide Spinning Reserve or Non-Spinning Reserve capacity in the Day-Ahead Market must submit an Energy Bid for at least the awarded or self-provided Spinning Reserve

or Non-Spinning Reserve capacity, otherwise the CAISO will apply the Bid validation rules described in Section 30.7.6.1. As provided in Section 30.5.2.6.4, a Submission to Self-Provide an Ancillary Service shall contain all of the requirements of a Bid for Ancillary Services with the exception of Ancillary Service Bid price information. In addition, Scheduling Coordinators must comply with the Ancillary Services requirements of Section 8. [Scheduling Coordinators submitting Ancillary Services Bids for System Resources in the HASP or Real-Time Market must also submit an Energy Bid for the associated Ancillary Services Bid under the same Resource ID, otherwise the bid validation rules in Section 30.7.6.1 will apply to cover any portion of the Ancillary Services Bid not accompanied by an Energy Bid. As described in Section 33.7, if the resource is a Non-Dynamic System Resource, the CAISO will only use the Ancillary Services Bid in the HASP optimization and will not use the associated Energy Bid for the same Resource ID to schedule Energy from the Non-Dynamic Hourly Resource in the HASP. Scheduling Coordinators must also comply with the bidding rules associated with the must offer requirements for Ancillary Services specified in Section 40.6.](#)

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#### **30.7.6.1 Validation of Ancillary Services Bids.**

Throughout the validation process described in Section 30.7, the CAISO will verify that each Ancillary Services Bid conforms to the content, format and syntax specified for the relevant Ancillary Service. If the Ancillary Services Bid does not so conform, the CAISO will send a notification to the Scheduling Coordinator notifying the Scheduling Coordinator of the errors in the Bids as described in Section 30.7. When the Bids are submitted, a technical validation will be performed to verify that the bid quantity of Regulation, Spinning Reserve, or Non-Spinning Reserve does not exceed the certified Ancillary Services capacity for Regulation, or Operating Reserves on the Generating Units, System Units, Participating Loads and external imports/exports bid. The Scheduling Coordinator will be notified within a reasonable time of any validation errors. For each error detected, an error message will be generated by the CAISO in the Scheduling Coordinator's notification screen, which will specify the nature of the error. The Scheduling Coordinator can then look at the notification messages to review the detailed list of errors, make changes, and resubmit if it is still within the CAISO's timing requirements. The Scheduling Coordinator is also notified of successful validation. If a resource is awarded or has qualified Self-

Provided Ancillary Services in the Day-Ahead Market, if no Energy Bid is submitted to cover the awarded or Self-Provided Ancillary Services by the Market Close of HASP and the RTM, the CAISO will generate or extend an Energy Bid as necessary to cover the awarded or Self-Provided Ancillary Services capacity using the registered values in the Master File and relevant fuel prices as described in the Business Practice Manuals for use in the HASP and IFM. If an AS Bid or Submission to Self-Provide an AS is submitted in the Real-Time for Spinning Reserve or Non-Spinning Reserve without an accompanying Energy Bid at all, the AS Bid or Submission to Self-Provide an Ancillary Service will be erased. If an AS Bid or Submission to Self-Provide an AS is submitted in the Real-Time Market for Spinning Reserve and Non-Spinning Reserve with only a partial Energy Bid for the AS capacity bid in, the CAISO will generate an Energy Bid for the uncovered portions. Scheduling Coordinators whose resources are subject to the must offer requirements for Ancillary Services as provided in Section 40 must also comply with the bidding requirements in Section 40.6. The CAISO will apply the bid validation rules to generate necessary Bids consistent with Section 40.6. As provided in Section 33.7, for Non-Dynamic System Resources the CAISO will not use the associated submitted Energy Bid or a Generated Bid for the same Resource ID in the HASP optimization. For Generating Units with certified Regulation capacity, if there no Bid for Regulation in the Real-Time Market, but there is a Day-Ahead award for Regulation Up or Regulation Down or a submission to self-provide Regulation Up or Regulation Down, respectively, the CAISO will generate a Regulation Up or Regulation Down Bid at the default Ancillary Service Bid price of \$0 up to the certified Regulation capacity for the Generating Unit minus any Regulation awarded or self-provided in the Day-Ahead. If there is a Bid for Regulation Up or Regulation Down in the Real-Time Market, the CAISO will increase the respective Bid up to the certified Regulation capacity for the Generating Unit minus any Regulation awarded or self-provided in the Day-Ahead. If a Self-Schedule amount is greater than the Regulation Limit for Regulation Up, the Regulation Up Bid will be erased.

Notwithstanding any of the provisions of Section 30.7.6.1 set forth above, the CAISO will not insert or extend any Bid for a Resource Adequacy Resource that is a Use-Limited Resource.

### **30.7.6.2 Treatment of Ancillary Services Bids.**

When Scheduling Coordinators bid into the Regulation Up, Regulation Down, Spinning Reserve, and Non-Spinning Reserve markets, they may submit Bids for the same capacity into as many of these

markets as desired at the same time by providing the appropriate Bid information [specified in Section 30](#) to the CAISO. The CAISO optimization will evaluate AS Bids simultaneously with Energy Bids. [In the HASP, the CAISO will not consider Energy Bids from Non-Dynamic System Resources submitted in association with Ancillary Services Bids under the same Resource ID in the HASP optimization.](#) A Scheduling Coordinator may specify that its Bid applies only the markets it desires. A Scheduling Coordinator shall also have the ability to specify different capacity prices for the Spinning Reserve, Non-Spinning Reserve, and Regulation markets. A Scheduling Coordinator providing one or more Regulation Up, Regulation Down, Spinning Reserve or Non-Spinning Reserve services may not change the identification of the Generating Units offered in the Day-Ahead Market or in the Real-Time Market for such services unless specifically approved by the CAISO (except with respect to System Units, if any, in which case Scheduling Coordinators are required to identify and disclose the resource specific information for all Generating Units and Participating Loads constituting the System Unit for which Bids and Submissions to Self-Provide Ancillary Services are submitted into the CAISO's Day-Ahead Market and Real-Time Market.

The following principles will apply in the treatment of Ancillary Services Bids in the CAISO Markets:

- (a) [The CAISO Market will](#) not differentiate between bidders for Ancillary Services and Energy other than through cost, price, effectiveness, and capability to provide the Ancillary Service or Energy, and the required locational mix of Ancillary Services;
- (b) [The CAISO Market will](#) select the bidders with most cost effective Bids for Ancillary Service capacity which meet its technical requirements, including location and operating capability to minimize the costs to users of the CAISO Controlled Grid;
- (c) [The CAISO Market will](#) evaluate the Day-Ahead Bids over the twenty-four (24) Settlement Periods of the following Trading Day along with Energy, taking into transmission constraints and AS Regional Limits;
- (d) [The CAISO Market will evaluate Bids \(of System Resources and Generating Units\) in the HASP and establish Ancillary Services Awards from Non-Dynamic](#)

System Resources by approximately forty (40) minutes prior to the hour of operation;

- ~~(d) evaluate Import Bids along with internal resources;~~
- (e) The CAISO Market will establish Real-Time Ancillary Service Awards through RTUC from imports and generation internal to the CAISO Balancing Authority Area at fifteen (15) minutes intervals to the hour of operation; and
- (f) The CAISO Market will procure sufficient Ancillary Services in the Day-Ahead, HASP, and Real-Time Markets to meet its forecasted requirements.

\* \* \*

### **33.7** [NOT USED] Ancillary Services in the HASP

After establishing the Day-Ahead Ancillary Services Awards, the CAISO will procure additional Ancillary Services needed to meet Reliability Criteria to maintain required Ancillary Services arising from changes in forecasts of Demand and resource Outages. The CAISO utilizes the HASP (for Spinning and Non-Spinning Reserve) and the RTUC to procure additional Ancillary Services needed for this purpose for the next Trading Hour. The HASP optimization will consider the optimal mix of Ancillary Services from System Resources and from Generating Units, but only the Ancillary Service from Non-Dynamic System Resources awarded in HASP are binding. These binding Ancillary Services Awards are for the full Trading Hour for which the given HASP run applies. Generating Units and Dynamic System Resources designated in the HASP to provide Ancillary Services for the same Trading Hour receive non-binding advisory Ancillary Services awards because the CAISO will re-optimize the use of these Generating Units and Dynamic System Resources to provide Ancillary Services in a subsequent RTUC run, as described in Section 34.2. The CAISO settles the HASP Ancillary Services Awards for Non-Dynamic System Resources as provided in Section 11.10.1.2. All Operating Reserves procured in HASP are Contingency Only Operating Reserves, as described in Section 30.5.2.6. Scheduling Coordinators submitting Ancillary Services Bids for Non-Dynamic System Resources in the HASP must also submit an Energy Bid under the same Resource ID for the associated Ancillary Services Bid. For these Non-Dynamic System Resources, the CAISO will only use the Ancillary Services Bid in the HASP optimization and will not Schedule Energy in HASP from the Energy Bid provided under the same Resource ID as the Ancillary

[Services Bid. The CAISO may dispatch Energy from the Contingency Only Operating Reserves awarded to Non-Dynamic System Resources in HASP through the Real-Time Contingency Dispatch as described in Section 34.3.2.](#)

### **33.8 HASP Prices for HASP Intertie Schedules.**

The RTUC will produce fifteen- ~~(15)~~ minute LMPs for the four ~~(4)~~ fifteen- ~~(15)~~ minute RTUC intervals for the applicable Trading Hour. The fifteen- ~~(15)~~ minute LMPs corresponding to the Scheduling Points are then used to derive a simple average hourly price for the Settlement of hourly Intertie Schedules at each Scheduling Point. [The RTUC also produces fifteen \(15\) minute ASMPs for the four \(4\) fifteen \(15\) minute intervals for the next Trading Hour. The CAISO uses these fifteen \(15\) minute ASMPs to derive a simple average hourly price for the Settlement of hourly HASP AS Awards. The RTUC run will also produce fifteen \(15\) minute Shadow Prices for each of the Intertie constraint for the four \(4\) fifteen \(15\) minute intervals for the applicable Trading Hour. These fifteen \(15\) minute Shadow Prices are then used to derive a simple average hourly price for charging hourly Intertie AS Awards providers for Congestion at the applicable intertie.](#) HASP Intertie Schedules [and HASP AS Awards](#) are settled in accordance with Section 11.4 [and 11.10.1.2, respectively.](#)

\* \* \*

### **34.2.2 Real-Time Ancillary Services Procurement.**

If the CAISO determines that additional Ancillary Services are required, other than those procured in the [DAM IFM, HASP,](#) ~~and~~ the RTUC will procure Ancillary Services on a fifteen- ~~(15)~~ minute basis as necessary to meet reliability requirements and will determine Real-Time Ancillary Service interval ASMPs for such AS for the next Commitment Period. All Operating Reserves procured in the RTM are considered Contingency Only Operating Reserves. Any Ancillary Service awarded in RTUC will be taken as fixed for the three ~~(3)~~ five- ~~(5)~~ minute RTD intervals of its target fifteen- ~~(15)~~ minute interval. In the RTUC, all resources certified and capable of providing Operating Reserves that have submitted Real-Time Energy Bids shall also submit applicable Spinning or Non-Spinning Reserves Bids, respectively, depending on whether the resource is online or offline. The CAISO will utilize the RTUC to procure Operating Reserves to restore its Operating Reserve requirements in cases when: (1) Operating Reserves awarded in [DAMIFM, HASP or RTUC](#) have been dispatched to provide Energy, (2) resource(s)

awarded to provide Operating Reserves in the [DAM-IFM, HASP or RTUC](#) are no longer capable of providing such awarded Operating Reserves, or (3) the Operator determines that additional Operating Reserves are necessary to maintain Operating Reserves within NERC and WECC reliability standards, including any requirements of the NRC. The CAISO will utilize the RTUC to procure additional Regulation capacity in Real-Time in cases when: (1) resource(s) awarded to provide Regulation in the [DAM-IFM, HASP or RTUC](#) are no longer capable of providing such awarded Regulation, or (2) the Operator determines that additional Regulation is necessary to maintain sufficient control consistent with NERC and WECC reliability standards, including any requirements of the NRC and Good Utility Practice. The RTUC will produce fifteen- [\(15\)](#) minute ASMPs for the four [\(4\)](#) binding fifteen- [\(15\)](#) minute intervals for the applicable Trading Hour. These fifteen- [\(15\)](#) minute ASMPs are then used for the Settlement of the fifteen [\(15\)](#) minute AS Awards. The RTUC run will also produce fifteen- [\(15\)](#) minute Shadow Prices for each of the Interties for the four [\(4\)](#) fifteen- [\(15\)](#) minute intervals for the applicable Trading Hour. These fifteen- [\(15\)](#) minute Shadow Prices are then used to charge for Intertie Real-Time AS Award providers for Congestion on the Interties. RTUC AS Awards are settled in accordance with 11.10.1.3.

### **34.3 Real-Time Dispatch.**

The RTD can operate in three modes: RTED, RTCD and RTMD. The RTED uses a Security Constrained Economic Dispatch (SCED) algorithm every five (5) minutes throughout the Trading Hour to determine optimal Dispatch Instructions to balance Supply and Demand. The CAISO will use the Real-Time Economic Dispatch (RTED) under most circumstances to optimally dispatch resources based on their Bids. The RTED can be used to Dispatch Contingency Only Operating Reserves, pursuant to Section 34.8, when needed to avoid an imminent System Emergency. The Real-Time Contingency Dispatch (RTCD) can be invoked in place of the RTED when a transmission or generation contingency occurs and will include all Contingency Only Operating Reserves in the optimization. [If the CAISO awards a Non-Dynamic System Resource Ancillary Services in the IFM or HASP and issues a Dispatch Instruction in the middle of the Trading Hour for Energy associated with its Ancillary Services \(Operating Reserve\) capacity, the CAISO will Dispatch the Non-Dynamic System Resource to operate at a constant level until the end of the Trading Hour. If the CAISO dispatches a Non-Dynamic System Resource such that the binding interval of the Dispatch is in the next Trading Hour, the CAISO will dispatch Energy from the Non-](#)



[Dynamic System Resource at a constant level until the end of the next Trading Hour. The dispatched Energy will not exceed the awarded Operating Reserve capacity for the next Trading Hour and will be at a constant level for the entire next Trading Hour.](#) The Real Time Manual Dispatch (RTMD) will be invoked as a fall-back mechanism only when the RTED or RTCD fails to provide a feasible Dispatch. These three [\(3\)](#) modes of the RTD are described in Sections 34.3.1 to 34.3.3.

\* \* \*

### **34.13 ~~Treatment of Resource Adequacy Capacity in the Real-Time Market.~~**

Resource Adequacy Resources required to offer their Resource Adequacy Capacity in accordance with Section 40 shall be required to submit Energy Bids for: (1) all such Resource Adequacy Capacity and (2) any Ancillary Services capacity awarded or self-provided in the [Day-Ahead IFM, HASP,](#) or Real-Time Market. In the absence of submitted Bids, as part of the validation described in 30.7, Generated Bids will be used for Resource Adequacy Resources required to offer their Resource Adequacy Capacity in accordance with Section 40. For any capacity from a Resource Adequacy Resource not required to offer Resource Adequacy Capacity in accordance with Section 40 that was awarded or is self-providing Operating Reserves capacity in the [Day-Ahead Market IFM,](#) Scheduling Coordinators must submit an Energy Bid for no less than the amount of awarded or self-provided Operating Reserves capacity above their Day-Ahead Schedule. Resource Adequacy Resources that are not required to offer their Resource Adequacy Capacity in accordance with Section 40 may voluntarily submit Energy Bids [or Ancillary Services Bids.](#) Submitted Energy Bids shall be subject to the maximum and minimum Bid requirements and Mitigation Measures as set forth in Section 39.

\* \* \*

## **ATTACHMENT C**

ATTACHMENT C

TABLE OF TARIFF CHANGES

Procurement of Ancillary Services from Non-Dynamic System Resources in the Hour-Ahead Scheduling Process

Section	Title	Explanation
8.1	Scope	Reinserting language previously deferred on 10/30/08, ER09-213.
8.2.3.1	Regulation Service	<p>Reinserting with clarifications language previously deferred on 10/30/08, ER09-213.</p> <p>Clarifying existing language to illustrate treatment of non-binding advisory Regulation, one of the Ancillary Services, determinations in HASP.</p>
8.3.1	Procurement of Ancillary Services	<p>Reinserting with clarification language previously deferred on 10/30/08, ER09-213.</p> <p>Non-substantive clarifications to existing tariff language.</p> <p>Proposed changes includes the inclusion of description of how incremental Ancillary Services are procured in HASP and clarifies the procurement of Ancillary services in other markets.</p> <p>Including a reference to Section 42.1 and 30 to provide a reference to the rules that also apply to the procurement and submission of bids for Ancillary Services in HASP, respectively.</p>
8.3.2	Procurement Not Limited to CAISO Balancing Authority Area	<p>Reinserting with clarifications language previously deferred on 10/30/08, ER09-213.</p> <p>Clarifying the type of bids for Ancillary Services Non-Dynamic System Resources can submit in HASP.</p>
8.3.3.3	Notice to Market Participants	Reinserting with clarifications language previously deferred on 10/30/08, ER09-213

ATTACHMENT C

TABLE OF TARIFF CHANGES

Procurement of Ancillary Services from Non-Dynamic System Resources in the Hour-Ahead Scheduling Process

8.3.5	N/A	Reinserting with clarifications language previously deferred on 10/30/08, ER09-213
8.3.7	Bidding Requirements, Including Submission to Self-Provide an Ancillary Service	<p>Reinserting with clarifications language previously deferred on 10/30/08, ER09-213.</p> <p>Additional language to explain how Non-Dynamic System Resources are treated in HASP as compared to internal resources.</p> <p>Additional non-substantive changes proposed to existing tariff provisions.</p> <p>Including a reference to Section 30 and 42.1 to provide clarity that the procurement and submission of bids for Ancillary Services in HASP is subject to the bidding and must offer rules in those Sections of the tariff, respectively.</p>
8.6.2	Right to Self-Provide	<p>Reinserting language previously deferred on 10/30/08, ER09-213.</p> <p>Including reference to Section 40.6 to clarify that Resource Adequacy requirements in that section apply to Ancillary Services Bids.</p>
8.7	Scheduling of Units to Provide Ancillary Services	<p>Reinserting with clarifications language previously deferred on 10/30/08, ER09-213.</p> <p>Inserting and clarifying timing of the provision of awards to market participants.</p>
11.1.2	Settlement Provisions	Reinserting clarifying language previously deferred on 10/30/08, ER09-918

ATTACHMENT C

TABLE OF TARIFF CHANGES

Procurement of Ancillary Services from Non-Dynamic System Resources in the Hour-Ahead Scheduling Process

11.10.1.2	Ancillary Services Provided in HASP	Reinserting with clarification language previously deferred on 10/30/08, ER09-213.
11.10.1.2.1	Congestion Charges for HASP Intertie Ancillary Service Awards	Reinserting language previously deferred on 3/31/09, ER09-918. Previous language is modified to be consistent with changes made in the 3/31/09 filing regarding congestion charges for qualified self-provided Ancillary Services at the interties. See transmittal letter 3/31/09 filing in ER09-919 at p. 5. Language pertaining to qualified ancillary services congestion charges was accepted for the day-ahead and real-time in the May 27, 2009 letter order in ER09-918.
11.10.2	Settlement for User Charges for Ancillary Services	Reinserting with clarifications language previously deferred on 3/31/09, ER09-918.
11.10.3.1	Hourly User Rate for Spinning Reserves	Reinserting with clarifications language previously deferred on 3/31/09, ER09-918.
11.10.4.1	Hourly User Rate for Non-Spinning Reserves	Reinserting with clarifications language previously deferred on 3/31/09, ER09-918.
11.10.9	Settlements of Rescission of Payments for Ancillary Services Capacity that is Undispatchable, Unavailable, and Undelivered Capacity	Reinserting with clarifications language previously deferred on 3/31/09, ER09-918.
11.10.9.1	Rescission of Payment for Undispatchable Ancillary Service Capacity	Reinserting with clarifications language previously deferred on 3/31/09, ER09-918

ATTACHMENT C

TABLE OF TARIFF CHANGES

Procurement of Ancillary Services from Non-Dynamic System Resources in the Hour-Ahead Scheduling Process

11.16.1	Order of Payment Rescission for Resources with More than One Capacity Obligation in a Settlement Interval	Reinserting with clarifications language previously deferred on 3/31/09, ER09-918
27.1.2.1	Ancillary Service Marginal Prices	Inserting language to reflect procurement of Ancillary Services in HASP.  Cross referencing provisions in Sections 33.7 and 33.8 regarding the procurement of Ancillary Services in HASP, and the calculation of Ancillary services prices, respectively.
27.1.2.2	Opportunity Cost in Ancillary Services Marginal Prices	New tariff language to describe the impact the new rule limiting the use of the energy bids associated with Ancillary Services bids submitted by Non-Dynamic System Resources in HASP has on the opportunity cost in the Ancillary Services price.
30.5.2.6	Ancillary Service Bids	Inserting new language to reflect proposed rule changes regarding the treatment of energy bids associated with Ancillary Services bids.
30.7.6.1	Validation of Ancillary Service Bids	Inserting cross reference to section 40 and 40.6 to clarify that submissions of Ancillary Services bids must also comply with the bidding requirements therein. Also, adding cross reference to Section 33.7 to reflect application of proposed rule changes regarding the treatment of energy bids associated with Ancillary Services bids.

ATTACHMENT C

TABLE OF TARIFF CHANGES

Procurement of Ancillary Services from Non-Dynamic System Resources in the Hour-Ahead Scheduling Process

30.7.6.2	Treatment of Ancillary Service Bids	Reinserting with clarifications language previously deferred on 10/30/08, ER09-213.  Also including new rule change regarding the treatment of energy bids associated with Ancillary Services bids.
33.7	Ancillary Services in the HASP	Reinserting with clarifications language previously deferred on 10/30/08, ER09-213.  Also including new language to describe treatment of bids from Non-Dynamic System Resources as compared to bids for Ancillary Services from internal resources or Dynamic System Resources in HASP.  Also including new rule change regarding the treatment of energy bids associated with Ancillary Services bids.
33.8	HASP Prices for HASP Intertie Schedules	Reinserting clarifying language previously deferred on 10/30/08, ER09-213 and adding clarification on the determination of Ancillary Services prices in RTUC and HASP.
34.2.2	Real-Time Ancillary Services Procurement	Reinserting with clarifications language previously deferred on 10/30/08, ER09-213
34.3	Real-Time Dispatch	New proposed provisions to reflect proposed energy dispatch in the Real-Time of Non-Dynamic System Resources awarded Ancillary Services in HASP.
34.13	Treatment of Resource Adequacy Capacity in the Real-Time Market	Reinserting with clarifications language previously deferred on 10/30/08, ER09-213

## **ATTACHMENT D**



# Memorandum

**To:** ISO Board of Governors

**From:** Nancy Saracino, Vice President, General Counsel and Corporate Secretary

**Date:** September 2, 2009

**Re:** **Decision on Ancillary Services Procurement in the Hour-Ahead Scheduling Process**

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*This memorandum requires Board action.*

## EXECUTIVE SUMMARY

Prior to the start of the new market, the California Independent System Operator Corporation (ISO) deferred implementation of market functionality that would have enabled the ISO to procure ancillary services from resources located outside of the ISO balancing authority area that lack telemetry with the ISO's energy management system (non-dynamic system resources) in the hour-ahead scheduling process (HASP). Consequently, as far as external resources are concerned, the ISO has been procuring ancillary services from both dynamic (external resources with telemetry) and non-dynamic system resources in the day-ahead market but only dynamic system resources in real-time market. The ISO deferred this functionality because the original software design could not accommodate the dispatch constraints of non-dynamic system resources' ancillary services in the real-time market.

In order to allow procurement of ancillary services from non-dynamic system resources in HASP, Management requests that the ISO Board of Governors (Board) approve the approach described below for dispatching energy from non dynamic system resources in the real time market. Specifically, Management proposes to dispatch energy from non-dynamic system resources at a constant level through the end of any given hour rather than on a five minute basis.

Management also requests that the Board approve that energy bids associated with un-awarded HASP ancillary service bids will not be considered for dispatch in the real-time market. Management developed this proposal in response to its commitment to consider the reinstatement of deferred functionality and in response to stakeholders concerns regarding this functionality.

***Moved, that the ISO Board of Governors approves the market rule changes necessary to allow procurement of ancillary services in hour ahead scheduling process from non-dynamic system resources as described in the memorandum dated September 2, 2009; and***

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

## **BACKGROUND AND DISCUSSION**

### ***Dispatch of Energy from Ancillary Services Procured from Non-Dynamic System Resources in HASP***

Within any given hour, the ISO has limited flexibility to dispatch energy from ancillary services for non-dynamic system resources procured in the previous hour. This is largely due to agreements between importers and neighboring Balancing Authority Areas that typically allow external resources to make only one mid-hour schedule change. Under the previous design, in order for ancillary services from external resources capacity procured in HASP to be effective during the real-time hour, the ISO had to be able to dispatch energy from such reserves in real-time on a five-minute basis. Because of this design limitation, the ISO requested approval from the Federal Energy Regulatory Commission (FERC) to defer the HASP ancillary services procurement functionality. FERC approved the deferral of this functionality on January 30, 2009,<sup>1</sup> and the ISO commenced its new market operations on April 1, 2009, without the ability to procure ancillary services from non-dynamic system resources in HASP.

In recent months, Management discussed with stakeholders a proposed solution that changes the dispatch logic for energy from ancillary services procured from non-dynamic system resources in HASP. Under the proposed solution, if a non-dynamic system resource receives a dispatch instruction in mid-hour for energy associated with its ancillary services (operating reserve) capacity awarded in HASP, the ISO will dispatch the resource to operate at a constant level until the end of the hour. In the event that the ISO dispatches the system resource across an hourly boundary, the energy will be dispatched at a constant level until the end of the next hour.

Management proposes to adopt these new dispatch rules so that it can procure ancillary services from non-dynamic system resources in HASP and use the associated energy as needed to manage contingency situations in the real-time. The proposed dispatch rules are widely supported by stakeholders.

### ***Treatment of Energy Bids Associated with Ancillary Services Bids from Non-Dynamic System Resources***

Under the current market rules, when a scheduling coordinator submits an ancillary services bid in the HASP or real-time market it is required to also submit an associated energy bid. In addition, even if the ISO does not award the ancillary service bid in HASP, it may still dispatch the associated energy bid in the real-time five-minute energy market. While discussing the merits of the proposed energy

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<sup>1</sup> *California Independent System Corp.*, 126 FERC ¶ 61,081 (2009).

dispatch rules discussed above in the recent stakeholder process, stakeholders expressed concerns that the tariff language should be clarified so as to exempt non-dynamic system resources from these otherwise generally applicable rules. See Attachment A for the stakeholder matrix.

Management proposes the following rule changes regarding the treatment of energy bids submitted together with ancillary services bids in HASP by non-dynamic system resources to address stakeholder concerns:

- Non-dynamic system resources would continue to be required to submit an energy bid associated with an ancillary services bid in HASP or the real-time market. However, only ancillary service bids will be used to solve the optimization problem and the associated energy bids will not be used. In this case, the resulting ancillary service prices will reflect the cost of providing capacity but not the opportunity cost of providing energy.
- In the event that these ancillary service bids are awarded in HASP, they will be available for contingency dispatch in real-time.

These rule changes would prevent the dispatch of energy bids associated with ancillary services bids in the event that the ISO does not award the ancillary services bid in the HASP. Stakeholders did not express any opposition to these proposed rule changes.

#### **MANAGEMENT RECOMMENDATION**

Management recommends the Board approve the policy to allow the ISO to procure ancillary services from non-dynamic system resources in HASP and the related modifications concerning how energy bids from such resources are treated in the real-time market.

**Stakeholder Process: Ancillary Services Procurement in Hour-Ahead Scheduling Process (HASP) and Dispatch Logic**

**Summary of Submitted Comments**

Stakeholders submitted one round of written comments to the ISO on the following dates:

- Round One, 8/19/2009

Stakeholder comments are posted at: <http://www.aiso.com/2401/2401702e12ca0.html>

Other stakeholder efforts include:

- Conference Calls
  - 8/12/2009
  - 8/28/2009

Management Proposal	Load Serving Entities, CPUC, Curtailment Service Providers	Management Response ( Completed by the ISO)
<p>Reverting back to Ancillary Services Procurement in HASP</p>	<p>Dynegy – Oppose the original design. Supports the ISO procuring full-hour ancillary service in HASP only if it does so by implementing a full-hour ancillary services market that allows all resources, including flexible in-state generating units and dynamic system resources, to participate in that full-hour market.</p> <p>PG&amp;E – Support</p> <p>Powerex – Conditional Concerns on 1) The level of bid cost protection provided to ancillary service bids in the event the ancillary service price or the congestion price are changed; 2) Capacity tagging requirements.</p> <p>SCE – No specific comment</p> <p>SMUD – Support</p> <p>WAPA – Support</p> <p>WPTF – Conditional Concerns about the level of bid cost protection provided to ancillary service bids in the event the ancillary service price or the congestion price are changed.</p>	<p>The following issues are not in the scope of this proposal but will be considered under other initiatives.</p> <ol style="list-style-type: none"> <li>1. Full-hour ancillary services in HASP in which all resources are given binding capacity awards – Management proposes to evaluate this issue together with other further design enhancements to the ancillary services market.</li> <li>2. Hourly bid cost protection provided to ancillary service bids in the event that ancillary service price or the congestion prices are changed - Management has identified this as an issue in the market initiatives roadmap process and will be addressing it in the forum of <i>Ex Post Price Correction “Make-Whole” Payments</i>.</li> </ol> <p>Management clarifies that e-tagging is required for all capacity imports.</p>
<p>Dispatch logic: When operating reserve capacity procured from non-dynamic system resources in the HASP is dispatched in real-time, the dispatch level will stay constant until the end of the hour, or until the end of the next hour when dispatched across an hourly boundary. In the latter case, the ISO would apply the lower amount of the awarded operating reserve capacity between these two adjacent hours. This dispatch method will be applied to operating reserve awards to non-dynamic system resources</p>	<p>Dynegy – No comment</p> <p>PG&amp;E – Support</p> <p>Powerex – No comment</p> <p>SCE – No comment</p> <p>SMUD – Support</p> <p>WAPA – Support</p> <p>WPTF - Conditional</p>	

Management Proposal	Load Serving Entities, CPUC, Curtailment Service Providers	Management Response ( Completed by the ISO)
in both the HASP and the day-ahead market.		
Treatment of energy bids associated with un-awarded capacity bids submitted by non-dynamic system resources in HASP.	<p>PG&amp;E, Portland General, Powerex, SCE, SMUD –</p> <p>Asked for clarification of this issue: An associated energy bid is required to be submitted at the same time as an ancillary service bid. Based on the current market design, in the event that an ancillary service bid is not awarded in HASP, the associated energy bid is still available for dispatch in the real time five-minute energy market. However, five-minute dispatch is not viable for non-dynamic system resources, and this has prevented them from participating in HASP.</p>	<p>Management proposes policy amendment to procure hourly inter-tie operating reserves in the HASP: Only ancillary service bids submitted by non-dynamic system resources will be used to solve HASP optimization problem and the associated energy bids will not be used. In this case, the resulted operating reserve prices will reflect the cost of providing capacity but not the opportunity cost of providing energy. In the event that a non-dynamic system resource is awarded ancillary services in HASP and dispatched for energy in real time contingency run, its associated energy bids will be used to determine real time energy prices. The energy bids will be used up to the total of day ahead and HASP capacity awards on that resource.</p>



Board of Governors    September 10-11, 2009

**Decision on Ancillary Services Procurement in Hour-Ahead Scheduling Process**

**Motion**

*Moved, that the ISO Board of Governors approves the market rule changes necessary to allow procurement of ancillary services in hour ahead scheduling process from non-dynamic system resources as described in the memorandum dated September 2, 2009; and*

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

**Moved: Capuano    Second: Doll**

Board Action:	<b>Passed</b>	Vote Count:	<b>4-0-0</b>
Capuano	Y		
Doll	Y		
Page	Y		
Willrich	Y		

**Motion Number: 2009-09-G1**