



California ISO  
Your Link to Power

---

*Issue Paper*

**Generated Bids and Outage Reporting  
for Non-Resource Specific  
Resource Adequacy Resources**

**December 18, 2009**

# Generated Bids and Outage Reporting for NRS-RA Resources

*Prepared for Discussion on a Stakeholder Call – December 30, 2009*

## 1 Introduction

The California Public Utilities Commission (CPUC) administers the Resource Adequacy (RA) program, which requires load-serving entities under its jurisdiction to procure sufficient capacity, termed RA capacity, to be available to the ISO to provide energy and reserves to serve load and maintain reliable operation of the ISO controlled grid. RA contracts between load serving entities and suppliers of RA capacity require the supplier to submit bids into the California Independent System Operator (ISO) markets for the RA resource up to the procured MW volume, in compliance with Section 40 of the ISO tariff. In return, the supplier receives a capacity payment.

Because suppliers have an obligation to bid in their RA capacity, the ISO has Tariff authority to insert bids for RA resources that fail to bid into the market.<sup>1</sup> Specifically, for internal generating resources, and for resource-specific system resources, the ISO's Scheduling Infrastructure and Business Rules (SIBR) software will insert a generated bid for the RA capacity up to the MW RA capacity volume specified in the supplier's supply plan. There are gaps in this process, however, when it comes to the case of system (or import) resources that are not resource-specific but do have RA contracts. For ease, non-resource-specific system resources with resource adequacy contracts will be denoted as NRS-RA resources. For the November 2009 RA compliance month, there are 63 NRS-RA resources which have a combined contracted resource adequacy capacity of 5,215 MWh.

Currently, the ISO is not inserting bids for NRS-RA resources that fail to bid into the market. This practice, however, will change.<sup>2</sup> Through this stakeholder effort, the ISO will work with market participants to address two issues required for implementing insertion of generated bids for NRS-RA resources that fail to offer into the ISO's day-ahead market. The first issue is the question of what bid price to insert for automatically generated bids for these resources. Since they are not linked to specific generating units, there is no obvious cost basis for the price component of the default bid for NRS-RA resources.<sup>3</sup>

---

<sup>1</sup> According to §40.6.8 of the CAISO Tariff, "the CAISO will determine if dispatchable Resource Adequacy Capacity from Resource Adequacy Resources has not been reflected in a Bid and will insert a generated Bid into the CAISO Day-Ahead Market for any dispatchable Resource Adequacy Capacity that is not reflected in a Bid into the CAISO Day-Ahead Market and for which the CAISO has not received notification of an outage."

<sup>2</sup> Paragraph 133 of FERC Docket No. ER09-1064-000 *Order Accepting in Part and Rejecting in Part Tariff Revisions Subject to Modification*, Issued June 26, 2009.

<sup>3</sup> A non-resource specific system resource that does in fact have a designated generating resource that supplies the RA capacity has the option to become a resource-specific system resource. For more information on the resource-specific system resource agreement, please contact Daune Kirrene ([dkirrene@caiso.com](mailto:dkirrene@caiso.com)) in the ISO's Infrastructure Policy and Contracts group.

Second is the issue of outages and outage reporting. For internal RA resources, and for resource-specific system resources with RA contracts, suppliers are required to submit outage notices through the Scheduling and Logging for the ISO of California (SLIC) software. The SLIC notification then informs the ISO market software that the RA capacity from the resource or a portion thereof is not available, so that the software will not utilize generated bids to schedule the RA capacity. The complication with the outage reporting requirements in the case of NRS-RA resources is that these resources are not specifically tied to actual generating units. This spurs the question of what it actually means for a non-resource specific system resource to have an outage or derate, and how such an outage or derate would flow through the market and settlements systems.

Starting with this *Issue Paper*, the ISO is initiating a stakeholder process to review and resolve the above policy issues to enable the ISO to implement procedures to insert generated bids for NRS-RA resources that fail to bid into the day-ahead market. The ISO will seek feedback and suggestions from interested stakeholders to help determine the resolution for these open issues.

## 2 Process and Timetable

The purpose of the present *Issue Paper* is to initiate a discussion process with stakeholders to determine the best approach for resolving the issues described briefly above, and in greater detail in the following sections. The proposed timeline for the Stakeholder initiative is relatively compact in an effort to take the policy resolution to the CAISO Board of Governors in March. The table below summarizes the key steps in the stakeholder process on refinements to processes relative to NRS-RAs, starting with the release of this issue paper and ending with submission of the ISO management proposal to the Board. The ISO invites stakeholder input on any and all topics discussed in this issue paper.

December 18, 2009	<i>Issue Paper</i> Posted
December 30, 1:00-2:00 PM (PT)	Stakeholder conference call
January 8, 2010	Stakeholder comments due *
January 19	<i>Straw Proposal</i> Posted
January 26	Stakeholder conference call
February 2	Stakeholder comments due *
February 16	<i>Draft Final Proposal</i> Posted
March 25-26	Presentation to ISO Board of Governors

\* Please e-mail comments to Gillian Biedler at [gbiedler@caiso.com](mailto:gbiedler@caiso.com)

## 3 Key Criteria for Evaluating Potential Solutions

This section provides some key evaluation criteria the ISO believes are important. Stakeholders are invited to identify other criteria that should be considered in assessing potential solutions.

- The policy that is developed should increase the ISO’s ability to reliably operate the grid given its lack of visibility into the generation source(s) behind an NRS-RA resource.
- The policy that is developed should provide consistent rules and effective incentives for suppliers of Resource Adequacy capacity with must-offer obligations to fully comply with §40 of the ISO tariff.
- Policy and design options should be evaluated for implementation feasibility and costs for both the ISO stakeholder and for the ISO.

## 4 Description of the Issues

Resource Adequacy resources must submit Economic Bids or Self-Schedules for their Resource Adequacy Capacity into the IFM and RUC” *per* CAISO Tariff §40.6.1(1). Furthermore, the CAISO Tariff §40.6.2. states that:

Resource Adequacy Resources that have been committed by the CAISO in the Day-Ahead Market or the RUC for part of their Resource Adequacy Capacity or have submitted a Self-Schedule for part of their Resource Adequacy Capacity must remain available to the CAISO through Real-Time, including capacity reflected in the Day-Ahead Schedule and any remaining capacity, for the scheduled and non-scheduled portions of their Resource Adequacy Capacity.

Finally, “Resource Adequacy Resources must participate in the RUC to the extent that the resource has available Resource Adequacy Capacity in the IFM,” *per* §40.6.1(5) of the CAISO Tariff.<sup>4</sup>

Prior to the close of the Day Ahead market, the ISO systems check for RA capacity that is bid in, and will insert a generated bid for any dispatchable RA capacity for which an outage was not reported. Some non-resource-specific system resources may not have an obligation to be offered in all hours. Rather, they have an obligation only to be offered in the hours for which they are contracted to provide RA capacity.<sup>5</sup> Thus, it seems as if any approach for generating bids for non-resource specific system resources needs to recognize these resources as RA capacity in some hours but not in others.

Currently, the ISO is not calculating or inserting generated bids on behalf of NRS-RA resources that fail to bid into the Day Ahead market as required by the CAISO Tariff. *Per* FERC’s June 26, 2009 Order on the Resource Adequacy Standard Capacity Product (SCP) filing, “the CAISO should be submitting generated bids for non-bidding resource adequacy capacity at the interties if it is not already doing so, however, a tariff change is not required to make this clear. To the extent that the CAISO has not been submitting such generated bids, the Commission directs the CAISO to do so as soon as possible.”<sup>6</sup> Non-resource specific System Resources that supply Resource Adequacy

---

<sup>4</sup> Additional provisions in CAISO Tariff §40.6.5 are applicable to NRS-RA resources.

<sup>5</sup> From the table on page 36 of the BPM for Reliability Requirements which describes the bidding obligation for these resources as follows: “Economic Bids or Self-Schedules are to be submitted for all RA Capacity consistent with inter-temporal constraints such as multi-hour run blocks or contractual limitations (e.g. 6 X 16). (CAISO Tariff 40.6.1, 40.8.1.12.2)”

<sup>6</sup> Please see footnote 2 above for citation.

capacity pose two important policy questions that must be resolved in implementing procedures for inserting generated bids for these resources when they fail to offer their capacity into the day-ahead market. These questions concern: (1) the bid price associated with a generated bid, and (2) the rules and procedures regarding outage reporting.

### Determination of a Generated Bid

CAISO Tariff §40.6.8 states that the ISO will insert a generated bid on behalf of Resource Adequacy resources with must-offer obligations that fail to bid into the market. Furthermore, if such a resource does not bid the full RA MW quantity, the ISO is authorized to extend the resource's highest bid segment out to the MW quantity specified by the Scheduling Coordinator in the resource's supply plan.

The Scheduling Coordinator for a resource-specific RA resource with a must-offer obligation has several choices over the method by which the generated bid is calculated; tariff section 39.7.1 describes these options. One of these methods, the variable cost option, is based on resource-specific operating and fuel costs of the generating unit. Since NRS-RA resources are not specific to a particular generating unit, basing their generated cost calculation methodology on resource-specific cost-based factors is not feasible. Below, three options are presented for methods by which to arrive at a suitable generated cost for NRS-RA resources.

### Outage Reporting

In the event that an internal RA resource or a resource-specific system resource is not available to meet its RA obligation due to an outage or derate, a SLIC outage ticket must be submitted for the resource. The receipt of a SLIC outage ticket informs the ISO that the RA capacity will not be available, so that when the capacity is not offered into the ISO markets, the ISO market software will not use generated bids to implement the must-offer obligation for the capacity.<sup>7</sup> For NRS-RA resources, however, an outage or derate of an associated physical generating resource is not really applicable because these resources are by definition not resource specific.

## **5 Options for Addressing the Issues**

### **5.1 Options for Generated Bid Calculation Methods for NRS-RA Resources**

For an NRS-RA resource that submits a bid into the IFM/RUC but not to the full MW capacity specified in the resource's Supply Plan submitted by its Scheduling Coordinator, the ISO recommends that the last segment of the resource's energy bid curve will be extended out to the full RA MWh quantity. This is consistent with the practice for resource-specific RA resources with must-offer obligations.

The ISO has identified the following two options for generated bids to be inserted on behalf of NRS-RA resources that fail to bid into the IFM:

#### Option 1 – Price-Taker Bid

---

<sup>7</sup> This requirement is stated in the CAISO Tariff §40.6.8.

One option is for the ISO to insert a price-taker (\$0/MWh) bid on behalf of NRS-RAs that don't offer into the market. Price-taker bids displace higher bids, so if the NRS-RA isn't going to deliver, it will have pushed out submitted bids upon which the bidders would presumably have delivered had they cleared. This option therefore has the potential to cause a reliability problem. Possibly counter-balancing this, however, are two compounding factors:

- Failing to deliver on a cleared bid subjects the NRS-RA resource to price risk between DA and HASP/RT since it will have to pay the market back for its scheduled but undelivered energy; and
- There are potential changes to e-tagging requirements being evaluated. Depending on the outcome of that ISO stakeholder process, those changes could possibly include additional financial incentives to increase the cost to the NRS-RA of failing to deliver its IFM scheduled energy in real time.

### Option 2 – LMP-based Generated Bid

The LMP-based option for the calculation of the generated bid price for internal resources is described in CAISO Tariff § 39.7.1.2. Briefly, a supplier's dispatches at its generation node over the last ninety days are ranked from lowest to highest by locational marginal price (LMP). The dispatches that fall into the lowest quartile, (*i.e.* the lowest twenty-five percent) are used to create a weighted price by multiplying price by dispatched MWh quantity for the resource at the particular PNode, summing all the outcomes of that calculation for the lowest quartile dispatches, and then dividing by the sum of the MWh quantities. In order to prevent this generated bid price from excessive volatility, the ability to use this generated bid calculation method is dependent on the outcome of a feasibility test. The feasibility test evaluates the frequency of dispatches at the generating node over the past ninety days to ensure that enough data are available for a stable and meaningful calculation. Internal resources that opt for the LMP-based generated bid calculation are required to choose a back-up method of calculation<sup>8</sup> to be used in the event that the feasibility test determines that there are not enough data upon which to base the LMP-based generated bid. Detailed information on how the generated bid option and the feasibility test work for internal resources is provided in the Market Instruments Business Practice Manual.<sup>9</sup> Note that generated bids are calculated separately for each market, and for Peak and Off-Peak periods.

In determining how the LMP-based option might be adapted for NRS-RA resources, the question arises of what generated bid calculation would be appropriate to have as a back-up in the event that the LMP-based generated calculation failed the feasibility test. For internal resources, the other two available options for determining generated bids are the variable cost option and the negotiated rate option, of which only the latter would be suitable for NRA-RA resources. Thus the first option for a backup method is that the NRS-RA resource have a negotiated generated bid in the ISO system

---

<sup>8</sup> See CAISO Tariff section 39.7.1 or the Market Instruments BPM Appendix D3 for information on the other proxy bid calculation methods.

<sup>9</sup> The Market Instruments Business Practice Manual is available at the following link: <https://bpm.aiso.com/bpm/bpm/doc/00000000000238>. The sections directly addressing the calculation of the LMP-based proxy cost option, as well as information on the feasibility test, are on pages D-3 and D-4.

available to use as the back-up generated bid calculation in the case that the LMP-based calculation fails the feasibility test. A second option is for the ISO to insert a \$0/MWh price taker bid, in the event of insufficient data to formulate an LMP-based bid.

The following example illustrates how the LMP-based approach would work,

Example 1: NRS-RA Resource A

The Scheduling Coordinator for Resource A has submitted a Supply Plan for that resource that indicates its capacity will be available over one intertie point. The table below shows all eight dispatches that occurred at the tie point in the last ninety days. The dispatches are sorted by LMP from lowest to highest. The lowest quartile is comprised of the two dispatches around which the box is drawn.

**Lowest Quartile Dispatch**

<b>Dispatch (MWh)</b>	<b>LMP (\$/MWh)</b>
500	7
150	8
100	10
275	12
120	15
75	17
230	22
300	25

To calculate the LMP-based generated bid, take the average of the LMPs weighted by their associated MWh dispatches. For this example, the LMP-based generated bid would be calculated as

$$\frac{7 \text{ \$/MWh} * 500 \text{ MWh} + 8 \text{ \$/MWh} * 150 \text{ MWh}}{500 \text{ MWh} + 150 \text{ MWh}} = \$7.23 \text{ per MWh.}$$

So if Resource A fails to bid into the market, a generated bid of \$7.23 *per* MWh would be inserted for it up to the MW capacity it is obligated to offer into the market as indicated in its Supply Plan.

Example 2: NRS-RA Resource B

The calculation of the LMP-based generated bid for an NRS-RA resource can be complicated by the fact that a Scheduling Coordinator is able to submit a Supply Plan for an NRS-RA resource that specifies capacity quantities to be available at each of multiple tie points. In such cases the supplier is obligated to offer the specified quantity at each tie point, and therefore it is necessary to create an LMP-based generated bid for each of the specified interties. In this second example, we'll calculate the LMP-based generated bids for NRS-RA Resource B for which the Supply Plan indicates its capacity will be available over four intertie points – A, B, C, and D. For this example, the

Scheduling Coordinator’s Supply Plan for meeting its obligation to provide 600 MW of capacity is summarized in the table below:

**Supply Plan – 600 MW RA Capacity**

<b>Tie Point</b>	<b>MW</b>
A	150
B	150
C	200
D	100

The following table captures the lowest quartile of LMPs received (as well as the associated dispatched MWh quantities for the particular resource) for all the dispatches of the RA resource over those four tie points during the past ninety days for a particular market and for a particular time period (either Peak or Off-Peak). The *per* MWh prices to the right of the table below are calculated by taking an average of the prices weighted by the MWh volumes dispatched at those prices just as in the above example.

**Lowest Quartile Dispatch by Tie Point**

	<b>Dispatch (MWh)</b>	<b>LMP (\$/MWh)</b>	
<b>Tie Point A</b>	150	\$5	} \$9.65
	140	\$10	
	275	\$12	
<b>Tie Point B</b>	300	\$25	} \$28.67
	350	\$30	
	100	\$35	
<b>Tie Point C</b>	75	\$18	} \$22.62
	50	\$20	
	200	\$25	
<b>Tie Point D</b>	250	\$14	} \$16.57
	80	\$16	
	200	\$20	

For Resource B, failure to bid in at any one of the four tie points would result in the applicable LMP-based generated bid at that location. For example, if Resource B was not bid in at Tie Point A as *per* its Supply Plan, a bid for 150 MWh at \$9.65/MWh would be inserted on its behalf even if 150 MW was bid in at Tie Point C. Failure to deliver at Tie Point A would result in Resource B having to buy back that power at Tie Point B’s HASP price.

Note that for internal RA resources that have opted for the LMP-based calculation of generated bids, the weighted average is calculated based on the quantities dispatched within each segment of the Default Energy Bid (DEB) curve. The DEB bid curve segments are fixed and pre-determined



by an independent entity. Since there is no physical resource justification for developing segments for an NRS-RA, there is no natural way to break up the default energy bid curve into segments. Thus, the default energy bid curve for NRS-RA resources is proposed to be a single segment *per* tie point up to the capacity specified in the resource's Supply Plan.

To be consistent with the treatment of internal RA resources, the ISO proposes that an NRS-RA resource's bid curve be extended to the full RA obligation at the same price as the last segment of bid-in supply in the event that it bids in only part of its obligated MWh volume. This would apply to each tie point specified in the NRS-RA resource's Supply Plan.

## 5.2 Options for Outage Policies for NRS-RA Resources

### Definition of an NRS-RA Outage or Derate

Non-resource specific system resources that supply RA capacity can provide that capacity from a variety of sources, for example a single unit, a group of resources, or *via* a bilateral transaction that is not tied to any specific physical resource, at their discretion. Thus, NRS-RA system resources technically do not experience outages as they are, by definition, not linked to a specific generating resource. None-the-less, the ISO recognizes that there may be circumstance over which the NRS-RA supplier has no control that can adversely impact the supplier's ability to meet its RA obligation. In order for the supplier to report an NRS-RA resource's unavailability to the ISO, the ISO will add the resource identification numbers for those resources to the SLIC system.

The Scheduling Coordinator will need to document the circumstances that led to the unavailability of the resource within a SLIC ticket. In view of the fact that non-resource specific system resources are not tied to specific generating units, the ISO believes that outages or derates for these resources for RA compliance purposes would be due to curtailments of transmission that is external to the ISO and is necessary for delivery to the resource's designated intertie point. Internal generating resources and resource-specific system resources are required to report forced outages as well as an explanation for the circumstances of the outage. CAISO Tariff §9.3.10.6 states that, in the event of a forced outage, "the Operator shall provide to the CAISO an explanation of the forced outage and the estimated return time" within a specific timeframe as well as an explanation that includes "a description of the equipment failure or cause and a description of all remedial actions taken by the Operator." While this requirement is not directly applicable to NRS-RA resources, it can be adapted to apply the following requirements to such resources:

- The Scheduling Coordinator should provide an explanation for its resource's unavailability and an estimated time at which the NRS-RA resource will become available again. The timeframe for this requirement should be the same for NRS-RA resources as for resource-specific resources;
- The Scheduling Coordinator should provide a description of the transmission curtailments or transmission outages external to the ISO that have led to the resource's unavailability; and
- An Operator reporting the forced outage of a physical generating unit is required to submit a description of actions taken to avoid or mitigate the outage. Similarly, the Scheduling Coordinator for an NRS-RA resource should provide a description of alternate transmission arrangements through which it attempted to fulfill its must-offer obligation.

Just as for resource-specific resources, NRS-RA resources' Scheduling Coordinators should be required to provide the CAISO with additional information as requested. As it does for resource-specific resources, the CAISO would have the authority to submit a report to the FERC regarding circumstances in which it determines that a Forced Outage may have been the result of gaming or other "questionable behavior" by the Scheduling Coordinator.<sup>10</sup>

#### Treatment of Outage or Derates in SIBR, Market Optimization, and Settlements Systems

As noted in the previous section, the ISO will need to introduce the ability to log outages or derates of NRS-RA resources into SLIC. As is the case for resource-specific RA resources, the day-ahead market systems will ignore a generated bid from an NRS-RA resource with an outage submitted into SLIC before the 10 A.M. close of bidding for the day-ahead market. An NRS-RA resource for which a derate has been submitted into SLIC by 10 A.M. will have a truncated generated bid inserted for it, or will have the extension of an incomplete bid truncated such that the Pmax to which the resource is derated will be reflected. If the outage is not reported by 10 A.M. SIBR will insert a generated bid based on the normal RA capacity. If that generated bid clears, but the NRS-RA resource does not deliver on its schedule, it will have to buy back the scheduled energy at the HASP price.

For a resource-specific RA resource that submits an outage after the 10 a.m. close of the Day Ahead Market, the Real Time Market optimization is informed and thus ignores a generated bid for any DA IFM or RUC schedule for an RA resource on outage. Ideally, the same would be true for NRS-RA resources. To achieve this, a new linkage would need to be forged between SLIC and the Real Time Market, and this is a major undertaking. Since work is underway to enable communication between SLIC and SIBR that would obviate the need for this linkage, bearing the consequence of the lack of communication between SLIC and the RTM for NRS-RA resources for the time being seems reasonable. Specifically, those consequences are that an NRS-RA resource that submits an outage after the close of the Day Ahead Market will not have those outages communicated to the Real Time Market, and thus SIBR will insert bids on behalf of those NRS-RA resources. This constitutes a reliability concern as the NRS-RA resources will clearly not show up in Real Time to fulfill any schedules resulting from cleared generated bids. None-the-less, this reliability concern is no greater than the one facing the ISO currently due to the fact that an NRS-RA resource can simply not show up as *per* its Supply Plan and its IFM/RUC schedule.

Also of concern is the fact that the current version of SIBR cannot accommodate a rule that dictates the insertion of bids under the RA must offer obligation for some hours and not for others. Without a change to this limitation of SIBR, bids would be inserted for an NRS-RA resource for hours in which it was not required to offer. Because working around this limitation of SIBR would be cumbersome, the ISO may wait to implement bid insertion for NRS-RA resources until a forthcoming release of SIBR is in place. The forthcoming SIBR release will include provisions for RA capacity to be designated RA must offer for a subset of hours for purposes of bid insertion.

Further, for resource-specific RA resources, the settlement system is informed by SLIC outages so that these resources are not inappropriately charged for failure to deliver, for example. However, extensive work would be required to modify the market and settlements systems to incorporate

---

<sup>10</sup> These requirements parallel those for resource-specific resources as laid out in CAISO Tariff §9.3.10.6.

information from SLIC into settlements for NRS-RA resources. As a result, manual processes will be required, at least in the near term, to avoid settlement charges that, but for the lack of communication between SLIC and the settlements system, would not have been assessed.

## **6 Conclusion**

The timeframe in which the ISO will strive to incorporate changes to processes for NRS-RA resources will ultimately depend on the proposal to which this Stakeholder engagement leads us.

The ISO will conduct an initial conference call to review this Issue Paper on December 30, 2009 from **time** to **time**.

The ISO invites stakeholder comments and discussion on the issues raised within this paper as well as other issues that should be examined. Initial comments should be sent to [gbiedler@caiso.com](mailto:gbiedler@caiso.com) by close of business on January 8, 2010.