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## **Issue Paper and Straw Proposal**

# **Congestion Revenue Rights (CRRs) Associated with Integrated Balancing Authority Areas (IBAAs)**

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# Congestion Revenue Rights (CRRs) Associated with Integrated Balancing Authority Areas (IBAAAs)

## 1. Introduction

The CAISO's February 9, 2006, Market Redesign and Technology Upgrade ("MRTU") Tariff filing discussed the need and the CAISO's intention under MRTU to improve upon the simple radial approach to modeling its inter-ties with adjoining Balancing Authority Areas ("BAAs," formerly known as Control Areas). Accordingly, over the past year the CAISO has been developing enhancements to the Full Network Model ("FNM") to improve the accuracy of the congestion management processes for the CAISO Controlled Grid, which will be implemented in the Day-Ahead and Real-Time Markets under MRTU. Improved modeling of adjoining BAAs will minimize potential discrepancies between: (a) modeled flows and congestion in the Day-Ahead Market, versus (b) actual flows and congestion in the Real-Time Market. These modeling improvements and the resulting reduction in Day-Ahead to Real-Time discrepancies will increase the accuracy and reliability of Locational Marginal Prices ("LMPs") in reflecting actual system conditions, managing congestion, and generally promoting consistency between the spot markets and the operating needs of the grid. The accuracy of the FNM is essential to realizing the benefits of the LMP-based MRTU market redesign. As reflected in the work papers developing the modeling and pricing methodologies for Integrated Balancing Authority Areas ("IBAAAs"),<sup>1</sup> to the extent the CAISO has data available to do so, it proposes to model certain adjoining BAAs in the FNM in a manner that reflects the flows between these BAAs and the CAISO BAA more accurately than is possible using a simple radial model of the inter-ties.

In addition to using the FNM for scheduling power flows and determining locational energy prices in the MRTU Day-Ahead and Real-Time Markets, the CAISO uses the FNM in the allocation and auction of Congestion Revenue Rights ("CRRs"). Accuracy of the FNM in the CRR process is critical to the CAISO's ability to balance the competing objectives of releasing as many CRRs as possible to market participants, while minimizing the risk of CRR revenue shortfall that could occur if the CAISO collects insufficient congestion revenues from the Day-Ahead Market to cover CRR settlements fully on a monthly basis.

During the ongoing stakeholder process on the IBAA modeling and pricing approaches, participants have raised a number of questions and issues regarding how the adoption of IBAAAs may affect the release and settlement of CRRs. This paper is intended to summarize the major issues and questions, to offer clarifications on some critical points and to describe the CAISO's proposed solutions.

The CAISO will conduct a preliminary discussion of this paper during the stakeholder conference call on IBAA issues scheduled for February 25, and will then provide an opportunity for a more lengthy discussion during the March 6 stakeholder meeting. Details on these two meetings can be found at <http://www.caiso.com/1f50/1f50b4905c1d0.html>.

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<sup>1</sup> BAAs that are modeled in the FNM using the IBAA approach are referred to as IBAAAs. For all documentation that has been provided to market participants on the development of IBAAAs and associated modeling and pricing approaches see: <http://www.caiso.com/1f50/1f50ae5b32340.html>.

The CAISO plans to file changes to the CAISO Tariff that reflect additional detail on the modeling specifications for the IBAA, the adoption of new terminology related to IBAA, and the adoption of a new pricing methodology related to the IBAA that it plans to implement at the start of MRTU. The CAISO will seek board approval of the pricing aspects of the IBAA at its March 26-27, 2008 Board of Governors Meeting.

Participants are requested to forward any comments to this discussion paper by close of business on February 29 to the following email address: [MRTUTariff@caiso.com](mailto:MRTUTariff@caiso.com). Additional comments will be requested after the March 6 discussion. The CAISO believes that this paper captures the IBAA-related CRR issues raised thus far, and encourages parties to forward any additional concerns to the same address so that it may consider these issues.

## **2. Foundational Issues and Proposed Approaches**

Although in several cases parties have raised very specific and detailed questions, there are several foundational matters that the CAISO believes require clarification at the outset. This document uses the phrase “IBAA change” to refer to any change whereby the FNM is enhanced on a permanent basis by modeling some transmission external to the CAISO Controlled Grid through the incorporation of a new IBAA or changes to an existing IBAA.<sup>2</sup>

The remainder of this section identifies three foundational areas where parties’ issues and concerns appear to be concentrated and where clear, reasonable solutions are needed. The CAISO emphasizes that it is still open to alternative ideas and approaches at this point, provided they meet the criteria discussed toward the end of this paper.

### **2.1. Impact of an IBAA change on the future release of CRRs**

In general the CAISO expects that IBAA changes will undergo extensive study and analysis before they are implemented in the FNM. As outlined in Section 4.2.6.3 of the draft and illustrative FNM Business Practice Manual (FNM BPM),<sup>3</sup> the CAISO will strive to synchronize future IBAA changes with the annual CRR release process. That is, the CAISO intends to schedule new IBAA changes to take effect on January 1 of a new year (i.e., in the Day-Ahead Market that is run on December 31), and to provide to market participants all the modeling and pricing details as part of the FNM information package that is made available for CRR purposes prior to the conduct of the annual CRR release process for that year. For example, if an IBAA change is scheduled to take effect on January 1, 2010, the CAISO would provide the modeling and pricing details of the change in the CRR FNM package that is made available in the summer of 2009 in preparation for the CRR allocation and auction processes for CRR year 2010. As a result, all CRRs released for 2009 and beyond – including one-year Seasonal CRRs as well as Long Term CRRs – would be released using the same basic FNM that will be used in the Day-Ahead and Real-Time markets starting in 2009.

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<sup>2</sup> The present discussion has no relation to and should be distinguished from the provisions, already in the MRTU Tariff Section 24.1.4, that address any reconfiguration of previously-released Long-Term CRRs that may need to be performed in the event that some transmission is removed from the CAISO Controlled Grid, for example by the departure of a Participating Transmission Owner. In the case of IBAA changes, there are no transmission facilities being removed from the CAISO Controlled Grid.

<sup>3</sup> The draft FNM BPM is posted at <http://www.caiso.com/1f50/1f50ae5b32340.html>.

In some instances there may be a need to implement an IBAA change mid-year because of a need for improved accuracy in the Day-Ahead and Real-Time Market congestion management processes. In such a case the CAISO would incorporate the IBAA change into the FNM for the first monthly CRR process in which the IBAA change will take effect, and will follow the proposed provisions described below for assessing and mitigating impacts on the previously-released Seasonal CRRs for the remainder of that year.

## **2.2. Impact of an IBAA change on the settlement of previously-released CRRs**

One concern that several stakeholders have expressed relates to the potential for an IBAA change to create a discrepancy between the source or sink location of a previously-released CRR and the new source or sink that is adopted based on incorporating the IBAA transmission into the FNM. The CAISO is considering two possible approaches for addressing this concern.

Approach 1: Allow the holder of a previously-released CRR whose source or sink is affected by the IBAA change to make a one-time election either to (a) modify the settlement of the CRR to be congruent to the revised IFM pricing associated with the IBAA change, or (b) retain the original source or sink specification of the CRR.

Approach 2: Modify all relevant CRR settlements to reflect the IBAA change, as in option (a) of approach 1.

Example 1. Suppose LSE-1 has acquired a CRR with source at T1 inter-tie and sink at SCE Default LAP. Suppose that T1 and another inter-tie T2 both connect the CAISO to the same adjoining BAA-7 that is going to be modeled as a new IBAA-7. Associated with the new IBAA-7 will be a pricing hub H-7 that will substitute for T1 and T2 for settling energy schedules in the Day-Ahead and Real-Time Markets that were priced at T1 or T2, respectively, prior to the IBAA change.<sup>4</sup>

Under Approach 1, LSE-1 would have a one-time election either to modify the CRR in question to source at H-7 instead of T1, or to retain the T1 source for CRR settlement purposes. Under Approach 2, LSE-1's CRR would automatically be modified to source at H-7 for CRR settlement purposes.

Example 2. This example is an export variant of the previous example. Suppose supplier S-3 has acquired a CRR whose source is an internal generator G-3 and whose sink is the inter-tie T2. Under the same IBAA change as in Example 1, under Approach 1 S-3 would have a one-time election either to modify the CRR to sink at H-7 or to retain the sink at T2. In contrast, under Approach 2 the CRR would automatically be modified to sink at H-7 for CRR settlement purposes.

Each of the two approaches has its advantages. Approach 1 obviously has the advantage of allowing CRR Holders the flexibility to make a choice. If the CRR Holder is most concerned about using the CRR to manage its congestion exposure related to scheduling energy flows on the CAISO Controlled Grid, then option (a) under Approach 1 allows the CRR to be modified so that any settlement changes resulting from new pricing locations in the IBAA will be applied in the same way to both the IFM energy settlement and the CRR settlement. Alternatively, if the

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<sup>4</sup> This example only mentions one new pricing location associated with IBAA-7, but in practice there may be more than one new pricing location associated with an IBAA change. A case in point is the new SMUD/Western IBAA.

CRR Holder is a speculator whose main concern in purchasing the CRR in the auction was to profit from expected congestion charges between the chosen source and sink of the CRR, option (b) allows the CRR Holder to retain exactly the same CRR as it originally acquired. In contrast, Approach 2 offers consistent and uniform treatment of all previously-released CRRs affected by the IBAA change. One possible benefit of this is that it would eliminate any uncertainty for CRR Holders regarding the choices other CRR Holders have made under Approach 1. Clearly if Approach 1 is adopted it will be necessary to specify a process whereby CRR Holders would make their elections, and how this process would be coordinated with the simultaneous feasibility assessment discussed in the next sub-section. Approach 2 avoids these potential complexities. In addition, at this point the CAISO does not have a definitive answer as to whether Approach 1 or Approach 2 offers lower risk of revenue inadequacy that may result from modifying the sources and sinks of previously-released CRRs (see the next sub-section for a more complete discussion of this topic), and invites stakeholders to comment on this and other possible pros and cons of the two approaches.

### **2.3. Impact of an IBAA change on the revenue adequacy of previously-released CRRs**

The previous section ignores the possibility that in modifying the sources or sinks of previously-released CRRs to match the new pricing locations associated with the IBAA change, the entire set of previously-released CRRs may no longer be simultaneously feasible. The present section addresses this question.

Because the MRTU Tariff requires that all CRRs be fully funded, any simultaneous infeasibility that results from IBAA-related changes to CRR sources and sinks would have to be funded somehow to prevent any direct impacts to the CRR Holders. Thus CRR Holders would be held harmless with respect to the payoffs and charges accruing to their CRRs, but the CAISO may need to recover a revenue shortfall in the event that congestion revenues are insufficient at the end of any month.

It is important to recognize that revenue inadequacy is not a problem if the IBAA change is incorporated consistently into the CRR network model that is used in the release of CRRs applicable to all time periods when the IBAA change will be in effect in the spot markets. As discussed earlier in conjunction with future CRR releases, the CAISO will strive to take this approach with all IBAA changes, except possibly in cases where there is a pressing need for improved accuracy in the congestion management procedures in the area of the proposed IBAA change. In the case of the recently proposed SMUD/Western and TID IBAAs, the proposed IBAA changes were incorporated into the CRR FNM for the annual CRR release processes (allocation and auction) that were conducted during 2007 in a manner that reflects how the CAISO intends to incorporate them into the FNM for the spot markets at the start of MRTU. Thus it will be possible to settle the relevant CRRs using the new pricing locations created for the IBAA without adding any new risk of revenue inadequacy.

In cases where IBAA changes are implemented after some Seasonal and Long-Term CRRs have been released based on the pre-IBAA FNM, it will be necessary to test for any potential failure of simultaneous feasibility and, if it occurs, to estimate its magnitude. The CAISO proposes to perform this assessment in the following steps.

1. Prepare the appropriate sets of post-IBAA Seasonal and Long-Term CRRs. There will be a different set of CRRs for each Season/TOU combination. If Approach 1 is taken as described in the previous section, some CRR Holders may elect to retain the original

source and sink designations of their CRRs, whereas other CRR Holders may elect to modify their CRRs to match the new pricing locations associated with the IBAA changes. If approach 2 is taken, then all affected CRRs will be modified appropriately.

2. For each Season/TOU run the Simultaneous Feasibility Test on the set of post-IBAA CRRs using the post-IBAA FNM and applying the limit-expansion feature where needed to achieve feasibility. In this step all CRRs for a given Season/TOU, including all modeled existing rights (TOR/ETC/CVR) and awarded Merchant Transmission CRRs, would be treated equally in the SFT, with no differential priorities among different types of rights. There would be no need for such differential priorities because no CRRs or other rights would be curtailed to achieve feasibility. Rather, if the entire set is not simultaneously feasible the limit-expansion feature of the SFT will achieve feasibility by increasing the transfer capacity on any overloaded facilities just enough to render the full set of CRRs feasible.<sup>5</sup> The results in the form of MW expansions of the transfer limits of specific overloaded facilities will serve to quantify the degree of infeasibility that results from modifying the previously-released CRRs to conform to the new pricing locations of the IBAA.
3. If no limit expansions are needed in Step 2, then the assessment is done and the conclusion is that the IBAA change and associated CRR modifications have not added any risk of revenue inadequacy.
4. Alternatively, if the Step 2 SFT does result in limit expansions for one or more facilities, then as a second test the CAISO proposes to reduce the test set of CRRs for that Season/TOU by eliminating the one-year Seasonal CRRs, to determine whether the infeasibility and the needed limit expansions are driven by the current Seasonal CRRs or are required for the Long-Term CRRs as well. With a reduced set of modified CRRs comprised of the Long-Term CRR set, the awarded Merchant Transmission CRRs and the modeled ETC/TOR/CVRs, the CAISO expects that any needed expansion of facility limits identified by the Step 2 SFT would be greatly reduced if not totally eliminated in Step 4.

If Step 2 indicates that some limit expansion has been performed by the SFT, this still does not mean for certain that there will be CRR revenue shortfall for that Season/TOU, it just means that the risk of CRR revenue shortfall is increased. If Step 2 resulted in limit expansions but Step 4 did not, then the increased risk is only for the current year Season/TOU CRRs, whereas if Step 4 also resulted in limit expansions then the increased risk may go beyond the current year. In either case, the CAISO proposes to use the CRR Balancing Account to cover any shortfall that occurs in any given month.

There are several reasons why the CAISO believes it is appropriate to use the CRR Balancing Account to manage this risk. First, the Tariff requires that all CRRs be fully funded, and FERC has approved the use of the CRR Balancing Account and associated allocation of any required shortfall to measured demand for ensuring full funding of CRRs. Second, because any given

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<sup>5</sup> See MRTU Tariff Section 36.4.2 for a description of the CRR Allocation optimization formulation, which would be applicable to the current proposal because there would not be financial bid prices associated with the CRRs being assessed for simultaneous feasibility. In general, in the absence of bid prices the SFT reduces CRR quantities based on maximum effectiveness in relieving binding constraints. When the limit-expansion feature is enabled, however, the SFT will increase flow limits on overloaded facilities to achieve feasibility rather than reducing CRR quantities. The last paragraph of MRTU Tariff Section 36.4.2 describes how this feature is used in preparing the CRR FNM for the monthly CRR release process, to ensure that all previously-released Seasonal and Long Term CRRs are feasible on the CRR FNM for that month.

IBAA change will occur in a limited area of the grid, it can be expected to affect a relatively small share of the total released CRRs, and hence any impact on revenue adequacy should be small relative to the total volume of congestion revenues and CRR settlements. (If Step 4 turns up a negative result – no limit expansion needed – then the effect is limited in time as well as magnitude.) Third, although any particular IBAA change will typically occur in a specific area of the grid, the benefits of the IBAA change in terms of improved accuracy of congestion management and pricing will be enjoyed by the entire CAISO BAA. Fourth, as noted above any limit expansion resulting from the SFT analysis only increases the risk of revenue inadequacy, but does not deterministically cause revenue inadequacy. If at the end of any month it turns out that the CAISO has collected net IFM congestion revenues that fall short of the required net CRR payments, it will not be possible to trace this result back and attribute an appropriate share of the shortfall to the IBAA change in any reliable manner.

### **3. Criteria for Evaluating Potential Solution Approaches**

The CAISO has identified the following criteria and considerations for evaluating the approaches discussed in this paper. Stakeholders are invited to comment on these criteria and suggest others that they believe should be considered.

1. IBAA changes should not undermine the consistency between Integrated Forward Market (“IFM”) settlement and CRR settlement for parties who have obtained CRRs to manage their congestion exposure due to their use of the CAISO Controlled Grid.
2. IBAA changes do not constitute a valid reason to depart from the principle of full funding of all CRRs.<sup>6</sup>
3. In the event that CRR revenue inadequacy results from maintaining the consistency between IFM settlement and CRR settlement, the resulting cost impact should be allocated in a just and reasonable manner.

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<sup>6</sup> Note that existing MRTU Tariff Section 36.2.8 provides for a departure from full funding in cases of Uncontrollable Force, System Emergency, or where transmission facilities or entitlements are withdrawn from the CAISO Controlled Grid, none of which apply in the case of an IBAA change.