

# Methodology for Determining CRRs for Merchant Transmission Upgrades

March 23, 2007

*The issues raised in this document will be discussed during a March 29<sup>th</sup> conference call and a scheduled April 3<sup>rd</sup> stakeholder meeting. The time and call-in numbers for these discussions are noted on the calendar page of the CAISO website.*

## **Introduction**

Consistent with Guideline No. 3 of Federal Energy Regulatory Commission (“FERC”) Order No. 681 (the “LT-FTR Rule”) and its September 21, 2006 MRTU Order, the CAISO has provided in its MRTU Tariff that Merchant Congestion Revenue Rights (“Merchant CRRs”) that are made feasible by transmission upgrades or expansions will be available upon request to any party that pays for such upgrades or expansions and has not elected for regulated cost recovery of their costs.

The CAISO is developing detail to be included as part of the Business Practice Manual for CRRs that will specify the procedures and the methodology pursuant to which Merchant CRRs will be made available. The CAISO’s May 2 filing at FERC will include any necessary additional details to be included in the MRTU Tariff.

This paper discusses some important issues that require resolution for implementation of Merchant CRRs. The CAISO seeks stakeholder input to develop these BPM processes and any additional tariff language.

As part of this open discussion of the processes for allocating Merchant CRRs, questions may arise that relate to the integration of merchant transmission development within the CAISO’s Transmission Planning processes. It is important to understand that the goal of this stakeholder process, leading up to a tariff filing on May 2, is not to document and develop the details that pertain to the development of the overall transmission planning process. Rather, at this time the CAISO seeks input and resolution of the non-transmission planning aspects of merchant transmission projects, required by the LT FTR Rule and September 21 MRTU Order, which pertain to the methodology and procedures that the CAISO will use to make available Merchant CRRs and the characteristics of the allocated Merchant CRRs.<sup>1</sup>

The CAISO anticipates that transmission planning issues will be addressed within other stakeholder processes to be implemented in compliance with the requirements of FERC’s recent order Preventing Undue Discrimination and Preference in Transmission Service (“Order No. 890”).

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<sup>1</sup> The relevant sections of the LT-FTR Rule and FERC’s September 21 MRTU Order are provided in Appendix A of this paper.

## **Principles of Merchant CRRs**

The features of Merchant CRRs and of how such Merchant CRRs will be made available were included in the CAISO's MRTU Tariff and associated expert testimony as filed on February 9, 2006.<sup>2</sup> The CAISO intends to incorporate these features in the Merchant CRR provisions of its Business Practice Manual for CRRs and in its Tariff as necessary:

- An entity will be eligible for Merchant CRRs only if such entity has not elected to recover costs of its investment through the CAISO's transmission access charges or other regulated return on its investment (herein called a "MT sponsor" or "MT developer").
- Entities may elect Merchant CRRs in the form of either option CRRs or obligation CRRs.
- Merchant CRRs will remain effective for thirty years or the life of the project, whichever is less.
- The quantity and source-sink pattern of Merchant CRRs allocated to the entity will be commensurate with the transfer capacity that the project adds to the CAISO Controlled Grid.
- The developer's entitlement to Merchant CRRs will begin when the transmission project (herein called the "MT upgrade") has been energized and operational control has been turned over to the CAISO.

**The CAISO intends to build on these principles and explore further CAISO's methodology for determining the amount and spatial configuration of the incremental CRRs to be allocated as Merchant CRRs.**

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## **Discussion of Merchant CRR Allocation Methodology**

This document is organized in the format of a series of questions to guide the development of the Merchant CRR allocation methodology. In some instances, the CAISO posits responses to these questions as a way to elicit further discussion and input from stakeholders. Some of these answers were proposed within a previous White Paper that has been re-posted as background information for this current public discussion.

(<http://www.aiso.com/1b8c/1b8cdc8c6bf0.pdf> )

The CAISO will discuss these questions and draft responses during a March 29<sup>th</sup> stakeholder conference call and April 3<sup>rd</sup> stakeholder meeting. To reiterate – these are proposed responses, and should be considered as "discussion drafts" since they do not yet represent final CAISO positions.

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<sup>2</sup> Docket ER06-615.

## **Methodology for Determining Merchant CRRs**

### **1) What is the purpose of this methodology?**

To determine the quantity, sources and sinks of CRRs that will be allocated to parties that fund merchant transmission projects, in recognition of the incremental transfer capability that each upgrade provides in the CAISO Full Network Model (FNM).

### **2) How would the methodology generally work?**

The CAISO generally is proposing to follow a two-step process so that it can determine the CRRs that are feasible on the network model before the transmission upgrade, and compare these to the incremental CRRs that are feasible after the transmission upgrade.

- Step 1 would determine the CRRs that the MT sponsor would NOT be eligible to be awarded as a result of its upgrade.
- Step 2 would determine the incremental amount of CRRs that the MT sponsor may elect to be allocated as Merchant CRRs.

### **3) How does Step 1 work?**

The CAISO would begin with a FNM that does not include the MT upgrade, but includes all adjustments for Transmission Ownership Rights (TORs), and any MT upgrades for which Merchant CRRs were previously allocated. The CAISO would apply all previously allocated CRRs (as well as Existing Transmission Contracts [ETCs] and Converted Rights [CVRs]) as “Fixed CRRs” to this network model that does not include the upgrade. These “Fixed CRRs” should be feasible for this CRR model.

(A high penalty can be added to allow their curtailment in case they are not feasible. This point is addressed below in the discussion of counterflow CRRs.)

The MT developer would be asked to submit nominations, or possibly a set of nominations, specifying the source, sink and number of megawatts of incremental CRRs that it would like to receive for its upgrade. The CAISO would add the nominated Merchant CRRs to the set of Fixed CRRs already modeled on the FNM but, in doing so, would replace the nominated quantity of each CRR with a large, positive quantity. These quantities, for each source/sink nomination, should be large enough to cause infeasibility when these CRRs are applied to the CRR model.

### **4) What are the attributes for nominated Merchant CRRs?**

Merchant CRRs would be point-to-point CRRs with balanced source/sink pairs.

Thus the nominations for each MT-CRR would include the following attributes:

1. A single source location
2. A single sink location
3. MW quantity
4. Term: Start date and End date

5. Time of use
6. Hedge type (option or obligation)

(The CAISO is reviewing whether Merchant CRR nominations could entail Multi-point attributes as well in the first CRR yearly process.)

**5) What is the purpose of adding these nominated Merchant CRRs to the model before the MT upgrade is incorporated into the CRR model?**

To determine whether the existing transmission capacity, prior to the MT upgrade, would have permitted allocation of some of the nominated CRRs. These CRRs are not made feasible by the upgrade; they are not incremental CRRs.

**6) What else happens in Step 1? What is the result of Step 1?**

The CAISO would next perform an optimization subject to a simultaneous feasibility test to determine the quantity of each nominated CRR that is feasible on the transmission grid (FNM) prior to including the transmission upgrade in the FNM. Since the nominated Merchant CRR nominations are the only control variables in this optimization/SFT process, these CRRs will be reduced to obtain feasibility. These cleared CRRs will be termed "Capacity CRRs."

These Capacity CRRs will be reserved and will not be allocated to the party funding the merchant project.

The objective function for the SFT optimization problem will be to maximize the MW amount of CRRs allocated. The MW amounts of those CRRs will be restricted to be nonnegative.

**7) What is the purpose of these "Capacity CRRs"?**

"Capacity CRRs" are not to be allocated to the MT developer; they are used to block capacity in the CRR model from being allocated to the MT owner during this specific allocation process.

(These "Capacity CRRs" used only for this process, and after this process they are discarded.)

**8) What happens in Step 2 of this methodology?**

The CAISO would add the MT upgrade to the CRR FNM. The incorporation of this upgrade may have two impacts on the model:

- The flow pattern of this network model may change because more/less impedance may be added between two locations, thus potentially impacting the set of shift factors derived from the original FNM
- The constraint limits within this model may increase or decrease.

Then the CAISO would apply to the CRR model the "Fixed CRRs," (including ETC, CVR and any previously allocated Merchant CRRs) the "Capacity CRRs" and the original source/sink pairs of nominated Merchant CRRs (along with their originally nominated MW amounts).

The optimization problem would be solved with the nominated Merchant CRRs as the control variables. The model would minimize the weighted sum of curtailed merchant CRRs to determine the amount that can be awarded in Step 2.

**9) What might be the result of Step 2?**

If the optimization process were able to find an optimal feasible solution, the cleared control CRRs would be the Merchant CRRs that would be awarded to the MT developer.

If the CAISO allows the Merchant MT to nominate multiple CRRs, a process will be needed for determining how these are evaluated. There are two choices: 1) stepwise, which is the way PJM does it, evaluating one CRR nomination at a time; 2) simultaneously, substituting preference weights provided by the MT developer for bids in the optimization software.

If the optimization process could not find any feasible solution by just using the nominated Merchant CRRs as the control variables, this means that the transmission upgrade has led to the infeasibility of previously-feasible CRRs, i.e., the Fixed CRRs and Merchant CRRs. In this unlikely event, the MT developer would need to provide additional CRR obligations that would alleviate the infeasibility. These additional CRRs will be termed “counterflow CRRs” and could be determined by the amount of reduction in the penalty-based CRR control variables associated with the “Fixed CRRs” and the “Capacity CRRs.”

[There are may be ties among which Fixed CRRs or Capacity CRRs that need counterflow CRRs, especially if the system has some radial lines or a single bottleneck connecting two regions. The nominator may have preferences among those alternatives. If this arises, one approach would be to allow the nominator to nominate candidate counterflow CRRs (which have a high penalty if chosen; the penalty could reflect preference weights). This would allow the nominated CRRs to be negative. This of course adds considerable complexity, and maybe this situation doesn't arise.]

**10) What happens after Step 2?**

After Step 2, the CAISO would need to run a final SFT to confirm that the Merchant CRRs (including any counterflow CRRs) are simultaneously feasible on the FNM including the upgrade, in the absence of the Fixed CRRs. The reason for this check is that the Fixed CRR set may change in the future and, if it changes, it should not cause the infeasibility of the Merchant CRRs.

**11) Would this methodology be used to determine Merchant CRRs for existing Merchant transmission facilities?**

Yes, the CAISO anticipates applying this methodology for awarding Merchant CRRs to eligible entities upon the implementation of MRTU.

**12) Is this methodology used by other ISOs?**

Yes, the elements of this allocation process are quite similar to PJM's.

### **Source and Sink Combinations**

**13) How many different source and sink combinations will be awarded as CRRs for a single merchant investment?**

A single investment may make many different CRRs feasible, because it has an impact on transmission capacity in a number of different contingencies. Thus, market rules will need to specify the number of different source/sink pairs that the funding party will be permitted to nominate.

*[The CAISO will discuss this response further with stakeholders.]*

**14) How many source and sink combinations could the MT developer seek to nominate?**

*[The CAISO will discuss this response further with stakeholders.]*

**15) If multiple Merchant CRR source/sink combinations were allowed for nomination, would there be any priority among the different nominations in determining which CRRs would be reserved?**

*[The CAISO will discuss this response further with stakeholders.]*

**16) Would there be a limitation on the source used for Merchant CRRs?**

Yes, for MT upgrades that are associated with generator interconnections, the Merchant CRR source should be located at the first point of interconnection with the CAISO grid.

**17) Are these Merchant CRRs allocated only after the facility is energized or do they get allocated shortly before the facility is energized?**

(PJM begins its allocation process 45 days prior to the date on which the facility is energized. The allocation is only “awarded” at the time that the transmission project is energized.)

*[The CAISO will discuss this response further with stakeholders.]*

### **Counterflow**

**18) What are “counterflow CRRs” and what might be the rationale for imposing these obligations upon the MT developer?**

It is possible that, in addition to increasing transmission capacity, the transmission upgrade might decrease transmission capacity between some points, in some contingencies. This may cause the infeasibility of previously allocated FTRs – the Fixed CRRs. If this occurs, the MT developer will be required to hold counterflow CRR obligations, in addition to the other Merchant CRRs that it receives, in order to compensate for this decrease in transmission capacity and for any congestion rent shortfall that the upgrade causes for the previously allocated FTRs.

**19) What is the process by which MT developers would be assigned counter-flow CRRs?**

This issue will need to be discussed further with stakeholders. There are instances in which alternative sets of counterflow CRRs may solve the infeasibility of the Fixed CRRs. In these instances, the CAISO would like to base the choice among the counterflow CRRs sets on the MT developers' preferences, to the extent possible.

One approach would be for the MT developer to provide preference weights that could be used in the optimization software to award it most favored (i.e., least disfavored) set of counterflow CRRs. (However, this enhancement may not be available at MRTU startup.)

An additional issue is that there may be parallel flow for the counterflow CRRs that is in addition to the flows needed to solve the infeasibility. These parallel flows could lead to the imposition of a larger financial obligation on the MT developer than is actually needed to solve the infeasibility.

Another approach, and perhaps the cheapest way to solve this, would be to assign contingency-specific counterflow flowgate obligations to the MT developer. However, these obligations may not be tradable.

**20) How long would the MT developer be required to keep these "counterflow CRRs"?**

The CAISO would determine the amount of additional counter-flow CRRs needed and provide this information to the MT developer.

One approach would be to require the MT sponsor to provide these additional counter-flow CRRs as long as the MT upgrade is creating infeasibility for those CRRs that were allocated and auctioned before the MT upgrade was energized. However, this approach means that the counterflow could expire after one year, meaning that the MT developer would have priority over an LSE that might want to renew a previously-allocated CRR in the Priority Nomination Tier.

**21) What steps will be taken if the CAISO finds that relatively few incremental CRRs are available for what appears to be a very useful transmission upgrade?**

There could be a process – prior to the actual process of allocating the Merchant CRRs – in which the CAISO would perform a series of studies to evaluate the feasibility of alternative sets of point-to-point Merchant CRRs. Perhaps the CAISO could do several studies for free (PJM does 3 or 4 studies of a single PTP CRR), and then impose a charge for additional studies. Another idea would be for the CAISO to license the FNM to another firm under a confidentiality contract, and then let the MT developer contract with that outside firm to do the studies.

If the upgrade is creating transmission capacity, then there are two reasons that the CAISO would identify only a low number of incremental CRRs: 1) the MT developer is nominating the wrong Merchant CRRs; or 2) the need for counterflow CRRs.

**22) Should the investor be permitted to hold counterflow CRRs to essentially "buy through" congestion with a low expected value in order to obtain a larger number of incremental CRRs over more valuable paths?**

## **California ISO**

Even if an expansion eliminates a constraint, it is possible that a different contingency constraint could become binding instead, limiting the Merchant CRR allocation. The counterflow CRRs mentioned in this question could be used to eliminate this problem.

*[The CAISO will discuss this response further with stakeholders.]*

### **23) Should the CAISO be tasked with developing a more complicated process for determining incremental CRRs in order to address this issue?**

*[The CAISO will discuss this response further with stakeholders.]*

## **Impact on Existing Capacity**

### **24) How should the CAISO determine the appropriate way to reserve ratepayers rights to CRRs that utilize existing transmission capacity?**

The Fixed CRRs do this. The outstanding issue is that the Fixed CRRs, as currently defined, are the CRRs that market participants currently hold. These are not necessarily the CRRs that they might wish to hold in the future, e.g., when load grows. Thus, the allocation rules could allocate Merchant CRRs that appropriate fallow transmission capacity that may be needed to serve future load growth. While this issue is known, no practical solution has yet been devised.

This is a really hard issue to solve. PJM's Fixed CRRs are essentially the set of currently outstanding CRRs. This may be the best approach, along with careful consideration in letting the counterflow CRRs expire.

## **Low Hanging Fruit**

### **25) How should the CAISO treat transmission that has been built in excess of current needs in order to facilitate future expansion, but that may not currently be useful?**

(While this excess may not currently be accessible as CRRs, it might be used if a merchant investor completes a relatively inexpensive "weak link".)

*[The CAISO will discuss this response further with stakeholders.]*

## **O&M Costs**

### **26) Should the investor in merchant transmission be required to pay a share of the O&M costs to maintain the current capability of the transmission system in cases in which the feasibility of their incremental CRRs rests on the existing transmission network?**

*[The CAISO will discuss this response further with stakeholders.]*

## **Queue for Transmission and Generation**



**27) What are the policy issues that may arise due to differences between the queuing procedures used to determine incremental CRRs for merchant transmission and the queuing procedures used to determine responsibility for the costs of transmission enhancements required for interconnection?**

*[This likely will be resolved at a later time as part of the ISO's response to Order No. 890. However, the CAISO could review and discuss possible responses with stakeholders.]*

## Appendix A

### LT-FTRs Rule and September 21 MRTU Order Requirements

As background information which may help to guide stakeholder discussions, the following section notes relevant excerpts from the LT FTR Rule and September 21, 2006 MRTU Order.

#### **FERC LT-FTRs Rule:**

#### **Guideline (3) – Rights Made Available by Expansions Go to Parties That Pay for the Upgrade**

Para. 210. We will modify guideline (3) in the Final Rule to remove the proposed requirement that transmission rights be granted for the life of a new transmission facility (the last sentence of the proposed guideline). The revised guideline will now read:

Long-term firm transmission rights made feasible by transmission upgrades or expansions must be available upon request to any party that pays for such upgrades or expansions in accordance with the transmission organization's prevailing cost allocation methods for upgrades or expansions.

#### Scope of Guideline (3)

Para. 211. Our intention in guideline (3) was to address transmission rights awarded to entities that fund transmission upgrades and expansions through direct cost assignment. Our subsequent discussion in this section applies only to such upgrades or expansions. All transmission organizations now allow transmission customers to fund capacity expansions and receive the transmission rights that are made possible by those expansions, although some of these transmission organizations have yet to develop exact term lengths and rules for awarding such rights. Guideline (3) does not address the award of transmission rights made possible by transmission upgrades that are rolled into transmission rates. When such transmission upgrades come into service, the transmission rights that result from such investments will be made available as rights from "existing capacity" and are thus addressed in guideline (4). Prevailing cost allocation rules will apply.

#### Term of Rights for Upgrades and Expansion

Para. 212. As noted, we will modify guideline (3) by removing the last sentence, which requires that the term of a long-term transmission right awarded for an upgrade or expansion is equal to life of facility. Based on the comments of PJM and other parties on the difficulty of defining life of facility, we will let transmission organizations and stakeholders determine the appropriate terms. However, we encourage transmission organizations to harmonize the terms for long-term rights to existing transmission capacity and new transmission capacity as much as possible.

Para. 213. Some commenters, such as National Grid, PG&E and EEI, argue that the term of rights to new transmission capacity should be shortened from the terms offered currently (e.g., PJM currently offers 30 year fixed terms) because transmission planning horizons are only 5-10 years. We believe that this change would unnecessarily introduce uncertainty into the development of merchant funded transmission facilities and, in most cases, it would not allow the funding party to receive the full benefits of its investment. Since the rights awarded for expansion are incremental rights, there is less possibility that they will be made infeasible by changes in the allocated set of rights to the remainder of the grid.

Para. 214. In response to LIPA's concern that New York ISO has not finished its rules for awards of long-term rights for transmission expansion, this guideline will require that transmission organizations develop and file tariff sheets and rate schedules for long-term rights for the types of expansions discussed in this section by the time that they award long-term rights for existing capacity.

#### Incremental Upgrades and Use of Existing Capacity

Para. 215. We clarify that under guideline (3), parties that fund transmission upgrades and expansions will be eligible for incremental transmission rights and not entitled to obtain transmission rights to existing transmission capacity held by others. However, each transmission organization will need to establish rules by which interconnection customers that construct new generation facilities and are eligible for long-term firm transmission rights can obtain rights to existing transmission capacity, as per guidelines (4) and (5).

#### Other Issues

Para. 216. We agree with OMS that rights awarded for transmission expansions made to support deliverability requirements for generator interconnection are not necessarily consistent with rights to hedge congestion charges associated with delivering power from the generator to load. This distinction between upgrades to support reliability (e.g., to qualify as a capacity resource) and those made to support transmission usage has been long-standing in the transmission organizations with organized electricity markets. However, we do not believe that the allocation of such transmission rights to support deliverability upgrades should interfere with the allocation of rights to others, since the rights would be incremental. Therefore, we will not address the rules for awards of such rights here.

**MRTU September 21 Order:**

Para. 873. Finally, we agree with FPL that the CAISO's proposal to allocate CRRs to merchant transmission lacks sufficient detail, and that the MRTU Tariff must specify how CRRs will be provided for the sponsors of merchant transmission projects. While the CAISO explains its basic proposal for providing CRRs to the sponsors of merchant transmission projects, the MRTU Tariff does not sufficiently address this issue. We direct the CAISO to further develop this proposal, in consultation with its stakeholders, and submit new tariff language regarding CRRs for sponsors of merchant transmission within 90 days of the date of this order.

Para. 1357. MRTU Tariff section 36.11 states that sponsors of merchant transmission upgrades may be allocated CRR options that reflect the contribution of the upgrade to grid transfer capacity as determined in section 24.7.3. The compensation package referred to under section 24.7.3 includes CRR options. TANC objects to the "posting" of an agreement on the CAISO's website and argues the compensation package should be filed with the Commission. We agree with TANC that the posting of an agreement negotiated between the merchant sponsor and the CAISO is insufficient given that the CRR allocation process for merchant transmission upgrades lacks specificity. We previously concluded in our discussion of CRRs that the CAISO's proposal for allocation of CRRs to merchant transmission sponsors lacks sufficient detail and directed the CAISO to further develop its proposal and submit revised tariff language. We conclude that this detail is necessary in order to permit the posting of an agreed-to compensation package for CRR options under section 24.7.3. Therefore, we direct the CAISO to make a compliance filing within 60 days of the date of this order providing this additional detail.