

Potential Rule Changes to CRR Rules

February 27, 2007



California ISO
Your Link to Power

California Independent
System Operator Corporation

Source Nominations at EZ Gen Trading Hubs

Congestion Revenue Rights Stakeholder Meeting

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February 27, 2007**

Purpose of Presentation

- The reason for this presentation is due to the EZ Gen Trading Hub results from the Congestion Revenue Rights (CRR) dry run
 - Trading hubs cleared very little in certain seasons and time-of-use (TOU) periods in tier 2
- The purpose of this presentation is to
 - Review The EZ Gen Trading Hub results
 - Provide an overview and results from two sensitivity studies performed by the CAISO
 - Discuss possible solutions with stakeholders



Contents of Presentation

- Background of EZ Gen Trading Hubs
- Use of the EZ Gen Trading Hub in the CRR dry run
 - EZ Gen Trading Hub results from the dry run
 - Reason for poor performance
- Sensitivity analysis
 - Methodology
 - Results
- Discussion of possible solutions and ideas



Background on the EZ Gen Trading Hubs

- Defined through a stakeholder process in the fall of 2004
- Defined to help facilitate the settlement of “seller’s choice” energy contracts
- To be used in financial Inter-SC trades

Supply Location and Price
(not static) \Rightarrow *Trading Hub*
Price \Rightarrow *Consumption Location and*
Price

- To be used as a source or sink in the allocation and auction of CRRs
 - Used only as source in the allocation process
- Each EZ Gen Trading Hub is an aggregated pricing node (APnode)



Background on the EZ Gen Trading Hubs

- There are three EZ Gen Trading Hubs corresponding to the existing congestion zones (NP15, ZP26 and SP15)
 - EZ = existing congestion zone
 - Each trading hub APnode is comprised of *all* the generator pricing nodes (PNodes) located in the existing zone
 - The weights (aka allocation factors) are based on the pro-rata share of the integrated metered output of each generator over a historic reference period
- In the dry run, each trading hub is comprised of the following gens
 - NP15 EZ Gen Trading Hub - 414 generators
 - ZP26 EZ Gen Trading Hub - 56 generators
 - SP15 EZ Gen Trading Hub - 204 generators



EZ Gen Trading Hub Use in the Dry Run

- Annual allocation process consists of tiers 1, 2 and 3 per season and time-of-use
- In the allocation the EZ Gen Trading Hubs may only be used as a source
- CRR Year 1 (which the dry run simulated)
 - Tiers 1 and 2 are source verified for all participants
 - Nominate up to 75% of energy contract amount for trading hubs
 - Tier 3 is source verified only for eligible load serving entities serving load outside of the control area
- CAISO Long Term CRR filing – In the Long Term CRR allocation EZ Gen Trading Hubs may not be used



EZ Gen Trading Hub Use in the Dry Run

- Modeling of EZ Gen Trading Hubs in the SFT
- For a particular trading hub, an injection at the i^{th} PNode (PNode defined within the trading hub) is modeled with a MW value of
 - Injection = i^{th} weight \times trading hub MW value
- Injections at a generator based PNode will come from
 - Nominations that have the corresponding EZ Gen Trading Hub as a source
 - Nominations that have the corresponding generator as a source

EZ Gen Trading Hub Use in the Dry Run

- Results from tier 2 for the NP15 and SP15 EZ Gen Trading Hubs
- % Cleared = sum of cleared values divided by sum of nominated values (all from tier 2)
- NP15 EZ Gen Trading Hubs perform poorly in several SFTs
- SP15 EZ Gen Trading Hubs also perform poorly in some SFTs
- The small %'s $\leq 3\%$ are effectively 0%

| Season | TOU | % Cleared | |
|--------|-----|-----------|-------|
| | | NP15 | SP15 |
| S1 | off | 93.0% | 99.6% |
| S1 | on | 100.0% | 96.8% |
| S2 | off | 67.7% | 85.2% |
| S2 | on | 0.2% | 10.9% |
| S3 | off | 0.3% | 100% |
| S3 | on | 0.2% | 20.8% |
| S4 | off | 0.0% | 99.5% |
| S4 | on | 0.0% | 100% |



EZ Gen Trading Hub Use in the Dry Run

- The reasons for the poor performance of the trading hubs in tier 2 are due to
 - The system transfer capability is limited to 75%
 - The upper bound for the generator nominations is limited to 75% of Pmax or contract amount
 - The trading hub limits are also at 75% of energy contract
 - EZ Gen Trading Hubs are mapped back to PNodes and thus portions of the trading hub share the same transfer capability as the portion from the generator(s)
 - This transfer capability was built to handle the generator deliverability alone
 - The trading hubs (and generators) can only be used as sources in the allocation
 - If the trading hub could be used as a sink counter-flow would be generated to help counter act the problem
 - Some of the entities that nominated the trading hub were limited in tier 1 to their sink upper bound and also needed to submit trading hub nominations into tier 2

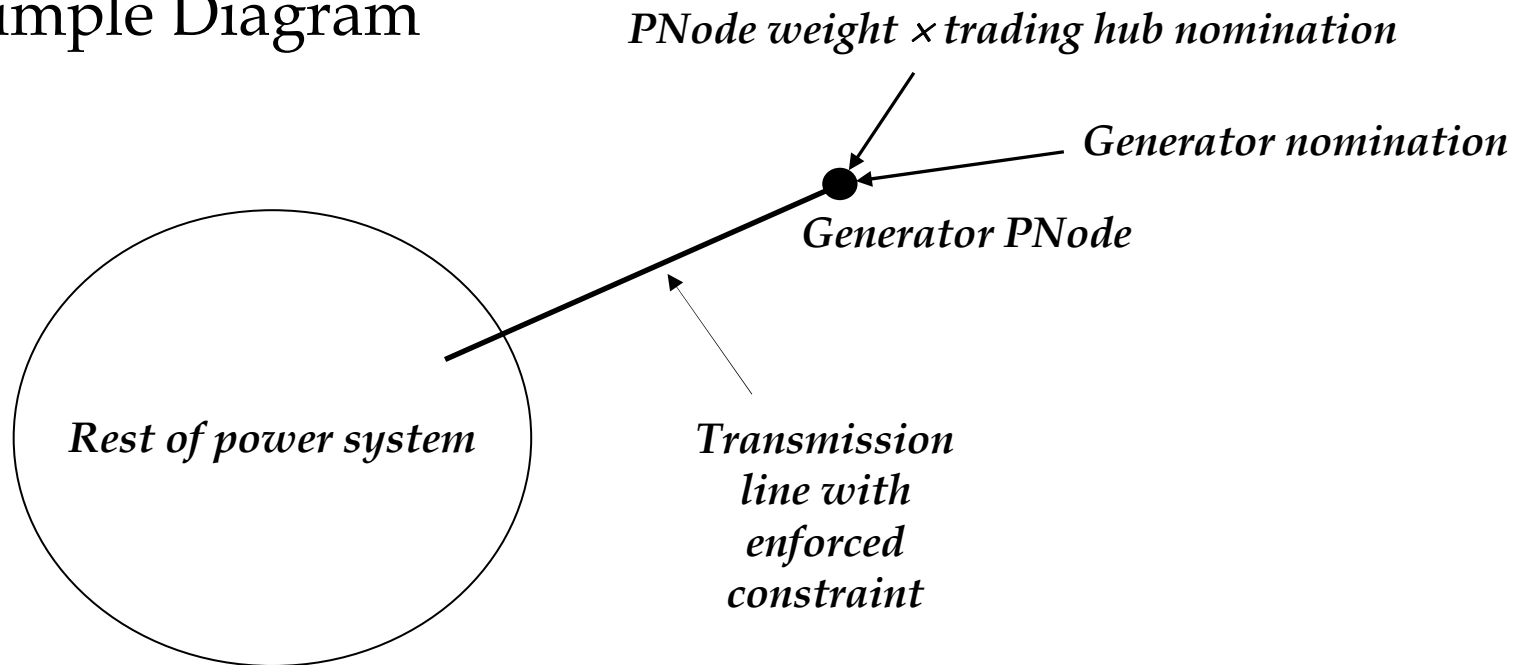


EZ Gen Trading Hub Use in the Dry Run

- For example: in tier 1, in many seasons and time-of-use periods, a constraint becomes overloaded due to the sharing of the constraint capability by both a generator and an EZ Gen Trading Hub
 - This overload is alleviated by adjusting the most effective control which in this case is the generator source
 - The constraint overload is removed and now the constraint becomes binding
 - In tier 2 any nomination by the corresponding EZ Gen Trading Hub contributes to the binding constraint
 - Since the constraint is binding no additional flow is allowed
 - Since the weights (aka allocation factors) for the EZ Gen Trading Hub are fixed, the whole trading hub nomination must be set to zero

EZ Gen Trading Hub Use in the Dry Run

Simple Diagram



Flow on the transmission line is equal to generation portion + PNode weight \times trading hub nomination portion

Sensitivity Analysis

- Many entities are using trading hubs and for some entities their verified sources consist of only trading hubs
- Due to the poor performance of the trading hub and the need by entities to use the trading hub the CAISO conducted a sensitivity analysis
- Objective of this sensitivity analysis
 - Work with readily changeable parameters to see if something could be changed so that more trading hub MW in tier 2 (only in tier 2 since tier 2 is a verified tier) may clear
- Processed only for Season 3, On peak

Sensitivity Analysis

- Analysis #1
 - Reduce the system transfer capability from 75% to 50% of this 75% in tier 1
 - Increase the system transfer capability to 75% of the full amount in tier 2
 - Example for a constraint: full OTC = 100 MW, 75% of full OTC = 75 MW, tier 1 limit is 37.5 MW and tier 2 limit is 75 MW

Sensitivity Analysis

- Analysis #2
 - Reduce the source nomination amount from 75% of the full verified amount to 50% of this 75% in tier 1
 - Increase the source nomination amount back to 75% of verified amount in tier 2
 - Example for a source: full verified amount = 100 MW, 75% of full verified amount = 75 MW, tier 1 limit is 37.5 MW and tier 2 limit is 75 MW discounted by the source MW cleared in tier 1
- In both analyses, capacity is being made available on the constraints going into tier 2



Sensitivity Analysis

- Note: the CAISO did not interact with the participants in these analyses
- Analysis #1 (reduced the system capability to 50% in tier 1)
 - Tier 1 nominations: did not manipulate the nominations
 - As a result of the reduced capability, less MW cleared in tier 1 as compared to dry run
 - Tier 2 nominations: set equal to tier 2 dry run nominations plus the tier 1 dry run cleared CRRs discounted by the tier 1 cleared sensitivity results
 - Assumed the tier 2 dry run nominations plus the tier 1 dry run cleared CRRs represents the CRR needs of the participants through tier 2

Sensitivity Analysis

- Analysis #2 (reduced the source limitation in tier 1)
 - Tier 1 nominations: scaled the nominations by 50%
 - Tier 2 nominations: set equal to tier 2 dry run nominations plus the tier 1 dry run cleared CRRs discounted by the tier 1 cleared sensitivity results

Sensitivity Analysis

- Sensitivity analysis results (Season 3, On peak)
 - Analysis #1
 - 100% of the trading hub nominations cleared through tier 2
 - Analysis #2
 - 100% of the trading hub nominations cleared through tier 2
- General observation: with additional capacity made available in an upcoming tier (e.g., tier 2), either through increasing system capability or increasing source limits, nominations with trading hub sources will have an advantage in consuming this capacity
 - Generally have an advantage over other sources do to their low effectiveness on possible overloaded constraints

Sensitivity Analysis

- Limitations with each analysis
- No interaction with the allocation participants
 - For analysis #1, if the participants would have been involved they may have shifted a portion of their nomination MW to other sources in tier 1
 - Because they knew of the reduced system capability
 - For analysis #2, the participants certainly would have shifted a portion of their MW from certain sources to other sources in tier 1
 - Because tier 1 is source MW validated

Other Solutions and Ideas

- Other solutions and ideas from the Market Participants are welcome
- Questions/Comments?

Set-aside of Import Capacity on Inter-ties

- **See separate presentation by Jim McClain**

CRR Source Verification Rules

- **The historical reference period for CRR source verification is calendar year 2006.**

- **Key issues for consideration:**
 - Should the CAISO verify RA capacity showings or LT Procurement plans, in addition to the historical period energy contracts?
 - Should the CAISO verify contracts as short as one day, with MW prorated to reflect the average MW over the CRR term? (This was how the Dry Run was conducted.)
 - Should the CAISO eliminate source verification in the monthly process?

Modeling of Transmission Outages

- **See separate presentation by Scott Jercich**

Common Monthly Forecasts for CRR Eligibility and RA Showings

- Stakeholders have suggested that forecasted load for monthly CRR allocations should be based upon the same forecast utilized by Resource Adequacy purposes.
- This would recognize the balance of incentives between understating load for RA purposes and overstating load for CRR eligibility.

Frequency of Monthly Allocation and Auction

- **Maintain monthly CRRs, but possibly amend the process for allocation and auction?**
 - Conduct process every other month (or six times per year) to cover both of the next two months?
 - Conduct process 8 times a year and release “half-season” CRRs instead of monthly CRRs?
 - Maintain monthly process for allocation and auction.



Outstanding CRR Process Issue Framing

CRR Transfers due to Load Migration

- **Mechanics of CRR Transfers**
 - How does the CAISO obtain transfer data that indicates specific load transfers (MWs) and effective dates of transfer?
 - What business processes are needed to perform the required transfers via the Secondary Registration System (SRS) and the CAISO settlement system?
- **Definition of CRRs to be Transferred**
 - Pro rata share of all CRRs that are allocated? Or a proportionate share of the value of the congestion-protection value of the allocated CRRs?
 - What is the methodology for calculating a possible financial equivalent? Use auction prices, historical LMPs or other methods?
- **Eligibility for Nominating Transferred CRRs in the PNP**



Methodology for Determining CRRs for Merchant Transmission Upgrades

- **Previous White Paper is re-posted at:**
<http://www.caiso.com/1b8c/1b8cdc8c6bf0.pdf>

- **Key Issues:**
 - *Impact on Existing Capacity:* how to reserve ratepayer rights to CRRs that utilize the existing transmission grid?
 - *Counterflow:* Should the investor be permitted to hold counterflow CRRs to obtain incremental CRRs over more valuable paths?
 - *Queue for Transmission and Generation:* inter-relationship with interconnection queue.



CRR Credit Policy

February 20, 2007 paper (authored by LECG's Scott Harvey) on "CAISO CRR Credit Requirements" is posted at:
<http://www.caiso.com/1b8c/1b8cdb4c74ab0.pdf>

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CRR Credit Policy

- **The CAISO's credit requirement policy is unchanged: Market Participants must have a combination of Unsecured Credit and posted security to cover Estimated Aggregate Liability (EAL).**
- **CRR Obligations can increase EAL if negatively valued**
- **Reason for CRR Credit Requirement: If a CRR holder defaults, other Market Participants could be paying for the payment shortfall due to non-payment.**

CRR Credit Policy

Available Credit = (Financial Security + Unsecured Credit Limit) – EAL

Currently, EAL is calculated weekly and considers the transactions from 65-95 prior trade days up to now.

With Payment Acceleration (scheduled for implementation about 6 months after MRTU), the number of prior trade days that EAL will calculate will be reduced to 20-50 days.

EAL will also consider the financial obligations of CRRs which can extend up to 10 years into the future.

EAL will include the projected net negative value of CRR portfolio.

CRR Credit Requirements

To participate in the Allocation: None

To participate in the auction:

Positive priced CRRs: Auction bidders must have sufficient Available Credit to cover the purchase of positively priced CRRs.

Negatively priced CRRs: EAL of the MP will increase. Before the buyer is paid to purchase negatively priced CRR, the buyer must have sufficient Available Credit.

Post Auction (On-Going):

In general, CRRs, regardless of how they are obtained, will be subject to the same credit requirements.

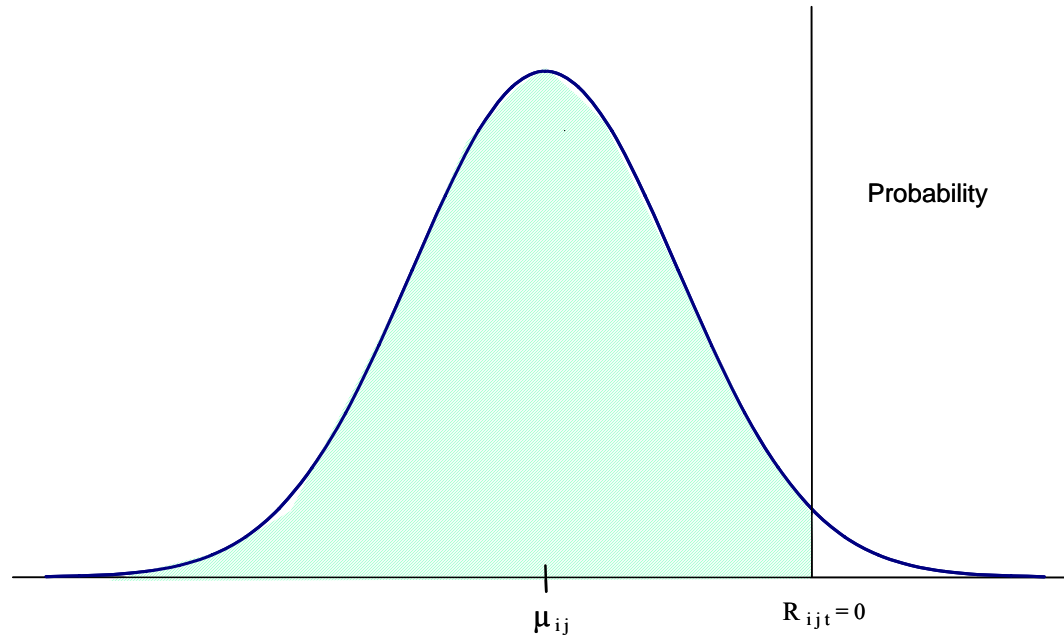


CRR Credit Risks (Post Auction)

CRRs that could likely be negatively valued in the Day Ahead market are:

- 1. Negatively priced CRRs in the auction**
- 2. Positive (close to zero) priced CRRs in the Auction**

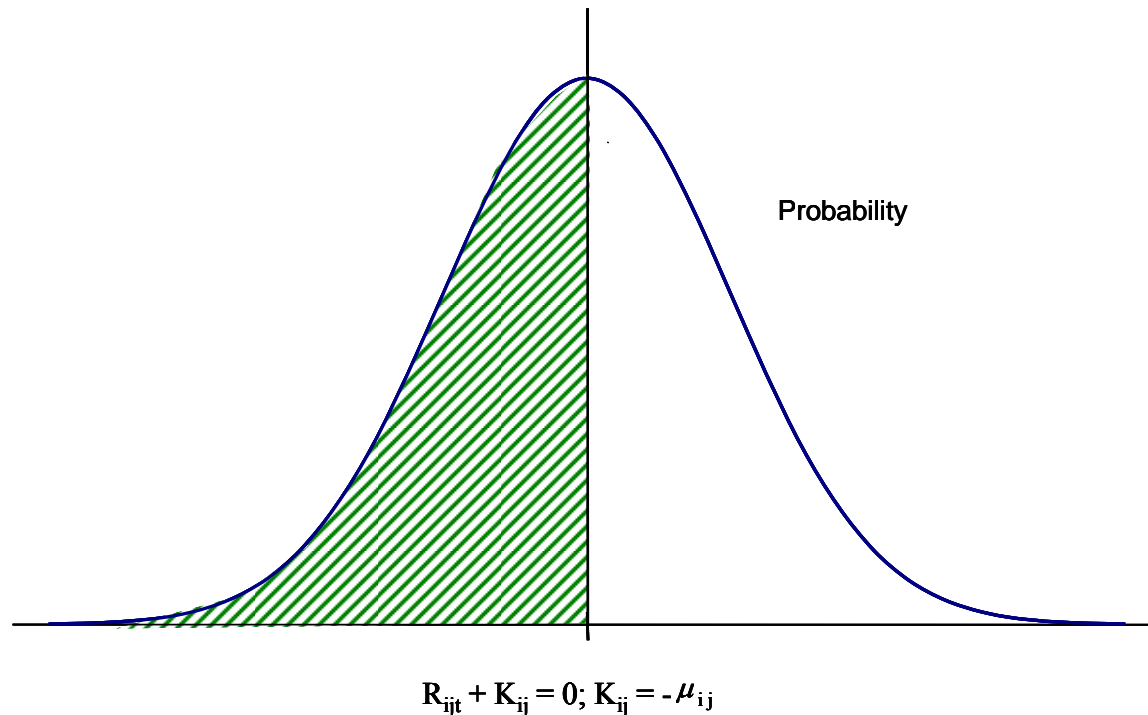
Negatively Priced CRRs (CRR Credit exposure without CRR Credit requirement)



Distribution of Payments by Holders of Negatively Priced CRRs

Negatively Priced CRRs

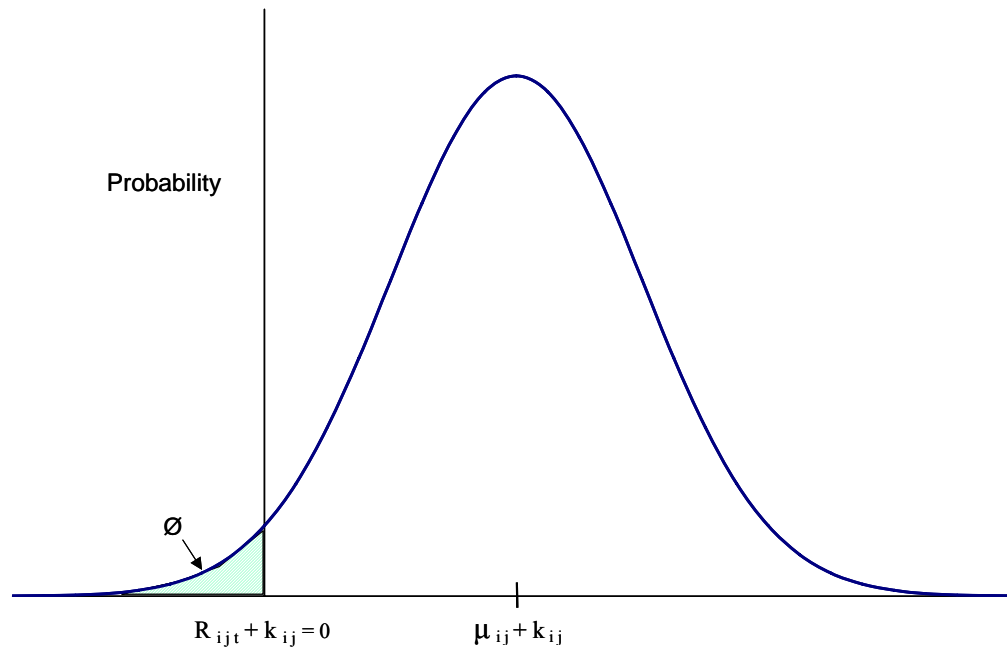
**(CRR Credit exposure with CRR Credit requirement =
CRR Expected value**



Distribution of Payments by Holders of Negatively Priced CRRs

Negatively Priced CRRs

**(CRR Credit exposure with CRR Credit requirement =
CRR Expected value + Margin**



Distribution of Payments by Holders of Negatively Priced CRRs

Post Auction CRR Credit Requirement

The CRR credit valuation will be based on CRR's expected value (CRR auction price) + margin to account for variations.

Without historical LMP data, the determination of variance is a challenge. Some of the options are:

- **LMP Studies data**
- **Historical level of Path 15 congestion variation**
- **Historical level of variability in congestion based on an eastern ISO.**

LT-CRR Credit Requirements

Each year of the LT-CRR would have a separate credit requirement.

For a n year CRR, the CRR Credit requirement would equal:

(Auction Price) * (\sqrt{n} * Deviation of 1 year CRR Credit Req).

Ex: For the 9th year of a CRR, use:

(Auction Price) * (3 * standard deviation of 1 year CRR).



Next Steps

- **Stakeholder written comments requested by March 9.**
- **The next iteration of the CRR Credit White Paper will be posted the week of March 19th.**
- **Stakeholder conference call (exclusively on CRR Credit issues) expected week of March 26th**
- **May 1st posting of CAISO proposal.**