

# Education for INC/DEC Credit Requirement

## I. What are Virtual Transactions?

Virtual transactions are made up of increment offers (INCs), decrement bids (DECs) and up-to congestion transactions (UTCs) that only exist in the Day-Ahead Energy Market.

INCs are offers submitted in the Day-Ahead Market to sell energy at a specific locations if the clearing price at that point is equal to or exceeds the offer and to buy back that energy in the Real-Time Energy Market. DECs are bids submitted in the Day-Ahead Market to buy energy at a specific locations if the clearing price at that point is equal to or below the bid and sell that energy in the Real-Time Energy Market.

## II. Virtual Credit Requirements

### 1. INC/DEC Credit Requirement

To submit Virtuals participants must have credit allocated to the intended account for the purpose of submitting Virtual transactions. The credit requirement to submit INCs and DECs are created from reference prices. Reference prices are calculated from historical LMPs at the node that the transaction is submitted. Each year is divided into six two-month periods (January-February, March-April, May-June, July-August, September-October and November-December). For each period, the absolute value difference between the cleared day-ahead price and the actual real-time price for each hour in each day during that period in the previous year is calculated. (There will be 1,488 such hourly values for each location in July-August.) Those values are then ranked, and the 97th percentile value (e.g. the ~44th highest for July-August) is chosen as the reference for that location.

$$\text{Reference Price}_{\text{node}} = 97^{\text{th}} \text{ percentile}(|DA LMP_{\text{node}} - RT LMP_{\text{node}}|)$$

To calculate the credit requirement for a increment offer or decrement bid take the MW offered multiplied by the associated reference price at the bid location. Since reference prices are calculated for the location with which they are associated, bids at different locations are multiplied by different reference prices.

$$\text{INC or DEC credit requirement} = \sum (\text{MW} * \text{reference price})$$

The total INC and DEC requirement is calculated as follows. The MW for all current market day submitted day-ahead INC Offers and DEC Bids multiplied by their reference prices and summed then added to the credit requirement for current submitted INC Offers and DEC Bids.

$$\begin{aligned} \text{Total INC and DEC credit requirement} = & \\ & \text{Requirement for current day submitted transactions} \\ & + \text{Requirement for previous day cleared transactions} \end{aligned}$$

## Appendices

## Appendix A: PJM INC and DEC Credit Requirements Problem Statement<sup>1</sup>

The current PJM Increment Offer (“INC”) and Decrement Bid (“DEC”) credit requirements were established in 2003.

They currently involve a Nodal Reference Price that is used in the bid screen process. This Nodal Reference Price for INCs/DECs is calculated separately for each location on the PJM grid. The year is divided into six two-month periods (January-February, March-April, May-June, July-August, September-October and November-December). For each period, the absolute value difference between the cleared day-ahead price and the actual real-time price for each hour in each day during that period in the previous year is calculated. (There will be 1,488 such hourly values for each location in July-August.) Those values are then ranked, and the 97th percentile value (e.g. the ~44th highest for July-August) is chosen as the reference for that location. Reference prices are applied to the bid locations with which they are associated, so bids at different locations will be multiplied by different reference prices.

All Participants are subject to INC/DEC screening as follows. First, the MWh for all current market day and prior market day submitted day-ahead bids are summed and multiplied by the reference price. Second, the calculation is repeated using current submitted bids plus the three prior days of cleared bids. If the resulting dollar value of the lesser of those two calculations exceeds a Participant’s Credit Available for Virtual Bidding, then the bids are rejected.

When the up to congestion credit review was being conducted, a comparison between a potential credit policy that included bid/offer prices, and one that did not, was completed by PJM Credit. Generally the credit requirement that included bid/offer prices covered more risk, with less overcollateralization. Given stakeholder desire to maximize credit coverage while minimizing overcollateralization, and given that the current rule has been in place for over 10 years, Twin Cities Power requests that stakeholders perform a review of the current INC/DEC credit rules and explore potential improvements.

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<sup>1</sup> Approved by the Credit Subcommittee June 19, 2013

## **Appendix B: INC/DEC Issue Charge**

**Issue Source:** Twin Cities Power

**Stakeholder Group Assignment:** The issue will be presented at the June 19, 2013 Credit Subcommittee.

**Key Work Activities:**

1. Perform education on the current INC and DEC credit policy.
2. Explore alternative methodologies for the INC and DEC credit policy and compare with current methodology.
3. Identify potential areas for improvements.

**Expected Deliverables:** Recommendation to (or not to) modify credit policy for IN/DEC transactions and develop Tariff changes as necessary.

**Expected Overall Duration of Work:**

1. Review of past periods, approximately 3-4 months.
2. Review of possible changes, approximately 2 months.

**Decision-Making Method:**

Stakeholder consensus

## Appendix C: UTC information from the [Credit Overview Document](#)

An Up-To Congestion (UTC) transaction is a bid in the Day-Ahead Market to purchase congestion and losses between two points. The UTC bid consists of a specified source and sink location, MW quantity and a “bid spread” that identifies how much the market participant is willing to pay for a congestion and loss position between the source and the sink. Up-to congestion transactions (UTCs) are transactions on a specific source-sink path and are cleared based on the total LMP price difference between the source and the sink. UTCs may have limits on the amount of bids<sup>2</sup> and the prices allowed<sup>3</sup> to be offered.

Reference values for Up-to Congestion transactions are calculated separately for every allowable path. The Up-to Congestion Reference Price for a path for a given month is the historical real-time price for the path at the given percentile (see below) of historical hours calculated for the prior Up-to Congestion Historical Month, averaged with the same percentile value calculated for the second prior Up-to Congestion Historical Month. An Up-to Congestion Historical Month is the month-long timeframe for which statistics are calculated and used in the Up-to Congestion Exposure calculation. In order to allow for processing and posting time, the Up-to Congestion Historical Month for up-to congestion credit calculations is time-shifted from normal calendar months. As currently implemented, each Up-to Congestion Historical Month consists of the first 20 days in that calendar month plus all days after the 20th in the preceding calendar month. For example, the Up-to Congestion Historical Month of April consists of March 21 through April 20. PJM may adjust this defined Up-to Congestion Historical Month to allow for sufficient calculation time, but will try to match a calendar month as closely as reasonably possible on a consistently defined basis. A path is considered counterflow if the value of the path is negative. When bidding, the path value used for counterflow determination is the lower of the bid price and the average day-ahead value of the path for the prior Up-to Congestion Historical Month. For cleared paths, the value used is the actual cleared DA price of the path. A path will be deemed prevailing flow if it is not counterflow.

The Up-to Congestion Exposure for any transaction hour is the product of the MWh for the path times the difference between the bid price and the Up-to Congestion Reference Price (see below). The Up-to Congestion Exposure for a Participant for a market day is the sum of the positive transaction hour exposures across all paths and all transaction hours. The Up-to Congestion Exposure for a participant at any time is the sum of the daily exposure totals for the most recent cleared market day plus the next uncleared market day.

Up-to Congestion Reference Prices are calculated using the following historical percentiles:

For Up-to Congestion Prevailing Flow Paths: 30th percentile (both bid and cleared)

For Up-to Congestion Counterflow Paths when bid: 20th percentile

For Up-to Congestion Counterflow Paths when cleared: 5th percentile.

These percentiles provide, respectively, the 70th, 80th, and 95th percentiles of exposure when they are subtracted from the submitted or cleared price for a given path.

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<sup>2</sup> PJM may require that a market participant shall not submit in excess of 3000 ‘up to’ congestion transactions in the Day-ahead Energy Market, when PJM determines that such limit is required to avoid or mitigate significant system performance problems related to the volume of transactions

<sup>3</sup> PJM M11: ‘Up to’ congestion bids shall be no greater than \$50/MWh, and no less than - \$50/MWh. Any ‘up to’ congestion transaction that bids higher than \$50/MWh or less than -\$50/MWh will be rejected.

The table below shows examples of the UTC calculation requirements for two paths. A Bid transaction will be considered counterflow if either the Bid Price or the Prior Month Mean DA Price is negative. A Cleared transaction will be considered counterflow if the Cleared Price is negative.

Files with “Path Reference Prices for Up-to Congestion Bid Screening” are posted at the bottom of the Energy Market web page (below the “Nodal Reference Prices for Increment Offer and Decrement Bid Screening” files. The link is at:  
<http://pjm.com/markets-and-operations/energy.aspx>

### UTC Credit Requirement Example

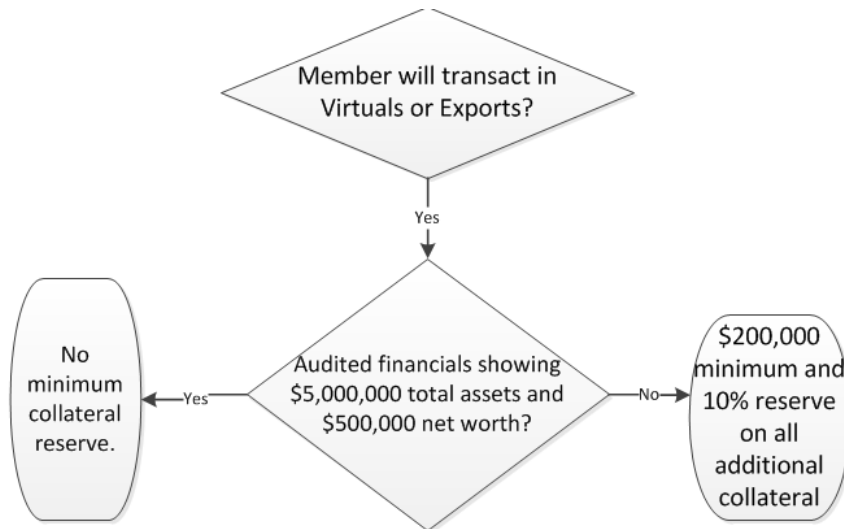
SourceName	SinkName	Bid or Cleared	Price	MW	Prior Month Mean DA Price	Prevailing or Counterflow	Up-to Congestion Reference Price	Credit Requirement
HALIFXDP TX1	BYRON 1	Bid	3.00	1	(55.69)	Counterflow	(72.53)	75.53
IRONWOOD	GRAND POINT	Bid	2.00	1	2.25	Prevailing	0.72	1.28
IRONWOOD	GRAND POINT	Bid	0.00	1	2.25	Prevailing	0.72	(0.72)
IRONWOOD	GRAND POINT	Bid	(1.00)	1	2.25	Counterflow	0.45	(1.45)
HALIFXDP TX1	BYRON 1	Bid	(3.00)	1	(55.69)	Counterflow	(72.53)	69.53
HALIFXDP TX1	BYRON 1	Cleared	1.00	1	N/A	Prevailing	(24.91)	25.91
IRONWOOD	GRAND POINT	Cleared	0.00	1	N/A	Prevailing	0.72	(0.72)
HALIFXDP TX1	BYRON 1	Cleared	(1.00)	1	N/A	Counterflow	(206.05)	205.05
IRONWOOD	GRAND POINT	Cleared	(3.00)	1	N/A	Counterflow	(2.06)	(0.94)
Total Credit Requirement (sum of all positive individual requirements)								377.30

UTC Reference Price	
HALIFXDP TX1 BYRON 1	P05 (206.05)
	P20 (72.53)
	P30 (24.91)
	DA (55.69)

UTC Reference Price	
IRONWOOD GRAND POINT	P05 (2.06)
	P20 0.45
	P30 0.72
	DA 2.25

## Appendix D: Minimum Collateral Requirements

To participate in the virtual market a participant must demonstrate a tangible net worth in excess of \$500,000 or tangible assets in excess of \$5 million through unqualified audited financials or an acceptable Corporate Guaranty<sup>4</sup>. If a Participant does not satisfy the Minimum Capitalization requirements above, it may still qualify to participate in the PJM markets by posting additional collateral. Collateral provided by other Participants that engage in virtual and export transactions shall be reduced by \$200,000 and then further reduced by 10%;



<sup>4</sup> Provided that both: (i) the guarantor is an affiliate company that satisfies the tangible net worth or tangible assets requirements, and; (ii) the Corporate Guaranty is either unlimited or at least \$500,000. If the Corporate Guaranty presented by the Participant to satisfy these Capitalization requirements is limited in value, then the amount usable for satisfying credit requirements will be the face value less \$500,000 and less an additional 10% of the remainder; also; any additional collateral will be reduced in value by 10%.

**Appendix E: Additional links related to the topic**

<http://www.pjm.com/~media/documents/agreements/pjm-credit-overview.ashx>

An overview of the PJM Credit Policy and Credit Requirements, and Supplement to the PJM Open Access Transmission Tariff, Attachment Q

<http://www.pjm.com/~media/committees-groups/committees/mc/20151019-webinar/20151019-item-02-virtual-transactions-in-the-pjm-energy-markets-whitepaper.ashx>

A paper on Virtual Transactions in the PJM Energy Markets published October 12, 2015. The paper contains initial recommendations for changes to the market rules that determine how virtual transactions can be submitted in PJM. The recommendations are targeted at maintaining the benefits provided by virtual transactions while eliminating bids that profit from the market without adding commensurate value.

<http://www.pjm.com/committees-and-groups/issue-tracking/issue-tracking-details.aspx?Issue={1CF7AF3C-8DD4-43AF-9CBB-998E21A749B9}>

Issue tracking on the “Review of Virtual Transaction Rules” being worked in the stakeholder process. The purpose of this Problem Statement is to initiate stakeholder dialogue on PJMs recommendations in addition to other market rule changes members would like to discuss and analyze for virtual transactions.

<http://www.pjm.com/~media/etools/ecredit/ecredit-presentation.ashx>

ECredit training

<http://www.pjm.com/~media/etools/ecredit/ecredit-training-scrollovers-and-calculations.ashx>

ECredit Scroll overs and calculations

<http://www.pjm.com/media/documents/merged-tariffs/oatt.pdf>

PJM Open Access Transmission Tariff; Credit Policy is found in Attachment Q.