

Comparison of Credit Requirements for Virtual Bidding

	NYISO	PJM	ISO-NE	MISO
¹ General Credit Provisions	<p>A Customer shall be required to allocate Unsecured Credit and/or provide collateral in an amount equal to or greater than its Operating Requirement. The Operating Requirement shall be determined separately from the Customer's collateral requirement for Virtual Transactions. Operating Requirement is the estimate of unpaid energy and other market transactions. 50 days exposure is calculated based on an average daily amount of transactions as seen in a BASIS month. (Tariff Sheet 496)</p>	<p>PJM assumes that participant exposure is equal to the highest two consecutive month's invoiced amounts (with special provision for new members, or exception where obligations are expected to significantly change). PJM assumes that virtual bidding activity is included in these invoiced amounts, so typically no ADDITIONAL credit is required for virtual bids. "Credit available for virtual bidding" is a member's total credit established with PJM, less any special set-asides (e.g. FTR auction), less any current obligations to PJM (e.g. unpaid prior month plus unbilled current month), less 15 percent of the member's credit requirement for normal market activity.</p>	<p>Financial Assurance Requirement for Non-Municipal Market Participants is the sum of:</p> <ul style="list-style-type: none"> • Hourly Requirements – Sum of 1) Net Hourly Charges that have been invoiced, but not paid; 2) net hourly charges that have been settled but not invoiced; and 3) most recent seven completely settled days of net charges (whether invoiced or not where such value shall not be less than zero); • Non-Hourly Requirements – average non-hourly charges over two most recently invoiced calendar months (excluding FTR settlements) times 2.5 • Virtual Requirement – amount of all unsettled Increment Offers and Decrement Bids • FTR Requirements – FTR Settlement Risk + Bid FA + Award FA + FTR Settlements • Disputed Amounts <p>Components can net against each other but cannot produce a single value less than zero</p> <p>For municipals, is the sum of:</p> <ul style="list-style-type: none"> • (3.5) times the sum of 1) aggregate Hourly charges on four most recent weekly bills plus 2) average monthly Non-Hourly Charges over two most recently invoiced calendar months, • FTR Requirements 	<p>For credit purposes, a Participant's Total Potential Exposure shall be the sum of the charges and credits for the following service categories as calculated per the formulas in Section IV of this Credit Policy:</p> <ol style="list-style-type: none"> 1. Real-Time Energy Market 2. Day-Ahead Energy Market 3. Virtual Transactions (consisting of charges that have been invoiced, settled but not invoiced, and exposure as described below for 2 days) 4. FTR Auction activity 5. FTR portfolio 6. Congestion and losses 7. Transmission Service <p>In general, the calculation of potential exposure to non-payment within each service category is based on three exposure components:</p> <ol style="list-style-type: none"> 1. Invoiced but not paid; 2. Measured but not invoiced, where measured means the settlement systems of the Midwest ISO have computed the charges and credits for all transactions for a given Operating Day; and 3. Estimated for future operating days based on known and/or potential activity.
² Is collateral segregated for virtual bidding?	<p>The Operating Requirement (credit for non-virtual bid charges) shall be calculated separately from collateral requirements for virtual bids.</p>	No.	<p>ISO New England does not segregate Financial Assurance by any specific market. Posted Financial Assurance may be used for transactions in any market.</p>	<p>MISO credit department authorizes a maximum virtual bid limit in MWh, based on available credit (Credit limit less market charges other than virtual bids.)</p>

Comparison of Credit Requirements for Virtual Bidding

³ What is the general formula used to determine Virtual Bidding Exposure?

NYISO	PJM	ISO-NE	MISO
<p>MWh bid times a price delta between RT and DAM prices.</p>	<p>PJM applies a screen to determine whether a virtual bidder's activity levels may be excessive in regard to historical levels, specifically, if the amount of uncleared virtual bids for two consecutive days exceeds the participant's total credit with PJM (less and FTR or special set-asides), then the bidder is subject to additional bid screening. "This provision was established because, while bids that are cleared are already being duly included in monthly obligations and are contributing as appropriate to the participant's credit requirement, bids that do not clear represent a potential credit exposure that is not measured by the regular credit process. The comparison against total credit is simply a measure of the magnitude of this potential exposure relative to the participant's credit resources at PJM."</p>	<p>Three categories of charges:</p> <p>Bid But Not Cleared Cleared But Not Settled Cleared But Not Settled Real Time:</p> <p>A complex paper describing the calculations for each category is available on the NEISO website.</p>	<p>$DMWhL \times MPD \times VMEW$, where</p> <p>$DMWhL$ = the Participant's daily Virtual MWh Limit</p> <p>MPD = the highest differential between the Day-Ahead and Real-Time Locational Marginal Prices at the 50th percentile over the previous twelve (12) months, assessed during the month of April and implemented May 1 of that Year and annually thereafter. The MPD that will be applied for April 2006 through April 2007 using the prior twelve (12) months data is \$13.33 per MWh.</p> <p>$VMEW$ = the number of days in the Virtual Transactions Estimated Exposure Window (2 Days).</p>
	<p>For market participants subject to virtual bid screening, all submitted virtual bids are screened as follows: A Participant/Member's Virtual Credit Exposure will be calculated on a daily basis for all virtual bids submitted by the market participant for the next operating day using the following equation:</p> <p>Virtual Credit Exposure = the lesser of:</p> <p>(i) ((total MWh bid or offered, whichever is greater, hourly at each node) x Nodal Reference Price x 2 days) summed over all nodes and all hours; or</p> <p>(ii) (a) ((the total MWh bid or offered, whichever is greater, hourly at each node) x the Nodal Reference Price x 1 day) summed over all nodes and all hours; plus (b) ((the difference between the total bid MWh cleared and total offered MWh cleared hourly at each node) x Nodal Reference Price) summed over all nodes and all hours for the previous three cleared day-ahead markets.</p>		

Comparison of Credit Requirements for Virtual Bidding

4 Details about the reference price

	NYISO	PJM	ISO-NE	MISO
	<p>The dollar per MWhr represents the highest zonal price delta (the absolute value of the difference between the Day-Ahead Market (“DAM”) and Real-Time Market (“RTM”) prices occurring within a specified period) at the 97th percentile.</p>	<p>Reference prices for virtual bids are 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.</p>	<p>Cleared But Not Settled</p>	
	<p>To determine the amount of credit support required per MWh, the ISO shall divide each year into the following six (6) two-month intervals: January and February, March and April, May and June, July and August, September and October, and November and December. The ISO shall determine the price differential between the Day-Ahead and Real-Time Energy market prices at the 97th percentile for each of the six (6) two-month intervals based on the same two-month interval in each of the prior two (2) calendar years. The amount of credit support required per MWh of authorization shall be the higher of the two price differentials produced by evaluating the same two-month interval for each of the prior two years. The ISO shall determine the amount of credit support required per MWh, as discussed above, separately for each of the eleven (11) virtual trading zones. A Virtual Transaction Customer’s credit requirement shall be based upon the highest amount of credit support required in any virtual trading zone in which the Virtual Transaction Customer is authorized to bid.</p>		<p>Cleared But Not Settled Real Time:</p>	

Comparison of Credit Requirements for Virtual Bidding

	NYISO	PJM	ISO-NE	MISO
5 Percentive value used for reference price?	97th percentile	97th percentile	A complex paper describing the calculations for each category is available on the NEISO website.	50th percentile (previously, MISO used 97%....In its MISO decision FERC ordered MISO justify the 97% rule (see MISO, Docket No. ER04-691-004, p.107). The MISO subsequently moved to a 50th percentile rule.
6 How often is the reference price adjusted?	NYISO does an assessment quarterly of the price delta between DA and RT, and adjusts the virtual bidding credit requirement if the amount changes by more than 10%. NYISO then recalculates the credit requirements.	Each month, PJM will update the Nodal Reference Price for each node and each aggregated price point based on a rank ordering of historical price differentials.	Proxies will be valid for month long strips and will be recalculated prior to start of each month. • The proxy values will be published on the ISO web site no less than 4 business days prior to the beginning of the applicable month	MPD = the highest differential between the Day-Ahead and Real-Time Locational Marginal Prices at the 50th percentile over the previous twelve (12) months, assessed during the month of April and implemented May 1 of that Year and annually thereafter The MPD that will be applied for April 2006 through April 2007 using the prior twelve (12) months data is \$13.33 per MWh.
7 What happens when the reference price is adjusted?			Each Market Participant's Virtual Transactions Credit Requirement will be recalculated in accordance with the periodic re-assessment of the value for variable MPD by the Transmission Provider (see Section III.A.1.). MISO may require Market Participants to: (a) reduce their Virtual MWh Limit or (b) provide additional Financial Security within two (2) Business Days from receipt of written notification (three (3) Business Days if notification occurs after noon EST), if there is an increase in the MPD.	
8 Days used for virtual bidding calculation	Exposure Calculation Factor: "2".	Lesser of 2 days, or 1 day plus previous 3.		2 days
9 Billing cycle for virtual transactions	Same monthly cycle as for other energy product Same as for other energy products.			

Comparison of Credit Requirements for Virtual Bidding

	NYISO	PJM	ISO-NE	MISO
<p>¹⁰ Loss Sharing on Virtual Transactions</p>	<p>All Market Participants will share in losses resulting from default of a virtual bidder on a virtual bid obligation (page 10) (all market participants includes: Physical Loads/Virtual Bidders/Physical Generators/TCC Market Participants) . Note that Loss sharing associated with default of a Market Participant in non virtual bid transaction continues to be covered by loads only.</p>			
<p>¹¹ Credit process for establishing virtual bid limits</p>				<p>A Market Participant shall submit its proposed Virtual MWh Limit via the Market Portal by 4 PM Eastern Daylight Time. It is the sole responsibility of the Market Participant to maintain a listing of the Market Participant's personnel authorized to conduct such Market Portal transactions specific to Attachment L of this Tariff. MISO will evaluate the Market Participant's submission, including the impact of the requested Virtual MWh Limit on the amount of the remaining Total Credit Limit relative to the Market Participant's Total Potential Exposure. If the requested Virtual MWh Limit will cause the Total Potential Exposure to equal or exceed the Total Credit Limit, the Virtual MWh Limit will be rejected. A Market Participant's Virtual MWh Limit must be approved by MISO before a Market Participant can participate in any Virtual Transaction.</p> <p>MISO shall process submissions of proposed Virtual MWh Limit one (1) Business Day following the day on which MISO receives such submission via the Market Portal, provided the submission is received by 4 PM Eastern Daylight Time. An approved Virtual</p>

Comparison of Credit Requirements for Virtual Bidding

	NYISO	PJM	ISO-NE	MISO
¹² Modifying virtual bid limits				<p>Modifications to a Market Participant's Virtual MWh Limit may be requested via the Market Portal. MISO shall process Virtual MWh Limit submission via the Market Portal one (1) Business Day following the day on which such submission was received by MISO, provided the submission is received by 4 PM Eastern Daylight Time. MISO must approve any proposed modification to a Market Participant's Virtual MWh Limit before the modification becomes effective. A decrease of a Market Participant's Virtual MWh Limit will decrease its Virtual Transactions Credit Requirement nine (9) calendar Days after the new Virtual MWh Limit is approved. In evaluating a request to increase a Participant's Virtual MWh Limit, MISO will evaluate the impact of the requested change on the amount of the remaining Total Credit Limit relative to the Participant's Total Potential Exposure. If the requested change causes the Market Participant's Total Potential Exposure to exceed its Total Credit Limit, then the request will be denied.</p>
¹³ Methodology for rejecting bids when over credit limit	<p>ISO Monitoring. The ISO shall monitor the bids submitted by a Virtual Transaction Customer. If the number of MWhs bid submitted by a Virtual Transaction Customer in any given day exceeds the number of MWhs that the Virtual Transaction Customer is authorized to bid, all of the Virtual Transaction Customer's bids for that day shall be rejected by the ISO.</p>		<p>Prior Policy "ISO Rejects All Increment Offers and Decrement Bids When Such Bids Causes the Non-municipal Participant to Be Out of Compliance With the Policy"* Revised Policy (effective 3/1/2005) ISO Will Reject Individual Increment Offers and Decrement Bids on a "Last In, First Out" Basis, Only As Needed to Bring the Non-municipal Participant Into Compliance With the Policy (below 100% of credit limit)</p>	
¹⁴ Timeline for responding to collateral calls	<p>NYISO requires one business day for the collateral adjustments for virtual bids, by 4pm on the next business day. If collateral not posted, suspended from placing additional virtual bids.</p>	<p>3 business days (page 3) of PJM policy</p>	<p>1 business day, unless change in credit limit due to downgrade of investment grade rating not more than one letter, in which case 5 business days.</p>	<p>2 business days</p>

Comparison of Credit Requirements for Virtual Bidding

	NYISO	PJM	ISO-NE	MISO
<p>¹⁵ Frequency of comparison of credit limits to liabilities</p>	<p>Comparison of credit limits to liabilities is performed on a daily basis</p>	<p>Comparison of credit limits to liabilities (including Virtual bidding) is performed on a daily basis</p>		<p>Enforcing the Virtual MWh Limit is daily. The sum of the absolute value of Virtual Bid MWhs and the absolute value of Virtual Offer MWhs submitted by a Market Participant for a given Operating Day may not exceed its Virtual MWh Limit. If both a Virtual Bid and a Virtual Offer are submitted for a given Node, then the absolute value of the greater of the Virtual Offer MWhs or the Virtual Bid MWhs at that Node will be counted when evaluating the sum of the absolute value of all Virtual Bid MWhs and Virtual Offer MWhs relative to the Virtual MWh Limit. MISO shall have the right to reject Virtual Bids and/or Virtual Offers that cause the sum of Virtual Bids and/or Virtual Offers submitted for a given Operating Day to exceed the Market Participant's Virtual MWh Limit.</p>
<p>¹⁶ Triggering points for contacting market participant about potential need for additional collateral.</p>	<p>NYISO calls at 50% and requires additional collateral within 1 business day. If not posted, NYISO may suspend the participant from further participation in virtual bidding. If the participant reaches 100%, NYISO may cancel bids before they are accepted and suspend further authorization for virtual bidding until credit requirements are met. Page 506.01</p>	<p>Can not exceed 85% use of credit limit. (page 3 of policy).</p>	<p>No. Notice to market participant at 80%. At 90%, Notice to NEPOOL Budget and Finance Subcommittee and to all members and alternates of the Participants Committee. At 100%, market participant is suspended from submitting incremental offers and decremental bids. If situation continues until next business day at 12noon, (a) the event shall be a Financial Assurance Default (defined in Section VII below); (b) the ISO shall issue notice thereof to such Non-Municipal Market Participant, to the NEPOOL Budget and Finance Subcommittee, and to all members and alternates of the Participants Committee and the New England governors and utility regulatory agencies, and (c) such Non-Municipal Market Participant shall be suspended from: (1) the New England Markets, as provided below; (2) receiving transmission service under any existing or pending arrangements under the Tariff or scheduling any future transmission service under the Tariff; and (3) voting on matters before the Participants Committee and NEPOOL Technical Committees; and (4) entering into any future transactions in the FTR system, in ea</p>	<p>MISO appears to permit 100% of the total credit limit to be consumed before requiring additional credit, but if a market participant exceeds that limit, MISO can require a multiple of the amount by which they were over the limit be posted.</p> <p>"In the event a Market Participant's Total Potential Exposure exceeds its Total Credit Limit as of the close of business on three (3) consecutive days, then for the next ten (10) days the Market Participant's Total Potential Exposure shall be equal to the sum of: (i) the amount calculated per the formulas in this Section IV; plus (ii) a factor of up to ten (10) times the average amount of the excess exposure over the three (3) consecutive days, if MISO determines, after consultation with the Market Participant, that such additional collateral is necessary to reflect the potential exposure associated with the Market Participant's expected market activity.</p>

Comparison of Credit Requirements for Virtual Bidding

NYISO	PJM	ISO-NE	MISO
	<p>Each PJM Market Participant that is identified as requiring Virtual Bid Screening based on bidding history will be screened in the following manner: If the participant's Virtual Credit Exposure exceeds its Credit Available for Virtual Bidding, the Market Participant will be notified via an eMKT error message, and the submitted bids will be rejected. Upon such notification, the Market Participant may alter its virtual bids and offers so that its Virtual Credit Exposure does not exceed its Credit Available for Virtual Bidding, and may resubmit them. Bids may be submitted in one or more groups during a day. If one or more groups of bids is submitted and accepted, and a subsequent group of submitted bids causes the total submitted bids to exceed the Virtual Credit Exposure, then only that subsequent set of bids will be rejected. Previously accepted bids will not be affected, though the Market Participant may choose to withdraw them voluntarily.</p>	<p>d. Virtual Transactions Notwithstanding the foregoing, if a Non-Municipal Market Participant is suspended in accordance with the provisions of this Policy as a result of one or more Increment Offers or Decrement Bids submitted by that Non-Municipal Market Participant and, but for such Increment Offers and/or Decrement Bids, such Non-Municipal Market Participant would be in compliance with this Policy, then such suspension shall be limited to (i) the immediate "last in, first out" rejection of pending individual uncleared Increment Offers and Decrement Bids submitted by that Non-Municipal Market Participant (it being understood that Increment Offers and Decrement Bids are batched by the ISO in accordance with the time, and that Increment Offers and Decrement Bids will be rejected by the batch); and (ii) the suspension of that Non-Municipal Market Participant's ability to submit additional Increment Offers and Decrement Bids unless and until it has complied with this Policy, and the determination of compliance for these purposes will take into account the level of</p>	

¹⁷ **Differences between initial and current policy**

Initially required collateral (cash or letter of credit) for all virtual transactions (no unsecured credit). Set high reference price of \$350/MWh. 7 days of credit requirements for virtual bids. Previously used a 90 day rolling calculation for determination of the reference price.

¹⁸ **FERC Orders on Credit**

FERC has previously ruled on the credit and collateral policies of the NYISO (Docket No. ER05-941-000, see Issuance of July 1st 2005)

PJM (see PJM, 104 FERC ¶ 61,309 at P 23-24 where FERC rejects a proposed four-day collateral requirement);

See MISO 108 FERC ¶ 61,163 at P 447-48 where FERC rejects a proposed six-day collateral requirement).

Comparison of Credit Requirements for Virtual Bidding

	NYISO	PJM	ISO-NE	MISO
19 Links to General Credit Policy	http://www.nyiso.com/public/webdocs/services/financial_services/credit/att_k.pdf		http://www.iso-ne.com/stlmnts/assur_crdt/index.html http://www.iso-ne.com/stlmnts/assur_crdt/pol_amndts/participa nt_fap_exhibit_1a_t2.pdf	http://www.midwestiso.org/publish/Document/27851_11011a2ccaa_-7f1c0a48324a/Credit%20Policy%20(Attachment%20L)%20_clean__11-13-06.pdf?action=download&_property=Attachment
20 Other Useful information on virtual bidding	Page 13. http://www.nyiso.com/public/webdocs/committees/mc/meeting_materials/2007-03-20/Draft_MC_Mins_022107_MP_Review.pdf		Details about calculating exposure for uncleared bids: http://www.iso-ne.com/stlmnts/assur_crdt/misc/virtual_fa_description.pdf Suspension process http://www.iso-ne.com/stlmnts/assur_crdt/misc/summary_suspension_proces.pdf	