



New Market Participant

MISO VIRTUAL TRADING



ONBOARDING
DOCUMENTATION



Virtual Trading In Midcontinent Independent System Operator, Inc. (MISO)

This document is meant to provide a general guideline for participating in virtual trading in MISO's Market. This document will discuss the aspects of setting up users, allocation of credit for virtual, portfolio creation and Commercial Pricing Node (CP Node) association, virtual bids and offers, Market User Interface (MUI) location for offer/bid submission, Market timelines, cleared offer/bid location, dead nodes (non-clearing), and settlements and invoices. This document should answer most questions related to virtual participation in MISO's Market.

Once you have certified as a Market Participant (MP), there are several steps that must be taken for system access and system setup. These steps are outlined below. Please let us know if you have any questions by submitting a case in the MISO help center [Help Center \(misoenergy.org\)](https://misoenergy.org/help-center) or by calling 866-296-6476 Option 3.

User Setup

Once an MP is certified, the Local Security Admin (LSA) should set up users for access to the MISO Portal (<https://markets.midwestiso.org/MISO/>). The Self-Service Local Security Administrator (SSLSA) will help guide the LSA in this process (see link below).

Note: The preferred browser to access the MISO Portal is Google Chrome.

[Self-ServiceLSAUserGuide.pdf](#)

Each MP requires at least two certificates, one LSA certificate and one user certificate. LSA Certificates are only set up by MISO IT by way of MISO Registration so set up or changes to LSAs are facilitated via the creation of a Help Center case submission. Prior to access to the Help Center, you will need a public MISO profile which can be created at the link below. Once your profile has been created, you may request an invite to the Help Center by submitting a request in the MISO help center [Help Center \(misoenergy.org\)](https://misoenergy.org/help-center). Once you have access, you can submit a case with the category of Change Request Attachment B with a type of Local Security Administrator (LSA). Each case must include the contact information of the new LSA and their distinguished name (DN) string of their digital certificate.

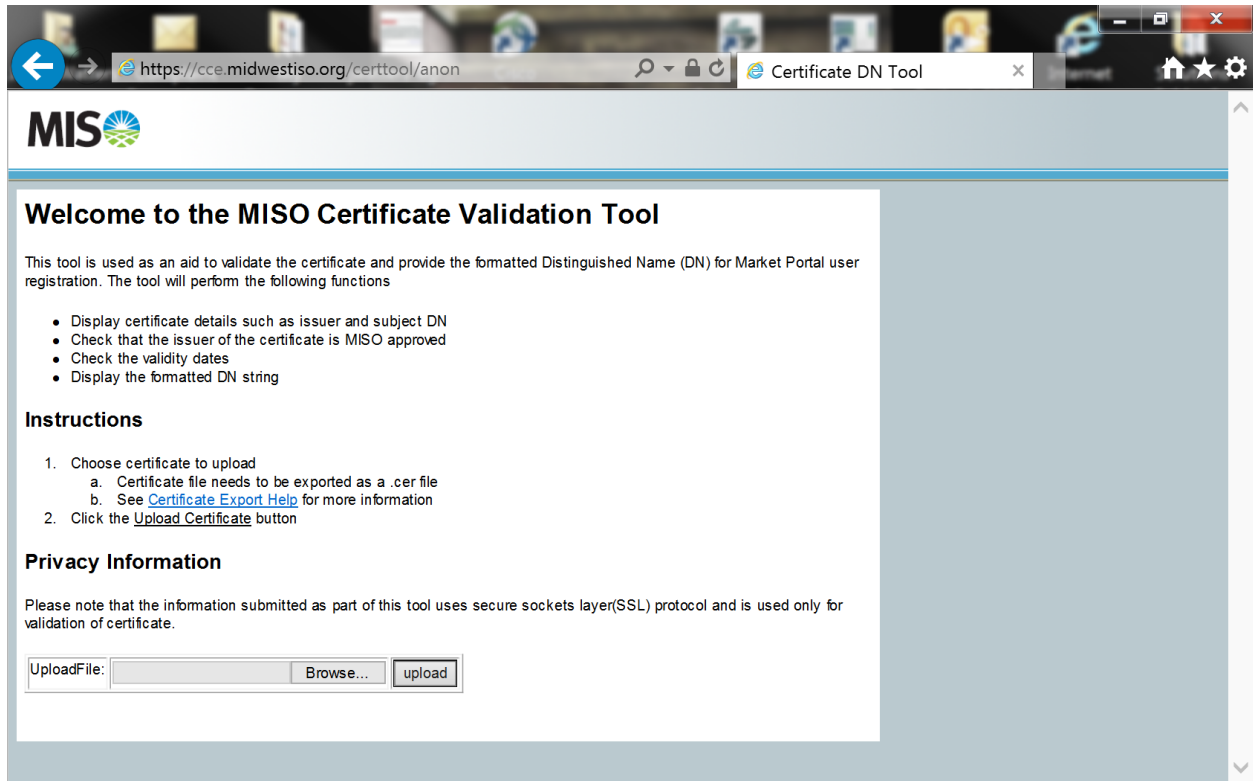
[Help Center \(misoenergy.org\)](https://misoenergy.org/help-center)

The LSA certificate can only be used by the LSA to create/view/maintain other users and will not function as a user certificate or allow access for other Market function activities. User certificates allow full access to MISO systems (pending provisioning by the LSA) which can include virtual bid/Offer submission, Virtual MW change, settlements etc.



When setting up users, the cert tool is used to format the distinguished name of the digital certificate for use by the LSA when setting up users.

CERT Tool: <https://cce.midwestiso.org/certtool/anon>



Anyone submitting bids or offers will need to have Day-Ahead/Real-Time (DART) submit access, so the LSA will have to provision each user certificate accordingly. Also, the LSA will want to provision the cert with a DART role of Market /Scheduling (instead of operational/page 16 of the SSLSA Users Guide mentioned above).

Note: LSAs will need to make sure to provision access for users for each applicable Asset Owner (AO). If DART access submit is not initiated for an AO, the user will not be able to view the DART tab for the AO in question.

CCE Environment (Sandbox)

In addition to the production Portal (financially binding), MISO provides a test environment called the Customer Connectivity Environment (CCE) environment or commonly known as the sandbox. In this area, an MP can play in the sandbox and not affect them financially. CCE access is set up by the LSA in the same way he sets up users for production Portal access but would use the CCE URL as it is a completely different environment. The CCE link is below.



MISO Portal: [MISO Market Portal \(midwestiso.org\)](http://midwestiso.org)

CCE Portal: <https://cce.midwestiso.org/MISO/>

Portfolio Creation/Manage Portfolios

To submit trades, a user must first create a portfolio in the MISO Portal and assign any nodes intended for trade to that portfolio.

Credit Allocation

Once users have been set up, the Credit Contact initiated in the MP application, will need to submit a Credit case on the Help Center to allocate a portion of their total credit limit for the purpose of virtual trading (change virtual MWh limit). That process is outlined in the Help Center Guide to Submit Credit Cases pdf (below). Remember, the LSA will need to provision the user's certificate to allow access to have credit submit rights to submit a change in the allocation.

Once the credit allocation is made, it will not become active until the next day (e.g. allocation made on Monday will be available for activity to be conducted on Tuesday).

[Help Center Guide to Submit Credit Cases.pdf](#)

Initial Value of TPE Credit Worksheet

Note-Virtual Transactions Estimated Exposure is based on the Virtual MWh Limit MPs set thru the portal and the Marginal Price Differential.

Virtual Transactions Estimated Exposure = Virtual MWh Limit x Marginal Price Differential x 2 days

Bid/Offer Submission

Once a user has access to the DART section of the Portal and has created his portfolios and associated trading CP nodes to that portfolio, they may place virtual bid/offer submissions in the Day Ahead Market on any modeled CP node in the MISO system (approximately 2200 nodes). This can be completed manually on the Portal (Bids or offers) or via API/Market User Interface. References for virtual submissions can be found in the Energy and Operating Reserves Market Business Practice Manual (BPM) and within the Market Portal Users Guide mentioned above. We have provided the requirements for submission below for both offers and bids.

[BPM 002 - Energy and Operating Reserve Markets](#)

[Download BPM](#)

MPs submit the following information for Virtual Supply Offers:

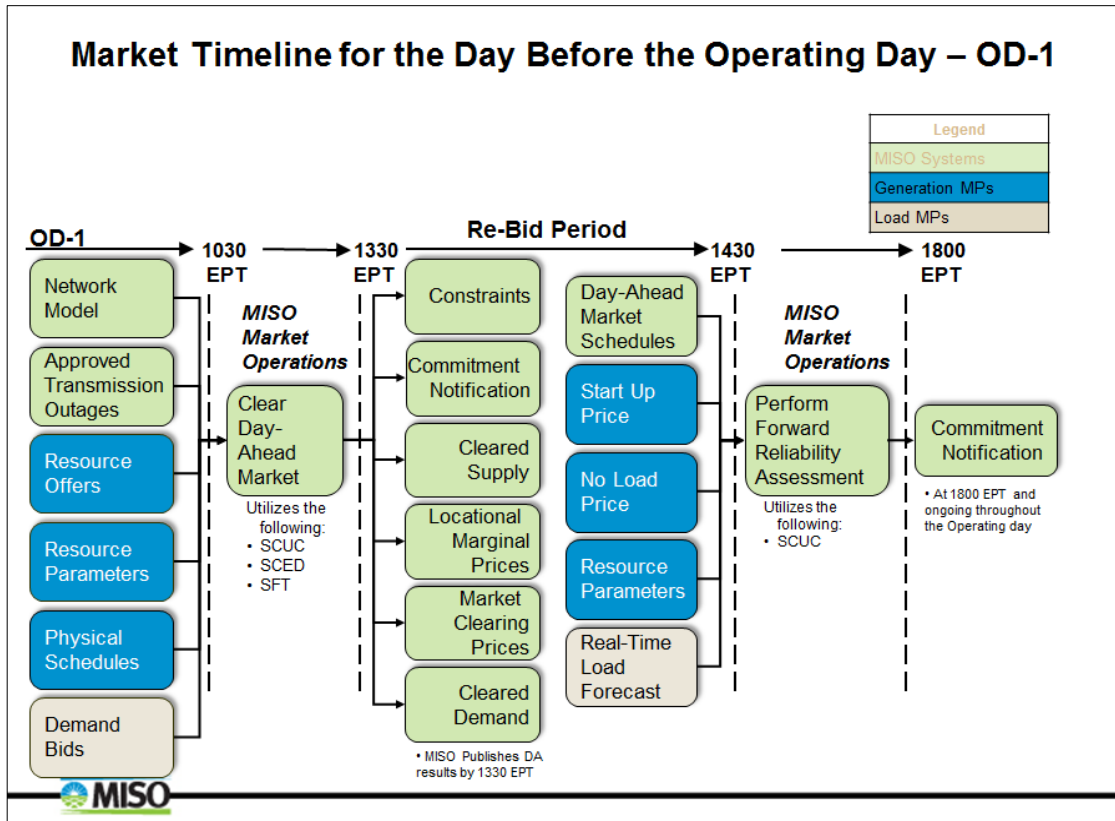
- MW, at least 0.1 MW, subject to credit limits and Independent Market Monitor (“IMM”) volume limits.
- Location (any CPNode).
- Hours over which the Offer applies.
- Offer price (the minimum price the market seller is willing to accept for Energy sold into the Day-Ahead Energy Market, where the \$/MWh Offer values may range from -\$500 to \$1,000.
- Up to 9 (MW/Price) blocks per Virtual Supply Offer.

MPs submit the following information for Virtual Demand Bids:

- MW, at least 0.1 MW, subject to credit limits and IMM volume limits.
- Location (any CP Node).
- Hours over which the Bid applies.
- Bid price (the maximum price the market buyer is willing to pay for Energy purchased in the Day-Ahead Energy and Operating Reserve Market, where the \$/MWh Offer values may range from -\$500 to \$2,000.
- Up to 9 (MW/ Price) blocks per Virtual Demand Bid.

Note-Virtual must be submitted by the Day Ahead Market close at 10:30 EPT/Eastern Prevailing Time.

Below is a timeline of the MISO DA activities.



For those wanting to programmatically submit virtual bids and offers, please see our Market User Interface (MUI 2.0) Users Guide below. We have also provided a link to a page which contains other pertinent documents.

MUI 2.0 website: [Markets and Operations \(misoenergy.org\)](http://Markets and Operations (misoenergy.org))

API User guide (contains info on listen& set up, IP whitelist, public key/cert etc.):

[MUI 2.0 API User Guide623176.pdf \(misoenergy.org\)](http://MUI 2.0 API User Guide623176.pdf (misoenergy.org))

Market Clearing

You can check for cleared virtuals on the Portal once the Day Ahead Market Clears (approximately 1:30PM).



Dead Nodes

There are times when nodes can be islanded and in fact, disconnected from the transmission system due to a transmission outage. A commercial pricing node that is disconnected from the rest of the grid in this way is called a “dead node.” While MISO calculates prices for dead nodes, no transactions can clear on dead nodes. On some occasions, participants may see that based on the posted LMP and offer they submitted, that they should have cleared when in fact they did not. This is almost always due to a dead node. In this situation, feel free to contact Client Services and Readiness by submitting a case at the MISO help center here: [Help Center \(misoenergy.org\)](https://helpcenter.misoenergy.org) to confirm if the node was indeed “dead” for the operating day/time in question.

Settlements

You will receive your first settlement statement seven days after the first operating day (S7) showing all your volumes and charge types assessed based on virtual activity. The settlement statements can be found in the Portal under the Settlements card. This is also where you will find the weekly invoice (if the LSA has provisioned your certificate for this access to the statements and invoices). You will find the LMP data posted on the MISO public website which ties into the settlements calculations. We use the Day Ahead ExPost LMP for the purpose of settling virtuals. You can find the Historical LMPs at the link below.

[MISO Market Data \(misoenergy.org\)](https://misoenergy.org) Upon opening your statement, you will need to use the stylesheet as this formats the statement into an easily viewable graphical interface. The Style Sheet files allow you to open the XML files in a browser. The Style Sheet needs to exist in the same folder as the XML file. By copying the Style Sheets and the XML files to a folder on your computer, you can open the XML file in a browser and the Style Sheet will control how the data is displayed. For more information on Style Sheets, please see pages of the Market Settlements BPM.

We also have a Settlements and Invoice Calendar which will provide the dates for when invoices and statements are posted (see link below).

Note: Invoices are posted to the Market Portal each Tuesday afternoon by the end of business (EOB).

Based on the MISO [Charge Type Matrix 03012016](#), you can view the charge types applicable to those submitting virtual bids and offers (see columns T-V).



Virtual Demand Bid=DA_RSG_DIST

B.11 Day-Ahead Revenue Sufficiency Guarantee Distribution Amount (DA_RSG_DIST)

Virtual Offer or Demand Bid =RT_RSG_DIST1

D.14 Real-Time Revenue Sufficiency Guarantee First Pass Distribution Amount (RT_RSG_DIST1)

Virtual FAQs

1. What is the definition of a virtual bid or offer?

A virtual bid or offer allows a participant to ‘virtually’ bid to buy or offer to sell MWs in the Day-Ahead Market.

Cleared virtual bids or offers are bought or sold at the Locational Marginal Price (LMP) of the Commercial Pricing Node (CP Node) that the bid or offer was submitted at. Any MW cleared in the Day-Ahead creates a position that is automatically reversed in the Real-Time Market.

So if a participant buys virtual MWs in the Day-Ahead Market, those virtual MWs are sold back to the market in the Real-time at the Real-time LMP of the CP Node that the original bid was submitted at. If a participant sells (offer) virtual MWs in the Day-Ahead Market, those virtual MWs are bought back from the market in the Real-time at the Real-time LMP of the CP Node that the original offer was submitted at.

Below is a simplified example that assumes a 100MW Virtual Demand Bid clears, and ignores other charges incurred by virtual transactions (e.g. Schedule 17, RSG MWP, etc):

The Virtual Demand Bid contributes a charge of $100 \times \text{DA LMP}$ at the node in question to the Day-Ahead Settlement result. The Real-Time Settlement result will be a credit of $100 \times \text{RTLMP}$. Using the MISO settlements sign convention, where credits are negative, gives a net result across settlement statements of:

$$\begin{aligned} & -100 \times \text{RTLMP} + 100 \times \text{DALMP} \\ & = 100 \times (\text{DALMP} - \text{RTLMP}) \end{aligned}$$

The Market Participant is charged or credited with the difference between day-ahead and real-time prices at the node. For this example, the result will be a credit (negative), when the real-time price is greater than the day-ahead price (the virtual bid was “bought low and sold high”).



2. What purpose do Virtual transactions serve in the Market?

Virtual Transactions serve two main purposes in the market.

- Virtual Transactions allow Market Participants to hedge Day-Ahead positions or speculate on locational price differences between the Day-ahead and Real-Time Markets.
- Virtual transactions provide a “crowd-sourced” mechanism to align the Day-Ahead and Real-Time markets. Virtual transactions are placed when expectations of market congestion at a location are different between the Day-Ahead Market and Real-Time Market. The act of making these bids or offers serves to move the price in the Day-Ahead market in the direction of expected Real-Time congestion, which serves to align prices and outcomes between these markets.
- Virtual transactions serve the purpose of allowing physical transactions to be communicated differently than speculative transactions. If virtual transactions were not allowed, market participants would still have expectations of inefficiencies (differences in pricing outcomes) between the Day-Ahead and Real-Time Markets, and would alter their physical bids to account for these expectations. The Market Operator would not be able to distinguish between the physical and speculative portions of these transactions-with potentially real implications to the reliability of the system.

3. I don't have any generation or load assets in the MISO footprint. Can I still participate in the Virtual Transaction Market?

Yes, participation in the virtual transaction market does not require the Market Participant to be a Generation or a Load owner. The requirements to participate in the virtual market are that the entity is a registered, valid Market Participant, and that all MISO credit requirements have been met (including Daily MW Limit and credit limits).

4. Do you have to register for the Market if you are only going to do virtual transactions?

Yes, you must go through the registration process and become a Market Participant with sufficient credit before any transactions can take place.

5. Who is the counterparty to a Virtual transaction?

There is no counterparty to a virtual transaction. The Market Participant that enters into the Virtual Transaction assumes all the risk involved with the Transaction.

6. When can Virtual bids or offers be submitted?



Virtual transactions can be submitted to MISO (through the portal or programmatic interface) no earlier than seven days before the operating day and up until 10:30 AM EPT the day before the operating day.

7. At what nodes can Virtual Transactions be submitted?

Virtual transactions can be submitted at any of the Commercial Pricing Nodes within the MISO Footprint (generation node, load zone/node, interface node, or hub).

8. How many virtual bids or offers can a Participant submit?

A Participant can submit up to 10 price/quantity pairs per hour per Commercial Pricing Node.

9. Are there any other limitations concerning the number of virtual transactions that a Participant can submit?

Yes, the number of virtual transactions a Participant can submit can be limited. The Participant must not have gone over either its Daily Virtual MW limit or its credit limit (as set with the MISO Credit Department).

10. When submitting an update to one hour of the day in a virtual transaction, do you need to resubmit all hours of the day?

With respect to "Deleting and Replacing Submitted Data," Fixed Demand Bids, Price-Sensitive Demand Bids, Virtual Offers, and Virtual Demand all function in the same fashion. From 6.2.4 of the XML Specification related to Fixed Demand Bids: "To remove a single hourly bid or to update a single hourly bid, all hourly bids for the location must be resubmitted. You cannot remove or update a single hourly interval."

So if you submit 24 hours of either Fixed Demand Bids, Price-Sensitive Demand Bids, Virtual Offers, or Virtual Demand, and then want to update 1 hour, a submittal with only 1 hour of data for any of these would null out the other 23 hours.

11. What is the smallest quantity that a Virtual Bid and Offer can be submitted for?

Virtual bids and offers can be submitted to a granularity of .1MW (one tenth of a Megawatt), which is the same granularity as Financial Transmission Rights bids and offers.

12. Can a Participant submit a Virtual bid/offer as having either a block or linear slope?

No, Virtual Bids/Offer in submittal and clearing are always treated as having a block slope. If the LMP is the same as the Bid/Offer the marginal block may clear partially.

13. What is meant by the statement that a Virtual Transaction can partially clear?



In cases where a Virtual Transaction is marginal on the system, the Virtual Transaction may clear partially, or in other words, not to the full MW amount submitted in that bid or offer block. The same applies for Price-Sensitive Demand Bids that clear on the margin.

14. Do virtual supply offers and demand bids impact the prices in the DA market?

Yes. Virtual supply offers and demand bids directly impact Day-Ahead LMPs, as they are included in the Day-Ahead bid stack. Virtual bids and offers can increase or decrease prices at CP Nodes in the system.

15. Do cleared virtual transactions cause any physical flow in the market?

No. Cleared virtual transactions are purely financial in nature, and as such do not cause any physical flow in the market.

16. Do virtual transactions settle similar to energy where the difference between the Day-Ahead and RealTime position are settled in the RealTime at RealTime prices?

Yes. Cleared virtual transactions take a position at a CP Node in the Day-Ahead and are settled at Day-Ahead Prices at that node. In the Real-Time, when no physical energy is provided (or consumed) to match the Day-Ahead schedule, the entire virtual quantity becomes the unprovided (or un-consumed) quantity in real-time, and as such, an equal and opposite settlement is conducted in Real-Time.

17. Why are cleared Virtual MW not charged or credited at their bid or offer price?

Virtual bids or offers are cleared based on the bid or offer price. However, when settled, cleared bids or offers are charged or credited based on the Day-Ahead or Real-Time LMP at the relevant CP Node for that bid/ offer.

18. If a Market Participant loses money by entering into virtual Transactions, does MISO keep the money?

No, MISO is revenue neutral and does not keep the money. Monies collected from Market Participants that enter into Virtual Transactions, will be paid out to Market Participants that earn Virtual Transaction or other congestion-related credits based on their DART market participation.

19. Does the Revenue Sufficiency Guarantee Charge net Virtual Transactions against each other to determine the charge to a given Market Participant?



Looking strictly at Virtual Transactions, Cleared Net Virtual Demand on a locational basis is included in the Demand that pays Day-Ahead Revenue Sufficiency Guarantee Distribution Charges.

For example, if an Asset Owner had 100 MW of Virtual Supply and 50 MW of Virtual Demand at Indiana Hub, they would have a net 50 MW of Virtual Supply at the Hub. In this case they would be responsible for 0 MW of Day-Ahead RSG Distribution Charges (even though they had 50 MW of Virtual Demand). In a second example, if the Asset Owner has 100 MW of Virtual Demand and 50 MW of Virtual Supply at the Michigan Hub, the Asset Owner would be responsible of 50 MW of Day-Ahead RSG Charges due to the net 50 MW of Virtual Demand at the Michigan Hub.

20. Will the Independent Market Monitor , monitor participation in the Virtual Transaction Market?

Yes, the Independent Market Monitor monitors the use of Virtual Transactions through conduct and impact tests. For more information on Virtual Transactions, please refer to:

- 1) Business Practices Manual for Energy and Operating Reserve Market BPM 002
- 2) Business Practices Manual for Market Settlements, BPM 005
- 3) Business Practices Manual for Market Monitoring and Mitigation BPM 009

<https://www.misoenergy.org/legal/business-practice-manuals/>