APX ISO Scheduling – CSV File Upload

APX MarketSuite®

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Version 5.0

Table of Contents

[Revision History 3](#_Toc42188262)

[Introduction 4](#_Toc42188263)

[I. Data Transfer 5](#_Toc42188264)

[II. User Interface 6](#_Toc42188265)

[III. CSV File Format – CAISO & ERCOT 8](#_Toc42188266)

[A. CAISO Market Participant Data 13](#_Toc42188267)

[B. ERCOT Market Participant Data 22](#_Toc42188268)

[IV. CSV File Format – PJM, SPP, MISO, ISONE, and NYISO 29](#_Toc42188269)

[*File Content* 31](#_Toc42188270)

[A. PJM Market Participant Data 35](#_Toc42188271)

[B. SPP Market Participant Data 37](#_Toc42188272)

[C. MISO Market Participant Data 39](#_Toc42188273)

[D. ISONE Market Participant Data 40](#_Toc42188274)

[E. NYISO Market Participant Data 42](#_Toc42188275)

# Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Revision | Date | Description | Updated by |
| 1.0 | 10/19/2015 | * Initial Version | Adam Barrett |
| 2.0 | 09/20/2018 | * PJM Expansion | Paul Innamorato |
| 3.0 | 01/07/2019 | * SPP Expansion | Adam Barrett |
| 4.0 | 7/30/2019 | * Added Gen Scheduling to PJM, clarified format for non-PJM & SPP regions | Adam Barrett |
| 4.1 | 12/04/2019 | * Added Transactions for NYISO, MISO, ISONE * Added support for ERCOT OnUpAS bids | Adam Barrett |
| 5.0 | 6/4/2020 | * Added xMarket Bilateral Trades section * Added PJM, MISO, and ISONE Bilateral Trade Details | Adam Barrett |

# 

# Introduction

The purpose of this document is to describe the user interface and CSV (comma separated value) file structure for uploading of ISO scheduling-related data to the APX MarketSuite®. This data may include generator bids and schedules, virtual bids, bilateral trades, resources parameters, and other similar data. This method of data entry is provided to facilitate easy and fast uploading of large amounts of data. The CSV file format is optimized for less-complex transactions, rather than transactions that involve many attributes for a single transaction.

The CSV scheduling data files may also be uploaded through MarketSuite™ Web Services. Refer to the [APX Technical Interface Specification – Secure Web Services](https://marketsuite.apx.com/Docs/APX%20Technical%20Interface%20Specification%20-%20Secure%20Web%20Services.doc) for details.

### Scope

This document explains APX MarketSuite® CSV scheduling support across all US ISOs.

**NOTE: The CSV file upload functionality differs slightly for the CAISO and ERCOT regions vs. other regions. There are small differences on format and functionality, which are explained in the appropriate sections of this document.**

### Supported Transaction Types

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Transaction Types | CAISO | ERCOT | PJM | MISO | ISONE | NYISO | SPP |
| Virtual Bids | X | X | X | X | X | X | X |
| Load Bids/Schedules | X | N/A | X | X | X | X | X |
| Bilateral Schedules | X | X | X | X | X |  |  |
| Generator Bids | X | X\* | X |  |  |  | X |
| Intertie/External Transactions | X | N/A |  |  |  |  |  |
| Resource Parameters | X | X\* | X\* |  |  |  | X\* |

\*Not all transactions supported for the category—check details in region-specific sections.

All Transactions are explained in detail in the corresponding regional (ISO) sections of this document.

### Supported Interval Resolutions

APX’s CSV scheduling file supports daily and hourly activity. This file format does not allow for scheduling transactions at a granularity of less than a full hour. If an hourly value is supplied for a transaction that is scheduled in sub-hourly (e.g. 15 Min) intervals at the ISO, the hourly value will be supplied for each of the intervals in the hour.

# Data Transfer

### Validations:

CSV files submitted to the APX MarketSuite® are subject to a format validation before they are saved in the APX system. If there is any problem with the file format, the entire file will be rejected and no data will be saved. The user will be able to view a message explaining the error in the File Upload user interface.

Content validations will occur after the format is validated and the file is saved in the system. Content validations may differ by region, but in any case, invalid content will not be saved or submitted to the ISO.

### Transaction Lifecycle:

Once a file has been successfully submitted, the data may be managed through the APX MarketSuite® manual user interfaces (i.e. Checkout, Bid/Offer, Trade, and Resource applications), or through subsequent file uploads. Within the uploaded file a flag can be turned on that will cause the APX system to submit the included data to the ISO immediately without requiring further user action. If this flag is turned off in the uploaded file the user can submit this data to the ISO via the Checkout application.

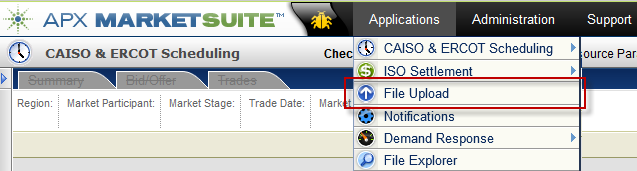
Transaction statuses are managed in a variety of ways as supported by the various ISOs. For example, for the CAISO market the APX system periodically checks the status of the submissions by querying the CAISO systems. For ERCOT, the APX system receives and processes asynchronous notifications from the ISO to update transaction statuses. Furthermore, for some ISOs, after the market closes, an automation queries and updates the final data set as it appears in the ISO, as well as bringing in market awards, schedule cuts and mismatched trades.

### Maximum File Size:

To preserve system resources and responsiveness, files will be limited in size to between 15,000 and 25,000 rows, depending on the region. Some transactions may take up more than one row (e.g. multi-point bid curves), in which case the limit would be less than 10,000 transactions. This limit may be increased in the future. See ISO specific section for exceptions.

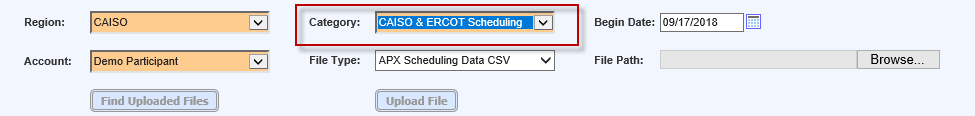
# User Interface

Scheduling CSV Files may be uploaded through an APX MarketSuite® user interface. The interface is available through the menu system:

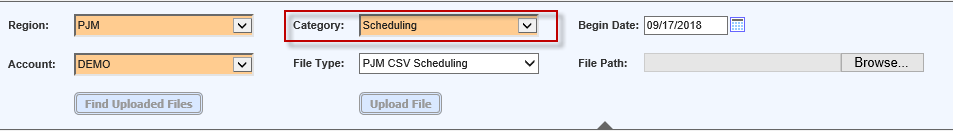


Application Interface:

**CAISO & ERCOT**



**PJM**



Input Criteria:

* **Region –** All supported ISOs associated with the user’s login
* **Account –** All Accounts for the selected Region associated with the user’s login
* **Category –** For CSV uploads, choose‘CAISO& ERCOT Scheduling’or ‘Scheduling’ (for non-CAISO/ERCOT regions)
* **File Type –** For Scheduling CSV File upload, select “APX Scheduling Data CSV”
* **Begin Date –** First day for which the file contains data. This is the day that the file will be associated with when querying for files in this interface, or in the APX MarketSuite® File Explorer application. Note: if the file contains no data for this date, it will fail to parse and an error will be returned
* **File Path –** Browse to find the CSV scheduling file the user wishes to upload

Action Buttons:

* **Find Uploaded Files –** This button will be enabled when a Region, Account, File Type, and Begin Date have been selected. Clicking this button returns a list of files in the **“Uploaded Files”** section, according to the criteria selected.
* **Upload File –** This button will be enabled when all criteria have been selected, including the File Path. Clicking this button will upload the file and refresh the list of Uploaded Files.

Messages Section:

The Messages section will populate whenever a file is uploaded. There will be a timestamp in the user’s local time, as well as a message indicating success or failure. Any failure will result in the entire file being rejected and no data saved to the APX system.

A success message will indicate the number of new rows affected. This will include canceled rows and updated rows, and will reflect the number of *intervals* affected, which may include intervals of less than one hour. The number of rows affected may not reflect he number of data rows in the file.

There are two types of validations that can cause a failure:

* Format validations will cause a failure and the message that says: “Upload for File 'temp.csv' Failed! Please verify the file format and resubmit.”
* Content validations will check the specific columns and ensure that the values are allowed and the data can be saved. A content validation failure should results in an error message with specific information about the failed validation.

Specific Content Validations:

There are many specific validations performed on the incoming data, which may include the following, depending on the region:

* **No Data for Begin Date –** (CAISO/ERCOT only)The file does not contain any data for the Begin Date selected in the Interface.
* **Bad Date –** The format/content of the Date column is incorrect for at least one row in any section.
* **Bad Hour –** A value in the Hour column is invalid. Allowable values are 1-24 (whole numbers only) and 2x (for the Daylight Saving Time duplicate hour)
* **Bad Transaction Name –** A Transaction name does not match a valid transaction for the Region and MarketStage.
* **Bad Location –** A Location name does not match a valid location for that Region and Transaction. Note: if you believe that a Location is missing from the APX MarketSuiteTM, please contact APX Operations or your account manager.
* **Bad MW –** A valuein the MW column is not valid for the Transaction.
* **Bad Price –** A value in the price column is not valid for the Transaction.
* **Bad Reference Code –** A value in the ReferenceCode column is invalid for the Transaction.
* **No Reference Code When Reference Code is Required –** A Transaction requires a value in the ReferenceCode column, but no value has been provided (such as for CAISO Physical Trades).
* **Bad Attribute Name –** An attribute name in the Attribute column does not refer to a valid attribute for that Transaction.
* **Bad Attribute Value –** An attribute value in the Attribute column is not valid for that attribute and Transaction.
* **Region Does Not Match Region Selected –** The Region in the file does not match the Region selected in the Interface.
* **MarketParticipant Does Not Match Account Selected –** (CAISO/ERCOT only, other regions allow multiple participants in the file)The MarketParticipant in the file does not match the Account selected in the Interface.
* **Market Stage Does Not Exist –** (CAISO/ERCOT only) The MarketStage in the file is invalid for the Region.
* **Bad Parameter Name –** A Parameter (in the ResourceParameter section of the file) does not match a valid parameter for the Region.
* **File Size Exceeds Limit –** Number of rows in the file exceeds the set limit of 15,000-25,000 rows.

# CSV File Format – CAISO & ERCOT

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Header |  |  |  |  |  |  |  |  |
| Version | SourceSystem | CreateDate | SubmitToISO | Region | MarketParticipant | MarketStage |  |  |
| 1 | APX\_Sample | 2015-08-14T16:48:00 | TRUE | MRTU | DEMO | DART |  |  |
| BidsOffers |  |  |  |  |  |  |  |  |
| Date | Hour | Transaction | Location | SinkLocation | MW | Price | ReferenceCode | Attributes |
| (Data rows here) |  |  |  |  |  |  |  |  |
| BilateralSchedule |  |  |  |  |  |  |  |  |
| Date | Hour | Transaction | Location | SinkLocation | CounterParty | MW | ReferenceCode | Attributes |
| (Data rows here) |  |  |  |  |  |  |  |  |
| ResourceParameters |  |  |  |  |  |  |  |  |
| Date | Hour | Parameter | Location | Value | TableValue | ReferenceCode |  |  |
| (Data rows here) |  |  |  |  |  |  |  |  |

File Format Validation:

* A file must contain the “Header” section and all its columns, as well as at least ONE of the data sections (“BidsOffers” and/or “BilateralSchedule” and/or “ResourceParameters”) and the corresponding columns. Files without the Header and at least one data section will be rejected.
* Files may be submitted with all three sections. The order of the sections does not matter.
* A data section header and columns should not be repeated (e.g. a “BidsOffers” section followed by a “BilateralSchedule” section, followed by a second “BidsOffers” section should not be uploaded).

### Header:

|  |  |  |  |
| --- | --- | --- | --- |
| **Column Name** | **Data Type** | **Description** | **Required** |
| Version | *integer* | CSV format version. "1" is the latest | N |
| SourceSystem | *string* | The system of origin | Y |
| CreateDate | *Datetime* | Datetime supplied by user. Not validated. | Y |
| SubmitToISO | *boolean* | A flag that indicates that the bids/offers should be sent automatically to the ISO. ‘False’ means that the bids/offers will need to be reviewed and submitted interactively using the APX MarketSuite®Checkout application. | Y |
| Region | *string* | ISO for which the transactions are being submitted Available values: MRTU, TX, PJM, MISO, ISONE, NYISO, SPP | Y |
| MarketParticipant | *string* | The ISO assigned participant code | Y |
| MarketStage | *string* | The market stage for which the transactions are being submitted. Possible values vary by region. See region-specific sections of this document | Y |

### BidsOffers:

|  |  |  |  |
| --- | --- | --- | --- |
| **Column Name** | **Data Type** | **Description** | **Required** |
| Date | *date* | Trade date for the transaction. Example: 8/20/2015 | Y |
| Hour | *string* | Hour of the day, in “Hour Ending” (1-24). Use “2x” for the duplicate hour on the Daylight Saving Time long day | Y |
| Transaction | *string* | The type of transaction. Possible values vary by region. See region-specific sections of this document. | Y |
| Location | *string* | Name or number of the ISO location. In the case of transactions that are point-to-point, this is the source location. | Y |
| SinkLocation | *string* | Name or number of the ISO sink location. This is only used for point-to-point transactions. | N\* |
| MW | *decimal* | MW value | Y |
| Price | *decimal* | Price for the transaction. If a multi-point bid curve is being submitted, the price will correspond to the MW point in the same row. Please see "multi-point bids" section for more information. | N\* |
| ReferenceCode | *string* | Identifier used in some transactions, often for transmission contract or bid name. See ISO-specific sections for more information | N\* |
| Attributes | *string* | Pipe-separated name/value pairs for attributes specific to the transaction being submitted. See "BidOffer and Trade Attributes" section for more information. Available attributes for a transaction are listed in the region-specific sections of this document. | N\* |

\*required for some transaction types

### BilateralSchedule:

|  |  |  |  |
| --- | --- | --- | --- |
| **Column Name** | **Data Type** | **Description** | **Required** |
| Date | *date* | Trade date for the transaction. Example: 8/20/2015 | Y |
| Hour | *string* | Hour of the day | Y |
| Transaction | *string* | The type of transaction. Possible values vary by region. See region-specific sections of this document. | Y |
| Location | *string* | Name or number of the ISO location. In the case of transactions that are point-to-point, this is the source location. | Y |
| SinkLocation | *string* | Name or number of the ISO sink location. This is only used for point-to-point transactions. | N\* |
| CounterParty | *string* | ISO code for the trade counterparty. | Y |
| MW | *decimal* | MW value | N\* |
| ReferenceCode | *string* | Identifier used in some trades, such as for the ISO contract code or Trade Name. See region-specific sections of this document | N\* |
| Attributes | *string* | Pipe-separated name/value pairs for attributes specific to the transaction being submitted. See "BidOffer and Trade Attributes" section for more information. Available attributes for a transaction are listed in the region-specific sections of this document. | N\* |

\*required for some transactions

### ResourceParameters:

|  |  |  |  |
| --- | --- | --- | --- |
| **Column Name** | **Data Type** | **Description** | **Required** |
| Date | *date* | Trade date for the transaction. Example: 8/20/2015 | Y |
| Hour | *string* | Hour of the day | Y |
| Parameter | *string* | Name of the parameter. Possible values vary by region. See region-specific sections of this document. | Y |
| Location | *string* | Name or number of the ISO location. | Y |
| Value | *string* | Numeric or text value for the parameter | N\* |
| TableValue | *string* | Pipe-separated name/value or X/Y pairs. Used for submitting ramp rate curves and other complex parameters. See “Resource Parameter Table Values” section for more information. | N\* |
| ReferenceCode | *string* | Used for Schedule ID in PJM and ISONE, where many parameters are entered for a discrete "Schedule ID" | N\* |

\*required for some transactions

### Multi-Point Bids

Multi-point bids—such as generator offer curves or virtual bids—are entered with one row per bid point. With the exception of the MW and Price columns, all other data should be the same. There will be no validation to ensure that the multi-point bid set conforms to the particular ISO rules for that transaction, the points will be saved in the MarketSuite® in the order that they appear in the CSV file and sent to the ISO (upon user submittal) for validation.

Example of BidsOffers section for a three point bid transaction for one hour:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| BidsOffers |  |  |  |  |  |  |  |  |
| Date | Hour | Transaction | Location | SinkLocation | MW | Price | ReferenceCode | Attributes |
| 8/20/2015 | 8 | DA Virtual Offer | DLAP\_PGAE-APND |  | 10 | 35 |  |  |
| 8/20/2015 | 8 | DA Virtual Offer | DLAP\_PGAE-APND |  | 20 | 45 |  |  |
| 8/20/2015 | 8 | DA Virtual Offer | DLAP\_PGAE-APND |  | 30 | 55 |  |  |

### BidOffer and Trade Attributes

BidOffer and Trade transactions may have optional or required attributes. Oftentimes these attributes will have default values and the user will only need to supply a value when it differs from the default. The specific attributes available for each transaction, along with the default for that attribute, are listed in the ISO-specific sections. When multiple attributes are submitted for a single transaction, the name/values are pipe-separated (i.e. “|”).

Example of a single attribute for a transaction:

|  |
| --- |
| Attributes |
| DependOnTradeName=APXY Buy |

Example of multiple attributes for a transaction:

|  |
| --- |
| Attributes |
| CurveType=Fixed|LinkedHours=8-23 |

### Resource Parameter Table Values

Some Resource Parameters require a complex data submission, such as for a ramp rate curve, distribution factors, or fuel use break down. The column “TableValue” is intended to support these cases. Since the format of a given table will vary depending on the parameter, the individual formats are given in the ISO-specific sections.

Example of a ramp rate curve TableValue:

|  |
| --- |
| TableValue |
| TwoColumns|1|15|25.99;TwoColumns|2|22|49.99 |

### Cancelling

For cancelling BidsOffers or BilateralSchedules, the transaction to be canceled must be submitted with no values in the MW columns (BidsOffers and BilateralSchedules). If the transaction was scheduled with a ReferenceCode, the same ReferenceCode must be submitted when canceling. When canceling a multi-point bid, only submit one row (not a row for each bid point).

Example of a canceled bid:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| BidsOffers |  |  |  |  |  |  |  |  |
| Date | Hour | Transaction | Location | SinkLocation | MW | Price | ReferenceCode | Attributes |
| 8/20/2015 | 8 | DA Virtual Offer | DLAP\_PGAE-APND |  |  |  |  |  |

Example of a canceled BilateralSchedule, with ReferenceCode:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| BilateralSchedule |  |  |  |  |  |  |  |  |
| Date | Hour | Transaction | Location | SinkLocation | CounterParty | MW | ReferenceCode | Attributes |
| 9/10/2015 | 1 | DA Buy Energy PHY | GEN\_UNIT |  | APX7 |  | Santgo |  |

Resource Parameters cannot be canceled.

### Data Coverage for Create/Update/Cancel

All Create, Update and Cancel operations must be explicit. For example, if a bid is submitted for 24 hours of a day, and then the file is re-submitted without the row for the first hour, the first hour will not be canceled or deleted from MarketSuite®.

## CAISO Market Participant Data

This section will detail all of the transactions that may be submitted in a CSV file in the CAISO region.

### Data Types

For all CAISO numeric values, the precision is 2 decimal places.

### CAISO Day-Ahead BidOffer

The following are valid Transactions when submitting BidOffer data for the CAISO MarketStage “DA”.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Transaction** | **Description** | **Location Type** | **Reference Code** | **Available Attributes** | **Notes** |
| ***DA Gen Energy Market*** | Generator Energy Market Bid. Minimum two, max eleven Price/MW rows | Generator |  |  |  |
| ***DA Gen Spin Market*** | Generator Spin Market Bid. One row with values for Price and MW | Generator |  |  |  |
| ***DA Gen NSpin Market*** | Generator Non-Spin Market Bid. One row with values for Price and MW | Generator |  |  |  |
| ***DA Gen RegUp Market*** | Generator Regulation Up Market Bid. One row with values for Price and MW | Generator |  |  |  |
| ***DA Gen RegDn Market*** | Generator Regulation Down Market Bid. One row with values for Price and MW | Generator |  |  |  |
| ***DA Gen RUC Market*** | Generator RUC Market Bid. One row with values for Price and MW | Generator |  |  |  |
| ***DA Gen Energy Self*** | Generator Energy, Self-Scheduled. MW only. | Generator | ETC/TOR contract ID (optional) |  |  |
| ***DA Gen RUC Obligation*** | Generator RUC Obligation. MW Only. | Generator |  |  |  |
| ***DA Gen RegDn SelfProvision*** | Generator Regulation Down, Self-Provided. MW only. | Generator |  |  |  |
| ***DA Gen RegUp SelfProvision*** | Generator Regulation Up, Self-Provided. MW only. | Generator |  |  |  |
| ***DA Gen NSpin SelfProvision*** | Generator Non-Spin, Self-Provided. MW only. | Generator |  |  |  |
| ***DA Gen Spin SelfProvision*** | Generator Spin, Self-Provided. MW only. | Generator |  |  |  |
| ***DA Import Energy Market*** | Intertie Import Bid for Energy. Minimum two, max eleven Price/MW rows | Intertie |  |  |  |
| ***DA Import NFEnergy Market*** | Intertie Import Bid for Non-Firm Energy. Minimum two, max eleven Price/MW rows | Intertie |  |  |  |
| ***DA Import UntCntg Market*** | Intertie Import Bid for Unit Contingent Energy. Minimum two, max eleven Price/MW rows | Intertie |  |  |  |
| ***DA Import Wheel Market*** | Intertie Import Bid for Wheel. Import/Source of Wheel is scheduled as a separate transaction. Minimum two Price/MW pairs | Intertie |  | "WheelingCounterResource" (Required) - The name of the resource on the other side of the wheel | Not currently supported. Contact your account manager. |
| ***DA Import Spin Market*** | Intertie Import Bid for Spin. One row with values for Price and MW | Intertie |  |  |  |
| ***DA Import NSpin Market*** | Intertie Import Bid for Non-Spin. One row with values for Price and MW | Intertie |  |  |  |
| ***DA Import RUC Market*** | Intertie Import Bid for RUC One row with values for Price and MW | Intertie |  |  |  |
| ***DA Import Energy Self*** | Intertie Import of Energy, Self-Scheduled. MW only. | Intertie | ETC/TOR contract ID (optional) |  | Use this Transaction for Wheels with ETCs/TORs |
| ***DA Import NFEnergy Self*** | Intertie Import of Non-Firm Energy, Self-Scheduled. MW only. | Intertie |  |  |  |
| ***DA Import UntCntg Self*** | Intertie Import of Unit Contingent Energy, Self-Scheduled. MW only. | Intertie | ETC/TOR contract ID (optional) |  |  |
| ***DA Import Wheel Self*** | Intertie Wheeling Import of Energy, Self-Scheduled. MW only. | Intertie | ETC/TOR contract ID (optional) | "WheelingCounterResource" (Optional) - The name of the resource on the other side of the wheel | Not currently supported. Contact your account manager. |
| ***DA Import RUC Obligation*** | Intertie Import of RUC Obligation. MW only. | Intertie |  |  |  |
| ***DA Import NSpin SelfProvision*** | Intertie Import of Non-Spin, Self-Provided. MW only. | Intertie |  |  |  |
| ***DA Import Spin SelfProvision*** | Intertie Import of Spin, Self-Provided. MW only. | Intertie |  |  |  |
| ***DA Export Energy Market*** | Intertie Export Bid for Energy. Minimum two Price/MW rows | Intertie |  |  |  |
| ***DA Export NFEnergy Market*** | Intertie Export Bid for Non-Firm Energy. Minimum two, max eleven Price/MW rows | Intertie |  |  |  |
| ***DA Export UntCntg Market*** | Intertie Export Bid for Unit Contingent Energy. Minimum two, max eleven Price/MW rows | Intertie |  |  |  |
| ***DA Export Wheel Market*** | Intertie Export Bid for Wheel. Import/Source of Wheel is scheduled as a separate transaction. Minimum two, max eleven Price/MW pairs | Intertie |  | "WheelingCounterResource" (Required) - The name of the resource on the other side of the wheel | Not currently supported. Contact your account manager. |
| ***DA Export Energy Self*** | Intertie Export of Energy, Self-Scheduled. MW only. | Intertie | ETC/TOR contract ID (optional) |  | Use this Transaction for Wheels with ETCs/TORs |
| ***DA Export NFEnergy Self*** | Intertie Export of Non-Firm Energy, Self-Scheduled. MW only. | Intertie |  |  |  |
| ***DA Export UntCntg Self*** | Intertie Export of Unit Contingent Energy, Self-Scheduled. MW only. | Intertie | ETC/TOR contract ID (optional) |  |  |
| ***DA Export Wheel Self*** | Intertie Wheeling Export of Energy, Self-Scheduled. MW only. | Intertie | ETC/TOR contract ID (optional) | "WheelingCounterResource" (Optional) - The name of the resource on the other side of the wheel | Not currently supported. Contact your account manager. |
| ***DA Load Energy Market*** | Load Energy Market Bid. Minimum two, max eleven Price/MW pairs | LAPs |  |  |  |
| ***DA Load Energy Self*** | Load Energy, Self-Scheduled. MW only. | LAPs | ETC/TOR contract ID (optional) |  |  |
| ***DA Virtual Bid*** | Virtual Bid (Convergence Bid - Buy) Energy Markey Offer. Minimum two, max eleven Price/MW pairs | All Pnodes |  |  |  |
| ***DA Virtual Offer*** | Virtual Offer (Convergence Bid - Sell) Energy Markey Offer. Minimum two, max eleven Price/MW pairs | All Pnodes |  |  |  |

### CAISO Real-Time BidOffer

The following are valid Transactions when submitting BidOffer data for the CAISO MarketStage “RT”.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Transaction** | **Description** | **Location Type** | **Reference Code** | **Available Attributes** | **Notes** |
| ***RT Gen Energy Market*** | Generator Energy Market Bid. Minimum two, max eleven Price/MW rows | Generator |  |  |  |
| ***RT Gen Spin Market*** | Generator Spin Market Bid. One row with values for Price and MW | Generator |  |  |  |
| ***RT Gen NSpin Market*** | Generator Non-Spin Market Bid. One row with values for Price and MW | Generator |  |  |  |
| ***RT Gen RegUp Market*** | Generator Regulation Up Market Bid. One row with values for Price and MW | Generator |  |  |  |
| ***RT Gen RegDn Market*** | Generator Regulation Down Market Bid. One row with values for Price and MW | Generator |  |  |  |
| ***RT Gen Energy Self*** | Generator Energy, Self-Scheduled. MW only. | Generator | ETC/TOR contract ID (optional) |  |  |
| ***RT Gen RegDn SelfProvision*** | Generator Regulation Down, Self-Provided. MW only. | Generator |  |  |  |
| ***RT Gen RegUp SelfProvision*** | Generator Regulation Up, Self-Provided. MW only. | Generator |  |  |  |
| ***RT Gen NSpin SelfProvision*** | Generator Non-Spin, Self-Provided. MW only. | Generator |  |  |  |
| ***RT Gen Spin SelfProvision*** | Generator Spin, Self-Provided. MW only. | Generator |  |  |  |
| ***RT Import Energy Market*** | Intertie Import Bid for Energy. Minimum two, max eleven Price/MW rows | Intertie |  |  |  |
| ***RT Import Dynamic Market*** | Intertie Import Bid for Energy on a Dynamic Intertie. Minimum two, max eleven Price/MW rows | Dynamic Intertie |  |  |  |
| ***RT Import NFEnergy Market*** | Intertie Import Bid for Non-Firm Energy. Minimum two, max eleven Price/MW rows | Intertie |  |  |  |
| ***RT Import UntCntg Market*** | Intertie Import Bid for Unit Contingent Energy. Minimum two, max eleven Price/MW rows | Intertie |  |  |  |
| ***RT Import Wheel Market*** | Intertie Import Bid for Wheel. Import/Source of Wheel is scheduled as a separate transaction. Minimum two, max eleven Price/MW pairs | Intertie |  | "WheelingCounterResource" (Required) - The name of the resource on the other side of the wheel | Not currently supported. Contact your account manager. |
| ***RT Import Spin Market*** | Intertie Import Bid for Spin. One row with values for Price and MW | Intertie |  |  |  |
| ***RT Import NSpin Market*** | Intertie Import Bid for Non-Spin. One row with values for Price and MW | Intertie |  |  |  |
| ***RT Import Energy Self*** | Intertie Import of Energy, Self-Scheduled. MW only. | Intertie | ETC/TOR contract ID (optional) |  | Use this Transaction for Wheels with ETCs/TORs |
| ***RT Import NFEnergy Self*** | Intertie Import of Non-Firm Energy, Self-Scheduled. MW only. | Intertie |  |  |  |
| ***RT Import UntCntg Self*** | Intertie Import of Unit Contingent Energy, Self-Scheduled. MW only. | Intertie | ETC/TOR contract ID (optional) |  |  |
| ***RT Import Wheel Self*** | Intertie Wheeling Import of Energy, Self-Scheduled. MW only. | Intertie | ETC/TOR contract ID (optional) | "WheelingCounterResource" (Optional) - The name of the resource on the other side of the wheel | Not currently supported. Contact your account manager. |
| ***RT Import NSpin SelfProvision*** | Intertie Import of Non-Spin, Self-Provided. MW only. | Intertie |  |  |  |
| ***RT Import Spin SelfProvision*** | Intertie Import of Spin, Self-Provided. MW only. | Intertie |  |  |  |
| ***RT Export Energy Market*** | Intertie Export Bid for Energy. Minimum two, max eleven Price/MW rows | Intertie |  |  |  |
| ***RT Export NFEnergy Market*** | Intertie Export Bid for Non-Firm Energy. Minimum two, max eleven Price/MW rows | Intertie |  |  |  |
| ***RT Export Wheel Market*** | Intertie Export Bid for Wheel. Import/Source of Wheel is scheduled as a separate transaction. Minimum two Price/MW pairs | Intertie |  | "WheelingCounterResource" (Required) - The name of the resource on the other side of the wheel | Not currently supported. Contact your account manager. |
| ***RT Export UntCntg Market*** | Intertie Export Bid for Unit Contingent Energy. Minimum two Price/MW rows | Intertie |  |  |  |
| ***RT Export Dynamic Market*** | Intertie Export Bid for Energy on a Dynamic Intertie. Minimum two, max eleven Price/MW rows | Dynamic Intertie |  |  |  |
| ***RT Export Energy Self*** | Intertie Export of Energy, Self-Scheduled. MW only. | Intertie | ETC/TOR contract ID (optional) |  | Use this Transaction for Wheels with ETCs/TORs |
| ***RT Export NFEnergy Self*** | Intertie Export of Non-Firm Energy, Self-Scheduled. MW only. | Intertie |  |  |  |
| ***RT Export UntCntg Self*** | Intertie Export of Unit Contingent Energy, Self-Scheduled. MW only. | Intertie | ETC/TOR contract ID (optional) |  |  |
| ***RT Export Wheel Self*** | Intertie Wheeling Export of Energy, Self-Scheduled. MW only. | Intertie | ETC/TOR contract ID (optional) | "WheelingCounterResource" (Optional) - The name of the resource on the other side of the wheel | Not currently supported. Contact your account manager. |

### CAISO Day-Ahead BilateralSchedules

The following are valid Transactions when submitting BilateralSchedules data for the CAISO MarketStage “DA”.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Transaction** | **Description** | **Location Type** | **Reference Code** | **Available Attributes** | **Notes** |
| ***DA Buy Energy APN*** | Purchase of Energy at an Aggregated Pricing Node | APNodes |  |  |  |
| ***DA Sell Energy APN*** | Sale of Energy at an Aggregated Pricing Node | APNodes |  |  |  |
| ***DA Buy Energy PHY*** | Purchase of Energy at a Physical Resource | Generator | Trade Name (Required) | "DependOnTradeName" (Optional, string 120) - CAISO Depend on Name. Will default to Location if not provided. |  |
| ***DA Sell Energy PHY*** | Sale of Energy at a Physical Resource | Generator | Trade Name (Required) | "DependOnTradeName" (Optional, string 120) - CAISO Depend on Name. Will default to Location if not provided. |  |

### CAISO Real-Time BilateralSchedules

The following are valid Transactions when submitting BilateralSchedules data for the CAISO MarketStage “RT”.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Transaction** | **Description** | **Location Type** | **Reference Code** | **Available**  **Attributes** | **Notes** |
| ***RT Buy Energy APN*** | Purchase of Energy at an Aggregated Pricing Node | APNodes |  |  |  |
| ***RT Sell Energy APN*** | Sale of Energy at an Aggregated Pricing Node | APNodes |  |  |  |
| ***RT Buy NSpin AST*** | Purchase of Non-Spin | "MRTU" |  |  | Location is “MRTU” |
| ***RT Buy RegDn AST*** | Purchase of Spin | "MRTU" |  |  | Location is “MRTU” |
| ***RT Buy RegUp AST*** | Purchase of Regulation Up | "MRTU" |  |  | Location is “MRTU” |
| ***RT Buy Spin AST*** | Purchase of Regulation Down | "MRTU" |  |  | Location is “MRTU” |
| ***RT Sell Spin AST*** | Sale of Non-Spin | "MRTU" |  |  | Location is “MRTU” |
| ***RT Sell RegUp AST*** | Sale of Spin | "MRTU" |  |  | Location is “MRTU” |
| ***RT Sell RegDn AST*** | Sale of Regulation Up | "MRTU" |  |  | Location is “MRTU” |
| ***RT Sell NSpin AST*** | Sale of Regulation Down | "MRTU" |  |  | Location is “MRTU” |
| ***RT Buy IFMU*** | Purchase of IFM Uplift Obligation | "MRTU" |  |  | Location is “MRTU” |
| ***RT Sell IFMU*** | Sale of IFM Uplift Obligation | "MRTU" |  |  | Location is “MRTU” |
| ***RT Buy Energy PHY*** | Purchase of Energy at a Physical Resource | Generator | Trade Name (Required) | "DependOnTradeName" (Optional, string 120) - CAISO Depend on Name. Will default to Location if not provided. |  |
| ***RT Sell Energy PHY*** | Sale of Energy at a Physical Resource | Generator | Trade Name (Required) | "DependOnTradeName" (Optional, string 120) - CAISO Depend on Name. Will default to Location if not provided. |  |

### CAISO ResourceParameters (DA and RT)

In CAISO, Resource Parameters are submitted with the RawBidSet in DA and RT. The APX MarketSuite will use the same parameter value for Day-Ahead Bids and (if applicable) Real-Tie Bids.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter Name** | **Description** | **Location Type** | **ReferenceCode** | **TableValue** | **Notes** |
| ***Op Reserve Ramp Rate*** | Operating Reserve Ramp Rate, by Day. | Generator or Intertie |  |  | Not yet supported for Interties |
| ***OperationalRampRate*** | Operational Ramp Rate, by Day. | Generator or Intertie |  |  | Not yet supported |
| ***RegulatingRampRate*** | Regulation Ramp Rate, by Day. | Generator |  |  |  |
| ***EnergyLimitMax*** | Energy Limit Max, by Day. | Generator |  |  |  |
| ***EnergyLimitMin*** | Energy Limit Min, by Day. | Generator |  |  |  |
| ***ContingencyDispatchFlag*** | Contingency Dispatch Flag ("Y" or "N"), by Day. | Generator or Intertie |  |  | Not yet supported for Interties |
| ***MinHourlyBlock*** | Minimum Hourly Block of consecutive awarded intervals (1-25), by Day. Used in DAM only. | Intertie |  |  | Not yet supported |
| ***DispatchOption*** | Dispatch Option. ("ONCE", "HOURLY", "15MIN" or "DYNAMIC"), by hour. Used in RTM only. | Generator or Dynamic Intertie |  |  | Not yet supported for Interties |
| ***BidCapacityLimit*** | Capacity Limit used in market optimization, by hour. | Generator |  |  |  |
| ***SecondaryTie*** | Secondary Tie for Intertie Transaction (EIM transactions), by Day. | Intertie |  |  | Not yet supported |
| ***DistributionFactors*** | Distribution Factors for generator sub-units, by hour. | Generator |  | TBD | Not yet supported |
| ***OperationalRampRate*** | Operational Ramp Rate, by Day | Generator |  | TBD | Not yet supported |
| ***StartupCostCurve*** | Startup Cost Curve, by Day | Generator |  | TBD | Not yet supported |
| ***StartupTimeCurve*** | Startup Time Curve, by Day | Generator |  | TBD | Not yet supported |

## ERCOT Market Participant Data

This section will detail all of the transactions that may be submitted in a CSV file in the ERCOT (TX) region.

### Data Types

For all TX MW values, the maximum precision is one decimal place. For all dollar values, the maximum precision is two decimal places.

### ERCOT Day-Ahead/Real-Time (DART) BidOffer

The following are valid Transactions when submitting BidOffer data for the ERCOT MarketStage “DART”.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Transaction** | **Description** | **Location Type** | **Reference Code** | **Available Attributes** | **Notes** |
| ***DART Gen Three-Part Offer*** | Generator Three-Part Offer. | Generator |  |  | Not yet Supported |
| ***DART Gen OffUp AS Market*** | Generator OffUpAS Bid (Non-Spin) | Generator |  |  | Not yet Supported |
| ***DART Gen OnUp AS Market|NSRS***  ***DART Gen OnUp AS Market|RRS***  ***DART Gen OnUp AS Market|URS*** | Generator OnUpAS Bid (Regulation Up, Spin, Non-Spin) | Generator | “LinkedOfferID”  (Required: Used to link different AS Product prices to a single bid. Ex: LinkedOfferID=1. Up to 5 LinkedOfferIDs may be used) | "CurveType" (required: Block,Fixed)  "LinkedHours" (optional: start hour+hypen+end hour. Ex: 7-23) | Per ERCOT rules, three products are submitted in one bid. To cancel, you may provide NULL mw/price for all previously submitted rows, or for just one previously submitted row per day/hour/ location/LinkedOfferID combo |
| ***DART Gen RegDn Market*** | Generator Regulation Down market bid. One row with values for Price and MW | Generator |  |  | Not yet Supported |
| ***DART Gen Output Schedule*** | Generator Output Schedule, for RTM. Hourly value to be applied to all 5-minute intervals. MW only. | Generator |  |  | ERCOT allows Output Schedules at a 5-minute level. Here, a single hourly value will be applied to all 5-minute intervals within the hour. |
| ***DART Gen NSpin Self*** | Generator Non-Spin Self Schedule. MW only. | Generator |  |  |  |
| ***DART Gen RegDn Self*** | Generator Regulation Down Self Schedule. MW only. | Generator |  |  |  |
| ***DART Gen Spin Self*** | Generator Spin Self Schedule. MW only. | Generator |  |  |  |
| ***DART Gen RegUp Self*** | Generator Regulation Up Self Schedule. MW only. | Generator |  |  |  |
| ***DART Gen NSpin SelfProvision*** | Self-Arranged Ancillary Service - Generator Non-Spin. MW only. | "ERCOT" |  |  | Location is "ERCOT" |
| ***DART Gen RegDn SelfProvision*** | Self-Arranged Ancillary Service - Regulation Down. MW only. | "ERCOT" |  |  | Location is "ERCOT" |
| ***DART Gen RegUp SelfProvision*** | Self-Arranged Ancillary Service - Regulation Up. MW only. | "ERCOT" |  |  | Location is "ERCOT" |
| ***DART Gen Spin SelfProvision*** | Self-Arranged Ancillary Service - Generator Spin. MW only. | "ERCOT" |  |  | Location is "ERCOT" |
| ***DART Load Resource Spin SelfProvision*** | Self-Arranged Ancillary Service - LaaR Spin. MW only. | "ERCOT" |  |  | Location is "ERCOT" |
| ***DART Load Resource CLR Spin SelfProvision*** | Self-Arranged Ancillary Service - Controllable Load Resource Spin. MW only. | "ERCOT" |  |  | Location is "ERCOT" |
| ***DART Load Resource OnUp AS Market|NSRS***  ***DART Load Resource OnUp AS Market|URS***  ***DART Load Resource OnUp AS Market|RRS*** | LaaR OnUpAS Bid (Regulation Up, Spin, Non-Spin) | LaaR | “LinkedOfferID”  (Required: Used to link different AS Product prices to a single bid. Ex: LinkedOfferID=1. Up to 5 LinkedOfferIDs may be used) | "CurveType" (required: Block,Fixed)  "LinkedHours" (optional: start hour+hypen+end hour. Ex: 7-23) | Per ERCOT rules, three products are submitted in one bid. To cancel, you may provide NULL mw/price for all previously submitted rows, or for just one previously submitted row per day/hour/ location/LinkedOfferID combo |
| ***DART Load Resource RegDn Market*** | LaaR Regulation Down market bid. One row with values for Price and MW | LaaR |  |  | Not yet Supported |
| ***DART Load Resource RegDn Self*** | LaaR Regulation Down Self Schedule. MW only. | LaaR |  |  |  |
| ***DART Load Resource Spin Self*** | LaaR Spin Self Schedule. MW only. | LaaR |  |  |  |
| ***DART Load Resource NSpin Self*** | LaaR Non-Spin Self Schedule. MW only. | LaaR |  |  |  |
| ***DART Load Resource RegUp Self*** | LaaR Regulation Up Self Schedule. MW only. | LaaR |  |  |  |
| ***DART PTP Obligation Bid*** | PTP Obligation Bid | All Pnodes | ERCOT Bid Name (required) | "LinkedHours" (optional: start hour+hypen+end hour. Ex: 7-23) | SinkLocation required. |
| ***DART SourceSink Self Schedule*** | SourceSink "SelfSchedule" | All Pnodes |  |  | SinkLocation required. |
| ***DART Virtual Bid*** | DAM Virtual Bid | All Pnodes | ERCOT Bid Name (required) | "CurveType" (optional: Slope,Block,Fixed. Default Slope) "LinkedHours" (optional: start hour+hypen+end hour. Ex: 7-23) |  |
| ***DART Virtual Offer*** | DAM Virtual Offer | All Pnodes | ERCOT Bid Name (required) | "CurveType" (optional: Slope,Block,Fixed. Default Slope) "LinkedHours" (optional: start hour+hypen+end hour. Ex: 7-23) |  |

### ERCOT SASM BidOffer

After the Day-Ahead Market has closed, ERCOT may run Supplementary Ancillary Service Markets several times for a given trade date. There are certain transactions that can be submitted in these markets. The APX MarketSuite has nine Designated Market Stages for SASMs: SASM, SASM1, SASM2….SASM9. The following transactions may be submitted in any of those SASMs.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Transaction** | **Description** | **Location Type** | **Reference Code** | **Available Attributes** | **Notes** |
| ***[SASM] Gen NSpin SelfProvision*** | Self-Arranged Ancillary Service - Generator Non-Spin. MW only. | "ERCOT" |  |  | [SASM] in Transaction name to be replaced with "SASM2", "SASM3", etc. Location is "ERCOT" |
| ***[SASM] Gen RegDn SelfProvision*** | Self-Arranged Ancillary Service - Regulation Down. MW only. | "ERCOT" |  |  | [SASM] in Transaction name to be replaced with "SASM2", "SASM3", etc. Location is "ERCOT" |
| ***[SASM] Gen RegUp SelfProvision*** | Self-Arranged Ancillary Service - Regulation Up. MW only. | "ERCOT" |  |  | [SASM] in Transaction name to be replaced with "SASM2", "SASM3", etc. Location is "ERCOT" |
| ***[SASM] Gen Spin SelfProvision*** | Self-Arranged Ancillary Service - Generator Spin. MW only. | "ERCOT" |  |  | [SASM] in Transaction name to be replaced with "SASM2", "SASM3", etc. Location is "ERCOT" |
| ***[SASM] Load Resource Spin SelfProvision*** | Self-Arranged Ancillary Service - LaaR Spin. MW only. | "ERCOT" |  |  | [SASM] in Transaction name to be replaced with "SASM2", "SASM3", etc. Location is "ERCOT" |
| ***[SASM] Load Resource CLR Spin SelfProvision*** | Self-Arranged Ancillary Service - Controllable Load Resource Spin. MW only. | "ERCOT" |  |  | [SASM] in Transaction name to be replaced with "SASM2", "SASM3", etc. Location is "ERCOT" |

### ERCOT Day-Ahead/Real-Time (DART) BilateralSchedules

The following are valid Transactions when submitting BilateralSchedules for the ERCOT MarketStage “DART”.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Transaction** | **Description** | **Location Type** | **Reference Code** | **Available Attributes** | **Notes** |
| ***DART Buy Energy  DART Sell Energy*** | Purchase of Energy. Hourly value to be applied to all 15-minute intervals. | All Pnodes |  |  | ERCOT allows Energy Trades at a 15-minute level. Here, a single hourly value will be applied to all 15-minute intervals within the hour. |
| ***DART Buy NSpin AS DART Sell NSpin AS*** | Purchase/sale of Non-Spin | "ERCOT" |  |  | Location is "ERCOT" |
| ***DART Buy RegDn AS DART Sell RegDn AS*** | Purchase/sale of Regulation Down | "ERCOT" |  |  | Location is "ERCOT" |
| ***DART Buy RegUp AS DART Sell RegUp AS*** | Purchase/sale of Regulation Up | "ERCOT" |  |  | Location is "ERCOT" |
| ***DART Buy Capacity DART Sell Capacity*** | Purchase/sale of Capacity | "ERCOT" |  |  | Location is "ERCOT" |
| ***DART Buy Spin CntrlLoad DART Sell Spin CntrlLoad*** | Purchase/sale of Spin from a controllable load resource | "ERCOT" |  |  | Location is "ERCOT" |
| ***DART Buy Spin Gen DART Sell Spin Gen*** | Purchase/sale of Generator Spin | "ERCOT" |  |  | Location is "ERCOT" |
| ***DART Buy Spin Load DART Sell Spin Load*** | Purchase/sale of LaaR Spin | "ERCOT" |  |  | Location is "ERCOT" |

### ERCOT Day-Ahead/Real-Time (DART) ResourceParameters

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter Name** | **Description** | **Location Type** | **ReferenceCode** | **TableValue** | **Notes** |
| ***HEL*** | Resource High Energy Limit, MW. | Generator and LaaR |  |  | COP Template |
| ***HSL*** | Resource High Sustainability Limit, MW. | Generator and LaaR |  |  | COP Template |
| ***LEL*** | Resource Low Energy Limit, MW. | Generator and LaaR |  |  | COP Template |
| ***LSL*** | Resource Low Sustainability Limit, MW. | Generator and LaaR |  |  | COP Template |
| ***Status*** | Resource status for COP | Generator and LaaR |  |  | COP Template |
| ***EOCFip*** | Energy Offer Curve Fuel Index Percentage. (0-100, whole numbers) | Generator |  |  | TPO Template. Not yet supported |
| ***EOCFop*** | Energy Offer Curve Fuel Oil Percentage. (0-100, whole numbers) | Generator |  |  | TPO Template. Not yet supported |
| ***MinEnergyCost*** | Min. Energy ($/MWh). | Generator |  |  | TPO Template. Not yet supported |
| ***StartupCold*** | Cold Startup Cost, $. | Generator |  |  | TPO Template. Not yet supported |
| ***StartupHot*** | Hot Startup Cost, $. | Generator |  |  | TPO Template. Not yet supported |
| ***StartupIntermediate*** | Intermediate Startup Cost, $. | Generator |  |  | TPO Template. Not yet supported |
| ***MinEnergyFIP*** | Min Energy Fuel Index Percentage. (0-100, whole numbers) | Generator |  |  | TPO Template. Not yet supported |
| ***MinEnergyFOP*** | Min Energy Fuel Oil Percentage. (0-100, whole numbers) | Generator |  |  | TPO Template. Not yet supported |

# CSV File Format – PJM, SPP, MISO, ISONE, and NYISO

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Header |  |  |  |  |  |  |  |  |  |
| Version | SourceSystem | CreateDate | SubmitToISO | Region |  |  |  |  |  |
| 1 | APX\_Sample | 2018-12-12 | FALSE | SPP |  |  |  |  |  |
| BidsOffers |  |  |  |  |  |  |  |  |  |
| Participant | Date | Hour | Transaction | Location | SinkLocation | MW | Price | ReferenceCode | Attributes |
| [Data rows go here] |  |  |  |  |  |  |  |  |  |
| ResourceParameters |  |  |  |  |  |  |  |  |  |
| Participant | Date | Hour | Parameter | Location | Value | TableValueX | TableValueY | TableValueZ | ReferenceCode |
| [Data rows go here] |  |  |  |  |  |  |  |  |  |
| BilateralSchedules |  |  |  |  |  |  |  |  |  |
| Participant | Date | Hour | Transaction | Location | SinkLocation | CounterParty | MW | ReferenceCode | Attributes |
| [Data rows go here] |  |  |  |  |  |  |  |  |  |

File Format Validations:

* A file must contain the “Header” section and all its columns (case-sensitive). Files without the Header section will be rejected.
* The file must choose between the following content options:
  + One or both of the “BidsOffers” and/or “ResourceParameters” sections. If both are provided they must be in that order. The sections should not be repeated—all BidOffer rows should be under one BidsOffers section.
  + BilateralSchedules
* For any/all data section submitted, all column names are required (case-sensitive), in the order shown above, even if there is no data for any row.
* These format validations will result in the entire file being rejected.

File Scope:

* **Multiple Participant Submissions:** BidOffer and Resource Parameter data for multiple participants may be submitted together in the same file, so long as the user submitting the data is authorized for each of the participants.
* **Multi-Day BidOffer Submissions**: Users may submit up to seven days at a time.
  + If Submit to ISO = True, we will submit all open ISO intervals and save the rest if the data into MarketSuite. If set to False we will save everything (assuming the MarketSuite windows are open – i.e. intervals in the past will be rejected).
* **Common Validations**:
  + If all accounts are mapped to user login the file should succeed.
  + If only a subset of accounts are mapped to users login APX will process those accounts and reject the rest
  + If file contains trade dates beyond system variable APX will process those for open dates and reject the rest
  + If the number of days submitted via CSV are less than or equal to the configured system variable (31 days):
    - AND does not contain days for closed MarketSuite time windows
      * AND SubmitToISO = True, then
        + Submit all data for time windows open at the ISO and Save the remaining intervals
      * AND SubmitToISO = False, then
        + Save all data
    - AND contains days for closed MarketSuite time windows
      * AND SubmitToISO = True, then
        + Submit all data for time windows open at the ISO and Save for the remaining intervals.
        + Reject intervals associated with closed time windows
      * AND SubmitToISO = False, then
        + Save all data associated with open time windows
        + Reject Intervals associated with closed time windows
* Users should exercise caution when submitting near a market deadline. APX will process the CSV file, but cannot guarantee the ISO data processing time. For this reason, APX recommends that, when submitting near a market deadline, users submit only the immediate trade date in question.
* Data submitted in advance of ISO scheduling windows will require user submission when the ISO scheduling window opens. APX does not queue submissions for scheduling windows that are not yet open at the ISO (i.e. data will only be saved in the APX MarketSuite).

## File Content

### Header:

|  |  |  |  |
| --- | --- | --- | --- |
| **Column Name** | **Data Type** | **Description** | **Required** |
| Version | *integer* | CSV format version. "1" is the latest | N |
| SourceSystem | *string* | The system of origin | N |
| CreateDate | *Datetime* | Datetime supplied by user. Not validated. | N |
| SubmitToISO | *True/False* | A flag that indicates that the bids/offers should be sent automatically to the ISO. ‘False’ means that the bids/offers will need to be reviewed and submitted interactively using the APX MarketSuite®Checkout application. | Y |
| Region | *string* | ISO for which the transactions are being submitted Available values: MRTU, TX, PJM, MISO, ISONE, NYISO, SPP | Y |

### BidsOffers:

|  |  |  |  |
| --- | --- | --- | --- |
| **Column Name** | **Data Type** | **Description** | **Required** |
| Participant | *string* | The participant for which the transaction is being submitted | Y |
| Date | *date* | Trade date for the transaction in format MM/DD/YYYY. Example: 8/20/2015 | Y |
| Hour | *string* | Hour of the day, in “Hour Ending” (1-24). Use “2x” for the duplicate hour on the Daylight Saving Time long day | Y |
| Transaction | *string* | The type of transaction. Possible values vary by region. See region-specific sections of this document. | Y |
| Location | *string* | Name or number of the ISO location. In the case of transactions that are point-to-point, this is the source location. | Y |
| SinkLocation | *string* | Name or number of the ISO sink location. This is only used for point-to-point transactions. (not currently used for SPP) | N\* |
| MW | *decimal* | MW value. To cancel a previously submitted transaction, this field should be left blank | N |
| Price | *decimal* | Price for the transaction. If a multi-point bid curve is being submitted, the price will correspond to the MW point in the same row. Please see "multi-point bids" section for more information. | N\* |
| ReferenceCode | *string* | Identifier used in some transactions, often for transmission contract or bid name. See ISO-specific sections for more information. (not currently used for SPP) | N\* |
| Attributes | *string* | Pipe-separated name/value pairs for attributes specific to the transaction being submitted. Available attributes for a transaction are listed in the region-specific sections of this document. | N\* |

\*May be required for some transaction types

### ResourceParameters:

|  |  |  |  |
| --- | --- | --- | --- |
| **Column Name** | **Data Type** | **Description** | **Required** |
| Participant | *string* | The participant for which the transaction is being submitted | Y |
| Date | *date* | Trade date for the transaction. Example: 8/20/2015 | Y |
| Hour | *string* | Hour of the day | Y |
| Parameter | *string* | Name of the parameter. Possible values vary by region. See region-specific sections of this document. | Y |
| Location | *string* | Name or number of the ISO location. | Y |
| Value | *string* | Numeric or text value for the parameter | N\* |
| TableValueX | *string* | Pipe-separated name/value or X/Y(/Z) sets. Used for submitting ramp rate curves and other complex parameters. (not currently used for SPP) | N\* |
| TableValueY | *string* | Pipe-separated name/value or X/Y(/Z) sets. Used for submitting ramp rate curves and other complex parameters. (not currently used for SPP) | N\* |
| TableValueZ | *string* | Pipe-separated name/value or X/Y/Z sets. Used for submitting ramp rate curves and other complex parameters. (not currently used for SPP) | N\* |
| ReferenceCode | *string* | Used for Schedule ID in PJM and ISONE, where many parameters are entered for a discrete "Schedule ID" (not currently used for SPP) | N\* |

\*required for some transactions

### BilateralSchedules:

|  |  |  |  |
| --- | --- | --- | --- |
| **Column Name** | **Data Type** | **Description** | **Required** |
| Participant | *string* | The participant for which the bilateral schedule is being submitted | Y |
| Date | *date* | Trade date for the bilateral schedule. Example: 8/20/2019 | Y |
| Hour | *string* | Hour of the day | Y |
| Transaction | *string* | Name of the bilateral schedule type. Possible values vary by region. See region-specific sections of this document. | Y |
| Location | *string* | Name or number of the ISO location. | Y |
| SinkLocation | *string* | For bilateral schedules that have a source and a sink, name or number of the ISO Sink location. | N\* |
| CounterParty | *string* | Not required for these regions. | N |
| MW | *decimal* | MW value of the transaction | Y (leave blank to cancel) |
| ReferenceCode | *string* | ISO-issued code for the bilateral schedule contract. | Y |
| Attributes | *string* | Pipe-separated name/value pairs for attributes specific to the bilateral schedule being submitted. Available attributes for a transaction are listed in the region-specific sections of this document. | N |

\*required for some transactions

### Multi-Point Bids

Multi-point bids—such as generator offer curves or virtual bids—are entered with one row per bid point. With the exception of the MW and Price columns, all other data must be the same. There will be no validation to ensure that the multi-point bid set conforms to the particular ISO rules for that transaction, the points will be saved in the MarketSuiteTM in the order that they appear in the CSV file and sent to the ISO (upon user submittal) for validation.

Example of BidsOffers section for a three-point bid transaction for one hour:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| BidsOffers |  |  |  |  |  |  |  |  |  |
| Participant | Date | Hour | Transaction | Location | SinkLocation | MW | Price | ReferenceCode | Attributes |
| DEMO | 1/20/2019 | 8 | DA Virtual Bid | GRDA\_HUB |  | 10 | 35 |  | CurveType=Block |
| DEMO | 1/20/2019 | 8 | DA Virtual Bid | GRDA\_HUB |  | 20 | 30 |  | CurveType=Block |
| DEMO | 1/20/2019 | 8 | DA Virtual Bid | GRDA\_HUB |  | 30 | 25 |  | CurveType=Block |

### BidOffer Attributes

BidOffer transactions may have optional or required attributes. These attributes may have default values and the user will only need to supply a value when it differs from the default. The specific attributes available for each transaction, along with the default for that attribute, are listed in the ISO-specific sections. When multiple attributes are submitted for a single transaction, the name/values are pipe-separated (i.e. “|”).

Example of a single attribute for a transaction:

|  |
| --- |
| Attributes |
| DependOnTradeName=APXY Buy |

Example of multiple attributes for a transaction:

|  |
| --- |
| Attributes |
| CurveType=Fixed|LinkedHours=8-23 |

### Cancelling

For cancelling BidsOffers, the transaction to be canceled must be submitted with no values in the MW and price columns. When canceling a multi-point bid, only submit one row (not a row for each bid point).

Example of a canceled bid:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| BidsOffers |  |  |  |  |  |  |  |  |  |
| Participant | Date | Hour | Transaction | Location | SinkLocation | MW | Price | ReferenceCode | Attributes |
| DEMO | 1/20/2019 | 8 | DA Virtual Bid | GRDA\_HUB |  |  |  |  | CurveType=Block |

Resource Parameters cannot be canceled, but in some cases they may be nullified (i.e. replacing a value with NULL).

### Data Coverage for Create/Update/Cancel

All Create, Update and Cancel operations must be explicit. For example, if a bid is submitted for 24 hours of a day, and then the file is re-submitted without the row for the first hour, the first hour will not be canceled or deleted from MarketSuite®.

## PJM Market Participant Data

This section will detail all of the transactions that may be submitted in a CSV file in the PJM region, as well as special validations for PJM.

### PJM BidOffer

The following Transactions are supported when submitting BidOffer data for PJM. If you would like to schedule a transaction that is not listed below, please contact your APX Account Manager.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Transaction** | **Description** | **Location Type** | **Reference Code** | **Available Attributes** | **Notes** |
| ***DA Gen Energy Market*** | Generator Energy Market Bid for DAM. Minimum one, max ten Price/MW rows | Generator | Numeric PJM Schedule ID, e.g. ‘1’ or ‘99’ - required | Required: ‘CurveType’ (Block or Slope) |  |
| ***RT Gen Energy Market*** | Generator Energy Market Bid for RTBM. Minimum one, max ten Price/MW rows | Generator | Numeric PJM Schedule ID, e.g. ‘1’ or ‘99’ - required | Required: ‘CurveType’ (Block or Slope) |  |
| ***DA Decrement Bid*** | DAM Virtual Bid | Settlement Point | N/A | Required: ‘CurveType’ (Block or Slope) |  |
| ***DA Increment Offer*** | DAM Virtual Offer | Settlement Point | N/A | Required: ‘CurveType’ (Block or Slope) |  |
| ***DA Fixed Demand Bid*** | Load Energy value in the DAM. | Load Zone | N/A |  |  |
| ***DA Price Sensitive Demand Bid*** | Load Energy Market Bid for DAM. Minimum one, max ten Price/MW rows | Load Zone | N/A | Required: ‘CurveType’ (Block or Slope) |  |

### PJM ResourceParameters

The following parameters are supported in PJM. These are all part of the ‘Energy Operating Limits’ template.

Notes:

* Only submit the parameters that you wish to change. The APX MarketSuite® will take existing value for non-submitted parameters and use those for the submission to PJM. The APX MarketSuite® regularly pulls down data from the PJM portal, so should have the latest info.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter Name** | **Data Type/format** | **Description** | **Location Type** | **Notes** |
| ***Commitment Status*** | String | Commitment status of the generator. Available values:   * Unavailable * Economic * Emergency * MustRun | Generator |  |
| ***Economic Max MW*** | Decimal | Optional element specifying the economic maximum limit for the hourly interval. | Generator |  |
| ***Economic Min MW*** | Decimal | Optional element specifying the economic minimum limit for the hourly interval. | Generator |  |
| ***Emergency Max MW*** | Decimal | Optional element specifying the emergency maximum limit for the hourly interval. | Generator |  |
| ***Emergency Min MW*** | Decimal | Optional element specifying the emergency minimum limit for the hourly interval. | Generator |  |
| ***Fixed Gen*** | boolean | Optional element specifying the fixed generation indicator for the unit for this hour. Must be ‘true’ or ‘false’ | Generator |  |

### PJM BilateralSchedules

The following parameters are supported in PJM. Note that APX does not support scheduling for monthly capacity trades.

Notes:

* **A ReferenceCode is required for all PJM bilaterals.**
* APX does not support scheduling monthly capacity trades
* APX regularly pulls down the bilateral contracts from PJM InSchedule. A contract must be saved in the MarketSuite in order to submit a bilateral schedule.
* MarketSuite does not support the upload of trade contracts.

|  |  |  |
| --- | --- | --- |
| **Transaction Name** | **Description** | **Notes** |
| ***DA Sell Energy IBT***  ***DA Buy Energy IBT*** | Day-Ahead Market Internal Bilateral Trade. |  |
| ***RT Sell Energy IBT***  ***RT Buy Energy IBT*** | Real-Time Market Internal Bilateral Trade. |  |
| ***RT Sell Energy RLR***  ***RT Buy Energy RLR*** | Real-Time Retail Load Responsibility Bilateral Trade. |  |
| ***RT Sell Energy WLR***  ***RT Buy Energy WLR*** | Real-Time Wholesale Load Responsibility Bilateral Trade. |  |
| ***DA Buy SchRes***  ***DA Sell SchRes*** | DA Scheduling Reserve Bilateral Trade. |  |
| ***RT Buy NonSynch***  ***RT Sell NonSynch*** | RT Non-Synchronized Reserve Bilateral Trade. |  |
| ***RT Buy Regulation***  ***RT Sell Regulation*** | RT Regulation Bilateral Trade. |  |
| ***RT Buy Synch***  ***RT Sell Synch*** | RT Synchronized Reserve Bilateral Trade. |  |

## SPP Market Participant Data

This section will detail all of the transactions that may be submitted in a CSV file in the SPP region.

### SPP BidOffer

The following Transactions are supported when submitting BidOffer data for SPP.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Transaction** | **Description** | **Location Type** | **Reference Code** | **Available Attributes** | **Notes** |
| ***DA Gen Energy Market*** | Generator Energy Market Bid for DAM. Minimum one, max ten Price/MW rows | Generator | N/A | Required: ‘CurveType’ (Block or Slope) |  |
| ***RT Gen Energy Market*** | Generator Energy Market Bid for RTBM. Minimum one, max ten Price/MW rows | Generator | N/A | Required: ‘CurveType’ (Block or Slope) |  |
| ***DA Virtual Bid*** | Generator Spin Market Bid. One row with values for Price and MW | Settlement Point | N/A | Required: ‘CurveType’ (Block or Slope) |  |
| ***DA Virtual Offer*** | Generator Non-Spin Market Bid. One row with values for Price and MW | Settlement Point | N/A | Required: ‘CurveType’ (Block or Slope) |  |

### SPP ResourceParameters

The following parameters are supported in SPP. These are all part of the ‘Energy Operating Limits’ template.

Notes:

* Parameters must be submitted for a specific market stage—DAM or RTBM. As such, each parameter has a “-DA” or “-RT’ suffix to indicate the market.
* Only submit the parameters that you wish to change. The APX MarketSuite® will take existing value for non-submitted parameters and use those for the submission to SPP. The APX MarketSuite regularly pulls down data from the SPP portal, so should have the latest info.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter Name** | **Data Type/format** | **Description** | **Location Type** | **Notes** |
| ***MaxEconomicLimit-DA MaxEconomicLimit-RT*** | Decimal | An economic MW level at or below a Resource’s Maximum Normal Capacity Operating Limit used for constraining Energy dispatch and Contingency Reserve clearing during normal system conditions. | Generator |  |
| ***MaxEmergencyLimit-DA***  ***MaxEmergencyLimit-RT*** | Decimal | The maximum MW level at which a Resource other than a Block Demand Response Resource may operate under Emergency system conditions. | Generator |  |
| ***MaxEmergencyRuntime-DA MaxEmergencyRuntime-RT*** | string (hh:mm) | The maximum length of time a Resource can operate above its Maximum Normal Capacity Operating Limit up to its Maximum Emergency Capacity Operating Limit. | Generator |  |
| ***MaxNormalLimit-DA***  ***MaxNormalLimit-RT*** | Decimal | The maximum MW level at which a Resource may operate continuously. | Generator |  |
| ***MaxRegulationLimit-DA***  ***MaxRegulationLimit-RT*** | Decimal | The maximum MW level at which a Regulation Qualified Resource, a Regulation-Up Qualified Resource or a Regulation-Down Qualified Resource may operate while providing Regulation Deployment. | Generator |  |
| ***MinEconomicLimit-DA***  ***MinEconomicLimit-RT*** | Decimal | A MW level at or above a Resource’s Minimum Normal Capacity Operating Limit used for energy dispatch at a minimum level during normal operating conditions. | Generator |  |
| ***MinEmergencyLimit-DA***  ***MinEmergencyLimit-RT*** | Decimal | The minimum MW level at which a Resource other than a Block Demand Response Resource may operate under Emergency system conditions. | Generator |  |
| ***MinEmergencyRuntime-DA MinEmergencyRuntime-RT*** | string (hh:mm) | The maximum length of time a Resource can operate below its Minimum Normal Capacity Operating Limit down to its Minimum Emergency Capacity Operating Limit. | Generator |  |
| ***MinNormalLimit-DA MinNormalLimit-RT*** | Decimal | The minimum MW level at which a Resource may operate continuously. | Generator |  |
| ***MinRegulationLimit-DA MinRegulationLimit-RT*** | Decimal | The minimum MW level at which a Regulation Qualified Resource, a Regulation-Up Qualified Resource or a Regulation-Down Qualified Resource may operate while providing Regulation Deployment. | Generator |  |
| ***MQSRLimit-DA MQSRLimit-RT*** | Decimal | The maximum amount of Supplemental Reserve that can be provided by a Quick-Start Resource from an off-line state. | Generator |  |
| ***TARRFactor-DA TARRFactor-RT*** | Decimal | Turn-Around Ramp Rate Factor | Generator |  |

## MISO Market Participant Data

This section will detail all of the transactions that may be submitted in a CSV file in the MISO region, as well as special validations for MISO.

### MISO BidOffer

The following Transactions are supported when submitting BidOffer data for MISO. If you would like to schedule a transaction that is not listed below, please contact your APX Account Manager.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Transaction** | **Description** | **Location Type** | **Reference Code** | **Available Attributes** | **Notes** |
| ***DA Load Energy Self*** | Load Energy value in the DAM. | Settlement Point | N/A |  |  |
| ***DA Load Energy Market*** | Load Energy Market Bid for DAM. Minimum one, max ten Price/MW rows | Settlement Point | N/A | Required: ‘CurveType’ (Block) |  |
| ***DA Virtual Bid*** | Generator Spin Market Bid. One row with values for Price and MW | Settlement Point | N/A | Required: ‘CurveType’ (Block) |  |
| ***DA Virtual Offer*** | Generator Non-Spin Market Bid. One row with values for Price and MW | Settlement Point | N/A | Required: ‘CurveType’ (Block) |  |

### MISO BilateralSchedules

The following bilateral schedules are supported in MISO.

Notes:

* **A ReferenceCode is required for all MISO bilaterals.**
* APX regularly pulls down the bilateral contracts from MISO. A contract must be saved in the MarketSuite in order to submit a bilateral schedule.
* MarketSuite does not support the upload of trade contracts.

|  |  |  |
| --- | --- | --- |
| **Transaction Name** | **Description** | **Notes** |
| ***DA Buy Energy FinSchedule***  ***DA Sell Energy FinSchedule*** | Day-Ahead Energy Financial Schedule. |  |
| ***RT Buy Energy FinSchedule***  ***RT Sell Energy FinSchedule*** | Real-Time Energy Financial Schedule. |  |

## ISONE Market Participant Data

This section will detail all of the transactions that may be submitted in a CSV file in the ISONE region, as well as special validations for ISONE.

### ISONE BidOffer

The following Transactions are supported when submitting BidOffer data for ISONE. If you would like to schedule a transaction that is not listed below, please contact your APX Account Manager.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Transaction** | **Description** | **Location Type** | **Reference Code** | **Available Attributes** | **Notes** |
| ***DA Load Energy Self*** | Load Energy value in the DAM. | Settlement Point | N/A |  |  |
| ***DA Load Energy Market*** | Load Energy Market Bid for DAM. Minimum one, max ten Price/MW rows | Settlement Point | N/A | Required: ‘CurveType’ (Block) |  |
| ***DA Virtual Bid*** | Generator Spin Market Bid. One row with values for Price and MW | Settlement Point | N/A | Required: ‘CurveType’ (Block) |  |
| ***DA Virtual Offer*** | Generator Non-Spin Market Bid. One row with values for Price and MW | Settlement Point | N/A | Required: ‘CurveType’ (Block) |  |

### ISONE BilateralSchedules

The following bilateral schedules are supported in ISONE.

Notes:

* **A ReferenceCode is required for all ISONE bilaterals.**
* APX regularly pulls down the bilateral contracts from ISONE. A contract must be saved in the MarketSuite in order to submit a bilateral schedule.
* MarketSuite does not support the upload of trade contracts.

|  |  |  |
| --- | --- | --- |
| **Transaction Name** | **Description** | **Notes** |
| ***DA Sell Energy IBT***  ***DA Buy Energy IBT*** | Day-Ahead Market Internal Bilateral Trade. |  |
| ***RT Sell Energy IBT***  ***RT Buy Energy IBT*** | Real-Time Market Internal Bilateral Trade. |  |
| ***DA Sell TMOR IBT***  ***DA Buy TMOR IBT*** | DA 30-minute Operating Reserve Bilateral Trade. |  |
| ***DA Sell TMNSR IBT***  ***DA Buy TMNSR IBT*** | DA Ten-Minute Non-Synchronized Reserve Bilateral Trade. |  |
| ***RT Sell LoadResp IBT***  ***RT Buy LoadResp IBT*** | RT Load Responsibility Bilateral Trade |  |

## NYISO Market Participant Data

This section will detail all of the transactions that may be submitted in a CSV file in the NYISO region, as well as special validations for NYISO.

### NYISO BidOffer

The following Transactions are supported when submitting BidOffer data for NYISO. If you would like to schedule a transaction that is not listed below, please contact your APX Account Manager.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Transaction** | **Description** | **Location Type** | **Reference Code** | **Available Attributes** | **Notes** |
| ***DA Load Energy Self*** | Load Energy self-Schedule in the DAM. | Settlement Point | N/A |  |  |
| ***DA Load Energy Forecast*** | Load Energy forecast in the DAM. | Settlement Point | N/A |  |  |
| ***DA Load Energy Market*** | Load Energy Market Bid for DAM. Minimum one, max ten Price/MW rows | Settlement Point | N/A | Required: ‘CurveType’ (Block) |  |
| ***DA Virtual Bid*** | Generator Spin Market Bid. One row with values for Price and MW | Settlement Point | N/A | Required: ‘CurveType’ (Block) |  |
| ***DA Virtual Offer*** | Generator Non-Spin Market Bid. One row with values for Price and MW | Settlement Point | N/A | Required: ‘CurveType’ (Block) |  |