Monitoring Analytics

MIRA Opportunity Cost Calculator User Guide

Monitoring Analytics, LLC

May 21, 2020

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1 Getting Started

PJM market participants who believe that their generating units qualify for an Opportunity Cost (OC) adder in accordance with PJM Manual 15, Section 12.1, should contact the Independent Market Monitor (IMM) to inquire about the availability of the Opportunity Cost Calculator (OCC) in the IMM's Member Information Reporting Application (MIRA.)

Contact the IMM with OCC inquiries at mira@monitoringanalytics.com.

A member of the IMM team will contact you to collect details of your constrained resource to determine if an OC adder is appropriate, to gather details about the resource configuration and operations, and to guide you through next steps.

If your resource qualifies, it will be set up as an OC Resource in MIRA's OCC module, and will be made available for weekly input updates and a weekly OC adder calculation.

To go to the OCC module in MIRA, under the Reporting menu, select OCC Resources:

From the OCC Resources screen, you will see a list of your company's OCC Resources, from which you can select to Enter Inputs, Manage Outages, or Manage Documents.

2 Uploading Constraint Documentation

Market participants with constraints must upload documentation, such as air permits, of the constraints that will be modeled in the MIRA OCC.

To upload a document, click on "Manage Documents" then Upload to upload documents.

Then:

The IMM will review air permits and related documentation prior to enabling the OCC Resource in MIRA.

It is expected that market participants will keep MIRA updated with currently valid permits in the OCC module.

3 Inputting Outage Dates

Planned outages are an important input to the OC calculation. Any known future period in which the market participant expects the OCC Resource to not operate or to operate at significantly reduced capability should be identified.

From the OCC Resources screen, select Manage Outages:

On the Manage Outages screen, select the plant or unit that will be out, the start and end date of the outage, and the Operating Percent for the outage period.

Use an Operating Percent of 0% for a complete outage, or select an Operating Percent of 25% if the resource will be derated to 25% of its Economic Maximum.

4 Submitting OCC Input Data

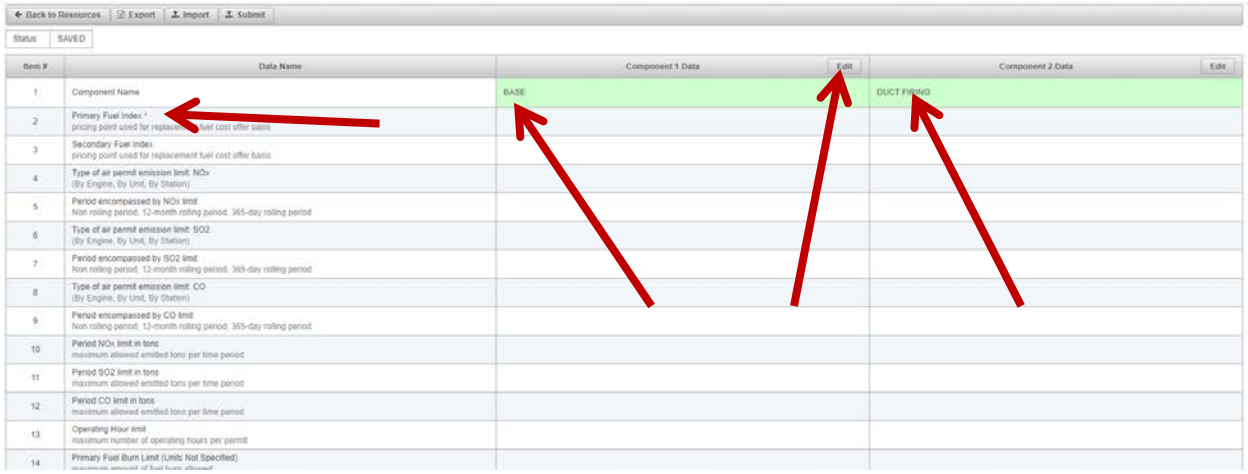
4.1 Manual Data Entry

From the OCC Resources screen, select Enter Inputs to view the input data required for the calculation.

The components encountered on the Inputs screen will depend on the configuration of the resource as well as the type of constraints that limit the output of the resource.

In the example below, there are two columns of input data required, one for the BASE operation of the resource, and one for the DUCT FIRING regime.

Rows that are marked with a red asterisk are required data.



To enter data on this screen, click on the "Edit" button at the top of the column of data to open a data entry dialogue box.

Note that fields that have been updated since the most recent OCC Results were posted for this resource will be shaded green.

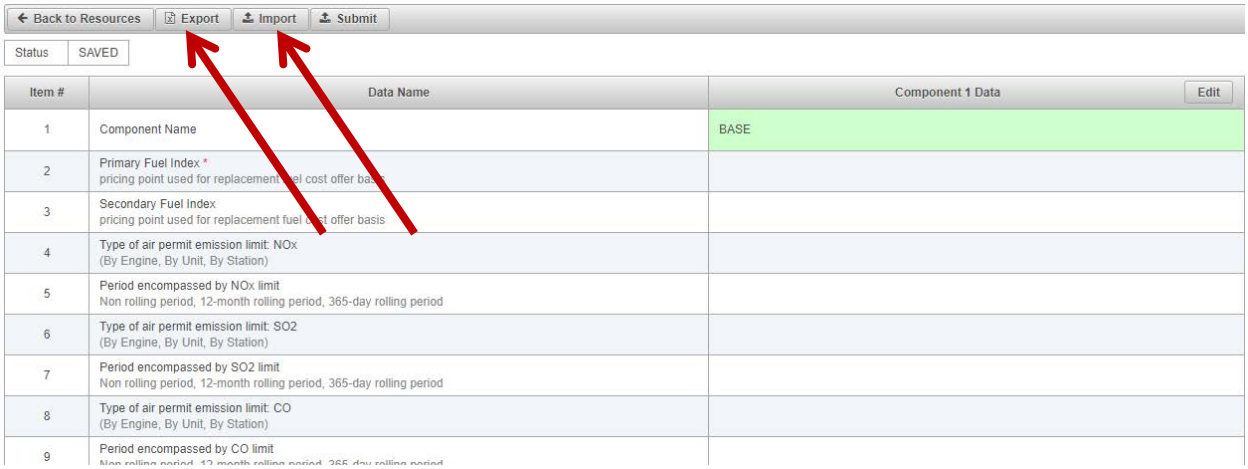
For each column, the following inputs can be created by a MIRA Administrator as needed:

Data Name	**Data Description**
Primary Fuel Index	Pricing point used for replacement fuel cost offer basis
Type of air permit emission limit: NOx	(By Engine, By Unit, By Station)
Period encompassed by NOx limit	Non rolling period, 12-month rolling period, 365-day rolling period
Type of air permit emission limit: SO2	(By Engine, By Unit, By Station)
Period encompassed by SO2 limit	Non rolling period, 12-month rolling period, 365-day rolling period
Type of air permit emission limit: CO	(By Engine, By Unit, By Station)
Period encompassed by CO limit	Non rolling period, 12-month rolling period, 365-day rolling period
Period NOx limit in tons	maximum allowed emitted tons per time period
Period SO2 limit in tons	maximum allowed emitted tons per time period
Period CO limit in tons	maximum allowed emitted tons per time period
Operating Hour limit	maximum number of operating hours per permit
Economic Minimum (MW)	expected average EcoMin in next 12 months
Economic Maximum (MW)	expected average EcoMax in next 12 months
NOx emission rate (lbs/MBtu)	as a function of fuel used
SO2 emission rate (lbs/MBtu)	as a function of fuel used
CO emission rate (lbs/MBtu)	as a function of fuel used
NOx emitted starting (lbs/start)	as a function of fuel used

SO2 emitted starting (lbs/start)	as a function of fuel used
CO emitted starting (lbs/start)	as a function of fuel used
Summer Heat Rate at EcoMax (MBtu/MWh)	average expected in next 12 months
Winter Heat Rate at EcoMax (MBtu/MWh)	average expected in next 12 months
Start-up Cost	average expected in next 12 months
Variable O&M adder ($/Mbtu)	as currently assumed in offers in $/Mbtu
Variable O&M adder ($/hour)	as currently assumed in offers in $/hour
Variable O&M adder ($/MWh)	as currently assumed in offers in $/MWh
Fuel Delivery Charge ($/MBtu)	average expected in next 12 months
Min. Run Time (hours)	as currently assumed for offers (HHHHH:MM)
Min. Down Time (hours)	as currently assumed for offers (HHHHH:MM)
Nominal Fuel Heat Content (MBtu/mcf)	Heat content to convert "mcf" to "Mbtu"
Non-Rolling Start Date	MM/DD/YYYY
Non-Rolling End Date	MM/DD/YYYY
Fuel Throughput History (13 month)	Monthly comma delimited actual fuel consumption (mcf or MBtu). Last number is current month to date.
Operating Hours History (13 month)	Monthly comma delimited actual operating hours. Last number is current month to date.
NOx Emissions History (13 month)	Monthly comma delimited actual tons of NOx emitted. Last number is current month to date.
SO2 Emissions History (13 month)	Monthly comma delimited actual tons of SO2 emitted. Last number is current month to date.
CO Emissions History (13 month)	Monthly comma delimited actual tons of CO emitted. Last number is current month to date.
Duct Firing Hours History (13 month)	Monthly comma delimited actual hours duct fired. Last number is current month to date.
Duct Fired Hours Limit	Maximum duct fired hours for the period, per the permit
Duct Firing Point	Average MW at which duct fire initiated
Fuel Throughput Limit	Maximum fuel consumption for the period(mcf or MBtu), per the permit
NOx emitted Current Period	Tons emitted in current period
SO2 emitted Current Period	Tons emitted in current period
CO emitted Current Period	Tons emitted in current period
Fuel Throughput in Current Period	Volume of fuel consumed in current period (mcf or MBtu)
Operating Hours Current period	Operating hours in current period

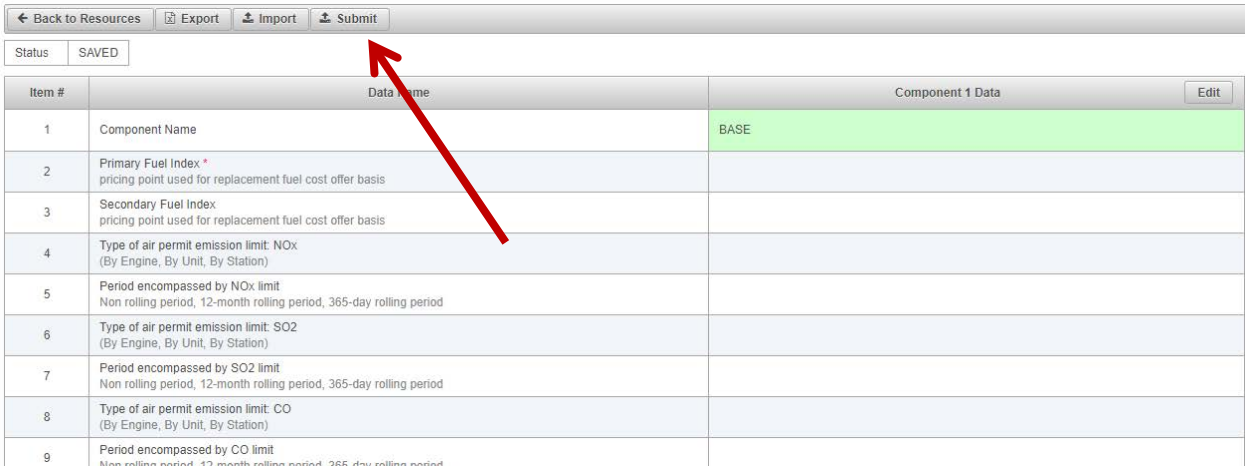
4.2 Data Export and Import

As an alternative to manually opening the "Edit" dialogue, market participants with OCC Resources can use the Export button on the MIRA OCC Inputs screen to export an Excel file that contains the data fields for the OCC Resource. The Export file can be saved, edited, and then Imported into MIRA as a way to populate or update the input data fields.



4.3 Market Participant Submit Inputs

When the market participant has entered all of the relevant data for their OCC Resource (either manually or by importing Excel file), the market participant will click on the "Submit" button.



The Submit button locks the inputs, and signals the IMM that inputs are ready for review and adder calculation.

If the market participant determines that an edit to the data is necessary from the Submitted state, they can contact the IMM, who can reset the state from Submitted to Saved, and the fields will be editable.

If no updates to the input data are required, the resource will remain in the Submitted state until the OC Adder has been calculated and the results posted to the OCC Results screen.

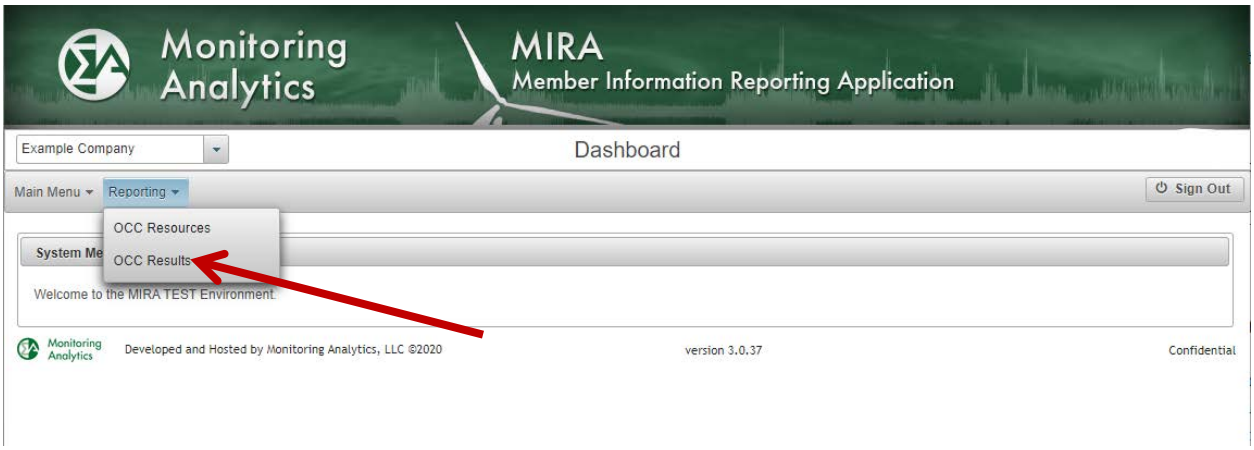
5 OCC Workflow

The OCC workflow will follow these steps:

1. Market participant with a constrained resource contacts the IMM to request the use of an OC adder and provides supporting information requested by IMM.
2. If IMM agrees that the resource qualifies to have an adder calculated, the IMM models the resource in MIRA's OCC module.
3. Market participant uploads current documents that provide evidence of the constraint, such as air permits, etc.
4. Market participant enters outage data and OCC input data into the OCC module in MIRA.
5. Market participant submits inputs for OC adder calculation.
6. IMM reviews input data.
7. If IMM identifies any issues with the input data, IMM will unlock the inputs and notify the market participant of the issue.
    a. The market participant may then update the inputs and submit them again.
8. If the IMM finds no issues with the market participant inputs, the calculation will be run, the result will be reviewed and posted by the IMM on the OCC Results screen.
9. The market participant may use the calculated OCC Adder for the date range specified on the OCC Results screen, which will usually be the Monday through Sunday following the week of data submittal.

6 OCC Results

After the OC Calculator has run, the results will be posted on the OCC Results screen, which is accessed by clicking on the OCC Results link in the Reporting menu.



The OCC Results screen will show a list of resources, the submittal date, the calculated adder, and any additional comment from the IMM necessary to clarify the applicability of the adder.

The calculated adder is the maximum amount that can be added to any segment endpoint Incremental Energy Offer of the resource's cost-based energy offers. When a resource is operating in different output segments with different fuels or with a different operational restriction, a separate adder must be calculated for each segment. The adders will be identified as "Base" (gas-fired and without duct burners), "Secondary fuel" (oil-fired), or "Duct firing" (gas-fired) in the Comment field. When the OCC calculation results in no adder for the resource, the Comment will read "Run limit is not reached."