

Operating Agreement and Manual Updates for Transparency

MIC Special Session
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IMM



Monitoring Analytics

Transparency

- **The problem statement for this group includes reviewing and updating the governing documents for transparency and accuracy about the dispatch and pricing process.**
- **The education phase revealed a number of areas where descriptions of the process are lacking.**
- **The IMM identified sections in the OA that are not up to date or lack clarity.**
- **Opportunity to enhance the PJM OA and Manuals to ensure dispatch and pricing process is transparent.**

Transparency in OA

- **Relevant sections of the Operating Agreement, Schedule 1:**
 - **1.11 Dispatch**
 - **2. Calculation of LMP**
- **There is currently no description in the dispatch section 1.11 about the use of SCED and the principles of least cost dispatch.**
 - **There is a description of this process in Section 2.2 General.**
 - **PJM proposed to move part of the description to Section 2.5 (real time prices) in the fast start pricing (FSP) proceeding).**

1.11 Dispatch

- **Economic dispatch process is a fundamental PJM function and it should be described in the OA.**
- **Recommend updating Section 1.11 to:**
 - **Describe the use of SCED, the principles of least cost dispatch in real time.**
 - **Describe the inputs to SCED (state estimator, generation and demand resource offers, transmission limits, penalty factors, reserve requirements, load forecasts).**
 - **Describe the process of approving SCED cases, the expected frequency, target time.**

1.11.3 Pool-dispatched Resources

- **Section 1.11.3 (a) refers to dispatch of limited energy resources by direct request, without specific reference to pumped storage hydro resources.**
 - **Pumped storage hydro resources have a unique treatment with dispatch that involves the use of real-time hydro schedules as an input to SCED.**
- **Day-ahead treatment of pumped hydro resources is defined in OA Section 1.10 Scheduling.**
- **Recommend describing real-time treatment of pumped storage hydro resources in the Dispatch section.**

1.11.3 Pool-dispatched Resources

- **RT SCED modifies the market seller submitted ramp rates using Degree of Generator Performance (DGP) for calculating energy and reserves available.**
- **This creates a difference between the dispatch signals sent to resources and the expected output used in SCED.**
- **The IMM has recommended eliminating the use of DGP.**
- **If PJM continues to use DGP, recommend describing the use of DGP in the OA.**

Section 2.4

- **Section 2.4 describes the process for choosing the unit offers used to calculate real-time prices, the offers of marginal units.**
- **There are proposed changes to the OA in the current stakeholder proceeding that change the use of hourly offers in SCED and LPC relative to the target time.**
- **Recommend stating clearly that the offers for an hour will be used to set prices for that hour.**
 - **Define the use of resource offers in SCED and LPC in Section 2.4.**

Section 2.3 State Estimator

- **SE solutions are calculated more frequently than every five minutes. Section 2.3 should be corrected.**

The Office of the Interconnection shall obtain a State Estimator solution every five minutes, which shall provide the megawatt output of generators and the loads at busses in the PJM Region, transmission line losses, and actual flows or loadings on constrained transmission facilities.

Section 2.4 and 2.5

- **Verify, clarify and update (Section 2.4(c)):**
“Units that must be run for local area protection shall not be considered in the calculation of Real-time Prices.”
- **Clarify application of rules governing the use of closed loop interfaces in setting prices.**
- **Section 2.5(d): Clarify and define the use of transmission penalty factors in setting the congestion component of LMP.**

APPENDIX



Proposed Description of Dispatch

- **From OA Section 2.2 General:**

The Office of the Interconnection shall determine the least cost security-constrained economic dispatch, which is the least costly means of serving load and meeting reserve requirements at different locations in the PJM Region based on actual operating conditions existing on the power grid (including transmission constraints on external coordinated flowgates to the extent provided by section 1.7.6) and on the prices at which Market Sellers have offered to supply energy and offers by Economic Load Response Participants to reduce demand that qualify to set Locational Marginal Prices in the PJM Interchange Energy Market.

Proposed Description of Dispatch

- ***(a) To determine actual operating conditions on the power grid in the PJM Region, the Office of the Interconnection shall use a computer model of the interconnected grid that uses available metered inputs regarding generator output, loads, and power flows to model remaining flows and conditions, producing a consistent representation of power flows on the network. The computer model employed for this purpose, referred to as the State Estimator program, is a standard industry tool and is described in Section 2.3 below. It will be used to obtain information regarding the output of generation supplying energy to the PJM Region, loads at buses in the PJM Region, transmission losses, and power flows on binding transmission constraints for use in the ~~calculation of Locational Marginal Prices~~ security-constrained economic dispatch. Additional information used in the calculation, including Dispatch Rates and real time schedules for external transactions between PJM and other Control Areas and dispatch and pricing information from entities with whom PJM has executed a joint operating agreement, will be obtained from the Office of the Interconnection's dispatchers.***

Proposed Description of Dispatch

- *(b) Using the prices at which energy is offered by Market Sellers and demand reductions are offered by Economic Load Response Participants, Pre-Emergency Load Response participants and Emergency Load Response participants to the PJM Interchange Energy Market, the Office of the Interconnection shall determine the offers of energy and demand reductions that will be considered in the **calculation of Locational Marginal Prices security-constrained economic dispatch**. As described in Section 2.4 below, every qualified offer for demand reduction and of energy by a Market Seller from resources that are dispatched by the Office of the Interconnection will be utilized in the security-constrained economic dispatch, including, without limitation, qualified offers from Economic Load Response Participants in either the Day-ahead or Real-time Energy Markets or from Emergency Load Response and Pre-Emergency Load Response participants in the Real-time Energy Market.*

Proposed Description of Dispatch

- *(c) Based on the system conditions on the PJM power grid, determined as described in (a), and the eligible energy and demand reduction offers, determined as described in (b), the Office of the Interconnection shall determine the least costly means of obtaining energy to serve the next increment of load at each bus in the PJM Region, in the manner described in Section 2.5 below. **To the extent it is able, the Office of the Interconnection shall perform the security-constrained economic dispatch calculation every five minutes using the most recent inputs available. The result of that calculation shall be ~~a set of Locational Marginal Prices based on the system conditions at the time reviewed by the Office of the Interconnection and, if and when approved, a set of Locational Marginal Prices~~ communicated to resources as the current dispatch instruction.***

Monitoring Analytics, LLC

2621 Van Buren Avenue

Suite 160

Eagleville, PA

19403

(610) 271-8050

MA@monitoringanalytics.com

www.MonitoringAnalytics.com

