

2.6 Calculation of Day-ahead Prices.

(a) The Office of the Interconnection shall use day-ahead security constrained economic dispatch optimization software to determine the least-costly means of obtaining energy and reserves to serve the next increment of load and meet ~~day-ahead scheduling reserve requirements in the PJM Region~~applicable reserve requirements, based on model flows and system conditions resulting from the load specifications, offers for generation as described in Operating Agreement, Schedule 1, section 2.4A, dispatchable load, Increment Offers, Decrement Bids, Up-to-Congestion Transactions, offers for demand reductions, offers for Synchronized Reserve, 10-minute Ramp and Uncertainty Reserve Up, 10-minute Ramp and Uncertainty Reserve Down, 30-minute Ramp and Uncertainty Reserve~~Non-Synchronized Reserve~~, and Secondary Reserve, and 60-minute Reserve, and interchange transactions submitted to the Office of the Interconnection and scheduled in the Day-ahead Energy Market. Day-ahead economic dispatch is performed in the day-ahead security constrained economic dispatch software program, known as the dispatch run. Day-ahead Prices are calculated in a subsequent execution of the day-ahead security constrained economic dispatch optimization software program, known as the pricing run. The pricing run executes the same optimization as the dispatch run but additionally applies Integer Relaxation to Eligible Fast-Start Resources.

The Day-ahead Energy Market uses a multistage solution. The first stage, Resource Scheduling and Commitment (RSC) solves for an initial unit commitment with a limited set of constraints. The second stage solves with a more complete set of constraints/contingencies and performs the Three Pivotal Supplier test. The third stage, Scheduling Pricing and Dispatch, optimizes the dispatch and calculates final Day-ahead Energy Market prices.

Such prices shall be determined in accordance with the provisions of this Section applicable to the Day-ahead Energy Market and shall be the basis for purchases and sales of energy and Transmission Congestion Charges resulting from the Day-ahead Energy Market. This calculation shall be made for each hour in the Day-ahead Energy Market by applying a linear optimization method to minimize energy costs, given scheduled system conditions, scheduled transmission outages, and any transmission limitations that may exist. In performing this calculation, the Office of the Interconnection shall calculate the cost of serving an increment of load at each bus from each resource associated with an eligible energy offer as the sum of the following components of Locational Marginal Price: (1) System Energy Price, which is the price at which the Market Seller has offered to supply an additional increment of energy from a resource, increment offers, import transactions, and/or has offered to decrease consumption by an Economic Load Response Participant resource, Decrement Bid, export transaction or price sensitive demand bid; (2) Congestion Price, which is the effect on transmission congestion costs (whether positive or negative) associated with increasing the output of a generation resource or decreasing consumption by an Economic Load Response Participant-Demand Resource, based on the effect of increased generation from the resource on any applicable transmission ~~line loadings~~constraints, which may include the modeling of energy and/or reserves, as described in the PJM Manuals; and (3) Loss Price, which is the effect on transmission loss costs (whether positive or negative) associated with increasing the output of a generation resource or decreasing the consumption by a Demand Resource based on the effect of increased generation from or consumption by the resource on transmission line losses. The day-ahead Locational Marginal

Prices at a bus shall be determined through the joint optimization program based on the lowest marginal cost to serve the next increment of load at the bus taking into account resource constraints, transmission constraints, marginal loss impact, and the impact of the applicable Operating Reserve Demand Curves. When the marginal energy megawatts is provided by converting a megawatts of reserves into a megawatts of energy, the resulting Locational Marginal Price takes into account the opportunity cost of that exchange.

(b) The Office of the Interconnection shall use its day-ahead market clearing software to calculate the cost of procuring an additional increment of Synchronized Reserve at each bus as the sum of the following components of the Synchronized Reserve Locational Clearing Price: (1) system Synchronized Reserve price, which is the price of supplying an additional increment of Synchronized Reserve in the system; and (2) Synchronized Reserve congestion price at the bus, which is the effect on transmission congestion costs (whether positive or negative) associated with increasing the output of a generation resource or decreasing the consumption by an Economic Load Response Participant at that bus providing Synchronized Reserve, based on the effect of such a change on the applicable transmission constraints modeling the joint flow of energy and Synchronized Reserve as described in the PJM Manuals.~~forecast if the Office of the Interconnection will experience a shortage of the 30-minute Reserve Requirement, Extended 30-minute Reserve Requirement, the Primary Reserve Requirement, Extended Primary Reserve Requirement, the Synchronized Reserve Requirement, and/or the Extended Synchronized Reserve Requirement, as further described in the PJM Manuals. If the day-ahead market clearing software forecasts that a shortage of any of the reserve requirement(s) exists, the Office of the Interconnection shall implement shortage pricing through the inclusion of the applicable Reserve Penalty Factor(s) in the Day-ahead Locational Marginal Prices consistent with the determination of the clearing price for each reserve product. Shortage pricing shall exist until the day-ahead market clearing software is able to meet the specified reserve requirements.~~

(c) The Office of the Interconnection shall use its day-ahead market clearing software to calculate the cost of procuring an additional increment of 10-minute Ramp and Uncertainty Reserve Up at each bus as the sum of the following: (1) system 10-minute Ramp and Uncertainty Reserve Up price, which is the price of supplying an additional increment of 10-minute Ramp and Uncertainty Reserve Up in the system; and (2) 10-minute Ramp and Uncertainty Reserve Up congestion price at the bus, which is the effect on transmission congestion costs (whether positive or negative) associated with increasing the output of a generation resource or decreasing the consumption by an Economic Load Response Participant at that bus, based on the effect of such a change on the applicable transmission constraints modeling energy and reserves that impact 10-minute Ramp and Uncertainty Reserve Up, as described in the PJM Manuals. The 10-minute Ramp and Uncertainty Reserve Up Locational Clearing Price shall be the sum of the cost of supplying an additional increment of 10-minute Ramp and Uncertainty Reserve Up at the bus as described above and the 60-minute Reserve Market Clearing Price.

(d) The Office of the Interconnection shall use its day-ahead market clearing software to calculate the cost of procuring an additional increment of 10-minute Ramp and Uncertainty Reserve Down at each bus as the sum of the following components of the 10-minute Ramp and Uncertainty Reserve Down Locational Clearing Price: (1) system 10-minute Ramp and Uncertainty Reserve Down price, which is the price of supplying an increment of 10-minute

Ramp and Uncertainty Reserve Down in the system; and (2) 10-minute Ramp and Uncertainty Reserve Down congestion price at the bus, which is the effect on transmission congestion costs (whether positive or negative) associated with decreasing the output of a generation resource or increasing the consumption by an Economic Load Response Participant at that bus, based on the effect of such a change on the applicable transmission constraints modeling energy and reserves that impact 10-minute Ramp and Uncertainty Reserve Down, as described in the PJM Manuals.

(e) The Office of the Interconnection shall use its day-ahead market clearing software to calculate the cost of procuring an incremental change in the 30-minute Ramp and Uncertainty Reserve service at each bus as the sum of the following: (1) system 30-minute Ramp and Uncertainty Reserve price, which is the price of supplying an increment of 30-minute Ramp and Uncertainty Reserve in the system; and (2) 30-minute Reserve congestion price at the bus, which is the effect on transmission congestion costs (whether positive or negative) associated with increasing the output of a generation resource or decreasing the consumption by an Economic Load Response Participant at that bus, based on the effect of such a change on the applicable transmission constraints modeling energy and reserves that impact 30-minute Ramp and Uncertainty Reserve, as described in the PJM Manuals. The 30-minute Ramp and Uncertainty Reserve Locational Clearing Price shall be the sum of the cost of supplying an additional increment of 30-minute Ramp and Uncertainty Reserve at the bus as described above, the system 30-minute Reserve price as discussed in Operating Agreement, Schedule 1, section 2.6(f) and the 60-minute Reserve Market Clearing Price.

(f) The Office of the Interconnection shall use its day-ahead market clearing software to calculate the cost of procuring an incremental change in the 30-minute Reserve at each bus as the sum of the following: (1) system 30-minute Reserve price, which is the price of supplying an increment of 30-minute Reserve in the system; and (2) 30-minute Reserve congestion price at the bus, which is the effect on transmission congestion costs (whether positive or negative) associated with increasing the output of a generation resource or decreasing the consumption by an Economic Load Response Participant at that bus, based on the effect of such a change on the applicable transmission constraints modeling energy and reserves that impact 30-minute Reserve, as described in the PJM Manuals. The Secondary Reserve Locational Clearing Price is the sum of the cost of supplying an additional increment of 30-minute Reserve at the bus as described above and the 60-minute Reserve Market Clearing Price.

(g) The Office of the Interconnection shall use its day-ahead market clearing software to calculate the cost of serving an additional increment of Day-Ahead Scheduling Reserve to the system as the 60-minute Reserve Market Clearing Price.

2.6.1 Declaration of Market Suspension

If the Office of the Interconnection declares a Market Suspension, per Operating Agreement, Section 1.10.8(d), Day-ahead Prices shall be set to zero dollars per megawatt-hour and for purposes of settlements for such Operating Day, the Office of the Interconnection shall utilize a scheduled megawatt quantity and Day-ahead Price of zero dollars per megawatt-hour and all settlements will be based on the real-time quantities and prices as determined pursuant to Sections 2.4 and 2.5 hereof.