



Working to Perfect the Flow of Energy

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PJM Manual 11:

**Energy & Ancillary Services
Market Operations**

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2.3.3 Market Sellers

The following business rules apply to Market Sellers:

Self-scheduled generation shall submit an hourly MW schedule.

Generators that are Capacity Resources shall submit offers into the Day-ahead Market, even if they are unavailable due to forced, planned, or maintenance outages.

Generators that are Capacity Resources and are self-scheduling shall submit offer data in the event that they are called upon during emergency procedures.

Generation Capacity Resources shall submit a schedule of availability for the next seven days and may submit non-binding offer prices for the days beyond the next Operating Day.

The set of offer data last submitted for each Generation Capacity Resource shall remain in effect for each day until specifically superseded by subsequent offers.

If a Generation Capacity Resource is not scheduled in the Day-ahead Market, it may revise its offer and submit into the real-time market or it may self-schedule the resource.

Generation owners planning to run generation resources scheduled in the Day-ahead Markets are required to call the PJM Control Center at least 20 minutes prior to bringing the unit online. Generation owners of self-scheduled generation resources must also provide at least 20 minutes notice.

Generation resources that are scheduled in the Day-ahead Market have a financial obligation to sell their output in real-time. Provisions exist in the Tariff that permit make whole payments to be made to those combustion turbines that are scheduled in the Day-ahead Market and then not called on in real-time by PJM that are further defined in PJM Manual M-28.

When a generation resource is not committed in Day-Ahead or Reserve Adequacy Commitment by PJM the market seller may update cost-based schedule availability hourly three hours prior to the operating hour. The cost-based schedule made available must follow the criteria defined by the Generation Owner in its fuel cost policy as defined in PJM Manual 15: Cost Development Guidelines.

A generation resource may not change schedule availability once it has been committed by PJM for the hours in which it is committed.

In order to update cost-based schedule availability, the Generation Owner must select the 'Use Cost Schedule in Real Time' flag in eMKT (New Schedule Availability Update Tab) between 1800-2100 the day prior to the operating day. Selecting this flag will make the Price schedule unavailable for the operating day selected.

PJM commits generation resources based on minimizing system production cost from the available schedules at the time of the commitment. Price based schedule will not be available in Real Time when resource owner selects the cost switch flag in eMKT between 1800-2100 day prior to the operating day.

Generation Capacity Resources that have notification, startup, and minimum run times that exceed 24 hours must submit binding offer prices for the next seven days.



Generation Capacity Resources that have notification plus startup times that exceed 24 hours and have been called on by PJM dispatch in advance of the close of the Day-ahead Market bid period for the desired Operating Day must modify their notification and startup time prior to the close of the market bid period for that day in order to create the possibility for the unit to be committed in the Day-ahead Market. The Resource will be offer capped.

Generation resources that are committed by PJM in advance of the Day-Ahead posting will be committed on the lesser of the available schedules at the time of the commitment.

Each Generation Capacity Resource must make available at least one cost-based schedule and if it falls within the types of generators in the PJM Unit Parameter matrix it must also submit a Price Based Parameter Limited Schedule.

Generation offers may consist of startup, no-load and incremental energy offer. A Generation Capacity Resource offer may not exceed \$1000/MWh.

Emergency and Pre-Emergency Demand Resource emergency or pre-emergency offer price may not exceed the following:

- 30 minute lead time: \$1,000/MWh, plus the applicable Primary Reserve Penalty Factor, minus \$1.00
- approved 60 minute lead time: \$1,000/MWh, plus [the applicable Primary Reserve Penalty Factor divided by 2]; and
- approved 120 minute lead time: \$1,100/MWh.

An economic demand resource offer may not exceed \$1,000/MWh, plus the applicable Primary Reserve Penalty Factor, minus \$1.00

Energy resources may offer into the Day-ahead Market or Real-time Market.

If an Energy resource does not submit offer data, then the offer is assumed to be a zero MW quantity.

Intermittent Generation Resources, that are Capacity Resources, shall meet the must offer requirement by either self-scheduling (Availability = Must Run) or may allow the Day-ahead Market to schedule by offering the unit as a dispatchable resource (Availability = Economic).

The hourly Day-ahead self-scheduled values for intermittent resources may vary hour to hour from the capacity obligation value,

Two single price-based schedules may be offered into the Day-ahead Market. One schedule must be a price based parameter limited schedule. The price-based parameter-limited schedule may be unavailable, and if it is, the “use max gen” flag must be set to “yes”. The price-based parameter limited schedule will be committed during Maximum Generation Emergency if it is unavailable in the Day Ahead Market and the “use max gen” flag is set to “yes”. The second price schedule is a price-based schedule that is not parameter limited. One of these two price schedules must be available in the Day-Ahead Market. In addition to the price-based schedule, one cost-based schedule shall be made available for PJM's use in the event that the resource is used to control a transmission constraint. The cost-based schedule shall be parameter-limited.



A generator offer that is accepted for the Day-ahead Market automatically carries over into the balancing market.

Only a single price-based offer may be submitted into the balancing market.

A generator offer for a generating unit with combined cycle capability shall make available either the schedule for the CTs or the schedule for the combined cycle unit, not both.

Only CTs may submit weather curves, which specify MW limits for CTs as a function of temperature.

Forecast points shall consist of a daytime temperature and a nighttime temperature.

There are separate weather curves for economic MW and for emergency MW.

Each CT is assigned to a weather point, which is entered by the Operating Company. As generating units change ownership it may be necessary to add weather points. The default for the weather points is the PJM temperature forecast.

The priority of generator offer operating limits are as follows: (1) Unit Hourly MW limits (eMKT Unit Hourly Updates), (2) Daily Unit Schedule Limits (eMKT Schedule Detail), (3) Unit limits (eMKT Unit Detail). Daily unit schedule MW limits can be overridden by unit hourly MW limits. Weather curves for CTs apply to both unit limits and schedule limits.

Market Sellers may submit increment offers or decrement bids at any hub, transmission zone, aggregate, single bus or eligible external interface point (posted on the PJM Web site) for which an LMP is calculated. It is not required that physical generation or load exists at the location that is specified in the increment offer or decrement bid.

A price-based unit has the option to choose cost-based start-up and no-load fees. A price-based unit that chooses the cost based option may change the start-up and no-load fees daily. A priced-based unit that chooses the price based option will continue to be able to change the start-up and no-load fees twice a year.

The choice between using cost-based and price-based startup and no-load fees can be made twice a year during the same open enrollment window (on or before 1200 hours March 31 for the period April 1 through September 30 and on or before 1200 hours September 30 for the period October 1 through March 31). Period 1 is defined as the period of time beginning April 1 and ending September 30. Period 2 is defined as the period of time beginning October 1 and ending March 31. If a priced based unit chooses the cost-based start-up and no-load fees option, the decision cannot be changed until the next open enrollment period takes place.

When a unit or part of a unit is designated as Maximum Emergency (ME), this means that the referenced output levels may require extraordinary procedures and that the designated MW is available to PJM only when PJM requests Maximum Emergency Generation. Designation of a unit or a portion of a unit as ME should be based on the real operating characteristics of the unit and not be used to withhold all or a portion of the capacity of a unit from the Day-ahead Market.

Designation of all or part of a unit's capacity as Maximum Emergency (ME) constitutes withholding in the Day-ahead Market, if:

- The capacity is not designated as ME in the bid for the Real-time Market, or;
- There is no physical reason to designate the unit as ME.



The consequence of withholding a unit's capacity under ME is:

- The unit will be given an outage ticket which reflects a de-rating equal to the positive difference in capacity designated Maximum Emergency in the bid for the Day-ahead Market and capacity designated Maximum Emergency in the bid for the Real-time Market.

A unit bid includes an Economic Maximum point, which is the highest output on its bid curve that the unit is offering for economic dispatch. The Economic Max represents the highest unrestricted level of MW that the operating company will operate the unit, under its offer, for economic dispatch. The Economic Max point should be based on the actual capability of the unit to operate on its bid curve and should not be used to withhold a portion of the capacity of a unit from the Day-ahead Market.

Reduction of Economic Max MW constitutes withholding in the Day-ahead Energy Market, if:

- The Economic Max MW is higher in the bid for the Real-time Energy Market than in the bid for the Day-ahead Market, or;
- There is no physical reason to designate a lower Economic Max in the bid for the Day-ahead Market bid than in the bid for the Real-time Market.

The consequence of withholding a unit's capacity by reduction of Economic Max MW is:

- The unit will be given an outage ticket which reflects a derating equal to the positive difference in Economic Max output designated in the bid for the Real-time Market and in the bid for the Day-ahead Market.

Generating units that are connected to the system at the same electrical location may be aggregated and offered into the PJM market as a single unit.

The aggregated unit must be offered into the PJM markets as a single unit with only one set of offer data, including startup, no load and incremental energy. This rule applies to all energy and ancillary service markets into which the unit is offered.

Hourly integrated, revenue quality meter data must be submitted to eMeter on the basis of the aggregated unit.

Real-time meter data is required for each physical unit in order to support the PJM state estimator model and to allow energy settlement on an individual unit level.

Balancing Operating Reserve deviations for aggregated units will be calculated based on the hourly aggregated unit output as defined in ***PJM Manual 28: Operating Agreement Accounting, Section Operating Reserve Accounting***.

Balancing Operating Reserve Generator deviations for units deemed to be "not following dispatch" that occur at a single bus will be able to offset one another.

A "single bus" will be any unit located at the same site and that has the identical electrical impacts on the transmission system. Units are deemed to have identical electrical impacts on the transmission system if they meet the following criteria:

- Units that have identical dfax to the system
- Units that are on the same low side of the bus (i.e. connected at same voltage level)



In the case of units on busses with bus-tie breaker, if bus-tie breaker was open less than 5% of the hours in the previous 3 years, supplier netting of units will be allowed across this bus-tie breaker.

PJM will maintain a list of units that are deemed to have identical electrical impacts on the transmission system to be used for Balancing Operating Settlement. PJM will review the list on an annual basis. Generators will be reviewed as needed during any new generation activation or reconfiguration process as defined in **Section 7 of PJM Manual 14d: Generator Operational Requirements**.

Unit parameters do not have to be identical for the units' deviation MW to offset one another.

If multiple units are deemed "not following dispatch" at a single bus, the deviation MW and direction of each unit at that bus will be summed to determine the deviation MW at that bus.

Units at a "single bus" must be owned or marketed by single PJM Market Participant.

Unit modeling changes in the PJM eMKT system (unit type, aggregation level, for example), not including changes based on physical changes at the plant, can be made at the beginning of each quarter.

CT's are permitted to provide an Economic Minimum less than the physical economic minimum value of the unit. Per the **PJM Manual for Operating Agreement Accounting**, for settlement purposes, PJM determines the resource's hourly UDS LMP Desired MWh based on its dispatch rate, offer data, and minimum and maximum energy limits for that hour. For steam units, the lesser of the day-ahead scheduled and real-time economic minimum limits, and the greater of the day-ahead scheduled and real-time economic maximum limits, are used. For CT's, operating at PJM direction, the actual real-time output is used as the UDS LMP Desired MWh value.



Attachment C: PJM Procedure for Cost Reimbursement

This procedure addresses participant reimbursement concerns regarding ~~limited fuel situations and~~ manning units above normal station manning levels at the direction of PJM. The aim of the procedure is to:

- ~~• Enable units that are requested to remain online by PJM System Operations past their initial, day-ahead commitment and in order to do so are forced to procure fuel at a higher cost than that on which their day-ahead or the Reliability Assessment (Rebid Period) offer was based, to better manage the risk associated with the additional costs associated with that operation. This procedure is not intended to guarantee cost recovery nor is it intended to address lost opportunity, profit maximization, or normal Operating Reserves make-whole payments where no change in fuel cost was experienced. and~~
- Explain the process for the recovery of costs to staff the station above normal station manning levels at the direction of PJM (“manning costs”) that cannot be submitted in the cost-based startup, because they are unknown at the time of the offer submittal. These manning costs are considered to be “start cost” as defined in PJM Manual 15: Cost Development Guidelines. This procedure is not intended to guarantee cost recovery nor is it intended to address compensation of units for normal manning costs.

Offers

~~In order to be eligible for reimbursement for higher cost fuel as a result of complying with a PJM dispatch request, participants will be required to enter a range of estimated costs to operate utilizing the higher priced fuel into one or more additional cost schedules (#1-69, #80-89) and make this information available prior to the Day-Ahead Market (“DAM”) or the Reliability Assessment (if the unit was not taken in the DAM) on the Schedule Selection page of the Market User Interface (“MUI”). The range of estimated costs should cover the range of costs that participants believe they could face during the PJM operating day. In every case, the submitted costs must follow the current PJM Manual 15: Cost Development Guidelines. Participants will be required to provide fuel cost documentation as documented in Section 1.8: Cost Methodology and Approval Process in PJM Manual 15: Cost Development Guidelines for the basis for the estimated fuel cost(s) and associated operating cost(s). Participants will also be required to provide documentation during the PJM operating day of the actual fuel costs incurred and the actual associated operating cost(s). Review of these costs will be conducted according to the process documented in PJM Manual M-15. If review shows that the new schedule regularly exceeds the actual costs incurred during the extended operating hours, the participant will be notified that the method for estimate calculations needs to be modified to more accurately reflect actual costs. If review shows that the new schedule continues to exceed actual costs, the participant will not be permitted to utilize this procedure for making intra-day cost-based offers.~~



Operations

~~If a unit has been asked to extend its hours of operation in real time and the unit has a limited fuel supply and must utilize higher priced fuel to remain online, the participant must inform the PJM system operator of the fuel cost change by requesting the real time offer to be switched to one of the additional available schedules. The participant must verify that the new schedule is the one reflecting fuel costs closest to those that will be actually paid to operate for the extended hours requested. The PJM operator will evaluate whether the higher cost schedule is economic and if so, will log and dispatch the unit on the new schedule.~~

If a station is directed by PJM to be manned beyond normal and required operating hours, the unit may submit the additional costs – manning costs – as defined below. Participants choosing to self-schedule a unit after PJM has directed the station to be manned above normal station manning levels are not eligible for recovery of manning costs.

Settlements

~~Participants who have been asked by PJM to extend a unit's run time and in order to comply with that request procured higher cost fuel have until 12:00 noon on the following business day to submit an e-mail to market_bids@pjm.com with the following information:~~

- ~~• Unit Name~~
- ~~• Date of operation~~
- ~~• Time of extended operation~~
- ~~• ID number of new schedule~~
- ~~• Name of new Schedule~~
- ~~• Contact information (name of sender, phone, e-mail)~~
- ~~• Date and time of PJM Dispatch contact to generator~~
- ~~• Actual marginal cost of unit considering the actual cost of the fuel procured to continue operating~~

~~Market operations personnel will confirm with System Operations the operation of the unit. The information will be forwarded to the Market Settlement Operations department for compensation. In the event that this occurrence cannot be confirmed, the unit will be paid on the original schedule logged by the system operators.~~

~~If a unit uses a cost based start up and is manned above normal station manning levels at the direction of PJM and all units at the station do not run during the operating day, written confirmation of actual costs incurred due to such manning requirements can be submitted to PJM as cancellation fees per Section 1.10.2 of Schedule 1 of the PJM Operating Agreement and the parallel provisions of Attachment K Appendix of the PJM Tariff. Submittal should follow the "Credits for Canceled Pool Scheduled Resources" timelines in Manual 28 (to be received within 45 days of date invoice was received by participant for the month in question). Request~~



~~should include the normal station manning hours, the hours outside of normal station manning levels in which the unit was requested to be manned by PJM and the actual costs incurred for manning above normal station manning levels. The Balancing Operating Reserve credit for manning costs equals the actual costs incurred less any CT Lost Opportunity Credit in excess of day-ahead scheduled MW times the difference in real-time and day-ahead LMPs.~~

If a unit uses a price based start-up and is manned above normal station manning levels at the direction of PJM and all units at the station do not run during the operating day, written confirmation of actual costs incurred due to such manning requirements can be submitted to PJM as cancellation fees per Section 1.10.2 of Schedule 1 of the PJM Operating Agreement and the parallel provisions of Attachment K Appendix of the PJM Tariff. Submittal should follow the “Credits for Canceled Pool-Scheduled Resources” timelines in Manual 28 (to be received within 45 days of date invoice was received by participant for the month in question). Requests should include the normal station manning hours, the hours outside of normal station manning levels in which the unit was requested to be manned by PJM and the actual costs incurred for manning above normal station manning levels. The Balancing Operating Reserve credit for manning costs equals the actual costs incurred less any CT Lost Opportunity Credit in excess of day-ahead scheduled MW times the difference in real-time and day-ahead LMPs, capped at the appropriate price based start cost as specified in the generating resource’s offer data.

If a unit uses a cost-based start-up and is manned above normal station manning levels at the direction of PJM and any unit at the station does run during the operating day, the manning costs that are not included in their cost-based start recovered through normal operations may be submitted to the PJM Market Settlements Department (mrkt_settlement_ops@pjm.com). Requests should include the normal station manning hours, the hours outside of normal staffing hours in which the resource was requested to be manned by PJM and the additional actual costs incurred for manning that is not included in the cost-based start. These manning costs will be added to startup costs and will be evaluated with Balancing Operating Reserve credits for the unit.