



## Energy Resource Curtailment Manual Changes

The following changes will be incorporated within the PJM manuals effective October 1, 2010 to supplement the Energy Curtailment Tariff change.

- 1. PJM Balancing Operations Manual (M12), Attachment B: Transmission Constraint Control Guidelines, Section B.2 (v20 page 73).** The existing Note Box:

**Note 1:** During Constrained Operations, Wind Resources will reduce redispatched cost-effectively to economic minimum based on their bid parameters as follows:

**Economic Minimum** = Minimum capacity based on available wind turbines in-service (i.e. minimum value based on blade feathering capability or other control limit as available).

**Emergency Minimum = 0.**

**Note 2:** Cost-effective redispatch (\$/MW effect) objective is to minimize the function = (Current Dispatch Rate – Unit Bid)/Unit Generation Shift Factor.

**Note 3:** The unit default cost/price bid will be assumed 0 unless provided via eMkt.

**Note 4:** Wind Farm Curtailment should be achieved within 15 minutes or within a timeframe that the wind farm technology permits. PJM should be notified if curtailment is expected to exceed 15 minutes.

Will be replaced with:

**Note 1:** In order to ensure Energy Resources do not force emergency procedures they must be dispatchable (dispatchable generation) in the range between their CIR and MFO (i.e. fixed gen flag must not be selected).

**Note 2:** Resources may not submit an economic minimum that exceeds the level of their CIR in the real-time energy market. This restriction does not apply to the day-ahead market.

**Note 3:** Energy Resources with no CIR have Economic Minimum = 0.

**Note 4:** Intermittent resources Emergency Minimum should be set to 0.

**Note 5:** During Constrained Operations, Resources will redispatched cost-effectively based on their bid parameters.

**Note 6:** Cost-effective redispatch (\$/MW effect) objective is to minimize the function [(Current Dispatch Rate – Unit Bid) ÷ Unit Generation Shift Factor].



**Note 7:** The unit default cost/price bid will be assumed 0 unless provided via eMkt.

**Note 8:** Intermittent resource curtailment should be achieved within 15 minutes or consistent with the resources ramp rate bid. PJM should be notified if curtailment is expected to exceed 15 minutes.

**2. Emergency Operations Manual (M13), Section 2.4.2 Minimum Generation Alert (v38 page 32).** The existing Note Box:

During Normal Operations, Wind Resources will reduce economically to economic minimum based on their bid parameters as follows:

**Economic Minimum** = Minimum capacity based on available wind turbines in-service (i.e. minimum value based on blade feathering capability or other control limit as available).

**Emergency Minimum** = 0

Will be replaced with:

**Note 1:** In order to ensure Energy Resources do not force emergency procedures they must be dispatchable (dispatchable generation) in the range between their CIR and MFO (i.e. fixed gen flag must not be selected).

**Note 2:** Resources may not submit an economic minimum that exceeds the level of their CIR in the real-time energy market. This restriction does not apply to the day-ahead market.

**Note 3:** Energy Resources with no CIR have Economic Minimum = 0.

**Note 4:** Intermittent resources Emergency Minimum should be set to 0.

**3. Definitions and Acronyms Manual (M35), Section 2: Definitions.** The existing definition for “Dispatchable Generation” will be replaced and Capacity Interconnection Rights and Maximum Facility Output will be added.

**Capacity Interconnection Rights:** The rights to input generation as a Generation Capacity Resource into the Transmission System at the Point of Interconnection where the generating facilities connect to the Transmission System.

**Dispatchable Generation**

Generation available physically or contractually to respond to changes in system demand or to respond to transmission security constraints.

**Dispatchable generation typically excludes nuclear generation and ambient air impacts on combustion turbines.**



**Maximum Facility Output:** The maximum (not nominal) net electrical power output in megawatts, specified in the Interconnection Service Agreement, after supply of any parasitic or host facility loads, that a Generation Interconnection Customer's Customer Facility is expected to produce, provided that the specified Maximum Facility Output shall not exceed the output of the proposed Customer Facility that Transmission Provider utilized in the System Impact Study.



## Wind Farm Communication Model Manual Changes

The following changes will be incorporated within the PJM manuals effective October 1, 2010 to incorporate the Wind Farm Communications Model Strawman.

### **Attachment 7: Wind Farm Communication Model**

Manual dispatch directives to multiple wind owners delay controlling actions resulting in less efficient market operations and a potential adverse impact to system reliability. Manual dispatch to a subset of owners at a common Wind Farm may result in customers questioning curtailments and additional administrative procedures to ensure fair/equitable reductions to an aggregate plant on a rotating basis. A single SCED basepoint for a Wind Farm to a single MOC Generation System Operator is an effective solution to ensure efficient and reliable operations.

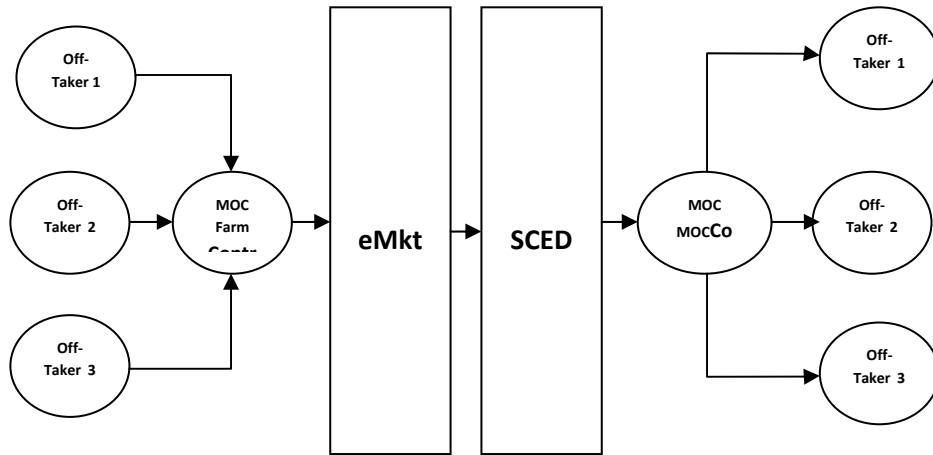
The purpose of this section is to define a dependable real-time communications model to manage wind, ensuring:

1. A single MOC Generation System Operator (single operational contact) for the processing of all real-time dispatch electronic signals and operational issues.
2. Accurate outage data, which is essential for an accurate Wind Power Forecast
3. Prompt wind reduction, which typically would occur as a last resort just prior to emergency procedures.

**Note 1:** This communication model may be expanded to include other renewable resources as PJM develops forecast tools or their penetration levels increase.

**Note 2:** The MOC Generation System Operators (single operational contact) will need to meet the PJM certification and training requirements outlined in PJM Manual 40: Certification and Training Requirements.

**Option 1:** PJM Operations would prefer a model where there is a single MOC Generation System Operator (single operational contact) responsible for the entire Wind Farm operations. The single contact would be responsible for all day-ahead and real-time bidding into PJM Systems (eMkt), process an SCED basepoint, real-time communications with PJM Dispatch, as well as providing accurate turbine outage information within eDart. Settlements can be allocated by PJM based on ownership shares.



**Option 2:** The alternate solution would still require a single MOC Generation System Operator (single operational contact), however, each owner/off taker would still be able to interact with eMkt, providing day-ahead bids and hourly updates. The single operational contact would be responsible for processing SCED basepoints, all real-time communications with PJM Dispatch, as well as providing accurate turbine outage information within eDart. PJM SCED would send individual basepoints to each owner/off taker as well as sending an aggregate base point to the operational contact. Settlements will model individual owner/offtakers.

