Subject: Wind and Solar Resource Bidding, Scheduling, Dispatch, and Settlement

Statement: The purpose of this Technical Bulletin is to describe key market rules for wind and solar resources.

Details:

This Technical Bulletin identifies market rules for wind and solar resources pertaining to bidding, scheduling, and settlements for energy. This Technical Bulletin assumes prior knowledge of NYISO bidding processes. For more information, see Section 7 of the NYISO Market Participant User's Guide at: https://www.nyiso.com/manuals-tech-bulletins-user-guides.

Day-Ahead and Real-Time Market Bidding Rules

If wind/solar resources choose to bid in the Day-Ahead market, they will:

- Bid as ISO-Committed Flex units
- Enter a Minimum Generation MW of 0 MW
- Enter a Minimum Generation Cost of $0.00
- Enter a Startup Cost of $0.00
- Enter the appropriate Bid Upper Operating Limits (Normal and Emergency).
  - The UOLn or UOLE is the maximum output capability of a wind/solar resource during normal and emergency conditions.
- Enter a Bid Curve reflecting the economic willingness for the resource to run (an example is shown in the following screenshot).

Wind/Solar resources bidding in Real-time shall:

- Bid as ISO-Committed Flex units
- Enter a Minimum Generation MW of 0 MW
- Enter a Minimum Generation Cost of $0.00
- Enter a Startup Cost of $0.00
- Enter the appropriate Bid Upper Operating Limits (Normal and Emergency).
  - The UOLn or UOLE provided with the bid is only used in the formula for determining any overgeneration charge. It is not used to determine the upper limit of the resource's dispatch range. For determining the upper limit of a wind/solar resource's dispatch range in real-time, the NYISO uses a Wind/Solar Energy Forecast.
- Enter a Bid Curve reflecting the economic willingness for the resource to run (an example is shown in the following screenshot):
*Note – the Generator Bid in the figure above indicates the wind resource’s desire to be scheduled according to the following instructions:

- produce 0MW as long as the LBMP is less than -$999
- produce up to 10MW as long as the LBMP is greater than or equal to -$999, but less than -$50
- produce up to 35MW as long as the LBMP is greater than or equal to -$50, but less than -$40
- produce up to 120.5MW as long as the LBMP is greater than or equal to -$40

Additionally, offers are evaluated independently between the Day Ahead Market and the Real Time Market. An accepted offer in the Day Ahead Market does not necessarily mean that offer will also be economic in real-time.

**Wind/Solar Resource Physical/Static Parameters**


### Wind/Solar Resources Must:

- Must supply a per-minute response rate (must be at least 6.7% of nameplate/minute and will only apply to ramp down resources)*
- Will only have their Energy authorization flags checked, with no Reserve or Regulation permissions granted (these flags not checked).*

### Scheduling

Day-ahead Scheduling:

Wind/Solar resources may provide day-ahead economic offers, but are not required to do so. Wind/Solar resources participating in the day-ahead market are treated no differently than any other resource in the day-ahead market.

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* Data is entered by NYISO Customer Relations Group
Real-Time Scheduling (RTS):
Wind/Solar resources will provide real-time economic offers that indicate the price below which they are no longer willing to generate.

The RTS will optimize for the most economic dispatch and may select a resource to limit its output. If the wind/solar resource is not economic to operate at its forecasted output level, the system will create a basepoint that reflect the resource’s desire to be limited, taking into account its stated response rate. The wind/solar resource must limit its output to the level (or below) specified in the basepoint within the next five minutes.

The system will use the wind/solar resource’s economic offer, its last known energy output, and its forecasted energy output to help determine its schedule. Absent any constraints, the instructions sent to wind/solar resources will generally reflect the ability of the system to take all the energy the resources can economically produce. However, if the wind/solar resource is selected economically to limit its output, a Wind and Solar Output Limit instruction sent to the resource will reflect those limitations.

Wind/solar resources that operate as Co-located Storage Resources (CSR) will be sent instructions to limit their output to the level specified in their basepoint when the total CSR schedules are close to the CSR injection Scheduling Limit. Specifically, a Wind or Solar Output Limit will be sent if both conditions, as stated below, are met for the CSR generators:

1. The ESR unit either has an Energy injection schedule or a non-zero Reserve/Regulation schedule; and
2. The sum of the CSR Generators Energy schedules (injections positive, withdrawals negative), Operating Reserves schedules, and Regulation Service schedules is greater than or equal to 90% of the CSR injection Scheduling Limit.

Instructions are sent electronically from NYISO via basepoints to the transmission owners. Transmission owners will communicate these instructions to wind/solar resources. A separate flag is included with the instructions from NYISO to the transmission owner indicating whether or not the basepoint directs the resource to limit its output. NYISO will continually communicate when wind/solar resources are subject to limitations and when they are not.

Settlement Rules

Please see the Accounting and Billing Manual for this information; https://www.nyiso.com/manuals-tech-bulletins-user-guides

ICAP Rules:

Refer to the ICAP manual at: https://www.nyiso.com/manuals-tech-bulletins-user-guides

Forecasting Rules:

Wind/Solar resources shall support the NYISO Centralized Wind and Solar Forecasting program by supplying meteorological data pursuant to NYISO procedures. Please see the Wind and Solar Plant Operator Data User’s Guide for additional details at:

1 Refer to MST 2.3 for definition of CSR Scheduling Limits
This Technical Bulletin is not currently expected to be incorporated into a NYISO Manual/User Guide.