Dispatch and Solar-Battery Hybrids

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PJM DIRS

General Dispatch of Solar, Batteries, and Hybrids

- Like all unit types, solar units and battery storage units can be dispatchable against their offer curve assuming Economic Minimum below Economic Maximum limits. Such resources receive an automatic dispatch basepoint.
  - Alternately, consistent with all unit types, such units can have no dispatchable range and their output is treated as fixed, and there essentially is no dispatch point.
- The output of dispatchable resources is expected to meet the dispatch basepoint at all times.
  - To accomplish this in certain circumstances, the Market Seller may need to frequently update economic limits in order to receive a higher or lower dispatch basepoint that the resource is capable of following.
- This all pertains to solar-battery hybrids as well.

Different Control Circumstances for Dispatchable Solar vs. Storage

- In general, standalone solar units are producing as much power as they are capable of producing at any given moment.
  - Since such power output varies minute to minute, it is not always consistent with their bid-in Economic Maximum levels.
  - Actual solar output less than Economic Maximum is usually not an indicator that the unit can produce more power, but rather that there has been a temporary drop in solar availability.
- By contrast, storage-type units could often produce less than they are capable of producing (e.g., because they are charging, or waiting for daily peak pricing, or a real-time price spike, etc.).
  - Actual output less than Economic Maximum can be an indicator that the unit can produce more power
- Therefore, PJM operators might expect different behavior from dispatchable batteries relative to dispatchable solar.

Implications for Solar-Battery Hybrids

From last slide: PJM might expect different behavior from dispatchable batteries relative to dispatchable solar.

- PJM may need to know when a solar-battery hybrid is operating in one of two modes:
  - "Hybrid mode", a dispatchable mode in which the battery is providing power to keep total hybrid plant output consistent with dispatch.
  - "Solar-only mode", a dispatchable mode in which the battery is ***not*** providing power to keep total hybrid plant output consistent with dispatch, but the plant is nonetheless dispatchable downward relative to solar availability.

Potential Solution for Dispatchable Solar-Battery Hybrids

*"The operator of a solar-battery hybrid that is dispatchable must indicate to PJM the hours for which the plant is operating in "solar-only" mode, during which time the battery is *not* providing power for the purpose of maintaining hybrid output consistent with PJM dispatch.*
Dispatchable solar-battery hybrids must follow dispatch in both "solar-only" mode and "hybrid mode".

- Suggest adding this solution to renamed Design Component 12
  - "Operating requirements" ← ~~*"Rules for dispatch response time and Economic Minimum/Emergency Minimum values relative to CIRs"*~~

Deviations and LOC Implications for Hybrid Operating Modes

- Both “hybrid mode” and “solar only mode” would be dispatchable (i.e., they would have a dispatchable range between ECOMIN and ECOMAX). Both modes would have the same implications for Balancing Operating Reserves deviation charges and Lost Opportunity Cost credits:
  - Units must follow their automatic dispatch basepoints, any manual dispatch overrides, and other instructions.
  - Units in such modes are subject to Balancing Operating Reserve deviation charges based largely on their offer curve relative to LMP in light of their economic limits (among other items and assuming unlimited ramp), rather than based on their Day Ahead schedule.
  - When subject to manual dispatch in the downward direction, all dispatchable units (including hybrids) are generally eligible for Lost Opportunity Cost payments when following such dispatch.
  - When subject to manual dispatch in the upward direction, all dispatchable units (including hybrids) generally become “pool scheduled” and are therefore eligible for Balancing Operating Reserve payments (i.e., make-whole payments) when following such dispatch.

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