Synchronized Reserve Deployment: IMM Package

SRDTF

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Replacing Deployed Reserves

- **NERC reliability standards require that the level of reserves after a disturbance be restored within 90 minutes after a disturbance occurs. (NERC BAL-002-3, R3)**
- **PJM currently attempts to restore reserves immediately when reserves are deployed.**
  - **Result is an inefficient outcome during the infrequent periods when reserves are used for their intended purpose.**
  - **Creates a tradeoff between replacing reserves and recovering ACE after disturbance. Exacerbated by IRD.**
- **Allowing time to recover reserves ensures recovery is addressed before replacing reserves and avoids charging customers high prices for using reserves that have been paid for.**

IRD Deployed Reserves

- **IRD deploys MW not considered reserves by PJM:**
  - **Resources dispatched that were deselected for Tier 1 synchronized reserves.**
    - Combined cycle units that do not qualify due to bringing on power augmentation or configuration changes.
    - In rare cases, wind and nuclear resources.
  - **Resources dispatched beyond their Tier 1 cleared MW quantity.**
  - **Resources dispatched beyond their Spin Max MW.**
- **IRD uses tier 2 MW as reserves instead of deploying them:**
  - **Tier 2 resources not dispatched for energy, but clearing to meet the reserve requirement.**
- **IRD solution does not dispatch the reserves that are paid for providing reserves.**

Appendix: IMM Package Details

Reserves Function

- **PJM has a well defined synchronized reserve product and reserve market design.**
- **There are defined standards for eligibility to provide, clear and be compensated as synchronized reserve.**
- **The energy market accounts for the lost opportunity costs of clearing reserves vs energy, and procures the most efficient, reliable set of reserves, given the eligibility, and unit parameters (spin max, spin ramp rate).**

Reserve Deployment

- **The upcoming changes to the reserve market (May, 2022) include further updates:**
  - **Uniform compensation for all synchronized reserves (combining Tier 1/Tier 2).**
  - **Defined penalties for underperformance for all synchronized reserves.**
- **The intent of having this design is to exercise the option to deploy these reserves in the event of an actual contingency (a spin event).**
- **The IMM proposal targets an efficient and fair way to exercise this option.**

IMM Solution Criteria for Reserve Deployment

- **Focus on reliability, to recover ACE, but avoid overshoot.**
- **All call message used for communication only, no associated request for all resources to ramp up.**
- **Deploy reserves proportional to the disturbance.**
- **Resources clearing the synchronized reserve market are responsible for responding during an event.**
- **Fair assignment of share of responsibility.**
- **Response evaluation based on dispatch instructions.**

IMM Package

- **Reserve deployment tool that generates dispatch signals.**
- **Existing mechanism for sending basepoints, but deployed synchronized reserves will be added to energy basepoints, similar to RTGEN tool in MISO, SPP.**
- **Deploy the synchronized reserves that cleared in the current five minute interval.**
- **The total MW to deploy is input by dispatchers, equal to the MW lost, or MW required for ACE recovery.**

IMM Package

- **The MW deployed from each resource is its share of the total cleared MW.**
- **For example, if the most recent RT SCED solution cleared a total of 1,600 MW of synchronized reserves, and the contingency is 800 MW, each cleared resource is asked to convert half the cleared synchronized reserves to energy.**
- **Fair assignment of obligation to respond to spin event.**
- **Existing Manual 12 (4.1.2) language, no changes needed for deployment.**
- **Resources that do not clear synchronized reserves continue with prior energy basepoints.**

IMM Package

- **Dispatchers input the total MW needed, the tool calculates resource specific MW and sends dispatch signals to the target levels (Manual 12, 4.1.2).**
- **Dispatchers aware of all the units that cleared every five minutes (or any time a new RT SCED solution is approved) with locational granularity.**
  - **For example, MW cleared in MAD, outside MAD.**
  - **Continue to have option for subzone deployment.**
- **All resources that clear every five minutes aware of commitment to follow new basepoints if an event were to occur.**

IMM Package: SCED Use

- **Dispatchers manually execute a new RT SCED with:**
  1. **The actual unit lost modeled, and**
  2. **Deployed synchronized reserves held at deployed energy amount (can be prepopulated, similar to IRD) until spin event is over.**
  3. **Uses short term emergency constraint limits.**
  4. **Reduce the reserve requirement by the deployed MW until spin event is over.**
- **Addresses cause of overshoot, avoids having to use load bias without an underlying forecast error.**

IMM Package: Performance Evaluation

- **Only for cleared synchronized reserve resources.**
- **Measurement of response: Status quo.**
- **For events ten minutes or longer:**
  - **Shortfall MW = Obligation – Actual response**

IMM Package: Settlements

- No calculation of overresponse.
  - Actual response is capped at the obligation.
  - Actual response = min(obligation, measured response).
- No portfolio offsetting for shortfall MW.
- Each resource individually clears and compensated for clearing reserves based on individual offers.
- Performance evaluation is consistent with clearing and compensation.

IMM Package: Pricing During Spin Events

- **Pricing during spin events should be consistent with supply and demand for dispatched reserves and energy.**
  - **Continue pricing based on 5 minute look ahead, most recent approved RT SCED solution.**
- **No retroactive pricing based on dispatched reserves.**
- **Subsequent approved SCED reflects impact of dispatched reserves in prices.**

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