Deployment of Additional DR Products with Stratified Strike Prices

Energy/Reserve Pricing & Interchange Volatility

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DR Operational Enhancements

- May 2013
  - Problem statement initiated by PJM
- June 2013
  - Issue approve by MRC and sent to CSTF
- July 2013 – November 2013
  - Discussed at the CSTF
- November 2013 MRC
  - CSTF main motion passes
- December 2013 MC
  - Main motion with 2 friendly amendments passes
- *December 24, 2013 – filed with FERC*

All Components

- Create Pre-Emergency/Emergency buckets
- 30-minute default lead time (2015)
- Reduce down time to 1 hour
- Mandatory compliance for all sub-zonal dispatch (2015)
- Reduction and stratification of offer caps
- M&V for sub-hourly deployments

Pre-Emergency/Emergency Buckets

- Starting June 1, 2014
  - Default is Pre-Emergency
  - Need an exception to qualify as Emergency

- Allows PJM to use a majority of its DR capacity without initiating emergency procedures

30-Minute Default Lead Time

- Creation of a 30-minute lead time bucket in addition to existing 60 and 120-minute
  - Voluntary for 2014
  - Mandatory for 2015
- Shrinking the lead time on DR will allow operators to call with more certainty on system conditions
- Should lead to
  - DR only being called when absolutely needed
  - More accurate quantities called
  - Better price-setting
  - Lower make wholes

Mandatory Sub-Zonal Compliance (2015)

- Currently compliance is not measured for sub-zonal dispatches
- Starting June 1, 2014, it will be measured and penalties will be assessed when the sub-zone is defined with 1-day's notice
- Starting June 1, 2015, remove the 1-day's notice clause

Reduction and Stratification of Offer Caps

- Proposed Methodology
  - 30-minute DR → $1,000 + (1 * Penalty Factor) - $1
  - 60-minute DR → $1,000 + (.5 * Penalty Factor)
  - 120-minute DR → $1,100
- Starting June 1, 2014
  - 30-minute DR → $1,549/MWh
  - 60-minute DR → $1,225/MWh
  - 120-minute DR → $1,100/MWh

Deployment

- Emergency/Pre-Emergency
- Three types of calls
  - System-wide capacity shortage
    - January 7th, 2014
  - Transfer Issues
    - January 23rd and 24th, 2014 (Mid-Atlantic & DOM)
  - Locational Constraints
    - September 10th, 2013 (ATSI)
    - January 22nd, 2012 (BGE & PEP)

Emergency/Pre-Emergency

- Typically Pre-Emergency will be loaded last economically, prior to an Emergency, due to ability to offer in excess of $1000/MWh
  - This does not need to be the case but typically will be
  - May be more economic than generation in some cases
- PJM will try to resolve any issues/deficiencies without entering emergency procedures when possible
- Pre-Emergency may be “skipped” in favor of lead-times and location

System-Wide Capacity Shortage Calls

- Deployment based on anticipated quantity needed and amount of DR in each bucket
- Will attempt to defer calling as long as possible and rely on shorter lead times as long as there is enough to cover what is needed
- Will call longer lead times when it is certain the DR is required
- Pre-Emergency likely deployed prior to or simultaneously with Emergency

Example – Anticipated RTO Capacity Shortage of 1700 MW

Product	Amount (MW)
PE-30	500
PE-60	1000
PE-120	2000
E-30	100
E-60	400
E-120	600

- In this case, PJM may be certain it needs some amount of DR, say 1,000 MW, but uncertain it needs to full 1,700 MW
  - t-120 → Call 1,000 MW of PE-120
  - t-60 → Call 500 MW of PE-60
  - t-30 → Call remaining needed in PE-30
- If PJM has not called enough DR at this point it can use the E-bucket
- Proportions will vary by scenario

Example – Unanticipated RTO Capacity Shortage of 1700 MW

Product	Amount (MW)
PE-30	500
PE-60	1000
PE-120	2000
E-30	100
E-60	400
E-120	600

- Resource trips in the RTO or under-forecasted load → 1,800 MW
- May require skipping longer lead times due to unforeseen issues
- Simultaneously call E and PE
  - ~~t-120 → Call 1,000 MW of PE-120~~
  - t-60 → Call all PE-60 and E-60 (1400 MW)
  - t-30 → Call all PE-30 and E-30 (600 MW)

Transfer Issues

- Usually caused by high loads in the Mid-Atlantic and Dominion and lower loads in the West
  - Can be outage-related as well
- Call is made to
  1. Reduce load in the Mid-Atlantic and Dominion
  2. Reduce transfer flows from west to east
- Will progress through Emergency/Pre-Emergency and lead times as permitted
- Will follow same concepts as System-Wide Capacity Shortage but calls directed to Mid-Atlantic and Dominion

Locational Constraints and Sub-Zonal

- Will call everything within the affected area
  - Difficult to discern impact of DR on localized constraints
  - DR in these areas is typically in small quantities. Trying to be too precise adds little to no value
  - Allows aggregation for CSPs throughout all products within the area/sub-zone