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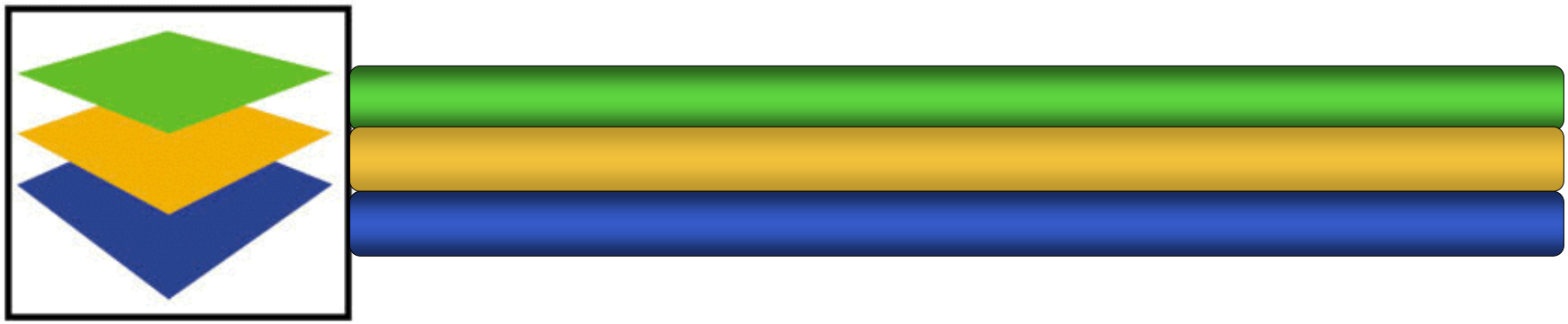

Demand Response Day-Ahead Reserve Participation

Presented by: Neenan Associates

Overview

- Some end-use customers have expressed an interest in participating in the NYISO's ancillary services markets
- NYISO Services Tariff already includes language allowing load's participation in these markets "to the extent ISO's software can support" it
- NYISO wants to develop the rules, protocols, and necessary software changes for a demand response program where end-use customers may provide certain types of ancillary services
  - 10 Minute Non-Sync Operating Reserves
  - 30 Minute Operating Reserves

Background: Operating Reserves (1)

- Suppliers of operating reserves must have 6-second interval telemetry with the NYISO and be able to receive basepoints at least every 5-minutes
- Allowable operating reserve quantities must exceed 1 MW and be in 0.1 MW increments thereafter
- Scheduled providers of operating reserves are paid the DAM market-clearing price for that specific type of operating reserve

Changes under SMD 2.0 (1)

- Offers to supply operating reserves will no longer have a quantity associated with them, but will be entirely dependent upon a pre-determined ramp rate for that resource
- In the DAM, a market-clearing price will be determined based on submitted availability bids and any Lost Opportunity Cost associated with resources backed down from supplying energy in order to supply operating reserves

Changes under SMD 2.0 (2)

- Resources scheduled to provide operating reserves in the DAM must buy out of their contract in Real-Time, at the market-clearing price for operating reserves, when dispatched for energy
- Previous non-performance penalties (i.e. reduction in availability payment and replacement energy charges) for failure to comply with a reserve pickup have been abolished
- LBMP will incorporate reserve shortage costs when next MW of NYCA load creates or increases reserves deficiency

Design Issues

- Verification Testing
- Energy Payment and Dispatch in Real-Time
- Restoration Period after Reserve Pickup
- Non-Compliance Penalty and Derating
- Joint Energy and Reserves Bidding Day-Ahead
- Aggregation & On-Site Generation

Verification Testing

- **Precedence**
  - Prior to submitting offers for operating reserves, generators must submit to testing their ramp rate in order to show maximum capability
  - ICAP/SCR Providers required to test
- **Frequency of tests**
  - Currently, most NYISO tests are on an annual basis
- **Type of test**
  - DMNC tests are scheduled with generators many months in advance
  - ICAP/SCR tests are randomly performed with roughly 24-hours notice

Energy Payment and Dispatch in Real-Time

- **Energy Payment**
  - DADRP rules ("Incentivized"): Energy payment to CSP and credit to LSE for long position
  - Alternative rules ("Unincentivized"): No energy payment to CSP, but credit to LSE for long position
- **Real-Time Market Dispatch**
  - During reserve pickups only
    - Infrequent energy payments provided
    - Limiting competition in energy market
  - Allow for economic dispatch
    - More frequent energy payments provided
    - Back-door way into the energy market
    - Enhancing competition in energy market

Restoration Period After Reserve Pickup

- Generators may be ramped down at the end of a reserve pickup to begin providing operating reserves again
- Loads may be unable to bring load back up as quickly as it was shed
  - RTS allows for Min Run Time of 15 Minutes to 1 Hour
  - ERCOT requires loads to return to pre-deployment load levels within 3-hours
- By not ramping down quickly after reserve pickup, scheduled reserve providers' ability to provide operating reserves is greatly reduced
  - Example: Load scheduled in HB 13-16 for 30 Min OR. For HB 14 a reserve pickup is executed for 1 hour. If load doesn't increase consumption in HB 15-16, is it still providing operating reserves, as scheduled?

Non-Compliance Penalty and Derating

- SMD 2.0 removed all penalties for non-compliance during reserve pickups because generators are assumed to want to generate electricity since it makes them more money and face a 2nd settlement obligation if they have a DAM reserve schedule.
- Persistent non-compliance could result in derating a resource's biddable "capacity"
- Loads may not have the same set of incentives to comply during reserve pickups that generators have

Joint Energy and Reserves Bidding Day-Ahead

- Through appropriate use of bidding parameters (i.e. ramp rate, max gen, min gen) SCUC should be able to schedule a load to provide either energy or operating reserves or both
- If a load is scheduled for both energy and reserves in the DAM, but fails to comply with the energy schedule in real-time:
  - Is there any impact on their reserves compliance?
  - What if a reserve pickup is initiated, does the load reduction count towards meeting the DAM or RTM energy requirement? (Compliance Priorities)
  - If derated for reserves due to persistent non-compliance, should there be any effect on energy offers?

Aggregation and On-Site Generation

- Direct Load Control aggregation programs could provide a sizable load reduction in a short period of time
  - Telemetering all “nodes” too expensive
  - Sampling methodology generally used to estimate performance
  - Locational distribution of “nodes” could present challenges with SCUC and RTS
- On-site generation could provide reserves but was excluded from participating in DADRP