Energy and Reserve Pricing & Interchange Volatility

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ERPIV: DASR Market Changes

Updated!!

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PJM and IMM Meetings

- PJM and the IMM have met several times between the meeting on Monday and today
- Goal is to align the proposals to the extent possible
- As a result, PJM and the IMM have arrived at a new proposal for how to adjust the DASR requirement for differences between DA demand and RT load and consequently allocate the cost of such adjustment

Original PJM Proposal

- The original PJM proposal was to adjust the DASR requirement on an hourly basis by the difference between the RT load forecast and the DA fixed demand
- The goal of this adjustment is to “gross up” the DA market to be consistent with the supply volume needed for the actual operating day
  - PJM would also commit long lead time units in the DA market (this is not changing)
- The original proposal did not include the impact of price-sensitive bids in the DA market
  - Price sensitive bids = INCs, DECs and price sensitive demand
- The reason was that the net impact of these bids can change day-to-day

Why the change?

- Based on the review of some detailed data with the IMM, PJM believes that price sensitive bids in the DA market need to be included in the calculation of the adjustment in order to arrive at the most accurate number
  - In some hours they contribute a significant amount of demand to the DA market (> 5000 MW) that if not accounted for would result in over scheduling

- However, because we don't know the amount of cleared price sensitive bids until after the DA market is complete, we need to estimate their impact

General Idea – DASR Requirement Adjustment

Hourly RT Load Forecast	**Hourly RT Load Forecast**
- Hourly DA Fixed Demand	**- *Adjusted Fixed Demand***
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Orig. DASR Req Adjustment	**-NEW DASR Req Adjustment**

- NEW DASR requirement adjustment includes the on-average impact of virtuals on HWA/CWA days by applying an adjustment to the fixed demand
  - More detail on next slide

Adjusted Fixed Demand

- Concept is to adjust the fixed demand by the average amount of additional demand in the market due to the net of INCs, DECs & PSD
  - MAX[0 , (DECs + PSD) – INCs] = Additional DA Demand
- Using this amount, scale the actual submitted fixed demand to account for any additional demand typically cause by clearing price sensitive bids
  - Result of this scaling produces the *“Adjusted Fixed Demand”*

- *DASR Requirement Adjustment would be the different between the hourly RT Load Forecast at noon and the hourly Adjusted Fixed Demand*

Estimating

- Because the amount of cleared price sensitive bids is unknown prior to setting the DASR requirement, it needs to be estimated
  - To estimate this, PJM will calculate a Price Sensitive Demand Factor (PSDF)
    - Not solely based on price sensitive demand bids
    - PSDF = cleared price sensitive bids / fixed demand
- The PSDF will be calculated separately for the summer and winter because bidding behavior is significantly different based on historical data
  - The summer PSDF will be based on the top 10 peak load days from May through October the of prior year
  - The winter PSDF will be based on the top 10 peak load days from December to March of the prior year

Estimating

- For each of the peak days
  - PJM will calculate the individual PSDF for each “peak” hour
  - Average the “peak” hourly values for a day to come up with a daily value
  - Average the daily values for each of the 10 days (summer or winter) to come up with the PSDF for that season

  - Peaks hours are…
    - For the summer days hours ending 14-19
    - For the winter days hours ending 7-10 and 17-20

For the top 10 all-time winter peak days the PSDF is 3.8%

For the top 10 all-time summer peak days the PSDF is 1.6%

Use of the PSDF

- The PSDF represents the average percentage of demand in the DA market from price sensitive bids as a fraction of the fixed demand
  - Typically on the order of 2-5% depending on the day
- The PSDF would be used to scale up the fixed demand on an HWA/CWA day prior to calculating the DASR requirement adjustment

  - Example
    - PSDF = 4%
    - Fixed Demand = 100,000 MW
    - Adjusted Fixed Demand = (1 + PSDF) * Fixed Demand = 104,000 MW

PSDF

- The PSDF adjusts up the fixed demand to account for the average demand from price sensitive bids in the DA market during peak hours
- The adjusted demand is then used to calculated the DASR requirement adjustment

  – Example
    - RT Load Forecast = 106,000 MW
    - Adjusted Fixed Demand = 104,000 MW
    - DASR Requirement Adjustment = 2,000 MW

Result

- This methodology is being used to recognize the fact that price sensitive bids can significantly impact the amount of cleared demand in the DA market
- The net result is that it will make the DASR Requirement Adjustment smaller than PJM had previously proposed without the incorporation of it
  - It will decrease by the average amount of additional demand cleared in the DA market from price sensitive bids during peak hours

DASR Cost Allocation

DASR Charges will be allocated in two buckets

- Base requirement and additional reserves committed for operational uncertainty
  - Allocated to real-time load
- Additional DASR requirement resulting from differences in Day-ahead demand and RT load
  - Allocated to differences in Day-ahead demand and Real-time load when participant is a net purchaser that underbid their demand day-ahead
    - Day-ahead demand is the sum of fixed demand + price sensitive demand + decs - incs

Energy and Reserve Pricing Manual Revision Summary

- Manual 11: Energy and Ancillary Service Operations
  - 2.3.6 – Added commitment of long lead resources in the day-ahead market
  - 2.5 – Added details on second step on Synchronized Reserve and Primary Reserve demand curves *(becomes effective only after approval of associated FERC filing)*
  - 2.8 – Clarified first step on demand curve is used in pricing when in voltage reduction / load dump action
  - 2.9 – Clarified first step on demand curve is used when calculating max possible energy price
  - 4.2.2 – Added business rules on the increase to the Synchronized Reserve and Primary Reserve Requirements
  - 4b.2.2 – updated reference to single step demand curve

Energy and Reserve Pricing Manual Revision Summary

- Manual 11: Energy and Ancillary Service Operations, continued
  - 11.2.1 - Added business rules on the increase to the DASR Requirement
  - 11.2.3 – Updates to the calculation of the DASR Offer quantity
  - 11.2.8 – Referenced separate cost allocation for the base and additional DASR quantities *(becomes effective only after approval of associated FERC filing)*
  - Other minor revisions to clean up formatting and references to retired applications

- Manual 28: Operating Agreement Accounting
  - Section 19 – Added DASR cost allocation changes

Questions or suggested revisions to the manual language may be sent to lisa.morelli@pjm.com

Interchange Volatility Manual Revision Summary

- Manual 11: Energy and Ancillary Service Operations
  - Section 7 – added interchange cap business rules
  - Other clean up changes related to ExSchedule implementation

- Regional Practices
  - Section 2.1.2.2 – updated submission timeline for real time with price transactions to 18:00 day-ahead
  - Section 2.1.2.6 – new section to reference interchange cap rules in M11.