Analysis of Residual Unit Commitment Results in MRTU Structured Testing

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Some market participants raised concerns about RUC market simulation results in November and December

- To address these concerns the ISO conducted an investigation into RUC market simulation results to:
  - Summarize the RUC prices, procurement quantities and procurement costs for the period of December 6, 9 – 12
  - Explain certain outcomes in structured testing, specifically the procurement of RUC capacity from non-RA capacity when zero-priced RA capacity appeared to be available.
The ISO examined RUC results for 24 hours of the five days of structured testing, December 6 and 9-12, 2008.

- The ISO’s principal findings of the analysis were as follows:
  - RUC LMPs for the majority of the hours during the five day period were at zero or close to zero
  - The total cost to the market for the test period for RUC awarded to non-RA capacity was only $94,882 for 1,566 MW
  - Quantities of RUC awarded to non-RA capacity were small relative to the quantity of RUC capacity procured
A number of conditions in structured market simulation differed from what will exist in live production

- Submission of bids for non-must offer RA resources
  - Based on set formula that will not exist in real world
- Maximum Energy Constraint set at 90%
  - Now set at 99%
- Adjustment to RUC Target based on expected Real-Time incremental supply and intermittent resources
  - Not factored in for market simulation
- Base Case scenarios
  - Created specific market conditions in order to test certain aspects of market performance
With the exception of Dec 10 there were very few hours where non-RA capacity was awarded RUC.
When RUC Awards did occur the quantities were minor ranging from a min of 11 MW to a max of 117 MW.

![Graph showing RUC Award MW vs. RUC Capacity over operating hours from 12/6 to 12/12.]

- RUC Award MW
- RUC Capacity
Prices were moderate with the majority of hourly RUC LMPs at $25 or less and only four hours with prices over $100MW.

For the entire structured test period the cost to the market for RUC Awards was $94,882 for 1,566 MW of RUC Capacity.
88% of the nodal prices over the 5 day period were zero or very close to zero within a range of -$10 to +$10.
The analysis the ISO used to determine causal factors of RUC prices was based on the decision tree shown below.
RA capacity was short across the peak hour by approximately 5000 MW

- Peak load forecast in structured simulation was 46,000 MW
- Approximately 18% of July RA showing (Approximately 9400 MW out of 52,000 MW) is non-resource specific
- 2700 MW is emergency Demand Response which does not participate in the market
- In HE 16 on December 10 about 78% of the total July RA showing which was made up of Generation and Interties was bid into IFM

For more information see the “Review of California ISO MRTU Structured Simulation Results” by Department of Market Monitoring posted at http://www.caiso.com/2338/2338847e69480.pdf
Most RA capacity not utilized in RUC was RA capacity associated with resources that did not have an IFM schedule.
The quantity of quick start RA capacity not utilized was very small in most hours with the exception of Dec 10.
RA Capacity was skipped and Non-RA capacity was awarded RUC for the following reasons:

- Maximum energy constraint binding in all hours and days of structured simulation except for December 10
- More economic to procure small quantities of non-RA capacity from on-line units and avoid SU/ML costs
- Ramp limitations prevented the use of some RA Resources
- Intertie scheduling points at maximum capacity in some hours on several days
- Colgate nomogram congestion on several days
- Other transmission congestion
Additional parameters will be set in production that will moderate quantity of RA capacity procured

- Adjustment to RUC Target based on expected Real-Time incremental supply and intermittent resources
- Maximum energy limit in RUC set to a high enough level as not prevent the RUC procedure from procuring additional minimum load energy when economic to do so
The ISO is confident that the results and performance of RUC are consistent with FERC-approved design

- Findings indicate that there are no flaws in design or implementation to jeopardize successful launch of MRTU
- The ISO is committed both before the March 31 launch and in production to monitor the performance and results of RUC and all other elements of the new market structure
- ISO will continue discussions to ensure compatibility with RUC design and Convergence Bidding