



FERC TECHNICAL WORKSHOP

PRICE FORMATION IN ENERGY AND ANCILLARY SERVICES MARKETS OPERATED BY RTOs/ISOs – OPERATOR ACTIONS

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OPERATOR ACTIONS

- In most cases, we do not know what out-of-market actions the Grid Operator is taking, which is why it is helpful to have this discussion.
- The Grid Operator will be concerned about revealing its actions:
 1. The Grid Operator will fear that market information will be misused by market participants.
 2. The Grid Operator will likely not want to be judged, measured or have its actions reviewed.
- LMP prices should incorporate and reflect operator actions. This is how the Grid Operator indicates what is going on.
- LMP prices should reflect fundamentals, essentially an economic dispatch stack.
- When prices do not reflect fundamentals, it is important for the market to understand why.

OPERATOR ACTIONS – LOAD FORECAST

- *Do last minute changes to the load forecast affect HASP and RT prices?*
- HASP intertie schedules are awarded in 15-minute blocks based on an “indicative” price, but settled based on 5-minute real time dispatch of CAISO controlled generation.
- For example, manual operator adjustment of the Hour Ahead CAISO system load forecast upwards can increase HASP imports, potentially over procure, and then drive down real time prices. HASP interties are then settled at a price lower than the indicative, or bid, price, resulting in a loss for the importer.
- Transparency in the load forecast and any manual intervention would be very important information for the market.
- In addition, alignment of the settlement price for HASP intertie schedules (and their bid price) and RT imbalance energy would improve the market.

OPERATOR ACTIONS – NOTIFICATIONS

- *Advance notification of nomograms and minimum generation requirements can help moderate significant price swings.*
- The Grid Operator will periodically make changes to the grid, taking transmission lines out of service, implementing nomograms or adding or removing local generation requirements.
- These changes can have significant impacts to the market. For example, on September 29, 2013, the CAISO lifted the So Cal binding constraint, which removed a limit of approximately 40% of local So Cal generation to be on-line. This had immediate impacts on both short term and long term SP markets. In 4 days, the short term heat rate dropped from 13.7 to 13.3. Longer term, Cal 14 dropped from 11.6 to 11.2 and Cal 15 dropped from 11.4 to 11.0, reflecting the market's expectation of lower cost imports. Potentially, longer term notification, such as a minimum of 6 months, can better moderate market impacts and the very significant resulting price impacts to the market.

OPERATOR ACTIONS – OASIS DATA

- *Does inconsistent OASIS data undermine the market?*
- For 15 days, from October 15-31, 2014, the CAISO published positive SP15 losses at the hub. It makes sense that the LMP loss component is negative, as power plants are generally constructed away from load. The price signal is inconsistent with fundamentals and the Grid Operator should be able to explain the cause, and fix the issue if needed.
- As recently as December 3-4, OASIS posted shadow prices which were significantly different than the MCC (marginal congestion component) of the LMP price at Palo Verde. The shadow price at PV was -\$7 while the MCC was -\$49. It is helpful to have an understanding of how prices are being set when data is inconsistent.

OPERATOR ACTIONS – OASIS DATA (2)

- *Does inconsistent OASIS data undermine the market?*
- During the period of December 3-4, OASIS posted HL (Heavy Load) prices of \$51 at SP, \$41 at NP and -\$3 at Palo Verde. Palo Verde was derated from 3300 MW to 937 MW. But OASIS showed no congestion across Path 26, so NP and SP prices should have been aligned (ZP equaled NP). Again, information that does not reflect fundamentals should be explained to the market. What happens when market participants don't understand the market fundamentals? They default (and raise forward prices) to the ISO model even though it doesn't make sense. Although a new nomogram was announced, there was no information about it available.
- In May, the ISO removed many intertie flow data points from OASIS. The CAISO restored some points subject to an NDA in October. We are still awaiting the posting of some 30 data points removed. Information is important and helpful for a well functioning

OPERATOR ACTIONS – OASIS DATA (3)

- *Does inconsistent OASIS data undermine the market?*
- For the second half of October 2014 and into November, the NP DA market renewable solar forecast showed an unexplainable drop in quantity from 800 MW to 300 MW. Does this affect thermal dispatch for the DA market? Does the ISO then over procure in the DA due to the drop in the NP DA solar forecast?
- Two 230 KV lines coming into the IV substation on the same bus have significantly different prices. Why?
- Transmission outage data is provided daily, but in an Excel spreadsheet that becomes very difficult to evaluate or determine impacts. Is there a better way to get information to market participants, possibly through a grid model, to reflect the status of the grid? Could the CAISO allow the grid model to be used to forecast prices? Currently, the NDA restricts use severely, and limits use to CRR evaluation only.

OPERATOR ACTIONS – DISPATCH ERRORS

- *Does price still align with economic dispatch?*
- Generation units, in particular, peakers, are now more consistently picked up in economic order. However, lower volatility has reduced the need for peaking generation. Some peaking units were skipped in February (\$157/MWhr LMP), June (\$112/MWhr) and October (\$151/MWhr).
- Incorporation of the gas price into the DA LMP remains a problem. It would be helpful for market participants to be able to provide an offer, which included variable cost, opportunity cost and actual DA gas prices including gas pipeline penalty costs and GHG costs. It is becoming increasingly difficult for the CAISO to actually calculate a variable cost for unit commitment. Recent stakeholder processes indicate CAISO interest to calculate default opportunity costs for peakers. This is a highly complex process, likely more difficult than the CAISO has anticipated.

OPERATOR ACTIONS – MARKET RULES

- *Are some market rules in need of review?*
- CRR underfunding may call for a review of the structure of CRR payments, and may warrant a physical component.
- Will DA gas prices be reflected in DA LMPs after the M-1 and M-2 electric-gas market coordination proceedings? Currently, a CAISO market participant must guess its CAISO dispatch, purchase gas at 5:30 a.m. day ahead, and schedule that gas at 9:30 a.m. PST. The ISO issues dispatch schedules at 1 p.m. and then the market participant must adjust the gas schedule in the 4 p.m. intraday nomination cycle. This results in a less efficient and more costly gas procurement process, with LMP prices, or at least all commitment costs, not reflecting DA gas prices. This was a significant problem in February 2014.
- Do we need an interim solution to fix 15-minute HASP intertie schedule settlements to ensure recovery of bid cost?

OPERATOR ACTIONS – OTHER ACTIONS

- *Are some market settlements in need of review?*
- T+3 settlement data is often incorrect, but revised at T+12. However, this becomes a problem at the end of the month, as customers are billed on CAISO data. Accurate and timely data is very helpful in a well functioning market.
- Since May, renewable generators are not paid for energy when they are off of their ISO provided schedule, due to the revised definition of Residual Imbalance Energy. When a generator is off schedule from their RT ADS dispatch in the imbalance energy market, they are settled at their variable cost. However, the variable cost on a wind turbine is \$0. Thus, the ISO does not pay wind generators when they provide energy in excess of the ISO provided schedule. We have suppliers who are owed millions of dollars in this seemingly erroneous situation.

FLEXIBLE CAPACITY

- The addition of intermittent Variable Energy Resources creates a reliability problem.
- We can have a solution which is consistent among RTOs, with FERC guidance, or we can let individual states create disparate solutions.
- The Grid Operator desires reliability. A Flexible Reserve capacity product would allow the Grid Operator to procure flexible capacity to match its forecast uncertainty associated with VERs. This can be day ahead or a forward term as desired by the RTO.
- The Grid Operator may still use real time/imbalance energy to meet this need, however, real time energy is typically economy, or as available energy. While it is economically efficient to utilize real time energy and 15-minute intertie scheduling, ultimately, the Grid Operator needs some quantity of reserves as a back up. These reserves should not be Operating Reserves, which are needed for other events.

FLEXIBLE CAPACITY (2)

- Prior to the Flex RA LSE requirement in California, the CAISO would periodically award schedules and capacity payments to units which it relied upon for flexible capacity.
- These awards were only known upon receipt of settlements.
- Suppliers were eager to obtain these additional payments, however, it was impossible to know who would get awarded or when.
- A Flexible Capacity reserve product may provide a solution which has price and quantity visibility to the market, and be an economical solution to the need to firm Variable Energy Resources.

OPERATOR ACTIONS – WHAT DO WE NEED?

- *Transparency – Let the market understand why LMP prices and dispatch does not reflect fundamentals. Let the ISO/RTO work with market participants to further incorporate those actions into LMP prices.*
- *Fix the default energy bid structure, to allow market participants to bid units, including start-up and minimum load (commitment) costs, to include DA gas, opportunity, GHG and pipeline penalty costs.*

