Operator Actions and Price Formation

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Introduction

- The actions of RTOs have a larger effect on market outcomes than the actions of any market participant.
- These comments focus on three key areas where operator actions or market modeling can undermine price formation:
  - ✓ Unmodeled constraints;
  - ✓ Actions to prevent operating reserve shortages; and
  - ✓ Managing and pricing constraint violations.
- As the market monitor for four RTOs, we've made numerous recommendations to improve price formation by preventing these issues from undermining market prices.
- This presentation describes each of these areas and the potential improvements that can be made to the RTOs' market rules/designs.

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Operator Actions to Avoid Shortages

- Most RTOs have implemented the most efficient form or shortage pricing available – demand curves for operating reserves that are jointly optimized with the RTO's energy market.
- Unfortunately, RTOs have reliability obligations to take actions to avoid shortages even when such actions are more costly, including:
  - ✓ Curtailing load/activating demand response;
  - ✓ Curtailing exports;
  - ✓ Committing high-cost resources;
  - ✓ Calling on emergency resources or emergency ranges on online units;
  - ✓ Recalling external capacity resources; and
  - ✓ Implementing voltage reductions.
- While these actions can eliminate the shortages, they generally artificially depress prices by changing the supply/demand balance (absent an approach to protect the prices).

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Operator Actions to Avoid Shortages

- NYISO and MISO have developed software that allows inflexible resources to set prices when they are needed.
  - ✓ This software determines whether the resources are needed to meet the systems requirements (i.e., whether they can be shut down).
  - ✓ Units that are needed can set prices, even when they are at their minimum output level and, therefore, not marginal.
- This software could be applied to price inflexible demand response and other operator actions.
- Supply that is acquired through emergency procedures should be priced at shortage pricing levels to prevent them from depressing prices.
  - ✓ For example, the emergency output on an online unit should be assumed to have costs > $1000/MWh.
  - ✓ This will minimize its dispatch so it will only be utilized if needed.
  - ✓ It will also prevent it from displacing market-based resources/output and lowering prices.

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Un-Modeled Constraints

- Our number one principle for RTO market design is:

  Maximize consistency between market requirements and reliability requirements
- This principle allows the markets to efficiently satisfy and price the system's needs.
- In doing so, it reduces the need for operator actions and reduces uplift costs.
- It is particularly important to model all requirements that can be satisfied by multiple resources or solutions in the:
  - ✓ Short-term (the day-ahead and real-time markets); or
  - ✓ Long-term (through investment in transmission or generation).
- In some cases, only one unit can satisfy the need, which can cause a contractual solution to be appropriate.

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Managing Scarce Transmission

- All RTOs employ a modeling parameter to specify how valuable it is to keep the flow over a transmission constraint below its limit.
- These parameters have many names, including:
  - ✓ Marginal value limits (MVLs);
  - ✓ Constraint penalty factors; and
  - ✓ Transmission constraint demand curves (TCDCs)
- They play a pivotal role in the RTO's dispatch and its prices.
- In the dispatch, they limit the redispatch of generating resources to manage the constraint.
  - ✓ For example, if the MVL is $1000/MWh and redispatching units needed to relieve the constraint would cost $1200/MWh per MW of flow, the constraint will be violated and its congestion costs will be capped at $1000/MWh.
  - ✓ Capping the dispatch can cause the operator to take out-of-market actions to relieve the constraint, including commiting high-cost units, manually dispatching units, reconfiguring transmission, or raising the MVL.
  - ✓ A "shadow cost" of $1000/MW for a constraint is relatively common and translates to LMP effects of $20 to $100 per MWh.

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Managing Scarce Transmission

- This MVL/Penalty factor structure and the accompanying operator actions raise several concerns:
  - ✓ These parameters substantially affect market outcomes, but are not filed or approved by FERC for a number RTOs.
  - ✓ When RTOs change them discretionarily, it can substantially affect prices and this discretion is not prescribed in many of the RTOs' tariffs.
  - ✓ Increasing these parameters during operation to acquire more relief may indicate that the constraints were undervalued previously.
  - ✓ Lowering these parameters during operation may indicate that the RTO is attempting to manually reduce congestion costs.
- These concerns could be addressed by:
  - ✓ Establishing parameters that reflect the reliability value of managing the constraints (which likely varies on a constraint-by-constraint basis).
  - ✓ Filing these values so they are known and approved by FERC.
  - ✓ Filing tariff provisions that specifies the procedures and authority for RTOs to modify the parameters.

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Managing Scarce Transmission

- In addition to specifying the parameters in the tariff, the most important pricing issue is that they ***set prices when the constraint is violated.***
  - ✓ If an RTO has set its MVL to $1000, it will utilize all redisatch up to $1000 to manage the constraint.
  - ✓ If the last redispatch it needed cost $999, its LMPs will reflect this shadow cost.
  - ✓ However, when the constraint becomes violated, some RTO's "relax" the constraint to set a shadow cost less than the MVL and reduce the resulting congestion shown in the LMPs.
  - ✓ Conditions are worse and reliability diminished when constraints are violated, so reducing the priced congestion by relaxing the constraint is difficult to justify and generally inefficient.
- MISO has discontinued this practice for most constraints, but this practice had been eliminating roughly $300 million in congestion costs per year.
- This raises serious price formation concerns, affecting day-ahead market commitments, investment, retirements, etc.

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