Stakeholder Comments

CAISO Generator Contingency & RAS Modeling Enhancements Issue Paper

Submitted by	Company	Date Submitted
Wei Zhou – (626)302-3273	Southern California Edison (SCE)	5/13/2016

SCE appreciates the opportunity to comment on the California Independent System Operator (CAISO) Generator Contingency & RAS Modeling Issue Paper (Issue Paper)[1]. SCE also appreciates the CAISO's openness in hearing potential solutions from participants in developing its proposal.

In the Issue Paper, the CAISO described that contingency reserves may not be fully deliverable without manual intervention under generation contingencies and that Remedial Action Schemes are not explicitly modeled in the CAISO markets. To improve the deliverability issue, and to the extent that a market design change is warranted, SCE recommends that the CAISO focus on defining more ancillary services (A/S) zones for more granular A/S procurement, rather than changing energy dispatch & pricing algorithms. At its core, this is an ancillary services issue, not an energy issue.

SCE also suggests that the CAISO combine this initiative with the Contingency Modeling Enhancements (CME) Initiative, as both are intended to address contingency modeling and share a list of similar issues.

1. The CAISO should evaluate the magnitude of the problem it's experiencing today.

As stated in the Issue Paper, today the deliverability is ensured through manual intervention if the market solution can't meet deliverability requirements. This likely is the most economic approach, given that the probability of losing a large generator AND a procured reserve being undeliverable as a result is small. If deliverability has to be addressed within the market simultaneously for single generation contingencies, which can represent a large contingency set, the market can be constrained and lead to expensive solutions regardless of the probability of contingency events.

In order to evaluate the scope and the magnitude of the problem, the CAISO should provide historical information such as the frequency of generation loss, the statistics (frequency, MW by zone) of undeliverable A/S, manual intervention (including exceptional dispatch MW) and the associated cost. This information is essential for stakeholders to assess the magnitude of the problem the CAISO is experiencing today.

2. The CAISO should consider combining this initiative with the on-going Contingency Modeling Enhancements initiative

Since this initiative and the CME initiative are intended to address contingency modeling, SCE recommends that CAISO combine the two. Under a new, combined initiative, a more comprehensive

[1] CAISO Generator Contingency & RAS Modeling Issue Paper, dated April 19, 2016, available at http://www.caiso.com/Documents/IssuePaper-GeneratorContingencyandRemedialActionSchemeModeling.pdf

approach can be developed to avoid any overlap[2]. Both initiatives share a list of similar issues as shown below; a collective approach may resolve these common issues and thus improve design efficiency. In contrast, solutions developed under separate efforts could further complicate the existing market design, A/S procurement and market settlements.

List of common issues under this initiative and the CME initiative

- How to ensure sufficient and deliverable reserves when a contingency occurs
- How to address a physical/real-time problem in the day-ahead time frame
- What are the costs and benefits given small probability of a contingency
- How virtual bids will be treated
- How does it impact the CRR market
- How does it impact the existing standard LMP pricing
- What are complexities it introduces

3. To improve reserve procurement and reduce exceptional dispatches as intended, the CAISO should consider defining more A/S zones for more granular A/S procurement, rather than changing energy dispatch & pricing algorithms

Based on SCE's review of the issue paper and involvement on the CME initiative, SCE recommends that the CAISO evaluate the approach of defining more granular A/S zones to address issues in both initiatives. SCE believes that this is an A/S issue, not an energy issue and many of the design issues as listed above can be better resolved under this approach. For example, virtual bids, the CRR market and LMPs would likely not be impacted under this approach. By defining more A/S zones and procuring appropriate amount in each zone, the deliverability issue of reserves can be largely addressed[3] and the grid operator will have more visibility to reserve capacity in those zones. Under normal conditions, procurement quantities can be based on a methodology similar to how ancillary services are zonally procured today. This approach can also provide flexibility should it be needed under un-anticipated system conditions[4].

Further, more granular A/S zones can be established consistent with Local Capacity Requirement (LCR) areas, or the areas connected by major WECC paths, or other methodologies based on operational needs (such as the concept of generation pockets and load pockets).

4. The CAISO should consider defining new potential A/S zones aligned with generation/load pockets that have deliverability issues

[2] Since the Contingency Modeling Enhancements Initiative is still ongoing and key design elements haven't been finalized, this is the best time to combine the two initiatives, given that both have a similar scope.
[3] In a similar fashion that the congestion between SP15 and NP15 is addressed under the current design.
[4] Such as under the Aliso Canyon Gas-Electric Coordination effort (p.26 , on the need of reducing A/S procurement from So Cal Gas units; and p. 18 there are multiple So Cal Gas zones in which gas availability can impact resources in the zones, Revised Draft Final Proposal, available at http://www.caiso.com/Documents/RevisedDraftFinalProposal_AlisoCanyonGas_ElectricCoordination.pdf)

Given that there are more than one thousand resources internal to the CAISO, likely there will be challenges in determining which resources should be included as generator contingencies. For example, if the set of the resources that are considered as generator contingencies is too large, it can create performance issues with market solution time, and such set can only grow as the market footprint expands. If the set is too small, it may not address the deliverability issue as intended. In addition, the interaction of such set to unit commitment is unclear but can be complicated. For example, should this set itself be dependent on which resources are committed in the market? Should it be static, similar to how single transmission contingencies are defined? Or should it be dynamic, as a unit not committed may not be considered as a contingency? Any unit commitment status change between the day-ahead and real-time markets can further complicate the issue.

During the stakeholder conference call, it was stated that one of the drivers for undeliverable operating reserve is when the reserve is procured in a generation pocket while there may also be a lack of transmission capacity to deliver such reserve to a load pocket. Therefore, SCE believes that the CAISO should evaluate whether it would be more effective to define generation and load pockets as A/S zones. Likely the deliverability issue can be largely resolved by more granular A/S procurement in the new zones.

5. The CAISO should provide clarification on the RAS modeling interaction with unit commitment and virtual bids

As described in the Issue Paper, RAS impacts are not explicitly modeled in the CAISO markets today. Although work-around may be possible to adjust a flow limit to approximate a RAS, the model today can't fully capture the sequential nature of RAS. By fully modeling the sequential nature, i.e., by modeling the loss of a pair (a transmission line loss followed by a generator trip), it could lead to more economic market solutions under certain conditions[5], thus an improvement to the markets.

Since a RAS represents a physical constraint, the CAISO should clarify how they would interact with virtual bids. There are two possible scenarios:

- If the generator is not committed by the optimization, then the transmission contingency will look just like other transmission contingencies.
- If the generator is committed, under the RAS, the transmission contingency will look different than a typical transmission contingency.

In other words, how the transmission contingency would be modeled, and the resultant flow limit, can depend on the unit commitment. While virtual bids may affect the unit commitment and thus could undo what the RAS intends, the virtual bids would take a financial loss based on difference in the clearing price between the day-ahead and real-time markets. The CAISO should clarify whether these understandings are correct and whether the resultant flow limit would also depend on the dispatch level (MW) of the generator, in addition to its commitment status.

[5] In comparison, if only the loss of the transmission line is modeled as a contingency without modeling the generator loss, even if the generator would trip to mitigate the transmission loss per RAS, the solution may be overly conservative and thus more expensive.