Comments on Contingency Modeling Enhancements Straw Proposal

Department of Market Monitoring
May 30th, 2013

The Department of Market Monitoring (DMM) appreciates the opportunity to provide comments on the Contingency Modeling Enhancements Straw Proposal

- DMM supports including the corrective constraints in the optimization. This should allow the ISO to more efficiently manage the 30-Minute contingency requirements through market processes, appropriately price the cost of meeting these constraints and compensate resources helping to meet these requirements.
- DMM does not support allowing separate bids for corrective capacity, since there does not appear to be any incremental costs associated with providing corrective capacity that are not covered by the LMPC – which will equal or exceed a resource's opportunity costs for providing this capacity.
- The additional demand for capacity and ramping services going forward may increase the potential for abuse of market power, especially if additional requirements are defined on smaller topologic regions. This issue can only be addressed as specific corrective capacity constraints are defined by the ISO.
- We also recommend removing the option for resources to bid-in their ramp rates, since market power can also be exercised by using bid-in ramp rates to physically withhold corrective capacity (or other ramping energy and capacity) from the market.

Advantages of the Preventive-Corrective Framework

The corrective constraints should allow the ISO to more efficiently manage the 30-Minute contingency requirements through in-market, optimized dispatches. DMM supports this approach on the basis that it should more efficiently procure capacity that is currently reserved through of out of market, non-optimized, manual operations. In addition, this new feature will require identifying which constraints require corrective capacity and a very specific formulation of the demand. The more precise and dynamic definition of demand, along with a procurement that leverages both capacity and power flow, will result in a least-cost in-market solution.

Historically, the ISO has met the corrective capacity requirements through on-line unloaded capacity and has manually committed and dispatched resources when needed to make additional corrective capacity available in real-time. The costs incurred from manual dispatch for corrective capacity are associated with the energy (and start-up, when applicable) a resource produces in order to be positioned to have unloaded ramping capacity. This energy is not eligible to set LMPs and there is no pricing of, or payment for, the resulting unloaded capacity that is counted toward meeting the non-modeled requirements for corrective capacity. The proposed corrective capacity product will value and pay for the corrective capacity and will also appropriately reflect the energy re-dispatch cost to obtain that capacity in the energy LMP.

Some stakeholders have commented that a benefit-cost analysis should be performed comparing the proposed product to the existing framework for meeting the corrective capacity requirements. This comparison is inappropriate as it would omit several important pricing and compensation issues inherent in the existing framework. The existing framework may appear lower-cost on the surface since there is no payment for the capacity that meets the requirement. Moving procurement into the spot market and co-optimizing with other energy and reliability products recognizes the persistent need for this service and appropriately values it through co-optimization with other spot energy and reliability products.

Breakdown of Price Components

Figure 1 breaks the LMCP and energy LMP into general components for comparison. DMM notes that while a resource may receive both energy and capacity payments, megawatts that are producing energy will not be paid the LMCP and megawatts providing corrective-capacity will not be paid the LMP. That is, a megawatt can only provide one service or the other, and only be compensated for one or the other.[1]

Both the LMP and LMCP have power balance components. For the LMP, the System Marginal Energy Cost is the value of the marginal megawatt of energy in keeping the power balance constraint in the base dispatch from being violated. The LMCP includes the shadow value on the power balance constraint in the corrective-contingency case, referred to here as the Contingency Marginal Capacity Cost. This represents the marginal value the corrective capacity provides in ensuring that it is feasible to re-dispatch resources post-contingency without dropping load during the recovery period, a key part of the reliability requirement.

Figure 1 - Locational Price Components (at same location)

		Power Balance		Cong. (Preventive)		Cong. (Corrective)
LMP	=	System Marginal Energy Cost	+	$P_{Cong,\ N-1}$	+	$P_{Cong,Corr}$ same as in LMCP
LMCP	=	Contingency Marginal Capacity Cost	+	0	+	$P_{Cong,Corr}$ same as in LMP

The preventive congestion component of the LMP, derived from the marginal congestion costs on the preventive constraints, represents the value of energy at the location in relieving, or cost in congesting, the preventive-constraint. The preventive congestion component for the LMCP will always equal zero, because the corrective-capacity will have no value in relieving the preventive constraints.

The corrective congestion component of the LMP represents the value of *energy* at the location in relieving, or cost in congesting, the corrective-constraint. This is consistent with the preventive congestion component, except that the corrective constraints are

[1] However the same capacity may provide both A/S and corrective services, but as explained below, this will not result in over compensation.

currently not modeled. The corrective congestion component of the LMCP represents the value of *corrective-capacity* at the location in relieving the corrective-constraint. The corrective congestion component will have the same value for the LMP and LMCP at the same location because one megawatt of *energy* will be just as effective as one megawatt *capacity* in relieving the corrective constraint.

As is shown in the straw proposal the Locational Marginal Capacity Price (LMCP) does not create double payments to resources that provide capacity effective on more than one constraint. Similarly, resources receiving both A/S and corrective capacity payments will not receive double compensation for these products. This is because the shadow prices will be incremental and their sum will never be more than the marginal value of the capacity at that location. To the extent that a resource can provide both A/S and corrective capacity, the combination of the ASMP and LMCP will signal this value, and the market will more likely procure capacity that is effective for both these reliability requirements rather than procure each type of capacity separately from more resources. In this way the corrective constraints may also improve the procurement of AS capacity, helping to locate it where it is more valuable and less vulnerable to being undeliverable post-contingency.

No Need for Separate Bidding of Corrective Capacity

DMM is not aware of any costs associated with providing corrective capacity that are not covered by the LMCP (which will at the very least cover opportunity costs). A resource's energy bid states its willingness to produce energy or leave capacity unloaded (that is, its willingness to provide capacity). For purposes of corrective capacity procurement, the energy bid is an implicit capacity bid which the Preventive-Corrective framework leverages to find the cost minimizing solution that meets the model constraints and correctly compensates capacity provided. Because the corrective capacity will be re-optimized in the real-time market, corrective capacity sold day-ahead can be converted to energy or other capacity awards in real-time if it makes economic sense to do so. Thus, there is no foregone opportunity to sell energy or capacity in real-time due to corrective capacity awards in the day-ahead market. Because there is no identifiable cost associated with providing corrective capacity, under competitive conditions we would expect to see price-taking offers if bidding were allowed. Under these circumstances there is not clear justification for allowing offers in the corrected capacity product.

Potential for Market Power in Corrective Capacity LMCP

The corrective constraints can be resolved in three general ways, with the LMCP being set differently in each case.

1. The marginal cost of moving a resource to a dispatch point where it can provide one more MW of capacity (or marginal value of moving it back down).
2. The marginal value of allowing one more MW to flow over a transmission line.
3. The opportunity cost of energy not sold due to holding the capacity in reserve.

In the first case, the LMCP can be increased by raising the energy bid. In this case existing mitigation measure would apply.[2]

Under the second case, the LMCP could be raised through higher energy bids on the congested side of the constraint, and current mitigation would apply, or by reducing energy prices on the uncongested side of the constraint. Because uncongested areas are generally assumed to be competitive, it is less likely a resource could influence prices to a significant degree. Therefore, the second case represents is less of a market power concern.

The third case is where market power could be exercised by bidding below true marginal costs.[3] Existing measures would not be able to mitigate this market power.

In order to exercise market power in corrective capacity through submitting low energy bids, a generator would need to have a sufficient amount of the available 20-minute capacity in a location where the LMCP is set by the opportunity cost of reducing energy production to reserve corrective capacity. It is not clear how frequently the LMCP will be set by energy opportunity cost, however with constraints covering larger topological areas (as is the case in the ISO proposal) we believe that the LMCP will be more frequently set by moving resources upward to achieve greater ramp capability or reserving existing online unloaded ramp capacity that is higher-priced (in energy) and has zero opportunity cost. While it appears less likely to occur, this third case where market power may be exercised by lowering the energy bid price should be monitored for.

DMM does have a more general concern with market power in ramping energy and capacity. Additional demand for flexible capacity through the introduction of corrective capacity constraints, flexible ramping product, and potential increase in ancillary service requirements may reduce regional competitiveness for capacity and ramp. Currently, the requirements for these existing and proposed products are no more granular than the existing north and south zones. However, if the ISO chooses to apply these requirements

[2] The pivotal supplier test that determines constraint competitiveness in the mitigation process will have to be augmented to include corrective capacity. Otherwise, the existing framework is appropriate for corrective capacity constraints as well as (existing) preventative constraints.

[3] Constrained by the price at which it becomes more attractive to reduce flows over the line and have the resource produce energy.

more granularly, competitiveness of supply will need to be evaluated more closely before doing so.

Eliminate Bid-In Ramp Rates to Limit Opportunity to Withhold Ramp Capacity

Market power can also be exercised by using bid-in ramp rates to physically withhold corrective capacity, or other ramping energy and capacity, from the market. DMM views the ramp rate as a physical characteristic of a resource and not a market mechanism that should be varied based on market conditions. With the increased emphasis on valuing ramping energy and capacity going forward – combined with the additional demand for these services that will be required by the contingency modeling enhancements and the flexible ramping product – the potential for deleterious market impacts resulting from withholding ramp could be more severe. DMM recommends that the option to bid in a resource's ramp rate be eliminated prior to implementing any additional market instruments that require and value capacity or ramping energy. Doing so will leave two venues for adjusting a resource's ramp rates: the Master File which facilitates slower moving or anticipated changes and SLIC in the event there is an abrupt and temporary change in the physical ability of a resource to ramp.

Suggestion for Empirical Analysis

DMM appreciates that it may not be practical or even feasible to test the proposed design in a setting that would lend itself to estimating the market impact. However, it may be informative to evaluate existing supply, procurement, and pricing of Spinning Reserve and Non-spinning Reserve as well as on-line unloaded ramping capacity that is not reserved for these services in the context of the anticipated requirements for the few broad-area constraints that the ISO is proposing to apply under the corrective capacity design. We recognize that adding the corrective capacity product in the market co-optimization will alter procurement, however this type of analysis will provide stakeholders a view of the extent to which existing supply and procurement would naturally cover the proposed requirements (and thus have minimal market impact).

Clarifications from ISO

DMM would like the ISO to clarify that the corrective constraints will be enforced in both the IFM and RUC markets, as well as the real-time markets. It should be noted that virtual bids in the IFM may distort the commitment and positioning of resources to meet the corrective constraints. The RUC market may help with the commitment issues, but the not the positioning issues created by virtual bidding. DMM would also like clarification on whether corrective capacity awards in day-ahead markets are permanent going into real-time, or whether they are free to be re-optimized based on changing market conditions.