Location Based Operating Reserve Pricing for Loads

Currently the NYISO Operating Reserves markets employ a location based pricing mechanism to pay suppliers. The sum total of payments to the suppliers is then socialized to loads through a load ratio share allocation. This methodology provides proper price signals to suppliers, but distorts reserve pricing signals to loads and hinders efforts to hedge these costs. Much like the energy or capacity markets, and indeed as is currently being employed to pay suppliers of operating reserves, if system constraints bind and result in the need to deviate from economic merit order in procuring operating reserves it is economically rational to reflect these pricing differences to the consumer. This paper outlines a simple method to create a location based operating reserve pricing for loads.

As stated above, the NYISO currently employs a location based pricing mechanism to pay suppliers of operating reserves. The NYISO has defined locational requirements for reserve supplies. When these requirements lead the NYISO to deviate from economic merit order, a price difference is established and paid to suppliers based on their location. This pricing spread can be used to create a location based cost allocation to loads.

When a price difference occurs, that price difference represents the shadow price of the constraint. Multiplying that shadow price by the quantity of reserves purchased to satisfy the constraint is the increased cost of satisfying the constraint. These costs would then be directly assigned to the loads on the high cost side of the constraint. The unconstrained costs could then be assigned to all loads on a load ratio share basis. The following example presents a simplified overview of the proposed methodology:

The NYISO operates with a 10-minute spinning reserve requirement of 600 MWs, and 300 MWs of that requirement must be east of the central east constraint. In this example assume that the constraint is binding and leads to a price of $1 per MW for reserves on the west, and $1.50 per MW for reserves in the east. Therefore, the total cost to the control area for purchasing 10-minute spinning reserves is $750. The shadow price of the constraint is $0.5, and the total cost of the constraint is $150 ($0.5/MW * 300 MWs). The $150 dollar constraint cost would be directly assigned to the loads east of central east on a load ratio share basis, and the unconstrained cost of reserves, $600 would be charged to all loads on a load ratio share basis.

These cost assignments can ultimately be converted to location-based prices for market participants. Taking our example a little further, let's assume that 35% of the load is located west of central east and 65% is located east of central east. The load ratio share of 10-minute spinning reserve in the west would be $210 ($1/MW * 600*.35) with a location-based price of $1/MW. The load ratio share of 10-minute in the east would be $540 ($150 + ($1/MW * 600 * .65), with a location-based price of $1.3846/MW.

This same methodology can be applied to any of the NYISO defined locational reserve requirements and could also be applied to bid-production cost guarantees.