

RESERVE SHORTAGE COST PRICING

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The reserve shortage cost model will overlay reserve shortage cost pricing rules onto the energy prices of either the EDRP/SCR dispatch results (if the EDRP/SCR dispatches are run) or the original SCD dispatch results (if the EDRP/SCR dispatches are not run).

- The reserve shortage pricing will apply only to the Eastern and pool-wide ten-minute total reserve constraints.
- NYISO operators are required to convert 10-minute non-spinning reserve into energy to maintain 10-spinning reserve so temporary spin shortages do not necessarily reflect conditions that would warrant shortage cost prices.

The inputs to the Reserve Shortage Cost model would be:

- Reserve Comparator output indicating the level of Eastern and pool-wide ten-minute total reserves
- Prices from either the EDRP/SCR or SCD dispatches
- Components of the EDRP/SCR and SCD prices including the reference bus price, penalty factors, shift factors and constraint shadow prices
- A set of rules governing the determination of energy prices in various reserve shortage conditions

The pricing rule proposal for a pool-wide shortage of ten-minute total reserve is to set the reference bus price to a value, assuming no congestion in the state, such that the New York City zonal price would be \$1,000/MWh.

The NYC zone has been chosen for two reasons:

- the location needs to be an Eastern location to maintain a consistent rule with the Eastern reserve shortage rule
- choosing a single bus or location creates risks of the bus becoming disconnected from the remainder of the system or exhibiting behavior dramatically different from the remainder of the system

The prices developed by the Reserve Shortage Cost model would be compared to the SCR/EDRP or SCD dispatch energy prices and the higher of the two prices would be posted for every location.

The pricing rule proposal for a shortage of ten-minute total reserve in the East would be to set the prices in the East, such that the New York City zonal price would be \$1,000/MWh.

All shift factors on constraints in the East would be set to 0. A new proxy constraint would be added where all locations in the East would have a shift factor of 1. The reference bus price from the SCR/EDRP or SCD dispatch would be held fixed and the shadow price of the new proxy constraint would be increased until the NYC zonal price reached \$1,000/MWh.

The prices developed by the Reserve Shortage Cost model would then be compared to the SCR/EDRP or SCD dispatch energy prices and the higher of the two prices would be posted for every location.

We need to define the circumstances under which the reserve shortage cost pricing rule would be applied. The reserve shortage cost pricing rules are not intended to apply to transient reserve shortage conditions that include, but are not limited to:

- immediately following the end of reserve pickups
- while emergency sales are being made to other control areas out of 10-minute reserves
- during schedule changes at the top of an hour

How the reserve comparator determines the level of available reserves is important to understanding what modifications may need to be made to the general reserve shortage pricing rules to address each of these situations.

Having changed the energy prices according to the reserve shortage cost modeling, the lost opportunity costs paid to units scheduled for reserves would also change.

There may be units that are dispatched down by SCD consistent with their bid curves (and the original SCD prices), that are not scheduled to provide reserves and that, under today's rules, would receive no lost opportunity cost payments.

To maintain the correct incentives for all units to follow their basepoints once the prices are changed by the Reserve Shortage Cost model, all on-dispatch units carrying latent 10-minute spinning reserves, whether scheduled to provide reserves by BME or not, should receive lost opportunity cost payments consistent with the energy prices determined by the Reserve Shortage Cost model.

It is likely that the reserve shortage cost model and the EDRP/SCR models could be developed within the same model framework.

In earlier presentations this combined model has taken on the name SCPM (Shortage Cost Pricing Model).

