RTS Issues

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DRAFT: For Discussion Purposes Only

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AGENDA

This presentation will discuss a number of issues including:

- Locational reserve pricing rules
- Pricing during a large event reserve pickup
- Pricing during a maximum generation pickup
- Changes to GT bidding options
- Scarcity pricing

OPERATING RESERVES

There are nine Locational Operating Reserve requirements modeled in the pricing dispatches of SCUC, RTC, RTD, and RTD-CAM. Each of these nine Locational Operating Reserve requirements corresponds to one of three reserve qualities: (i) 10-minute spinning reserve; (ii) 10-minute total reserve; and (iii) 30-minute total reserve; combined with three locational classifications: (i) NYCA, (ii) East of Central East and (iii) Long Island. :

Requirement (MW)	NYCA	East of Central East	LI
10-Minute Spinning Reserve	600	300	60
10-Minute Total Reserve	1200	1000	120
30-Minute Total Reserve	1800	1000	270 to 540

OPERATING RESERVES

The nine locational Operating Reserve constraints allow nine locational reserve prices to be developed corresponding to three distinct reserve products: 10-minute spinning reserve; 10-minute non-synchronous reserve; and 30-minute reserve combined with three distinct reserve pricing regions: (i) west of central east; (ii) east of central east excluding Long Island; and (iii) Long Island.

Requirement (MW)	NYCA	East of Central East	LI
10-Minute Spinning Reserve	600	300	60
10-Minute Total Reserve	1200	1000	120
30-Minute Total Reserve	1800	1000	270 to 540

Shadow Prices ($/MW)	NYCA	East of Central East	LI
10-Minute Spinning Reserve	SP3	SP6	SP9
10-Minute Total Reserve	SP2	SP5	SP8
30-Minute Total Reserve	SP1	SP4	SP7

Reserve Clearing Prices ($/MW)	West	East excl LI	LI
10-Minute Spinning Reserve	WS	ES	LIS
10-Minute Non Sync	W10	E10	LI10
30-Minute Reserve	W30	E30	LI30

OPERATING RESERVES

SCUC, RTC, RTD and RTD-CAM calculate the shadow prices associated with the constraint that models each locational Operating Reserve requirement.

If there is more Operating Reserve of a particular quality and location scheduled than is required to meet the corresponding locational Operating Reserve requirement then the shadow price of that constraint will be zero as the constraint is not binding.

OPERATING RESERVES

Nine locational Operating Reserve prices can be developed from the nine constraint shadow prices where the price of each reserve quality and location reflects the sum of the shadow prices for all locational Operating Reserve requirement constraints that that reserve could count towards.

Shadow Prices ($/MW)	NYCA	East of Central East	LI
10-Minute Spinning Reserve	SP3	SP6	SP9
10-Minute Total Reserve	SP2	SP5	SP8
30-Minute Total Reserve	SP1	SP4	SP7

Reserve Clearing Prices ($/MW)	West	East excl LI	LI
10-Minute Spinning Reserve	WS	ES	LIS
10-Minute Non Sync	W10	E10	LI10
30-Minute Reserve	W30	E30	LI30

W30 = SP1
W10 = SP1 + SP2
WS = SP1 + SP2 + SP3
E30 = SP1 + SP4
E10 = SP1 + SP2 + SP4 + SP5
ES = SP1 + SP2 + SP3 + SP4 + SP5 + SP6
LI30 = SP1 + SP4 + SP7
LI10 = SP1 + SP2 + SP4 + SP5 + SP7 + SP8
LIS = SP1 + SP2 + SP3 + SP4 + SP5 + SP6 + SP7 + SP8 + SP9

OPERATING RESERVES

For example, Western 30-minute reserve can only count towards meeting the NYCA 30-minute total operating reserve requirement, it cannot meet any Eastern or Long Island operating reserve requirement and it cannot meet any 10-minute total or 10-minute spinning reserve requirement, therefore, the Western 30-minute reserve price is set equal to the NYCA 30-minute total Operating Reserve requirement constraint shadow price.

Similarly, Eastern 10-minute spinning reserve can count towards meeting all of the Eastern reserve requirements and all of the NYCA reserve requirements but none of the Long Island reserve requirement so that the Eastern 10-minute spinning reserve clearing price is set by summing the shadow prices of all of the Eastern and NYCA locational Operating Reserve requirement constraint shadow prices.

OPERATING RESERVES

The tables below show the prices that result from a set of hypothetical shadow prices.

Shadow Prices ($/MW)	NYCA	East of Central East	LI
10-Minute Spinning Reserve	0	10	5
10-Minute Total Reserve	0	5	0
30-Minute Total Reserve	2	0	0

Reserve Clearing Prices ($/MW)	West	East excl LI	LI
10-Minute Spinning Reserve	2	17	22
10-Minute Non Sync	2	7	7
30-Minute Reserve	2	2	2

LI prices will not be posted but can be calculated from the shadow price results. If a LI resource is marginal, meeting an Eastern or NYCA requirement, then the shadow price associated with that Eastern or NYCA constraint will capture the bid and lost opportunity cost of the LI resource and the resource will set the price across the wider area.

RTD-CAM – Pricing During Reserve Pickups

Most forms of RTD-CAM activation will maintain the consistency of schedules and prices such that, but for GT block loading, the prices and schedules are entirely consistent with each other.

There are two forms of RTD-CAM for which this is not true: large event reserve pickups and maximum generation pickups. In each case the basepoints sent to dispatchable resources do not correspond to dispatch solution that could be reached from a single security constrained dispatch solution where generation and load are balanced. The basepoints sent to dispatchable resources by design exceed the load in order to effectuate a swift increase in generation either to cross zero in the case of reserve pickup or to avoid a severe reliability consequence in the case of a maximum generation pickup.

RTD-CAM – Maximum Generation Pickups

In a maximum generation pickup all resources are sent basepoints at their upper operating limits and are required to respond as quickly as possible.

In the past this has typically be managed by placing the entire state out-of-merit and using SCD prices before the event to set price during the event.

In RTS the basepoints sent to all resources will again be set equal to the resources upper operating limit.

Prices will be set by a normal RTD-CAM dispatch, however the schedules from that dispatch will be ignored, overwritten by each resources upper operating limit.

RTD-CAM – Maximum Generation Pickup Settlement

Maximum generation pickup dispatch intervals will be flagged and will be subject to individual bid production cost guarantee treatment on a dispatch cycle basis until the emergency event is terminated. Losses will not be offset by profits over the remainder of the day.

The settlement rules for energy and reserves will be established to ensure every resource has the appropriate incentive to reach the upper operating limit as quickly as possible.

Scarcity pricing is not triggered as it exists today, as the reserve demand curves are the mechanism for implementing the reserve shortage portion aspect of the current scarcity pricing proposal and it is present at all times. If EDRP was activated before the emergency event then those rules would apply according to the existing constructs as applied to RTD-CAM results rather than SCD results.

RTD-CAM – Large Event Reserve Pickups

In a large event reserve pickup all resources on the high priced side of the interface are moved according to the solution of the small reserve pickup dispatch.

Resources on the low priced side of the dispatch that would be moved down according to the solution of the small event reserve pickup event are instead sent an energy basepoint consistent with their current generation level, i.e., they are sent a basepoint equal to their generation at the time the reserve pickup was activated.

Prices will be determined by the small reserve pickup event dispatch.

RTD-CAM – Large Event Reserve Pickup Settlement

Large event reserve pickup dispatch intervals will be flagged and will be subject to individual bid production cost guarantee treatment on a dispatch cycle basis until the reserve pickup is terminated. Losses will not be offset by profits over the remainder of the day.

The settlement rules for energy and reserves will be established to ensure every resource that is held at a operating level above that indicated by energy prices is held harmless when following the energy and reserve instructions sent to them.

SCARCITY PRICING – Reserve Shortage

Scarcity pricing in its current form has two components: Reserve shortage pricing; and EDRP/SCR pricing.

In the RTS design reserve shortage cost pricing is superceded by the reserve demand curve implementation. There will no longer be special pricing rules invoked upon the declaration of a persistent 10-minute reserve shortage. Rather the reserve demand curves will value reserves and reserve shortages dynamically without any special action or declaration required.

The prices determined will reflect full congestion and loss differentials consistent with the dispatch instructions provided to all dispatchable resources.

SCARCITY PRICING – EDRP/SCR

In the initial implementation of RTS, EDRP/SCR pricing will continue to involve a post processor type modification of energy prices consistent with the current methodology.

The key difference is that in RTS there are no longer separate lost opportunity cost payments made to dispatchable resources providing reserves so modifying energy prices only is not sufficient.

The reserve prices need to be made consistent with any increase in the energy prices to maintain the integrity of the dispatch solution.

We are still working through the details of the specific rules to ensure that the appropriate pricing incentives are maintained for all energy and reserve providers. The increase in reference bus price for statewide calls or the shadow price of the Eastern EDRP constraint may provide the magnitude of reserve price change.

SCARCITY PRICING – EDRP/SCR

Q. Are the reserve demand curves impacted by the price of the EDRP/SCR resources?

A. Not really. For instance it is possible for a $100/MW reserve demand curve to apply with a $700 energy price before EDRP is called if a resource with a $600/MWh energy bid is also on the margin for reserves and the expected level of 30-minute operating reserves has not yet reached the level requiring EDRP activation.

- The reserve demand curve value reflects the opportunity cost value of reserves not the energy price directly so it is very difficult to draw any conclusion between the relationship between the $500/MWh energy price on the EDRP resource.