Scarcity Pricing

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Demand Response In-Depth

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Session Objectives

- Describe Scarcity Pricing and its purpose
- Describe the link between Scarcity Pricing and Operating Reserves
- Explain the Scarcity Pricing methodology
- Illustrate effect of Scarcity pricing on Real Time price during a Reliability based Demand Response Event

Scarcity Pricing - Purpose

- Reliability based Demand Response events (SCR/EDRP) are deployed to supplement generation when Operating Reserves are forecast to be short or when there is an actual Operating Reserve Deficiency
- Comprehensive Scarcity Pricing: Mechanism that ensures EDRP/SCR resource participation in a reliability based event is factored into calculating the Real Time prices
- The purpose of Comprehensive Scarcity pricing is to create consistent prices and schedules during EDRP/SCR events and to align pricing outcomes with operator actions
  - Without Scarcity Pricing, dispatching SCR/EDRP resources when system conditions are stressed may actually lower the real-time prices, leading to inefficient price signals

Scarcity Pricing Mechanism- Overview

Normal Operating day – 2620 MW of Operating Reserves

Real Time Market Clearing price for all Operating Reserves products

Operating Reserves forecast to be short or actual shortage

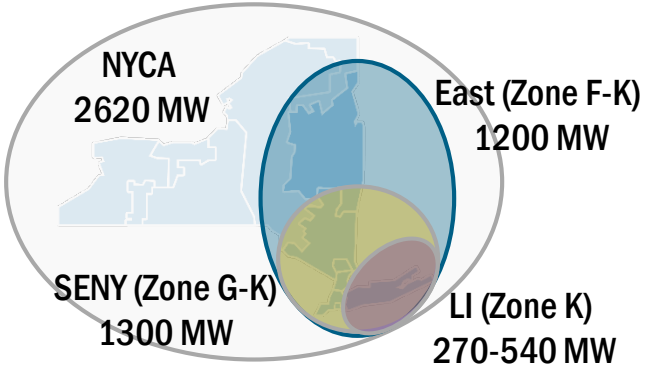
Operating Reserves Demand Curves established; NYISO deploys SCR/EDRP resources

Additional 30 minute Operating Reserves procured in Real Time in SCR/EDRP deployment zone(s)

Scarcity pricing rules used to calculate Market Clearing prices for revised 30 minute reserves

Operating Reserves

- Operating Reserves Products:
  - 10-minute Spinning Reserve, 10-minute non Synchronous and 30-minute Reserve
- Locational Operating Reserves
  - Locational requirement for East of Central East (Zones F-K), South Eastern New York (Zones G-K) and Long Island (Zone K) and NYCA wide



Total 12 Operating Reserves products based on product type and location

Operating Reserves – Market Clearing Price

- During a normal operating day, Operating Reserves suppliers are selected through a co-optimized real-time commitment process that minimizes the total bid cost of Energy, Demand Reduction, Regulation Service, and Operating Reserves
- Real Time Operating Reserves Market Clearing Prices are calculated, for the different Operating Reserves products
- When Operating Reserves are forecast to be short, NYISO institutes the implementation of Operating Reserves Demand Curves, to calculate Market Clearing Prices, up to a target level, based on pricing rules set forth in the Tariff *
  - Real Time Operating Reserves will therefore not be purchased at a cost higher than the relevant demand curve indicates should be paid

	NYCA	EAST	SENY	LI
10 Minute SPIN				
10 Minute Total				
30 Minute Total				

* Section 15.4.6 of Rate Schedule 4 of the Market Services Tariff

Scarcity Pricing - Methodology

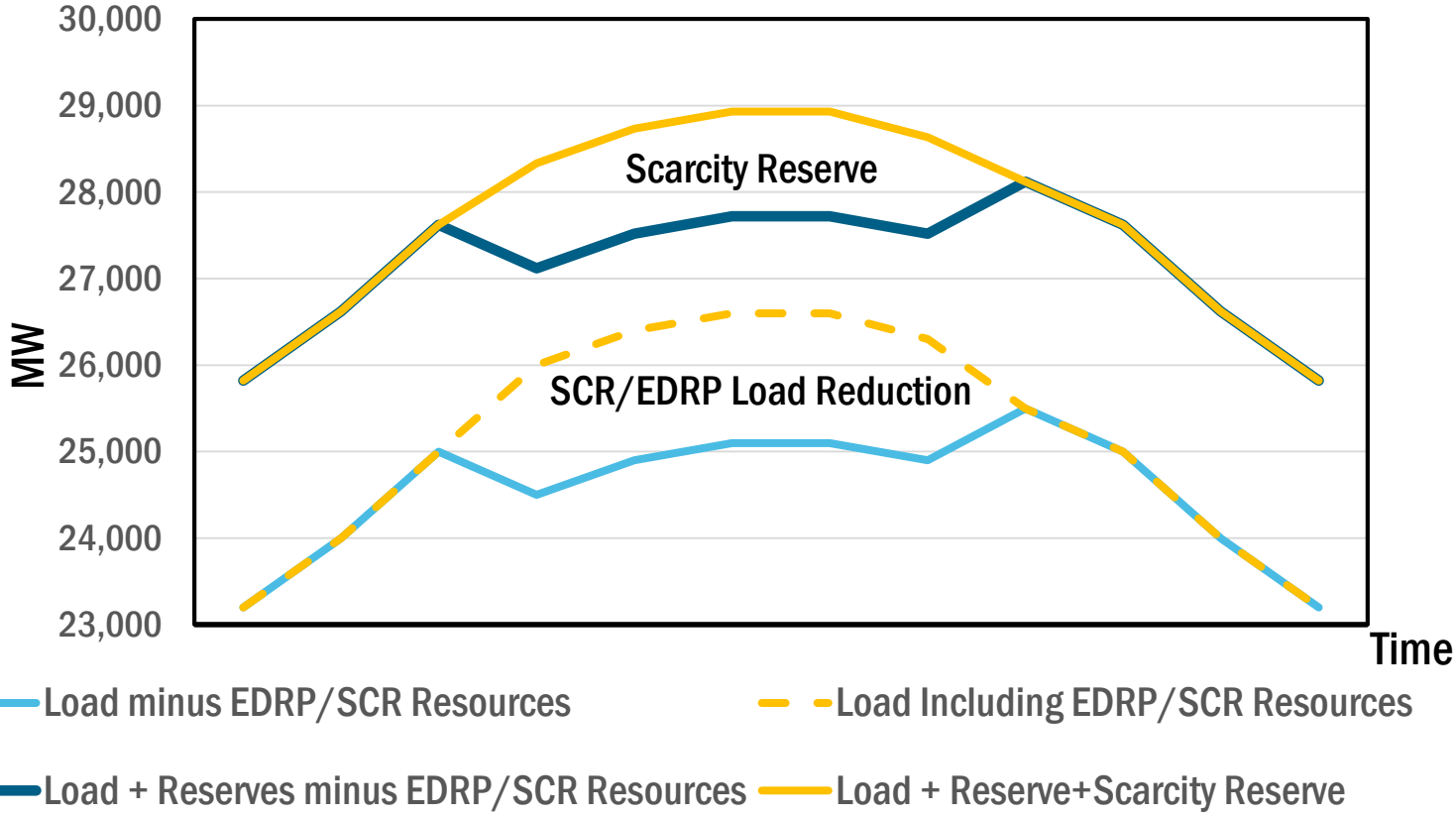
- When SCR/EDRP resources are deployed, a revised Real Time 30 minute Operating Reserve requirement is calculated for the entire event duration, in the load zone(s) that the SCR/EDRP resources are deployed in
- To meet this revised 30 minute requirement, additional 30 minute reserves (Scarcity Reserve Requirement) are procured in the load zone(s) that SCR/EDRP resources are deployed in (Scarcity Reserve Region)

Scarcity Reserve Requirement = Expected Load Reduction by SCR/EDRP Resources - Available 30-60 minute Reserves

Revised 30 minute Reserve Requirement = 2620 MW + Scarcity Reserve Requirement

- The Scarcity Reserve Requirement will be applicable for all Real-Time intervals during which NYISO has activated EDRP/SCR resources to provide load reduction

Scarcity Reserves - Illustration

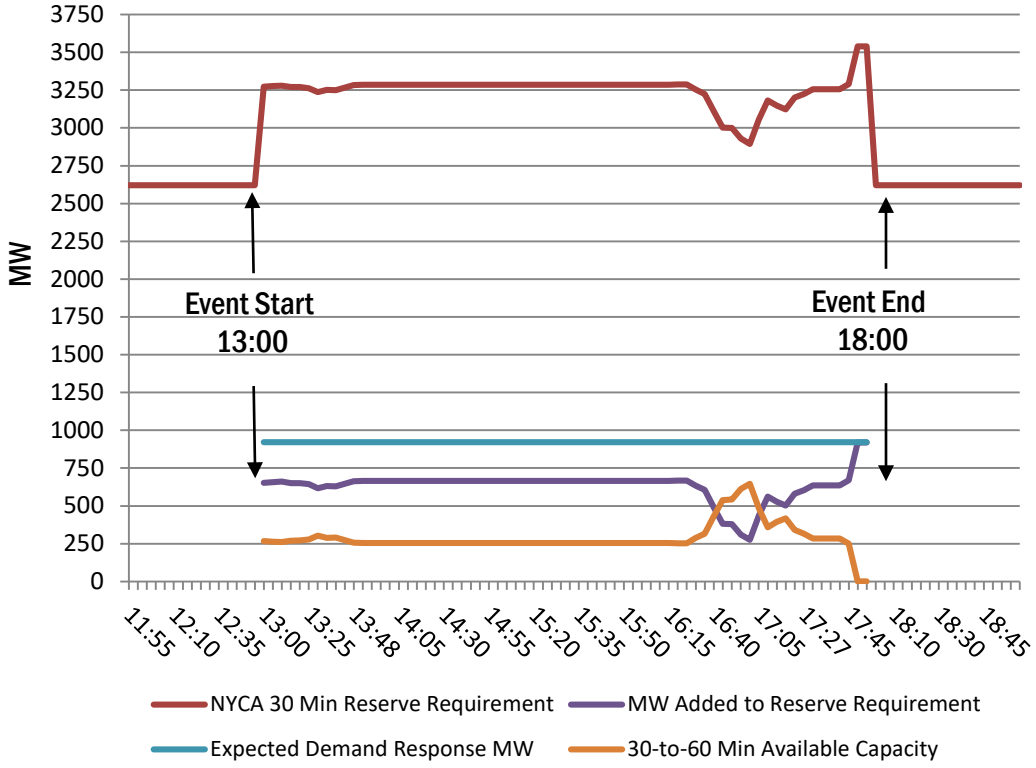


Scarcity Pricing- Methodology

- Operating Reserves Market Clearing prices will be calculated for the revised 30-minute interval, using the Operating Reserve demand curves, adjusted in Real Time to account for the Scarcity Reserve Requirement
- According to the rules set forth in the MST, NYCA 30 minute reserve demand curve values priced at less than $500/MW will be set to $500/MW in real-time during EDRP/SCR activations
- Market Clearing prices will be calculated for every 5 minute RTD time interval for the duration of the event

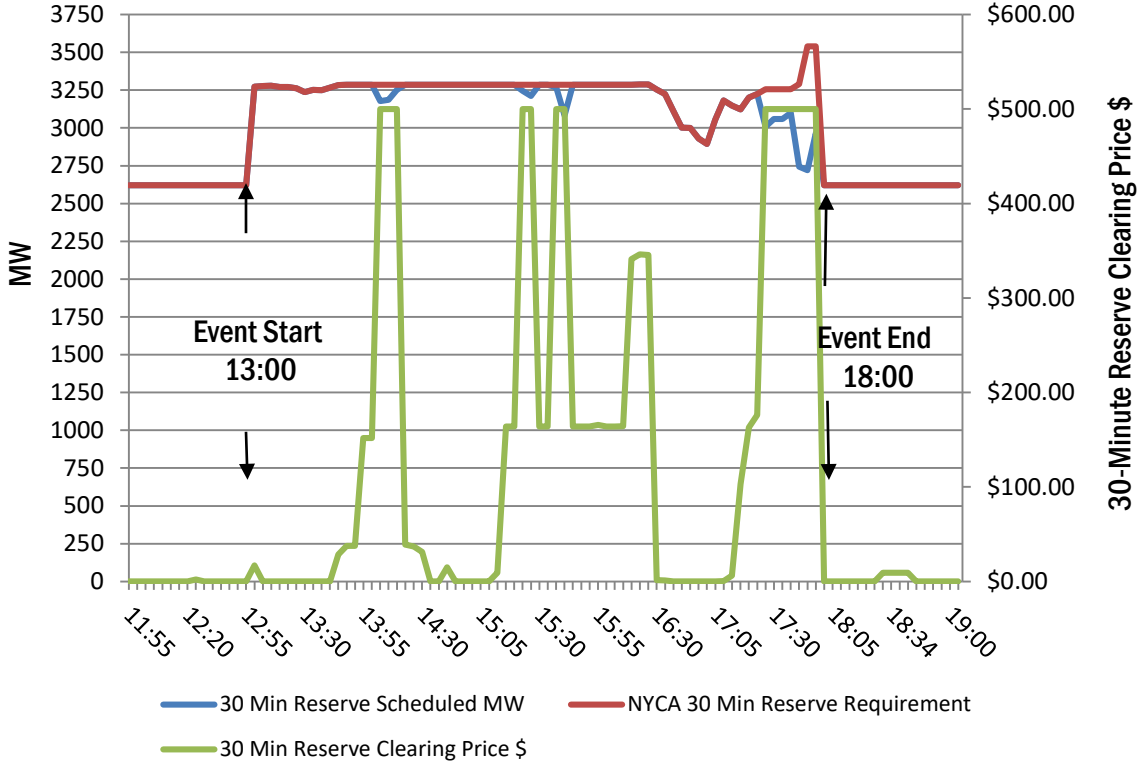
Scarcity Pricing- Example

- EDRP/SCR Reliability Event deployed by NYISO on August 12th, 2016
- NYISO activated EDRP/SCR resources NYCA wide, from 13:00-18:00 due to projected Reserves shortage
- Revised 30 minute Reserve requirement was calculated as discussed above



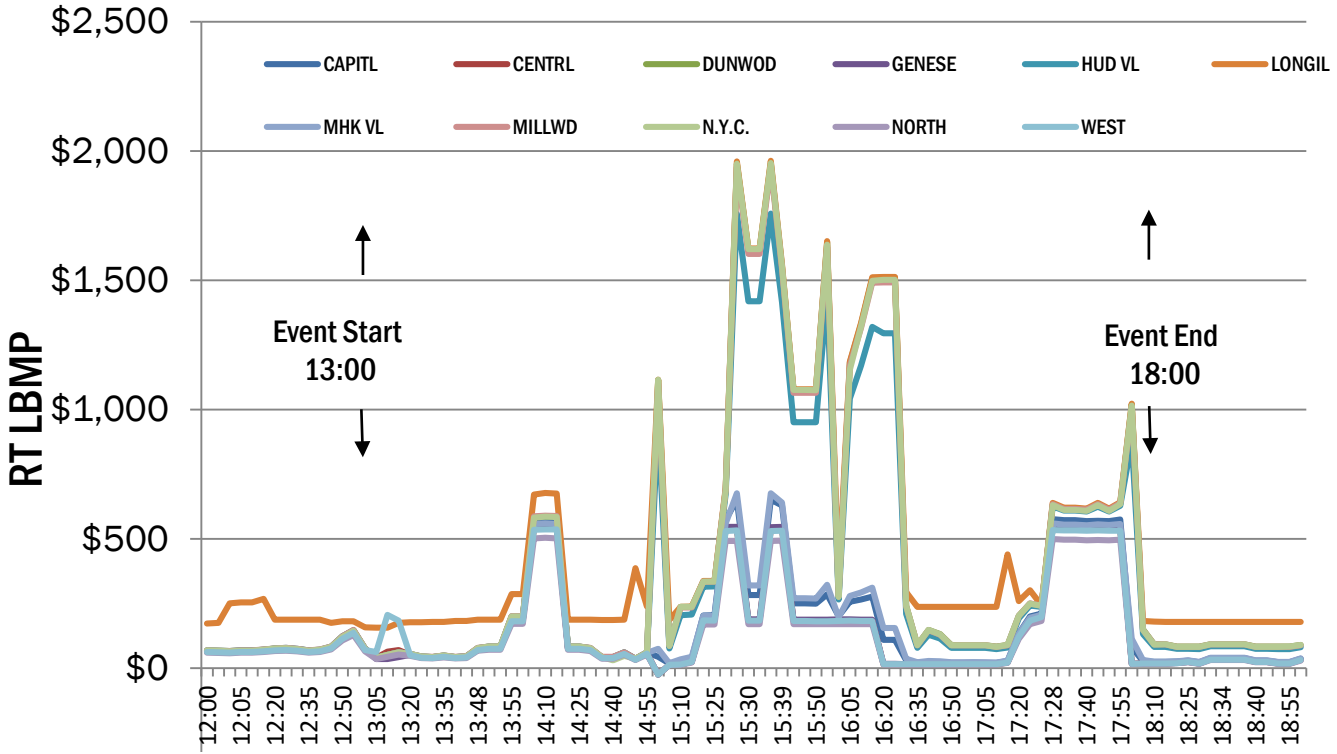
Scarcity Pricing- Example

- 30 minute Reserves procured at every 5 minute interval for event duration
- 18 Real Time pricing intervals with $500 clearing price for NYCA 30- minute reserves
- Scarcity pricing reflects the consistency between the price signals and actual system needs



Scarcity Pricing – Example

Zonal RT-LBMP for the 18 Real Time pricing intervals with $500 clearing price for NYCA 30- minute reserves



Scarcity Pricing - Summary

- Scarcity pricing mechanism allows real-time prices to reflect the value of SCR/EDRP resources when they are called upon to maintain system reliability
- Without the scarcity pricing, dispatching SCR/EDRP resources when system conditions are stressed, may actually lower the real-time prices, leading to inefficient price signals

Let's Review

Calculate the revised 30 minute reserve requirement during a NYCA wide SCR/EDRP event given the following parameters:

Expected Load reduction by SCR/EDRP resources = 500 MW

Available 30-60 minute reserves = 200 MW

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