

## RTS Primer

### Introduction

From a Market Participant's perspective, the most visible change that SMD2 will introduce is the replacement of the Balancing Market Evaluation (BME) and Security Constrained Dispatch (SCD) applications with the Real-Time Scheduling (RTS) system. RTS uses a common computing platform, algorithms, and network models for both the real-time commitment and real-time dispatch functions. This synergy between the commitment and dispatch processes results in improved consistency between advisory and real-time prices and schedules, and a more efficient use of control area resources.

### RTS Overview

RTS is comprised of three major components. These components are:

- Real-Time Commitment (RTC),
- Real-Time Dispatch (RTD), and
- Real-Time Dispatch - Corrective Action Mode (RTD-CAM)

### Real-Time Commitment (RTC)

RTC effectively replaces the Balancing Market Evaluation (BME) function. As with BME, RTC looks ahead in time, co-optimizes energy, reserves and regulation, and determines the resources necessary to meet the demands of the next hour. Unlike BME, which runs hourly and selects generation to meet the hourly peak demand, RTS executes and posts every 15 minutes, and makes commitment decisions that are optimized over a 2 ½ hour period using 15-minute snapshots of the state of the power system. This will result in a much more rational and efficient unit commitment, and is expected to reduce uplift costs.

RTC issues binding commitments to 10-minute and 30-minute resources, determines transaction schedules for the upcoming hour, and supports self-committed unit schedules in “as-bid” 15-minute intervals.

### Real-Time Dispatch (RTD)

RTD replaces the Security Constrained Dispatch (SCD) function. As with SCD, RTD issues a 5-minute basepoint. Unlike SCD, which dispatches energy based upon a single scan of the power system, RTD co-optimizes energy, reserves and regulation over the next ~ 60 minutes, and dispatches the power system while considering forecasted conditions up to 60 minutes ahead. The enhanced “look-ahead” capability of RTD will reduce the likelihood of price spikes and provide for a smoother unit dispatch.

RTD recognizes the transaction schedules, self-committed unit schedules, and units committed by RTC in making dispatch decisions. RTD also determines the real-time reserve and regulation schedules.

### Real-Time Dispatch - Corrective Action Mode (RTD-CAM)

RTD-CAM is a tool that the NYISO system operators can run on demand to address abnormal or unexpected system conditions. RTD-CAM can produce a new set of basepoints, and/ or commit 10-minute resources on demand. It also includes innovative algorithms that support reserve pick-ups, and the return to normal system operations.

### **RTS Market Features**

RTS introduces a host of market enhancements that include:

- New bidding flexibility for generators,
- The ability for a generator to self-schedule/self-commit,
- A two-settlement system for Reserves and Regulation,
- The use of reserves and regulation demand curves,
- Real-Time automated market power mitigation,
- An assortment of more subtle enhancements that will provide better pricing signals, and improved consistency from the Day-Ahead Markets through the Real-Time markets.

### Generator Bidding Flexibility

With the deployment of SMD2, a supply resource will have the opportunity to more accurately reflect its start-up costs through its bids. Start-up costs may be bid hourly, and specified as a discrete dollar cost, or as a function of elapsed time since the most recent shutdown. This feature directly addresses start-up cost issues related to late-in-the-day starts where minimum run times may not be honored into the next operating day. A supply resource will also be able to offer up to 12 steps of MW / cost per MW pairs, consistent with the entire operating range of the unit. This enhanced bidding functionality is expected to have a favorable impact on the “risk premium” associated with supply offers.

### Self-Scheduling

A supply resource has the option of being economically evaluated by the NYISO, or setting its own schedule. Should a supply resource wish to set its own schedule, it effectively agrees to be a “price-taker” and accepts the applicable LBMP. A self-scheduled resource has the option of performing as “Self-Committed Flexible” or Self-Committed Fixed. As a Self-Committed Flexible resource, the unit will be evaluated based only on system security criteria and, if selected, will be issued the as-bid schedule. Capacity beyond the as-bid schedule is effectively “on-dispatch” and may be committed by the NYISO. Self-Committed Flexible resources are eligible to participate in the 10-Minute spin, 30-Minute spin, and Regulation Markets.

A Self-Committed Fixed resource will be evaluated based only on system security criteria and, if selected, will be issued the as-bid schedule. A Self-Committed Fixed resource is not eligible to participate in the Reserve or Regulation Markets. In addition, an ISO-Committed Flexible resource (on-dispatch resource) will be able to bid as a Self-Committed Fixed resource in real-time to manage its start-up in preparation for its DAM schedule.

Both Self-Committed Flexible and Self-Committed Fixed resources may include ¼ hour schedule changes that are within the ramping capabilities of the resource in their offers.

### Real-Time Demand Response

SMD2 includes the infrastructure necessary to allow demand side resources to participate in the Real-Time Energy, Reserves<sup>1</sup>, and Regulation Markets in the future. When the NYISO system is fully capable, a demand side resource will be able to submit offers for Energy and Ancillary Services, much the same as a supply resource. The offers will be evaluated and, if selected, a schedule for energy (reduction in energy consumption) or Reserves will be issued. The Day-Ahead Demand Reduction Program (DADRP), the Emergency Demand Response Program (EDRP), and the Special Case Resource (SCR) programs are continued.<sup>2</sup> The introduction of real-time demand response capability in the future will provide a degree of demand elasticity to the Real-Time Markets and help to soften the impact of price spikes.<sup>3</sup>

### Two-Settlements for Reserve and Regulation Markets

The Reserve and Regulation Markets will realize the full benefits of the two-settlement system under SMD2 market rules. All “On-dispatch” and Self-Committed Flexible resources (including eligible demand side resources), that submit energy bids will be considered for reserve scheduling. Availability offers may be submitted for Day-Ahead Reserve Markets, however, if no reserve offer is submitted, a \$0 offer is assumed. Real-Time availability offers are fixed at \$0.

Reserve Market clearing prices in both the Day-Ahead and Real-Time Markets are set on an east – west locational basis based upon the resulting shadow prices, with marginal lost opportunity costs incorporated into the clearing price. Real-Time Reserve schedules are settled at each RTD interval.

Regulation suppliers must be either “On-dispatch” or Self-Committed Flexible, and “On-control” to be eligible to participate in the Regulation Markets. Regulation suppliers will submit availability offers for both the Day-Ahead and Real-Time Regulation Markets. As with the Reserve products, Regulation service clearing prices will be set based upon shadow prices, with marginal lost opportunity costs incorporated into the clearing price. Real-Time Regulation schedules are settled at each RTD interval.

The two-settlement system for Reserve and Regulation Services provides an incentive to perform to the schedule through the settlement process, and is expected to contribute to a reduction in uplift costs.

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<sup>1</sup> Current reliability rules only allow for participation in the Energy, and 10-Minute and 30-Minute Non-Synchronized Reserve Markets.

<sup>2</sup> Certain restrictions may apply with respect to participation in the EDRP and SCR programs.

<sup>3</sup> To be eligible to participate, a demand side resource will need to meet certain criteria for communications with the NYISO and its host Transmission Owner, as well as conform to the appropriate performance criteria. Curtailment Service Providers may aggregate real-time demand response resources at a bus or a zonal level, subject to the approval of the NYISO.

### Reserve and Regulation Demand Curves

A reserve demand curve will be applied to each of the nine reserve constraints<sup>4</sup> in the NYCA. The reserve demand curves will be consistent across the Day-Ahead and Real-Time Markets. The purpose of the reserve demand curves is to apply consistent prices (and scheduling results) across the temporal markets in the event that the desired reserves are unavailable, or costs exceed the perceived value of the affected reserve product(s). Under such conditions, the reserve clearing price for the affected reserve product(s) will be set consistent with the point reached on the respective demand curve.

A regulation demand curve will be applied to Regulation Service, much the same as the reserve demand curve described above. In the event that the desired amount of regulation is not available, or the cost of regulation that is available exceeds the perceived value, the Regulation clearing price will be set by the price/quantity point reached on the demand curve. Regulation will employ a single demand curve across the Day-Ahead and Real-Time Markets.

The introduction of demand curves for Reserve and Regulation Services will also serve to limit the level of price spikes seen today when expensive units are committed or scheduled in real-time to allow the NYISO to fully meet the 30-minute reserves requirement.

### Real-Time Market Power Mitigation

The Automated Mitigation Procedure (AMP) will be extended to the Real-Time Markets with the deployment of SMD2. Offers for energy, start-up, and minimum generation will be evaluated at each 15-minute RTC interval for instances of the exercise of market power. Similar to the existing Day-Ahead AMP, the Real-Time AMP will evaluate offers for both conduct and the resulting impact on prices. The Real-Time AMP will apply to both energy prices and guarantee payments and, if warranted, will mitigate offers in real-time, replacing the identified offers with previously agreed to reference offers. The RT AMP will cover units in un-constrained areas only if the unit has violated both the conduct and impact thresholds and has not justified its behavior to the MMU.

### State-of-the-art Control and Computing Platforms

SMD2 includes the replacement of the legacy NYISO control and computing platforms with new, state-of-the-art systems that offer vastly improved reliability. The new infrastructure also includes the capacity to support growth within the New York Control Area, as well as future market enhancements that would have been beyond the capacity of the legacy systems.

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<sup>4</sup> The nine reserve constraints refers to constraints with respect to 10-Minute Spin, 10-Minute Total, and 30-Minute Spin Reserve products and East, West, and Long Island locational considerations.